Innovation Ireland

Report of the Innovation Taskforce

March 2010

Ireland - The Smart Economy

INNOVATION TASKFORCE

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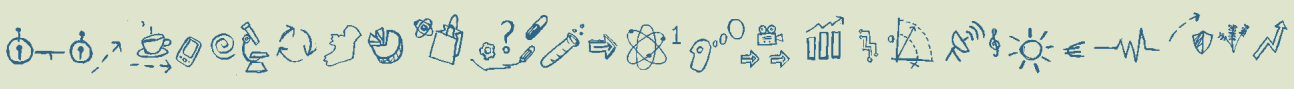


Foreword

In December 2008, the Government published its medium-term economic framework - *Building Ireland's Smart Economy* - which contains five key action areas for driving productivity growth across all sectors of the economy, public and private. This report from the Innovation Taskforce is concerned with one of those action areas which involves positioning Ireland as an International Innovation Hub.

When the Taskforce first met just over six months ago I referred to the Government's vision for Ireland as "an innovative, high-value export-led economy with some of the world's leading research-intensive multinationals and thousands of innovative small and medium enterprises." I am pleased that the Taskforce has endorsed this vision. However, while the Taskforce has shown that the 'glass is more than half full' in terms of Ireland's current performance and potential in innovation, it has also made clear that Ireland still has a distance to travel if we are to develop an Innovation Ecosystem to match our ambitions.

In this Report, the Taskforce has produced many recommendations, all focused on supporting the entrepreneur and enterprise as the heart of this ecosystem. They have focused, correctly, on how to deliver a step-change in the level of company start-ups and their growth to international scale in order drive job creation in innovative, export-focused sectors.

The Taskforce has made a wide range of recommendations including in the areas of investment in R&D, the higher education sector, access to Intellectual Property, public procurement, tax and other incentives, convergence and other opportunities for transforming existing companies, infrastructure and marketing.

The report contains many interesting ideas, as well as calling for reinforcement and better alignment of existing efforts and programmes. It also poses a challenge to industry to seize the opportunities arising. I look forward to working with my colleagues in Government to take forward the Taskforce's recommendations to make Ireland an International Innovation Hub.

I am very encouraged by the interest in the work of the Taskforce and it shows a level of energy which we need to capture as we move forward. I know that the Taskforce has, by itself, already been an important stimulus to thinking and action by many organisations and individuals.

Finally, I would like to express my sincere gratitude to the Taskforce members for their exceptional contribution of time and effort which has resulted in a comprehensive, timely and important report. I can assure them that their work is of central importance in delivering the Government's vision for Ireland's economic renewal.

Brian Cowen, T.D.
Taoiseach

Executive Summary

Despite the serious economic challenge currently facing Ireland in responding to the global economic crisis, stabilising the public finances and protecting jobs, we have an opportunity at the same time to lay the foundations for future economic growth.

Increasing our competitiveness by reducing costs, stabilising the public finances and preparing for a global recovery, while essential, will not be enough to ensure we return to sustainable economic growth. Increasing productivity, that is developing new ways to get a higher quality and quantity of output of goods and services from each unit of input, is the key driver of economic performance and sustainability. Innovation, in both the production and use of ideas, technology and processes, is important in this context because it is a key driver of productivity.

WHAT IS INNOVATION?

> " Innovation entails investment aimed at producing new knowledge and using it in various applications. It results from the interaction of a range of complementary assets which include research and development, but also software, human capital, design, marketing and new organisational structures – many of which are essential for reaping the productivity gains and efficiencies from new technologies". OECD[1]

What we need to do now is to place innovation at the heart of enterprise policy. Our future economic success depends on increasing levels of innovation across all aspects of Irish enterprise – from large Irish-owned multinationals to foreign multinationals located here to established Small and Medium Enterprises (SMEs) in services and manufacturing, as well as start-ups and existing companies with high growth potential.

Innovation is a broad concept and extends beyond the enterprise sector. The Innovation Taskforce endorses *Building Ireland's Smart Economy*, which provides a framework across five action areas for enhancing productivity and promoting sustainable growth in the Irish economy.

This report does not address all aspects of that Smart Economy agenda but it does address one vital aspect. In line with our terms of reference, our focus is on Action Area 2 in *Building Ireland's Smart Economy,* namely *"building the innovation or 'ideas' component of the economy through the utilisation of human capital – the knowledge, skills and creativity of people – and the ability and effectiveness of that human capital to translate ideas into valuable processes, products and services."*

We do not claim, or believe, therefore that this Report is a solution to all of Ireland's economic challenges. It does, however, contain a vision and recommendations that we believe can lead to a significant step-change in restructuring the economy towards export-led sectors, a revival of productivity growth and the creation of sustainable employment for future generations.

Ireland has many attributes which make it suited to becoming an Innovation Hub in Europe. Over 500 million people live within a three hour flight of Dublin. We have favourable demographics, a strong educational standard, a good tax and regulatory environment, a growing entrepreneurial culture and an international mindset. We have a reputation for cultural innovation and a large Diaspora who are talented in many fields. We have an excellent group of innovative multinational companies and have recently had significant success in attracting high-value Research & Development (R&D) activity into Ireland. Nevertheless, we need to do more.

Our aim is that by 2020 Ireland will have a significant number of large, world leading, innovation-intensive companies, each having a global footprint, many of which are Irish headquartered and owned. These companies will provide high-quality employment and generate exports and tax receipts. They will vary in scale, type of activity and pattern of company ownership. What will be distinctive about these companies is that they will be ambitious, export-focused and, above all innovative.

In order to achieve this vision and secure Ireland's economic future we need to significantly increase our current rate of job creation and new company start-ups.

This requires a concentrated and focused national effort. Policy and investment decisions must be centred on supporting and encouraging the entrepreneur and innovative enterprises through driving an economic and business model, which is both invigorating and self-renewing.

To make innovation work for us we have to develop an ecosystem in which each element, and each interaction, supports innovation across the economy and society. The key elements in such an ecosystem are:

a. Entrepreneurs and enterprises (indigenous and foreign-owned);

b. Investment in research and development;

c. The education system, in particular, higher education institutions;

d. Finance, in particular risk capital;

e. The tax and regulatory environment;

f. Public policy and institutions.

The Taskforce agreed six principles as fundamental to creating this ecosystem and transforming Ireland into an International Innovation Hub. These are:

1. The entrepreneur and enterprise must be at the centre of our efforts.
2. Establishing, attracting and growing and transforming enterprises must be the focus of a coherent national effort.
3. Availability of smart capital is crucial for starting, growing and transforming enterprises.
4. An education system which fosters independent thinking, creativity and innovation is vital to achieving the Smart Economy.
5. The State should actively accelerate success by encouraging flagship projects and by prioritising the provision of excellent infrastructure.
6. We must sharpen the focus of our national research system to target areas of potential strategic and economic advantage for Ireland.

Knowledge is the currency of the innovation economy and the education system is pivotal in making innovation happen. We have made significant investment in R&D in recent years and we must build on this investment to strengthen the base of knowledge which is an essential element of a successful innovation ecosystem.

That is why our first key recommendation is to deliver on the investment framework set out in the Strategy for Science, Technology and Innovation (SSTI) 2006-13 and achieve the goal in the renewed Programme for Government of investing 3% of GDP in R&D by committing to investment in an updated SSTI for the 2014-2020 period.

This requires greater and more co-ordinated public research investment, leveraging of more private sector investment and channelling this investment into agreed areas of national priority.

We believe that current economic difficulties should not be allowed to diminish the level of investment which we believe is necessary or inhibit the return on investments already made. A more efficient and effective approach to identifying and accessing Intellectual Property (IP) arising from public research investment is vital if we are to strengthen our commercialisation focus. We make a number of recommendations in relation to IP which we believe could make Ireland a centre of international best practice, creating significant employment and Foreign Direct Investment (FDI) opportunities.

A key recommendation is the development of a national IP protocol as a priority, so that entrepreneurs and companies have predictability about the terms on which they can access IP created at Higher Education Institutions (HEIs) in order to turn it into products and services that meet customer needs.

We also recommend that more meaningful metrics to measure performance of HEIs and Technology Transfer Offices (TTOs) should reflect this Protocol and that a portion of state funding for HEIs might be linked to these metrics.

The achievement of clarity and consistency in our national IP regime will set a standard for the consistent and speedy treatment of IP and give us a competitive advantage within the EU while the process of finding, accessing and bundling IP from the HEIs needs to be rationalised.

We recommend that we build on this advantage by developing and marketing Ireland as an International Innovation Services Centre offering global IP management, licensing and trading services.

If we are to start and grow innovative enterprises on an unprecedented scale, we also need to increase the availability of smart capital. A **key goal must be a transformation in the scale and nature of the Irish Venture Capital environment by attracting top tier venture financing to Ireland so as to successfully scale innovative companies.** This can best be achieved through the Innovation Fund - Ireland, as envisaged in *Building Ireland's Smart Economy,* implementation of which will be shaped by the market-testing exercise currently led by the National Treasury Management Agency (NTMA) supported by Enterprise Ireland (EI).

We must also realise the opportunity to redirect capital investment into innovative companies, including through "business angels" who also transfer knowledge and experience.

That is why we recommend that Ireland should nurture a national portfolio of Business Angel funds. Until this has been achieved, we suggest that temporary State intervention in the form of a new Seed Capital scheme is required. We also identify a set of tax initiatives to incentivise start-up and angel funding activity.

While Enterprise Ireland is very active in this space, it has a broad focus and we believe that it must increasingly focus on start-up and early stage activities if we are to achieve the job creation trajectory envisaged in this Report.

One of Ireland's most significant attributes and opportunities in driving innovation is its vibrant multi-national community. Despite increasing competition, there are new Foreign Direct Investment opportunities for Ireland to be exploited by the IDA, as well as scope to transform existing FDI enterprises. The attraction of blue chip companies to Ireland to carry out research, development, product design and other innovation activities here is an increasingly important strand within our inward investment portfolio and **we recommend steps to strengthen the innovation ecosystem thereby helping to attract more new investment and embed existing FDI**.

We also recommend measures to help increase R&D and innovation capabilities, including in the area of product design, within Irish industry.

As well as sustaining our strengths in particular sectors we must also grasp the significant opportunity offered by new developments in converging technologies. We must strengthen and scale indigenous companies including through incentivising collaborations. We believe that the State can leverage these existing attributes and resources in a variety of ways to drive our transformation to an Innovation Hub.

For example, **we recommend that Ireland can brand itself as an Innovation Hub, in fact and in image, through attracting the European headquarters of private US companies via a specially devised European Accelerator Programme.**

We believe that public procurement should be used to drive and stimulate the development of innovative solutions with export potential. **We therefore recommend that a number of carefully selected Flagship projects should be set in train requiring the development of innovative new products and services, many of which will occur through cross-sectoral collaboration between companies both indigenous and Multinational Corporations (MNCs).**

Furthermore, **we propose that a team from the key agencies should be formed to ensure that we take full advantage of new opportunities in convergence by driving the necessary investment, regulatory and education actions.**

Our future human capital is significantly shaped by our education system. We therefore believe that innovation and creativity must be promoted at all levels of the education system. In the HEI sector we support the delivery of scale and capacity through rationalisation, collaboration and alliances such as the Innovation Alliance between Trinity College Dublin and University College Dublin and the Strategic Alliance between the National University of Ireland, Galway and the University of Limerick. Looking to the future we must develop sufficient revenue streams to sustain excellence in our HEIs.

At second level we need to raise levels of competence and attainment in maths and sciences substantially such that they feed into Science, Technology, Engineering and Maths (STEM) disciplines at third and fourth levels and we need to develop and reinforce creativity and problem solving capacities across the workforce. We believe that **mathematics attainment is crucial in this regard and suggest additional measures to improve this including incentives such as the awarding of CAO bonus points to those taking higher level mathematics** for Leaving Certificate.

Similarly, entrepreneurial skills need to be fostered at second, third and fourth levels of our education system. We believe that a more concerted national effort at workforce up-skilling is also essential for a competitive and productive workforce to support development of a smart economy. We **strongly support placement schemes in companies for both graduates and undergraduates** to facilitate the transfer of high technology skills and expertise.

Given the scale of our ambitions, and the challenges Ireland faces, we recognise that we must also increase our current human capital stock by **proactively attracting people to Ireland to start up innovative companies**, to augment the indigenous base of potential entrepreneurs.

This requires effective marketing to ensure that potential investors, entrepreneurs and researchers are attracted here to help strengthen our innovation eco-system. All State agencies and HEIs need to **jointly market and brand Ireland as a leading innovation location and destination of choice for European and other overseas investors**. We need to fully utilise the willingness of the Diaspora to contribute, while strategically re-focusing efforts towards new and emerging markets.

Key to this effort is an **organised programme of visits and other activities whereby Ministers, Departments and State agencies convey a consistent, positive message about Ireland as a centre of excellence for innovation.**

We also need to find ways to enhance understanding across society of the role every person can play in building an innovation-intensive economy and making the Smart Economy a reality.

We need a sea change in attitudes – in public and private sectors - towards innovation and entrepreneurship, to recognise that they involve risk, and occasionally result in failure. Legal arrangements also need to avoid any sense of stigma from a failed business venture provided there has been a reasonable approach to business risk. **That is why we recommend that personal bankruptcy legislation needs to be reformed.**

High quality physical infrastructure is another important ingredient in building a successful and innovative economy and in attracting overseas entrepreneurs and FDI. Universal access to high quality broadband is one key infrastructure for the Smart Economy. **While Ireland has seen increasing uptake of broadband, accelerated progress is required. We also identify wet laboratory space for life sciences as a deficit which must be addressed as a matter of priority.**

Given the scale of the transformation necessary and the broad range of actions required we need clear targets against which progress can be measured, and mechanisms for doing so. We have provided an estimate of how many jobs might be created – 117,000 by 2020 is at the lower end of our projections (see Chapter 13) - and we believe that the recommendations set out in this report, if implemented in a coherent and determined fashion, can deliver the inflection point in performance which is required.

We believe that engagement between its members has already enabled the Taskforce to influence policy and programmes relevant to innovation over recent months. We have identified 24 Key Recommendations which we consider should be implemented as a matter of priority. **Our recommendations are set out in the table on pages 94 – 106, along with indicative timelines and cost estimates** and we propose the development of meaningful metrics by which to measure and evaluate progress.

We recognise the difficult economic context and that some of these recommendations have significant cost implications which would require re-prioritisation of limited resources at a time of serious budgetary pressure, while others require a re-alignment of efforts within Departments and Agencies. **The measures we have recommended are designed to secure the outcomes we propose as necessary and feasible, and it is in that context that we put them forward for evaluation by the Government as it prioritises its use of scarce resources.** In the same way, the suggested tax changes can be evaluated in the framework of analysis of tax reliefs which in line with public policy should underpin and justify all such provisions of the tax code.

While all recommendations in the Report are not necessarily supported by all members, and may not represent the position of each member's organisation, this report represents our collective view of the right overall pathway forward to create an innovative, high-value, export-led enterprise sector.

We recommend a new High-Level Implementation Committee reporting to the Taoiseach and the Cabinet Committee on Economic Renewal to ensure that the recommendations are implemented in a dynamic and responsive fashion reflecting the fast-changing global environment in which Ireland must compete.

A list of all the Recommendations along with associated timelines and responsibility for implementation is set out on pages 94 - 106.

1. Vision

OUR VISION – INNOVATION IRELAND

"The Ireland of the future will be a smart, high-value, export-led economy. It will have some of the world's leading research-intensive multinationals, a number of which will be Irish-owned. It will have thousands of innovative small and medium enterprises."

The Taoiseach, announcing the establishment of the Innovation Taskforce, in June 2009.

+ We agree. Our vision is that by 2020 Ireland will be an Innovation Hub with a significant number of large, world leading, innovation-intensive companies, each having a global footprint, many of which are Irish headquartered and owned.
+ These companies will provide high-quality employment and generate exports and tax receipts. They will have scale, and will recycle capital and experience while reinforcing a positive international image of Ireland as a place to invest risk capital and develop new innovative products and services.
+ Our vision also involves the creation of thousands of innovative companies, from very small start-ups through small, medium and larger companies, many of which aspire to scale themselves.
+ This requires a transformation in how we generate jobs and growth, and a shift in how we learn and how we work. It means making connections between ideas and people in ways which have not been tried before. It involves re-evaluating our attitudes to both success and failure in order to reap the rewards of innovation.
+ Our vision encompasses existing companies and sectors that are strong in Ireland today with the aspiration to grow and innovate, thereby creating further jobs and profits. It requires a transformation of existing Irish businesses, as well as continuing to support moves by MNCs here into higher value activities which provide high quality jobs.
+ It also encompasses new companies: spin-outs from university or started by people working in Irish or MNC industry today. Many of these will be in emerging industries or in converging sectors using cutting-edge technology and concentrating significant efforts in research and development (a number of examples of innovative companies are interspersed in Textboxes within this Report).
+ To be very clear, our vision is not just about start-ups or businesses run by "people wearing white coats" - it includes family-run businesses, SMEs and MNCs that have been in existence in Ireland for many years. And they are supported by an innovative and entrepreneurial public service.

What is distinctive about these companies is that they are ambitious, they are export-focused and above all they are innovative.

A TIME TO BE AMBITIOUS

It is sometimes assumed that by simply improving cost competitiveness we will return to the economic growth path that transformed this country during the 1990s.

We disagree. While we must be cost competitive, we need to find new sources of competitive advantage that will provide high-quality sustainable jobs and economic growth.

The economic challenge facing Ireland at this time is to secure a return to the highest sustainable rate of economic growth based on rising incomes per head for a population whose employment rate is high.

Success in meeting this objective will require a high level of productivity across the whole economy, that is the measure of the way in which resources – physical and human – are deployed to produce goods and services.

In the first instance, this requires that production – and the cost of inputs to production – are competitive in terms of international markets. The pressure on unit costs, including wages, is eased as productivity levels rise within and across firms.

Productivity can be increased by increasing the efficiency with which resources are used to produce existing goods and services. This is an immediate and continuing imperative for firms and the public service, in all sectors and at all levels of technological sophistication.

But a more challenging and ultimately more effective route to productivity growth is through the dynamic offering that flows from activities such as product and process development, product differentiation, market segmentation and changes in the competences and scale of firms. These are the central elements of innovation, and they provide the basis for a more sustainable and less volatile growth performance than strategies focused solely on low costs and operating efficiencies. Innovation therefore is everyone's business.

It is vital for the survival of existing businesses and their prospects for returning to growth. It is vital for the public service, if the growing demands for service delivery are to be met in the face of social and demographic change. It is vital for employers and entrepreneurs at all levels, if they are to have access to rewarding opportunities as the pace of technological and organisational change quickens.

Ireland needs a radical increase in job creation to provide opportunities for those who are currently unemployed and those entering the labour market from schools and colleges over the period ahead.

Most jobs in the economy, and most of the jobs associated with the rapid increase in employment over the decade up to 2005, are not in occupations with a high technology content. That is likely to be the case in the future. But job retention and creation will require that all sectors have the core skills and competencies to successfully change in the way they work as new technologies and processes are diffused and adopted across the economy.

Entrepreneurs will be needed and will need to be supported – to lead such change right across the economy, in the public and non-profit sectors as well as at all levels of the private sector.

Fortunately, there is evidence from the surveys of employers[2] and employees carried out by the National Centre for Partnership and Performance (NCPP)[3], and from the review of the leadership of change in different sectors by the National Economic and Social Development Office (NESDO)[4], that there is a positive orientation towards change and innovation across the economy and a resilience in facing the prospect of continuing rapid and pervasive change in the world of work.

Given that our interest is in the economic impact of innovation – that is in the jobs and value added generated and retained in Ireland – we have focused our attention on how innovation in strategic aspects of Ireland's economic performance can be increased radically, to match the scale of the challenges we face.

Because innovation applied to economic activity is an interactive process, we have looked at the ecosystem which supports and promotes innovation in Ireland. The actors in this system and the way they currently interact are unique to Ireland, just as every country and region has its own innovation characteristics.

This ecosystem is often described in terms of the place of science and technology in the Irish economy, and this is indeed critically important. However, innovation extends beyond this to involve institutions concerned with education and the labour market, as well as the markets for knowledge (in terms of intellectual property) and financial markets.

THE NEED FOR AN INFLECTION POINT

While acknowledging the breadth of the innovation challenge, we have focused our attention on the aspects of Ireland's innovation ecosystem which have a particular impact on the development of dynamic, knowledge-based enterprises with the potential and ambition to grow to significant scale in products and services of global significance. Specifically, we have considered how to accelerate the establishment and growth of such firms, whether arising from the transformation of existing businesses, the diversification of the Irish economy, activities of FDI companies, start-ups associated with new knowledge generated in Irish research centres or the attraction to Ireland of entrepreneurs with global market ambitions.

Irish economic policymakers have taken brave steps at key points in our economic history to intervene and cause inflection points in our economic development. These interventions resulted in significant productivity increases and laid the foundations for prosperity – now is the time to do that again.

We know that productivity growth fell back significantly during the property boom but we also know the key role that innovation - in both the production and use of technology - plays in enhancing productivity and economic output. Thus, our objective is to position Ireland as an Innovation Hub in Europe.

It is important to make clear that this does not just involve high-tech innovation. It is about processes as well as technologies, domestic as well as internationally-traded sectors, multinational as well as indigenous enterprises, and public as well as private sectors. To illustrate this we have interspersed the Report with examples of innovative companies and examples of innovation which has resulted in significant job creation and benefits to society in terms of the development of new products, processes and services. The first such example is overleaf.

Box 1.1

Citi

Citi has had a presence in Ireland for the past 45 years. It employs 2,000 people in Dublin and Waterford. Originally a branch of Citibank, N.A., it then invested in and developed a regional operations and service centre with support from the Irish Government. This centre quickly became a Regional Service Centre (RSC) of operational excellence.

On the back of the success of the RSC, Citi migrated a number of major global and regional products to Ireland. These products include worldwide payment businesses, trade services, securities and fund services. The global and regional management of these products are now mostly located in Citi's principal vehicle in Ireland, Citibank Europe plc. The services, client delivery and product businesses have quickly been supplemented by comprehensive skilled project/implementation teams.

As a result, Citi in Ireland has now become a major centre for global customers of Citi's Global Transaction Services (GTS) business.

Citi was the first financial services company to set up a dedicated research and development facility. This global Research, Development, Innovation and Learning (RDIL) Centre was opened by the Taoiseach on Wednesday 30th September 2009. This centre has become a hub for developmental and fundamental research projects in the financial services business. Citi is continuing to develop its core capabilities to support the development of innovative products and services from Ireland. To date, Citi has invested over €62 million in RD&I projects in Dublin and created a Centre of Excellence for the development of products and processes for Citi's Europe Middle East & Africa (EMEA) business.

The RDIL Centre is currently working on new information technologies to transform the modes of interaction between clients and banks in the future. Examples of innovations being worked on include digital account management, portal and multi-channel technologies, media and collaboration, mobile technology and analytics.

We need to be ambitious. It is not an option merely to sustain the current trajectory of job creation in, and start-up of, innovative export-focused companies. That will not create enough jobs, it will not earn sufficient tax revenues, and it will not ensure an adequate standard of living for our people in the longer term. In order to secure Ireland's economic future we need to create an inflection point, a game changer. Achieving this inflection point is the focus of this Report.

We believe we can reinvent ourselves again. And we on the Taskforce are not alone in this. We were both astonished and genuinely gratified by the creativity of the ideas put forward in the large number of submissions received (see Box below). This gives us confidence that we can deliver on our vision of translating the ideas and creativity of our population into sustainable jobs for our people.

Box 1.2

Note on consultation

The Taskforce conducted an extensive consultation process, both formal and informal. 117 responses were received to a public call for written submissions and each of these was considered by Taskforce members. A list of respondents is at Appendix 3. A summary of the submissions is available at www.innovationtaskforce.ie.

Issues addressed in the submissions include:

+ Definitions of innovation and metrics for success of innovation policy;
+ The need to embed innovation more fully in all levels of the education system;
+ The need for more research collaboration and alliances;
+ How to improve rates of commercialisation of IP and Technology Transfer;
+ Incentives and taxation policy;
+ The need to use State procurement to leverage innovation;
+ How to attract entrepreneurs to Ireland and leveraging the Irish Diaspora;
+ Sectoral innovation opportunities and the need to pursue opportunities in converging technologies;
+ The contribution which can be made by design, arts, the humanities and social sciences to innovation;
+ Infrastructural deficits.

As well as formal submissions, the Taskforce Working Groups met with a wide variety of stakeholders. Further details on the Working Groups are in Appendix 4.

One of the Taskforce Working Groups also conducted a web-based survey to inform its deliberations. Over 200 responses were received and the findings of the survey are summarised in Appendix 5.

The Taskforce would like to take this opportunity to thank all those who fed into its deliberations. Many of the proposals contained in this Report were directly influenced by submissions received. The Taskforce hopes that all respondents will have an opportunity to participate in a continuing dialogue and shared effort on Ireland's innovation policy as the vision in this Report is taken forward.

A NATIONAL EFFORT IS REQUIRED

One of Ireland's strengths has been the consistent support across political, administrative and other systems for the attraction of Foreign Direct Investment (FDI). We believe that the same strength and consistency of effort is required for our updated vision to transform ourselves into an Innovation Hub for Europe.

We realise that the Government faces severe budgetary pressures in restoring the public finances, and all our recommendations must be viewed in that context. Nonetheless, we believe that full economic recovery will only be achieved if we prioritise this agenda.

In this Report, we identify the essential components of the environment – or what we call *the ecosystem* – that we must put in place so that new ideas can be created, nurtured and put to work to create jobs and economic benefits for the country. We have also set ambitious goals for the number of jobs which we believe can be delivered.

While our vision is undoubtedly challenging, we also believe that it is realistic given our many strengths and the progress we have made in recent years in building our knowledge base and innovation capability. Our objectives can be delivered although this will not happen overnight.

What is required now is a sustained national effort to build a successful innovation ecosystem centred around innovative enterprises and the entrepreneur.

Our vision cannot be delivered by Government action alone. Our vision requires support and commitment from all stakeholders and involves cultural and behavioural changes across our population as a whole. We believe that Ireland's population is ready and able to meet this challenge.

2. Context

EVOLUTION OF ENTERPRISE POLICY

Ireland is now confronted with a serious economic challenge – responding to the recession and protecting employment, whilst at the same time ensuring that we lay the foundations for future economic growth. Ireland has faced and overcome such challenges in the past. Many of the strengths that helped us in the past still hold true today and can, if accompanied by the right infrastructure, be used to meet this latest challenge.

The seeds for the dramatic economic growth recorded in the 1990s and early part of this decade were sown in the 1960s as, for the first time, Ireland embraced the twin philosophies of investment in human capital (primarily the decision to provide free second level education to all) and encouraging FDI into Ireland. This was further underpinned by the growing appreciation amongst policymakers of the value of the then EEC and the opportunities offered by the nascent free trade area. As a small and ever more open economy, however, Ireland was at the mercy of the global economy. Cyclical global downturns and the oil crises of the 1970s combined with some poor domestic policy decisions stunted Irish economic growth and required a re-orientation of public policy.

By 1987 a new consensus emerged at the heart of Irish economic policymaking. Spurred on by record unemployment, mass emigration and a rapidly deteriorating fiscal situation, the Government and other key stakeholders reached agreement on a Social Partnership deal that provided for industrial peace in return for reduced levels of personal taxation. This deal, allied to continued low taxation on corporate profits contributed to the creation of a virtuous circle of increased labour participation, higher personal incomes, and expanding Government revenues.

The improved domestic economic climate, in conjunction with Ireland's traditional advantages of geographical location, English language fluency and a high quality workforce at competitive cost led to massive inflows of FDI, primarily from the United States. As an open, competitive and flexible economy, with a low corporate tax rate together with membership of the European Union, and more recently the Euro, Ireland was, and continues to be, an ideal base for global companies to support global and EU markets.

Box 2.1

Factors Underpinning Our Economic Success

A number of factors contributed to Ireland's economic progress over the past 20 years:

+ Joining the Common Market offered Ireland access to established European markets; the subsequent evolution of the Common market into the EU and Euro area ensured progressively greater economic unity within Europe.
+ Global trade expanded at an unprecedented pace. In particular, advanced sectors such as Information and Communications Technology (ICT) and Life Sciences, which were targeted for inward investment by FDI policy, experienced significant growth through the mid and late 1990s.
+ A well qualified workforce and consistent, long-term consensus-based policies which have delivered a favourable corporate tax, fiscal and wage setting environment.
+ The ability to identify new and emerging opportunities across the manufacturing and internationally traded services sectors, target specific investments and establish Ireland as a leading location for FDI has been a key element in our success to date.

These factors helped drive exports and employment growth within Ireland. Employment almost doubled between 1988 and 2008[5], while exports increased from $22 billion to $211 billion[6]. This helped drive increases in Irish living standards, with Gross Domestic Product (GDP) per capita increasing from $10,455 in 1988 to $45,026 by 2008[7].

Over the past decade, it has become clear that Ireland's international competitiveness depends increasingly on goods and services which have high knowledge content. There has also been a recognition that Ireland needs to shift into more knowledge-based activities, transforming existing enterprises (both Irish and foreign-owned) and attracting a new wave of investment in areas such as information and communications technology, energy, medical devices and biotechnology.

As a consequence, since 2000 enterprise policy has placed increasing emphasis on innovation:

+ Science Foundation Ireland (SFI), legally established in 2003, is funding excellent scientists and engineers working at the frontiers of biotechnology, information and communications technology and, more recently, sustainable energy and energy-efficient technologies.
+ Higher Education Authority (HEA)/Programme for Research in Third Level Institutions (PRTLI) investments have been strengthened and aligned to co-ordinate infrastructure provision and the development of human capital.
+ The IDA reinforced its drive to attract R&D activities to both upgrade existing FDI client operations in Ireland and to seed new activity.
+ Enterprise Ireland has increased its focus on driving indigenous company innovation and commercialisation from increased R&D activity in HEIs.

This investment is beginning to have a significant impact including:

+ Total R&D spending has almost trebled to €2.6 billion in 2008, which is equivalent to 1.66% of Gross National Product (GNP)[8].

+ Business Expenditure on R&D has risen to an estimated €1.68 billion in 2008 - double the level recorded in 2000. By 2007, 163 companies were spending over €2 million on R&D[9].
+ Higher Education R&D spending has almost quadrupled in current terms over 10 years and is now at the EU and OECD average levels [10]. Ireland's research output and reputation has been dramatically enhanced. Two Irish universities are in the world top 100 – one in the top 50[11].
+ Ireland's volume output of research articles rose by 33% between 1998 and 2007 [12], while Ireland's share of world papers has risen by 20% [13] and its citation share has risen by 32% [14].
+ 50% of IDA investments in 2009 were in Research Development & Innovation (RD&I) with over €500 million of investment. There are now about 170 IDA supported companies with a significant R&D mandate with a spend of approximately, €1.2 billion [15].

The Community Innovation[16] survey published by the Central Statistics Office (CSO) estimates that total spend on innovation activities in 2008 was almost €5.3 billion.

EU data also shows that this investment is bearing fruit. While Ireland remains an Innovation Follower rather than an Innovation leader, its innovation performance as measured by the EU Innovation Scorecard is now above the EU27 average. It is a growth leader within this group of countries with a rate of improvement above that of the EU27.

It is sometimes argued that Ireland should be clever copycats rather than developing its own R&D capacity, i.e. we should just do the 'D' in R&D. However, while it is often the case that companies make more money from adapting and utilising technology by process innovation than they do from inventing new technology, economic evidence suggests that R&D stimulates economic growth directly through innovation and also indirectly through technology transfer[17]. Thus, a country's ability to absorb foreign technology is enhanced by investment in education and by investment in own R&D[18]. Thus Ireland's ability to absorb and adapt innovation from elsewhere is crucially dependent on having a strong R&D culture and smart people.

The Government's Strategy for Science, Technology and Innovation (2006) signified a recognition of the importance of R&D and innovation for Ireland's economic development and was designed to bring Ireland into line with countries that create a significant proportion of their GDP from the creation and utilisation of knowledge – countries like Singapore, Australia, Germany, Denmark, Austria, and France.

We strongly believe that Government investment to date has brought Ireland up to a credible base from which to build a sustainable innovation ecosystem capable of competing globally. Ireland must remain committed to our ambitions in this area, as well as ensuring that we enhance our innovation performance across the enterprise sector. However, there is a need to more explicitly position the entrepreneur and innovative enterprises at the centre of all our efforts, and to move our creation of export-focused companies and jobs on to a new and more dynamic trajectory.

Many of the strengths which helped us in the past still hold true today[19] and can, if accompanied by the right policy infrastructure, be used to meet this latest challenge:

+ We have a well established legal system and a stable democracy.
+ Our economy is open to enterprise and innovation. Ireland is the third most globalised economy in the world[20] with trade over 150% of GDP[21].
+ We have a growing enterprise culture.

+ The proportion of 24-34 year olds with at least degree-level education is significantly higher than the OECD and EU average. The number of PhD graduates per thousand of the population and employed in industry has risen significantly.
+ We have the security of European Union membership, the benefits of the euro as our currency, and free movement of people, goods, services and capital, as well as over 500 million people living within a three hour flight of Dublin.
+ We are native speakers of the international business language. A large number of MNCs are located here, many of which are involved in R&D activities already.
+ We are a relatively small market in global terms, which creates the opportunity for market trials and experimentation in Ireland before the expense of addressing global markets.
+ We have a large and influential international Diaspora.
+ Through investments over the last decade we have established a capacity and reputation for leading international quality research in a number of fields.
+ We have a rich cultural and scientific heritage (see Box 2.2).

While acknowledging these considerable strengths and the significant progress made to date, the Taskforce believes that an inflection point or game changer (as occurred in both the 1960s and the 1980s) in the performance of Irish enterprise is required if we are to return to export-led growth and create the numbers of sustainable jobs required. This is a particular challenge in the context of a global enterprise economy which is changing significantly in favour of lower-cost emerging economies. The scale of what needs to be done should not be underestimated.

Box 2.2

Ireland's cultural and scientific heritage

Emigrants from Ireland spread a belief in education, literature, poetry and art across Europe during the tenth and eleventh centuries. The Irish contribution to the world literature has been valuable, based on our rich Celtic and early Christian heritages. The books of Kells, Durrow and Dimma are internationally well known. More recently, James Joyce, Oscar Wilde, Oliver St. John Gogarty, William Butler Yeats, George Bernard Shaw, Samuel Beckett, John B Keane, Seamus Heaney, John Banville, John McGahern, Frank McCourt, Maeve Binchy, Sebastian Barry, William Trevor, Colm Tóibín, Anne Enright and Roddy Doyle are amongst our most internationally recognisable writers. We have also made striking contributions in the fields of music, theatre and film including through U2, Liam Neeson, Brendan Gleeson, Gabriel Byrne, Colin Farrell, Saoirse Ronan, Jim Sheridan, Neil Jordan and internationally renowned productions such as Riverdance.

Concurrently with our literary and cultural tradition, Ireland has made some astonishing contributions to science and engineering from the 17th century until today. Robert Boyle contributed to the understanding of gases. Francis Beaufort derived the Beaufort wind scale. George Boole discovered the algebra underlying computing logic. William Rowan Hamilton evolved a new branch of mathematics. Nicholas Callan invented the electrical induction coil. William Parsons discovered the spiral nature of galaxies. John Tyndall contributing to the understanding of the nature of light. William Thomson investigated heat, leading to the Kelvin scale. George Francis Fitzgerald proposed that a moving body shrinks, thus influencing Einstein's relativity work. Ernest Walton worked with John Cockroft to show that the atom was not in fact monolithic. George Johnson Stoney calculated the magnitude of a single unit of electricity, which he then named the "electron". Mary Ward wrote on the microscopic nature of plants. Kathleen Lonsdale influenced X-ray crystallography, and discovered the flat nature of the benzene ring. JD Bernal similarly influenced X-ray crystallography for work on proteins, nucleic acids and viruses. Denis Burkitt was an early pioneer in understanding cancer and John Bell's theorem is key in quantum mechanics.

SCALE OF THE CHALLENGE

While Ireland needs to regain, and is in the process of regaining, our competitive edge by reducing the relative cost of doing business in Ireland, this alone will not be sufficient. The world has moved on and the model which worked in the 1990s no longer suffices.

While the United States will remain an important source of FDI, the role and significance of new economic leaders, particularly China, has greatly increased. China has a policy of active engagement with many governments world-wide to foster trade, economic development, and to acquire both raw materials and friendly export markets. Our policies must respond to this new reality.

Meanwhile, the relative cost of manufacturing and production has universally continued to fall. Market competition forces companies to source the most efficient production centres anywhere on the planet. Within Europe, the accession of ten new member states in 2004, and a further two in 2007, has led to intense competition for FDI throughout the European Union and globally.

Education standards have risen dramatically in many jurisdictions, together with competence in English. Ireland is now only one of many alternative locations which can offer an English speaking, high-skilled and young workforce, coupled with a low (or in some countries zero) corporation tax regime, and extensive capital and development grant aid. Ireland needs to find new ways to compete successfully in this fast-changing world.

SMART ECONOMY FRAMEWORK, INNOVATION AND ENTERPRISE POLICY

Building Ireland's Smart Economy was published by the Government in December 2008 in response to the challenges facing the Irish economy in a changed world. It identifies five action areas for sustainable economic renewal, with the objective of increasing productivity across all sectors of the economy:

+ Securing the Enterprise Economy and Restoring Competitiveness;
+ Building the Ideas Economy – Creating the 'Innovation Island';
+ Enhancing the Environment and Securing Energy Supplies;
+ Investing in Critical Infrastructure;
+ Efficient and Effective Public Services and Smart Regulation.

As this Smart Economy Framework highlights, there are many aspects of a successful enterprise policy. These include cost competitiveness, labour market and skills policies, investment in physical and other infrastructure, trade promotion, tax and regulation etc. Each of these is of obvious concern to the enterprise sector during this difficult economic period.

The Taskforce has not been asked to examine all these issues which are being addressed in many other policy development processes, except where they impinge directly on our terms of reference.

Instead its focus is on progressing the second action area of the Smart Economy vision: *"building the innovation or 'ideas' component of the economy through the utilisation of human capital – the knowledge, skills and creativity of people – and its ability and effectiveness in translating ideas into valuable processes, products and services."* In the context of this objective, the Taskforce was asked:

+ To examine options to increase levels of innovation and the rates of commercialisation of research and development on a national basis with a view to accelerating the growth and scale-up of indigenous enterprise and to attract new knowledge-intensive direct investment;
+ To bring forward proposals for enhancing the linkages between institutions, agencies and organisations in the public and private sectors to ensure a cohesive innovation and commercialisation ecosystem;
+ To identify any specific policy measures which might be necessary to support the concept of Ireland as an International Innovation Development Hub including in the areas of legislation, educational policy, intellectual property arrangements, venture capital and immigration policy.

Our focus therefore is on the issue of innovation in the enterprise sector and, in particular, on driving and supporting entrepreneurship, which is increasingly recognised as a driver of increased productivity and economic growth.

It is important to note that (as already mentioned in Chapter 1 and as we explain in the next chapter) innovation is not just relevant to high-tech or start-up businesses. Ireland's future economic success depends on increasing levels of innovation across all aspects of Irish enterprise – from large Irish-owned multinationals to foreign multinationals located here to established SMEs in services and manufacturing, as well as start-ups and existing companies with high growth potential.

Innovation is therefore at the heart of enterprise policy and our recommendations seek to support increased innovation across all parts of the Irish economy.

In the following chapters we elaborate on our understanding of innovation and the principles which have informed our work. We recommend specific actions which will help to deliver an inflection point in the level of innovation in Irish enterprise and thereby drive an updated model of sustainable economic growth.

ECONOMIC AND BUDGETARY CONTEXT

The past 12 months have been particularly difficult with Irish GNP estimated to have contracted by at least 10%[22] in 2009 (or over 7.5%[23] in GDP terms). A further contraction in the economy is forecast for 2010 (albeit at a much more modest rate). While growth is anticipated to return during 2010, both in terms of GNP and GDP, overall annual growth is forecast to fall again this year.

The most obvious impact of the recession, however, can be seen in the employment and unemployment figures. The number of people employed in Ireland fell from 2.1 million[24] to just over 1.9 million[25] over the 12 months to Quarter 3, 2009 (an annual decrease of 184,700 or 8.8%). Over the same period, unemployment increased by 120,400 (or 75.5%) to reach 279,800. This equates to a seasonally adjusted unemployment rate of 12.4%[26] - by way of comparison the unemployment rate was just 4.6% at the end of 2007. Unemployment is forecast to peak this year and to ease thereafter as economic growth resumes[27].

Although there are signs that the Irish economy is beginning to stabilise, serious challenges remain. The Taskforce acknowledges that the Government faces difficult choices in reconciling different legitimate policy goals and will have to weigh these considerations when considering our Report and recommendations.

Nonetheless, we strongly believe that it is only by investing financial resources in this agenda, in particular in human capital and the technology that supports it, that the Irish economy will recover to provide levels of growth and employment which will in turn sustain the level of public services desired by the Irish population. We do not see an alternative path to recovery other than one driven by innovation.

3. The Innovation Ecosystem

OUR CONCEPT OF INNOVATION HAS BROADENED

"Innovation entails investment aimed at producing new knowledge and using it in various applications. It results from the interaction of a range of complementary assets which include research and development, but also software, human capital, design, marketing and new organisational structures – many of which are essential for reaping the productivity gains and efficiencies from new technologies[28]" - OECD.

Innovation – the introduction of a new or significantly improved product (good or service), process, or method - has long been acknowledged as central to economic performance.

Many of the submissions to the Taskforce highlighted the changing nature and understanding of innovation. In recent years attention has increasingly been focused on innovation in product design, business processes or organisational design. Services firms innovate through informal R&D, the purchasing and application of new technologies as well as the introduction of new business models.

In the internet age characterised by open systems, innovation is often facilitated by new forms of collaboration and interaction, for example where businesses engage with their customers and suppliers in an open-ended dialogue, which can sometimes lead to new business ideas and models.

International research has highlighted the importance of new experimental forms of work organisation, the way in which firms locally and internationally are networked and the shifting boundaries of the division of labour in design, development and production[29]. 'Soft skills' such as the ability to work in multi-disciplinary teams therefore become more important[30].

Migratory flows of people and their relationships is another emerging theme in research on the innovation process, for example helping to transfer knowledge between regions and countries.

Innovation also takes place in a non-commercial context, for example in a public service, healthcare or community development setting.

INNOVATION ECOSYSTEM

Growing and harnessing innovation has its challenges: innovation is not a simple journey from A to B, but one which loops around through time and space. To make innovation work for us we have to develop a system in which each element, and how it interacts with other elements, supports innovation across the economy and society. The elements that make up such an ecosystem include:

(i) entrepreneurs and enterprises (indigenous and foreign-owned);

(ii) investment in research and development;

(iii) the education system, in particular higher education institutions;

(iv) finance, in particular risk capital;

(v) the tax and regulatory environment;

(vi) public policy and institutions.

The diagram below sets out the main elements of the national innovation system.

FIGURE 3.1: MAIN ELEMENTS OF THE NATIONAL INNOVATION SYSTEM

A successful innovation policy requires all elements of the ecosystem to co-operate and collaborate together, and in international networks, to ensure that knowledge is developed, transferred and applied in productive ways.

Entrepreneurs and enterprises are at the heart of the ecosystem because the success or failure of our vision depends on our capacity to translate ideas into exportable goods, services and sustainable jobs.

ROLE OF THE ENTREPRENEUR

While a strong innovation-intensive multinational sector is crucial to the future success of the Irish economy, there is a powerful link between innovation and new firms. The entrepreneur plays a key role in this regard.

Many innovations start with small companies, particularly in more recent years in biotechnology and the internet, for example. Entrepreneurs play a key role in driving innovation in start-ups and high-potential growth companies of small and medium size. Importantly, in an increasingly competitive world, entrepreneurial individuals have been shown to stimulate innovation and transformation in established firms.

While most enterprises are not venture-backed, venture capital has a particularly important role to play in high-growth enterprises. Innovative firms, particularly in high technology sectors, find it difficult to raise more traditional forms of finance (e.g. bank debt). Risk capital provided by the VC sector, and associated management experience therefore becomes crucial. The empirical evidence[31] shows that venture-backed start-ups redefine the US economy through direct effects and spill-over effects. Essentially, while Silicon Valley-spawned companies employ only a minority of all Americans, it is likely that productivity in the US economy would be significantly lower without the companies it has spawned. Similarly, the Agency-backed sector in Ireland employs just 15.5%[32] of the workforce yet we know that the presence of these companies has resulted in significant spillovers into the rest of the economy.

The evidence also suggests that governments can intervene to stimulate and support entrepreneurship and assist in providing supporting risk-capital. In Silicon Valley the government was the initial catalyst in the growth of the region and in particular sectors and firms. The presence of high-quality universities, a strong human capital base/good education, and a strong research base are crucial (although the minority of venture-backed firms are likely to be spin-outs from HEIs).

The venture capital environment is also crucial. However, venture capital and the entrepreneurs it funds are not a substitute for vibrant universities or corporate research labs – all elements are essential to a successful ecosystem.

THE TASKFORCE'S APPROACH – PLACING THE ENTREPRENEUR/ENTERPRISE AT THE CENTRE

While acknowledging the move towards a wider definition of innovation, the Taskforce's primary focus is, in accordance with our Terms of Reference, on innovation in an enterprise context.

In particular, we believe that the entrepreneur and innovative enterprises must be at the centre of our efforts to deliver the vision we have set out.

This focus on the entrepreneur and enterprise at the centre of the innovation ecosystem underpins the principles we have developed in the next chapter as the basis for our Report and our subsequent recommendations.

4: Principles for Success

The Taskforce has agreed six principles which we believe are fundamental to our goal of transforming Ireland into an International Innovation Hub.

1 **Our first fundamental principle is that the entrepreneur and enterprise must be at the centre of our efforts.** Our national policy framework must be shaped around encouraging entrepreneurs, retaining those who are here, and attracting others from abroad, by making it easier for them to succeed in Ireland than anywhere else in Europe. In particular, we must aim to attract serial entrepreneurs who have grown and exited businesses, and embarked on their next venture. Our legal, taxation and overall policy framework must be aligned and targeted towards achieving this end. Culturally, we must be supportive of and incentivise those high achievers who through their entrepreneurial and innovative efforts generate employment, increase tax receipts and thereby benefit the economy as a whole.

2 **Our second principle is that establishing, attracting growing and transforming enterprises must be the focus of a coherent national effort.** We must ensure that our national culture and policies are supportive of, and drive, ambition, innovation and transformation and accept that there will be some failures along the way. We have a number of advantages that we must exploit in this regard including our relatively small size and our thriving multinational community which offers significant potential for collaboration and the exploitation of converging technologies. Successful companies usually create a further positive feedback loop as entrepreneurial employees leave to create their start-ups as spin-outs from the parent company – in the case of IONA Technologies, more than 30 spin-outs emerged over a decade, usually with the full blessing of the senior IONA team. Individuals may therefore also need to demonstrate more flexibility and mobility in their career ambitions to achieve our Smart Economy vision.

3 **Our third principle is that the availability of smart capital is crucial for starting, growing and transforming enterprises.** Risk capital can be attracted to Ireland if we can create a culture of innovation, in which new ventures and companies grow rapidly and bring leading offerings to the global market. These offerings can be new

products, new services, new processes and/or new designs, and any combination of these. Rapid growth not only creates jobs, but also creates business experience in global markets which can then be fed back into new cycles of start-ups and into exploiting further waves of new technology. Generally, where possible, the provision of capital should be left to the market but there may be circumstances where the state needs to intervene to ensure that innovators and businesses have access to start-up and growth capital. Entrepreneurs who successfully exit their businesses should be encouraged to re-cycle their wealth directly into new businesses, and share their experience by mentoring younger entrepreneurs.

4 **Our fourth principle is that an education system which fosters independent thinking, creativity and innovation is vital to achieving the Smart Economy**. Education has a role both in developing the skills necessary for innovative export-led firms and more generally in engendering cultures and attitudes which are supportive to innovation more broadly. All levels of the education system must contribute to embedding these values in our population from the very young to the older members of our workforce. A particular focus must be on the development of creative, highly-skilled graduates as well as life-long learning, mentoring and continuous professional development.

5 **Our fifth principle is that the State should actively accelerate success by encouraging flagship projects (see chapter 8) and by prioritising the provision of excellent shared infrastructure.** The State can intervene by providing excellent infrastructure universally to all interested companies. Such shared infrastructure fairly obviously includes transport and logistics networks, broadband, and "wet" laboratories for life science companies. But from time to time, it may emerge that an intelligent and far-sighted intervention by the State can provide a substantial, competitive and, ideally, unique advantage to companies operating in Ireland. Such interventions may change and disrupt an entire global industry because those companies using the new infrastructure gain considerable advantage over their international competitors allowing Irish companies develop a solution which can then be exported. This in turn can attract yet further foreign direct investment, as companies come to Ireland to use this highly innovative infrastructure. The State benefits by the additional employment resulting from companies using the infrastructure, and possibly also from revenues received by use of the infrastructure itself. This State investment must be undertaken with a holistic view of its return on investment.

6 **Our final principle is that we must sharpen the focus of our national research system to ensure that it is targeted at areas of potential strategic and economic advantage for Ireland.** In particular, our research system must be aligned with an effective technology transfer and commercialisation infrastructure to ensure that the significant investment being made yields increasing rewards to economy and society in terms of employment, revenue and solutions to societal challenges. This requires action from Public Research Funding Agencies, from Higher Education Institutions, and from enterprise and individual researchers. The inclusion by some HEIs of innovation as a third pillar of education alongside teaching and research is a welcome development. We believe that further transformation is necessary to maximise the relevance of our research system to the changing demands of an export-focussed Smart Economy.

In the chapters which follow we set out a series of recommendations informed by these principles which we believe will help to achieve our vision of a successful innovation ecosystem with the entrepreneur and enterprise as its central driver.

The order of the chapters reflects a logical flow through the elements of the ecosystem, rather than any ranking of importance.

5. Strengthening the Knowledge Base

Traditionally, economic growth has been seen as accumulating physical capital and putting it to work to make things which could be sold to the end user. Capital is still important, but knowledge is the new currency of the innovation economy and our long-term economic success is tied inextricably to human and knowledge capital.

The innovative enterprises we spoke about in the previous chapters need all three forms of capital to fuel their growth.

The education system is therefore pivotal in making innovation happen. It is the key to fostering the generic qualities of problem solving, creativity and other personal skills development that can have a far reaching impact on the innovation capacity of Irish society. Curriculum developments at primary and post-primary levels, aimed at developing these generic qualities from an early age need to be resourced and given impetus as part of our overall innovation strategy. Many of the building blocks to support the innovation transformation have been laid. The primary curriculum has been overhauled and is now much more learner centred. At second level, important recent elements of a continuing programme of curriculum reform have included a new Junior Certificate Science syllabus, a new subject of Leaving Certificate Technology and a revised programme in Design and Graphics Communication. Project Maths is rolling out with a strong problem-solving focus. In higher education the transformation has been profound as research and commercialisation have, alongside teaching, become a core part of the mission.

The most important recommendation we can make is to keep faith with this overall direction. This is no trivial task, however. Already, economic contraction has meant that the pace of investment has been slowed and catching up will require serious consideration or rebalancing investment priorities within the NDP. We recommend that this should be done.

Nor can we let the overall soundness of the current strategic direction blind us to areas at each level of the education system where there is significant room for improvement. Therefore, in this chapter, we focus both on the overarching investment priority and the specific areas where change is needed.

It is important to note that education was one of many significant and complex issues which the Taskforce had to consider over a relatively short period of time. We do not claim that our recommendations are comprehensive or cover all the elements of educational reform which need to be undertaken to transform Ireland into an International Innovation Hub. Instead we focus on areas of particular concern to our members and those who made submissions to us. Where relevant we acknowledge the work of other groups who are specifically focussing on aspects relevant to our remit, in particular the Higher Education Strategy Group which is considering reform within the sector.

STATE INVESTMENT IN R&D

Only fifteen years ago, Ireland had no significant research base to speak of. The level of research and development activity was low in both higher education and industry. Since then, Government has established a new agency, SFI, to increase the quality and quantity of research performed in Ireland, and PRTLI investments have delivered world class research infrastructures. These initiatives and other research investments have supported the development of higher education based research that is of world class standard (our world ranking of research quality has increased from 33rd in 2003 to 17th in 2009[33]) and fits with wider supports for commercialisation and business R&D (see example in Box 5.1 below). This is an essential first step towards a fully functioning innovation ecosystem.

Box 5.1

The Centre for Research in Adaptive Nanostructures and Nanodevices (CRANN), TCD, UCC and Hewlett-Packard

The Centre for Research in Adaptive Nanostructures and Nanodevices (CRANN) is an SFI-funded research centre at Trinity College Dublin and University College Cork. Over the last three years the investigators in the centre have collaborated with Hewlett-Packard (HP) in the joint development of flexible, transparent and highly conductive thin films. This project uses fundamental research that has been undertaken in the universities and is directly linked to a major strategic initiative within HP to develop flexible, transparent displays – "electronic paper" – utilising low-cost role-to-role manufacturing.

The research programme is funded through the SFI CSET programme, with additional Industrial and Development Agency (IDA Ireland) funding supporting associated technology development within HP Ireland. The collaboration has produced outstanding results; the novel technologies developed have been used to manufacture prototypes across the HP organisation including HP Labs in Bristol and Palo Alto, and the Technology Development Organisation in Corvallis. A number of scientific papers have been published in high-impact-factor journals and the techniques developed have resulted in invention disclosures at both CRANN and HP leading to patent applications. Most importantly, the research has now resulted in the project outputs being identified on the global HP product development roadmap as a technology candidate for next-generation products, providing the opportunity for technology developed in Ireland to underpin a major new product initiative for a global multinational corporation.

As a result of this SFI-sponsored programme HP Ireland is now recognised within HP as a provider of important technology solutions for the organisation – enabling the growth of the research mandate locally. CRANN is now well integrated into HP Corporation and has developed a new and more extensive research programme to continue into the future. Ireland is now associated with creative research and innovation, a recognition that is critical for Ireland as it demonstrates a capacity to deliver real value to industry, aiding in the attraction of new foreign direct investment and the further embedding of existing industry and their associated jobs.

However, there are two big dangers as we see it. Firstly, that investment in knowledge creation will not be maintained. And secondly, higher education institutions will fail to build the connections with industry to ensure that this research gets commercialised, an issue which we address specifically in the next chapter.

5.1 Key Recommendation

Deliver on the investment framework set out in the Strategy for Science, Technology and Innovation (SSTI) 2006-13 and achieve the goal in the renewed Programme for Government of investing 3% of GDP in R&D by committing to investment in an updated SSTI for the 2014-2020 period.

The current family of agencies that fund or engage in research include SFI, EI, IDA, HRB, IRCSET, IRCHSS, EPA, SEI, TEAGASC, the Marine Institute, and the HEA which also has an overarching responsibility for allocation of funding across the higher education system. Whilst these structures have the strength of each agency delivering to the needs of their specific communities, the multiplicity of agencies places limitations on the capacity to ensure sufficient focus, as well as efficiency, coherence and value for money.

Improved co-ordination is required between all the Irish public agencies that manage research funding, to ensure optimum Value for Money of public research funding. We recognise that value for money is measured by tangible indicators such as IP, spin-out companies and jobs, as well as more intangible factors such as an increased knowledge base, a pool of skilled graduates and international reputation.

We recommend that steps be taken to improve this co-ordination as a matter of priority, building on the announcement in Budget 2010 of a move to a single funding stream, to ensure that all research funding is being used in the best way possible to help the entrepreneur/enterprise to succeed. An identified pathway to fund each research project would also remove barriers which arise when a project needs to switch between different funding agencies during the process, including appropriate commercialisation supports.

While we recognise that continued funding of a broad base of fundamental research is crucial to the future of the Smart Economy, we also believe that, as we build towards a goal of investing 3% of GDP in R&D, greater resources should be committed to funding applied research that is focused on the needs of industry in Ireland, while continuing to invest in the people, skills and reputation that comes from active world class researchers working in areas of importance to the Irish economy. This prioritisation and focus should be informed by detailed analysis and underpin the efforts of all relevant Departments and Agencies. Implementation of several recommendations in this report, such as proposed Flagship projects (Recommendation 8.1) should also be aligned with identified national priorities.

5.2 Key Recommendation

Building on the announcement in Budget 2010, the current structures for delivery of research funding should be reformed with the goal of implementing the following changes:

+ Consolidate funding streams and enhance co-ordination to deliver optimum value-for-money;
+ Ensure that funded research has an identified funding pathway and single lead responsible agency, underpinned by commercialisation supports;
+ As we build towards our goal of investing 3% of GDP in R&D, commit greater resources to funding applied research that is focused on identified priority opportunities for industry in Ireland.

IMPROVING HUMAN CAPITAL: PRIMARY & SECOND LEVEL EDUCATION

We believe that Ireland needs to substantially raise national mathematical and pure science attainment, particularly at second level.

A diverse range of advisory groups (including the Expert Group on Future Skills Needs[34] and the National Competitiveness Council[35]) and key enterprise and professional bodies (including ICT Ireland and Engineers Ireland) have recognised the need for Ireland to raise its level of mathematical achievement to ensure it will continue to successfully compete with other economies and to fulfil the Government's vision of the Smart Economy. Ireland's ability to reposition industry towards knowledge intensive high-technology sectors will depend critically on the supply of people with mathematics, science, engineering and technology skills.

Mathematics is important because it underpins many other disciplines such as science, technology, business and finance. Knowledge of mathematics is also a prerequisite for many occupations with which it may not normally be associated including nursing and social science related occupations. Higher-level mathematics will be a key determinant of Ireland's ability to create a cohort of top tier, world-class engineering and science graduates. It is also fundamental requirement for the development of a world-class research and innovation system in Ireland.

We strongly endorse the Project Maths programme which is a significant investment in promoting better understanding of mathematics at second level, enhancing attainment and increasing the proportion of students taking higher-level mathematics and must be commended. We also note that the Minister for Education and Science is establishing a group in partnership with industry, HEIs and the second level system to see how best positive attitudes to maths can be promoted, how participation in higher-level maths can be increased and to add value to the Project Maths initiative. We suggest that a panel of international experts in mathematics from outside the Irish system should be established by the National Council for Curriculum & Assessment (NCCA) to support the work of this Group and the ongoing implementation of Project Maths generally.

The Taskforce also calls for more experienced mathematicians, engineers and scientists to make themselves available to provide mentoring and support to teachers and to talented students.

5.3 Key Recommendation

Introduce additional measures to promote the take-up of higher level maths, including possible incentives such as the awarding by HEIs of CAO bonus points on a pilot basis starting with Leaving Certificate 2012, so that this year's LC cohort can make informed subject choices on commencing Fifth Year.

5.4 Supporting Recommendation

+ Increase investment in intensive training for mathematics teachers and the full rollout of Project Maths;
+ Implement the new syllabuses in Leaving Certificate Biology, Physics and Chemistry. Implement new approaches to assessment based on the experience of the current trial in schools;
+ Introduce a new mentoring programme for teachers and talented students, involving experienced mathematicians, engineers and scientists who we would encourage to make a wider contribution to advancing the quality of teaching and learning in their discipline.

IMPROVING HUMAN CAPITAL: HIGHER EDUCATION

Higher Education is central to the innovation society. Higher Education advances the knowledge and skills of students and trains the next generation of researchers, policy makers and business leaders. HEIs have a specific responsibility to create new knowledge which underpins the evolution of new services and products. All of this happens through constant interaction between students, staff and society at large. We see four vital roles for HEIs, specifically.

1. Undertake excellent research, scholarship and teaching across all disciplines, which is reflected in the quality of graduates emerging into the labour market;
2. Develop strong research groups selected for funding in a competitive manner in identified areas of strategic priority which have the capacity to impact on the full research and innovation continuum;
3. Strengthen the commercialisation function and increasingly generate economic value from the intellectual property generated (we will deal specifically with some of these issues in the next chapter on knowledge transfer);
4. Collaborate with and support entrepreneurs and enterprises in research, innovation and commercialisation and provide associated skills through life-long learning.

As part of the drive for improved national competitiveness and the need to add maximum value through public investment, the number and roles of institutions within Higher Education is currently being considered by the Higher Education Review Group.

We very much welcome and strongly support the TCD-UCD Innovation Alliance announced in March 2009 (for further information on the TCD-UCD Alliance see Text box 5.2 below) and the recently announced strategic alliance between the University of Limerick and NUI Galway.

We believe that such inter-HEI alliances, including partnerships with top tier overseas HEIs, such as the NUIG/UL relationship with Georgia Tech, must be developed and strengthened, and strong performance incentivised, to ensure that our research and technology transfer ecosystem has the necessary scale and capacity to drive us towards our vision of the Innovation Island. We would also encourage cross-border co-operation with HEIs in Northern Ireland to help achieve critical mass in areas where the island can compete internationally.

Box 5.2

TCD-UCD Innovation Alliance

The Innovation Alliance between Trinity College Dublin and University College Dublin established on 11 March 2009 combines the strengths of the two near-neighbour institutions to help develop a strong innovation ecosystem for Ireland. It will engage with enterprise and government on specific initiatives to transform graduate education and scale up enterprise development and has a number of components.

THE INNOVATION ACADEMY

The Innovation Academy builds on the respective strengths of the universities to create a robust and mutually beneficial continuum between teaching, research and innovation. The overarching goal of the Innovation Academy is to produce a new breed of graduate, expert in their disciplines, but imbued with the creativity, entrepreneurship, mentoring and supports to rapidly convert knowledge, ideas and inventions into commercial use and societal benefit. Conceptually, the Innovation Academy will broaden the student experience through formal entrepreneurship and innovation training, producing business aware and policy-adept graduates – adding value to the organisations they enter as employees and enabled, through their training, to engage in the creation of new ventures themselves.

A JOINT VENTURE IN ENTERPRISE DEVELOPMENT

A key objective of the Innovation Alliance is to enhance the commercialisation of ideas, discoveries and inventions generated within the institutions – arising from specific university-based research of our staff, or from the innate creativity of our students or our research partners. To drive the development of technology- and ideas-intensive enterprise, the Alliance is developing a new joint venture – built around true incubation and scaling – to facilitate:

+ A joint approach to scale-up the capture, protection and commercialisation of intellectual property, with a major operational shift towards open innovation and increased deal flow;
+ An embedded one-stop solution for business creation and dedicated incubation. It will maximize the pre-investment value of Irish-based intellectual property through inclusion of all the necessary supports for pre-money early-stage companies, including mentoring, legal expertise, market experts, accommodation, prototyping, and financial advice;
+ Co-developed and co-marketed enterprise capabilities across the institutions, underpinning the future growth and scaling of new ventures post-investment. These facilities will house campus companies spinning-out of the two universities but equally the spinning-in of national and international companies, where proximity to the academic expertise and campus-based technologies of the Alliance partners will confer a competitive advantage.

JOINT RESEARCH STRATEGY

The Innovation Alliance will build on existing expertise and investments to advance research programmes of scale which focus on important national needs, maintain established foreign direct investment, attract additional FDI, include indigenous enterprise, train graduates, and engage partners through an open innovation framework. A framework will be developed to incentivise participation by industry (building on existing research and training relationships with over 400 companies) through all available mechanisms, including public-private partnership with the State.

We believe that the new HE strategy must create a momentum for rationalisation of provision, stronger collaboration between providers and with enterprise and employers and continuous improvement in education outcomes. It will also need to address the requirement for an investment framework for the future which is based on a realistic assessment of needs, an acknowledgment of the limited capacity of public funding to fully address those needs and, as a corollary, the requirement for a diversity of revenue earning options for HEIs, including commercialisation and possibly tuition fees.

We are also recommending further collaboration with regard to developing standardised approaches to commercialising Intellectual Property which would involve all higher education institutions (see chapter 6).

5.5 Supporting Recommendation

Drawing on the example of the TCD-UCD Innovation Alliance and the more recent NUIG-UL Strategic Alliance, we support further collaboration, alliances and streamlining of provision between HEIs as well as new models of HEI-industry collaboration.

CONTRIBUTION OF ARTS, HUMANITIES AND SOCIAL SCIENCES

The relationship between the science, engineering and technology disciplines and innovation is well articulated in several policy documents. Less developed and understood is the role that the arts, humanities and social sciences can play in supporting enterprise and employment. While fully endorsing the emphasis placed on science and technology in the SSTI, the Taskforce believes that in a well-functioning innovation ecosystem STEM disciplines are complemented by the arts, humanities and the social sciences (AHSS) and more needs to be done to enhance that complementarity. Innovation, increasingly, will occur at the margins of disciplines. There are great opportunities to be grasped by merging the potential of the AHSS with scientific possibilities. By sharing diverse ideas, insights and approaches we can make the greatest progress in meeting a range of social and economic challenges.

The AHSS contribute to innovation at a societal and individual level. For the individual, the AHSS disciplines develop a wide range of skills beyond specific qualifications. These skills, described as generic because they can be applied in a wide variety of non-discipline specific areas, include critical and analytical thinking, cultural awareness, communication and broader perspectives. They are skills much sought after by employers in innovative industries and businesses for their contribution to a more flexible and multi-skilled person. These skills are particularly relevant in the context of the trend towards convergence (see chapter 8).

The Arts and Humanities can help translate science to the wider public while visual art and design research can make complex information more understandable. Research in law underpins the efficiency of Intellectual Property in incentivising and rewarding innovation while modern languages play an obvious role in driving international trade and cross-cultural collaboration. These disciplines also have a unique contribution to make to certain sectors of the economy including services and what are broadly described as the creative and cultural industries.

Creative industries such as television, on-line education provision, web design, development of assistive technologies and digital content are good examples of areas of economic activity which effectively harness the synergies between AHSS disciplines and those of SET. They are leading to increasing economic returns from the creation of intellectual property as well as services in areas such as marketing and advertising.

5.6 Supporting Recommendation

Promote the contribution of AHSS to the innovation ecosystem, and, in particular, seek to increase synergies between different disciplines within AHSS and SET disciplines.

CULTIVATING ENTREPRENEURSHIP IN HEIs

There is scope to increase the focus on entrepreneurship within HEIs in Ireland, with a view to ensuring that both undergraduates and postgraduates are exposed to the concept and encouraged to develop the inter-disciplinary skills required to translate their academic learning into the enterprise arena (as is envisaged in our fourth principle). This applies across all degree programmes, including engineering, science, law, business studies and the creative arts. The TCD-UCD Innovation Alliance includes a number of specific measures to help achieve this objective and the Taskforce welcomes these and supports their implementation.

The Taskforce also suggests that HEIs, with support from relevant agencies, develop Business Plan Competitions with funded prizes which would provide seed capital for winning students to start new enterprises.

5.7 Supporting Recommendation

All HEIs should introduce initiatives to cultivate innovation and entrepreneurship at both undergraduate and postgraduate level, drawing where appropriate on the model proposed by the TCD-UCD Alliance. This could include Business Plan Competitions with funded prizes.

BUILD THE COHORT OF WORLD CLASS GRADUATES WORKING IN IRELAND

As well as building the base of skills across society in the areas of science, engineering and maths, and enhancing national interest in courses in engineering and science in our HEIs, there is a need to create a cohort of top tier, world-class engineering and science graduates who are versed in the very latest technology developments world-wide. The principal vehicle to achieve this is investment which supports world-class, peer reviewed research and PhD education in HEIs. Under the SSTI, graduate education has been improved by the move to structured PhDs and the consequent broadening of the skills base in graduate education. Our vision requires a more energetic flow of people between HEIs and industry and vice versa. It is important therefore to progress implementation of the research careers framework which has recently been developed.

One further way which could help to strengthen the base of highly-skilled graduates in Ireland, is to increase participation by Irish students in world-leading institutions abroad and create an incentive for these engineers and scientists to work in Ireland during their careers. This can be seen as complementing our recommendations in the section below about internationalisation of Irish education and two-way flows of students through the Irish system.

5.8 Supporting Recommendation

Introduce a Programme to incentivise participation in certain postgraduate courses in the world's top ten Engineering, Science and Business Schools by individuals who would then return to work in Ireland. One approach would be a limited tax relief 'futures' scheme which would allow successful graduates avail of a personal tax relief to offset their tax liabilities arising from employment within the State. An alternative would be a two-way mobility programme between Ireland and international HEIs.

INTERNATIONAL STUDENTS

International students can play an important role in national innovation systems. The Taskforce believes that Ireland should create the kind of virtuous circle observed in the US where an excellent research and innovation system attracts the best international students and faculty. This in turn enhances the quality and reputation of the system and its institutions which then support high levels of commercialisation and a well qualified pool of employees for industry.

A new co-ordinated approach to marketing Ireland to international students is now being implemented by the Government working with the HEIs. Attracting top tier students to Ireland also helps raise Ireland's international profile in general in the global research community. Top tier foreign alumni from Irish HEIs may in turn rise in their own societies to be advocates for Ireland. This could be particularly important in building linkages with new high growth markets.

Attracting PhD students from outside the EU plays an important part in our overall innovation eco-system by building the base of high quality students who will in turn facilitate knowledge transfer into enterprise and commercialisation of research. The contribution of these students needs to be adequately reflected in future funding and fees frameworks (for example through the HEA) and marketing efforts by the HEIs.

Considerable progress has been made in simplifying immigration and work permit requirements for overseas researchers in both HEIs and industry, most recently through the Hosting Agreement Initiative. However in order to remain attractive, we need to go further to ensure that PhD students and PhD graduates from overseas do not face difficulties in obtaining residency status.

In addition, it is important that we incentivise such highly-qualified students to remain in Ireland and facilitate them, either in seeking employment in Ireland, or in working towards establishment of their own company.

5.9 Supporting Recommendations

+ Ensure effective streamlined immigration arrangements for SSTI-related PhD students, postdoctoral researchers and their families re-locating to Ireland;
+ Introduce fast-track residency status for PhD graduates employed by Irish-based businesses;
+ Increase the current six month extension during which a PhD graduate can stay in Ireland to seek another job to 12 months.

LIFE-LONG LEARNING

A more concerted national effort at workforce up-skilling is essential to building a competitive and productive workforce that can support innovation across the economy.

On the basis of international metrics, Ireland performs well in terms of overall higher education participation and attainment. Our participation rate is continually increasing and has grown from 55% in 2004 to 66% in 2007 and is now approaching 70%[36]. However, these figures conceal an important age profile differential in overall educational attainment. Ireland is in the top quartile of the OECD for tertiary education attainment among the 25-34 year age groups and is just 1% below the top quartile in the 35-44 year age groups. However, Ireland performs less well comparatively for the over 45s[37]. This reflects the fact that many of those currently working have not had the opportunity to participate in higher education.

It is essential that we continue to improve participation rates in higher education. However, we must also recognise many of those currently working have not had the opportunity to participate in higher education. This represents both a challenge in that we are under-skilled compared to many of our competitors, but also an opportunity. A positive change to this profile could lead to a significant improvement in national productivity and competitiveness.

5.10 Supporting Recommendation

There should be a policy shift towards life-long learning within our Higher Education, Further Education and training system. HEIs, FÁS, and other public agencies, as well as employers, need to better align their respective roles in this regard.

6. Transferring Knowledge

Higher Education Institutions play a key role in developing research in identified areas of strategic priority and in strengthening the commercialisation function and generation of economic value from the intellectual property generated. We must optimise knowledge transfer between HEIs and Industry.

In this chapter, we suggest action in a number of different areas to improve the linkages between HEIs and other elements of the national innovation system, particularly industry and relevant Government Agencies. We focus on the need to further incentivise innovation within HEIs and on the need to improve the efficiency and effectiveness of our system for converting IP into commercialised products and services. The goal is to facilitate optimum knowledge transfer between HEIs and industry (for an example see Box 6.1 below), and to fast-track the access by entrepreneurs, existing companies and start-ups to HEI IP, enabling existing companies to scale, and supporting developments in areas such as converging technologies.

Box 6.1

Neonatal Brain Research Group, UCC

Science Foundation Ireland Principal Investigators, Dr. Geraldine Boylan, Dr. Gordon Lightfoot and Dr. Liam Marnane conduct research in the Neonatal Brain Research Group in UCC. The group has developed innovative software to detect seizures in newborn babies. Seizures, which are often impossible to detect visually, may occur in up 20% of premature infants and require immediate evaluation and treatment to prevent long term brain injury.

The primary detection tool used by the Neonatal Brain Research Group uses an EEG (electroencephalograph) device that measures the electrical activity of the brain. The group has developed an innovative technology using signal processing and machine learning techniques to automatically detect seizures from this electrical activity. The patented intellectual property developed has led to the acquisition of additional grants from other funding agencies including the Wellcome Trust, Enterprise Ireland and the European Union. In addition, the research team is collaborating with a global healthcare company, Cardinal Health, to bring their novel technologies to market.

CareFusion is a medical-technology company that is a wholly owned subsidiary of Cardinal Health. CareFusion's Irish operation has been based in Gort, Co. Galway, for over three years. With over 100 employees, CareFusion manufactures a large range of medical device products, which are distributed to over 70 countries worldwide and provide clinical diagnosis and treatment for patients with serious illnesses.

KNOWLEDGE TRANSFER FROM HIGHER EDUCATION INSTITUTIONS INTO INDUSTRY

There is an opportunity to strengthen the links between business and HEIs through the use of graduate and undergraduate placement programmes. Such placements will help businesses improve their competitiveness and productivity and ensure that graduates have relevant industry experience, which is particularly important in the current economic downturn.

A radical shift is now needed in the experience which our undergraduates and postgraduates undergo at our HEIs. Innovation and entrepreneurship needs to be fostered in young graduates and in society at large. Our HEIs can do much to nurture and foster an aspiration to start a company, by exposing their students to some of the issues involved but practical experience through placements could prove valuable in grounding theoretical learning in the reality of operating in industry.

Given the current depressed labour market, there is a risk that recent graduates in Engineering and Science, and other disciplines, may emigrate or have their skills decline, leaving a skills shortfall in the labour market in the medium term.

Graduate internships provide an opportunity for companies to benefit from the skills and knowledge acquired through the education system, while giving graduates an opportunity to gain initial experience in the workplace.

The Government introduced a range of new labour market activation measures during 2009 including a Work Placement Programme managed by FÁS, which facilitates graduates for a maximum placement of nine months, provided that they have been in receipt of social welfare for at least three months. The scheme is limited to 2,000 individuals nationwide and those placed continue to receive their social welfare entitlements.

The Taskforce believes that there is scope to supplement this with a targeted scheme for graduates with STEM degrees. This should allow for placement of up to 12 months and be structured through a bursary scheme involving payment of unemployment allowance as well as a top-up payment by the employer, while making clear that a company has no legal obligation at the end of the internship to confer employment.

To be successful this will require strong support and participation from industry. The relevant industry representative bodies should take a leading role in developing and promoting it to their members.

6.1 Supporting Recommendations

+ Introduce a scheme similar to the "Knowledge Transfer Partnership Programme" in the UK[38] by placing recent graduates in companies to facilitate the transfer of high technology skills and expertise;
+ As part of the current Work Placement Programme introduce a targeted strand for STEM graduates with the assistance of industry representative bodies;
+ Establish a national undergraduate internship programme which builds on existing HEI initiatives but has a more concerted involvement of industry, especially as regards consistency in the availability of places. This may require an element of subsidisation for the participating firms.

STRENGTHEN ENTREPRENEURIAL CULTURE IN HIGHER EDUCATION INSTITUTIONS

The Taskforce believes that we need to recognise and reward entrepreneurial culture in our HEIs in accordance with our sixth principle. Specifically, a clear career path is needed that develops people's talents and which fixes a remuneration framework which rewards people appropriately and encourages mobility.

HEIs can develop many initiatives to improve the current culture of innovation and IP management within their institutions. Career promotions should be linked to innovation activities. Specific outputs that are not covered by a publication list (e.g. licensed, rather than unlicensed dormant, patents; specific collaborations with business; consultancy work; product design and development collaborations; involvement in a spin-out etc.) should be criteria for appointments and promotion. Alumni who are innovators should be celebrated. "Innovation Champions" whose role is to identify commercialisation opportunities and advise and encourage colleagues on matters relating to innovation can be appointed within each HEI Department and School. There should be regular training and education on IP issues. Senior researchers could also be temporarily seconded to an entrepreneur who licenses IP.

6.2 Supporting Recommendation

+ Implement a new suite of HR and performance management policies in the HEIs to incentivise and reward innovation and commercialisation. These should include:
  - Facilitation of staff who wish to provide their expertise to innovative companies, through full-time or part-time secondments. The filling of any vacancies arising from such secondments should be exempt from any restrictions relating to the Employment Control Framework;
  - Seek to ensure that academics who take leave of absence/sabbaticals to gain industry experience, are not penalised in their academic career;
  - Ensure that career advancement is based on valuing commercialisation work as well as research and teaching performance.
+ Researchers who develop technology that is transferred to a company through a licence or other mechanism should be invited to apply for specific State research funding to further support the basic research programs being conducted in that researcher's laboratories (e.g. similar to the UK ROPA (Realising Our Potential Awards) Scheme).

FURTHER ASSISTING COMMERCIALISATION

The Business Partners Programme was established in 2009 as a pilot programme to give participating entrepreneurs access to EI's portfolio of potential start-up companies. EI works with individuals on a defined research project to produce a start-up ready company in six months.

The entrepreneurs who get involved have the experience of building start-up teams around new businesses. They also have management experience in technology-based companies and in developing technology concepts into commercial product or service offers. The programme has proven very successful in its pilot phase, and EI should continue to run the programme in 2010 and beyond.

Commercialisation of State sponsored R&D should be further catalysed by enabling both Irish resident and overseas entrepreneurs to be placed into HEI R&D centres and laboratories. Entrepreneur in residence schemes can also have fruitful impact on academic researchers by helping them understand key research challenges and opportunities faced by specific global industries, and the industry "state of practice". In turn this may make researchers more likely to produce research solutions to existing commercial problems. A scheme on these lines was introduced by SFI in 2009 and should be maintained and promoted.

Laboratory access programmes to HEIs are reasonably common in, for example, the USA. They provide an opportunity for SMEs, who with their own resources could not afford expensive research equipment, to undertake their own advanced development. In the Irish case, access on commercial terms may be attractive to both SMEs and the HEIs.

Product design and development teaching programs – conducted in close collaboration with industry partners around specific projects – are also in use at leading US HEI engineering departments as extensions of company in-house product development teams. Companies work with these engineering school programs to test drive new product concepts not on their critical path, or to gain access to out-of-the-box thinking by university graduate students and faculty.

6.3 Supporting Recommendations

+ Introduce a scheme to ensure greater access by industry to HEI specialist equipment and laboratories;
+ Significantly increase the placement of "entrepreneurs in residence" into relevant R&D laboratories and centres of the HEIs.

INTELLECTUAL PROPERTY ARISING FROM STATE SPONSORED R&D IN HIGHER EDUCATION INSTITUTIONS

The Intellectual Property created in the nation's HEIs is a critical building block of an innovative Smart Economy and is central to our first principle. Entrepreneurs and companies need a clear, consistent, speedy and predictable system to facilitate their engagement in research with HEIs, and to find and access IP created at HEIs, in order to turn it into products and services that meet customer needs.

Ideally, this system should enable an entrepreneur or company to:

+ go to a single location to find all research opportunities and all IP that has been generated across the entire HEI system;
+ immediately get referred to the key person who will negotiate an agreement, and only be required to negotiate with one key person, even if the activity/IP exists in multiple HEIs;
+ get the same, standard, predictable and professional service every time they access the system.

Such a system would give Ireland a competitive advantage over many other countries, as the place to go to innovate.

The Taskforce recognises that significant progress has been made in recent years towards achieving these goals - particularly with the strengthening of the Technology Transfer and Development offices of the HEIs, funded through Enterprise Ireland. We also recognise, however, that there is more work to be done in order to get to a system that is truly entrepreneur-friendly.

Our consultation process highlighted a view that there is currently a disparity of approaches to finding and accessing IP from the various HEIs which makes it time consuming, expensive and challenging to commercially exploit Irish State funded IP, particularly in cases where multiple HEIs may be involved in assembling technology for an innovative solution.

We are aware of the concurrent Forfás Review of Current Supports to Encourage the Exploitation of Intellectual Property (IP) emanating from the Higher Level Research Sector and we look forward to the findings of that report.

We acknowledge that an efficient system for facilitating industry involvement in State-funded research with HEIs, and for commercialising IP from HEIs, involves input and participation from a number of stakeholders, including Government, R&D funding agencies, the HEIs, and the entrepreneurs and companies that use the IP. All links in the chain must operate efficiently in order for the system as a whole to function properly. As a starting point these stakeholders should agree that the key principle in commercialising IP from publicly-funded research should be the gross return to the economy, and not solely to the HEI(s) involved, while respecting the importance of maintaining the incentives to individual researchers. When evaluating the "gross return to the economy" here, we mean issues such as the creation of jobs and new companies, enabling existing companies to scale, and supporting developments in areas such as converging technologies.

With that in mind, we make the following recommendations with a view to building on past progress and achieving the system described above.

Position Ireland as one location in the EU where there is a clear and consistent national policy and rules for the ownership of and access to State supported IP.

There is currently confusion amongst both industry and HEIs around national policy in respect of the terms that apply to HEI-industry research and access rights to HEI IP. This is not an issue unique to Ireland, and other countries have taken initiatives to improve the situation.

Industry needs predictability around these issues. We know from international experience that predictability and consistency of approach in respect of industry-HEI interactions evolves over time (e.g. transaction rate; scale; long term partnerships). Consistency can also be created by way of legislation (e.g. Bayh Dole Act in USA).

Ireland has an opportunity to be one of the few locations in the world for which there is clear, fair and unambiguous operating procedures for State supported IP. We recommend a national IP Protocol be introduced, which establishes "ground rules" which must be followed when agreeing terms around ownership of and access to all State supported IP. It should deal with at least the following issues:

IN RESEARCH PROJECTS WITH INDUSTRY:

+ the criteria for deciding ownership and access to IP (it is envisaged the criteria would set out: all the possible optional contributions which the entrepreneur could make to the project (both financial and in-kind); other possible returns to Ireland/EEA which could result from the project, and the rights re IP ownership and access which the entrepreneur would be entitled to in return for those contributions/returns);
+ the criteria for agreeing appropriate warranties and indemnities;
+ the mutual responsibilities, obligations and rights of collaborating parties;
+ the responsibilities, obligations and rights of parties to declare background IP;
+ the ability and limitations of an academic researcher to publish and use results for research purposes.

IN LICENSES TO INDUSTRY:

+ the criteria for agreeing appropriate warranties and indemnities;
+ issues relating to payments and returns to be sought by the State for licenses and spin-outs: with the key principle being the gross return to the economy, and not solely to the HEI(s) involved being the prime outcome sought, while respecting the importance to maintain the incentives to individual researchers.

Once the IP Protocol has been developed, more meaningful metrics by which the HEIs and TTOs are measured, need to be adopted, to reflect this IP Protocol.

In order to incentivise innovation and commercialisation activities within HEIs, a proportion of State funding for the HEIs should be linked to national metrics on innovation and commercialisation.

6.4 Key Recommendation

+ Develop and publish a national IP Protocol, which establishes "ground rules" which must be followed, when agreeing terms around ownership of and access to all State supported IP;
+ Adopt more meaningful metrics by which HEIs and TTOs are measured, to reflect the IP Protocol;
+ Link a proportion of State funding for the HEIs to national metrics on innovation and commercialisation.

CLARIFY AND STANDARDISE IP TERMS OF STATE FUNDING AGENCIES

There have been mixed signals from various State funding agencies with respect to expectations around IP management. Funding agencies need to adopt a clear and standardised approach around this issue, to ensure HEI IP has optimum commercial value, and to "fast-track" the due diligence process for the entrepreneur.

There have also been mixed signals from various State funding agencies with respect to the expected returns/outputs from HEI-industry research collaborations. This has led to strained relations between HEIs and industry. This is not an issue unique to Ireland, and other countries have recognised this issue and have taken initiatives to improve the situation. Funding agencies need to develop a framework to enable speedy agreement between HEI and industry collaborators of research terms, and which are in line with the IP Protocol.

6.5 Supporting Recommendation

+ Ensure all funding agencies adopt and publish standardised requirements for the management of IP within HEIs, in accordance with the IP Protocol;
+ Develop a framework to ensure that, when funding collaborative projects, all terms are agreed between collaborators before the related funding is drawn down and that those terms are aligned with the IP Protocol.

ENSURE THAT IP PROCEDURES, PROCESSES AND CONTRACTS WITHIN HEIs ARE WORLD CLASS AND STANDARDISED ACROSS HEIs AS FAR AS POSSIBLE

HEI researchers need to properly manage their IP in order to ensure it has optimum commercial value, and to "fast-track" the due diligence process for the entrepreneur. As the employers of the researchers, HEIs play an important role in improving the culture of IP management by researchers.

HEIs could introduce a number of initiatives to enable industry to experience a predictable, consistent and speedy approach in all interactions in respect of HEI IP. The development of model contracts, and alignment of IP policies amongst all HEIs, would greatly assist industry in this respect.

6.6 Supporting Recommendations

Ensure:

+ The IP management policies and procedures within all HEIs are best in class, in particular to avoid inadvertent IP leakage or inadvertent exposure to commercial liability, and that these policies and procedures are standardised across all HEIs, as far as possible;
+ That, with the assistance of funding agencies, researchers within HEIs are appropriately incentivised to properly manage their IP;
+ Agreements between HEIs are in place to enable speedy licensing of IP from multiple HEIs in accordance with the IP Protocol, with a single commercial lead;
+ An expert group of representatives from the HEIs and the private sector is appointed to develop model contracts, in line with the IP Protocol, for all activities at the HEI/Industry interface, to be used by all HEIs at the option of the entrepreneur/company (i.e. non-disclosure agreements, material transfer agreements, licence agreements, etc.) (internationally accepted model contracts to be used as a starting point).

RATIONALISE THE PROCESS OF FINDING, ACCESSING AND BUNDLING IP FROM THE HEIs

The Taskforce recognises that significant progress has been achieved in recent years in establishing the TTOs and that the initial priority should be to establish and implement a National IP Protocol and deliver the related recommendations above (6.4-6.6). In tandem with this, we believe steps are required to enable speedy access to HEI IP and in particular IP bundling which take account of our principle that the entrepreneur and enterprise must be at the centre of our efforts.

6.7 Key Recommendation

Convene an expert group of representatives from Industry, the VC sector, the HEIs, the legal profession, and the public sector, who are informed by TT structures internationally, to recommend, by September 2010, the most appropriate structure that would achieve the following:

+ A national office that has knowledge about current research projects and access to all IP created throughout the HEI system as well as the mandate to bundle, market and facilitate speedy commercialisation of IP from all HEIs in accordance with the IP Protocol;
+ In that office, a single point of access, and point of contact, for the entrepreneur, to all IP that has been generated across the entire HEI system;
+ Mechanisms put in place to ensure full support of the activities of this office by the HEIs/TTOs.

7. Scaling Irish Companies

A core challenge identified by the Taskforce is to help more Irish companies grow quickly to significant scale.

GROWTH CAPITAL

Given our ambitions for the "Smart Economy", and the need to create an inflection point in the creation and growth of innovative companies we need a transformation in the scale and nature of the Irish Venture Capital (VC) industry. This could be achieved by attracting top tier venture financing to Ireland so as to successfully scale innovative companies.

At present, in Ireland, there is capacity to make only a relatively small number of new investments above €2 million a year. Further, the usual investments by the indigenous VC community are relatively small by international standards.

Due to the limited number of indigenous VCs there is also insufficient domain expertise to cover the wide variety of markets which our companies are targeting. Further, without the operational experience of running and growing global innovation companies in these or related markets, there can be a tendency to risk relatively (compared to top tier VCs) small amounts of investment, rather than larger bets on new innovations which may change global industries.

An entrepreneur is at risk of spending too much time fund raising in Ireland for what will be, by top tier standards, a small amount obtained relative to top tier standards.

Enterprise Ireland has made considerable efforts to develop the domestic Irish VC industry with significant investment from the NPRF. The challenges facing the Irish VC industry are similar to those faced in most European countries particularly those with a small domestic market and without significant sources of domestic risk capital.

To date, EI has committed €139.5 million through the most recent Seed and Venture Capital Scheme, which has leveraged a further €386.5 million of investment in the Irish VC market[39]. In addition, a further two commitments have been made to Fund managers who are currently fundraising. Central to the strategy underpinning the Scheme was the long-term viability and scale of the Irish Venture Capital industry.

One critical challenge facing Ireland is to continue to support the development of the Irish VC industry, which will remain an important part of the overall VC ecosystem, particularly in the current economic environment, as VCs commence a new fundraising cycle in the coming years. A well-functioning domestic VC sector can complement (including investing alongside) the international venture capital that will be attracted under the Innovation Fund Ireland proposal. The Taskforce therefore supports continued investment to sustain and build further the domestic VC sector.

However, the Taskforce believes that we need to transform the industry to match the existing potential for good innovative deals given the existing base of experienced entrepreneurs in Ireland, as well as the increase which can flow from successful implementation of this report.

Acquisition is also an important strategy pursued by many scaling companies requiring access to risk capital. One possible short-term opportunity that might be created by access to top tier risk financing (venture capital and/or private equity) would be to 'roll-up' some of the technology clusters of relatively small (by global standards) Irish companies into global companies of scale which could then each provide enhanced solutions to customers worldwide.

The Innovation Fund, as envisaged in the Government's Smart Economy Framework, is a creative and intelligent way to fix this as fast as possible. Central to the approach is to attract smart capital and top tier venture financiers to come to Ireland, ideally with active partners physically relocating to Ireland, and networked into a global top tier venture financing firm.

At the time of publication of Building Ireland's Smart Economy, a number of international top tier VC firms expressed strong interest in the concept. Subsequent developments in international financial markets mandated the necessity for revised consideration of the timing of the introduction of the Fund. The Government also used this as an opportunity, prior to proceeding, to obtain the views and recommendations of this Taskforce as to how the Innovation Fund can best support the development of Ireland as an Innovation Hub. We believe the Innovation Fund, as envisaged, is more important than ever. We are aware that the NTMA, working with EI, is currently tasked with the groundwork for establishing the Fund.

While we strongly support the establishment of the Fund as soon as is possible, it is vital that this is done in an informed way. Balancing the taxpayers' financial interest and the fact that each tier 1 VC fund has its own individual perspectives and needs means that a 'one size fits all' approach would be naïve. Furthermore, depending on the fund-raising stage of each potential VC partner, there will be a need to phase the introduction of funds. We are aware that many other countries and regional economies have endeavoured to introduce innovation funds and many have been ineffective in delivering economic benefits. For this to work we would be of the view that a market assessment gauges carefully the appropriate timing and structure of the funds. Based on its experience, skills and reputation we are confident that the NTMA, with the assistance of Enterprise Ireland, is the appropriate authority to complete this process.

A related initiative to encourage top tier venture financing to locate partners in Ireland is to leverage their portfolio companies with a European base in Ireland, as we discuss in Recommendation 8.3.

Another approach would be the development of "entrepreneur in residence" schemes in our HEIs, open to top tier VC funds, as proposed in Recommendation 6.3.

7.1 Key Recommendation

Attracting top-tier venture partners from abroad to Ireland is a priority and can best be achieved through implementation as soon as possible of the Innovation Fund - Ireland, envisaged in Building Ireland's Smart Economy.

There are a number of other opportunities which we believe should be explored to help uniquely position Ireland as a location for top tier venture financing:

+ **the MNCs operating in Ireland:** Many of these have sophisticated treasury management activities that know Ireland well. A formal link, including equity participation, to a MNC can help a young company grow in partnership with the MNC and can provide the MNC with access to new technology and innovation initially proven in the global market;
+ **the Diaspora:** As evidenced by the *Global Irish Economic Forum* hosted by the Government in September 2009 in Farmleigh, there is potential to draw on the willingness of members of the Diaspora to help, many of whom have relevant expertise as well as resources;
+ **the NPRF:** We are fortunate that we have in Ireland an experienced, proven, professional, commercial, sophisticated manager of funds in the NPRF. This organization has credibility with top tier global investment houses, talks their language and has commercial acumen;
+ **the IFSC ecosystem of professionals:** The work of managing capital is a core competency that we have built in the IFSC. Skills available from individuals and firms within the IFSC can be deployed to assist in strengthening the VC industry operating in Ireland;
+ **the ISEQ:** We have an internationally networked and professional stock exchange which can help companies to prepare themselves for IPO, including floating on other international exchanges including the NASDAQ.

7.2 Supporting Recommendations

In addition to implementing Innovation Fund – Ireland, mechanisms should be explored which would utilise the following opportunities to enhance the availability of Venture Capital in Ireland:

+ Existing MNCs located in Ireland should be invited to suggest means by which they would be willing to assign some of their treasury funds into Irish based innovative companies or venture capitalists;
+ Facilitating the Irish Diaspora who wish to invest in risk capital for Irish based innovative companies;
+ Creating a programme to access venture debt (a commercial instrument, particularly from international private equity firms) for later stage companies based in Ireland.

Investment should also continue in developing a sustainable, forward-looking and high quality Irish Venture Capital Industry, complementing the Innovation Fund-Ireland.

INCENTIVES

Sometimes entrepreneurs are tempted to sell out "too soon" because they are personally financially constrained. Given our level of ambition for the economy, we need to incentivise our entrepreneurs to remain ambitious to build companies to sufficiently large scale.

It is also important that if a company eventually is sold to an MNC, the Irish operation is of such a scale and importance that it has a good chance of remaining in Ireland.

The best way to counter a tendency to exit prematurely is the availability of growth capital from investment firms that will buy into the company, allowing the entrepreneur to partially exit, while also enabling and incentivising them to build the business further. Investment firms of this nature exist in UK and US and cover Ireland, but often not at the lower size range of available companies. It might be possible to use Innovation Fund – Ireland to help attract one or more of these growth or venture/growth firms to better serve the Irish market.

In the meantime however, we propose a remedy to assist entrepreneurs in maintaining their ambition to grow and scale companies. We suggest the introduction of a Scaling Incentive Scheme (SIS). This would provide for periodic "SIS dividends" which, on the recommendation of the company's Board of Directors, could be paid to the founding entrepreneur(s) at the critical growth stage in a company's lifecycle, i.e. during the scaling period. The scheme might work as follows:

+ The entrepreneur(s) should have more than a threshold ownership interest in the (export led innovative growth) company of 10% (each);
+ SIS dividends could only be paid once every three years;
+ Such dividends would be capped at the lower of either 10% of the increase in value of the company or group in the previous three years (or since the last such SIS dividend), or the level of the company's distributable reserves on that date;
+ The relief might be clawed back in the event of a sale of 50% of the entrepreneur's shareholding within a six month period.

We appreciate concerns about introduction of a new tax incentive scheme. However, if implemented appropriately it could assist in incentivising entrepreneurs to have ambition to scale their companies.

7.3 Supporting Recommendation

In order to support and incentivise the scaling of innovative indigenous companies:

+ introduce a Scaling Incentive Scheme (SIS) to acknowledge successful scaling, whilst continuing to grow a company;
+ in implementing the Innovation Fund – Ireland (see above) endeavour to ensure the programme includes managers which specialise in investing in fast growing existing companies.

EXECUTIVE SKILLS

As acknowledged in our first and second principles, Ireland needs to develop a cohort of experienced smart economy entrepreneurs and business executives who have the necessary skills to develop global innovative companies.

Ambitious entrepreneurs and rising young executives can learn considerably from practical executive development which places an emphasis on coaching, mentoring and especially meeting successful peers.

Enterprise Ireland's Leadership for Growth (L4G) programme, operated in conjunction with Stanford Graduate Business School and other providers, has been particularly successful in enabling CEOs of Irish based innovative companies to meet CEOs, business executives, and venture capitalists in Silicon Valley. EI also have a range of existing supports in the area of sales/marketing including dedicated management development programmes.

While L4G has been highly beneficial, it has focussed to date on the development of the capacity and capabilities of CEOs. There is now an urgent need to further develop the competence of indigenous executives in two key areas which will be crucial in building Irish companies that can compete globally, namely (i) raising international finance to scale their companies and (ii) positioning and selling products in the global marketplace. In particular, we should draw on the experience of those Irish CFOs, CEOs and senior sales executives who already have practical experience and success in this regard to give seminars and even coaching.

A further challenge is to strengthen the sales compatibilities of SMEs who need to market and sell in overseas markets at a relatively early stage in their development.

7.4 Supporting Recommendation

Build on the success to date of the Leadership For Growth (L4G) programme by:

+ Continuing the existing L4G programme and developing additional programmes which expose senior executives within existing Irish enterprises to best practice, case studies and personal face to face contact with the executives and founders of successful innovative companies;
+ Placing an immediate focus on developing the skill sets and experience of CFOs, and CEOs, in the area of raising international finance from Ireland to scale companies;
+ Strengthening training and development provision in the areas of international marketing and sales.

8. Transforming Irish Enterprise

Innovation has a central role to play in transforming existing Irish enterprises, both in the FDI and indigenous sectors. In this chapter we identify a number of ways to achieve this, including some initiatives which can support greater linkages between MNCs and the SME sector, thereby building a stronger overall enterprise component of the ecosystem.

FLAGSHIP PROJECTS

The first customer win and success is an important milestone for the entrepreneur with an innovation, as acknowledged in our fifth principle. The State can provide the initial customer endorsement while also acting as a reference for other potential customers. The very first deployment with a customer is also a learning opportunity, demonstrating what works, what does not work, how a customer deploys the innovation, what other needs the customer has beyond the innovation itself and so on.

Importantly, the role of other companies supplying the same customer is also clarified with respect to the innovation, and it facilitates development and refinement of joint solutions, for example between multinationals located in Ireland, indigenous companies and new start-ups.

Public procurement can be used to purchase innovative new services for the State, which in turn foster co-operation between companies operating in Ireland in the development of products and services for sale on international markets.

We recognise that innovation involves risk and that concerns about perceived waste of public funds can incentivise the public service to be risk adverse, including in its procurement policy. We nevertheless believe that the risk of innovation can be reconciled with the necessary caution required in public procurement.

In 2009 the Government published *Buying Innovation: The Ten Step Guide for Smart Public Procurement and SME Access to Public Contracts*[40] and the Taskforce welcomes this initiative and supports its implementation.

We understand that the enterprise agencies are already working to identify major procurement projects across the public service in order to ensure that any spin-off benefits of this nature are captured.

However, the Taskforce believes that in addition it is desirable to take a more strategic and ambitious approach to leveraging public procurement to promote innovation which can then be exported. State procurement to meet an identified public need would drive collaboration between MNCs, SMEs and HEI research to meet a tangible goal.

We suggest that a number of pilot areas be identified first to test this approach. While the criteria in selecting projects would need to be agreed by Government, we suggest that they might include that the project:

+ Meets a specific defined public need;
+ Is sufficiently novel that it will lead to a global market opportunity – other locations would benefit from the same solution;
+ Should result in an exportable solution, with clear channels to the global market;
+ Ideally includes a combination of indigenous companies and MNCs operating in Ireland and might possibly attract further MNCs to establish in Ireland;
+ Is based on an open and transparent call for proposals;
+ Ensures that other companies that can later add further value to the core flagship can participate if they so wish without having legal or financial obstacles, thus enabling start-ups and smaller companies to cluster around the core providers of the flagship.

The approach will only be successful if it has an IP model which maximises the potential to foster a cluster of co-operating companies in Ireland around the solution.

It would not be appropriate for the Taskforce to recommend any specific projects for use in a pilot phase, but some examples for illustrative purposes could be:

+ Remote health care monitoring and early diagnosis: which could include home monitoring of patients, including post-operative and the elderly, providing early diagnosis and assisting prevention. An opportunity arising might be for assessment and diagnosis to be provided via call centres from Ireland to many markets. Ireland already has expertise too in distributed wireless monitors and sensors, and biodiagnostic devices.
+ Intelligent high-efficiency street lighting, combining wireless displays and asset tracking: street lighting is an opportunity for smart energy management. Because of the height of street lighting, display technologies could be included; wireless based sensors could also be used to track assets, including stolen goods and property tagged with low cost and secure RFID tags.

A variation on this approach would be for Ireland to anticipate an EU or other international obligation, for example implementation of an EU Directive. In this case, there may be a possibility to initiate a flagship project which would have consequential export opportunities across the rest of the EU and maybe further afield.

Clearly such projects would need to be identified on foot of rigorous analysis. The initiative should be overseen by a Committee chaired at Ministerial level which includes the enterprise agencies and the National Public Procurement Operations Unit.

8.1 Key Recommendation

The Government should identify a suitable procurement model and then pilot a number of Flagship projects where public procurement to meet specific public needs would stimulate the development of innovative solutions with export potential through collaboration between MNCs, SMEs and HEIs.

CONVERGENCE AND INTER-FIRM COLLABORATION

Market and technology convergence is an opportunity to transform the established industrial base in Ireland while also providing entirely new business opportunities. Our experience suggests that collaboration between enterprises already operating in Ireland but in different sectors is currently only modest.

With our strong base of companies and research capabilities across a number of sectors, Ireland has a perhaps unique opportunity to take advantage of the increasing convergence of technologies. This convergence is leading to new opportunities, new types of business, new products and services, an increased blurring between formerly discrete sectors and new customer markets for many of the more traditional sectors (see Box 8.1 for a relevant example).

Box 8.1

Creganna-Tactx Medical

Creganna was established in 1980 to provide engineering services to the Irish micro-computer and electronics industries. While the company grew successfully serving this sector, the company founders were searching for alternative markets to increase the value added of its products and gain international growth potential. In the mid-90s Creganna entered the rapidly growing medical device sector, making the strategic move to focus exclusively on this area in 1999.

The company expanded its customer base through offering a growing portfolio of innovative medical component technologies and manufacturing services. In 2004 the company expanded its service offering to include contract design, development and prototyping, enabling Creganna to support clients at the earliest stages of the product lifecycle. Creganna also launched its Innovation Centre – a dedicated unit committed to developing innovative solutions for its customers.

Creganna is now recognised within the medical device industry as an expert contract design and manufacturing partner and is a supplier to all leading companies within the sector. Innovation and commitment to R&D remains central to the company's business plan and is a key driver of growth resulting in a doubling of sales over the three years to 2008. Creganna is currently actively researching opportunities such as convergent medical technologies. In 2009 Creganna acquired Tactx Medical, firmly placing Creganna–Tactx Medical in the top ten global providers of technologies and services to minimally invasive medical device companies.

Creganna–Tactx Medical has more than 800 staff worldwide and employs over 550 people at its Galway headquarters, including over 170 in R&D and engineering development. In 2009 Creganna–Tactx Medical had combined revenue of $110 million.

For example, advances in the food sector towards functional foods bring the clinical trial and production processes closer to those in the biopharma sector. Electronics, micro- and nano-technologies will play a stronger role in the Life Sciences sector as new drug delivery mechanisms are developed. The use of sensors embedded in construction materials and wireless communications creates a very different environment for new buildings, energy efficiencies and facilities management.

The Taskforce believes that convergence offers opportunities for both the transformation of existing MNC investment in Ireland and to develop synergies between the indigenous sector and MNCs (according to our second principle). Leading HEI researchers who are networked into the international research community should be part of these engagements between convergent industries.

8.2 Key Recommendation

+ Establish a team drawn from the relevant agencies with responsibility for ensuring collaborations between firms, and with the HEI sector, to take advantage of convergence opportunities. It should bring forward and, as appropriate, implement actions in the following areas:
  - support for prioritised areas of convergence opportunity through existing or new public funding schemes;
  - public funding schemes which incentivise inter-firm collaborations in respect of converging technologies;
  - ensure that the regulatory environment (and how it is applied or interpreted) is supportive of convergence e.g. combination medical products;
  - education and training programmes that provide the multi-disciplinary capabilities required to support cross technology and cross sectoral convergence;
  - establishment of an industry-led convergent technologies network to facilitate collaboration between companies, academics and medical practitioners across the formerly discrete sectors of pharma, bio, med tech, ICT and engineering;
  - marketing Ireland's advantages as a location for convergence focused activities.
+ Industry, including MNCs located in Ireland, should also be asked to identify specific areas of opportunity where they would be interested in participating in convergence-related activities.

LEVERAGE NON-EUROPEAN INNOVATION: EUROPEAN ACCELERATOR PROGRAMME

One way to help position Ireland as an International Innovation Hub is to attract the European headquarters of successful private US companies. This would complement efforts to increase the level of start-up companies in Ireland.

The objective would be to target companies backed by top tier VC funds that already have established business models and innovative offerings in their home market. Ireland should provide a highly attractive location to expand their international operations into the European market (and possibly further afield).

Rapidly growing innovative companies, backed by top tier VC funds, are highly likely to exit either by IPO or trade sale after a few years. Their expansion into the European market is likely to significantly increase the value of that exit, but the company may not have the cashflow to fund a European expansion.

In accordance with our second and fourth principles, the Taskforce believes there is an opportunity to target companies at that stage of development through a European Accelerator Programme. As well as IDA marketing efforts, this could involve building relationships with top tier VC funds (see Recommendation 7.1) and offering the possibility of an equity investment in the European expansion.

If successful, such a Programme would offer a number of advantages:

+ it would deliver jobs in Ireland in a relatively short timescale through companies which are already operating innovative business models in their own markets;
+ it would help increase top tier venture finance interest in Ireland;
+ it would provide an established and repeatable formula for European business development, which provides little operational distraction for the parent companies;
+ it would attract seasoned business executives from the private, high-growth, enterprise sector to locate in Ireland to develop European business operations (particularly for international marketing and sales);
+ the State can expect to receive a return on its investment within a reasonably short period of time as a result of a liquidity event (by the parent corporation itself exiting);
+ over a relatively short period of time, a number of 'quick wins' could advance our visibility as an Innovation Hub in Europe.

8.3 Key Recommendation

The IDA and EI should jointly develop and implement a "European Accelerator" Programme with the initial goal of attracting 20 companies from within the portfolios of top tier venture capital funds to open their European headquarters in Ireland in the immediate future, and aim to grow this number tenfold within the next five years.

INCREASING R&D AND INNOVATION CAPACITY WITHIN SMEs

Ireland's future success depends on increasing levels of innovation across all sectors of Irish enterprise. Economic evidence suggests that the ability to absorb and adapt innovation is crucially dependent on having a strong R&D culture.

In Appendix 6 dealing with certain technical tax issues, we suggest changing the existing cap on outsourcing of R&D for the purposes of the R&D Tax Credit. This could be of particular benefit to SMEs who wish to engage in collaborative R&D. We also recommend investigating the possibility of introducing an improved tax credit for qualifying SMEs, taking into account any impact this may have on other supports available to SMEs under State Aid rules.

In addition, many SMEs that currently do not carry out R&D often fall outside the remit of current research and innovation investment and support programmes and we believe that efforts are required to incentivise companies to carry out these activities for the first time.

While SMEs can gain a competitive edge by innovating across all their operations, day-to-day pressures can make it difficult for smaller companies in finding the time and resources to engage in innovation. However increasing levels of innovation is the best means for them to survive and prosper. The introduction of an innovation audit for qualifying SMEs is therefore strongly recommended to assist these companies to innovate. As part of the innovation audit, innovation partners could be identified (e.g. customers, consultants, suppliers, HEIs), as well as appropriate sources of research funding.

Studies demonstrate that SMEs gain the most benefit from R&D collaborations. Furthermore, access to State funding for research has been identified by many SMEs as a key barrier to scaling (particularly in the Life Sciences area). Current initiatives should be reviewed to ensure increased involvement by SMEs in research activities.

8.4 Supporting Recommendation

Consider modifications to the R&D Tax Credit regime which would be of benefit to SMEs, as outlined in Appendix 6.2.

Building on current State initiatives, introduce a targeted innovation audit scheme for qualifying SMEs by January 2011, including for those SMEs that do not engage in any R&D at present.

When reviewing the current research funding schemes (see Recommendation 5.2), introduce initiatives to encourage:

+ more involvement by SMEs in collaborative research, both with other indigenous companies, with MNCs and with Irish and non-Irish HEIs;
+ more R&D contracts between small companies and customers.

NEW PRODUCT DESIGN AND DEVELOPMENT

Product design and development is increasingly recognised as a source of growth for existing businesses. For example the European Commission published a staff working paper in the past year, titled *Design as a Driver of User-Centred Innovation*[41], in which it was stated: "The results are compelling: companies that invest in design tend to be more innovative, more profitable and grow faster than those who do not. At a macro-economic level, there is a strong positive correlation between the use of design and national competitiveness."

Recent comparisons suggest that Irish firms are substantially underperforming vis à vis their EU competitors when compared on the basis of percentage of annual revenues derived from new product introductions[42], both for SMEs and large enterprises.

User-centered product design, prototyping, development, engineering and management should be placed at the center of Irish enterprise and industry. Recent advances in design methods from US and other countries need to be introduced more rapidly in top Irish HEIs and enterprises. We need to improve both the quality and frequency of new product introductions by Irish companies and make it a priority that Irish enterprises are leaders in product design (see example in Textbox 8.2).

Box 8.2

Inishowen Engineering

Inishowen Engineering was traditionally a sub-contract manufacturer of precision steel components, structural steel and marine and agri-related fabricated products. The company always had high technical capability and a strong flair for innovation.

An opportunity was identified in the marine industry for an improved lighting system for fish farming. This was licensed to Inishowen Engineering (with support from Enterprise Ireland's Tech Transfer team), who successfully developed the concept into a novel patented product, named the Atlantis Light.

The Atlantis Light has a number of unique selling points:

1. Lower 110V power supply, improving operator safety and maintenance demands.
2. The reduced voltage also supports considerable energy saving.
3. Product design is less complex than existing products and end-users have indicated that the product reduces maintenance activity by 90%.
4. The patented product is far lighter than the existing state-of-the-art; consequently it's easier to access and easier to position.

A partnership was formed between Inishowen Engineering, Marine Harvest Ltd (MH) and the University of Stirling in Scotland to carry out a full live trial on a Scottish fish-farm. Results of the completed trial show that the Atlantis Light has additional benefits over the current leading systems for lighting in this area. Two sizes of the product are already available, and Inishowen Engineering has commenced the development of a third light product specifically for salmon smolts at Marine Harvest's request, who are the largest fish farm company in the world, with 230 sea fish farm sites in five countries. As a result, the potential exists for significant sales over the coming years.

Inishowen Engineering currently employs 56 staff and is expecting to increase this number as the above and other opportunities develop.

A number of current programmes, including EI's R&D Activity in Enterprise Programme, the Commercialisation Programme, the Innovation Vouchers Programme and the Innovation Partnerships Programme can be used to support product, service and process development. These can involve hands-on and advisory, as well as financial, support to companies at the cutting edge of the market place.

However, a stronger foundation for new product design and development excellence in Ireland should be developed through close collaboration between industry, HEIs and professional organisations around needs assessment, rapid prototyping, teaching, research, executive education, workforce development and roadmapping.

Ireland should strive to become known as a global center of excellence in product design and development in strategic sectors such as medical devices, energy systems and software systems and services. In doing so, Irish institutions will need to expand their horizons and networks to leading design firms and engineering and medical schools in Europe, North America and Asia. We should recognise, celebrate and reward product design and engineering teams and team leaders as role models for creativity, invention and technical and management excellence.

Given the relatively specialised nature of this subject, the Taskforce recommends that a dedicated exercise be carried out to address the following issues:

+ to assess the quality of product and services design and development practices in Irish enterprises and industry today, and benchmark the performance of Irish companies against their international competitors;
+ how to embed product design teaching and research in Ireland's engineering schools;
+ how to shift design education in Ireland to a model where creativity and innovation in product design are encouraged;
+ which Government agency(ies) should have responsibility and oversight for this product design and development initiative;
+ how this initiative should be coordinated across the relevant agencies.

Membership of this advisory group should include a broad-based collection of organisations from industry, HEIs, professional societies and Government.

8.5 Supporting Recommendation

Form an industry-HEI advisory group on New Product Design and Development to provide a forum for Irish industry, HEIs, professional bodies and Government to agree a national agenda and roadmap for product design and development.

CAPTURING OPPORTUNITIES IN FDI – A 'TEAM IRELAND' APPROACH

We very much welcome the recently published IDA Strategy, *'Horizon 2020'*. The Taskforce's recommendations in a range of areas will help to support Ireland to compete for FDI activities, as well as supporting the ongoing transformation of the existing FDI base here. The Textbox below summarises key target areas for the IDA[43].

Box 8.3

Foreign Direct Investment Strategy

The IDA's current focus is on securing high value investment for Ireland in three key areas:

GLOBAL SERVICES

Global Business Services companies that are global by nature need a core they can consider as 'home'. Ireland is uniquely positioned to deliver on their needs. Today's Ireland is already a thriving centre for the delivery of Business Services across global business networks as leading companies deploy their Irish Business Service Centres as a key strategic tool, leveraging people and resources around the world to maximise competitive advantage.

Services Innovation plays a key role in attracting and maintaining services activities in Ireland. Not all existing services companies are innovation-active and there is an opportunity to encourage more clients to broaden their mandate and undertake new investment by entering this space.

RD&I

RD&I is becoming increasingly internationalised. FDI-derived RD&I investments are highly valued and globally are relatively few in number. Therefore, the competition to attract this type of investment is becoming increasingly intense, particularly in developed economies. Ireland's vibrant RD&I sector experienced a 10% increase in Foreign Direct Investment in 2009. Sector growth is being driven by exceptional collaborative efforts by industry, academia, Government agencies, regulatory authorities and fiscal policy – backed up by a strong pro-business Government policy.

HIGH END MANUFACTURING

Manufacturing is the bedrock on which the growth in Ireland's FDI was founded. Historically, it has been a significant segment of our investment portfolio and it will continue to remain so into the future. Higher technological investment and higher value products will be the hallmark of future manufacturing operations in Ireland. These operations will be knowledge-, capital- and skills-intensive, characterised by a participative innovative culture where management and staff continuously collaborate to drive innovation, productivity, agility, learning and adaptability. The co-location of production and R&D is a key element in sustaining existing, and winning new, manufacturing FDI.

Policy areas covered by this Report which are of particular importance to future success include:

+ **Tax:** Maintaining a low corporate tax environment is absolutely critical to our ability to attract and retain a significant FDI presence in Ireland. It is worth noting that no country in the OECD increased its corporation tax rate in the past six years, but instead there is a continuous move to reduce corporation tax rates.

+ A number of recent initiatives in relation to the R&D Tax Credit and taxation of Intellectual Property have been instrumental in enhancing the product Ireland is offering to FDI clients. It is critical that Ireland continues to enhance its offering in this area as a key element of our portfolio of attractions for FDI. (Taxation policy is discussed in more detail below).

+ **Infrastructure:** A modern transport, telecom, energy, waste and water infrastructure is key to the ongoing competitiveness of the Irish economy. In particular, an advanced broadband infrastructure is becoming a basic requirement for a developed knowledge-led economy. (see chapter 11)

+ **Regulatory Environment 'Fit for Purpose':** We must ensure that regulation, where introduced, improves on existing regulation without being overly burdensome on business. We must also look at ways that regulation (e.g. in the clean tech sector) can actually serve to encourage investment. Reform must be achieved through dialogue between the regulatory authorities, Government Departments and the enterprises operating in the sector. We must strike the right balance between business advancement and control, and establish a regulatory environment that is "fit for purpose".

+ **Incentives:** The ongoing reductions in the EU State Aid limits restrict Ireland's capability to provide direct supports to attract FDI. In this respect it is increasingly important that we are innovative in how we support high value FDI.

+ **Skills & Labour Market:** Favourable demographics and consistent investment in education ensure a plentiful supply of highly qualified and skilled workers with excellent technical, language and customer service capabilities, as well as a reputation for flexibility and innovation. We must continue to build on this advantage by ensuring that our education system responds flexibly to the needs of the Smart Economy and that our labour market remains flexible.

+ **Research & Development:** FDI companies account for nearly three quarters of business expenditure on R&D[44]. Currently Ireland attracts a range of RD&I investments, critical to meeting the ambitious targets set out in the Government's *Strategy for Science Technology and Innovation*. Globally, FDI-derived R&D investments are highly valued and relatively few in number, therefore, the competition to attract this type of investment, is becoming increasingly intense.

+ **IP Policy:** The current system of IP does not facilitate smooth collaboration between MNCs and HEIs. We strongly advocate that IP should be easily accessible and readily available and in Chapter 6 we discussed further the need for a national IP policy that is more conducive to the needs of MNCs, while ensuring the economy gets a return for its R&D investment.

There is increasingly complementarity between our strategies for FDI and indigenous industry based around the idea of making Ireland an Innovation Hub. This needs to be reflected in both the evolution of enterprise policy and the levels of co-operation between agencies involved in different parts of the innovation ecosystem.

8.6	Supporting Recommendation
	Work to support the continued growth and transformation of Ireland's FDI base while also maximising linkages with the indigenous sector, including through flagship projects (Recommendation 8.1), convergence activities (Recommendation 8.2), improved IP arrangements (Recommendation 6.4) and the proposed European Accelerator Programme (Recommendation 8.3).

SECTORAL ACTIONS

The Taskforce has consulted extensively with industry representatives from a wide range of existing sectors, covering both MNCs and indigenous industry. The details of this consultation process, which included both interviews and a questionnaire, are set out in Appendices 3 to 5.

The purpose of this exercise was twofold. Firstly we wanted to identify horizontal issues which would help in the transformation required in Irish enterprise and these consultations have informed all the Taskforce's recommendations.

Secondly, we wanted to capture specific challenges facing firms at a sectoral level to suggest some actions in response. This exercise was also informed by the existing research of Forfás and the National Competitiveness Council, and draws on a number of dedicated sectoral reports whose recommendations support the objectives of the Taskforce.

The list of sectors and recommended actions is not intended to be definitive but instead highlights key issues emerging from our consultations.

FOOD SECTOR

The most significant change occurring in the food and drinks market is the increasing convergence of three main trends: health and wellness; premium, indulgence and convenience, and the emergence of ethical sustainability considerations.

The increased focus on health and wellness, developments in enabling technologies, and increased knowledge about the pharmacologic effects of certain nutrients has led to the development of functional foods and nutraceuticals (e.g. cholesterol reducing products). Ireland is ideally placed to capitalise on this opportunity given its strong base of research active food and pharma companies and well-recognised strengths in this area (probiotics in particular).

The issues to be addressed to realise these opportunities are:

+ Address fragmentation in the primary production and food processing industries and diversify into Eurozone markets;
+ Agency structures should be streamlined in order to ensure that Ireland has a coherent and integrated strategy for the sector;
+ Identify and emulate best practice in the application of EU legislation by other Member States;
+ Support increased R&D activity among Irish-owned firms and HEI research groups in the sector.

PHARMACEUTICALS/BIOPHARMACEUTICALS

Global developments in the Life Sciences sector - sectoral convergence, downward pricing pressures from purchasers and the shift towards personalised healthcare – are leading to an increasingly complex manufacturing environment for the sector. The need to bring products/treatments to market as quickly and cost effectively as possible must be managed in the context of requirements for efficiency, safety and quality control.

Ireland is very well placed to provide leading edge manufacturing solutions that meet the evolving needs of the sector.

This sector needs to continue investment in transformational change within manufacturing firms, building on Ireland's international reputation for manufacturing and regulatory excellence by increasing the level of process R&D activity, increasing supports and opportunities for specific training, and leveraging the ongoing research and investments e.g. SFI's SRC in Innovative Drug Delivery (IDDN) and Solid State Pharmaceuticals cluster, BioPAT and NiBRT.

MEDICAL TECHNOLOGIES AND DEVICES

Convergent medical products, remote healthcare and diagnostics represent major opportunities for the medical technologies sector in Ireland. Ireland has a strong and growing base of medical technologies companies, a number of which are engaged in in-firm R&D. This should be matched by SFI investment in a Strategic Research Centre in the sector.

The ongoing restructuring of the health service also offers opportunities, for example Academic Medical Centres can align medical schools and hospitals to deliver better patient care, better clinical research and substantive enterprise opportunities.

The development of a clinical trials and research system is critical for the further growth and development of this sector in Ireland (both indigenous and MNCs), and to ensure that we leverage investments in Research and Development - translating research from bench to bedside. This requires a cultural shift and commitment to research within the hospital environment, consistent with the objectives of the Health Research Action Plan.

A priority is the need to consolidate the existing ethics approval committees for clinical research through the Health Information Bill and the streamlining of ethics approval processes.

INTERNATIONALLY TRADED SERVICES

Advances in technology, together with regulatory reform and trade liberalisation, has fuelled the rapid growth of Internationally Traded Services, and enabled the remote delivery of services. This trend is expected to accelerate in coming years with the implementation of the EU Services Directive and parallel developments in the World Trade Organisation.

The changing nature of services in an increasingly globalised economy presents Irish service providers with significant potential for growth. It will be important to identify, develop and implement dedicated business support measures to promote R&D and innovation capability in services companies. The establishment of an internationally-led competence centre in Services Science Innovation in Ireland should also boost Irish capacity and focus in this and the ICT area. See Textbox below for an example of services innovation.

Box 8.4

PayPal

PayPal, an eBay company, set its European operations centre in Dublin in 2003, serving customers across Europe including in Italy, France, Germany, Spain, UK, the Netherlands and Poland. PayPal Ireland now employs some 1,200 full-time staff in several different functions including customer service, risk management and merchant solutions.

The Dublin centre is PayPal's first regional centre of excellence and the model for PayPal's international operations worldwide. As part of PayPal's commitment to European customers, the Dublin centre is re-engineering PayPal's end-to-end customer experience through innovative solutions in product, process, policy and technology.

INTERNATIONAL FINANCIAL SERVICES

Over the last two decades, Ireland has successfully established itself as an attractive location for international financial services. Ireland is recognised globally as having strong competencies in a number of key areas such as banking, fund management, insurance and leasing. Recently these have been complemented by the establishment of an SFI Strategic Research Cluster for Financial Mathematics.

A robust regulatory environment that ensures high standards are complied with, while at the same time enabling innovation of new products and services, is paramount to the success of this sector. Ireland's reputation has been damaged because of domestic events in the sector, and regaining confidence in the global marketplace is essential. Rebuilding the reputation of Ireland's International Financial Services sector abroad must be a focus for this sector in the short and medium term.

It is also important to continue to address training and education needs (e.g. the Finuas Initiative) to ensure an adequate supply of highly skilled people to work in financial services including the areas of risk management, treasury management and derivatives, mathematical and analytical skills, all of which have experienced skills shortages.

INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT)

The convergence of computing, communications, content, and consumer electronics is an overriding significant influence on the global ICT industry and is creating many opportunities for growth in the sector. Ireland is well placed to take advantage of the convergence trend given its existing enterprise base of ICT, electronics and software companies.

The emergence of a number of strong software and IT services sub-sectors in areas such as financial markets, telecommunications (including mobile) and e-Learning provide opportunities for Ireland to develop itself as a centre of excellence in some of these areas.

In this sector the enterprise agencies should develop a "holistic" support package that encourages activities across the value chain through Research, Development, Technical Support and Laboratory Services. There is also an imperative to ensure availability of an appropriately skilled labour force.

CLEAN TECHNOLOGY

The global market for environmental and energy goods and services is vast and it continues to grow quickly. Ireland is well placed to capture a significant share of this growing market in niche areas. We have strong capabilities in key areas such as renewable energy, electronics, software, and waste and recycling. Our commitment to research and development and the export focus of indigenous industry, in addition to a considerable track record as a base for overseas investment, are key to capturing the potential of this sector. The addition of Energy to the remit of SFI in 2009 will help consolidate progress.

We need to develop Ireland's green brand and green cluster and to address technical, regulatory and planning barriers that are delaying the development of renewable energy projects.

8.7 Supporting Recommendation

Implement measures to support increased innovation and growth across both MNC and indigenous enterprises in key strategic sectors for Ireland, and in particular the specific proposals listed above.

TAX RECOMMENDATIONS

Improving a number of existing tax provisions could help to significantly boost investment in the areas that are key to developing a highly-innovative, export-led enterprise sector.

Important changes were made in the Finance Bill 2010 and we commend many of these which reflect issues considered by the Taskforce. However a number of further changes are still required. In addition, the Commission on Taxation, which reported in 2009, made a number of suggestions on which we feel it is appropriate to comment.

A number of specific tax-related recommendations relevant to business angels and entrepreneurs are included in Chapter 9. Tax issues of a broader application across all sectors of enterprise (including start-ups, SMEs, indigenous and MNCs) are included here. Key tax recommendations are set out below. Supporting recommendations and necessary technical changes are set out in Appendix 6.

In the current budgetary climate, and given the increasing awareness of the cost of tax expenditures (for example through the work of the Commission on Taxation), these recommendations will need to be carefully assessed in terms of their cost to the Exchequer and other impacts. However we also emphasise that this assessment needs to fully reflect the economic and employment benefits to Ireland of increasing levels of R&D and innovation as part of a significantly improved innovation ecosystem.

TAXATION OF INTELLECTUAL PROPERTY

Ireland has an opportunity to become the place of choice within EMEA from which to license and exploit IP. It is vital that our Intellectual Property tax regime is, and remains, attractive.

Our regime allows taxpayers to secure a tax deduction for the cost of acquiring IP. Broadly speaking, the deduction is limited to 80% of the related profit in any one year. That profit is then taxed at the 12.5% tax rate.

Most other developed jurisdictions also allow a tax deduction for the cost of acquiring IP. Resulting profits are then taxed at applicable tax rates. Historically those tax rates were typically higher than the Irish tax rate. However that has changed significantly in recent times and a number of European countries have introduced specific regimes which provide targeted lower effective tax rates on profits derived from the exploitation of IP.

Ireland needs to re-evaluate whether our international tax offering is competitive enough for mobile IP intensive businesses. Specifically we should consider whether an "Innovation Box" or similar regime is appropriate.

We recognise that in reviewing our regime and bringing forth changes, it is of paramount importance that Ireland remains consistent in its approach to tax policy, transparent in the way in which we implement our tax laws and above reproach. Cognisant of these restrictions, we must look at the competitiveness of our tax offering to mobile Intellectual Property rich businesses.

8.8 Key Recommendation

Urgently review, in conjunction with relevant industry representatives, the competitiveness of our tax offering to mobile Intellectual Property rich businesses

THE R&D TAX CREDIT

The R&D tax credit is a reasonably generous allowance granted to companies performing qualifying R&D in the EEA. Essentially businesses carrying on qualifying R&D are entitled to a tax credit of 25% on top of tax deductions received for qualifying spend. This effectively provides a tax incentive of 37.5% towards qualifying R&D spend.

However our system is an "incremental" system, which means that the credit is generally only available for spend in excess of spend incurred in 2003. While this was relaxed somewhat in very specific circumstances in Finance Bill 2010, we believe it is now time to remove the incremental base requirement across the board.

We recognise that this recommendation may have serious cost implications and that there may be an element of "deadweight cost" associated with the removal of the base year. However, we believe it could help to deliver the step change required in the level of R&D being undertaken in Ireland. Our aim should be to encourage companies, both domestically controlled and foreign, to undertake extensive R&D activities in Ireland. Retaining an incremental based system continues to penalise companies who undertook R&D in Ireland in 2003. Instead, we should be encouraging companies performing R&D to continue to do it in Ireland. Each year companies have to re-evaluate their investment decisions. We should help them to ensure that in the face of international competition, their next R&D investment is made Ireland. There is no basis for thinking that just because a company undertook R&D in Ireland in 2003, it will continue to do R&D in Ireland again. A company making an investment decision in 2010 should not be penalised for performing R&D in Ireland seven years ago.

8.9 Key Recommendation

Remove the incremental spend requirement for the R&D Tax Credit entirely.

MAKING IRELAND AN ATTRACTIVE PLACE FOR MOBILE TALENT TO RESIDE

In the context of building and sustaining our 'Smart Economy', it is vital that the limited form of remittance basis of taxation is overhauled. We note the positive changes made to broaden the relief in Finance Bill 2010. However changes were also made that could make it less attractive for our foreign based Diaspora to return to Ireland.

In our view we need a regime that encourages MNCs to send their expatriates to Ireland and acts as an incentive for foreign based academic and entrepreneurial talent to come to Ireland.

Certain restrictions and safeguards could be placed on a new regime and these would include limiting an individual's ability to claim under the regime to say five years, making it skills-based, and linking it to minimum salary levels.

It is our view that a "Mobile Talent Regime" if structured properly could be very useful in attracting the right talent into Ireland (employees, academics and entrepreneurs).

8.10 Key Recommendation

Develop an attractive and competitive high value Mobile Talent Regime.

SUPPORTING TAX RECOMMENDATIONS AND COMMENTS

We have set out our key tax related recommendations above. In Appendix 6 we set out a number of supporting tax recommendations and specific technical changes we believe are required to our existing provisions in order to ensure they are fit for purpose.

8.11 Supporting Recommendation

Implement the supporting tax recommendations set out in Appendix 6.

9. Increasing Start-Ups

Success in achieving our vision in Ireland as an Innovation Hub requires a dramatic increase in the number of start-ups with the potential and ambition to grow innovative, export-focussed companies.

THE INNOVATION 'FUNNEL'

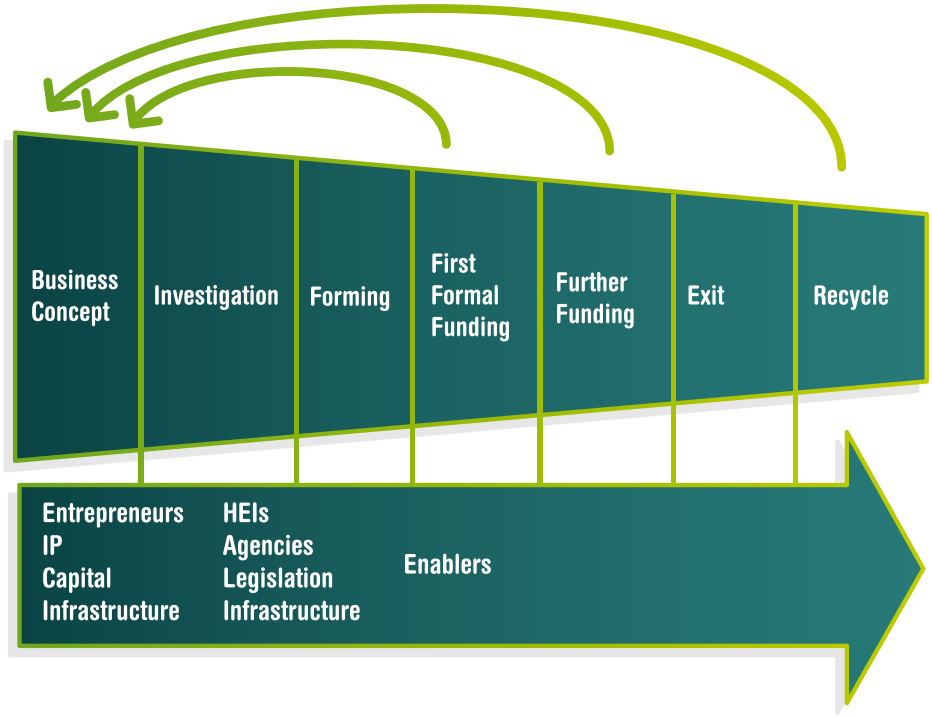
One way to view the innovation process is as a funnel which includes a series of stages as follows:

1. **Business Concept** - the entrepreneur envisages a market opportunity which the business may meet;
2. **Investigation** – gathers further evidence for the market opportunity, and assembles the basic components and technologies which will constitute the core of the customers' solution;
3. **Forming** - the entrepreneur establishes a new company, or new business unit or product line within an existing company; secures seed or exploratory budget financing, and assembles the initial business team together;
4. **First Formal Funding** – obtains sufficient capital commitment to achieve key commercial and technical milestones which can verify the viability of the new offering;
5. **Subsequent Formal Funding** – scales the business to bring the new offering to the global market;
6. **Exit – Shareholders** – entrepreneur and investors - obtain an exit through a public offering (IPO), trade sale, or dividends;
7. **Recycling** – the entrepreneur creates a new venture leveraging his/her experience, business and industry networks; the financial capital from the exit is recycled by the entrepreneurs and investors into the next technology wave and new market opportunities.

This process is graphically described below.

It is important to note that a project is unlikely to proceed through this funnel in a linear fashion, but may potentially require adaption and restructuring and so may re-start and re-enter in a revised form. A firm may iterate several times both within a particular stage, and across a series of stages, before finally succeeding. A project may enter the funnel in Ireland having completed earlier stages elsewhere. Timeframes also depend on the business sector (for example, pharma requiring a much longer gestation period than software).

FIGURE 9.1 THE INNOVATION FUNNEL



Business concepts will emerge from many different sources – including from research in a higher education institution or existing company, a spin-out from a MNC or an individual from Ireland or abroad with a new business idea.

The key point is that succeeding in our vision requires a dramatic increase in the number of start-ups with the potential and ambition to grow innovative, export-focused companies.

Box 9.1

EIRGEN PHARMA LTD

In 2004 Patsy Carney and Tom Brennan founded EirGen Pharma Ltd which specialises in the development, registration and manufacture of high potency niche pharmaceutical products for global markets using isolation technology. This technology is used specifically for work on cancer and organ transplant products.

EirGen Pharma's innovative isolation technology is a purpose built high containment facility, which allows the handling of high potency or moisture sensitive products in an environment which is safe to both the user and the product. This is one of only three such facilities in Europe. Through this manufacturing technology they successfully provide flexible pharmaceutical solutions that quickly, safely and cost effectively facilitate their customer's route to market.

EirGen was supported as an Enterprise Ireland High Potential Start-up in March 2005 and through a commitment to investment in world-class R&D combined with state-of-the-art manufacturing practices has positioned itself internationally as a knowledge-based, technologically-sophisticated company.

EirGen Pharma commercially launched its early stage breast cancer drug Eir-012 across Europe in 2009. This is EirGen's first pharmaceutical product to receive pan European approval and represents a significant milestone for the company. This, coupled with a significant pipeline of drugs which are due for commercialisation in 2010 and beyond, allows EirGen to be in a position to significantly increase staff levels. The company currently employs 26 high-skilled employees in Waterford and expects employment to increase to 40 within the next two years.

In 2009 EirGen signed a significant partnership agreement with a leading Japanese pharmaceuticals company to develop and commercially supply three cancer products from their facility in Waterford. Having specialised in generic drugs, in 2010 EirGen has begun to engage big pharma companies for their product development. Eirgen is a shining example of the innovative, high-technology life sciences companies that are developing in Ireland.

ROLE OF ENTERPRISE IRELAND

Enterprise Ireland's core objective is increasing exports on the basis that sustainable employment in the economy is most ably supported by export growth. Innovation across all aspects of the business is central to securing the exports required to fuel the economy. The companies that will deliver this growth are at varying stages of the business cycle, be they high-tech start-up companies or long established family owned businesses.

Enterprise Ireland works with approximately 3,000+ companies to grow export sales:

+ These companies accounted for over €14 billion in exports in 2008 with some reduction expected in 2009 due to the decline in international markets;
+ A growing proportion of EI exports are now contributed by sectors such as Services, Software and Lifesciences – dynamic sectors which will drive export growth in the future;
+ Enterprise Ireland clients' contribution to employment and spend in the Irish economy is similar to that of foreign-owned enterprises based here, with 134,000 full time jobs and economy spend close to €20 billion.

In pursuing its strategy to grow exports and export-led jobs, EI is focused on:

1) Winning Export Sales

2) Innovation

3) Start-ups

4) Scaling

The vast majority of Enterprise Ireland's capital funding to companies is focused on the Start-Up and SME sector with over 90% of all investment in 2009 in these companies.

The Taskforce recognises the essential contribution played by EI in a range of areas, many of which are consistent with the Taskforce's vision of an innovative export focused economy. The Taskforce believes that if we are to achieve the inflection point in our economy, EI will need to be able to increase its focus and available resources for encouraging entrepreneurs to found companies and on nurturing early stage companies.

9.1 Key Recommendation

While Enterprise Ireland has a broad agenda to support export-focused Irish enterprise, its mission, strategies, business plans and expenditure need to prioritise more clearly, and provide leadership in, the increasingly important areas of start-up and early-stage activities.

Insufficient early stage funding is currently available through the private sector and Enterprise Ireland, despite investment by EI of €31 million in two significant seed funds in conjunction with the main banks, leveraging a total of €79 million for the provision of seed capital to new and early stage businesses in Ireland. Given the urgency of growing the base of start-up companies, we propose an enhanced State seed stage capital scheme in the short-term (Recommendations 9.2 below).

After five years or so, we would hope that business angel networks and seed stage investors (Recommendation 9.3) should be able to sustain start-up activity in Ireland, and that the State could then retire its seed stage capital scheme.

The Taskforce recognises that some of the following recommendations have substantial resource implications which cannot be met from EI's existing budget without cancelling other significant programmes, while others would require a change in Government policy regarding the provision of matching funding. We acknowledge the extreme pressures on the Exchequer and recognise the rationale for requiring co-funding in a scheme of this nature. However, we believe that there is a clear market failure at present which may prevent worthwhile start-ups proceeding. For that reason, some flexibility in this provision is proposed.

The Taskforce also believes that State seed stage funding decisions should be decided on the basis of recommendations from private sector reviewers who have relevant experience. The review panel should not be remunerated (other than reasonable expenses).

9.2 Key Recommendation

Introduce a new State seed capital scheme (in addition to existing EI supports) which:

+ would fill the current gap in private seed capital, by providing milestone-driven funding for each approved project (the level of funding will vary considerably by sector but will typically be between €100,000 and €500,000);
+ introduces a moratorium for the immediate period ahead on existing requirements for co-investment from other sources where appropriate to enable strong prospects to succeed;
+ significantly increases the number of projects securing funding of this level;
+ is evaluated by measuring wider employment and economic impacts, not just the direct return on capital invested;
+ should be reviewed after five years for effectiveness, and annually thereafter with a view to ultimately withdrawing from the market; and
+ involves a private sector panel which would make recommendations on specific technology sectors and markets and on which projects to fund.

ANGEL FUNDING

Business angels - successful business people who deploy their excess capital into new businesses – play a vital role in seeding a Smart Economy. Importantly, they give not only their money, but also their time and personal experience to the company, and this knowledge transfer is as fundamental as the cash to entrepreneurs.

A co-ordinated approach to angel funding is helpful both for the investor, and for the innovator seeking new talent and financing. Investors benefit from a clear and efficient mechanism to receive and evaluate new opportunities, and form networks with their peers for structuring co-investments. Innovators benefit from a well-defined and transparent mechanism to present their proposals, in the knowledge that they will be evaluated by investors with relevant expertise, and a sincere desire to help good ideas succeed.

Development of funded Business Plan Competitions could also help to provide seed funding in certain instances.

EI, in conjunction with InterTradeIreland, has supported the establishment and expansion of Business Angel Networks and recently appointed a new National Director for the Halo Business Angel Network.

To date, however, Ireland's business angel community for Smart Economy companies has remained relatively weak and does not seem to have operated to a significant degree as a mechanism to recycle the personal expertise and resources of previously successful innovators.

However, there may now be an opportunity for Ireland because:

(i) private investment capital, which in recent years had been focused predominantly on the property market, may now be looking for alternative opportunities;

(ii) investment under the SSTI in recent years means we have a growing base from which innovative start-up companies may emerge;

(iii) many people who have recently lost their jobs due to the economic crisis might see it as an opportunity to start a new business.

The Taskforce therefore proposes a number of recommendations to help develop a stronger base of business angel networks and private seed stage investors in Ireland (Recommendation 9.3 below).

9.3 Key Recommendation

Build on the work of EI, InterTradeIreland and others to nurture angel funding by:

+ Formally approving a national portfolio of sector-specific Business Angel funds and starting to do so during 2010; to qualify for approval each such fund should be substantially composed of previously successful innovators who wish to apply their expertise and resources to helping new start-up companies succeed; such innovators may be found also amongst the Diaspora;
+ Offering direct financing for administrative support for up to two years at a value of €50,000/year for each such new approved Business Angel fund, after which it is expected to be self sustaining with respect to administration overheads;
+ Implement a €10 million fund to be made available to approved Business Angel Funds on a competitive basis as a primer to help these groups raise their initial funds.

TAX INCENTIVES

Ireland needs to grow a cohort of business angels operating in Ireland who recycle their personal experience and capital into new start-ups. If entrepreneurs who have built a successful innovation-based, export-focussed, high growth firms exit, it is in the national interest that the key investors and entrepreneur(s) recycle their personal expertise and capital into new innovative ventures.

We thus propose that a reduced effective rate of Capital Gains Tax, of 12.5%, would arise on the sale of shares in an innovation-based export led company where the proceeds on disposal of those shares are reinvested in another qualifying company. To the extent that proceeds are not fully reinvested within a required timeframe, the current standard rate of 25% would apply.

A "qualifying company" would be another start-up which is based on innovation and has clear export opportunity. This would include, in particular, companies which have received angel funding either from the (temporary) State Seed Capital Scheme or/and from an approved Business Angel fund – see above.

9.4	Supporting Recommendation
	Introduce a reduced effective rate of CGT arising on the sale of shares in a successful innovation company, where proceeds are reinvested in another qualifying innovation company within a reasonable period.

A Seed Capital Investment Scheme currently operates (under the BES provisions) to allow individuals, who satisfy certain criteria, to secure income tax relief for investment in a newly incorporated company which is engaged in certain activities. Essentially, since 1 January 2007, where a sum of up to €600,000 is subscribed for new ordinary shares in a company, it can be relieved against total income of the individual in any of the six years immediately preceding the year in which the investment is made. The maximum relief in any one tax year is €100,000 (for the tax year 2007 and beyond). Previously this was limited to €31,750 per annum.

It is acknowledged that this can be a very useful relief where it is possible to meet all of the criteria required. However the relief requires the taxpayer to have paid a reasonable amount of tax in Ireland in the past six years. This means that the relief would not be available to newly arrived foreign entrepreneurs - whom Ireland needs to attract. It also is of no incentive to those outside the current tax net (including the unemployed and those on low income).

We therefore recommend that a more forward-looking "Entrepreneurial Tax Credit" be introduced.

This incentive would provide a tax credit or rebate to an entrepreneur in a qualifying company where new jobs are created by their company. By "qualifying company", we mean a start-up which is based on innovation and has clear export opportunity. This would include in particular companies which have received angel funding either from the (temporary) State Seed Capital scheme or/and from an approved Business Angel fund.

For the Entrepreneurial Tax Credit relief/rebate, if an entrepreneur was to start a company then for every five jobs created, in addition to their own, they would be entitled to a rebate of the tax paid on their salary in each of the first three years, capped at €100,000.

The scheme might be available only once during the life of an entrepreneur, so as to prevent serial start-ups occurring solely to avail of the incentive. Only a single company could be accepted as "qualifying". The rebate/relief might be obtained a full year after the submission of a personal tax return, in order to mitigate against a company being deliberately folded after the tax relief were received.

9.5	Supporting Recommendation
	Introduce an Entrepreneurial Tax Credit based on the approach outlined above.

Difficulties are caused by the difference in tax treatment applying to the sale of shares and the exercise of unapproved share options.

The sale of shares is subject to CGT, currently taxed at a rate of 25%. However, in the case of unapproved share options (which in practice covers the vast majority of share options), the gain arising on exercising the options is taxed under the income tax provisions at a rate that could exceed 45% assuming a marginal rate of 41% plus levies. If the shareholder holds share options beyond exercise (which is rarely the case as they are required to sell shares to meet their tax liability arising from these share options), then CGT at the current rate of just 25% arises on any gain arising above the exercise price.

It is acknowledged that where venture capital is used as a mechanism to finance companies, in the absence of remedial measures, the level of equity held by original founders and entrepreneurs can be diluted significantly as they engage in subsequent venture funding rounds. However it is also acknowledged by the venture investors that it is essential to keep the entrepreneur and original founder motivated in scaling the business. Thus, in order to deal with the dilution which would otherwise be caused by subsequent venture funding rounds, it usually becomes prudent for the venture investor to "re-flate" the entrepreneur and founder with share options. But then, as we noted above, the tax due currently arising under the Irish tax code on exercising share options could be twice that arising had the shares been directly owned.

It is not desirable for entrepreneurs and founders to be squeezed out of the equity holdings in their own companies. This will happen more where companies are venture- funded. "Re-flation" using share options is currently unattractive because of the tax cost arising (c. 45% vs. 25%). We therefore recommend that options which are specifically issued to re-flate founder entrepreneurs, be afforded CGT treatment. We designate such options as "Founder Share Options". The new Founder Share Options would be explicitly linked to the original shares held by the founder(s) and entrepreneur(s). CGT treatment would then apply on any subsequent sale of these "linked" options.

All other options granted to other employees would be treated as in the current tax code – the scheme would be limited only to entrepreneur founders. The term 'Entrepreneur Founders' would be tightly defined and would only apply to investment in qualifying companies as defined, (i.e. innovation led, export focussed, Venture Capital and/or Private Equity funded companies).

9.6 Supporting Recommendation

Introduce "Founder Share Options" which are eligible only for CGT treatment.

BES AND SEED CAPITAL RELIEFS

The availability of reliefs such as BES and Seed Capital will be vital to the Irish economy over the next number of years as they provide incentive and support to those entrepreneurs looking to self-finance projects. These reliefs are needed now more than ever since they will help to provide equity capital which is not otherwise available.

However they need to be made more accessible to investors.

While the current cap of €2 million on the level of BES funding which can be claimed by companies, has been increased significantly in recent years, it would be worth exploring increasing the relief available to, say, €5 million.

We would suggest that this scheme should be made available to all micro, small and medium-sized companies, as defined by EU Legislation, assuming the business activities are consistent with our smart economy agenda.

We would also suggest that the current geographic limits be removed to allow "medium sized" enterprises, as defined, located in all areas of the country to qualify for BES and Seed Capital funding. We appreciate that these conditions have been set at EU level but given the very changed economic environment, we believe that these reliefs should now be made available to all Smart Economy companies nationwide.

In order for the value to be realised from these reliefs, the qualification criteria for BES and Seed Capital Relief must be made less burdensome from an administrative perspective. Qualification could centre on the prior approval of a business plan with realistic ambition to maintain or increase employment levels within a specified period of time.

In addition, there should be some incentive in the relief to get involved or mentor the company where this is appropriate. Instead the current restrictions essentially make it very difficult for someone with a genuine interest or significant shareholding in the company (30% plus) to avail of the relief.

9.7	**Supporting Recommendation**
	Review the BES and Seed Capital Relief legislation with a view to making it easier for entrepreneurs to utilise these schemes.

ATTRACT ENTREPRENEURS TO IRELAND

Given the scale of our ambitions for making Ireland a European Innovation and Commercialisation hub, we need to proactively attract people to Ireland to start up innovative companies and augment the indigenous base of potential entrepreneurs. There are a number of ways in which this can be achieved:

+ Firstly, and most importantly, by providing the best possible innovation eco-system for those wishing to start an innovative company, in particular the availability of finance. All the Taskforce's recommendations are centred on this objective;
+ Secondly, by attracting high quality students and researchers into the Irish system and encouraging them to remain in Ireland to exploit the outcomes of their research;
+ Thirdly, by targeting people outside Ireland who are interesting in starting a company and proactively seeking to encourage them to come here.

Ireland has benefitted from foreign entrepreneurs establishing their enterprises in Ireland, and creating jobs. Today, Ireland needs to encourage further entrepreneurs, including from amongst the Irish Diaspora, to relocate to Ireland to found and headquarter their businesses. There may also be non-nationals employed by the MNCs in Ireland who may see an opportunity for a new venture, but who are concerned for their residency status should they leave their current employment to found a start-up.

A streamlined, fast-tracked, immigration and residency procedure should be available to entrepreneurs who can demonstrate that they have a reasonable and sound business plan for a new innovation-led, export-oriented company, and either have a verifiable track record in establishing an innovative company, or can demonstrate appropriate experience within a company operating within the industry sector in which one intends to start a new venture.

Currently, any non-EEA National wishing to establish a business in Ireland must not only seek the permission of the MinJELR to do so but also commit to transferring capital of at least €300,000 to Ireland. We believe that this restriction may not be in the national interest and the criteria should be relaxed for those from overseas who have an appropriate track record in building innovative companies, or who are of sufficient credibility to attract committed funding from one of our approved Business Angel funds.

Dedicated supports should be available for start-ups led by overseas entrepreneurs who re-locate here. We recommend that EI initiate marketing programmes in at least three foreign jurisdictions to promote Ireland as an excellent location for starting innovative export-oriented companies. This could include suggested overseas roadshows to promote Ireland as a location for entrepreneurs.

A further mechanism to encourage seasoned foreign entrepreneurs to Ireland is via an "entrepreneur in residence" programme, in the context of catalysing the commercialisation of State sponsored R&D in our HEIs (see Recommendation 6.3).

Funded Business Plan competitions could also play a role in attracting overseas start-ups to locate in Ireland (see page 68).

9.8 Key Recommendation

Launch a marketing campaign, initially on a pilot basis, to promote Ireland as an excellent location for starting innovative export-oriented companies.

9.9 Supporting Recommendations

+ Introduce new arrangements to fast-track special residency permits for appropriate qualified entrepreneurs, and their immediate families (including a work permit for spouses);
+ The requirement for non-EEA nationals to commit to transferring capital of at least €300,000 if they wish to start a business in Ireland should be waived where alternative criteria are met (for example acceptance by an approved Angel Fund);
+ A dedicated support package should be provided by EI and/or IDA, to assist early stage overseas projects which locate here.

FEASIBILITY & PRODUCT INVESTIGATION

Entrepreneurs need to be able to rapidly investigate whether they have correctly identified a market opportunity. Enterprise Ireland offer a number of feasibility grants as follows:

+ A typical HPSU applicant may be approved a feasibility grant of up to €15,000 (subject to matching funds) to support the development of a business plan to be presented to potential investors. This can be followed by further assistance in the form of convertible preference shares matched by the investment by the promoter and/or business angels, family etc., prior to a formal funding round – typical EI investment can be in the range from €50,000 to €150,000.
+ Participants on the Enterprise Platform Programmes may be supported through CORD grants (up to €30,000 for one year) while they participate on the Programme.
+ Potential university spin outs are supported through technology development and proof of concept grants to develop prototypes, prepare business plans, undertake market research etc. Support levels can vary up to €300,000 depending on the technology area etc.

To significantly increase the number of companies entering the "Innovation Funnel", it is essential that adequate funding supports are readily available to assess business viability at an early stage.

9.10 Supporting Recommendation

Enhanced funding and other supports should be put in place for "project investigation", of up to €50,000 per new project, for its entrepreneur promoter to confirm, or otherwise, a market opportunity, possibly by offering loans (repayable from future profits) rather than grants as at present.

10. Supporting the Entrepreneur

Effective Enterprise Agency support, increased interest in, and awareness of, innovation and entrepreneurship, an optimised IP regime and a tolerance of failure are all required to provide a supportive environment for the entrepreneur.

ENTERPRISE AGENCIES

Given the dedicated nature, organisationally speaking, of our agency structures to support enterprise, effective and productive co-ordination is essential if the ambitious goals set out in this Report are to be achieved.

Initiatives to further strengthen working relationships between EI and IDA have been developed by the "Enhanced Agency Collaboration Group" established in November 2008. A range of specific initiatives arising from the findings of this Group has been implemented including:

+ A pilot project to stimulate cross-agency sectoral engagement (e-learning and Medtech) to maximise the benefits for Ireland;
+ A framework has been developed to manage access to Enterprise Ireland support by non-EI companies. Revised procedures have been agreed and implemented to facilitate inter-agency transfer of companies; and
+ Close working relationships in overseas networks have been strengthened, particularly in relation to overseas visits and missions.

Technology Ireland also operates under the direction of the InterDepartmental Committee on STI and brings together Forfás, the IDA and Enterprise Ireland along with Science Foundation Ireland and the Higher Education Authority with a mandate to ensure maximum cohesion, complementarities and synergies between these agencies.

The Taskforce also notes that the *Renewed Programme for Government (October 2009)* contains a commitment to a "review of the effectiveness of State agency support for enterprise, including the interaction between the IDA, Enterprise Ireland and County Enterprise Boards".

Bearing in mind the heightened focus on entrepreneurship and innovative enterprises in this report and the set of recommendations to add this priority to the existing focus of the enterprise agencies the Taskforce believes that it would be appropriate to review the current configuration

of enterprise agencies in the new agenda for reform set out in this report and elsewhere including the need to attract earlier stage companies and entrepreneurs to Ireland, having an integrated presence in as many international business locations as possible, better linkage between MNCs and indigenous companies and the need for greater focus on start-up and seed capital stages.

10.1 Key Recommendation

There should be an independent review of the current configuration of enterprise support agencies and programmes to reflect the changing enterprise challenge outlined in this report including increased focus on linkages between MNCs and indigenous firms.

DEVELOPING THE ENTERPRISE COMPETENCE OF PUBLIC SERVANTS

Relatively few public servants working on policy have direct personal experience of working in innovative enterprises. Such direct experience would help in delivery of the ambitious goals under *Building Ireland's Smart Economy*.

10.2 Supporting Recommendation

Introduce a scheme to enable a number of public servants each year to be placed into innovative high growth companies, at no expense to these companies whilst still meeting the normal remuneration and employment benefits of the public servants concerned.

INCREASING INTEREST IN, AND AWARENESS OF, INNOVATION AND ENTREPRENEURSHIP

Nurturing a societal interest in innovation and entrepreneurship is a broad challenge. There is probably no single action which on its own can significantly accelerate the public interest in innovation. Recommendations 5.3 and 5.4 relating to Science and Maths in school will have a role to play.

There are a range of national award schemes and competitions which explicitly focus on innovation and entrepreneurship including the Student Enterprise Awards, the annual Engineers Ireland Innovation Awards, the BT Young Scientist competition, the Irish Patent Office's Junior Inventor of the Year and the Ernst and Young Entrepreneur of the Year. It is important that the Taoiseach, Tánaiste and other members of the Government continue to support and endorse these schemes.

Exhibitions and events which showcase innovation in Ireland should also be encouraged and endorsed and the Taskforce particularly welcomes the recent Innovation Dublin week which showcased Dublin businesses, HEIs, local authorities and cultural institutions. Dublin will also be European City of Science in 2012 while the Science Gallery intend to bring the World Innovation Forum to Dublin in 2012, an event which has never previously been held outside of New York.

As referenced in Recommendation 5.9 above, there is a need to promote lifelong learning across society to ensure an openness to new ideas and to develop the capabilities within the workforce for the type of innovative economy we aspire to. A national Continuing Professional Development (CPD) scheme focussing on innovation, technology, and the process of forming and managing an

entrepreneurial firm could be valuable. It could be offered in conjunction with appropriate HEIs, with accreditation where necessary.

There is also scope for cultural creativity and science to work together to re-position technology and innovation in innovative new ways in the public mind, and help re-position artists, culture and creative minds into the centre of innovative businesses. Cleverly undertaken, such initiatives can also help position Ireland internationally as an innovative brand - see chapter 12 below.

10.3 Supporting Recommendations

+ Public service broadcasters should be encouraged to devote broadcast time to topics of national strategic interest in innovation, entrepreneurship and the smart economy;
+ As part of a wider effort to promote lifelong learning across the workforce, a national Continuing Professional Development (CPD) scheme to champion and promote innovation to the general workforce should be developed.

INTELLECTUAL PROPERTY, EDUCATION AND RELATED SUPPORTS

In enabling the Smart Economy, IP will play a critical role. IP comes in many different forms and is more than just patents (e.g. copyright; know-how). Different industries rely to a greater or lesser extent on different IP rights for commercialisation. It is estimated that 70% of a typical company's value lies in its intangible assets, up from around 40% in the early 1980s[45]. An understanding of the importance of IP, its value and commercial potential should be strongly cultivated in the business community and Irish society at large.

10.4 Supporting Recommendations

+ Introduce national initiatives to increase the public awareness of IP issues (e.g. through the BT Young Scientist exhibition);
+ Introduce a programme from the Irish Patent Office to promote and educate both industry and students about all aspects of IP (similar to that run by the UK IP Office);
+ Develop a more co-ordinated approach by the various agencies that run IP training seminars and initiatives for industry.

Many SMEs find the high costs of proper legal and IP advice prohibitive, and appear not to take a proactive strategic position in respect of IP issues.

Proper legal advice at the early stage of all companies is key (e.g. the terms of a first funding round could cause difficulties to a company in securing follow-on funding). Where a company's core asset is IP, its first IP licence or patent filing could have a substantial impact on its ability to properly commercialise that IP going forward. The importance of SMEs obtaining proper legal and IP advice, including IP audits, has been recognised internationally[46].

10.5	**Supporting Recommendation**
	Examine ways in which qualifying innovative export-orientated companies can have convenient access to low-cost, high quality legal, patent and tax advice (including IP audits). Ideally this should take the form of a tender to the private sector to establish a cost-effective and pro-active support function for these services.

INNOVATION PORTAL

Currently there is a broad and changing range of R&D and commercialisation schemes available from different Departments and Agencies. Enterprises and entrepreneurs have no single source of accurate and current information on R&D funding available in Ireland.

We have made a number of recommendations to the design and delivery of research and enterprise supports.

In addition, we believe that there should be a single website providing an access point to information on all relevant schemes available from Enterprise Agencies and other research funders. In addition to acting as an information registry, the portal should assist collaboration between HEIs and enterprises, for example through hubs to link enterprises and researchers. It could also provide information on IP, for example the IP Protocol proposed in Recommendation 6.4.

10.6	**Supporting Recommendation**
	Establish a national one stop shop website providing information on all research expertise, innovation, enterprise and other relevant supports available to business.

BANKRUPTCY LEGISLATION

Innovation and entrepreneurship involve risk, and occasionally result in failure. If a venture is ultimately going to be unsuccessful, it is clearly better if this is recognised as early as possible and the venture closed down. The experience and learning from a failed business venture can often be an important ingredient of future success. If we are to succeed in building an economy with high levels of innovative companies we need to see a shift in societal attitudes which acknowledges this reality.

Importantly, legal arrangements for business failure need to avoid any sense of stigma from a failed business venture, while not facilitating reckless behaviour or inappropriate risk-taking. In particular, the Taskforce believes that Ireland's personal bankruptcy legislation needs to be reformed and the Law Reform Commission is currently completing a consultation process on measures which would modernise Ireland's legislation in this area, as has taken place in the UK and other countries.

10.7	**Key Recommendation**
	Ireland's bankruptcy legislation should be modernised following the conclusion of the Law Reform Commission's current consultation process on Personal Debt Management and Debt Enforcement.

11. Providing the Infrastructure

High quality physical infrastructure is an important ingredient in building a successful and innovative economy, making Ireland an attractive location for investment and for people to work and live. In particular, cities play an important role as drivers of national and regional growth, and as a magnet for investment and mobile skilled workers and entrepreneurs.

The Taskforce has not attempted a full review of physical infrastructure investment priorities, but (in accordance with our fifth principle) has identified two specific priorities which are central to delivery of our vision.

BROADBAND INFRASTRUCTURE

The availability of high quality broadband is strategically important to enabling and exploiting innovation. Advanced broadband services are essential to the success of the Smart Economy - particularly for services firms to develop and capture new business opportunities. Opportunities will be driven by existing communications-intensive sectors such as software development, medical devices and financial services and emerging sectors such as renewable energy, energy efficiency, cloud computing and personalised healthcare. 4G networks and WiMax will be critical as moves towards a wireless society accelerate. The availability of high quality broadband is essential to improving our status as an attractive location for FDI and enabling existing and start-up Irish firms to compete in international markets.

"Next Generation Broadband: Gateway to a Knowledge Ireland[47]", published in June 2009, sets out the strategic policy framework for investment in high speed broadband. A central commitment is that there will be universal access to broadband by 2010 and that by 2012 our broadband speeds will be equal or exceed those in comparator EU regions.

Ireland has made significant progress in the rollout and uptake of broadband. However, Ireland still occupies mid-table positions in many international comparisons. The National Broadband Scheme is currently facilitating broadband rollout in remote areas.

The Taskforce believes that a significant improvement in the quality of broadband is essential[48]. The applications of the future (e.g. cloud computing) will demand much higher speeds, symmetric services (similar upload and download speeds), low latency (speed of response of the system to the user) and uncontended access (user does not have to share bandwidth with other users due to network constraints).

This requires significant investment. Investment by operators in upgrading the local access networks (from the network backbones to customer premises) is currently disappointing.

To promote greater investment, regulation may need to allow for higher rates of return. Potential also exists to use regulation to support co-investment where the high cost of civil construction works is shared among a number of operators, but each operates its own network and defines its own services and prices. The impact on competitors and retail prices would need to be assessed carefully.

11.1 Key Recommendation

Given the critical need for advanced broadband services in building a highly innovative enterprise sector, the nationwide roll-out of Next Generation Network (NGN) services, for bandwidth up to and surpassing 1Gbps, should be prioritised.

11.2 Supporting Recommendations

+ Extend building regulations to facilitate the provision of high speed broadband;
+ Ensure that the provision of broadband infrastructure is intrinsic in all State investment plans (e.g. roads, water distribution and meters, drainage works, smart electricity meters, etc.), including Local Authority plans;
+ Reduce the costs of providing telecoms and broadband services by reviewing planning rules, reducing charges, and developing consistent charges and processes across local authorities;
+ Facilitate provision of access to public ducting infrastructure by establishing the planned "one stop shop";
+ Ensure a clear, predictable and technology neutral, regulatory approach to NGN;
+ Government procurement should be used where appropriate to stimulate the provision of high quality symmetric broadband (e.g. eSchools, eHealth and eGovernment initiatives).

LABORATORY FACILITIES

The State, under the aegis of EI and SFI, expends considerable resources on funding focussed research and development projects in the areas of ICT, Lifesciences and Green Technology, and areas in which these disciplines converge.

However, there is currently a shortage of key laboratory space in Ireland necessary for spin-out and other companies to commercially develop and exploit the outputs of the hundreds of millions being invested every year by the State in research projects, as outlined by the report from BiGGAR Economics.[49]

11.3 Key Recommendation

Ensure that:

+ At least one wet laboratory facility of scale is made available for post-incubation life-science start-ups;
+ A laboratory incubator space is established for microelectronics start-ups.

12. Marketing 'Innovation Ireland'

Our ambition to make Ireland an international hub for innovation and commercialisation will require effective marketing to ensure that potential investors, entrepreneurs, highly-skilled labour and researchers are attracted here to help strengthen our innovation ecosystem.

INTERNATIONAL INNOVATION SERVICES CENTRE

The Taskforce believes that, provided the right structures and incentives are put in place, there is an opportunity for Ireland to develop and market itself as a global centre of choice for the management, licensing and trading of IP – patents, copyrights, design rights and trademarks.

Companies with valuable IP recognise the importance of developing a proper management and commercialisation strategy with respect to their IP. This includes the management of large portfolios of patents and other IP registrations, maintaining those justified by cost and risk analysis; determining which should be allowed to lapse; determining licensing opportunities; and, where appropriate, the pursuit of infringement actions. Whilst we recognise that some companies may choose to manage their IP portfolios close to Head Office, and that certain administrative IP functions are currently outsourced to low-cost jurisdictions, Ireland has an advantage of being the location of many MNC activities, is close to Europe, is English speaking, and has an attractive IP and tax environment. Development of capability in support/advisory services across other European countries could be an added attraction of the IISC.

Whilst these activities are currently being carried out from other countries, we believe that Ireland has strengths which can provide the basis for the development and marketing of Ireland as a global centre of choice from which these IP activities could be carried out. These strengths include:

+ through the IFSC we have established a base of relevant skills and support services
+ a large number of US MNCs already have operations in Ireland
+ a modern statutory framework for IP
+ a recently updated IP taxation regime
+ we provide an English language location within the EU

Implementing the recommendations in chapter 6 (IP arising from State-sponsored R&D in HEIs) would further strengthen Ireland's attractiveness as the location of choice in which to carry out research and manage and commercialise the resulting IP and reinforce other aspects of our vision for Ireland as a European innovation hub.

12.1 Key Recommendation

Develop and market Ireland as an International Innovation Services Centre offering a location for global IP management, licensing and IP trading services.

STRENGTHEN IRELAND'S POSITION AS A LOCATION FOR RESEARCH & COMMERCIALISING IP

Ireland's IP legislation is up to date, and follows EU legislation and other international IP treaties. It therefore has an element of consistency and predictability which makes it an attractive location in which to carry out research, and from which to commercialise IP.

Ireland also has the added advantage of being a common law jurisdiction, but which is grounded in a written Constitution (like the USA), and also has a full understanding and recognition of EU legislation and the general EU regulatory environment. It is therefore an ideal gateway from which US companies can operate in Europe, and from where they can manage their European operations, as so many currently do. In addition, Ireland could also serve as a gateway to Global markets for Indian and Asian headquartered companies.

Ireland also compares favourably with other jurisdictions in terms of IP protection and enforcement, and is ranked at the top of international tables[50]. This is particularly welcome as it both encourages inward investment, and provides Irish companies with a strong platform for protecting their own IP rights. On the enforcement side, the introduction of the Commercial Court in 2004 has substantially fast-tracked the resolution of IP disputes, and it is already the forum of choice for most IP disputes in Ireland.

Additional initiatives could further strengthen Ireland's attractiveness as an International Innovation Services Centre from which to create and commercialise its IP.

12.2 Supporting Recommendations

+ Implement changes at the Irish Patent Office to bring it more in line with patent offices internationally (see Appendix 7 for more details);
+ Support initiatives to position Ireland as an attractive forum for the resolution of international IP disputes through mediation and other forms of dispute resolution;
+ Continue initiatives to further reduce the timeframes and cost of resolution of IP disputes in Irish courts;
+ Work to harmonise IP regulations at EU level (see Appendix 7 for more details).

MARKETING AND PROMOTION

One action outlined in *Building Ireland's Smart Economy: a Framework for Sustainable Economic Renewal* is that the enterprise development agencies would jointly market and brand Ireland as a leading innovation location and destination of choice for European and other overseas investors.

The enterprise agencies are in the process of designing and developing a common brand for the national enterprise and research agenda that is aligned with the Government's framework; that is compelling, future focused, and will generate awareness of Ireland at home and abroad as a vibrant, innovation-led, modern enterprise economy. The first stage in this process was completed by December 2009. The branding will shortly be rolled out and used across a range of communications materials in support of the various communications strategies of the enterprise agencies and other stakeholders involved in branding Ireland.

The arts and the creative sector also can play an innovative role in positioning Ireland in a new way, particularly when science and arts are brought together to utilise technology in insightful and original ways. The enterprise agencies could develop their branding work accordingly and so reinforce Ireland's unique position.

The Innovation Portal (Recommendation 10.6) can also act as an important marketing tool outside of Ireland.

12.3 Supporting Recommendation

+ Build on the existing IDA international marketing campaign with a view to attracting international entrepreneurs to Ireland, increasing R&D intensive investment by MNCs and raising the level of awareness of the benefits of innovation to the Irish public;
+ A single national brand identity based on the concept of innovation should be consistently used in key international media, trade shows and network events by all relevant agencies.

A priority at the moment is to reinforce Ireland's reputation through a consistent focus on our pathway to economic recovery based on the Smart Economy concept and our re-branding as the Innovation Island.

All opportunities need to be taken to assimilate, deliver and reinforce this message, including via senior politicians and senior public servants who are the face of Ireland to the international business and political communities. This requires a high degree of professionalisation in the planning and execution of international engagements, at all levels and in all appropriate settings.

We strongly believe that all of us should expect our senior politicians and senior public servants to travel overseas periodically to promote Ireland's strategic interests, and be able to engage international investors and policy influencers in an appropriate fashion.

While St. Patrick's Day is a particularly important and valuable promotional opportunity for Ireland, this promotional programme should be sustained throughout the year, and important and emerging markets should have a co-ordinated calendar of visits by a selection of senior politicians and senior public servants.

12.4 Key Recommendation

An organised programme of visits and other activities should be put in place whereby Ministers, Departments and State Agencies and other relevant stakeholders (for example industry associations) convey a consistent, positive message about Ireland as a centre of excellence for innovation.

LINKS WITH ASIA AND OTHER EMERGING MARKETS

Ireland needs to strengthen its engagement with China, India and other Asia markets to reflect their growing economic and trade significance. As well as Asia there will also be export opportunities in emerging economies in South and Central America, the Middle East and elsewhere.

These Global trends will be reflected over time in the importance of these markets as a destination for exports, a place where innovation happens and a potential source of investment.

Ireland must strategically target our limited resources to maximise impact. The Asia Strategy has now been concluded and is to be replaced by a new Trade and Investment Strategy which will identify future priorities for deployment of national resources and efforts. This needs to take account of changes in world trade and investment patterns, and the likely future trajectory of Irish economic development.

This Strategy should encompass the full range of economic, political, educational and cultural levers available to strengthen our profile and presence in these markets. It should include the location of the overseas offices of the enterprise agencies, how these can work cohesively together and with our embassies, political, educational and cultural visits and exchanges, and marketing campaigns. Consideration also needs to be given to issues such as the teaching of Asian and other languages in Ireland.

12.5 Supporting Recommendation

A new Trade and Investment Strategy should be developed and implemented to strategically focus our national resources and efforts. This Strategy should include specific initiatives to target opportunities in emerging economies.

LINKS WITH THE DIASPORA

The Irish Diaspora is a relatively under-utilised national resource which could be mobilised in support of our 'Innovation Ireland' ambition. It is estimated to include as many as 70 million people, which is an extraordinary resource for an island where 5 million people live. However, it could be strongly argued that the potential of the Irish Diaspora has not been fully engaged as a resource to support national economic and international business development.

The inaugural Global Irish Economic Forum hosted by the Government in September 2009 in Farmleigh was convened with two broad objectives: to explore how the Irish at home and abroad, and those with a strong interest in Ireland, could work together and contribute to our overall efforts at economic recovery; and to examine ways in which Ireland and its global community could develop a more strategic relationship with each other, particularly in the economic sector.

The report of the Forum is available online[51] and it offers strong support for the Government's ambitions to build a Smart Economy and associated investments and strategies in support of research and innovation.

The Government is pursuing the recommendations emerging from the event across a range of areas relevant to innovation and a report on progress is being published shortly.

One of the early deliverables from the Forum is the establishment of the new Global Irish Network made up of those invited to the Forum and other leading members of the Global Irish community. This Network will be an additional resource for promoting Ireland's key messages abroad and will facilitate greater strategic and practical interaction between Ireland and leading business figures in the Diaspora.

The Forum also recommended placing a greater value on the "affinity Diaspora" - foreign nationals who have lived in Ireland, but now returned to their countries of origin. Furthermore, the Forum also recommended establishment of a global Irish Youth Forum, to engage with younger members of the Diaspora and this is being taken forward as a proposed new Farmleigh Overseas Graduate Programme.

In addition, a certificate of Irish ancestry was among the recommendations contained in the recent 'Strategic Review of Ireland-US Relations', and the Minister for Foreign Affairs has confirmed that this is being put into effect.

We endorse these actions which can strengthen the practical support which the Irish Diaspora can provide, for example, assisting in introductions for financing, customer acquisition, and outsourcing; market intelligence; mentoring of senior management teams; and business partnering.

12.6	**Supporting Recommendation**
	The Strategy for engaging with the Diaspora following the Global Economic Forum in Farmleigh should include specific objectives to support Ireland's ambition to be an International Innovation Hub.

NORTH-SOUTH CO-OPERATION

The Taskforce recognises that there is significant potential in strengthened North-South co-operation to help in implementing the vision and many of the recommendations set out in this report. The Nordic model of research and innovation co-operation[52] which aims to dismantle barriers to the development of an open innovation system in the region to the mutual benefit of each of the Nordic countries shows the benefits of a strategic, policy-led approach.

Significant North-South co-operation is already underway, as shown for example by InterTradeIreland's Mapping Study of Research & Technological Development Centres on the Island of Ireland and the InterTradeIreland INNOVA, FUSION and Innovation Connections Programmes.

Other significant areas of North-South co-operation and collaboration include the Innovation Voucher Programme, the Competence Centre Programme, the US-Ireland Research and Development Partnership and the joint approach to attracting EU FP7 funding (the Seventh EU Framework Programme for Research and Technological Development).

The success of these initiatives demonstrates that there are significant opportunities in building critical mass in areas where the island can compete internationally, leveraging world-class recognition and research funding. There are also opportunities in a North-South context to enhance the international marketing and branding of 'Innovation Ireland.'

12.7 Supporting Recommendation

The Taskforce recognises the potential to expand North-South co-operation as a step towards developing the island into a leading region for research and innovation by generating valuable synergies; expanding the critical mass of research capacity; increasing participation in international funding programmes; promoting internationally the innovative capacity of the island; and enhancing international competitiveness.

13. Measuring Success

Given the scale of the transformation required to achieve our vision for a highly innovative Irish economy, and the imperative to achieve an inflection point in the jobs it supports, we need clear targets against which progress can be measured, and mechanisms for doing so. Clarity about the progress being achieved, and the returns delivered by public investments made, will also help build and sustain public support for the strategy.

EMPLOYMENT OBJECTIVES

Chapter Two of this report outlined the scale of the challenge we face. In this section we consider what might be achievable goals for job creation if we deliver on our vision. It is not the intention to provide definitive forecasts of employment growth - in part because labour forecasting is notoriously difficult to achieve in an accurate manner (and forecasting in such a volatile economic period as we are currently experiencing adds to the problem), and in part because at a sectoral level, the high-technology sector is not sufficiently separated from the rest of the economy to facilitate such an exercise.

However, implementation of the recommendations in this Report combined with other actions over the period ahead as policies evolve, will make a significant contribution to the development of the Smart Economy and will have a positive impact in terms of employment.

This section, therefore, considers the type of employment growth that may flow from implementing the recommendations in this Report which will lead to improved innovation and contribute to the realisation of the Smart Economy. The Taskforce believe that the implementation of the recommendations in the Report, supported by a favourable economic context, has the potential to contribute to net job creation in high-tech firms of the order of between 117,000 and 215,000 between now and 2020[53]. This excludes the creation of additional jobs through the multiplier effect (i.e. every job created will have spin off job creation through increased company and individual expenditure on goods and services). This range is based on experiences in other economies that have already achieved the type of development to which Ireland aspires. This range should be viewed as an aspiration rather than a definitive numerical forecast.

It is instructive to consider the example of Silicon Valley[54]. The Silicon Valley area has a population of approximately 2.5 million and an employment pool of 1.4 million (by way of comparison, total employment in Ireland is approximately 2.1 million out of a population of 4.5 million). It is estimated that 320,000 people are employed in 5,500 high technology firms.

The average number of jobs per high technology firm in Silicon Valley, at about 60, clearly masks a wide range of jobs per company - these figures include direct employees at all occupation levels ranging from unskilled manual workers up to associate professional and professional employees. These figures also include all firm sizes - both one or two person start-ups and MNC giants such as Oracle, Cisco or Google. It is also worth noting that larger companies will also have employment outside of Silicon Valley (and Ireland), such as regional sales offices and development centres.

We believe that Silicon Valley, as the recognised world leader in high technology, should serve as an aspiration or objective for Ireland to strive towards. It is worth noting, however, that employment in the Bay Area (which is home to Silicon Valley and many of the outcroppings from that cluster) has actually declined by more than 360,000 over the last 10 years, and over a longer 20 year time horizon, employment growth has remained quite modest. This trend parallels recent trends in Ireland suggesting that agency supported employment has remained relatively constant - in this context, the fact that agency supported employment in Ireland has been maintained over recent years represents a significant achievement.

Further, Silicon Valley is quite unique in global terms given the sheer volume of world class research institutions, huge historical investment in research from State and Federal sources including defence and medicine, and the presence of key pioneering industries such as the semiconductors industry since the 1950s and 1960s. Given the base from which Ireland is starting from, therefore, there may be more appropriate benchmarks for Ireland to compare itself with over the medium term.

According to Eurostat[55], in 2007, more than 2 million people were employed in high-tech manufacturing in the EU-27 (1.1% of total EU employment). Another 12 million (5.6%) were employed in medium-high-tech manufacturing and 7 million (3.3%) were employed in high-tech knowledge intensive services. At regional level, the leading region for high-tech employment was Berkshire, Buckinghamshire and Oxfordshire (UK), with high-tech sectors accounting for 10.7 % of total employment. A region such as this may provide a more realistic short-term model for Ireland.

At present, it is estimated that approximately 6.2% of workers in Ireland are engaged in high-tech employment[56]. Based on the most recently published ESRI Medium Term Review[57], employment in 2020 is forecast to be around 2.3 million. Were Ireland to increase its share of employment in high-technology firms from the current level to 10.7%, this would see employment in high-tech firms increase from approximately 131,000 in 2008 to 248,000 in 2020, a net increase of 117,000. Obviously this masks the fact that more employment will have to be created to arrive at a net positive figure as inevitably there will be significant job churn over the same period.

Were Ireland to achieve levels of employment in high-tech firms comparable with Silicon Valley, the numbers would increase substantially. More realistically, Ireland might aspire to be a leader in Europe and aim to have 15% of employment concentrated in high-tech firms. This would result in almost 346,000 people being employed in high-tech firms by 2020 – a net increase of 215,000 jobs over the period.

The Taskforce believe that additional high-tech employment creation can have an even more significant secondary effect – the higher productivity levels inherent in high-tech employment may result in a higher multiplier effect, producing in turn, even more secondary employment. It should be noted, however, that the figures for net employment creation already capture an implicit element of the secondary employment effects.

SOURCE OF JOBS

The Taskforce have considered the avenues of growth through which high-tech employment can be created. It is important to note that while a significant proportion of high-tech employment is likely to be concentrated in the agency supported sectors of the economy, the high-tech economy extends beyond the remit of the enterprise agencies. All sectors have the potential to create high-tech employment.

At the heart of our Report is a significant strengthening of the innovation ecosystem, and centring it around the entrepreneur and enterprise, which can deliver the substantial increase in employment desired.

Within the overall ecosystem, a number of different components of job creation in the Smart Economy were identified.

In the short-term, leveraging emerging innovation from outside Europe, and, in particular, establishing the European arm of top tier VC backed high growth companies via a European Accelerator Programme, as referenced in Recommendation 8.3, is an action which could create jobs, although it will not ultimately be the primary source of growth.

Transforming the operations of established companies in Ireland, including the MNCs, towards more innovation-intensive activities, as we discussed in Chapter 8 will not only protect jobs in the short-term, but will increase employment into the future.

Cultivating and growing a strong indigenous innovation sector, for example, through a significant increase in the number of new start-ups and effectively scaling them will be a significant source of employment growth if we deliver our goals.

Promoting Ireland as a location for research and commercialising IP, for example as referred to in Recommendation 12.1, has the potential to create a modest number of jobs in the short-term, although this may increase significantly over time.

POSITIVE FEEDBACK LOOP

Central to the Taskforce's whole approach is the need to foster 'positive feedback loops'. As more companies exit, and as the national average value of these exits increase, then the positive feedback loop accelerates the engine of the Smart Economy: the re-cycling of talent and of capital; the attraction of Ireland for overseas based ventures and entrepreneurs; and the increased momentum behind a small number of emerging global champions as they bulk up with appropriate acquisitions. Furthermore, if the average age of companies as they exit remains stable and modest, then the vibrancy of the Smart Economy can be monitored: by contrast, stagnant companies, with little chance of exit or growth, lock up both talent and capital.

For every successful new firm, others may fail. However, even in the case of initial failure, it is to be expected that many entrepreneurs will try again – this re-cycling effect will result in a positive feedback loop that can be further augmented through successful companies creating new company spin-outs. Thus company failures are offset by positive feedback as founders and senior managers try again and successful companies breed further new start-ups (which in turn may succeed or fail).

The positive feedback loop is absolutely critical to the success of the Innovation Process in driving job creation. Under certain conditions, entirely new start-ups 'seed' the Innovation Process 'engine', and the positive feedback loop results in many more successful companies being created, than are being 'fed' into the engine as entirely new start-ups.

This analysis considers just what might be achievable if the re-cycling of venture-capital and entrepreneurial expertise envisaged by the Taskforce was to become a reality.

METRICS/TARGETS

The Taskforce believes that there needs to be clear metrics for measuring outcomes from State investments and other interventions.

A range of relevant data is already collected, mainly by Forfás or the CSO. Much of the data collected is compatible with the Frascati Manual (the OECD methodology) or the Oslo Manual (the OECD methodology for innovation). These are essential bases for international comparability and benchmarking.

A set of 47 performance indicators has been developed for the Strategy for Science, Technology and Innovation and these are updated on a rolling basis, by Forfás. Other relevant data sources are the Community Innovation Survey, the Annual Business Survey of Economic Impact (ABSEI) and the Annual Employment Survey.

The annual reports of the relevant agencies are also useful sources of data, although as a general rule the Taskforce believes that indicators should be capable of validation independently of those implementing that particular activity or intervention. Self-measurement - that is where an agency or department charged with delivering a particular initiative or programme asserts its own outputs – is insufficient on its own, and independent measurement or validation is essential.

There are certain innovation and entrepreneur-related annual statistics in relation to angel funding and venture capital, acquisitions etc, as well as on first-time and repeat entrepreneurs which the Taskforce believes is important if we are to measure progress and returns for investment in this area.

No existing survey collects this data at present. We consider that the CSO is in the best position to fill these data gaps with its statistical expertise and access to the full business register which would also capture very small firms not captured in other registers. It is proposed, therefore, that a new survey be launched by the CSO to collect this data which should then be analysed and monitored as an evidence base for building policymaking in this space.

Areas which additional indicator metrics might cover include technology adoption and creativity by the public at large (e.g. the number of Irish users of social networking sites like Twitter and Facebook; the number of Facebook, Droid or iPhone applications developed for the global market from Ireland).

As well as measuring academic research activity, (e.g. paper citations, graduation numbers, and patent filings) a key theme should be transfer of technology knowledge and competence from such academic research into commercial success (e.g. the number and value of academic-industry collaborations; the average number of years of industry experience which academics have obtained; the number and lifetime of academic spin-out companies; the number of new products developed through industry-HEI collaborations).

Given the emphasis we place on the role that company exits play in creating a positive reinforcement loop, these metrics need to capture the number of, and average value of, company exits.

These indicators must also be communicated in a way which is useful to policy-makers in re-defining priorities in light of progress, as well as being understandable by the general public.

13.1 Key Recommendation

+ A transparent and objective process, overseen by the High Level Implementation Committee (see recommendation 14.1), should define and regularly publish metrics which report progress on all aspects of the innovation ecosystem, including the impact of State-funded research projects, as well as the specific job creation objectives outlined above;
+ This should include metrics on angel funding, venture capital investments, IPOs and other exits by venture-backed companies. A new survey for the collection of this material should be devised by the CSO.

MEASURING RETURNS ON STATE SUPPORTED R&D

A particular concern which has arisen during the course of the Taskforce's work is the need to develop a more sophisticated understanding of the returns from public investment in R&D to the Irish economy, how that differs between different types and sectors of investment, how both the direct and indirect returns over time can be measured, and how returns arise from synergies with other aspects of the innovation ecosystem.

While the Taskforce strongly endorses the need for increased public investment in all aspects of the innovation ecosystem, given the serious resource constraints facing the Irish Exchequer, a better understanding of this issue will help ensure informed decisions on priorities within the overall investment envelope and that those investment priorities complement each other and support the overall thrust of public investment.

13.2 Supporting Recommendation

A study should be undertaken to identify a model for measuring direct and indirect economic returns from public investment in R&D in Ireland to inform decision-making on investment priorities and refine the framework of performance indicators for STI investments.

14. Implementing the Report

The Taskforce believes that Ireland needs to restructure its economy towards export-led sectors and a revival of productivity growth to build a Smart Economy if it is to deliver continued economic growth and a rising standard of living for all its citizens; in fact, we believe that Ireland has no strategic choice but to do so.

We believe that the recommendations set out in this Report, if implemented in a coherent and determined fashion, can deliver the inflection point in performance which is required.

A table (pages 94 to 106) has been prepared setting out each of our recommendations with associated estimates of timelines and costs, as well as assigning responsibility for implementation.

We propose that regular reports on progress in implementation of these recommendations should be prepared for consideration by the Government and published.

We recognise that some of the recommendations have significant resource implications, at a time of severe budgetary pressure, while others will require a re-alignment of priorities within Departments and Agencies.

We also recognise that implementation will require a sustained effort over time, as new opportunities emerge and new challenges require a response. We also note that greater North-South Co-operation has the potential to contribute to progress in many areas.

The Taskforce believes that a sustained partnership approach between public and private sectors is now required. If Ireland is to recover and enter a new phase of sustainable growth, all parts of the innovation ecosystem will have to play their part, by demonstrating a willingness to change and adapt. One strength of a small country is the capacity to align the efforts of each organisation and sector – and support of broader societal and political communities - in a major national effort. That is what is now required.

We believe there is a need for stronger relationships between the Government Departments, Agencies and the HEI sector to optimise the effectiveness of the innovation ecosystem.

We recognise that a number of oversight structures already exist in relation to the Strategy for Science, Technology and Innovation, including the Cabinet Committees on Economic Renewal and Science, Technology and Innovation, the Interdepartmental Group on STI, the Advisory Council on Science and Technology and the Enterprise Feedback Group.

However, we believe that there is a need for a strong high level focus on the overall innovation agenda which ensures that it is driven forward with energy in line with our vision. Equally, it will be important to establish this in a way which avoids unnecessary duplication and overlap with existing structures.

14.1 Key Recommendation

Establish a High Level Implementation Committee, taking account of existing structures, which reports to the Taoiseach and the Cabinet Committee on Economic Renewal, and which includes representatives from the public and private sectors. We suggest its mandate include:

+ monitoring implementation of this Report;
+ identifying any further high level policy measures required in light of developments and progress;
+ ensuring that the structures are in place to facilitate stronger networking between Government Departments, Agencies, the HEI sectors and other stakeholders;
+ acting as a focal point for efforts to promote innovation across the economy;
+ publicly reporting on progress at regular intervals.

IMPLEMENTATION TABLE

A timeline of 'immediately' implies action should be taken within three months. Short- term refers to an implementation period of less than a year, medium-term of one to two years and long term of over two years. The recommendations are classified broadly as cost neutral, low-cost and high-cost. It should be noted that cost estimates are indicative and relate to direct Exchequer costs rather than net costs taking account of potential Exchequer revenues and the net economic benefits that might arise.

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
5.1 Deliver on the investment framework set out in the Strategy for Science, Technology and Innovation (SSTI) 2006-13 and achieve the goal in the renewed Programme for Government of investing 3% of GDP in R&D by committing to investment in an updated SSTI for the 2014-2020 period.	Government M/ETE	High Cost	Long Term
5.2 Building on the announcement in Budget 2010, the current structures for delivery of research funding should be reformed with the goal of implementing the following changes: + consolidate funding streams and enhance co-ordination to deliver optimum value for money; + ensure that funded research has an identified funding pathway and single lead responsible agency underpinned by commercialisation supports; + as we build towards our goal of investing 3% of GDP in R&D, commit greater resources to funding applied research that is focused on identified priority opportunities for industry in Ireland.	M/ETE M/STI Cabinet Committee on STI	Cost Neutral	Short Term
5.3 Introduce additional measures to promote the take-up of higher level maths, including possible incentives such as the awarding by HEIs of CAO bonus points on a pilot basis starting with Leaving Certificate (LC) 2012, so that this year's LC cohort can make informed subject choices on commencing Fifth Year.	M/ES HEIs	Low Cost	Immediate
6.4 Develop and publish a national IP Protocol which establishes "ground rules" which must be followed when agreeing terms around ownership of and access to all State supported IP.	M/ETE	Low Cost	Short Term
Adopt more meaningful metrics by which HEIs and TTOs are measured, to reflect the IP Protocol.	M/ETE	Low Cost	Medium Term
Link a proportion of State funding for the HEIs to national metrics on innovation and commercialisation.	M/ETE M/ES	Cost Neutral	Short Term

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
6.7 Convene an expert group of representatives from Industry, the VC sector, HEIs, the legal profession, and the public sector, who are informed by TT structures internationally, to recommend, by September 2010, the most appropriate structure that would achieve the following: + a national office that has knowledge about current research projects and access to all IP created throughout the HEI system as well as the mandate to bundle, market and facilitate speedy commercialisation of IP from all HEIs in accordance with the IP Protocol; + in that office, a single point of access, and point of contact, for the entrepreneur, to all IP that has been generated across the entire HEI system; + mechanisms put in place to ensure full support of the activities of this office by the HEIs/TTOs.	M/ETE	Low cost	Immediate
7.1 Attracting top-tier venture partners from abroad to Ireland is a priority and can best be achieved through implementation as soon as possible of the Innovation Fund - Ireland, envisaged in *Building Ireland's Smart Economy.*	M/Fin M/ETE Taoiseach	High Cost	Short Term
8.1 The Government should identify a suitable procurement model and then pilot a number of Flagship projects where public procurement to meet specific public needs would stimulate the development of innovative solutions with export potential through collaboration between MNCs, SMEs and HEIs.	M/ETE M/Fin with relevant Ministers	To be determined	Short Term

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
8.2 Establish a team drawn from the relevant agencies with responsibility for ensuring inter-firm collaborations to take advantage of convergence opportunities. It should bring forward and, as appropriate, implement actions in the following areas: + support for prioritised areas of convergence opportunity through existing or new public funding schemes; + public funding schemes which incentivise inter-firm collaborations in respect of converging technologies; + ensure that the regulatory environment (and how it is applied or interpreted) is supportive of convergence, e.g. combination medical products; + education and training programmes that provide the multi-disciplinary capabilities required to support cross technology and cross sectoral convergence; + establishment of an industry-led convergent technologies network to facilitate collaboration between companies, academics and medical practitioners across the formerly discrete sectors of pharma, bio, med tech, ICT and engineering, and + marketing Ireland's advantages as a location for convergence focused activities. Industry including MNCs located in Ireland should also be asked to identify specific areas of opportunity where they would be interested in participating in convergence-related activities.	M/ETE, EI IDA SFI	Cost Neutral	Immediate
8.3 The IDA and EI should jointly develop and implement a "European Accelerator" Programme with the initial goal of attracting 20 companies from within the portfolios of top tier venture capital funds to open their European headquarters in Ireland in the immediate future; and aiming to grow this number tenfold within the next five years.	M/ETE IDA EI	High Cost	Short Term
8.8 Urgently review, in conjunction with relevant industry representatives, the competitiveness of our tax offering to mobile intellectual property rich businesses.	M/Fin	Cost neutral	Medium Term
8.9 Remove the incremental spend requirement for the R&D Tax Credit entirely.	M/Fin	High Cost	Medium Term
8.10 Develop an attractive and competitive high value Mobile Talent Regime.	M/Fin	High Cost	Medium Term

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
9.1 While Enterprise Ireland has a broad agenda to support export-focused Irish enterprise, its mission, strategies, business plans and expenditure need to prioritise more clearly, and provide leadership in, the increasingly important areas of start-up and early-stage activities.	M/ETE EI	High cost	Short Term
9.2 Introduce a new State seed capital scheme (in addition to existing EI supports) which: + would fill the current gap in private seed capital, by providing milestone-driven funding for each approved project (the level of funding will vary considerably by sector but will typically be between €100,000 and €500,000); + introduces a moratorium for the immediate period ahead on existing requirements for co-investment from other sources where appropriate to enable strong prospects to proceed; + significantly increases the number of projects securing funding of this level; + is evaluated by measuring wider employment and economic impacts, not just the direct return on capital invested; + should be reviewed after five years for effectiveness, and annually thereafter with a view to ultimately withdrawing from the market; + involves a private sector panel which would make recommendations on specific technology sectors and markets and on which projects to fund.	M/ETE EI	High Cost	Short Term
9.3 Build on the work of EI, InterTradeIreland and others to nurture angel funding by: + formally approving a national portfolio of sector-specific Business Angel funds and starting to do so during 2010; to qualify for approval each such fund should be substantially composed of previously successful innovators who wish to apply their expertise and resources to helping new start-up companies succeed; such innovators may be found also amongst the Diaspora; + offering direct financing for administrative support for up to two years at a value of €50,000/year for each such new approved Business Angel fund, after which it is expected to be self sustaining with respect to administration overheads; + Implement a €10 million fund to be made available to approved Business Angel funds on a competitive basis as a primer to help these groups raise their initial funds.	M/ETE EI Intertrade Ireland	High Cost	Medium Term

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
9.8 Launch a marketing campaign, initially on a pilot basis, to promote Ireland as an excellent location for starting innovative export-oriented companies.	M/ETE EI IDA	Low Cost	Immediate
10.1 There should be an independent review of the current configuration of enterprise support agencies and programmes to reflect the changing enterprise challenge outlined in this report, including increased focus on linkages between MNCs and indigenous firms.	M/ETE	Low Cost	Medium Term
10.7 Ireland's bankruptcy legislation should be modernised following the conclusion of the Law Reform Commission's current consultation process on *Personal Debt Management and Debt Enforcement*.	M/JELR	Cost Neutral	Medium Term
11.1 Given the critical need for advanced broadband services in building a highly innovative enterprise sector, the nationwide roll-out of Next Generation Network (NGN) services, for bandwidth up to and surpassing 1Gbps, should be prioritised.	M/CENR	High Cost	Long Term
11.3 Ensure that: + at least one wet laboratory facility of scale is made available for post-incubation life-science start-ups; + a laboratory incubator space is established for microelectronics start-ups.	M/ETE EI	High Cost	Medium Term
12.1 Develop and market Ireland as an International Innovation Services Centre offering a location for global IP management, licensing and IP trading services.	M/ETE IDA M/Finance	Low Cost	Short Term
12.4 An organised programme of visits and other activities should be put in place whereby Ministers, Departments and State Agencies and other relevant stakeholders (for example industry associations) convey a consistent, positive message about Ireland as a centre of excellence for innovation.	M/FA M/ETE	Low Cost	Immediate
13.1 A transparent and objective process, overseen by the High Level Implementation Committee (see 14.1 below), should define and regularly publish metrics which report progress on all aspects of the innovation ecosystem including the impact of State-funded research projects, as well as the specific job creation objectives outlined. This should include metrics on angel funding, venture capital investments, IPOs and other exits by venture-backed companies. A new survey for the collection of this material should be devised by the CSO.	Taoiseach M/ETE CSO Forfás	Low Cost	Medium Term

KEY RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
14.1 Establish a High Level Implementation Committee, taking account of existing structures, which reports to the Taoiseach and Cabinet Committee on Economic Renewal and which includes representatives from the public and private sectors. We suggest its mandate include: + monitoring implementation of this Report; + identifying any further high level policy measures required in light of developments and progress; + ensuring that the structures are in place to facilitate stronger networking between Government Departments, Agencies, the HEI sectors and other stakeholders; + acting as a focal point for efforts to promote innovation across the economy; + publicly reporting on progress at regular intervals.	Taoiseach	Cost Neutral	Immediate

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
5.4 Increase investment in intensive training for mathematics teachers and the full rollout of project maths.	M/ES	High Cost	Medium Term
Implement the new syllabuses in Leaving Certificate Biology, Physics and Chemistry. Implement new approaches to assessment based on the experience of the current trial in schools.	M/ES	High Cost	Long Term
Introduce a new mentoring programme for teachers and talented students, involving experienced mathematicians, engineers and scientists who are keen to make a wider contribution to advancing the quality of teaching and learning in their discipline.	M/ES Industry	Low Cost	Short Term
5.5 Drawing on the example of the TCD-UCD Innovation Alliance and the more recent NUIG-UL Strategic Alliance, we support further collaboration, alliances and rationalisation of provision between HEIs as well as new models of HEI-industry collaborations.	HEIs HE Strategy Group	Cost Neutral	Medium Term
5.6 Promote the contribution of AHSS to the innovation ecosystem and, in particular, seek to increase synergies between different disciplines within AHSS and SET disciplines.	M/ES M/STI HEIs SFI/HEA	Cost Neutral	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
5.7 All HEIs should introduce initiatives to cultivate innovation and entrepreneurship at both undergraduate and postgraduate level, drawing where appropriate on the model proposed by the TCD-UCD Alliance. This could include business plan competitions with funded prizes.	HEIs	Low Cost	Medium Term
5.8 Introduce a Programme to incentivise participation in certain postgraduate courses in the world's top ten Engineering, Science and Business Schools by individuals who would then return to work in Ireland. One approach would be a limited tax relief 'futures' scheme which would allow successful graduates avail of a personal tax relief to offset their tax liabilities arising from employment within the State. An alternative would be a two-way mobility programme between Ireland and international HEIs.	M/ES M/Fin	Low Cost	Medium Term
5.9 Ensure effective streamlined immigration arrangements for SSTI-related PhD students, postdoctoral researchers and their families re-locating to Ireland.	M/JELR	Cost Neutral	Short Term
Introduce fast-track residency status for PhD graduates employed by Irish-based businesses.	M/JELR	Cost Neutral	Short Term
Increase the current six month extension during which a PhD graduate can stay in Ireland to seek another job to 12 months.	M/JELR	Cost Neutral	Immediate
5.10 There should be a policy shift towards life-long learning within our Higher Education, Further Education and Training system. HEIs, FÁS and other public agencies, as well as employers, need to better align their respective roles in this regard.	M/ES M/ETE HEIs FÁS	To be determined	Long Term
6.1 Introduce a scheme similar to the "Knowledge Transfer Partnership Programme" in the UK by placing recent graduates in companies to facilitate the transfer of high technology skills and expertise.	M/ETE HEIs Industry	Low Cost	Medium Term
As part of the current Work Placement Programme introduce a targeted strand for STEM graduates with the assistance of industry representative bodies.	M/ETE Industry	Cost Neutral	Short Term
Establish a national undergraduate internship programme which builds on existing HEI initiatives but has a more concerted involvement of industry, especially as regards consistency in the availability of places. This may require an element of subsidisation for the participating firms.	M/ETE HEIs Industry	To be determined	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
6.2 Implement a new suite of HR and performance management policies in the HEIs to incentivise and reward innovation and commercialisation. These should include: + Facilitation of staff who wish to provide their expertise to innovative companies through full-time or part-time secondments. The filling of any vacancies arising from such secondments should be exempt from any restrictions relating to the Employment Control Framework; + Seek to ensure that academics who take leave of absence/sabbaticals to gain industry experience, are not penalised in their academic career; + Ensure that career advancement is based on valuing commercialisation work as well as research and teaching performance.	M/ES HE Strategy Group HEIs	Low cost	Medium Term
Researchers who develop technology that is transferred to a company through a licence or other mechanism should be invited to apply for specific State research funding to further support the basic research programs being conducted in that researcher's laboratories (e.g .similar to the UK ROPA *Realising Our Potential Awards* Scheme).	Research Funding Bodies	Low cost	Short term
6.3 Introduce a scheme to allow access by industry to HEI specialist equipment and laboratories.	HEIs	Cost Neutral	Short Term
Significantly increase the placement of "entrepreneurs in residence" into relevant R&D laboratories and centres of the HEIs.	HEIs Research Funding Agencies	Low Cost	Short Term
6.5 Ensure all funding agencies adopt and publish standardised requirements for the management of IP within HEIs, in accordance with the IP Protocol.	M/ETE, Cabinet Committee on Economic Renewal Research Funding Agencies	Cost Neutral	Medium Term
Develop a framework to ensure that, when funding collaborative projects, all terms are agreed between collaborators before the related funding is drawn down and that those terms are aligned with the IP Protocol.	M/ETE Research Funding Agencies	Cost Neutral	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
6.6 Ensure the IP management policies and procedures within all HEIs are best in class, in particular to avoid inadvertent IP leakage or inadvertent exposure to commercial liability, and that these policies and procedures are standardised across all HEIs as far as possible.	M/ES HEIs	Cost Neutral	Short Term
Ensure that, with the assistance of funding agencies, researchers within HEIs are appropriately incentivised to properly manage their IP.	Research Funding Agencies HEIs	Cost Neutral	Immediate
Ensure that agreements between HEIs are in place to enable speedy licensing of IP from multiple HEIs in accordance with the IP Protocol, with a single commercial lead.	M/ES M/ETE EI HEIs	Cost Neutral	Medium Term
Ensure that an expert group of representatives from the HEIs and the private sector is appointed to develop model contracts, in line with the IP protocol, for all activities at the HEI/Industry interface, to be used by all HEIs at the option of the entrepreneur/company (i.e. non disclosure agreements, material transfer agreements, licence agreements, etc.) (internationally accepted model contracts to be used as a starting point).	M/ES M/ETE EI HEIs	Cost Neutral	Short Term
7.2 In addition to implementing Innovation Fund - Ireland, mechanisms should be explored which would utilise the following opportunities to enhance the availability of Venture Capital in Ireland: + existing MNCs located in Ireland should be invited to suggest means by which they would be willing to assign some of their treasury funds into Irish based innovative companies or venture capitalists; + facilitating the Irish Diaspora who wish to invest in risk capital for Irish based innovative companies; + creating a programme to access venture debt (a commercial instrument, particularly from international private equity firms) for later stage companies based in Ireland. Investment should also continue in developing a sustainable, forward – looking and high quality Irish Venture Capital Industry, complementing the Innovation Fund - Ireland.	M/Fin M/ETE EI	To be determined	Medium Term
7.3 In order to support and incentivise the scaling of innovative indigenous companies: + introduce a Scaling Incentive Scheme (SIS) to acknowledge successful scaling, whilst continuing to grow a company; + in implementing the Innovation Fund - Ireland (see above) endeavour to ensure the programme includes managers which specialise in investing in fast growing existing companies.	M/Fin M/ETE EI	High Cost	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
7.4 Build on the success to date of the Leadership For Growth (L4G) programme by: + continuing the existing L4G programme and developing additional programmes which expose senior executives operating from Ireland to best practice, case studies and personal face-to-face contact with the executives and founders of successful innovative companies; + placing an immediate focus on developing the skill sets and experience of CFOs, and CEOs, in the area of raising international finance from Ireland to scale companies; + strengthening training and development provision in the areas of international marketing and sales.	M/ETE EI	High Cost	Medium Term
8.4 Consider modifications to the R&D Tax Credit Regime which would be of benefit to SMEs, as outlined in Appendix 6.2.	M/Fin	High cost	Medium term
Building on current State initiatives, introduce a targeted innovation audit scheme for qualifying SMEs by January 2011, including for those SMEs that do not engage in any R&D at present.	M/ETE EI	High cost	Medium Term
When reviewing the current research funding schemes (see Recommendation 5.2), introduce initiatives to encourage: + more involvement by SMEs in collaborative research, both with other indigenous companies, with MNCs and with Irish and non-Irish HEIs, + more R&D contracts between small companies and customers.	M/ETE EI SFI	Low cost	Medium Term
8.5 Form an industry-HEI advisory group on *New Product Design and Development*, to provide a forum for Irish industry, HEIs, Professional Bodies and Government to agree a national agenda and roadmap for product design and development.	M/ETE M/ES IBEC IUA	Cost Neutral	Short Term
8.6 Work to support the continued growth and transformation of Ireland's FDI base while also maximising linkages with the indigenous sector, including through Flagship projects (Recommendation 8.1), convergence activities (Recommendation 8.2), improved IP arrangements (Recommendation 6.4) and the proposed European Accelerator Programme (Recommendation 8.3).	M/ETE IDA EI	To be determined	Immediate
8.7 Implement measures to support increased innovation and growth across both MNC and indigenous enterprises in key strategic sectors for Ireland, and in particular the specific proposals listed in pages 58 to 61 above.	IDA EI	High Cost	Immediate
8.11 Implement the supporting tax recommendations set out in Appendix 6.	M/Fin	To be determined	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
9.4 Introduce a reduced effective rate of CGT arising on the sale of shares in a successful innovation company, where proceeds are reinvested in another qualifying innovation company within a reasonable period.	M/Fin	High Cost	Medium Term
9.5 Introduce an Entrepreneurial Tax Credit.	M/Fin	High Cost	Medium Term
9.6 Introduce "Founder Share Options" which are eligible only for CGT treatment.	M/Fin	High Cost	Medium Term
9.7 Review the BES and Seed Capital Relief legislation with a view to making it easier for entrepreneurs to utilise these schemes.	M/Fin	To be determined	Medium Term
9.9 Introduce new arrangements to fast-track special residency permits for appropriate qualified entrepreneurs, and their immediate families (including a work permit for spouses). The requirement for non-EEA nationals to commit to transferring capital of at least €300,000 if they wish to start a business in Ireland should be waived where alternative criteria are met (for example acceptance by an approved Angel Fund). A dedicated support package should be provided by EI and/or IDA to assist early stage overseas projects which locate here.	M/JELR M/JELR M/ETE EI IDA	Cost Neutral Cost Neutral Medium Cost	Short Term Short Term Short Term
9.10 Enhanced funding and other supports should be put in place for "project investigation" of up to €50,000 per new project for its entrepreneur promoter to confirm or otherwise a market opportunity, possibly by offering loans (repayable from future profits) rather than grants as at present.	M/ETE EI	Low Cost	Medium Term
10.2 Introduce a scheme to enable a number of public servants each year to be placed into innovative high growth companies, at no expense to these companies, whilst still meeting the normal remuneration and employment benefits of the public servants concerned.	M/Fin M/ETE	Low Cost	Medium Term
10.3 Public service broadcasting should be encouraged to devote broadcast time to topics of national strategic interest in innovation, entrepreneurship and the smart economy. As part of a wider effort to promote lifelong learning across the workforce, a national Continuing Professional Development (CPD) scheme to champion and promote innovation to the general workforce should be developed.	M/CENR M/ES M/ETE	Cost Neutral High Cost	Immediate Long Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
10.4 Introduce national initiatives to increase the public awareness of IP issues (e.g. through the BT Young Scientists exhibition).	M/ETE M/ES	Low Cost	Short Term
Introduce a programme from the Irish Patent Office to promote and educate both industry and students about all aspects of IP (similar to that run by the UK IP Office).	M/ETE	Low Cost	Medium Term
Develop a more co-ordinated approach between the various agencies that already run IP training seminars and initiatives for industry.	M/ETE	Cost Neutral	Short Term
10.5 Examine ways in which qualifying innovative export-oriented companies can have convenient access to low-cost, high quality legal, patent, and tax advice (including IP audits). Ideally, this initiative should take the form of a tender to the private sector to establish a cost-effective and proactive support function for these services.	M/ETE	To be determined	Short Term
10.6 Establish a national one stop shop website providing information on all research expertise, innovation, enterprise and other relevant supports available to business.	M/ETE M/ES	Low Cost	Medium Term
11.2 Extend building regulations to facilitate the provision of high speed broadband.	M/EHLG	Cost Neutral	Short Term
Ensure that the provision of broadband infrastructure is intrinsic in all State investment plans (e.g. roads, water distribution and meters, drainage works, smart electricity meters, etc.) including Local Authority plans.	M/CENR M/EHLG	Low Cost	Medium Term
Reduce the costs of building access networks by reviewing planning rules, reducing charges, and developing consistent charges and processes across local authorities.	M/EHLG M/CENR	Cost Neutral	Medium Term
Facilitate provision of access to public ducting infrastructure by establishing the planned "one stop shop".	M/CENR	Low Cost	Short Term
Ensure a clear, predictable and technology neutral regulatory approach to Next Generation Networks.	M/CENR	Cost Neutral	Short Term
Government procurement should be used where appropriate to stimulate the provision of high quality symmetric broadband (e.g. eSchools, eHealth and eGovernment initiatives).	M/Fin M/ES M/HC	Cost Neutral	Medium Term

SUPPORTING RECOMMENDATIONS	Lead Actor/s	Indicative Exchequer cost	Timeline
12.2 Implement changes at the Irish Patent Office to bring it more in line with patent offices internationally (see Appendix 7 for more details).	M/ETE	High Cost	Medium Term
Support initiatives to position Ireland as an attractive forum for the resolution of international IP disputes through mediation and other forms of dispute resolution.	M/ETE IDA M/JELR	Low Cost	Long Term
Continue initiatives to further reduce the timeframes and cost of resolution of IP disputes in Irish courts.	M/JELR	Cost Neutral	Medium Term
Work to harmonise IP regulations at EU level (see Appendix 7 for more details).	M/ETE	Cost Neutral	Medium Term
12.3 Build on the existing IDA international marketing campaign with a view to attracting international entrepreneurs to Ireland, increasing R&D intensive investment by MNCs and raising the level of awareness of the benefits of innovation to the Irish public.	IDA EI	Low Cost	Medium Term
A single national brand identity based on the concept of innovation should be consistently used in key international media, trade shows and network events by all relevant agencies.	IDA EI SFI	Cost Neutral	Medium Term
12.5 A new Trade and Investment Strategy should be developed and implemented to strategically focus our national resources and efforts. This Strategy should include specific initiatives to target opportunities in emerging economies.	M/ETE M/FA	Cost Neutral	Medium Term
12.6 The Strategy for engaging with the Diaspora following the Global Economic Forum in Farmleigh should include specific objectives to support Ireland's ambition to be an International Innovation Hub.	M/FA	Cost Neutral	Short Term
12.7 The Taskforce recognises the potential to expand North-South cooperation as a step towards developing the island into a leading region for research and innovation by generating valuable synergies; expanding the critical mass of research capacity; increasing participation in international funding programmes; promoting internationally the innovative capacity of the island; and enhancing international competitiveness.	Taoiseach M/FA M/ETE	Cost Neutral	Short Term
13.2 A study should be undertaken to identify a model for measuring direct and indirect economic returns from public investment in R&D in Ireland to inform decision-making on investment priorities and refine the framework of performance indicators for STI investments.	M/ETE	Low Cost	Short Term

APPENDIX 1:

MEMBERSHIP OF THE INNOVATION TASKFORCE

Mr. Dermot McCarthy (Chair)	Secretary General, Department of the Taoiseach
Mr. Lionel Alexander	Vice-President and General Manager, Hewlett Packard (Manufacturing) Ltd.
Professor Don Barry	President, University of Limerick
Dr. Hugh Brady	President, University College Dublin
Mr. Damien Callaghan	Investment Director, Intel Capital
Mr. Michael Carmody	President, Institute of Technology, Tralee
Dr. Steven Collins	Co-Founder & Chief Executive Officer, Kore Virtual Machines
Mr. Ned Costello	Chief Executive, Irish Universities Association
Professor Frank Gannon	Director General, Science Foundation Ireland
Mr. Seán Gorman	Secretary General, Department of Enterprise, Trade & Employment
Mr. Joe Harford	Chair of the High Level Action Group on Green Enterprise
Dr. John Hegarty	Provost, Trinity College Dublin
Dr. Chris Horn	Co-founder & former Chief Executive Officer, Iona Technologies
Dr. Brian Kelly	Founder & Chief Executive Officer, Celtic Catalysts
Mr. Michael Kelly	Chairman, Higher Education Authority
Dr. Burton Lee	Director, European Entrepreneurship and Innovation Programme, Stanford University School of Engineering; Managing Partner in Innovarium Ventures
Mr. John Lynch	Chief Executive Officer, Merrion Pharmaceuticals Ltd.
Ms. Tara MacMahon	IP Lawyer
Mr. Dan MacSweeney	Chief Executive Officer, Carbery
Ms. Brigid McManus	Secretary General, Department of Education and Science
Mr. Bryan Mohally	Vice President, Supply Chain Operations Europe, Johnson & Johnson
Mr. Jim O'Brien	Second Secretary General, Department of Finance
Mr. Mark O'Donovan	Director, Raglan Capital
Mr. Barry O'Leary	Chief Executive Officer, IDA Ireland
Mr. Barry O'Sullivan	Senior Vice-President, Cisco Systems
Dr. Paul Roben	President, Celtic Consulting
Mr. Frank Ryan	Chief Executive, Enterprise Ireland
Ms. Anna Scally	Partner, KPMG

The Secretariat for the Taskforce was provided by the Department of the Taoiseach assisted by colleagues in Forfás and the Department of Enterprise, Trade and Employment.

APPENDIX 2:

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AHSS	Arts, Humanities and Social Sciences
BES	Business Expansion Scheme
BioPAT	Biopharmaceutical Process Analytical Technology: industry-led research network supported by EI.
CAO	Central Applications Office
CAT	Capital Acquisition Tax
CGT	Capital Gains Tax
CORD	Commercialisation of Research and Development
CPD	Continuing Professional Development
CSET	Centre for Science, Engineering and Technology: Partnerships which link scientists and engineers across academia and industry to address crucial research questions.
CSO	Central Statistics Office
DES	Department of Education and Science
DSE	Discover Science and Engineering: DSE is a Government initiative that aims to increase interest in science, technology, innovation and engineering among students, teachers and members of the public.
ECDL	European Computer Driving License
EEA	European Economic Area
EEC	European Economic Community
EERP	European Economic Recovery Plan
EI	Enterprise Ireland
EPA	Environmental Protection Agency
EMEA	Europe, Middle East and Africa
ESRI	Economic and Social Research Institute
EU	European Union
EuroStat	European Statistical Agency
FÁS	Training and Employment Authority
FDI	Foreign Direct Investment
Forfás	The national policy advisory body for enterprise and science.
GDP	Gross Domestic Product
GNP	Gross National Product
HEA	Higher Education Authority

HEAnet	Provides cutting edge Internet Services to Educational and Research Institutions & Organisations throughout Ireland.
HEI	Higher Education Institutes
HPSU	High-Potential Start-Up
HRB	Health Research Board
IBEC	Irish Business and Employers Confederation
ICT	Information and Communication Technology
IDA	Industrial and Development Agency
IDDN	Irish Drug Delivery Network
IFSC	International Financial Services Centre
IoTs	Institutes of Technology
IP	Intellectual Property
IRCHSS	Irish Research Council for Humanities and Social Sciences
IRCSET	Irish Research Council for Science, Engineering and Technology
M/ES	Minister for Education & Science
M/ETE	Minister for Enterprise, Trade & Employment
M/Fin	Minister for Finance
M/HC	Minister for Health & Children
M/CENR	Minister for Communications, Energy & Natural Resources
M/EHLG	Minister for Environment, Heritage & Local Government
M/STI	Minister of State for Science, Technology and Innovation
M/FA	Minister for Foreign Affairs
M/JELR	Minister for Justice, Equality and Law Reform
MNC	Multi-National Corporations
NCCA	National Council for Curriculum and Assessment
NCPP	National Centre for Partnership and Performance
NESC	National Economic and Social Council
NDP	National Development Plan
NGN	Next Generation Network
NiBRT	National Institute for Bioprocessing Research and Training
NPRF	National Pension Reserve Fund
NSAI	National Standards Authority of Ireland
NTMA	National Treasury Management Agency
NUIG	National University of Ireland, Galway
OECD	Organisation for Economic Co-operation and Development

PAYE	Pay As You Earn
PRTLI	Programme for Research in Third Level Institutions
R&D	Research and Development
RD&I	Research, Development and Innovation
RFID	Radio Frequency Identification
ROPA	Realise Our Potential Awards
SEI	Sustainable Energy Ireland
SFI	Science Foundation Ireland
SIF	Strategic Innovation Fund
SIS	Scaling Incentive Scheme
SMEs	Small and Medium Enterprises
SRC	Strategic Research Cluster
SSTI	Strategy for Science, Technology and Innovation
STEM	Science, Technology, Engineering and Maths
STI	Science, Technology and Innovation
TCD	Trinity College Dublin
Teagasc	The national body providing integrated research, advisory and training services to agriculture and the food industry.
TSSG	Technology Software and Systems Group
TTO	Technology Transfer Office
UCD	University College Dublin
UL	University of Limerick
VC	Venture Capital

APPENDIX 3:

CONSULTATION PROCESS AND SUBMISSIONS RECEIVED

Most of those who made written submissions to the Taskforce agreed to the publication of their submissions to facilitate debate and raise awareness in relation to the work of the Taskforce. A summary document which explores the key proposals and themes contained in these submissions was also prepared. The published submissions and summary can be found on the Innovation Taskforce website at www.innovationtaskforce.ie.

The Innovation Taskforce would like to thank all those who took the time to make a submission. A list of respondents* is below.

A & L Goodbody	**American Chamber of Commerce Ireland**
BMW Regional Assembly	**Brandon, Gerard**
Brazil, Professor Thomas J.	**Brophy, David; Curley, Donnacha; Lane, Cathal**
BT	**Callaghan, Dr. James; Woods, Dr. Margaret**
Carr, Alan	**CELT Centre for Environmental Living and Training**
Centre for Innovation and Structural Change, NUI Galway.	**Centre for Software Engineering, DCU**
Chambers Ireland	**CMC Consulting**
ComReg	**Coyle, Pearse**
Datta, Dr. Shoumen	**Dawson, Professor Kenneth**
Design Twentyfirst Century	**Devitt, Dr. Frank**
Digital Media Forum	**Dublin Local Authorities**
Ducrée, Jens	**Eircom**
Environmental Protection Agency	**ETP Ireland**
First Klass Family Fun	**Fountain Healthcare Partners**
Freuder, Professor Eugene C.	**Gallagher, Professor William**
Glass, Dr. Alistair M.	**Global Standards 1 (Ireland) Ltd.**
Grimes, Professor Seamus	**Health Research Board**
Herrera, Frederic	**Higher Education Authority**
Hussey, Professor Conleth D.	**IBM Ireland Ltd.**
ICT Ireland/Irish Software Association	**IDA Life Sciences**
Innovator	**Institutes of Technology Ireland**
InterTradeIreland	**IPM Logic**
Irish Bioindustry Association	**Irish Business and Employers Confederation (IBEC)**
Irish Management Institute (IMI)	**Irish Venture Capital Association**
IT Sligo	**Kelleher, Professor Dermot**

Kelly, Dr. Brian	Kelly, Martin
Kumar, Damini, European Ambassador for Creativity and Innovation	Lane, Tim
Líonra	Loftus, Professor Brendan
Lowe, Liam	Macra na Feirme
Mac Suibhne, Seamus	Mahon, Kieran
Marine Institute	McCarthy, Sean
McDonnell, Dr. Kevin	Mc Grath, Declan
McManamon, Peter	Microelectronics Industry Design Association (MIDAS), Ireland
Milner, Professor Richard G	Molloy, Edmond
Moore, Cormac	Murray, Martin
National Centre for Partnership and Performance (NCPP)	National Digital Research Centre
National Standards Authority of Ireland (NSAI)	National University of Ireland Galway
National University of Ireland, Maynooth	National University of Ireland Maynooth, Innovation Economy Forum
Neri, Fillippo	Noonan, Kevin
O'Dowd, Colm	Ó hÓbáin, Lorcán
O'Mahony, Professor Donal	O'Neill, Padraic
O'Neill, Sean	Rath, Dr. Myles
ReEnPower	Reynolds, Joe
Riordan, Catherine	Robinson, Dr. James C.
Royal Irish Academy	Science Foundation Ireland
Science Gallery	Scott, Professor Mike
Scott, Toby & Leadbeater, Charles	Shannon Development
Smart Bay Working Group	Spillane, Professor Charles
Spirit of Ireland	Still Point Productions
Stokes, Richard	Taylor, Professor David
Teagasc	Telecommunications and Internet Federation
Telecommunications Software and Systems Group, (TSSG)	Temple Bar Cultural Trust, Business to Arts & The Science Gallery
Tol, Richard	Trade Facilitate Ltd.
University College Cork	Visual Artists Ireland
Vladatu, Dr. Liviu	Wafer, Brendan (CIRCA Group)
Western Development Commission	Whatmore, Professor Roger
Wheatley, Joseph	Whelan, Dr. John
Wicklow County Campus	Women in Technology and Science (WITS)

** Not all respondents wished to be included in this list.*

APPENDIX 4:

WORKING METHODS

The Innovation Taskforce met in full day plenary sessions in Government Buildings on 17 July, 25 September, 30 October, 14 December and 29 January. In addition, a consultation meeting was held with interested parties on 19 October.

The Taskforce issued a public call for submissions (for more information on submissions see Appendix 3). In addition, the Taskforce consulted extensively through formal and informal networks and through meetings with the smaller Working Groups which were formed to address specific aspects of the Terms of Reference.

WORKING GROUPS

Given the potentially large agenda facing the Group, the relatively limited reporting timeframe of six months and the significant expertise and experience of members, it was decided that the best way to progress the Terms of Reference was through the establishment of a number of focussed Working Groups to consider certain aspects of the Work Programme. Some of these Working Groups co-opted additional members to assist with their work.

Working Group 1: Incentives, intellectual property and venture capital: identifying measures to increase innovation, commercialisation and entrepreneurship including changes to incentives, venture capital arrangements and IP strategies.

Membership: Anna Scally (Chair), Tara MacMahon, Brian Kelly, Damien Callaghan, Barry O'Sullivan, Frank Gannon.

Working Group 2: Commercialisation, technology transfer and converging technologies including examining institutional structures for R&D funding delivery, how to maximise commercialisation of research, increase technology transfer and promote innovation in converging technologies.

Membership: Mark O'Donovan (Chair), Chris Horn, Paul Roben, Dan MacSweeney, Michael Carmody, Ned Costello.

Working Group 3: Achieving the Innovation Island - how to position and promote Ireland as the innovation island including attracting entrepreneurs, FDI, international start-ups and private sector R&D investment.

Membership: Bryan Mohally (Chair), John Lynch, Joe Harford, Don Barry, Michael Kelly, Frank Ryan, Barry O'Leary. **Co-opted members**: Bill Kearney IBM, Aidan Gough InterTradeIreland, Elizabeth Harvey Forfás.

Working Group 4: International Innovation Development Hub (Dublin): supporting the development of the TCD/UCD Alliance including identifying necessary supporting policy measures.

Membership: Steven Collins (Chair), Burton Lee, Hugh Brady, John Hegarty. **Co-opted members**: Des Fitzgerald UCD, David Lloyd TCD, Brian Kelly, John Tierney Dublin City Manager, Gina Quinn Dublin Chamber of Commerce, Shay Garvey Delta Partners.

The Groups met on a number of occasions as well as corresponding online and through conference calls. They met with a number of relevant individuals and stakeholder organisations. Working Group 3 also conducted on an online survey of stakeholders as part of its consultation process (see Appendix 5.) Regular updates were made by each Working Group at Plenary meetings and the final outcomes from the Working Groups have significantly shaped the content of this Report.

APPENDIX 5:

SUMMARY OF STAKEHOLDER SURVEY RESULTS

Working Group 3 conducted a survey of relevant stakeholders as part of their examination of options for 'Achieving the Innovation Island'.

The survey questions presented a series of statements highlighting a number of aspects that the Group considered to be essential in positioning and promoting Ireland as an Innovation Island (taking account of the significant potential offered by an all-Island approach). It asked respondents to comment on whether these statements were currently true or aspirational. Where statements were deemed aspirational, it asked respondents to suggest proposals to make the statements true. It also asked respondents to identify the five elements/aspects they viewed as most significant for positioning and promoting Ireland as an Innovation Island.

The survey was issued to more than 300 stakeholders (suggested by members and therefore intended as a statistically representative sample) and over 200 responses were received: 67% of respondents were from industry, 20% from education, just under 9% from state bodies and 4% were from other areas. Of the industry respondents, 67% were from MNCs, 27% from SMEs and 6% from start-ups.

The aspects highlighted as most important are summarised below in order of importance.

VALUING INNOVATION

We value innovation and R&D as the key foundations of our economic growth for the future. This is reflected in:

+ The emphasis that we put on 'developing the innovative mind', in graduate and postgraduate studies of all disciplines;
+ The high priority afforded to the status and promotion of research and development as a career of choice;
+ The many types of support that are given to Public and Private sector entities engaging in Innovative, and R&D activities.

Most respondents considered the first two items to be aspirational (only 30% considered the first statement to be true while 22% found the second to be true). Respondents were positive about the types of support provided for innovation (nearly 69% agreed that this was true.)

Policy proposals suggested by respondents in response to this question included: compulsory innovation modules in all 4th Level Courses, more use of internships or placements in industry for postgraduate training, more interdisciplinary programmes, employment of more engineers and scientists in schools, reintroduce bonus points for maths and incentivise top students to take science and technology courses through bursaries, career mentoring etc.

INCENTIVES

A significant majority (nearly 80%) agreed with the statement that we have a highly attractive range of financial incentives.

Policy proposals in this regard included: more scaling incentives, tax breaks for secondments of industry scientists and engineers back to R&D programmes within HEIs, incentives to encourage MNCs to work with Irish SMEs, incentivise more development activity in addition to research and allow R&D tax credits to be applied above the line.

ALIGNMENT OF NATIONAL INNOVATION SYSTEM/RELEVANT AGENCIES

There were two questions in relation to the level of alignment and level of integration of the components of the national innovation system (Agencies, HEIs, Government Departments, Public Research Bodies, Technology Transfer Offices etc.) both generally and in relation to attracting new enterprise and supporting entrepreneurs. Both were identified as amongst the top five most important areas in the survey. A large majority of respondents to both questions considered full alignment was still an aspiration.

Proposals to increase integration include a one-stop shop, a Steering Group or regular forums, aligned strategies, objectives and metrics or an agency to oversee all relevant bodies including the development of an aligned strategy framework.

TALENTS TO BRING A TECHNOLOGY FROM INCEPTION TO MARKET DELIVERY

A majority of respondents to the survey agreed that we had the required High Quality Technical and Managerial R&D skills, Technology Transfer skills, Manufacturing skills and Creativity, Flexibility and Entrepreneurial skills. Commercialisation (47.5%) and marketing (52.8%) were the areas of deficit most highlighted by respondents.

Policy proposals included: dedicated real life experienced personnel for areas such as financing, IP exploitation and marketing, to be available in virtual offices within IDA/EI where new company staff can borrow them for dedicated time periods, incentives that allow and attract senior international managers to be based in Ireland so that we can learn from them, develop mechanisms to build links between experienced professionals and people who may have solid ideas but don't know how to progress them.

APPENDIX 6:

SUPPORTING TAX RECOMMENDATIONS AND COMMENTS

A6.1 DEDUCTION FOR INTELLECTUAL PROPERTY

We have recommended in the body of the report that the Department of Finance, together with relevant Industry representatives, review the competitiveness of our tax regime for internationally mobile IP rich businesses. This is key.

In this context, specific changes are required to the capital allowances based regime that we have in order to ensure that it is competitive.

The Finance Bill 2010 made a number of welcome changes. Specifically, among the changes, it revised the definition of know-how, shortened the 'clawback' period to 10 years, and clarified the treatment of asset impairments. However we suggest that the following changes are still required:

(a) **A further reduction in the Holding Period to five years: at present this can serve as a deterrent to companies moving IP to Ireland.**
Having a clawback effectively places a form of exit charge on companies. While most will not leave, if our regime is not attractive enough we will fail to attract companies to Ireland. If we fail to attract companies to Ireland we will lose the ability to benefit from those companies, the jobs they create, the experience they provide many potential employees with and the spin off wealth and other benefits derived by the communities they establish in. It is essential that the potential for clawback is not used as an excuse against bringing valuable IP into Ireland in the first instance.

Many of Ireland's competitors for internationally mobile IP investment do not have similar clawback provision. We recommend that the holding period be removed or reduced substantially to five years.

(b) **Separate Trade and Losses forward - Complications**
As currently drafted, the legislation requires activities that relate to managing, developing or exploiting specified intangible assets on which allowances have been claimed, to be regarded as a separate trading activity ('Relevant Trade'). In addition, companies involved in the sale of goods and services where part of their profits derived from intellectual property are required to segregate their activities for tax purposes. This can lead to significant complications and uncertainties. While amendments were made in the Finance Bill 2010 to make this a little more workable. We would advise that this section is revisited.

A6.2 R&D TAX CREDIT REGIME

In the body of the report, we recommend removing the Incremental Base requirement. This is key.

However, two further matters require further consideration in relation to the R&D regime. They are (a) the permitted level of outsourcing and (b) level of credit for SMEs.

(a) Level of Outsourcing

It is our view that the level of permissible outsourcing is low. While we understand the historic rationale for this, in an environment where collaboration is so critical we recommend revisiting this.

Also the current outsourcing limits do not recognise specific sectoral concerns that arise. For example, for pharmaceutical companies, clinical trials must be outsourced and they are a significant part of the R&D cost.

To encourage more collaboration between MNCs, indigenous Irish companies and Universities, the current cap on outsourcing should be increased to 25%.

(b) Level of Credit for SMEs

The R&D credit is currently set at 25% but we recommend investigating the possibility of introducing an improved tax credit for qualifying SMEs, taking into account any impact this may have on other supports available to SMEs under State Aid rules.

A6.3 CARRIED INTEREST PROVISIONS

The introduction of Carried Interest provisions on 1 January 2009 was a welcome move in trying to build the Smart Economy and pave the way for top tier VC houses to come to Ireland.

We would however suggest a small number of technical changes to the regime in order to ensure it is capable of working as intended.

These include:

(a) Amending the definition of "relevant investment"

At present the definition of 'relevant investment' applies only to 'start up' companies. Given the length of time necessary for start-ups to get established and the key role that high potential growth companies have in providing employment, in our view, it is necessary to apply the relief to "investments made" on or after 1 January 2009. This would encourage investments to be made in already established companies which are only now in a position to secure funding.

(b) Holding period:

Currently the relief requires a six year holding period which severely limits the incentive to make investments in early stage companies. The relief would be more accessible to funding houses if it were reduced to three years as this would reflect typical investments made in early stage companies.

(c) Nature of Investments:

The current drafting of the legislation is couched solely in terms of individual investments, applying to an *'an amount of carried interest which is not greater than 20% of the total profits from the relevant investment*'. Consequently in practice it is difficult to interpret how it should work for a multi-investment scenario, which would be commonly used by funding houses. We believe that the legislation should be re-drafted to reflect the reality that carry usually comes from an amalgam of different profits and losses from underlying investments. Based on the current wording in place, it is difficult to see how the relief would in practice operate.

A6.4 POOLING FOREIGN TAXES SUFFERED ON ROYALTIES

We welcome the Finance Bill 2010 changes in relation to unilateral credit relief for foreign withholding taxes (WHTs) on royalties and its extension to all companies. However it is imperative that we now move to an overall pooling system for foreign withholding tax on royalty receipts. We appreciate concerns raised by the Department of Finance in relation to the cost of addressing this issue. However we believe reform is required in order for Ireland to be able to compete for internationally mobile IP licensing businesses. We also recommend that in any assessment of the cost of changing the current position takes into account the additional benefits which may arise from the introduction of such a change.

A6.5 WITHHOLDING TAX ON PATENTS

While a number of welcome changes were made to the patent withholding tax provisions in Finance Bill 2010, further changes are still required. It is important that further changes in this area continue to recognise the importance of existing and potential future foreign multinational business to the continued development of the Smart Economy.

A6.6 THE PATENT INCOME EXEMPTION

We note that the Commission on Taxation which reported in 2009, proposed the discontinuance of the tax exemption for patent royalties[58]. We acknowledge the excellent work of the Commission. However in the context of *Building Ireland's Smart Economy*, we would not be in agreement with this recommendation.

We believe that the patent exemption has played an important role in developing Ireland's smart economy to date.

The exemption for patent royalties has already been significantly curtailed. It would, in our view, be counter-productive to remove the (now more restricted) patent income exemption concurrently with stimulating the smart economy.

APPENDIX 7:

ADDITIONAL PROPOSALS TO SUPPORT MARKETING IRELAND AS A LOCATION FOR RESEARCH AND COMMERCIALISING IP

Changes at the Irish Patent Office to bring it more into line with patent offices internationally:

+ Introduce substantive examination of patent applications by the Irish Patent Office[59], thus restoring one of its core functions and increasing IP expertise;
+ Make the Irish Patent Office more user-friendly (including electronic and after-hours filings);
+ Other initiatives to bring the Irish Patent Office into line with services offered by the UK IP Office and other international patent offices should be considered, including playing an important role in training and awareness in respect of IP issues, and providing support to industry.

Initiatives re harmonisation of IP regulations at EU level:

+ Rapid ratification of the London Agreement to significantly reduce the translational costs of patent filings[60];
+ Support the establishment of a single EU court to adjudicate cross-border IP disputes by promoting the European Patent Litigation Agreement[61], and to then propose Ireland as a venue for this new Court system;
+ Continue to support and expedite the establishment of a single Community Patent through negotiations in Europe;
+ Complement the UK's implementation of the recommendations in Gower's Review of Intellectual Property[62] in the UK, with related Irish initiatives developing from this review (e.g. re the patent "experimental use" exception).

Notes and References

1 OECD (2009) *Interim Report on the OECD Innovation Strategy*. Paris: OECD p. 4.

2 NCPP (2010) *National Workplace Survey 2009: Employer Survey*. Forthcoming, Dublin: NCPP.

3 NCPP (2010) *The Changing Workplace in 2009: The NCPP-ESRI National Workplace Survey of Employees*. Forthcoming, Dublin: NCPP.

4 NESDO (2009) *Ireland At Another Turning Point Reviving Development, Reforming Institutions and Liberating Capabilities*. NESDO Report No 1 Dublin: NESDO.

5 CSO Database Direct (2010) shows employment increasing from approximately 1.1 million in 1988 to 2.1 million in 2008. Available from: http://www.cso.ie/px/pxeirestat/database/eirestat/eirestat.asp

6 OECD (2010) *Source OECDOnline Database.* [Online] Available from: http://stats.oecd.org/Index.aspx?DataSetCode=CSP2009

7 OECD (2010) *Source OECD Online Database.* [Online] Available from: http://stats.oecd.org/Index.aspx?DataSetCode=CSP2009

8 Forfás (2009) *R&D Statistics in Ireland 2009 at a glance*. Dublin: Forfás p. 10.

9 Ibid. p. 23.

10 Ibid. pp. 24-25.

11 Times Higher Education/QS (2009) *World University Rankings*. London: QS

12 Forfás/HEA (2009) *Research Strengths in Ireland: a bibliometric study of the public research base in Ireland*. Leeds: Evidence Ltd p. 1.

13 Ibid. p. 1.

14 Ibid. p. 5.

15 Figures supplied by IDA 2010.

16 Central Statistics Office (2009) *Community Innovation Survey 2008*. Cork: Central Statistics Office p. 1.

17 Griffith, R. Redding, S. and Van Reenen, J. (2004), *Mapping the Two Faces of R&D: Productivity Growth in a Panel of OECD Industries, The Review of Economics and Statistics* vol. 86(4): pp. 883-895.

18 Dowrick, S. (2003) *A Review of the Evidence on Science, R&D and Productivity*. ANU, Paper prepared for the Department of Education, Science and Training, Australian Government. See also Australian Government (2008) *Venturous Australia - building strength in innovation*. Melbourne: Australian Government - *Annex 4 -Evidence on the economic impact or research and development*.

19 All bullets from Government of Ireland (2008) *Building Ireland's Smart Economy*. Dublin: Government Stationery Office pp. 29-30 unless stated otherwise.

20 Ernest & Young/Economist Intelligence Unit (2009) *Redrawing the Map: Globalisation and the changing face of business*. London: Ernest and Young p. 20.

21 Department of Finance (2010) *The Irish Economy in Perspective* January 2010. Dublin: Department of Finance p. 12.

22 Ibid. p. 4.

23 Ibid. p. 16.

24 Ibid. p. 6.

25 Ibid. p. 19.

26 Central Statistics Office (2009) *Quarterly National Household Survey* Quarter 3 2009. Cork: Central Statistics Office p. 8.

27 Department of Finance (2010) *The Irish Economy in Perspective* January 2010. Dublin: Department of Finance p. 18.

28 OECD (2009) 2009 *Interim Report on the OECD Innovation Strategy*. Paris: OECD p. 4.

29 Kristensen, P.H., Lilja,l K. Eds. (2009) *New Modes of Globalising: Experimentalist Forms of Economic Organisation and Enabling Welfare Institutions - Lessons from the Nordic Countries and Slovenia*. Aalto University School of Economics.

30 NESC (2008). *The Irish Economy in the Early 21st Century*. NESC Report 117 Dublin: NESC.

31 Lerner, Josh (2009) *Boulevard of Broken Dreams*. Princeton: Princeton University Press pp. 58-61.

32 Forfás (2008) *Annual Employment Survey 2008*. Dublin: Forfás and Central Statistics Office (2008) *Quarterly National Household Survey* Cork: CSO.

33 Science Foundation Ireland (2009) *SFI Annual Report & Accounts* 2008. Dublin: SFI p. 12.

34 Forfás (2008) *Expert Group on Future Skills Needs, Statement on Raising National Mathematical Achievement*. Dublin: Forfás.

35 Forfás (2009) *National Competitiveness Council, Statement on Education and Training*. Dublin: Forfás.

36 Source: HEA Forthcoming.

37 OECD (2010) *Education at a Glance 2009* Paris: OECD - Table A1.3A.

38 The KTP Programme Annual Report states that 73% of placed graduates are offered full time employment by their companies. Technology Strategy Board (2009) *KTP Annual Report 08/09*. Didcot UK: Technology Strategy Board p. 7.

39 Figures supplied by Enterprise Ireland 2010.

40 Department of Enterprise, Trade & Employment (2009) *Buying Innovation: The Ten Step Guide to SMART Procurement and SME Access to Public Contracts*. Dublin: Department Enterprise, Trade & Employment

41 European Commission Staff Working Document (2009) *Design as a Driver of User-Centred Innovation*. Brussels: EU Commission

42 OECD (2008) *Science, Technology and Industry Outlook*. Paris: OECD [Online] Available from: http://dx.doi.org/10.1787/450834182743

43 Further detail is set out in IDA (2010) *Horizon 2020 - IDA Ireland Strategy*. Dublin: IDA.

44 Ibid. p. 4.

45 HM Treasury (2006) *Gowers Review of Intellectual Property* December 2006. London: Her Majesty's Stationery Office p. 30. citing "Identifying and Managing Intellectual Property Risk and the Use of Insurance as a Risk Management Tool", Cauthorn K., Fordham Annual Conference 2006.

46 For example the 'IP Genesis Scheme' at the French IP Office offers a free IP audit to SMEs who are not using the IP system.

47 Department of Communications, Energy and Natural Resources (2009) *Next generation Broadband: Gateway to a Knowledge Island*. Dublin: Department Communications, Energy and Natural Resources

48 In Ireland, 5 percent of broadband connections are above 10Mb/s. The EU-24 average is 15.5 percent of connections above 10 Mb/s. (EU-27 minus Austria, France and Netherlands where data is unavailable). Forfás (2010) *Broadband Benchmarking Report*. Dublin: Forfás

49 BiGGAR Economics (2007) *Study of Laboratory Space Requirements in Ireland and Potential Strategies for its Provision*. Dublin: Enterprise Ireland/IDA

50 For example the 2009 Taylor Wessing Global Intellectual Property Index ranked Ireland seventh in a review of twenty four key jurisdictions, despite only being added to the survey this year. Among the EU countries Ireland ranked fourth overall, behind only the UK, Germany and the Netherlands. This Index ranks 24 of the world's leading economies for protection and enforcement of patents, trade marks, copyright, and domain names. Taylor Wessing (2009) *Global Intellectual Property Index*. London: Taylor Wessing p. 3.

51 See http://www.globalirishforum.ie/

52 For further information see www.nordicinnovation.net

53 Note that these figures only refer to employment in high-tech firms. The process used to estimate these figures does not take account of wider, macroeconomic trends, nor of the overall level of employment in the economy. There may be some level of economic restructuring occurring as well as employment creation (i.e. the proportion of employment in high-tech firms may increase regardless of changes in overall employment and vice-versa).

54 See the Index of Silicon Valley for useful figures. Joint Venture: Silicon Valley Network (2010) *Index of Silicon Valley*. San Francisco: Joint Venture: Silicon Valley Network.

55 European Commission (2009), *Science, Technology and Innovation in Europe*, Eurostat Pocketbooks, 2009 edition. Luxembourg: Office for Official Publications of the European Communities

56 Ibid.

57 Fitzgerald, J., et al (2008), *Medium Term Review 2008-2015*. No. 11 Dublin: ESRI

58 Commission on Taxation (2009) *Commission on Taxation Report* Dublin: Government Stationery Office pp277/278

59 That is a substantive examination of search reports from the UK, so that it can refuse to grant a patent application on substantive grounds (e.g. lack of novelty or an inventive step).

60 The countries party to the agreement have agreed to waive - entirely or largely - the requirement for translations of already granted patents in their national language.

61 A unified system with a dedicated patent court which would make patent litigation more predictable, faster, and less expensive.

62 HM Treasury (2006) *Gowers Review of Intellectual Property*. London: Her Majesty's Stationery Office.

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