# Chapter 10
# Ireland: The Challenges of Building Research in a Binary Higher Education Culture

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## Introduction

The Irish higher education environment has changed dramatically and rapidly over the last few decades. Not only was Ireland transformed from a predominantly agricultural economy, with an ethnically and religiously homogeneous population, but it also effectively skipped the industrial age. The country was catapulted into the twenty-first century, with over half the population employed either in public or private services, e.g. retail, tourism, finance/business, administration, health and education, which accounted for 64% GDP in 2007. This was complemented by strong export growth led by foreign owned multi-nationals, especially in pharmaceuticals, medical devices and software. During the 'Celtic tiger' days, society was transformed from being labour-exporting to one heavily dependent upon immigration with new training needs.

Ireland's growth was strongly predicated upon policy attention and financial support to education and the formation of 'human capital' since the late 1950s. A critical element had been the synergy between the introduction of free secondary education in the mid-1960s and economic growth, which, in turn drove demand for higher education. The desire to widen participation led to the abolition of tuition fees in 1997; today, over 55% of second-level students go on to higher education, up from 44% a decade ago, and the government has set a target of 72% by 2020. This growth helped transform public sentiment in favour of significant expansion in national funding for research and S&T-related matters, and greater focus on enterprise–academy collaboration. Between 1997 and 2008, approximately €3 billion was invested, albeit Ireland still lagged behind EU and OECD neighbours as a percentage of GDP.

By 2009, all had changed utterly. The global recession, acerbated by domestic problems, brutally ended Ireland's 'Celtic tiger' status. Higher education – a

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beneficiary of the boom – became a casualty of the politically charged and financially challenging environment. Higher education policy reflects this volte-face. Until recently it was dominated by questions of massification and access, getting more people well-educated; today, the emphasis is on quality and world-class excellence – but within the context of achieving greater coherence, collaboration and efficiency across the system. These objectives are reflected in three major and concurrent policy initiatives: the *Strategic Review of Irish Higher Education* (2009–2010), the government's strategy for *Building Ireland's Smart Economy* (2008), and the Ministry of Finance's *Special Group on Public Service Numbers and Expenditure Programmes*.

## Overview

Prior to the 1970s, higher education was dominated by five universities, whose lineage stretched back to the nineteenth century with the exception of Trinity College Dublin, established in 1592. To meet these new challenges, the government established two national institutes of higher education, in Limerick (1972) and Dublin (1975), to provide technologically focused programmes. After some controversy, both institutions effectively declared themselves universities forcing the government to pass legislation in 1989. At this stage, it is fair to say that they bear little relationship to the alternative mission the government had envisaged (White, 2001).

Given that experience, it is perhaps not surprising the government has been more steadfast in maintaining a de jure binary system. In response to publication of *Technician Training in Ireland* (OECD, 1964) and *Investment in Education* (OECD, 1965), the *Steering Committee on Technical Education* concluded there was an urgent need to produce technically qualified people in order to plan for industrial development. Regional Technical Colleges (RTCs) should educate 'for trade and industry over a broad spectrum of occupations ranging from craft to professional level, notably in engineering and science, but also in commercial, linguistic and other specialities' (Government of Ireland, 1967). Under the RTC and Dublin Institute of Technology (DIT) Acts, 1992, their functions were further identified as

> To provide vocational and technical education and training for the economic, technological, scientific, commercial, industrial, social and cultural development of the State with particular reference to the region served by the Colleges, as well as to:
>
> - Engage in research, development and consultancy work,
> - Exploit any research, consultancy or development work,
> - Enter into arrangements with other institutions in or outside the State for the purpose of joint programmes in both teaching and research.

There were 11 colleges when the Acts were introduced, and 13 in 2000. In 2007, all institutes of technology, including Dublin Institute of Technology, were brought under the remit of the Higher Education Authority (HEA).

By 2000, all RTCs had been renamed 'institutes of technology' (IoTs) in somewhat controversial circumstances, officially in recognition of their university-level

teaching and research but unofficially because the nomenclature of 'institute of technology' was perceived as having higher status; similarly, permission was given in 2007 to rename the 'Director' as 'President'. Both actions sought to build on the singular experience of the older and larger Dublin Institute of Technology (DIT). Its establishment in 1992 brought together six former science, engineering, business and music colleges, with lineage dating to the late nineteenth century. DIT has its own legislation and authority to make academic awards from apprenticeship to PhD, including Honourary Doctorates, under the Qualifications (Education and Training Act) 1999, while other IoTs have delegated authority from the Higher Education and Training Awards Council (HETAC). In recent years, it has sought re-designation as a university in order to remove any and all confusion about its dual sector position.

All IoTs, with the exception of DIT, work through the Institutes of Technology Ireland (IOTI) formerly Council of Directors (CoD). It acts as a representative and lobby group for the sector, through which negotiations with the government and trade unions are conducted. Given growing disparity in ambitions and size of the various IoTs, the larger ones, e.g. Waterford and Cork, have tended to operate in a semi-detached manner. WIT and CIT have also made submissions for University designation. DIT has an ambiguous relationship with the other IoTs, arguing that its awarding powers make it a university-in-all-but-name (Norton, 2008).

Irish higher education is generally described as a binary system. It is, however, more complex and varied than the term usually suggests (Skilbeck, 2003). There are 7 universities, 14 IoTs, 9 Colleges of Education, the National College of Art and Design, 2 non-state-aided private colleges and other national institutions. The universities and IoTs have been treated differently in policy, funding and recognition. Until March 2006, the HEA, the statutory planning and development body for higher education and research, was only concerned with the university sector, while the IoTs were governed by the Department of Education and Science.

Distinctions between programme type, qualification and students further emphasise the differences between the two sectors. The university sector is now significantly larger and expanding rapidly. In 2007/2008 of the total 159,978 students, 58% were enrolled in universities and 42% in IoTs, of which DIT had 8% and the other IoTs 33%, representing a significant turn-about since 2000 (HEA, 2009a). Seven IoTs have fewer than 3,000 full-time students. While postgraduate enrolment is increasing in the IoTs, that have only 17% of all postgraduates while universities have 83% (HEA, 2009a) IoTs account for 46% of first admissions (HEA, 2009b), and in 2007/2008 approximately 53.7% of its students were at diploma, certificate and BA(Ordinary) level (HEA, 2009a).

Another distinction has been the role of research. The 1967 steering committee did not specify research as a fundamental function, although both the 1992 RTC and DIT Acts acknowledged this role 'subject to such conditions as the Minister may determine'. In contrast, the 1997 University Act reconfirmed research as an unqualified function of universities stating that a 'university shall promote and facilitate research'. This delayed development of research in the IoTs.

As competition for students, finance and reputation accelerates, the gap between universities and IoTs is widening. During the 'Celtic Tiger' days, some IoTs

struggled to recruit students; with high unemployment, student applications to all HEIs has risen. Evidence continues to show students are choosing universities over IoTs, all things being equal (Fitzgerald, 2006; Walshe, 2007; Flynn, 2007), which is increasing socio-economic stratification. This gap is most apparent in postgraduate education, primarily the PhD cohort. Universities, on the back of EU and Irish Government declarations to considerably increase the number of PhD students, have promoted the concept of fourth level or postgraduate education. By using this term, they are trying to distinguish between themselves as the postgraduate provider and IoTs as the undergraduate or third level provider (IUA, 2007).

Table 10.1 below provides an overview of all the IoTs, which are named in accordance with the county or town/city. Throughout, DIT, given its size and the way data is collected, is indicated separately in some tables, omitted in others or subsumed under the generic IoT label. Unfortunately, there is no comprehensive regularly updated published and verifiable information; while academic staff numbers are likely to be constant, research performance across the other categories will have changed in some cases quite significantly since the dates given albeit the relativities would be fairly accurate.

**Table 10.1** The relative size and performance of the IoTs and DIT

| | Total student 2007/2008 | Total MPhil and PhD 2007/2008 | WTE academic staff 2008 | Research awards € millions 2006 | Refereed publications 2005 |
|---|---|---|---|---|---|
| Dublin Institute of Technology (DIT) | 13,555 | 331 | 954 | 6.7 | 143[a] |
| Athlone (AIT) | 4,178 | 61 | 272 | 1.7 | 4 |
| Cork (CIT) | 8,592 | 119 | 656 | 4.7 | 49[a] |
| Dundalk (DKIT) | 4,041 | 19 | 300 | 3.4 | 98[a] |
| Institute of Art, Design and Technology (DLIADT) | 1,687 | 9 | 128 | – | 7 |
| Galway-Mayo (GMIT) | 5,888 | 84 | 394 | 2.6 | 11[a] |
| Blanchardstown (ITB) | 1,665 | 12 | 120 | – | 24 |
| Carlow (ITC) | 4,107 | 34 | 222 | 0.3 | 11 |
| Sligo (ITS) | 4,484 | 31 | 301 | 1 | 13 |
| Tallaght (ITT) | 3,321 | 71 | 212 | 1.9 | n/a |
| Tralee (ITTR) | 2,222 | 17 | 226 | 0.2 | 28 |
| Limerick (LIT) | 3,444 | 10 | 308 | 0.2 | n/a |
| Letterkenny (LYIT) | 2,107 | 5 | 198 | 0.4 | 4 |
| Waterford (WIT) | 7,463 | 175 | 579 | 9.2 | 123 |
| Total | 66,754 | 978 | 4,869 | 32.3 | 515 |

[a]Includes refereed and non-refereed publications.
Source: Adopted HEA/Forfás (2007), Forfás (2007a) and IOTI (2008).

In 2003, the Department of Education and Science invited the OECD to evaluate the performance of higher education and recommend how it could better meet Ireland's strategic objectives. The OECD (2004) reaffirmed the binary as the best mechanism to maintain diversity. It also recommended that HETAC's decision to devolve authority to award doctorates to four IoTs should be rescinded. Given the intensity of local politics in Ireland, the government has been slow to take action. Recent government and HEA initiatives to encourage and promote critical mass and synergies between all HEIs, and especially between universities and IoTs, have also contributed to a realignment within higher education, under the guise of collaboration. The provision of advanced qualifications and growth of research activity within the IoT sector has helped blur the boundaries between universities and IoTs, with all the accompanying demands for funding and support. This has revealed significant gaps in capacity and capability, calls to concentrate activity in only a few institutions and counter-calls for the end of 'restrictive practices'. These issues will be explored in the last section of this chapter.

## National Policies for Research

There is no official research policy that relates specifically to the IoTs although there are references in the underpinning legislation and other documents that IoTs should focus on applied research with a regional focus. In reality, differences in core and capital funding, and curriculum and qualifications level, between IoTs and universities have played a greater role defining respective research mission.

Since intensification of globalisation and the dynamics of the knowledge society, policy has focused on the link between research and international competitiveness (DETE, 2006, p. 8; DETE, 2004):

> Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture.

To meet this goal, all competitions, with a few exceptions, are open to all HEIs. In recent years, the HEA, which funds Programme for Research in Third Level Institutions (PRTLI) and the various research councils, has actively encouraged collaboration across sectoral lines in all its programmes. As a result, many large research projects, Centres-of-Excellence and Graduate Schools involve both universities and IoTs, some of which are led by the latter. Science Foundation Ireland (SFI), principally because it supports basic research in biotechnology, ICT and now energy, has been closer to the universities but the IoTs have also been successful.

While there are nuanced differences in opinion between national agencies, the prevailing view, heretofore, is that research excellence should be supported wherever it occurs, because Ireland is at too early a stage to concentrate all its resources in a few universities. There is also a very strong local political dimension which

would oppose efforts to centralise and/or undermine regional capacity. It could be argued that in the absence of a formal statement competition is defining policy.

## *Priority Setting Between Teaching and Research*

Institutional differentiation is embedded in the fabric of how the university and IoT sectors are organised and managed, and how academic work is determined. Practical, vocationally oriented teaching has been a defining characteristic of the IoTs, exemplified by low student/staff ratios compared to the universities: 14:1 versus 20:1, respectively, in 2007/2008.

IoT academics are contractually obliged to teach 560 h/year or 16 h/week, which is often reinterpreted by some academics and their trade unions as only doing 16 h work per week. The academic year concludes on the 21 June and academic staff are not required to return to work until 1 September; any changes outside these times are to be compensated. In addition, there are the normal national holidays. The emphasis is on teaching, and only recently on research and service, provoking additional claims for reduction in teaching in order to undertake research or participate on committees, etc. In contrast, academic work in the universities is widely accepted as comprising the three components of teaching, research and service.

A 2004 study revealed significant differences between time spent on research in each sector (see Fig. 10.1). Estimates suggest that between 9 and 11% of IoT

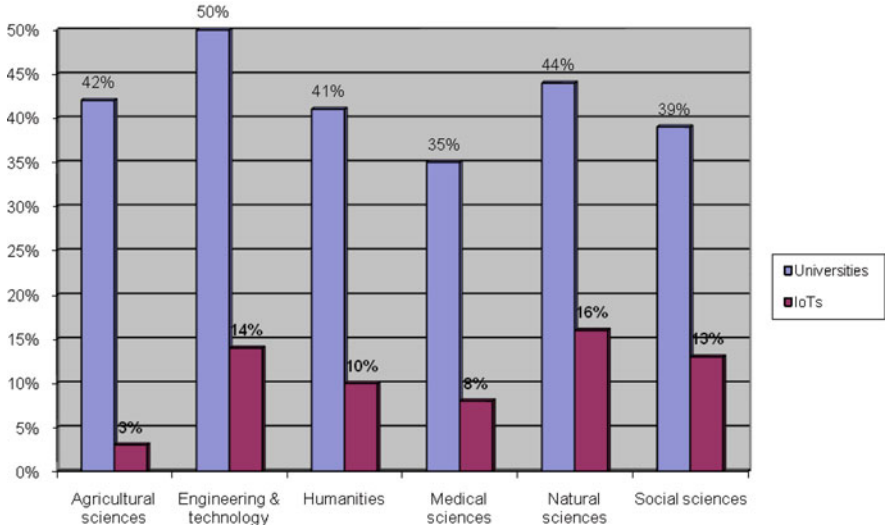


**Fig. 10.1** Average percentage of time spent on research by academic staff across universities and IoTs by field of science, 2004
Source: Adapted from (Forfás 2005)

staff are involved in research but this figure is highly variable across the different institutions (IOTI, 2008, pp. 22, 17).

While national bargaining, under social partnership, sets salary and broad socio-economic determinates, the definition of academic work differs between sectors. In addition, for the IoTs, detailed employment and contractual issues are negotiated with the academic trade union and the Department of Education and Science in tripartite talks. This makes individual institutional requirements difficult to agree and implement.

## *Funding Research*

Beginning 2008, all HEA-funded HEIs (universities and IoTs) are funded according to the recurrent grant allocation model (RGAM), based on input (student numbers) and output metrics with a percentage tied to research performance. This is a significant change from when approximately 30% of university budgets were attributed to R&D using estimates of academic time spent on research, and IoTs were funded by the Department of Education and Science on the basis of hours taught in the classroom with little flexibility to move between pay and non-pay accounts.

Because of infrastructural inequities that have developed over time, the universities have been significantly more successful. Despite new money, this historical gap plus differences in bid capacity and capability exist, with a few notable exceptions. IoTs accounted for only 5.5% of total R&D spending in the higher education sector in 2006 despite the fact that R&D funding for IoTs grew by 77.7% from 1998 to 2000 (Forfas, 2007b). Since 1998, R&D spending performed in the IoTs has risen from €13.5 million in 1998 to €33.3 million in 2006 (Forfás, 2008). Table 10.2 – which covers 80% of research expenditure for the period listed – breaks down the sources of direct funding (from government departments, state agencies and research councils) most of which are competitive. Different agencies use different formats for different periods. Only Enterprise Ireland (EI) and the Department of Education and Science provide targeted funding for IoTs. In addition, DIT and WIT receive significant EU Framework funding.

**Table 10.2** R&D funding sources of IoTs (€ millions), 2000–2007

| Source | Science Foundation Ireland | Enterprise Ireland | EU Framework 6 | Technology Sector Research | Programme for Research in Third-Level Institutions | Misc. | Total |
|---|---|---|---|---|---|---|---|
| Period covered | 2000–2007 | 2001–2007 | 2001–2007 | 2000–2007 | 2000–2007 | 2000–2007[a] | |
| R&D funds | 13.1 | 32.5 | 9.4 | 5.1 | 51.5 | 9.8 | 167.3 |
| Percent | 8% | 19% | 6.5% | 30% | 30% | 6.5% | 100% |

[a]Approximately 15 additional national and international funds.
Source: IOTI (2008, p. 19).

IoTs success is all the more 'significant when measured against high teaching loads and a relative deficit of research infrastructure' (CoD, 2003, p. 41). Targeted initiatives are being considered but this may be hard to justify when quality is emphasised. There is the additional problem of attempting to develop sustainable applied or industrial-relevant research without research excellence in the underpinning sciences (Conlon, 2007).

## IoT Research Strategy

HEI strategic plans and, in particular, research plans are new developments in Ireland, but they are now a legislative requirement and prerequisite for some funding initiatives. All institutions must provide evidence of a published and publicly available institutional strategy against which research priorities are closely mapped. This should be a rolling 3-year strategy, with action plans and targets aligned to national strategic priorities, and not change annually to fit different funding criteria. In this way, the HEA is steering change and mission differentiation across the HE system, and closer alignment between research activity and institutional and national priorities. Other funding initiatives, such as SFI or the research councils, have not adopted this position but by requiring all proposals to be signed by an institution's vice-president for research there is an assumption of institutional alignment. In other instances, agencies require matching funds, another way of ensuring a proposal meets institutional priorities.

While each IoT has gone about strategic planning in its own way, there is broad consensus that drafting a plan should involve consultation with key internal and external stakeholders. Governing bodies, which usually include industry, students and other public stakeholders, should be involved. Both DIT and WIT have established a dedicated Office of Strategic Planning to lead and oversee this annual process.

### *Institutional Strategy and Priority Setting*

When compared internationally, Ireland has a young research system. As already stated, there is no specific research policy for the IoTs but there is a distinctive approach to their research which reflects their history, particular competences and emphasis on social applicability and innovation (Table 10.3). In addition to strengths in science and technology disciplines, there is burgeoning humanities and social science research, especially in business, the environment, and creative arts and media.

The IOTI plus DIT came together to produce a *Framework for the Development of Research in the Institutes of Technology* (IOTI, 2008). Its aim was to provide a strategic voice for research which has often existed below the public and policy radar. Nevertheless, the final document, in addition to identifying broad targets, was controversial among the institutions because it sought to provide a common

**Table 10.3** R&D Priorities in IoTs and DIT

| | Life sciences | Physics and engineering | Other |
|---|---|---|---|
| DIT | Food, nutrition and health | New materials and technology<br>Sustainable energy<br>ICT | Business and social development<br>Creative arts and media |
| AIT | Toxicology, Biomed | Nanotechnology | Social care |
| CIT | BioPharma/chemical | Wireless systems photonics | |
| DKIT<br>DLIADT | Smooth muscle | | Entrepreneurship<br>Creative arts<br>Entrepreneurship<br>Learning science |
| GMIT | Marine, forestry and energy | Biomedical device design | Tourism and hospitality |
| ITB | | Graphics/gaming e-learning, speech, etc.<br>Processing occupational road safety | Occupational road safety |
| ITC | Environment and BioRemediation | Networks | Design |
| ITS | Environment | Mechanical and manufacturing engineering | Socio-economic research |
| ITT | BioPharma | Sensors and medical devices | |
| ITTR | Biological sciences | Geometric optics | Social science |
| LIT | Neutraceuticals | Renewable energy controls | Internationally traded services |
| LYIT | Marine biotech | Computing/animation<br>Wireless technology<br>Sustainable and renewable energy | Creative industries |
| WIT | Bio/pharma science<br>Health sciences | Telecommunications | Business management |

Source: Adapted IOTI (2008).

strategic objective for institutions of various capacity and capability. In addition to aiming to double the amount of research funding earned, number of researchers and PhDs completions, the Framework also focused on achieving an integrated research continuum of 30% basic, 55% applied and strategic, and 15% industry-focused research (IOTI, 2008, p. 7).

Each IoT is developing a strategy and defining a priority domain. Strategies also identify structural challenges, e.g. high teaching workloads, weak research management infrastructure, development of IP management, provision of seed funding,

research overheads, and training. The need for collaboration, within the academy and particularly with other public or private partners, is seen as vital. Table 10.4 identifies other issues, including assessment metrics, albeit as Lillis (2007) suggests there may not always be alignment between objectives and performance.

## *Organisation and Management of Research*

Research management is a big challenge for IoTs who wish to engage to a significant extent in research (Hazelkorn, 2004, 2005). Only half have appointed a designated head of research (DIT has the equivalent of a VP of Research and Enterprise) or established the equivalent of a Research Support Unit to identify funding opportunities, advise on proposal preparation, assist with research project administration, coordinate institutional funding applications and provide research performance statistics. To compensate, the IOTI has established a research office funded by a government initiative to provide services and advocate on behalf of the IoTs.

Research centres are an institutional issue; larger IoTs, e.g. DIT and WIT, have a significant and growing number of centres some of which work in close collaboration with the universities, and the public or private sector. Competitive large-scale funding for Enterprise Ireland designated Centres-of-Excellence are an important development but are dependent upon close collaboration with indigenous industry and future funding being available.

Within the parameters described above, each IoT allocates research time according to its own priorities and budgets. The larger institutions are flexible, supporting research interests regardless of position or status, and reducing teaching on the basis of research output or earned income. This view would stem from the realisation that new appointments are more likely to be research active. In contrast, other IoTs, would be much more rigid, and allow only senior academic staff additional time for research.

## *Collaboration with Universities and Industry*

Ireland places a high priority on collaboration within and across sectors, and with private industry in order to maximise critical mass in key priority domain. Both PRTLI and SIF have made collaboration a requirement (Government of Ireland, 2007, p. 206). There have been growing number of research partnerships and strategic institutional alliances, across the binary. There are clear advantages to all HEIs, including strengthening research capacity and broadening programme provision. Cork Institute of Technology and University College Cork have jointly developed a maritime research campus. The Dublin Regional Higher Education Alliance involves four universities, DIT, and three IoTs, while the universities and DIT are involved in a Graduate Education Network. These initiatives follow a successful collaboration between HEIs along the western seaboard, the Shannon Consortium.

**Table 10.4** Institutional research strategies and performance measurements

| | Research strategy | Research metrics | Encourage basic research | Develop/recruit research-active staff | Encourage research activity |
|---|---|---|---|---|---|
| DIT | Research strategy | • PhD-track students and completions<br>• Refereed publications<br>• Books/monographs<br>• Conference/policy papers<br>• Major works in production, performances and exhibitions<br>• International collaboration<br>• Patents, licenses, invention Disclosures<br>• Company start-ups | Yes | Yes | Yes |
| AIT | Included in strategic plan | • Refereed and non-refereed publications<br>• Conference/policy papers<br>• Licenses | Not specified | Yes | Yes |
| CIT | Included in strategic plan | • Refereed and non-refereed publications<br>• Conference/policy papers<br>• Patents | Yes | Not specified | Yes |
| DKIT | Research strategy | • Publications<br>• Conference/policy papers<br>• Other published Research | Not specified | Yes | Yes |
| DLIADT | Research strategy | • Refereed and non-refereed publications<br>• Conference/policy papers<br>• Research papers<br>• Training courses | Not specified | Yes | Yes |

**Table 10.4** (continued)

| | Research strategy | Research metrics | Encourage basic research | Develop/recruit research-active staff | Encourage research activity |
|---|---|---|---|---|---|
| GMIT | Internal Research Development programme (IRDP) | • Refereed and non-refereed publications<br>• Conference/policy papers<br>• Patents | Not specified | Yes | Yes |
| ITB | Included in strategic plan | • Refereed and non-refereed publications<br>• Conference/policy papers | Applied Focus | Yes | Yes |
| ITC | Strategy statement for R&D | • Refereed and non-refereed publications<br>• Conference/policy papers<br>• Patents | Not specified | Not specified | Yes |
| ITS | Included in strategic plan | • Refereed and non-refereed<br>• Publications<br>• Conference/policy papers | Not specified | Not specified | Yes |
| ITT | Included in strategic plan | • Publications<br>• Paper/presentations<br>• Prizes | Not specified | Yes | Yes |
| ITTR | Included in strategic plan | • Refereed and non-refereed<br>• Publications<br>• Conference/policy papers | Not specified | Not specified | Not specified |
| LIT | Included in strategic plan | • No | Not specified | Not specified | Not specified |
| LYIT | Included in strategic plan | • Refereed and non-refereed<br>• Publications<br>• Conference/Policy papers | Not specified | Not specified | Yes |
| WIT | Included in strategic plan | • Refereed publications<br>• Conference/Policy Papers | Not specified | Yes | Yes |

Source: Adapted from HEA/Forfás (2007).

However, there is little interaction between industry and higher education. A recent report shows that in 2005–2006 only 17% of research-active companies in Ireland collaborate with the higher education sector. Despite policy emphasis on increasing collaboration with industry, this was a decrease from 19% in 2001 (Forfás, 2007c).

IoTs, supported by Enterprise Ireland, are boosting enterprise-related research and company creation; €24 million was allocated in 2002 for nine new on-campus business incubation centres and the expansion of three centres, opened in the late 1980s, in IoTs which border Northern Ireland. Incubator centres provide start-up facilities, mentoring and office support for new business concepts and small inward-investing companies; clients are recent graduates or new 'entrepreneurs'. Usually, a company takes up a tenancy for 3 years on the basis that if they are unable to survive at that stage, their chances of longer term viability are slim.

IoTs are also embedding 'entrepreneurship' in education and training modules. The latter has received targeted competitive funding via the Enterprise Platform Programme (EPP). Emphasis is on spin-ins, e.g. participants from newly establish SMEs or multinationals, in contrast to the universities where the emphasis is on spin-outs, e.g. from the university's own research. The extent to which EPP participants and/or incubator tenants translate into sustainable and growing companies is variable across the regions. Technology transfer activity is also limited. Several companies highlighted the lack of technology transfer competence in HEIs as an obstacle (cf. Jordan & O'Leary, 2007).

IoTs were established to provide vocational and technical education and training. While the majority focuses on higher certificate and BA (Ord.) level, only the larger IoTs concentrate on advanced professional competence, at doctorate level. DIT, for example, has adopted the concept of 'professional doctorates' as developed in the UK and Australia; thus far, it has validated one for architecture. It has also validated structured PhD programmes with a work-based research component. Continuing professional development has often been viewed as a distinctive mission for the IoTs, although initial restrictions on operating at advanced levels and growth in the universities has meant that in some disciplines, e.g. business, architecture and nursing, the IoTs face stiff competition from the universities.

## *Human Resources and Careers*

Until recently, academic staff appointed to IoTs were recruited primarily on the basis of their ability to teach, and depending upon the institution, to teach at undergraduate level only. The growth of postgraduate programmes coupled with emphasis on research has required a sea-change in human resource strategy and implementation. Today, new academic appointments are likely to have a PhD, research-performance skills and a publication profile. This focus clashes with appointment criteria determined by the Department of Education and Science, which has specified that

candidates have industrial/professional experience. While research-focused appointments may not have the same experience or commitment to industry as their predecessors, it has proved difficult to recruit established professionals with appropriate research experience or capability, at the appropriate level and salary. These developments may ironically undermine a core IoT attribute.

With few exceptions, all appointments must be made at assistant lecturer level, although there are few contractual differences between assistant lecturer, lecturer or senior lecturer grades.

> The policy of recruiting staff at Assistant Lecturer level, i.e., the start-point on the promotional scale, allows little flexibility in recruitment and makes the IoT less competitive in attracting more experienced staff (IOTI, 2008, p. 21).

The number of teaching hours per week is specified as 18 h/week for assistant lecturers and 16 h/week for others. All academic staff are expected to be involved in research and service but in reality the emphasis is on teaching – and academics respond accordingly. Movement between assistant and lecturer grade – which requires a master's degree and evidence of research/scholarly activity – is termed 'progression' not promotion – a subtle distinction suggesting the process is largely a paper exercise and certainly that is the trade union's perception. The number of senior lecturer posts is a fixed-proportion of all academic staff, and there are few such opportunities. Those who do wish to progress on the salary scale have little option but to move into management positions, e.g. Head of Department or School, or in the case of DIT as Dean of Faculty. Upon appointment, all staff are tenured, with public service entitlements; neither dismissal nor redundancy is acceptable, legislatively or politically.

Not all IoTs share a common vision as to what is required in the future. This is not surprising given their different sizes, strengths and ambitions. Yet, the Department of Education and Science negotiates on human resource matters with the IoTs as a single group, and academic staff are represented by a trade union whose membership is drawn primarily from the secondary sector. Due to collective bargaining, individual IoTs are prohibited from developing their own career structure, and until recently, required Department of Education and Science approval for all new positions, even replacement of resignations or retirements. Flexibility in entry salary or grade, to attract particular candidates, has been strictly monitored.

Management and academic staff in the IoTs share few characteristics with their counterparts in the universities; indeed, as stated above, the understanding of academic work also differs. While this has created a very complex environment, with little flexibility, there has been a gradual change in the profile and ambitions of academic staff and correspondingly institutional profile (see Table 10.1). However, it is likely to be several decades before the full effect of new recruitment and staff development policies take effect. Because high calibre research-active individuals are attracted to institutions which can best meet their ambitions, it will take considerable time before IoTs can build the appropriate infrastructure to recruit and retain such staff.

## Research Performance

The pattern of research activity varies considerably across the IoT sector. Estimates show only five institutions claim over 20% research-active staff, while several conduct almost no research. This uneven pattern is reflected in tensions across the sector, between the larger and more active institutions and the universities, and with the government and HEA.

### *Extent and Output of Research*

The most significant sources of funding to the IoT sector are the Technology Sector Research programme (30% of the funding), Enterprise Ireland (19%) and PRTLI Cycles 1–4 (30%). These three sources represent approximately 80% of the total R&D funding to the sector (see Table 10.2 above, IOTI, 2008, p. 20). Concentration in the first two programmes is not surprising given their specific orientation; indeed the former is only open to IoTs to compete.

The pattern of research income varies significantly and unevenly across IoTs, with the most active, e.g. DIT and WIT, earning almost 50% of total IoT research income – and others reporting little or no research. This pattern is reflected in the Programme for Research in Third-Level Institutions (PRTLIT). In 2007, while the IoT sector increased its funding share from 4.1% (in cycles 1–3) to 19.8% in cycle 4, i.e. from €25 million to €42 million, only three IoTs (ITT, CIT, WIT) were project leaders of major PRTLI projects in cycle 4. In the 2009 competition, all but four IoTs (DIT, WIT, CIT and LYIT) were successful in the first round. In the absence of up-to-date, comprehensive and verifiable information, the data below reflects this differentiation.

- Publications: Of 515 publications during 2005, over 50% came from two institutions, DIT and WIT (see Table 10.1).
- Research Income: IoT research income ranged from €191,000 to €9.1 million, with an average of €2.7 million. In comparison, university funding ranged from €14.3 million to €60.5 million (Forfás, 2007a).
- Patents: According to the HEA/Forfas report (2007) only eight patents were registered by IoTs in 2005 (ITC 2, CIT 3, GMIT 1, DIT 2) albeit it is unclear whether these numbers represent patents granted or only submissions. This unevenness is reflected in more recent data from the European Patent Office (November 2009) which showed only three patents granted to IoTs, all of which were granted to DIT.

A recent study of research strengths in Ireland has grouped DIT with the National University of Ireland at Maynooth and the University of Limerick in terms of comparitive research performance. No other IoT is mentioned (Forfas, HEA, 2009).

### *Relevance of Research for the Region*

IoTs were established with the specific mission of contributing to the technological, scientific, commercial, industrial, social and cultural development of Ireland, with particular reference to technical skills, applied research and knowledge/technology transfer appropriate to their region. The location of the IoTs reflects this orientation. Four are located in Dublin alongside four universities, three are located outside Dublin close to universities, while the remaining seven are the main higher education providers in their respective area.

The National Spatial Strategy (NSS) (Government of Ireland, 2002) identified 'gateways' and 'hubs' around the country through which Irish social and economic development should be developed – a key motivation being to spread people, employment and resources more evenly around the country rather than the current concentration in Dublin. All IoTs, with the exception of Carlow, are located in 'gateways'. Proposals to tie individual IoTs and universities to specific regional foci and partnerships have, however, proved controversial, and the NSS has for various reasons been largely ignored.

At an official level, enterprise development agencies are specifically required to meet regularly with IoTs but this often tends to be 'on an ad-hoc basis, while others are more strategic' (HEA/Forfás, 2007, p. 176). Enterprise Ireland has responsibility to 'work closely with the Institutes of Technology . . . to strengthen their ability to support industry at regional level' while IDA Ireland tends to work with its existing and potential client base in the region. Overall, there would be general agreement that despite their remit, there is no over-riding evidence of specific regionally relevant research. Indeed, it is not clear the extent to which the universities have done more in this area.

## Dilemmas and Challenges

The Irish higher education system is at a crossroad. The binary system is constrained by historical circumstances and unresponsive to changing national and global requirements, there are low levels of internationalisation, and weak governance and strategic leadership. Despite significant investment in recent years, it remains below that of appropriate peers nations and institutions, and the possible emergence of a super-league of universities at the European level could be unfavourable to Ireland's small research community. Even if the economy had not experienced the current deep recession, Irish higher education required structural and policy attention. Indeed, it is arguable that Ireland has been late tackling many issues.

The *Strategic Review of Irish Higher Education* was conceived prior to the current recession, but the latter is now framing both the context and likely recommendations. Announced in February 2009, the Review has been tasked with assessing higher education's fitness-for-purpose, developing a vision and national policy objectives, and identifying 'focused targets' for the next 5 years. It has been

asked to consider the number and roles of institutions, governance and accountability, level of resources and potential for greater efficiency 'having particular regard to the difficult budgetary and economic climate that is in prospect in the medium term'. Two other government initiatives, despite being oppositional to each other in objectives and strategic vision, share the view that Irish higher education requires reform and restructuring, including mergers. *Building Ireland's Smart Economy* endorses investment in R&D while the *Special Group on Public Service Numbers and Expenditure Programmes* has, inter alia, recommended significant reductions in funding for higher education, suggested rationalisation of provision and institutional mergers, questioned research spending and the number of PhDs, and criticised academic contracts in both the universities and IoTs.

There are probably five key challenges for the IoT sector.

## *Higher Education System*

Ireland has operated a binary system since the 1970s, but like experience elsewhere, statutory instruments as a means for regulating diversity are becoming recognisably too restrictive and inflexible. Moreover, in the Irish case, the number and range of institutions is more complex than the traditional binary implies. Many IoTs, especially DIT, provide education and research to PhD. In so doing, they challenge traditional assumptions about the academic and geographic boundaries of their mission. Professions serviced by the IoTs require advanced qualifications and the research to underpin the quality of those qualifications. This has driven a sea-change within the institutions, many of which have developed research portfolios similar to the universities. In addition, while studies suggest proximity matters when it comes to innovation, new technology and the importance of status and reputation are undermining what may have originally been seen as their unique selling point.

Unfortunately, IoTs struggle with their brand and identity, with internal and external stakeholders. Evidence suggests that industry, philanthropists and students (domestic and international) tend to choose partnerships with universities rather than IoTs. SMEs, and their larger colleagues, desire to work with leaders in the field, not just the local HEI. In addition, the decline in the number of secondary school leavers has been matched by students choosing to study at universities rather than IoTs because of the social and cultural capital attached to those qualifications. Not surprisingly, the two larger IoTs, DIT and WIT, have recently applied for university designation, although DIT's position in the *Times QS Ranking of World Universities* (2009) could ironically undermine its bid. DIT is the sixth highest ranked Irish HEI, significantly higher than two universities, and the highest ranked UAS-type institution excluding Ecole Polytechnique.

The big policy debate concerns how to retain diversity without encouraging 'mission drift', and how to reconcile institutional ambition with tightening resources and the pursuit of excellence. Don Thornhill (2003) former chairman of the HEA, acknowledged 'concern with nomenclature and titles and a perception that there is not parity of esteem between the two sectors of higher education'. The OECD

(2004, pp. 37, 39) was supportive of the need to retain a 'differentiated tertiary education system' and said 'steps [should be taken] to integrate the components better than . . . at present'. However, 'for the foreseeable future there [should] be no further institutional transfers into the university sector'.

Taking an opposing stance, Skilbeck (2003, p. 12) questioned whether providing more advanced programmes to increase the proportion of enrolments in higher level qualifications did represent 'mission drift in a negative sense' as distinct from responding to 'individual demands for advanced qualifications' and societal 'demands for higher levels of competence and knowledge'. Coolahan foresaw that such developments were likely to 'see more pressure from the extra-university sector for greater status within the higher education system . . . confirming the desire to move towards a more open, even-structured higher education system' (CoD, 2003, p. 18). His view was echoed by the IoTI, which anticipated that if the OECD's recommendation was implemented, 'the impact would be to initiate a drift towards convergence and to incentivize perversely that which the report least desires' (Coy, 2005).

These examples illustrate the voracity of the debate leading up to the Strategic Review, albeit at the time they were conducted in the context of the larger IoTs seeking university designation and whether that was a positive or negative development. Today's discussion is still concerned with 'mission drift' but this is matched by the need to enhance national capability and capacity, and ensure efficiency and value-for-money. In this context, strategic clusters, collaborative networks and/or mergers are being openly (and secretly) discussed, including those between universities and IoTs within the same city/region. An alternative view is shaped by concern that mergers between universities and IoTs could encourage de-differentiation. A National Technological University (NTU), including all or most IoTs, is promoted by the IOTI albeit without endorsement from all member IoTs. The NTU would be enabled by a common governance structure. Yet, while this proposal would reduce the number of autonomous institutions, it would not readily resolve many of the other challenges identified. Another concept, based on the 'California' or 'Wisconsin' system models, would formalise the division between undergraduate and postgraduate activity, whereby some IoTs would be 'feeder' institutions – either to the universities or larger IoTs. A further proposal, which is gaining prominence, favours adapting international practice with respect to planning agreements or compacts. Rather than using legislative controls or regulatory frameworks to maintain mission and institutional strategy, core funding could be provided in exchange for specific objectives and targets. In turn, this approach would be used to shape and maintain differentiation.

All three government initiatives have identified the need to reform and restructure higher education. It is unclear how far this will actually go because any change is likely to unfurl political and local objections. Thus, the Strategic Review group may opt to define a policy vision and framework, and actively encourage HEIs towards that end. No matter which approach is adopted, the IoTs are probably most likely to experience the greatest change. However, unless there is recognition of differences in capacity and capability among the IoTs, it will not succeed in stemming individual submissions for re-designation.

## *Research*

Dynamics of Ireland's knowledge-economy strategy is eroding the binary, and widening the gap between the de jure and de facto research role for the IoTs, and especially for DIT and WIT (Hazelkorn, 2004; Jerrams & Donovan, 2005). Government strategy aims to 'allow each of our existing Universities and Institutes of Technology to be supported in developing and enhancing their roles according to their existing strengths' (Government of Ireland, 2007, p. 204) but IoTs should develop 'into an effective technology resource, focused on collaboration with local industry on the basis of applied research and technology development' (DETE, 2006). The OECD was especially forthright stating 'the role of the institutes of technology should be much more targeted towards particular areas of applied research so that they can act as technology development partners to industry, especially SMEs, particularly on a regional or even a national basis' (OECD, 2004, p. 35). That recommendation was tied to another, that IoT funding should come from Enterprise Ireland (applied) and not SFI (fundamental).

Despite these statements, there is a growing realisation that national capacity and capability is unlikely to be met by reliance on the universities alone. Yet, there is also concern over the lack of critical mass in key fields of science and yawning investment/funding gap vis-a-vis peer nations. This political and economic reality has underpinned a consistent requirement by the Higher Education Authority that HEIs show evidence of research concentration, consolidation and collaboration in order to be successful in competitive processes. Today, both DIT and WIT have a research and income mix nearing that of the smaller universities, as noted throughout this chapter.

## *Funding Deficit*

Historic differentials in funding between the universities and IoT sector are aggravated by the current economic recession in Ireland. There has been an infrastructure deficit because the university and IoT sectors have been funded according to different criteria and standards. Moreover, because Irish higher education has been dependent upon the exchequer for almost 90% of its funding, there is little history of diversified earnings, due to a combination of philosophical, economic and taxation issues. IoTs were, until recently, unable to seek loans or establish campus companies without permission, a restriction which did not apply to the universities. Moreover, given their status and reputation, the universities have been able to attract philanthropy to support massive capital building programmes across their campuses.

The new recurrent grant allocation model (RGAM) aims to shift the burden of funding away from the public exchequer and towards institutions, via a combination of performance, output and competitive metrics. However, the unit cost model is likely to be less beneficial to IoTs which have traditionally had a low student/staff ratio. It will also challenge the traditional small-class model of teaching, with its emphasis on practice-based learning, which has been one of the sector's defining characteristics. Finally, the core funding given per PhD student – which has enabled

the universities to underpin research growth – is likely to be replaced by a competitive and proportionate element, which is likely to further disadvantage the IoTs. The recession is likely to impact disproportionately on the sector.

These difficulties are compounded by the overall investment gap. Ireland abolished tuition fees for all full-time undergraduate students in 1997. Today's public deficit had paved the way for their re-introduction, and an income contingent loan scheme based on the Australian Higher Education Contribution Scheme (HECS) was being considered. However, a *New Programme for Government* (October 2009) ruled that out. While the new revenue generated would only have replaced existing core funding, the decision not to proceed will pose financial difficulty for the entire higher education sector. The government has introduced budget and employment restrictions to cope with the public sector deficit, and several IoTs are struggling. For a sector already coming from behind, this new environment will widen the gap between institutions, leading to greater differentiation, reform and restructuring.

## *Academic Work and the Human Resources/Industrial Relations Environment*

The majority of existing academic staff within the IoT sector have been employed to teach. This is reflected in the contracts and the way IoTs are funded. As demand rises for postgraduate qualifications and research, these traditional concepts of academic work are being challenged. Is research part of the job or additional? What about academic staff who do not possess the requisite skills or who, heretofore, have shown a lack of commitment to undertaking research?

The social partnership/national bargaining model which underpins Ireland's approach to industrial relations has precluded easy or fast changes in contracts or alterations to reflect individual institutional requirements or ambitions. This has made it extremely difficult to offer contracts which may attract and retain highly skilled and experienced academic researchers. In addition, there is no effective career structure; promotion is often on the basis of seniority, and appointment criteria and salary levels cannot be competitively adjusted. The academic trade union is primarily a secondary teachers union, with an 'industrial' rather than 'professional' conception of academic work and approach to its affairs. The universities, in contrast, have few of these difficulties despite the fact that their academic staff are represented by a variety of different trade unions. The key difference would appear to be a shared and embedded understanding of what constitutes academic work, even if there may be disagreement around the edges.

In reality, there has been no easy solution to the industrial relations environment facing the IoTs. Ironically, the current economic environment may be the catalyst because issues concerning academic contracts and performance are now the subject of wider political discussion following the report of the Department of Finance's *Special Group on Public Service Numbers and Expenditure Programmes.* The latter openly challenged the basis of academic and administration contracts across the entire higher education sector, stating that there was scope for greater productivity.

There is little doubt but that academic reform will emerge as a recommendation from the *Strategic Review of Irish Higher Education*, including review of workloads, performance-related pay and promotion, and the introduction of a research assessment-type exercise and teaching and learning surveys. As a comprehensive approach to higher education develops, there may also be greater convergence between types of academic contracts and expectations.

### *Poor Infrastructure and Organisation*

The IoTs were built, in the main, in the 1970s and 1980s, at a time when they performed a traditional vocational function and Ireland was experiencing economic difficulties. Building specifications were more typical of a secondary rather than a higher education environment. While there was an injection of investment into the IoTs in recent years, it remains far below that which has gone into the university sector, much of which was funded through a combination of private philanthropy, competitive government funding and their own resources, including borrowings. Many IoTs have facilities which are not-fit-for-purpose and do not have the resources to independently fund development. Earlier estimates had suggested that an additional investment of €154 million was required up to 2013 to meet the needs for adequate and appropriate research infrastructure. This included equipment and approximately 20,000 $m^2$ of space inclusive of refurbished/converted space (IOTI, 2008, p. 44). In the current economic environment – in which economists are warning that the 'golden years' of Irish higher education is unlikely to return – it is difficult to see how these disparities will be rectified.

Organisationally, the difficulties described about the lack of academic career structures spills over into management. Because IoTs were closely managed by the Department of Education and Science until their recent relocation to the Higher Education Authority, the establishment of appropriate positions, salary, career structure, etc. was never contemplated. Across the sector as a whole there is a need for more strategic leadership and management, especially for the difficult times ahead.

In order to move forward, both of these issues will need to be resolved not least if the IoTs are to remain attractive to staff and students who, given the competitive environment, make choices, inter alia, based on the quality of the facilities and working environment/conditions.

## Conclusion

The rise and growth of the IoT sector was a success story of massification, laying the foundation for Ireland's 'Celtic tiger'. Today, deteriorating public finances present a massive challenge. Ireland's binary system – lauded as a model of differentiation – has become a straightjacket; there is an insufficient critical mass to ensure Ireland's participation in world science and underpin the government's drive for a smart economy. The Bologna Process and the new Irish Qualifications Framework

have harmonised qualifications, thus removing a traditional distinction. Many IoTs are struggling against public preference for university-based qualifications. Recent initiatives had sent out mixed-messages by fostering cross-sectoral collaboration and rewarding research performance/excellence wherever it occurs. These developments have induced new thinking and realignment across the system, challenging the semi-protected position of both universities and IoTs. How can Ireland best promote a diversified HE system while paying homage to regionality, critical mass and excellence? If funding simply rewards existing strengths and experience, it is likely to promote steep vertical differentiation, widening the gap between elite and mass institutions – maintaining the IoTs in a competitive race they can never win and promoting social selectivity by sector. A National Technological University, although promulgated as a means of boosting the status and reputation of the IoTs, is likely without additional investment to concretise differences. On the other hand, if clustering of HEIs – along regional or strategic lines – is encouraged, then the system as a whole might be able to mobilise its capacity beyond individual capability. This could be accomplished by linking funding to policy objectives and institutional mission – recognising a spectrum of strengths across teaching, research and community engagement – thereby encouraging greater horizontal differentiation and opportunities (Sörlin, 2007, pp. 434–435). A nation-wide governance structure might help to ensure greater coordination and cohesion across the sector as a whole. While the latter ideas are gaining growth/support, it is uncertain which direction policy will go.

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