



Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Research & Knowledge Transfer Strategy (2007-2010)

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1. Abbreviations

3CS	Centre for Converged IP Communications Services
3GSM	Third-generation Global System for Mobile Communications
AFM	Atomic Force Microscopy
AMT	Advanced Manufacturing Technology
AOL	America On-Line
AWSG	Adaptive Wireless Systems Group, AWSG
CALMAST	Centre for the Advancement of Learning of Maths, Science and Technology
Carlow IT	Carlow Institute of Technology
CF-FD	Commercialisation Fund Technology Department
CF-PoC	Commercialisation Fund Proof of Concept Phase
COFORD	National Council for Forest Research and Development
EI	Enterprise Ireland
EPA	Environmental Protection Agency
ERA	European Research Area
EU	European Union
EUA	European University Association
FDI	Foreign Direct Investments
FhG Fokus	Fraunhofer Institute Fokus
FORVAMS	Forest Vegetation- Alternative Management Systems Group
FP4	Fourth Framework Programme
FP5	Fifth Framework Programme
FP6	Sixth Framework Programme
FPLC	Fast Protein Liquid Chromatography
GC-MSG	as chromatography-mass spectrometry
GVA	Gross Value Added
HEA PRTL	Higher Education Authority - Programme for Research in Third-Level Institutions
HEI	Higher Education Institution
HETAC	Higher Education and Training Awards Council
HR	Human Resources
ICCAS	Institute of Chemistry the Chinese Academy of Sciences
ICT	Information and Communications Technology
IoT	Institute of Technology
IP	Intellectual Property
IPR	Intellectual Property Rights
IRCSET	Irish Research Council for Science, Engineering and Technology
ISOL	Information Systems, Organisational Studies and Learning Research Group
IST	Information Society Technologies
IUQB	Irish Universities Quality Board
KDEG	Knowledge and Data Engineering Group
MALT	Masters in Learning and Teaching Programme
M-Zones	Managed Zones
NQF	National Qualifications Framework
NSS	National Spatial Strategy
NTU	Nanyang Technological University
NUIG	National University of Ireland, Galway
NUIM	National University of Ireland, Maynooth
NUS	National University Singapore
OECD	Organisation for Economic Co-Operation and Development
ORG	Optics Research Group
PI	Principle Investigator

R&D	Research & Development
RDS	Royal Dublin Society
SEAM	South East Applied Materials Research Centre
SEPP	South East Enterprise Platform Programme
SFI	Science Foundation Ireland
SIF	Strategic Innovation Fund
SME	Small and Medium Enterprise
SRG	Semiconductor Research Group
SSL	Solid State Research Laboratory
SSRG	Separation Science Research Group
SSTI	Strategy for Science, Technology and Innovation
TCD	Trinity College Dublin
TSR	Technological Sector Research Programme
TSSG	Telecommunications Software & Systems Group
UCC	University College Cork
UCD	University College Dublin
UL	University of Limerick
WeLearnT	Centre for eLearning Technologies Research
WIT	Waterford Institute of Technology

2. Executive Summary

Waterford Institute of Technology (WIT) is an established and dynamic Higher Education Institute (HEI) that has a reputation for innovation and leadership. It had been established by statute as a Regional Technical College in 1970. Its designation was changed in 1998 to Waterford Institute of Technology. Following a number of international reviews it was granted authority to award its own graduate degree and postgraduate degree awards in 2005.

It has 5,820 full-time students and 4,550 part-time students. The range of academic programmes covers Humanities, Health Science, Science, Informatics, Engineering, Business and Education. It also has a leading role in the provision of life-long learning and access for disadvantaged groups.

The development of research within the Institute is driven by the same spirit of innovation and commitment which has driven all of the academic developments since its foundation. In a relatively short time the Institute has created a thriving postgraduate research community. Its motivations for the development of research are its unique position as a catalyst for regional economic development, the demands from staff to engage in research to the highest international standards and the demand from our graduates for access to fourth level education.

The introduction of a strategic and targeted approach to the development of research within the Institute has resulted in major growth in the level and quality of the research produced by the Institute. Over the last 10 years the Institute has grown its research capacity to 300 staff involved in research, 145 students registered for postgraduate research degrees and approved research funding of 10.6 MEuro in 2006. It has funding from the major national and international research programmes such as HEA PRTLI, Science Foundation Ireland and EU Framework 6. It is outward facing in its Research Strategy with strategic research alliances with 50 international research institutes in Europe, Asia and the Americas. It has forged strong strategic partnerships with Irish institutional partners.

The Institute has a very ambitious plan for the sustained development of its research. The HEA PRTLI Cycle 4 submissions reflect this ambition, bringing together the major strands of the Institute's Research Strategy. The proposal reflects the Institute's emphasis on creating critical mass in areas of national and strategic importance. It engages the partnerships of the Atlantic Corridor (NUIG, UL, and UCC) and the key academic players of the South-East and East (NUIM and Carlow IT). It also leverages the strong international links through the involvement of Institutes such as National University of Singapore, Nanyang Technical University, and Academy of Science Beijing. It also recognises the importance of Knowledge Transfer as a tool for economic development through the participation of industry and government agencies in the research programme. This reflects the philosophy of the Institute that Ireland is an open economy which must integrate its resources nationally and use its ability to leverage international partnerships for the economic benefit of the country. This is a template for the continued development of our research base.

3. Institute Research Vision Statement

WIT is committed to the creation of an open innovative research and learning environment encompassing:

- Leading researchers with a national and international reputation;
- High calibre national and international research students working on quality assured research degree programmes;
- National and international networks of academic and industrial partners, including independent research centres.

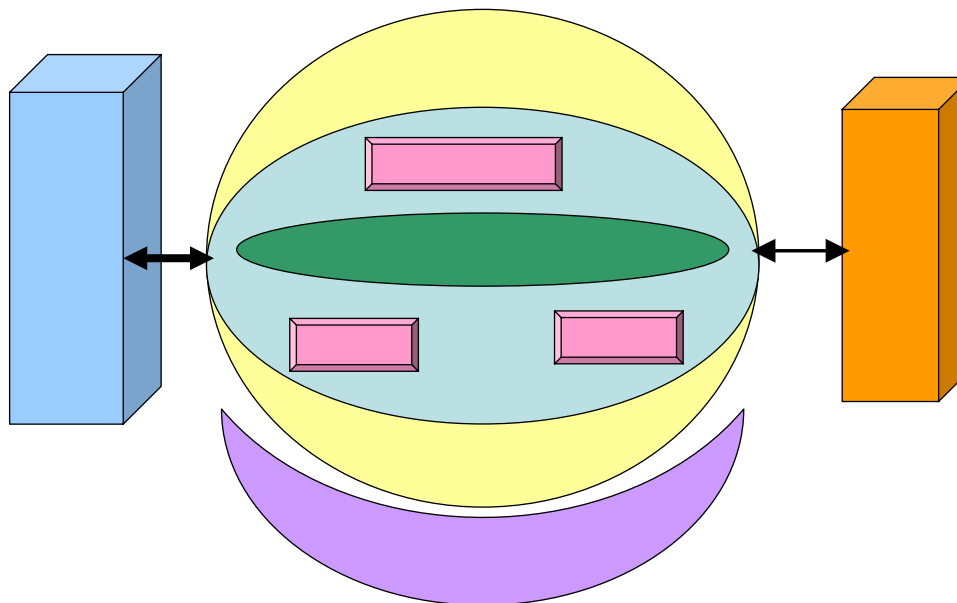
We are committed to the creation of new knowledge, new innovative products and services for society, and also to educating the next generation of researchers and members of society.

4. Institute Research Mission Statement

The Institute's research mission is to contribute to the economic and cultural well being of the nation and region through the pursuit of research at the highest international level. The quality of our research and scholarship will sustain a research informed learning environment within the Institute at undergraduate and postgraduate levels. The Institute is committed to the transfer of knowledge created through the research process for the common good of society and in particular the development of the region. This will support the creation of the University of the South East.

5. WIT's Research & Innovation Environment

WIT's philosophy is to move towards an environment which co-locates research, postgraduate studies, industry and entrepreneurship creating a research and innovation eco-system for the knowledge economy.



6. Research Strategy 2007-2010

6.1 Introduction

The purpose of this document, Waterford Institute of Technology's (WIT) Institutional Research Strategy (2007-2010), is to set out the Institute's research objectives and priorities within a coherent three-year framework. It is aligned to the WIT's Institutional Strategic Plan (2007-2010) that commits the Institute to the creation of a "research informed learning environment", and it is based on the pursuit of internationally recognised excellence in research and scholarship. The Research Strategy will guide the development of research within the Institute by building on our existing strengths, and it will enhance and expand the level of research within the Institute. The National Spatial Strategy (NSS) is a coherent national planning framework for Ireland for the next 20 years. It defines Waterford as a regional gateway driving regional development. The Research Strategy supports the Institute's role as a catalyst for regional innovation. The emergence of the information society and with it a global economy, has created major challenges for the South East region. Research is no longer an option but a requirement for the Institute. Our research activity must be the best of breed contributing to the national knowledge capital. The research is sustained through a strong and vibrant fourth level programme producing high quality graduates.

This Strategy builds on a solid research base. The Institute has taken a strategic approach to the development of research over the last 10 years. This has produced a sustainable research environment across all faculties within the Institute. The last 5 years have been particularly significant with the Institute successfully competing for funding under the major funding programmes including HEA PRTLI, Science Foundation Ireland (SFI) and the EU Framework 4, 5 & 6 Programmes. The Institute has 200 active funded research projects and has increased its annual research funding to 10.6 MEuro (2006). The growth in staff actively participating in research is reflected in the growth in postgraduate research student numbers to 145 currently registered in 2007.

The Institute has strong research partnerships with the Irish universities North and South which through the establishment of graduate schools are being extended. International academic research collaboration programmes have been established with 50 research institutes including National University of Singapore and Academy of Science Beijing creating greater mobility of research students and professors between the Institutes. Strategic relationships and knowledge transfer with industry have resulted in the creation of a number of industrial-academic clusters funded through programmes such as the Enterprise Ireland Applied Research Enhancement Programmes and an SFI Research Cluster and the Framework 6 Programmes. The establishment of its Research Office (2003) provides the leadership and management capability to sustain the development and maintenance of the Institute's research environment.

A guiding principle for the continued development of the Institute's research environment is the prioritisation of research activity capable of achieving the highest international standards and which can have a major impact on national economic development. As the Institute's resources are limited they must be invested strategically and efficiently. WIT will grow its research by leveraging its relationship with key external stakeholder organisations such as industry, public sector research organisations and Government agencies. We will strategically cooperate with our national and international research partners to access an increasingly distributed knowledge production system, define new research funding streams and more effectively transfer knowledge in a global context.

The development of the Institute's research capacity is carefully planned by focusing on research management and support infrastructures, setting standards based on best practise and rewarding achievers. The timeframe required for the development of a sustainable and effective research environment must be realistic. Research is essentially about people (staff, postgraduate students and partners). The Institute needs to create a balance by challenging and motivating academic staff on the one hand, and on the other hand ensuring that research targets are realistic and achievable thus avoiding the potential of creating unnecessary disillusionment and tension. It is essential that quality research policies, procedures, management and support infrastructures are put in place at all levels of the organisation. Over the lifetime of this strategic plan research management and support will be further embedded at school and department level and this Research Strategy will drive the agenda at all levels within the Institute.

As talent is a scarce resource a key challenge is to increase the number of postdoctoral fellows in the Institute. Waterford Institute of Technology must compete internationally for academic staff, high quality postgraduates and postdoctoral staff. The Institute must ensure that there is a well defined career path and a clear human resource management framework in place. We need to enhance existing programmes and develop a reputation for providing strong research and development training at postgraduate and postdoctoral level.

This Research Strategy (2007-2010) builds on outcomes of the previous Research Strategy, while reflecting the opportunities and challenges of the evolving Irish research and development landscape. It must respond to the Government's economic strategy of establishing Ireland as a research driven high value economy. It must respond to the emergence of a global higher level postgraduate marketplace, increased competition for research in National and European funding programmes and the emphasis on international benchmarking and critical mass of research activity. It must also respond to increased emphasis on PhD programmes and graduate schools. The strategy addresses the impact of research on the Institute's teaching and learning programmes. Research as a vehicle for economic growth is addressed by a clearly defined Knowledge Transfer Strategy and underpinned by the Institute's outreach Strategy. The external economic environment will inevitably evolve over the next 5 years and the performance of the Research Strategy needs to be monitored against these changes. The strategy will enable the Institute to establish clear implementation plans which can incorporate these changes.

This document sets out the higher order aims of research at the Institute as articulated through a set of key research objectives. The document also addresses the Institute's Strategy and in the areas of Teaching and Learning and Knowledge and Technology Transfer. The Strategy recognises the interdependence of research, teaching and knowledge transfer, and aims to encourage a research and teaching culture that supports the creation and disclosure of knowledge.

6.2 Context for Research Strategy

The context is defined here as a set of external drivers, and a set of internal drivers, each detailed below.

6.2.1 External drivers

The Institute's Research Strategy is guided by a number of key external drivers including:

- **Government Policy** as set out in **The National Development Plan (2007-2013)** and **The Strategy for Science, Technology and Innovation (SSTI)** The policy commits to spending 2.7 BEuro on Science Technology and Innovation activities with particular focus on R&D. It aims to strengthen and build Ireland's research base through:
 - Increasing the numbers of students taking science subjects from primary school through to PhD level;
 - Fostering a collaboration culture in Ireland through industry-academia linkages and clusters / networks which can consolidate a critical mass;
 - Increasing quality research capacity;
 - Increasing the number of PhD graduates through 4th level education;
 - Creating better research and innovation management infrastructure in higher level Institutes.

Impact on Institute Research Strategy: Provides greater opportunities for funding for research and postgraduate studies. However there is increased emphasis on benchmarking research against international best practise and focusing resources towards research areas with critical mass.

Institute Response: Selectively develop and refine the Institute's research capacity and facilities around networks of excellence and research clusters to ensure a critical mass of internationally recognised research activity. Increase investment in PhD programmes internally and through collaboration with national and international partners.

- **The National Spatial Strategy (NSS)** aims to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning. In order to drive **development in the regions**, the NSS proposes that areas of sufficient scale and critical mass will be built up through a network of gateways and hubs. Waterford performs a key role as a gateway in the South East. WIT has an important part to play in the economic, social and cultural development of the region.

Impact on Institute Research Strategy: Greater expectation from regional stakeholders on the ability of the Institute to support regional growth through outreach, further education opportunities and knowledge transfer.

Institute Response: Ensure increased participation of Institute members on regional development boards and think tanks. Develop regional knowledge transfer strategy. Link the region to global research community through greater mobility of staff and students from external research partner sites to the region and visa versa. Strategically invest in WIT's infrastructure to enhance regional research infrastructure.

- **The creation of the European Research Area, resulting from the Lisbon accord** has placed increased emphasis on improved coordination of research activities and the convergence of research and innovation policies, at national and EU levels. WIT has an established leadership role in the European IST research Framework Programme and is committed to playing a leadership role in the emerging European Framework Programmes (ERA).

Impact on Institute Research Strategy: Increased opportunities to partner with leading European research centres and access to additional funding sources. Greater level of competition for funding and human resources. Increase in European legislation regarding postgraduate student and research staff terms and conditions.

Institute Response: Build on European links to create strategic partnerships with leading European research centres. Ensure HR policies for postgraduate students and research staff are in line with European best practise. Maximize European Research Networks to enhance access to European research infrastructure.

- **The globalisation of research** has highlighted the need for international linkages and benchmarking of research activity against international best practice.
Impact on Institute Research Strategy: Research and Innovation activity at the Institute must be evaluated against international rather than national research activity. Increased competition for industry led research investment in research as Irish based industry are increasingly creating research partnerships with research centres abroad.
Institute Response: Institute must continue to network its research activity with leading international academic and industrial R&D centres. It needs to continue the policy of hosting leading academic researchers at WIT and placing its postgraduate students in external R&D centres. The Institute must strategically engage with industry to build on research collaboration and knowledge transfer activities.
- **The Government focus and investment in 4th level education** will increase the number of graduate students seeking to continue their education to PhD level as well as increasing the number of foreign students coming to Ireland for PhD studies. The growth in 4th level education requires higher education institutions to consider **new models of graduate training**. Graduates require a broader and more flexible skill set.
Impact on Institute Research Strategy: Increase growth in 4th level students with greater requirement for research resources. Increase in number of international students. Need to invest in new “industry oriented” postgraduate training and development programmes.
Institute Response: Create greater co-operation with national and international 4th level Institutes to establish inter institutional graduate schools. Increase the number of staff qualified to supervise to PhD level. Review and revise structure and scope of the postgraduate training programmes. Develop policies for postgraduate student internships in industry and at external academic research centres.
- It is increasingly difficult to **attract quality academic and postdoctoral research staff**.
Impact on Institute Research Strategy: Potential impact on the ability of the Institute to submit project proposals and to deliver on research contracts.
Institute Response: Create internships for postgraduate students at partner research Institutes. Develop a career support structure which is capable of attracting and retaining quality research staff. Issues such as teaching hours, contract security, contract duration, training and development and remuneration must be addressed.
- There is an increasing willingness of **industry to engage in collaborative R&D** with the higher level sector underpinned by an increasingly competitive global environment, increased funding and tax credits for industry.
Impact on Institute Research Strategy: Need to create a research management environment which can balance academic freedom, postgraduate training and industry needs.
Institute Response: Review institutional guidelines for academic staff and industry collaboration to ensure effective management of joint collaborative projects and the intellectual property generated. Strategically partner with specific industry sectors and public research institutes allied with WIT’s research centres of excellence.

6.2.2 Internal drivers

Internal factors directing this Research Strategy include:

- The need to respond to WIT’s strategic commitment as outlined in its Institutional Strategic Plan 2007-2010 to develop a research driven learning environment and an internationally relevant and vibrant knowledge region that fosters an international exchange of ideas, technology and people.
- The requirement for the continued development of an institutional research culture/ethos through the provision of a balance between teaching and research for research active staff.
- The need to further prioritise and optimise the effectiveness of research activity within the Institute through the ongoing establishment and sponsorship of research clusters.
- To consolidate and build on the research achievements to date and the Institute’s advancement of fostering a culture of innovation and entrepreneurship in response to the Institutional Strategy (2003-2006).
- The increased research activity and the increase in postgraduate students require greater access to quality research infrastructure and support resources (library, technical support, computing, database, etc.).
- The requirement to create a balance between academic research staff, postdoctoral fellows and research students.
- The requirement to cover the cost of providing a career structure for postdoctoral research fellows.
- The requirement to position WIT to strategically connect with its research partners (nationally and internationally) in order to enhance the quality and impact of the Institute’s research and teaching programmes.
- WIT’s commitment to continue to enhance its research support framework for its research community to ensure adherence to best practice in relation to research management, intellectual property management, exploitation and knowledge transfer.
- To provide the financial and learning support environment which will attract and retain the highest quality researchers and postgraduate students from the top national and international institutions.

During the period of 2003-2006 the Institute has been able to categorise its research activity as in Figure 6-1: WIT Research Group Matrix. This has enabled the Institute to effectively create strong strategic links with groups of industries and target key funding opportunities. Good examples are the Industry Led Research Programme fund to enable knowledge transfer between TSSG and 16 leading indigenous industries, the Applied Research Enhancement grant to support research collaboration between SEAM and a group of industries in the South East region.

Research Centres of Excellence	Research Clusters	Research Groups
<ul style="list-style-type: none"> • Telecommunications Software and 	<ul style="list-style-type: none"> • Separation Science* • Estuarine Research* • Macular Pigment • Management Research in Healthcare and Healthcare Economics • Social and Family Research • Flexible Wireless 	<ul style="list-style-type: none"> • Advanced Manufacturing Technology (AMT) Research Group • Automotive Control Group • Centre for eLearning Technologies Research (WeLearnT)

<p>Systems Group (ISSG)</p>	<p>Communications and Large Scale Simulation Research Group</p> <ul style="list-style-type: none"> • Information Systems, Organisational Studies and Learning Research Group (ISOL) • South East Applied Materials Research Centre (SEAM) • Waterford Crystal Centre for Marketing Studies 	<ul style="list-style-type: none"> • Centre for Entrepreneurship • Centre for Newfoundland and Labrador Studies • Optics Research Group (ORG) • Semiconductor Research Group (SRG) & Solid State Research Laboratory (SSL) • Health Behaviour Research • Molecular Ecology* • Bioremediation & Biocatalysis Group* • Forestry* • Surface & Interfacial Chemistry*
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Figure 6-1: WIT Research Group Matrix

The groups denoted by an (*) collectively form a Network of Research Excellence. Their research programmes are to be incorporated into two competence centres called **Environmental Innovation** and **Pharmaceutical Science and Molecular Biotechnology Research**¹. This team of multi-disciplinary researchers have established research programmes with the EPA, Coillte and Teagasc in addition to companies within the pharmaceutical sector.

6.3 Review of the Research Strategy 2003-2006

A guiding principle for the Institute is that prioritisation is given to research activity which can achieve the highest international standards and can be networked into the international research community. The Research Strategy 2007–2010 will build on the results of the previous Research Strategy (2003-2006). In this section we evaluate the implementation of the strategy against its objectives. The implementation of the strategy was supported by a process of ongoing monitoring and evaluation in the context of an evolving external research environment. The key objective of the evaluation process is to provide a balanced view of the strengths and weaknesses of the Institute’s research position and to document the challenges for the next Research Strategy.

6.3.1 Review of Strategic Objectives 1 – 8 of the Research Strategy (2003-2006)

The following is a summary of the key responses to the strategic objectives as defined in the previous Research Strategy (2003-2006).

¹ As defined in the Institutional Strategy (2007-2010)

6.3.1.1 Strategic Objective 1: Research Resources Identification

Create a centralised database of the Institute's human, financial and infrastructure resources allocated to research.

The Research Office & Capitals Projects Office maintain a repository containing the following information:

1. Active academic research staff, research assistants and postdoctoral research fellows and postgraduate students involved in research;
2. Funded projects and budgets;
3. Peer reviewed publications;
4. Physical resources dedicated to research;
5. A physical resource needs analysis covering the period 2006-2010.

The database is an important support tool for the development of the next research planning process.

6.3.1.2 Strategic Objective 2: Implementation of a Research Quality Control System

The Institute has developed a number of complementary quality control systems.

- **Postgraduate Quality Control:** The Institute has been accredited to maintain a register of postgraduate degrees at *masters level (level 9)* in the schools of Science, Business, Humanities and in the areas in Mechanical Engineering and Electronic Engineering (Department of Engineering Technology) and at doctoral level (level 10) in the School of Science. The award recognises the maturity of the Institute's research environment, the quality of its postgraduate supervision and the reputation of the research-active academic staff.

As a consequence of delegated authority the Institute maintains its own process and procedures for the management of postgraduate research. Academic quality control is the responsibility of the Academic Council. Two important subcommittees of the Academic Council are firstly the Research Sub-Committee which deals with research and postgraduate quality control issues and which is responsible for vetting all postgraduate research proposals ensuring that appropriateness of the research challenge and supervisory arrangements in line with the award. The second is the Ethics Research Committee responsible for ensuring that all research projects have ethical approval.

These postgraduate processes and procedures are consistent with the Irish Universities Quality Board recommendations and have been independently evaluated by an external review panel nominated by HETAC.

- **Research Quality Assurance:** The Research Office collects and collates information on funding success, publications, knowledge transfer and postgraduate student progressions as metrics for measuring the quality and impact of the Institute's research activity. It engages regularly with the funding agencies to ensure that the Institute is meeting its contractual obligations as well as reviewing and signing off on all project reports.

It has also categorised research activity in to 4 distinct groups. These are Self Tasked Research, Research Groups, Research Clusters and Networks of Excellence. The first two are managed within the departments with a degree of flexibility on how they are organised and managed. The Research Clusters and Network of Excellence tend to be

multidisciplinary and may span more than one department. Research groups awarded these titles are more strictly monitored against expected performance targets (through the Research Office).

- **Research Funding and Project Management:** The Research Support Unit (RSU) in the Research Office is responsible for managing the project funding process from initial project proposal to completion of funded projects. All proposals submitted for external funding are required to meet a certain quality threshold and must be signed off by the Research Office. The performance of funded projects is monitored by the Research Office to ensure conformance with the terms and conditions of the contract. The Institute has hired two dedicated financial officers to support staff in the financial management of research projects.

6.3.1.3 Strategic Objective 3: Identification of Institutional Strategic Research Areas

One of the key objectives of the last Research Strategy was to quantify and organise research activity within the Institute to ensure maximum impact regionally, nationally and internationally. The Research Office, in collaboration with the schools, carried out a detailed review of all research activity within the Institute. The first phase of the review concentrated on the evaluation of the quality of the research activity, its relevance to the Institute teaching programme and its potential impact on the future development of teaching within the Institute. The second phase addressed the relationship between the Institute Research Strategy and the national Research Strategy (as defined through the National Development Plan, the Strategy for Science Technology and Innovation (SSTI) and National Spatial Strategy).

6.3.1.4 Strategic Objective 4: Development of School and Departmental Research Strategies

The Institute has undertaken a number of major reviews of its research activity during the period of the Research Strategy. The most important was the review for delegated authority. This was used as an opportunity by the Research Office to engage with the schools and departments and its staff to review the type of research activity undertaken in each school. As a result of this process the majority of schools have developed or are in the process of formalising their research strategies.

6.3.1.5 Strategic Objective 5: Academic Staff Training and Development Policy

The Institute has developed a number of initiatives in support of staff research development. The main support mechanism includes:

- **Institutional PhD programme:** The Institute has established a financial support programme for staff registered for a PhD in an external HEIs. The support includes payment of fees, flexible teaching hours and support for travel to conferences.
- **Travel grant:** All staff are eligible to apply for a travel grant to attend conferences or visit external research centres. In the case of conferences priority is given to staff presenting a paper.
- **Sabbatical programme:** The Institute has introduced an annual Sabbatical programme open to all full-time members of staff. It has been running for two years with an annual cost of €500,000.

6.3.1.6 Strategic Objective 6: Development of criteria for the creation of research and development centres

The Research Office has produced a position document which categorises research activity, which is structured under Self Tasked Research, department Research Groups, Research Clusters and research Network of Excellence. Previously the Institute had created a process by which groups could be designated as research centres. This has now been superseded by a new process by which groups can submit a proposal for the establishment of a research cluster or a network of excellence. Acceptance is based on a review process by a group of internal and external senior academics. The first set of research clusters were created last year. A continued level of academic performance is required if a centre or cluster is to retain its title (annual review).

6.3.1.7 Strategic Objective 7: Grant Programmes for the Development of Research

The Research Office runs a number of internally funded programmes to support the development of research capacity.

- **Behest programme** supports research staff commencing a research career. Funding is less than €6,000 per submission and covers travel, books or small equipment. Submissions are reviewed by a panel composed of internal and external senior researchers. Successful candidates are encouraged to join an established research group either within the Institute or within another Institute. The programme has supported over 30 researchers since its establishment.
- **Behest Cluster programme** supports the establishment of research clusters through targeted investment up to a value of €50,000. The first call was implemented last year and resulted in funding for 3 cluster proposals. It is also reviewed by a panel of internal and external experts. Proposals are evaluated based on the quality of the leaderships, academic track record of the sponsors, quality of the three-year research plan, and relevance to the Institute Strategy.
- **Annual Equipment fund:** This is a once-off payment to research groups for the purchase of equipment. Funding may be up to €100,000.

6.3.1.8 Strategic Objective 8: Monitoring the Performance of an Institutional Research Strategy

The Research Office monitors the development of research through the collation of information relating to postgraduate student numbers, funding submissions and awards, industry and academic research partnerships, paper acceptance at conferences, and journals. Statistics are collated by schools and departments twice a year and presented to the Executive. These statistics are analysed and used to identify deviation from the Research Strategy and to prioritise areas for intervention and investment. As this analysis is a major part of the review of the previous Research Strategy, the analysis of the various metrics is presented below in numbered subsections.

6.3.2 Statistics: Growth in Research Activity in WIT

The following tables shows the growth in Research Activity over the review period, Research Active Staff² and Postgraduate Students in the Institute. It also includes the number of full-time

² Research active staff as defined by the Forfás survey of Research & Development in the higher education sector 2004 'The following activities are deemed as "research activities" for the purpose of this survey: personal research; team research; writing research proposals; writing research reports; supervision of PhD students; other research based activities including administration and planning.' Source OECD (2002) *Proposed Standard Practice for Surveys of Research and Experimental Development*, "Frascati Manual 2002".

contract research staff who have obtained a PhD (post-doctoral) and staff who have been awarded a masters degree (research assistant).

6.3.3 Statistics: Level of Research Activity in WIT

Category	2003-2004	2005-2006
Research Active Academic Staff	157	184
Post-doctoral Researchers	3	11
Research Assistants ³	5	21
Postgraduate Research Students	67	127
Senior Professional Researchers/Developers	12	18
Professional Researchers/Developers	16	35
Total	260	453

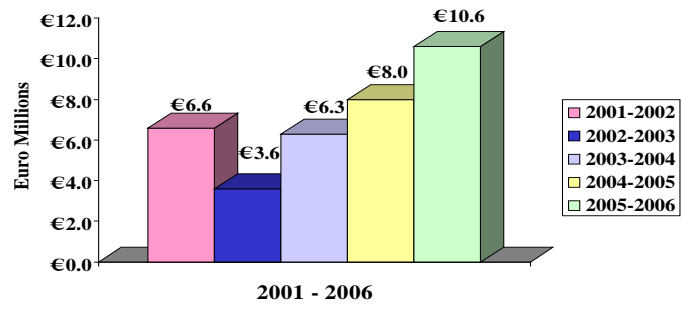
The implementation of the Research Strategy has resulted in significant growth across all of the categories monitored. 50% of WIT's academic staff are now actively involved in research. Two important increases are the number of postgraduate students which has grown from 67 to 127 and the number of post-doctoral researchers which has increased from 3 to 11. Key factors in the increase of the postgraduate students are the increase in the number of students funded through research projects (50%) and the percentage opting to continue from master's level to PhD level (80%). The ratio of research students to supervisors is healthy at 1 to 1.

6.3.4 Statistics: Growth of Research Funding

An important measure of the growth of quality research is the ability of the research community to compete for research funds nationally and internationally. The Research Office has developed a staff support and quality assurance system to ensure that the all research proposals are of the highest quality. This has resulted in a major increase in research funding from 6.3 MEuro in 2003 to 10.6 MEuro awarded in 2006.

During the reporting period the Institute has received funding from all of the major national funding agencies (SFI, HEA PRTLI, Health Research Board and EI) and from the European Framework 6 Programme (FP6).

External Research September



6.3.7 Statistics: Conclusions

Analysis of the impact of the various research strategies indicate a substantial increase in the quantity and quality of the research activity conducted in the Institute. The key achievements can be summarised as:

1. The establishment of an Executive position as Head of Research & Innovation and the associated research support infrastructure.
2. Targeted investment by the Institute in research has increased the number of staff involved in research and the capacity of research staff to successfully compete for external funding.
3. Funding success at the highest national and international level including HEA PRTLI, Science Foundation Ireland, European Framework Programme leading to a doubling of research funding to 10.6 MEuro in 2006.
4. A substantial growth in postgraduate PhD students.
5. Increased collaboration of research groups with international world-class research universities.
6. The majority of postgraduate students are continuing to PhDs as opposed to 2003 when the majority of postgraduate students registered for a master's degree.
7. Increased ability to generate intellectual property for the benefit of the national economy reflected in the creation of two Enterprise Ireland Applied Research Enhancement centre grants and a large growth in grants for commercialisation of its IP. A key indicator has been the number of Enterprise Ireland grants for Intellectual Property (IP) exploitation, which for WIT, was 20 in ICT (highest was 23 for TCD).
8. Capital award under PRTLI which enabled the Institute to establish its first Research and Innovation building on its new 190 acre west campus.

6.3.8 Review of Impact of HEA PRTLI Cycle 3 Funding

WIT was successful in HEA PRTLI Cycle 3 through an institutional proposal built on a research programme, called M-Zones, led by the TSSG with partners in KDEG (TCD) and AWSG (CIT). The research programme itself was based on the TSSG's existing expertise in communications management, developed over a number of years with EU FP4 and FP5 funding in particular, and applying this to the wider domain of pervasive and ubiquitous computing, in particular defining strategies for managing interconnected smart spaces.

Perhaps most importantly for WIT, this longer term basic research funding, supported by capital funding to establish a purpose-built building for the TSSG, allowed the TSSG to prosper. Although the capital budget was small for a new building, it was creatively combined with funding from Enterprise Ireland, to create an integrated Research & Innovation Building as the first new building in WIT's West Campus in Carriganore. This building, recently re-branded as ArcLabs – an integrated vision for research and innovation – combines all the types of research conducted in the TSSG (basic, applied and pre-product research) with the entrepreneurial training and incubation space for spin-out and spin-in companies, underpinning a uniquely creative and thriving research and innovation culture that has already begun to produce real impact economically in the region. This approach was thus ahead of its time for a research group in PRTLI Cycle 3, and fits well with the new requirements for Knowledge Transfer in PRTLI Cycle 4.

The HEA PRTLI Cycle 3 funding awarded to TSSG provided the impetus for continued engagement in basic research (including the subsequent SFI Development Award and SFI PI Cluster award for Autonomic Management of Communications Networks and Services) placing

the TSSG amongst the top ranked academic research centres in Ireland. In applied research it secured 12 EU FP6 projects totalling more than 5 MEuro, placing the TSSG at the top of the Irish table of ICT EU funding. In pre-product research and development it secured 20 EI funded projects in the period 2000-2007 placing the TSSG at the top of the table for ICT innovation funding. This refocusing also helped in terms of publications metrics, with a serious emphasis in the basic research team towards academic impact through publications which included 5 books, (peer reviewed conference and journal publications combined – 2000:2, 2001:4, 2002:12, 2003:12, 2004:17, 2005:33, 2006:41). The HEA funding also provided the longer term funding that allowed the TSSG to reorient its student research programmes from MSc (research) towards PhD programmes, with the initial structures of a specialist graduate school to support this process. To date the TSSG has graduated 30 MSc (research) students and have 15 registered PhD students with the first cohort of 5 PhD students due to graduate in 2007.

Thus a relatively small investment from the HEA PRTL I funding has produced a very good return, uniquely in academia this success has been achieved in all parts of the research and innovation spectrum, underpinning one of Ireland's real success stories in research and development. In total the TSSG has won 30 MEuro from 1996-2007, and the HEA PRTL I Cycle 3 funding has been the pivotal funding in terms of strategic importance both in terms of providing a building and also in terms of providing longer term recurrent funding that helped us develop the management structures to act as a foundation for success.

This unparalleled success has come at a slight cost, the TSSG has already outgrown the PRTL I Cycle 3 building, now having nearly 130 staff and students (when the building was planned for 80) meeting and exceeding all targets it laid out. Thus the new proposal under Cycle 4 has provision for additional space for the TSSG in the new research building on the WIT West Campus in Carriganore.

The reviewers appointed by the HEA to conduct a review of research infrastructure in Ireland were particularly impressed by the professional management structures which have put in place in WIT, both within the TSSG, in the Research Support Unit and WIT administrative offices that underpins this type of phenomenal success. The Institute is confident that it can continue to invest wisely and efficiently to produce a similar excellent return on investment for future research and infrastructure funding.

6.3.9 Key challenges for the Research Strategy (2007-2010)

Major progress has been made in the development of the Institute's research capacity particularly over the period of the last Research Strategy. The next strategy will build on these advances by addressing the following key issues: research capacity, research infrastructure, undergraduate & postgraduate activity, research management, human resource management and quality assurance.

6.3.9.1 Research Capacity

The Institute continues to grow its research funding and postgraduate numbers. In the next phase of our strategic plan we need to:

1. Increase the number of research staff who are qualified to supervise to PhD level. This is achieved through three main processes: Increasing the number of staff qualified to PhD level, ensuring that a greater number of qualified staff are mentored in supervising PhD students and filling new positions with staff with a PhD supervision experience.

2. Continue to increase the number of postdoctoral staff employed by the Institute. The Institute will focus its funding strategy towards funding programmes which provide for the hiring of postdoctoral researchers. We need to use our strategic research links to identify highly qualified postdoctoral staff.

6.3.9.2 Research Infrastructure

The Institute has invested heavily in research over the last 10 years. This has paid dividends as reflected in the increased success of the Institute in attracting research funding and postgraduate students. The development of the research infrastructure to support the expected growth in research activity over the next 5 to 10 years is a major challenge for the Institute. The Institute has conducted a research infrastructure needs analysis for the Institute to 2013 and has developed a strategy for the creation of sufficient research space to meet this need. Part of the strategy is the further development of the West Campus, which contains the ArcLabs Research and Innovation Centre (partly funded through HEA PRTLII). The implementation of the research infrastructure strategy through continued development of the campus requires a focus on attracting infrastructure funds from funding institutions and industry/academic partnerships.

6.3.9.3 Undergraduate and Postgraduate Activity

The creation of a sustainable research environment is dependant on the establishment of a strong postgraduate research programme. The decrease in the Irish student population and in particular the decrease in interest in science has a major impact on the Institute's student profile. Increasingly student places are being taken up by mature students and international students. Continued development of the research environment will require greater emphasis on attracting high quality students from other institutions and from abroad. The growth of mature and part-time postgraduate research students is also an issue. The Institute needs to develop policies for the management of this new research environment.

6.3.9.4 Human Resource Management

In a global economy the attraction and retention of quality staff is a challenge. This is particularly the case in the Institute of Technology sector. The academic contract is defined in the context of teaching and not research. The Institute needs to create a resource management framework which recognises the balance between the need for high quality teaching and research resources. The framework needs to recognise the role of the permanent academic member of staff and the postdoctoral and postgraduate research staff in the development and management of research and postgraduate studies. Issues such as performance and rewards, training and career development and promotion needs must be addressed by the framework.

6.3.9.5 Quality Assurance System

The Institute is operating in an environment of increased international competition. This is evident in the emergence of benchmarking and other evaluation criteria both in Ireland and the international community. The Institute needs to position its research so that it is capable of matching these stringent performance criteria in order to enhance its international reputation.

The Institute quality assurance procedures for managing research are in line with the recommendations of the Irish University Quality Board (IUQB). However we need to move on to the next level and extend the system to produce an integrated quality assurance model which can encapsulate all aspects of the research process from idea to delivery. The development of the quality assurance system will continue to be guided by the recommendations of key organisations such as the IUQB and ERA. The Institute needs to develop an environment where its quality assurance procedures can be benchmarked against international best practise.

6.4 Strategic Objectives for Research 2007-2010

6.4.1 Strategic Objective 1:

Selectively develop and refine the Institute's research capacity and facilities around networks of excellence and research clusters to ensure a critical mass of internationally recognised research activity capable of leveraging national and international financial and intellectual resources in support of national and regional cultural and economic development.

- Ensure the complementarity and alignment of strategic priorities and investment strategies at Institute, school and department levels.
- Develop 3-year strategic investment and development plans with the Institute's Networks of Excellence and Research Clusters.
- Create a staff development, promotion and reward environment which will help the Institute to retain and reward key research staff and attract high quality staff from around the world.
- Identify and target strategic national and international partners (academic and industry) for each strategic research area.

6.4.2 Strategic Objective 2:

Create an integrated Research and Postgraduate studies Quality Assurance Framework compliant with international standards.

- Create a centralised quality assurance board comprised of the representatives of schools and functions involved in the management of postgraduate studies and research management.
- Create an integrated research project management framework addressing postgraduate students, postdoctoral research staff, funding agency and institutional management requirements.
- Create internal and external review panels to evaluate and make recommendation on the operation of the Institute research and postgraduate studies quality assurance framework.

6.4.3 Strategic Objective 3:

Create research networks with leading national and international academic research centres around the globe in the research areas of strategic importance to the Institute.

- Create inter-institutional research collaboration programmes.
- Extend the institutional visiting and adjunct professorship programme to cover all areas of strategic importance.
- Target national and international research programmes which provide financial support for inter-institutional co-operation.
- Extend the number of international research seminars, workshops and conferences which are run and are co-organised at the Institute.
- Implement bi-lateral mobility programmes for staff and postgraduate students with key international partner institutions.
- Bind inter-institutional activities directly into the quality assurance framework, ensuring that staff gain appropriate recognition for these initiatives.

6.4.4 Strategic Objective 4:

Establish a leading 4th level training network through the development of joint postgraduate programmes with national and international institutions.

- Create strategic co-operation agreements for postgraduate studies with national higher-level institutes.
- Promote research co-operation between the Institute's academics and the external research community at national and international level.
- Maximise opportunities for international postgraduate training through the European Research Areas as well as international agreements (China, Singapore etc).
- Participate in National Graduate Schools programmes allied to Institute's key research strengths e.g. Marine Science being led by NUI Galway.

6.4.5 Strategic Objective 5:

Establish strategic research programmes between the Institutes' key research groups, high technology industry and government agencies for the development of joint research programmes and to support the commercialisation of the Institute's Intellectual Property.

- Establishment of a Knowledge Transfer Function within the Research Office.
- Establish a research/innovation environment which supports the creation of new high value industries within the region.
- Create regional economic impact through the transfer of knowledge and technical know-how from the Institutes research programmes.
- Create a reward system for intellectual property generation and transfer.

6.4.6 Strategic Objective 6:

Fully integrate the research programmes with the undergraduate and postgraduate teaching to ensure the continued relevance and quality of the Institutes' degree offerings.

- Promote departmental special interest groups as key stakeholders in the discovery and development of knowledge in key disciplines and the custodians of major curriculum strands.
- Encourage the binding of these special interest groups to research centres and research groups.
- Encourage and promote school and department research seminars for information sharing and as dissemination activities for special interest groups and research centres.
- Establish a system of course sponsorship and advisory panels between special interest groups, research clusters and courses.
- Provide autonomy to centres of excellence to develop postgraduate degree courses.

6.5 Operational Plan for Research 2007-2010

6.5.1 Introduction

The institutional strategic objectives are mapped into a three-year operational programme. This programme is further decoupled into annual plans which identify clear targets and outcomes. Progress towards the achievement of the strategic objectives is evaluated against the annual operational plan.

6.5.2 Operational Actions

Action 1	Develop a strategy for the integrated management of research and postgraduate studies across the Institute. <i>Examine the role of the Registrar's Office, Research Office, Postgraduate Studies Office, Schools and Departments based on international best practice.</i>
Year 1	Establish a working group of the key institutional stakeholders. Produce initial consultation document for submission to Executive and Academic Council. An institutional agreement on structures, roles and responsibilities.
Output	
Action 2	Map and prioritise Institute research areas in the context of National and European research strategies and funding opportunities. <i>This will inform the school and department research strategies and the prioritisation of cluster areas.</i>
Year 1	The Research Office in conjunction with the research community will produce a detailed position document indicating areas of strategic research priorities, strategies for the development of those areas including strategic national and international partners and target funding area.
Output	A set of year 1 performance targets for each research priority area mapped to external opportunities.
Action 3	Develop an integrated Institute, school and departmental Research Strategy for the enhancement of research activity in areas of strategic importance for the Institute. <i>The strategy should address the issue of sustainability of research through staff development and promotion, postgraduate student numbers, hiring policies, balance of teaching and research activity and infrastructure needs. It should also specify the school and department policy for the development of interdisciplinary research clusters.</i>
Year 1	The Research Office will engage with Heads of School and Department and research staff to develop a prioritised list of requirements for the targeted development of prioritised research areas. The outcomes of the process will be mapped into a research investment plan which will be submitted to the Executive for ratification. The plan will provide research performance and postgraduate student targets for each of the strategic areas.
Output	An institutional investment plan for research covering training, Institute investment in support infrastructure, external funding and postgraduate resources.
Action 4	Create research management structures at school and department level to compliment central supports via the Research Office. <i>There is a need to devolve aspects of the research strategic development and management activities towards the schools and departments. Need to look at the creation of Faculty Dean of Research Offices.</i>
Year 1	Establish executive community to review international best practise and evaluate financial and structural impact of selected models.
Output	Discussion document available to stakeholder for comment and feedback.

Action 5	<p>Create and implement three-year research strategies for centres of excellence, research clusters and research groups.</p> <p><i>The strategy will define research performance targets such as funding, peer review publications, postgraduate students, IP creation and transfer, external links to industry, academia and government agencies. It will be aligned with the school and department research strategies.</i></p>
Year 1	Using the output of Action 3 the Research Office will engage with centres and clusters to develop individual strategic plans.
Output	A set of individual strategic plans for centres and clusters.
Action 6	<p>Develop and implement a formal framework of recognising strategic partnerships with national and international partnerships.</p> <p><i>The framework will document the protocols and responsibilities for the establishment and management of strategic relationships. It should also provide a process for reviewing the effectiveness of the strategic partnerships and the process by which strategic partnerships are ended.</i></p>
Year 1	The Research Office to engage with the research community and external representatives to document guidelines and framework.
Output	Framework document on research partnerships.
Action 7	<p>Adapt a methodology for evaluating institutional research performance from international best practice.</p> <p><i>The performance metrics are of value in evaluating where best to invest resources to ensure that the goals of the Research Strategy are met.</i></p>
Year 1	Research Office to conduct review of international best practise for research performance measurement. Update present performance evaluation document and present to Executive for approval.
Output	Common set of research performance metrics and performance report templates implemented for all research activity in Institute.
Action 8	<p>Develop and implement an academic research careers policy.</p> <p><i>The IoT academic contract is specifically for teaching duties. A complimentary career path needs to be created for staff engaged in research with particular reference to promotion, remuneration, training and duration of contract.</i></p>
Year 1	Establish a working group of management and academic research staff to address area. Provide a mapping between international best practise and Institute process. Separate priorities in to areas which can be addressed directly by the Institute and areas which require third party agreement. Develop and cost initial implementation strategy for submission to the Executive Board.
Output	Position document on research careers policy.
Action 9	<p>Work with HR to develop and implement postdoctoral research staff career path.</p> <p><i>The strategy should address performance evaluation, remuneration, supervisory and promotion prospects.</i></p>

Year 1	Create a working group with HR, management and representatives of research staff to review the present procedures and benchmark against national and international best practise (such as European Handbook on research careers).
Output	Policy document agreed by the Executive Board.
Action 10	Implement a remuneration and support system of visiting professors and adjunct professorships.
	<i>To encourage greater participation of international research experts in the Institutes research community.</i>
Year 1	Update present policy to formalise the support mechanisms and funding support (particularly for longer term stays). Include processes and procedures for requesting support resources.
Output	Standardised Institute wide system for the management of visiting professors and adjunct professorships.
Action 11	Establish as a minimum, one research seminar per strategic research area per year.
	To foster and grow greater inter-institutional research collaboration, provide opportunities for postgraduate students to present and discuss their research results with leading academic experts and fellow students.
Year 1	Work with head of Schools and Departments to review the scope of the established seminars. Make recommendations on what additional seminars should be established in the next three years.
Output	<i>An agreed seminar programme reflecting the Institute research priorities. Run at least 4 international seminars in the first year.</i>
Action 12	Leverage the national and international funding mechanisms to establish postgraduate student mobility programmes with partner universities and research Institutes.
	<i>The globalisation of research provides opportunities for the Institute to create joint postgraduate research programmes with a number of its national and international research partners.</i>
Year 1	Develop an Institute Strategy for targeting funding mechanism which focuses on mobility such as EI international funds, Marie Curie fund.
Output	Three successful applications in year one.
Action 13	Benchmark our research, postgraduate studies and knowledge transfer processes and procedures against international best.
	<i>Since delegation of authority to the Institute at level 9 and 10 (science) the Institute maintains its own quality processes and procedures.</i>
Year 1	Establish a process that ensures all stakeholders meet to discuss how a benchmarking process is undertaken.
Output	Benchmarking document.
Action 14	Establish a Knowledge Transfer function within the Research Office – to evangelise the Institutes research output and actively promote

	<p>knowledge transfer.</p> <p><i>The “economic footprint” of the Institute within the region is to be significantly enhanced, incorporating knowledge transfer, knowledge sharing and collaborative R&D.</i></p>
Year 1	Recruit Technology Transfer Specialist.
Output	Technology Transfer expertise available for research community on campus.

7. Knowledge and Technology Transfer Strategy 2007 – 2010

7.1 Introduction

Waterford Institute of Technology (WIT) is committed to optimising its contribution to the economic, social, cultural and intellectual well-being of society. The Institute prides itself on being an outward-looking organisation with an extensive network of partnerships within and outside the South-East region

Knowledge transfer for WIT covers a broad range of activities and goes well beyond the transfer of knowledge for economic and commercial benefit. In keeping with emerging approaches internationally, knowledge transfer is seen as an ‘engagement’ with a diverse range of public and private organisations in a bi-lateral, mutually beneficial process.

7.2 Context for Knowledge Transfer Strategy

The need to create a dynamic knowledge transfer process is being driven by a number of external and internal drivers.

7.2.1 External Drivers:

- The need to respond to national policy⁴, which identifies knowledge transfer from higher education institutions as a **key issue in the development of a world class research and commercialisation** environment in Ireland.
- **The need to enhance regional innovation** – an imperative for the Institutes of Technology, as highlighted in both the Strategy for Science, Technology and Innovation and the recommendations of the OECD Review of Higher Education⁵. In a recent study undertaken in the South-East region by Goodbody economic consultants⁶, it is estimated that **through the impact of its R&D and knowledge transfer activities, WIT can raise the region’s GVA by 0.5 – 1.5% by 2010**. The study highlights the positive impact of knowledge transfer in attracting **FDI** to the region, supporting **regional industry**, stimulating **local enterprise** and **social and cultural development in the South East**– an impact consistent with Waterford’s designation as a regional gateway in the National Spatial Strategy⁷.
- **The need to ‘foster multi-actor collaboration’ and lead the creation of the knowledge region.** Higher-level institutions are playing a pivotal role in the creation of knowledge intensive regions by promoting and supporting a culture of collaboration among regional stakeholders in developing knowledge-based industries.
- The recognition that the targets set by the **European Commission in Lisbon** can only be achieved through developing effective knowledge transfer mechanisms and closer collaboration between higher level institutions and the wider community. Recent communication from the Commission on developing a **broad-based innovation**

⁴ Strategy for Science, Technology and Innovation and National Development Plan 2007-2013

⁵ Review of National Policies for Education: Review of Higher Education in Ireland, 2004

⁶ The Economic Impact of a University of the South East, Goodbody Economic Consultants, June 2005

⁷ The National Spatial Strategy, 2002 - 2020

strategy for the EU⁸, recognises that knowledge transfer is a vital part of an Innovation strategy. This is further reinforced in the **European Technology Platforms** and the **Seventh Framework Programmes for Research and Technological Development**.

- **The need to respond to increasing demand from industry.** As companies come under pressure on competitiveness and productivity, knowledge transfer relationships are seen as an important element in improving innovation in industry. The report of the Small Business Forum recommends “(companies should)...form significant productive relationships with outside sources of knowledge and technology, and in particular, with the Institutes of Technology and other third level institutions... to acquire the knowledge they need to develop new products, processes and designs”⁹ – this is reflected in growing demand from industry to engage in knowledge transfer.
- The **changing nature of society** places an increasing responsibility on third level institutions to contribute in the broadest way, to improving the ‘quality of life’ and to enhance not just the economic but also the cultural, intellectual and social capital of society. Around the globe, third level institutions are confronted with a wide array of new demands to transfer knowledge. This “enlarged realm of expected impact”¹⁰ has placed the third level sector at the centre of an expanded knowledge transfer process.

7.2.2 Internal Drivers

- The need to respond to **WIT’s strategic commitment** as outlined in its Institutional Strategic Plan 2007 – 2010 to develop an internationally relevant and vibrant knowledge region that fosters an international exchange of ideas, technology and people.
- The need to enable the Institute to **build on the achievements of its increasingly growing research community** over the last 10 years and to exploit its capacity to innovate from its intellectual resources for the betterment of the Institute, its region and society.
- WIT’s need to leverage the knowledge resources of its partners in industry, government and the wider community **to inform and enhance its teaching and research programmes** in an ever changing knowledge based society.
- The requirement to position WIT **to strategically connect** with its research partners in order to access an increasingly distributed knowledge production system and to more effectively transfer knowledge in a global context.
- WIT’s commitment to **continue to enhance its research support framework** for its research community to ensure adherence to best practice in relation to research management, intellectual property management, exploitation and knowledge transfer.

⁸ Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Putting knowledge into practice: A broad-based innovation strategy for the EU: COM (2006) 502

⁹ Report of the Small Business Forum “Small Business is Big Business 2006”

¹⁰ The Rise of Knowledge Regions: emerging opportunities and challenges for universities, European University Association, 2006

- To build on the Institute's achievements of **fostering a culture of innovation and enterprise** through initiatives such as the development of the ArcLabs Research & Innovation Centre, the initiation of campus company spin outs, the development of a comprehensive suite of teaching and research programmes on enterprise development, all of which inform and support undergraduate teaching and research activity at WIT.
- WIT's tradition and increasing scale of activity of collaborating with industry and other external partners through its provision of **continuing professional development programmes, outreach activity and practice of public engagement** throughout the region and beyond.

7.3 Review of Knowledge Transfer 2003 – 2006

The South East region has consistently under performed when evaluated against the key indicators for the generation of a knowledge economy. This is mainly due to the predominance in the region on agriculture and manufacturing industry. Ireland is increasingly seen as a world leader in the creation of an entrepreneurial economy while the South East is producing fewer entrepreneurs than any other region.

The challenge for the Institute, as the catalyst, for regional economic development, is to reverse this trend. Its Knowledge Transfer Strategy is core to achieving this objective. The strategic approach is as follows:

1. Work with the national and regional development agency to attract external investment in to the region.
2. Create industry-academic networks around some of the leading international manufacturing companies in the region in order to enhance the level of innovation within these organisations.
3. Create a support system that can support the development of High Potential Start Up industries in the region including the creation of Spin-outs and Spin-ins.

The implementation of the Institute's Strategic Plan (2003-2006) has focused on addressing these objectives.

Create a support system that can support the development of high potential start up industries in the region

The Institute has created a unique Knowledge Transfer and Innovation model based on the integration of research, entrepreneurship and HPSUs at its ArcLabs Research and Innovation Centre at the West Campus. Arclabs Research and Innovation Centre opened in 2005 and sponsored by the PRTL Program, Cycle 3, Enterprise Ireland and private industry has provided a unique environment for innovation and commercialisation through the co-location of research and enterprise activities. Arclabs serves as a focal point for attracting inward investment and is a stimulus for the creation of indigenous knowledge-based industry. Arclabs incorporates:

- The Incubation Centre, currently supporting 12 start up enterprises, 2 of which are WIT spin-outs
- The South East Enterprise Platform Programme (SEEPP) which has to date supported 119 entrepreneurs
- The WIT School of Business Centre for Entrepreneurship
- The Industry Liaison Office

- The Telecommunications Software and Systems Group (TSSG)
- The Centre for Converged IP Communications Services (3CS).

The ArcLabs Research and Innovation Centre bring together entrepreneurship, research and entrepreneurial activity, providing an integrated support framework for knowledge-based industries in the South-East.

A key component of the model is the Institutes Commercialisation of Research process which is designed to ensure that funding for commercialisation and marketing are made available while ensuring that researchers have continued access to research funding. In particular TSSG currently has 19 active commercially oriented research projects funded through Enterprise Ireland's, Proof of Concept, Advanced Technology Development, Innovation Partnership and Applied Research Enhancement Programmes valued in excess of €5.6m. It has to date founded 2 campus companies Aceno and Nubiq (spin-outs), demonstrated products in international trade fairs such as 3GSM and has also transferred technology directly into two other start up enterprises (spin-ins) – Waterford Technologies and Hash 6. This approach has directly supported the increased level of entrepreneurship and new HPSU start-ups in the region. The Institute is committed to support the creation of an additional 12 start-ups in ArcLabs over the coming year.

Create industry- academic networks around some of the leading international manufacturing companies in the region in order to enhance the level of innovation within these organisations

Create networks

The ability of an institute to meet the needs of individual companies is limited. In order to overcome this challenge the Institute has developed a policy of building industry-academic networks. The strategy is to identify a number of regional and national industries with a common sector focus. The Institute works with the industries to create a network which can link directly to a research centre within the Institute. The Institute helps the industry and academic partners to define a research and commercialisation strategy. An important element of the strategy is the identification and leveraging of funding to underpin the relationship. The policy has resulted in the creation of two nationally funded Applied Research Enhancement Centres (EI programme). The Institute is in the process of putting two additional networks for the coming year.

Other Engagement with industry partners

Research collaboration with industrial partners has been a major focus over the lifetime of the Plan. Research centres such as TSSG, have developed strategic collaborations with leading international corporations such as Motorola, Vodafone, BT and Oracle. In 2006, the Institute secured €1.5 million in funding from Enterprise Ireland for the development of an industry-led network research programme for Irish companies in the telecommunications sector. Collaboration with public sector research organisations has also grown, including collaboration with Teagasc, the EPA, the Marine Institute, COFORD and the Health Services Executive. Regional learning partnerships have been developed with a number of organisations, including an executive MBA programme with Waterford County Council as well as customised training programmes delivered to companies such as AOL, SunLife, Teagasc and the Health Service Executive.

Work with the national and regional development agency to attract external investment in to the region.

Participation in regional development strategy

The institute actively engages with the national and regional development agencies in the development and implementation of the regional development strategy. Members of the Institute participate on national and regional level economic task forces and policy fora. Bodies in which members of the Institute are represented including organisations such as the South East Business & Innovation Centre, the Waterford Chamber of Commerce Board and Wexford County Enterprise Board.

Knowledge transfer through conferences, public debate and outreach activities

Over the last three years, the Institute has proactively delivered a conference series throughout the region, informing and provoking debate on topics relating to regional development and the knowledge economy. The Centre for Entrepreneurship hosted two regional development conferences, 'Developing an Entrepreneurial Society' and 'Creating a High Tech, High Growth Economy'. It is currently one of the main drivers of the 'Spirit of Enterprise' forum focusing on enterprise and economic development of the South East. WIT's research leaders have successfully hosted international conferences such as Manweek 2006 organised by the TSSG. The School of Education and Professional Development has forged a strategic alliance with the Enniscorthy Enterprise Support Unit to deliver a broad range of further and higher education programmes in Wexford, aimed at SME owners and local industry. Through its CALMAST¹¹ initiative, WIT has organised events for over 20,000 primary and secondary students and was recently awarded the Descartes Prize for Science Communications. There has been active dissemination to the wider public regarding the knowledge base within WIT including the publication of a regular research newsletter - Research Matters (<http://www2.wit.ie/Research/News>) – and regular networking and seminar events.

Conclusion

The approach is beginning to produce real results in terms of regional and national economic impact. This is recognised nationally as reflected in the fact that WIT is the only Institute of Technology to have been successful in securing approval from Enterprise Ireland's Technology Transfer Strengthening Programme for the appointment of a full-time Technology Transfer Specialist. This will improved the capture, protection and management of IP, professionalisation of its delivery to industry and broadening of routes to commercialisation.

7.4 Strategic Objectives 2007-2010

The strategic objective in the period 2007 – 2010 is to expand and deepen the Institute's knowledge transfer activities, to create a framework that will support the successful, consistent and continuous transfer of knowledge, intellectual property and expertise from Waterford Institute of Technology to industry and the wider community.

This framework will:

¹¹ Centre for Advancement of Learning of Maths, Science and Technology

- Be consistent with the Institutional Strategy, Research Strategy and existing commercialisation framework. In particular, the framework will recognise the interdependence of research, teaching and knowledge transfer and encourage a research and teaching culture that supports the creation and disclosure of knowledge. The framework will also recognise that Governance issues need to reflect the growing emphasis on knowledge transfer activities.
- recognise that a more strategic approach to knowledge transfer and external partners needs to be developed and these linkages need to be actively managed in order to maximise the full benefits of engagement.
- recognise that consideration needs to be given to addressing cultural change within the Institute and introducing staff development programmes and mechanisms for maintaining and building staff motivation to engage in the creation and transfer of knowledge.
- optimise and build on the Institute's existing infrastructure and resources, in particular the ArcLabs Research and Innovation Centre, the Centre for Entrepreneurship, the South East Enterprise Platform Programme and the Institute's research groups.
- recognise the important role that the Institute plays in the economic and social development of the South-East region, in particular its role as a catalyst for regional innovation and entrepreneurship and as the key driver in fostering the creation of a region of knowledge in the South-East.
- be consistent with the national and international policy framework and reflect international best practise in the area of knowledge and technology transfer.
- recognise that the Humanities and the Social Sciences have an important role to play in the functioning of third level institutions as communities of knowledge and in the institution's engagement with the wider community.

7.5 Knowledge and Technology Transfer Strategy 2007-2010

WIT's Knowledge and Technology Transfer Framework revolves around four strategic objectives:

Objective 1 Create a supportive environment for the creation and transfer of knowledge

The Institute will ensure that:

- knowledge and technology transfer remains a strategic priority for the Institute and the interdependence of research, teaching and knowledge transfer is recognised in the Institute's strategy.
- an environment and institutional framework is created which supports a culture of partnerships and rewards the creation, management and exploitation of intellectual property and knowledge.

- all those involved in research and knowledge creation understand the concept of knowledge transfer, are mindful of the knowledge transfer imperative and are confident that they can engage in the knowledge transfer process.
- there are well-developed and clearly-understood protocols and procedures for the identification of Intellectual Property, its evaluation, protection and exploitation.
- there are adequate supports available to the research community and to the Institute's knowledge transfer professionals to engage fully in the creation and transfer of knowledge.
- the means by which knowledge is transferred is broadly defined and can include activities as diverse as publications, licensing, conferences, consultancy, start-ups, training, student, graduate and staff placements in industry, business or government.

Objective 2 Build collaborative partnerships with the wider community

The Institute will ensure that:

- a strategic approach is taken to developing partnerships, ensuring that partnerships reflect the Institute's core strengths and that benefits to the Institute and the partners are thus optimised. The Institute will work towards documenting the extent of its relationships with external organisations, assessing their impact and showcasing examples of productive engagement.
- it is involved in a wide range of academic and professional partnerships and networks and is recognised as a 'knowledge broker', and a valuable source of knowledge.
- it further develops relations with the Institute's alumni, recognising that the most effective form of knowledge transfer is through Institute graduates.

Objective 3: Create a research support framework to facilitate effective transfer of knowledge and technology

The Institute will ensure that:

- a comprehensive structure of practical and readily-accessible supports is available to those involved in the creation of knowledge.
- a fully resourced team of knowledge transfer professionals is in place in the Institute to deliver a programme of active engagement, training and supports for those involved in knowledge transfer.
- all forms of knowledge transfer including publications, licensing, conferences, consultancy, spin-out companies, training, student, graduate and staff placements in industry, business and government are supported.
- opportunities are created where academics and business can explore mutually beneficial opportunities for knowledge transfer and where companies interested in exploiting intellectual property or being involved in collaborative research projects are actively identified.

- a programme of industry-focused services, including consultancy, industry training, joint academic / industry partnerships and industry placements is developed. The scope of this programme will reflect the report of the Forum on Small Business¹² which notes that much innovation in small companies is non-technological.
- funding and support is accessed from a wide range of national and European sources to support the creation and transfer of intellectual property and knowledge.

Objective 4: Using knowledge transfer to support innovation and the creation of a Knowledge region in the South East

The Institute will ensure that it:

- plays a leading role in the region's strategy to encourage new knowledge-based, business start-ups and is recognised by the local and regional development agencies as an integral part of the support framework for new enterprises in the South East.
- remains the catalyst for the development of research clusters in the region and engages with local industry to form knowledge transfer partnerships, covering technology and related business process needs which contribute to productivity, competitiveness and innovation in local industry.
- takes a leading role in defining innovation policy in the region and developing the regional innovation structure. In conjunction with the development agencies and other regional stakeholders, the Institute will work towards the creation of a region of knowledge in the South East.
- develops a national and international reputation for academic excellence in the field of entrepreneurship research, enterprise start-up, business incubation, knowledge transfer and collaborative research, and that this knowledge and expertise informs the public policy debate and feeds into the teaching programmes.

7.6 Operational Plan 2007-2010: Knowledge and Technology Transfer

This section identifies actions that will be undertaken to implement the strategy.

Objective 1 Create a supportive environment for the creation and transfer of technology and knowledge

Actions:

- 1.1 Undertake an Institute-wide audit to document all areas in which knowledge is being created across the Institute. Identify in conjunction with the schools, the most appropriate means of transferring this knowledge.
- 1.2 Examine policies and procedures in relation to the creation, management and exploitation of intellectual property in line with the National Code of Practice on IPR. This includes analysing policies and procedures from other institutions to reflect international best practices, liaising with external professional advice and making recommendations to respective institutional management and Governing Boards.

¹² Report of the Forum on Small Business, 2005

- 1.3 Develop and deliver a planned commercialisation awareness programme within the Institute, focusing on commercialisation strategies and intellectual property management.
- 1.4 Incorporate training on innovation management and entrepreneurship as part of the generic postgraduate training programme. Work towards embedding knowledge transfer in teaching programmes at undergraduate level.
- 1.5 Develop a programme for increased staff mobility including sabbatical exchange of staff with industry in a two-way exchange. Attract researchers with industry experience.
- 1.6 Develop a staff incentive programme for creation of high value intellectual property.

Measurable Outputs:

- M.1.1 A matrix showing knowledge created across the Institute and the most appropriate method of transfer.
- M.1.2 A set of well-defined and clearly-understood protocols and procedures for the identification of IP, its evaluation, protection and exploitation.
- M.1.3 Clearly defined policies and procedure in relation to IP management, campus company development and collaborative research.
- M.1.4 Publication of policies and procedures on institutional websites.
- M.1.5 A handbook on technology transfer and commercialisation for researchers.
- M.1.6 Eight seminars per year delivered to academic researchers and targeted training for postgraduate researchers.

Objective 2 Build collaborative partnerships with the wider community

- 2.1 Improve management information systems to track, support and monitor the extent to which the Institute engages with external organisations. Evaluate the scope and strength of linkages and identify strategic partnerships that best reflect and exploit the Institute's core strengths. Showcase successful engagements.
- 2.2 Ensure all IP and knowledge transfer procedures are industry-friendly and that there are low barriers to engagement and transfer.
- 2.3 Improve the Institute's profile and visibility to external organisations including industry, community groups, academic and policy-makers, through a central web portal, marketing literature, workshops, public lectures, conferences and participation in research bodies and working groups.
- 2.4 Increase participation in industry clusters and strategic research clusters, nationally and in FP7. Allied with WIT's key strengths in telecommunications, environmental innovation, pharmaceutical and molecular biology and materials target key strategic industries for potential collaboration.
- 2.5.1 Build up WIT Communities through the Institute's Alumni recognising the valuable role it can play in delivering knowledge transfer internationally.

Measurable Outputs:

- M.2.1 An analysis of the Institute's engagement with external organisations.
- M.2.2 Introduce a selection of business and legal agreement templates for effective 'user friendly' interface with industry to facilitate innovation partnerships and technology uptake.
- M.2.3 A searchable web-based database of available technologies at WIT.
- M.2.4 Marketing literature specifically aimed at marketing the Institute as a source of valuable technologies and expertise.
- M.2.5 An annual showcase research conference targeting industry, angel investors, venture capitalist and Enterprise Ireland.

- M.2.6** The establishment of one additional industry clusters around the Institute's strategic research competencies.
- M.2.7** A programme of knowledge transfer promotions for alumni members.

Objective 3 Create a research support infrastructure to facilitate the effective transfer of knowledge and technology

- 3.1** Recruit and appoint a technology transfer specialist in the ICT field.
- 3.2** Assess existing and potential portfolio of strategic research of commercial value. Meet the Principal Investigators of the strategic research centres and begin evaluation of research for commercial potential.
- 3.2** Enhance commercialisation support for researchers by handling disclosures in a professional and timely manner, undertaking technical and commercial assessments and advising and support on patenting, licensing and contracts.
- 3.3** Enhance the skills of the Institute's knowledge transfer professionals through a planned process of Continuing Professional Development.
- 3.4** Co-ordinate the delivery of industry-focused services (consultancy, training, academic /industry partnerships) through the Research and Innovation office.
- 3.5** Develop a programme to encourage and reward peer review publications in key journals and conferences.

Measurable Outputs:

- M.3.1** Appointment of a technology transfer specialist and the implementation of a prioritised action plan.
- M.3.2** A programme of continuous professional training for the Institute's knowledge transfer professionals.
- M.3.3** An integrated Institute offering to industry.
- M.3.4** Establishment of a technology transfer office leading to an enhanced research support management infrastructure for researchers to incorporate more specialised knowledge on intellectual property management and transfer.

Objective 4 Using knowledge transfer to support innovation and the creation of a knowledge region in the South East

- 4.1** Develop an integrated model for supporting the emergence of knowledge-based business start-ups in the South East, integrating transfer of technology and intellectual property with an effective support framework.
- 4.2** Create awareness among potential entrepreneurs of the commercial opportunities offered by active research projects.
- 4.3** Actively target strategic industries to deliver knowledge transfer partnerships
- 4.4** Lead the development of a Region of Knowledge in the South East, by fostering collaboration among the regional stakeholders.
- 4.5** Enhance enterprise education and training in the region at undergraduate and postgraduate levels and through engagement with industry.

Measurable Outputs:

- M.4.1** Creation of two industry – academic networks.
- M.4.2** Delivery of three Innovation Partnerships per year.
- M.4.3** Championing the region's involvement in national and European Regions of Knowledge initiatives, resulting in at least one international project.

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