



NUI Galway
OÉ Gaillimh



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Innovation & Entrepreneurship Policy Overview: US, EU and Ireland



**Galway City and County Council
Industry and Economic Baseline
Study**

14th April 2015

No.2

Galway City and County Council Industry and Economic Baseline Study

Date: 26th February 2015

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Executive Summary

This White Paper focuses on reviewing key policies from the US and the European Union before focusing on national policy. The implementation of innovation and experience. The variety of EU programmes provide significant opportunities for firms, public sector bodies, scientists, third level institutions and other stakeholders to participate, particularly through Horizon 2020. A particular focus is on increasing the levels entrepreneurship policy sets the conditions by which companies, individuals and entrepreneurs make decisions. The US is a world leader both in terms of innovation policy and its implementation through investment in public research programmes and schemes that enable companies to exploit publicly funded research effectively in global markets.

The European Union's ambition, areas of focus and research programmes mirrors to some extent the US of entrepreneurship throughout the Union and increasing collaboration between industry and higher level institutions.

At a national level several policies have been created and implemented that is designed to position Ireland as a leading location for innovation and entrepreneurship. Over the last four years national policy has focused on job creation through the Action Plan for Jobs and entrepreneurship support initiatives.

A key focus of these policies has been on increasing the levels of collaboration between industry and academia and providing confidence to businesses to invest in Research and Development. Investment in innovation also comes through national research programmes that are investing in technologies that can be used in a wide variety of industry settings. The implementation of EU and national policies with respect to enhancing innovation and entrepreneurship present real opportunities for businesses in Galway City and County. Maximising the participation in publicly funded research and policies such as Horizon 2020 enhances the sustainability and improves the competitiveness and the international orientation of businesses in Galway City and County. Finally, the desired outcomes of the implementation of these policies is to create conditions that support innovation and entrepreneurship.

Review of Innovation Policy

1 Review of US Innovation Policy

“There is no national, coordinated innovation policy system in the United States. While some nations have developed national innovation strategies (e.g., Germany, Sweden, and Finland), the United States generally has not.”¹ Nonetheless, the United States remains one of the world leaders in patents, R&D investment, scientific papers and other standard benchmarks of innovation. It has a highly decentralized and diverse innovation system, involving several actors, including branches of federal and state governments, public agencies, universities, the private sector, and other organisations. US innovation policy is influenced by the philosophy that commercial innovation is chiefly the purview of the private sector, aided by universities and government laboratories, and less so the federal government. Therefore, the primary role of the national government is to facilitate the interactions between these organisations. The system combines a high-level of R&D (with federal government agencies sponsoring much of the basic research) and a strong orientation towards the market and applications.

Past Policy Initiatives

US policy-makers in the past have driven US innovation with a host of major policy innovations, including legislation explained in Table 1, as well as putting in place the R&D tax credit and lowering capital gains and corporate tax rates. These innovation policies supported by legislations have had a significant impact on the competitiveness of the US economy and firm level investment in research and development. In particular the Small Business Innovation Development Act 1982 has been one of the most effective legislative programmes to support R&D and this has been mirrored by the European Union. The Bayh Dole Act (1980) allowed universities to exploit technology that is created on campus and placed the US at the forefront of knowledge exploitation in key sectors as well as creating platform technologies that are used in a wide variety of industry settings. For international policy makers the US is a leader and a benchmark for the development of national policies and programmes designed to increase R&D investment and to foster sustainable collaborations between third level institutions, firms and government.

Table 1:
Chronology of US Innovation-related Legislation: 1980s to 2000s

Year	Legislation	Highlights
1980	The University and Small Business Patent Procedure Act (Bayh–Dole Act)	Permits universities and small business to obtain title to inventions funded by the federal government so as to license inventions
1980	Stevenson–Wydler Technology Innovation Act	Requires federal laboratories to establish technology transfer offices and to set aside funds for technology transfer.
1981	Economic Recovery Tax Act	Establishes the Research & Experimentation tax credit as part of the U.S. Internal Revenue Code on a temporary basis

¹ Atkinson, R. (2014) “Understanding the U.S. National Innovation System.” Available at: <http://www2.itif.org/2014-understanding-us-innovation-system.pdf>

1982	Small Business Innovation Development Act	Requires federal agencies to provide special set aside funds for small business R&D. Was reauthorized in 2000 and 2008
1984	Cooperative Research Act	Eliminates tripling damages from anti-trust violations so that firms, universities and federal laboratories can engage in joint precompetitive R&D.
1986	Federal Technology Transfer Act	Authorizes national laboratories to enter into cooperative R&D agreements (CRADAs) and negotiate licensing agreements
1988	Omnibus Trade and Competitiveness Act	Renames the National Bureau of Standards as the National Institute for Standards and Technology and expands its mission; establishes centres for transferring manufacturing technology
1989	National Competitiveness Technology Transfer Act	Extends CRADA authority to all federal laboratories, including weapons labs.
1992	Small Business Technology Transfer Act	Establishes the Small Business Technology Transfer (STTR) programs to fund cooperative research involving small businesses, universities, and federal laboratories
1999	The American Inventors Protection Act	Provides for the filing and publication of patent applications
2007	America COMPETES Act	Expands R&D in agencies involved in physical sciences and expand opportunities for science technology engineering and mathematics

Source: Shapira and Youtie, (2010) - *The Innovation System and Innovation Policy in the United States*

In key technology areas the US Government has set up a host of new collaborative research ventures designed to ensure that the US sustains its technological leadership in order to sustain economic growth and development. Such programmes include:

- **SEMATECH** - A partnership between the United States government and 14 U.S.-based semiconductor manufacturers to solve common manufacturing problems and regain competitiveness for the U.S. semiconductor industry that had been surpassed by Japanese industry in the mid-1980s
- **Science and Technology Centres (STC)** - Established by the National Science Foundation (NSF) with the objective to mount an innovative, interdisciplinary campaign in important areas of basic research. STCs have grown from a new idea into a vital network of programs.
- **Engineering Research Centres (ERC)** - University-led institutions developed through the National Science Foundation (NSF) whose mission is to remove disparity between academic and industrial engineering applications. In this way, engineering students would be better prepared to enter the engineering workforce.²
- **Advanced Technology Program (ATP)** - Established by the National Institute of Standards and Technology (NIST), the program was designed to stimulate early-stage advanced technology development that would otherwise not be funded. ATP is unique in that it is designed for early-stage research in industry, not academia, though it supported academia indirectly (as subcontractors or collaborators in projects)³
- **Baldrige Quality Award** - The national quality award that recognizes U.S. organizations in the business, health care, education, and non-profit sectors for performance excellence,

² For more information see <http://erc-assoc.org/>

³ For more information, see <http://www.atp.nist.gov/atp/overview.htm>

the only formal recognition of the performance excellence of both public and private U.S. organizations given by the President of the United States.

- **National Medal of Technology and Innovation** - formerly the National Medal of Technology, it is an honour granted by the President of the United States to American inventors and innovators who have made significant contributions to the development of new and important technology.

Recent Policy Initiatives

In September 2009, the Obama administration released *A Strategy for American Innovation: Driving towards Sustainable Growth and Quality Jobs*, which outlines federal activities for encouraging and using innovation. The strategy emphasises the need for an economy based on sustained innovation, broad innovation (not just technology focused), internet-enabled business, marketing, and social innovations, as well as a focus on regional innovation clusters (RICs) and their introduction to the policy arena.

The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are two of the largest sources of early-stage capital for innovative small companies in the United States. These have been key programmes that have contributed to the US economic recovery. The aim of the SBIR program is to help certain firms conduct research and development (R&D), providing grants and contracts to early-stage innovation ideas - ideas that, however promising, are still too high risk for private investors, including venture capital firms. The *Small Business Technology Transfer Program* uses a similar approach to the SBIR program to expand public/private sector partnerships between small businesses and non-profit U.S. research institutions. The STTR program requires the company to have a partnering research institution, which must be awarded a minimum of 30% of the total grant funds.

These programs allow US-owned and operated small businesses to engage in federal research and development (R&D) that has a strong potential for commercialization. The current administration recently announced funding for three new centres focused on digital manufacturing, lightweight materials, and next-generation power electronics.⁴

In 2012, President Obama and Congress passed the Jumpstart Our Business Start-ups (JOBS) Act in support of entrepreneurship and small business growth. The JOBS Act was designed to encourage small business and start-up funding by easing federal regulations and allowing individuals to become investors. The JOBS Act has facilitated an increase in the usage of crowdfunding platforms such as Kickstarter, Indiegogo and Fundable.⁵ This programme has contributed to the growth of small business in the US and policy makers in other countries are examining ways of mirroring this programme.

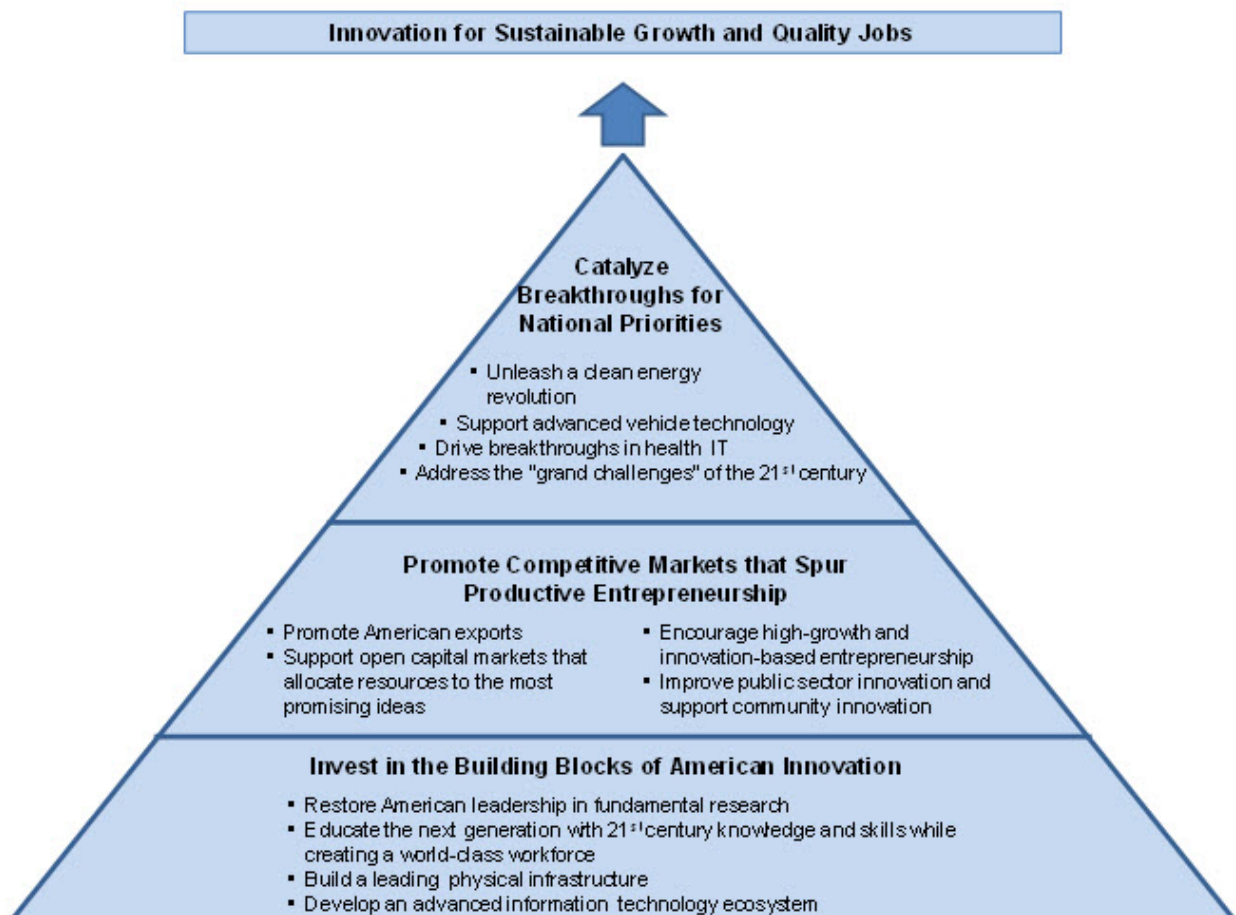
Furthermore in 2013, *American Strategy for Innovation* was launched which has three areas of focus: investing in the building blocks of American Innovation, promotion of market based innovation and catalyzing breakthroughs for national priorities (see Figure 1). The intention of this strategy is the creation of jobs and growth. Specifically new initiatives include access to high speed wireless web access, patent reforms, clean energy technologies, and Start-Up America, which is focused on entrepreneurship: "The Administration launched the Start-Up

⁴ For more on SBIR and STTR programs, see <https://sbir.nih.gov/>

⁵ For more on the JOBS program, see <https://www.sec.gov/spotlight/jobs-act.shtml>

American initiative with new agency efforts that accelerate the transfer of research breakthroughs from university labs; create two \$1 billion initiatives for impact investing and early-stage seed financing, among other incentives to invest in high-growth startups; improve the regulatory environment for starting and growing new businesses; and increase connections between entrepreneurs and high-quality business mentors. Responding to the President's call to action around the national importance of entrepreneurship, private-sector leaders are independently committing significant new resources to catalyze and develop entrepreneurial ecosystems across the country.”(White House, 2013)

Figure 1:
American Strategy for Innovation



Source: White House (2013) Strategy for American Innovation,
<http://www.whitehouse.gov/innovation/strategy/executive-summary>

Other Significant Innovation Policy and Funding Initiatives

The Obama Administration have introduced a wide variety of policy and funding measures that not alone support scientific advancement and the leadership of the US but will have spill-over impacts on the US economy. Some of these include:

- Energy Regional Innovation Clusters (ERIC) program, in which the Department of Energy is leading six other federal agencies to help U.S. regions develop innovation zones and accelerate energy innovation and commercialization. A public-private consortium led by Pennsylvania State University won the first grant of up to \$130 million to form an innovation hub focusing on energy-efficient building technologies.
- In May 2010, the Department of Commerce awarded \$12 million in grants to six U.S. teams with the most innovative ideas to drive technology commercialization and entrepreneurship in their regions.
- President Obama's budget for Fiscal Year 2011 authorized more than \$300 million in new funding for federal agencies to assist regional innovation cluster initiatives
- Connecting America: The National Broadband Plan – The Recovery Act earmarked \$7.2 billion in grants to stimulate broadband deployment throughout the U.S. Goals of the plan include next generation broadband service, universal broadband service, mobile wireless broadband innovation and coverage, broadband access of Community Anchor Institutions, a nationwide, wireless, interoperable broadband public safety network, and broadband for tracking energy consumption.
- US – China collaboration on renewable energy research policies, university growth, information and communication technologies, medical research

Funding

The U.S. system for supporting scientific research is based on two fundamental aspects: support for mission-oriented research (often based around defence and health), funded mainly through federal agencies, and support for basic, curiosity-directed research through university funding. Funding from the federal government (especially Department of Defence in Silicon Valley and Boston's Route 128) has played a key role in the development of some U.S. innovation clusters. The US federal government financed approximately \$140 billion of R&D activity in 2013. Recently, the Obama administration has proposed establishment of a National Network for Manufacturing Innovation (NNMI), modelled in part on efforts like the German Fraunhofer centres. The first NNMI established was a Department of Defence centre for additive manufacturing (named "America Makes") that brings together firms, universities and several government agencies in a unique public-private partnership.

Congress is considering broader NNMI legislation, which would expand the number of centres, and importantly, make the choice of centres and technologies determined by industry. Industries would have to commit funding to the centres and take a leadership position in order to receive matching federal funding. However, the proposed funding levels are relatively limited, especially when compared to what other nations are committing. For example, on a per GDP basis, Korea invests 89 times more than the United States on industrially-oriented research, Germany 43 times more, and Japan 15 times more. On the other hand, compared to other nations, the US national innovation system erects relatively few barriers to entry for firms to break into existing markets, thus ensuring robust competition and the constant threat of "Schumpeterian" creative destruction.

2 Review of EU Innovation Policy

Lisbon Agenda and Europe 2020

Towards the end of the 20th Century, it became clear that Europe was falling behind the United States and some other countries in Asia in terms of research and innovation and the need for more coordination at the European level became clear. As an attempt to reverse this trend, the European Commission set up the Lisbon Agenda, sometimes referred to as the Lisbon Strategy, which was officially adopted in March 2000. The overall aim of this plan was for Europe to become, by 2010, “the most competitive and dynamic knowledge-based economy in the world, capable of sustainable growth with more and better jobs and greater social cohesion.” The Lisbon Agenda was implemented in multiple policy initiatives, but unsatisfied with its results, the Commission proposed a new start for the Lisbon Strategy in 2005.⁶ The renewed Lisbon Strategy focuses on the year 2020. This European Commission strategy document, *Europe 2020*, sets out a vision of Europe’s economy for the 21st century being driven by smart, sustainable and innovative businesses, advising that “entrepreneurship must be developed by concrete policy initiatives.”⁷

The Europe 2020 strategy is about delivering growth that is: smart, through more effective investments in education, research and innovation; sustainable, thanks to a decisive move towards a low-carbon economy; and inclusive, with a strong emphasis on job creation and poverty reduction. The strategy is focused on five goals in the areas of employment, innovation, education, poverty reduction and climate/energy. The EU2020 strategy announced seven flagship initiatives, of which at least five are intimately linked with innovation (Innovation Union, Digital Agenda, Resource Efficient Europe, A New Industrial Policy for the New Globalisation Era and an Agenda for New Skills and Jobs).

Innovation Union and Horizon 2020

The Innovation Union is one of the seven flagship initiatives of the Europe 2020 strategy. The Innovation Union Strategy was launched in 2010, stating that member states need to:

- Continue investment in education, RD&I and ICT
- Achieve greater collaboration between national systems of innovation
- Reform education systems to meet future demands
- Create a European Research Area for researchers
- Develop more effective innovations from research, removing barriers for entrepreneurs whilst building on strengths in design and creativity
- Promote a more enhanced collaboration with international partners

This strategy contains over thirty action points among which include the strategic use of public procurement budgets to finance innovation, a comprehensive innovation scoreboard based on 25 indicators, and a European knowledge market for patents and licensing. Furthermore, it includes measures to reinforce existing successful initiatives such as the Risk Sharing Finance Facility, launched in cooperation with the European Investment Bank (EIB), which supports investment in high-risk research, technological development and demonstration projects

⁶ European Commission (2004). “Facing the Challenge, the Lisbon Agenda for Growth and Employment; Report of the high level group chaired by Wim Kok”, November 2004.

⁷ European Commission (2010) “Europe 2020: A European Strategy for smart, sustainable growth”, COM(2010) 2020.

through loans and guarantees. Another key element of the Innovation Union Strategy is the measures to revitalize and speed up efforts to build a European Research Area (ERA). The ERA is a system of scientific research programmes integrating the resources of the EU and concentrated on multi-national co-operation in the fields of medical, environmental, industrial and socio-economic research.⁸

Horizon 2020 is the financial instrument implementing the Innovation Union, the biggest EU Research and Innovation Program with nearly €80 billion of funding available over 7 years (2014 to 2020). The three main pillars of Horizon 2020 are outlined in Table 2 below. The Horizon 2020 EU Research and Innovation Framework provides the EU with an opportunity to make socially responsible choices that lead to new sustainable models of innovation which contribute to the public good. The aim is that Horizon 2020 will tackle societal challenges by helping to bridge the gap between research and the market by, for example, helping innovative enterprise to develop their technological breakthroughs into viable products with real commercial potential.⁹

Table 2:
Horizon 2020: Three Pillars

Excellence in Science: Excellent Science. This will raise the level of excellence in Europe's science base and ensure a steady stream of world-class research to secure Europe's long-term competitiveness. It will support the best ideas, develop talent within Europe, provide researchers with access to priority research infrastructure, and make Europe an attractive location for the world's best researchers.

Industrial Leadership: This will aim at making Europe a more attractive location to invest in research and innovation (including eco-innovation), by promoting activities where businesses set the agenda. It will provide major investment in key industrial technologies, maximise the growth potential of European companies by providing them with adequate levels of finance and help innovative SMEs to grow into world leading companies.

Societal Challenges: This reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere. A challenge-based approach will bring together resources and knowledge across different fields, technologies and disciplines, including social sciences and the humanities. This will cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and support for public procurement and market uptake. It will include establishing links with the activities of the European Innovation Partnerships.

Source: European Commission (2011) *Horizon 2020 – The Framework Programme for Research and Innovation*, COM (2011) 808 Final, 30.11.2011, pp. 4-5.

Regional Innovation: Smart Specialisation

The European Commission recently promoted the 'Smart Specialisation' platform initiative for "developing a vision, identifying competitive advantage, setting strategic priorities and making use of smart policies to maximize the knowledge-based development potential of any region,

⁸ For more on the Innovation Union, see <http://ec.europa.eu/research/innovation-union/>

⁹ For more on Horizon 2020, see <http://ec.europa.eu/programmes/horizon2020/en>

strong or weak, high-tech or low-tech”.¹⁰ Smart specialisation is an innovation policy concept for regions designed to promote the efficient and effective use of public investment in research. Smart Specialisation is “a process of priority-setting in national and regional research and innovation strategies in order to build ‘place-based’ competitive advantages and help regions and countries develop an innovation-driven economic transformation agenda.”¹¹ Regional change through smart specialisation involves four processes; transition, modernisation, diversification, and the radical foundation of a new domain. To support the development of smart specialization the EU, the European Commission set up the S3 (RIS3) Platform to assist Members States and regions in developing their own smart specialization strategies. RIS3 suggest a six step approach in developing smart specialization, set out as follows:

- Analysis of the regional context and potential for innovation
- Governance – Ensuring participation and ownership
- Elaboration of an overall vision for the future of the region
- Identification of priorities
- Definition of coherent policy mix, roadmaps and action plan
- Integration of monitoring and evaluation mechanisms

The four pillars of smart specialisation as outlined by Foray *et al* (2012) are:

- ‘(Tough) Choices and Critical mass: limited number of priorities on the basis of own strengths and international specialisation – avoid duplication and fragmentation in the European Research Area – concentrate funding sources ensuring more effective budgetary management
- Competitive Advantage: mobilise talent by matching RTD+I capacities and business needs through an entrepreneurial discovery process
- Connectivity and Clusters: develop world class clusters and provide arenas for related variety/cross-sector links internally in the region and externally, which drive specialized technological diversification – match what you have with what the rest of the world has
- Collaborative Leadership: efficient innovation systems as a collective endeavour based on public-private partnership (quadruple helix) – experimental platform to give voice to unusual suspects.’¹²

In principle smart specialization is about ensuring long-term sustainability in a region and ensures that regions have the economic base and supporting structures and programmes in place to ensure long-term survival. It may mean for some regions transition from existing sectors to new ones, examining how Key Enabling Technologies (KETs), for example, can be deployed within a region to strengthen or develop sectors and how effective synergies can be made between sectors inside and outside the region.

In 2014, RIS3 undertook a Smart Specialisation Review of Ireland and for the purposes of the review Ireland was evaluated as one region.

Policy Initiatives for SMEs and Entrepreneurs

¹⁰ Joint Research Centre (2012) S3 Platform S3platform For more information, see: www.s3platform.jrc.ec.europa.eu

¹¹ Landabaso, M. (2014). "Guest editorial on research and innovation strategies for smart specialisation in Europe: theory and practice of new innovation policy approaches." *European Journal of Innovation Management* 17(4).

¹² Foray, D., Goddard, J., Beldarrain, X.G., Landabaso, M., McCann., P., Morgan, K., Nauwelaers, C., Ortega-Argles, R., (2012) *Guide to Research and innovation Strategies for Smart Specialisation (RIS 3)*, EU Commission, Brussels.

The goal of the *European Charter on Small Enterprises*, launched in 2000, was to improve Europe's enterprise performance, making it a more dynamic region in terms of innovation and entrepreneurial activity. One of the pledges of the charter was to "strengthen the spirit of innovation and entrepreneurship which enables European business to face the challenges ahead." (European Charter on Small Enterprises, 2000) Under the Charter, Member States and the Commission took action to support small enterprises in ten key policy areas:

- Education and training for entrepreneurship;
- Cheaper and faster start-up;
- Better legislation and regulation;
- Availability of skills;
- Improving online access;
- Getting more out of the Single Market;
- Taxation and financial matters;
- Strengthening the technological capacity of small enterprises;
- Making use of successful e-business models and developing top-class small business support;
- Developing stronger, more effective representation of small enterprises' interests at Union and national level

The *Small Business Act for Europe 2008* (SBA) increased the focus on development and intensification of entrepreneurship promotion and education, towards a more entrepreneurial, innovative Europe. At the heart of this act is the *Think Small First* principle, requiring that legislation takes SMEs' interests into account at the very early stages of policy making in order to make legislation more SME-friendly. A range of tools are available to ensure the effective implementation of the principle, including:

- The application of an SME test to forthcoming legislative proposals
- The use of specific SME provisions in legislation in order to avoid disproportionate burden on SMEs
- The consultation of the SME stakeholders
- The work of the SME Envoy
- The use of Common Commencement dates for legislation relevant for business

EU Entrepreneurship 2020 Action Plan

In January 2013, the EU Commission published the "Entrepreneurship Action Plan – Reigniting the Entrepreneurial Spirit in Europe". This document 'is a blueprint for decisive action to unleash Europe's entrepreneurial potential, to remove existing obstacles and to revolutionize the culture of entrepreneurship in Europe.' The Action Plan is built on three main pillars:

1. Entrepreneurial education and training
2. Creation of an environment where entrepreneurs can flourish and grow, and
3. Developing role models and reaching out to specific groups whose entrepreneurial potential is not being tapped to its fullest extent or who are not reached by traditional outreach for business support.

A public consultation of the European Commission's Entrepreneurship 2020 Action Plan (2012, p.28) concluded 10 measures that need to be addressed:

1. Reducing bureaucracy
2. Tax environment more favourable to early stage financing
3. Entrepreneurial behaviour, skills and mindset to be embedded in national/regional curricula at all levels
4. Raising awareness of government administration and their staff about entrepreneurial and SME challenges
5. Adequate child/dependent care facilities available
6. Reinforce loan guarantee and venture capital facilities
7. Offer support for new businesses to innovate
8. Speed up and simplification of licensing and other permit procedures
9. All you people to have one entrepreneurial experience before leaving secondary school
10. Targeted training, finance internationalisation support programmes for high growth potential SMEs.

The published *Entrepreneurship 2020 Action Plan* addresses many of the issues raised during the public consultation phase including administrative simplification, access to finance, support for new entrepreneurship, transfers of businesses and second change for honest entrepreneurs. Moreover, the action plan identifies specific categories of entrepreneurs including women, seniors, migrants and unemployed. On a national level, it is the SME envoy, (in Ireland's case the Minister for Small Business) appointed by the respective national government, who is responsible for driving the implementation of the Action Plan.

Guidebook Series: How to support SME Policy initiatives from Structural Funds

Guidebooks are currently being prepared and disseminated by the European Commission and are based on the knowledge the Directorate-General Enterprise and Industry has acquired in the field of SME Policy analysis, development and implementation. These guidebooks are designed to offer tested examples, practical help and hands-on advice gathered by SME Policy expert groups. Many of the best practices identified by these expert groups need financial support for their implementation for which financing by structural funds is available, in particular also at regional level. Each guidebook deals with a specific area of SME policy while a general guide is also available in order to provide a broad overview of the processes involved. This series of Guidebooks is designed for those involved in SME Policy or regional development, in the hope of raising further awareness regarding EU SME Policy and facilitating the funding process of appropriate SME policy measures and initiatives at national and regional level.

The titles of the Guidebooks¹³ published so far are:

1. Building Entrepreneurial Mind-sets and Skills in the EU
2. Using standards to support growth, competitiveness and innovation
3. Facilitating Transfer of Business
4. The Smart Guide to Service Innovation
5. Regional implementation of the SBA – Small Business Act for Europe
6. How to use structural funds for SME & Entrepreneurship Policy
7. Supporting the Internationalisation of SMEs

¹³ More information on these guidebooks is available at: <http://ec.europa.eu/enterprise/policies/sme/regional-sme-policies/>

Funding

One of the best-known goals of the Lisbon Agenda is to increase spending on research and development to 3% of GDP in European countries. Because of its nature as a union of 27 independent countries, most of the investment takes place at the level of the individual states. In contrast to the United States, where 94% of public R&D funds are federal, just 7% of public funds flow through central EU programs. The 27 EU countries therefore constitute a type of rolling experiment in which useful comparisons can be made across countries and time. The most widely acknowledged assembly of data in this respect is the European Innovation Scoreboard (EIS).

3 Major National Innovation Policy Initiatives

A range of strategic national, regional and local-level policies have influenced Ireland's innovation policy. There has been substantial emphasis on the importance of innovation since the 1990's. The Culliton Report (1992) advocated a restructuring of the IDA into separate agencies with different responsibilities, a move implemented in 1994 when three separate agencies were made distinct: IDA-Ireland (the Industrial Development Authority, Ireland), Forfas and Forbairt. IDA-Ireland was allocated the task of FDI promotion, Forfas took charge of overall strategy (including innovation policy); and a separate agency, Forbairt, (renamed Enterprise Ireland in 1998), was charged with promotion of indigenous development – that is, the development and growth of Irish enterprises in world markets. All three agencies operated under the Department of Enterprise, Trade, and Employment.

In 1999, the Irish Council for Science, Technology and Innovation (a Forfas group) produced the Technology Foresight Report. This report concluded that biotechnology and information and communications technology represent "the engines of future growth in the global economy" and that "Ireland should, as a matter of priority, seek to create a world-class research capability in selected niches of these two enabling technologies as an essential foundation for future economic growth in Ireland". The report was the precursor to the establishment of the Science Foundation Ireland (SFI) in 2000 which was charged with providing funding for research in information and communication technologies (ICT) and biotechnology. In 2008 the strategic areas of endeavor to be funded by the SFI were extended to include sustainable energy and energy-efficient technologies.

In 2006 the *Strategy for Science, Technology and Innovation (SSTI) 2006-2013* was published with the intention to coordinate national efforts in commercialisation and technology transfer, and to set out clear actions that would enhance technology commercialisation within the Irish economy. This strategy is based on a shared vision of placing Ireland firmly on the global map in terms of the excellence of our research and its application for the benefit of society.

A key policy document with respect to the role of enterprise in Ireland was the *Enterprise Strategy Group (ESG) Report* published in July 2004 chaired by Eoin O'Driscoll. The ESG identified characteristics of competitive advantage for Ireland which were based on expertise in market, expertise in technology product and service development, world class skills, education and training, attractive tax regime and effective, agile government. Moreover, the report identified the essential conditions for this to occur: cost competitiveness, physical and

communications infrastructure, innovation and entrepreneurship and management capability. The ESG (2004) stated ‘...that enterprise in Ireland, while having highly developed manufacturing ability, lacks capability in two essential areas: international sales and marketing and the application of technology to develop high value products and services. The report points to areas of activity in services and high value manufacturing which, if enabled by expertise in markets and technology, would significantly enhance the enterprise base.’

In 2004, Forfás published *Building Ireland’s Knowledge Economy* setting out its vision for Ireland to 2010 and a clear set of specific recommendations to achieve this vision. “Ireland by 2010 will be internationally renowned for the excellence of its research and be at the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture”. (Knowledge Economy, 2004) The report identified successful motivation techniques for business to do more R&D, promoting innovation and a culture of entrepreneurship amongst researchers and fostering effective linkages between enterprise and academia as the determinants for Ireland’s future economic well-being.

Responding to the emergence of the Global Recession in 2008, the Irish government published a report entitled *‘Building Ireland’s Smart Economy’* (2008). The 5 main action areas from this report were;

1. Securing the Enterprise Economy
2. Building the Ideas Economy – Creating ‘The Innovation Island’
3. Enhancing the Environment and Securing Energy Supplies
4. Investing in Critical Infrastructure
5. Efficient and Effective Public Services and Smart Regulation

Innovation Taskforce

The Innovation Taskforce was established in July 2009 to advise the government on a strategy to make Ireland into a true hub for innovation and commercialisation, and in 2010 published their report.¹⁴ The Report of the Innovation Taskforce is concerned with one of the *‘Building Ireland’s Smart Economy’* action areas, creating the ‘Innovation Island’, positioning Ireland as an International Innovation Hub. The aim of the Innovation Taskforce 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. The Taskforce agreed six principles as fundamental to creating this ecosystem and transforming Ireland into an International Innovation Hub. These are:

Table 3:
Principles for Creating an Ecosystem – Innovation Taskforce

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

¹⁴ For the full report of the Innovation Taskforce, see:
http://www.forfas.ie/media/Report_of_the_Innovation_Taskforce.pdf

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

Source: Report of the Innovation Taskforce, 2010

Action Plan for Jobs

The Action Plan for Jobs initiative began in 2011 in an effort to tackle the high levels of unemployment with over 1,000 actions identified across a range of areas and sectors.¹⁵ Competitiveness has been a focus of the Action Plan for Jobs and the focus in 2014 was about improving the international competitiveness ranking of Ireland. The plan is focused on Disruptive Reforms, Competitiveness, Pathways to Work, Access to Finance, Growing Irish Enterprise, Developing and Deepening the Impact of FDI and Sectoral Opportunities. Within the disruptive reforms agenda nine key areas were targeted for 2014 including entrepreneurship, FDI, manufacturing, big data, ICT skills, trading online, energy efficiency, national health innovation hub and integrated licensing application services. A recent review of the Action Plan for Jobs by the OECD (2014) recommended, with respect to entrepreneurship support, the following actions:

- creation of Local Enterprise Offices
- creation of a Youth Entrepreneurship Fund
- review of taxation for entrepreneurs
- national entrepreneurship strategy

The most recent review of the Action Plan for Jobs (2015) highlighted 5 strategic ambitions:

1. To support 100,000 additional jobs by 2016
2. To get Ireland back to a top-five ranking in international competitiveness
3. To stimulate the domestic economy and generate employment in locally traded sector
4. To build an indigenous engine of growth that drives up the export market share of Irish companies
5. To build world-class clusters in key sectors of opportunity

Entrepreneurship Forum - Entrepreneurship in Ireland 2014

“Given that two thirds of all new jobs across the economy are created by businesses in the first five years of existence, the Government is determined to look at new ways of providing supports for entrepreneurs and start-ups.” (Minister Bruton, 2014)

The Entrepreneurship Forum was established by the Minister for Jobs, Enterprise and Innovation in May 2013 to examine the ecosystem from the perspective of entrepreneurs and to make recommendations to support and promote entrepreneurship and, in January 2014, the forum published their report ‘Entrepreneurship in Ireland’. It emphasises that the creation of a strong start-up ecosystem requires entrepreneurial leadership at a grassroots level, with continuous activities and events designed to engage entrepreneurs. Examples of these include Activate Dublin, Startup Ireland, Startupweekend, Bizworld, Startups.ie, IT@Cork and

¹⁵ For a list of Action Plan for Jobs 2012-15 Reports, see: <http://www.djei.ie/enterprise/apj.htm>

Smallbusinessadvice.ie. The report also urged that existing entrepreneurs and industry leaders should help drive the entrepreneurship agenda through networking, mentoring, electronic interaction and dissemination of information. It argued that Ireland must leverage its existing talent base and entrepreneurial networks if it really wants to promote and stimulate a vibrant culture of high quality entrepreneurship.

Firstly, the Forum identified 6 distinct goals of a successful entrepreneurship policy:

1. Strengthen the start-up community in Ireland
2. Increase the pipeline of entrepreneurs
3. Energise job creation
4. Continue growth of the indigenous export sector
5. Capitalise on Ireland's strengths in growth industries
6. Use under-employed resources

To achieve these Entrepreneurship Policy goals the Forum then identified the main pillars of an effective start-up ecosystem:

1. Innovative 'can-do' culture
2. Mentorship & peer learning
3. Vibrant hotspots of activity
4. Access to talent
5. Access to finance
6. Public policy

The report puts forward 69 interrelated recommendations within the six pillars, with some of the key recommendations outlined in Table 4.¹⁶

Table 4:
Pillars of an Effective Start-up Ecosystem – Entrepreneurship Forum

Pillar	Key Recommendations
Innovative 'can-do' culture	<ul style="list-style-type: none"> Develop a National Educational Strategy for Entrepreneurship at all levels of the education system. LEOs, in conjunction with Microfinance Ireland, should pilot a new programme for young people who set up their own business. Microfinance Ireland should ring-fence money for a Micro Youth fund to facilitate youth-led business ventures.
Mentorship & peer learning	<ul style="list-style-type: none"> Establish a dynamic, self-organised mentoring network, driven by entrepreneurs and supported by individuals, LEOs, industry expert groups, and business institutions. Programme support to be geared toward enhancing a collaborative start-up community and 'give before you get' culture. A target of 80% delivery of unpaid mentoring initiatives and 20% paid mentoring should be pursued.
Vibrant hotspots of activity	<ul style="list-style-type: none"> A working group should be established to develop a policy for the promotion of the coworking model with a view to using unoccupied public buildings and NAMA buildings, and to work with the private sector to implement a pilot programme in 2014 to roll out 5 coworking spaces in Dublin, Cork, Galway, Limerick and Waterford of 10,000 square feet each.

¹⁶ For a full list of the 69 recommendations, see <http://www.djei.ie/enterprise/smes/EntrepreneurshipForumReport2014.pdf>

	<ul style="list-style-type: none"> • Adopt policies enabling the rapid sharing of Intellectual Property for the public benefit in programmes such as Easy Access IP. • Training on commercialisation should be provided to every STEM Bachelors student as part of their degree. PhD and Post Doctorate students should also receive mandatory commercialisation instruction as part of their research programmes.
Access to talent	<ul style="list-style-type: none"> • Make changes to Irish law and regulations to improve Employee Stock Option Programmes. Reforms should make it easier and less expensive for companies to run employee share programmes, while making participation in these programmes more tax efficient for employees. • Allow youth to participate in a new work experience programme, to be called an 'Apprenticeship Programme', to be funded directly by the companies. • Enlarge the JobBridge programme by a factor of up to 20 times to help more people escape from the trap of being perpetually unemployed. • Implement visa reforms to attract more of the world's best talent to Ireland.
Access to finance	<ul style="list-style-type: none"> • Incentivise peer-to-peer lending. The first €10,000 in interest income from loans to start-up businesses would be tax-free. Businesses must be less than 6 years old in order to qualify for this exemption. • Establish Diaspora Funds to engage the global Irish community with our start-ups.
Public Policy	<ul style="list-style-type: none"> • Capital Gains should be taxed at 20% rather than 33% to create incentives for investment in new enterprise. • A National Entrepreneurship Website for startups, with social media channels, should be established which contains relevant up-to-date information on services available, along with links to agencies relevant to establishing and growing a business. • An Entrepreneurship Policy Unit should be tasked with co-ordinating government start-up policy in Ireland.

Source: *Entrepreneurship in Ireland Report, 2014*

National Policy Statement on Entrepreneurship in Ireland

Informed by the *Entrepreneurship in Ireland* report, the Government's *National Policy Statement on Entrepreneurship in Ireland* (2014) sets out the Government's strategic objectives (See Table 5) in its role as a facilitator within the Irish entrepreneurship ecosystem, covering key areas that affect entrepreneurs and start-ups. It also highlights the focus of public policy in the coming years. Key performance indicators and actions have been identified for each of the strategic objectives.¹⁷ Through this initiative, the Government's ambition is to achieve the following in the next five year period:

1. Increase the number of start-ups by 25% (3,000 more start-ups per annum)
2. Increase the survival rate in the first five years by 25% (1,800 more survivors per annum)
3. Improve the capacity of start-ups to grow to scale by 25%.

¹⁷ For a full list of KPIs and actions, see <http://www.enterprise.gov.ie/en/Publications/National%20Policy%20Statement%20on%20Entrepreneurship%20in%20Ireland.pdf>

Table 5:**Overview of Strategic Objectives: National Policy Statement on Entrepreneurship in Ireland**

<p>Culture, Human Capital and Education</p> <ul style="list-style-type: none"> ➤ Make entrepreneurship an integral part of our ambition as a nation. Support its development in our education system, in our communities and in corporate behaviour. ➤ Celebrate and reward successful entrepreneurs. ➤ Ensure that greater numbers of people, particularly in underrepresented cohorts such as females, youths, migrants and older persons start and run their own business. ➤ Improve the quality and range of ICT professionals domestically to make Ireland a hub for technology start-ups.
<p>Business Environment and Supports</p> <ul style="list-style-type: none"> ➤ Create a business environment in Ireland where it is easy to start up and grow a new business in terms of Company Law; Tax; Regulation; Licensing and where it is one of the most attractive environments in Europe. ➤ Promote best in class standards across the network of Enterprise Ireland and Local Enterprise Offices which fully exploit the enterprise assets of their community and foster new thinking in the enterprise area. ➤ Stimulate and support high levels of quality entrepreneurial ventures with high growth, export, wealth and job creation potential.
<p>Innovation</p> <ul style="list-style-type: none"> ➤ Make Ireland a location of choice for high quality international start-ups. ➤ Develop the best infrastructure to support technology transfer into commercialisation as a new business opportunity (Knowledge Transfer Ireland; Campus Incubators; Commercialisation Fund; Technology Centres). ➤ Develop a support framework where innovative start-ups can reach their full potential.
<p>Access to Finance</p> <ul style="list-style-type: none"> ➤ Expand the range of access to finance instruments to match our ambition as a start-up hub so that all viable businesses have the opportunity to access sufficient finance to meet their needs. ➤ Attract more angel and international venture capital investors and continue to develop the domestic venture capital sector. ➤ Ensure that the banks develop the skills and focus necessary to deliver appropriate financial instruments to start-ups and early stage entrepreneurs
<p>Entrepreneurial Networks and Mentoring</p> <ul style="list-style-type: none"> ➤ Improve the impact of mentoring as a tool to support entrepreneurship. ➤ Increase the levels of peer networks for mentoring, angel finance and problem solving that sustain entrepreneurship. ➤ Build world class entrepreneurial hubs and achieve greater regional spread of such hubs, facilitating entrepreneurial leadership.
<p>Access to Markets</p> <ul style="list-style-type: none"> ➤ Encourage local and national private enterprises to commit to offer opportunities for fledgling businesses to find a market. ➤ Encourage public local and national authorities to commit to offer opportunities for fledgling businesses to find a market.

- Ensure start-ups have clearly identified customer/market segments and clearly developed value propositions and where appropriate are export oriented in their thinking early in their development.

Source: National Policy Statement on Entrepreneurship in Ireland (2014)

The Government's National Policy Statement on Entrepreneurship in Ireland (2014) includes several key actions focused on regional development including:

- Build world class entrepreneurial hubs and achieve greater regional spread of such hubs to facilitate entrepreneurial leadership
- Use competitive funds available to the LEOs to seek proposals for entrepreneurship hubs at regional level. (LEOs)
- Initiatives will be developed at local and regional levels to encourage business to work with LEOs and Údaras na Gaeltachta to support more start-ups establish, survive and grow (e.g. through mentoring or networking)
- Údarás na Gaeltachta will implement measures to support early stage business development with a particular focus on regional competitive advantage in specific sectors, including cultural tourism, audio-visual and digital technology, marine resources, niche manufacturing, food & beverages and creative language-based services

Regional level

Policy-makers seek to bring about more balanced regional development through the National Development Plan and the National Spatial Strategy. The National Spatial Strategy identified Galway City as the National/International Gateway City for the west region, as part of an overall framework of gateways and hubs in Ireland. The role of the 'gateway' is to drive development across the urban and rural areas they influence, and to support a more balanced pattern of national development. These gateways will be complemented and strengthened further by the development of certain medium-sized towns as hubs. Tuam was identified as a hub, with Galway as its neighbouring gateway.

The 2015 review of the Government's Action Plan for Jobs places strong emphasis on balanced regional development, with one of the disruptive reforms introduced this year entitled 'Delivering Regional Potential'. This reform will include the launch of Competitive Funding Initiatives of up to €25 million to promote innovative collaborations to support regional entrepreneurship and innovation to better exploit regional competitive advantage. The Government also plans to promote the required economic infrastructure and property solutions to attract investment. Actions set out by the Government for this reform are laid out in the areas of supporting enterprise at a regional level, support for local and rural development, and delivery of high speed broadband.¹⁸

The *Action Plan for Jobs – Regional*, launched in February 2015, is a 5-year, €250million strategy aimed at accelerating the jobs recovery in every part of the country and is focused on supporting agencies and organisations within each region to build on the particular strengths and assets of their area and drive new job-creation strategies and projects. The initiative, as set out by the Minister for Jobs, Enterprise and Innovation, includes three main elements:

¹⁸ For more information on the 2015 Action Plan for Jobs, see: <http://www.djei.ie/publications/2015APJ.pdf>

- Each of the 8 regions will develop its own Action Plan, with lead responsibility for coordinating the development of the plan will be assigned to an Enterprise Ireland or IDA Ireland official in each region. Relevant stakeholders, including enterprise agencies, educational institutions, local authorities, businesses and community groups, will be responsible for working together to develop the Action Plan in each region with all 8 plans in place by the third quarter of 2015.
- To support and encourage regional stakeholders in working together, up to €100million in Enterprise Ireland funding will be made available over 5 years through a series of competitive calls. The first tranche of €50million will be made available from 2015. Funding under these programmes will be allocated on a competitive basis, with most funds awarded to regional projects offering the best prospects for job-creation
- IDA Ireland will roll out a 5-year €150million capital investment programme to help attract more multinational jobs into each region. This programme will build on the recent investment by IDA in facilities in Athlone and Waterford, and will include investments over the coming years in building advance manufacturing and office facilities in Sligo, Tralee, Castlebar, Galway, Dundalk, Limerick, Athlone, Carlow and Waterford.



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