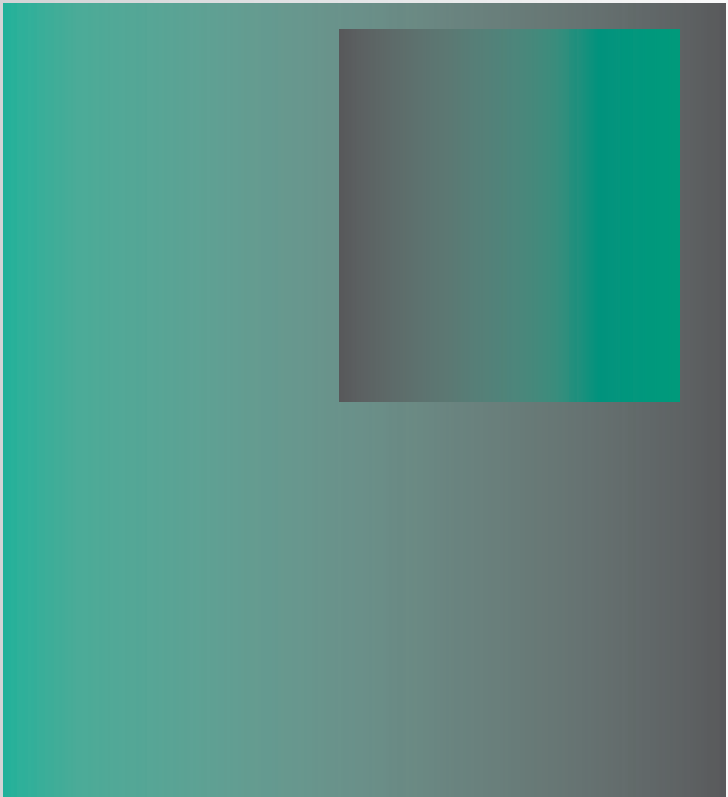
University Research Management

DEVELOPING RESEARCH IN NEW INSTITUTIONS

Ellen Hazelkorn



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Publié en français sous le titre :

La gestion de la recherche universitaire

DÉVELOPPER LA RECHERCHE DANS LES NOUVEAUX ÉTABLISSEMENTS

Foreword

Today, knowledge has become a commodity with enormous geo-political implications. Across the OECD, governments are asking how higher education can be restructured to become a more effective and efficient economic driver. In recent years, countries have conducted wide-ranging reviews of the structure and financing of their higher education systems, or have introduced legislation along similar lines. Governments are anxious to identify and establish world-class institutions. Questions are being asked about which institutions should do research and what kind of research they should do. The responses to these questions carry enormous implications for an institution's academic profile.

While higher education institutions-HEIs have always behaved competitively, the new globalised economy has created a more aggressive environment, with new rules and challenges. Individual institutions and their faculty are coming under increasing pressures to increase expand capacity and capability. In turn, the status and prestige of individual HEIs is being determined by the quality and quantity of this research, with the latter arguably have a disproportionate influence on the former. These metrics are rapidly shaping a new binary divide between third level and fourth level institutions, and between research-rich and research-poor HEIs and nations.

With active support from the OECD Programme on Institutional Management in Higher Education (IMHE) the author, Ellen Hazelkorn, led the international study which addresses these issues. Uniquely, the study places emphasis on three themes. As such, it looks at the macro picture and offers some new insights. First, it focuses attention on the institutional level. It seeks to understand the strategic management and organisational issues and challenges that now arise for higher education. It aims to provide guidance for institutional managers to respond to the increasing pressures required to grow research capability and capacity.

Second, the study raises issues about the relationship between institutional behaviour and government policy. In this regard, the study proposes institutional initiatives for HEIs and policy recommendations for government in order to enhance the participation of all HEIs as partners in a nationally balanced socio-economic strategy.

Third, the study focuses on newer higher educational institutions, which as a group comprise the majority of institutions today. These institutions emerged at a particular historic time to meet specific demands and needs. Many were established or grew up in the post-1970s, often in response to government initiatives for the

massification and democratisation of higher education and to labour market demands and other economic factors.

Twenty-five HEIs from across 17 OECD and non-OECD countries took part in the study: Aalborg Universitet (Aalborg University), Denmark; Arkitektstolen Aarhus (Aarhus School of Architecture), Denmark; Auckland University of Technology, New Zealand; Carleton University, Canada; Coventry University, England; Dublin Institute of Technology, Ireland; Hogeschool Gent, Belgium; Hong Kong Polytechnic University, Hong Kong China; Macquarie University, Australia; Napier University, Scotland; Örebro Universitet (Örebro University), Sweden; RMIT University, Australia; Széchenyi István University, Hungary; Universitat Politècnica de Catalunya (Technical University of Catalonia), Spain; Techniká univerzita v Liberci (Technical University Liberec), Czech Republic; University of the Arts London, England; Unitec, New Zealand; Universidade do Porto, Portugal (University of Porto); Université du Quebec à Chicoutimi (University of Quebec at Chicoutimi), Canada; University of Crete, Greece; Helsingin Yliopisto (University of Helsinki), Finland; University of Tsukuba, Japan; Zapadoceska univerzita v Plzni (University of West Bohemia), Czech Republic; University of Western Sydney, Australia; Victoria University, Australia. With few exceptions, these are public institutions, either established or reconstituted since 1970. They have varying research histories and experiences but all award undergraduate and postgraduate qualifications, while a few also offer further education.

Acknowledgements. *This study has been generously supported through a sabbatical from the Dublin Institute of Technology, Ireland and by the OECD Programme for Institutional Management in Higher Education. The author thanks all the participants in the study and their institutions, and members of the New Generations University Group and the Modern University Group for their many helpful comments. Special gratitude is due to Fumi Kitagawa and John Donovan for helping transcribe the data. The author also had the opportunity to benefit from conversations with many people and comments on an earlier draft: Katy Bindon, Andrew Codling, Helen Connell, Burton Clark, John Donovan, Neil Furlong, David Gillingham, Declan Glynn, Brendan Goldsmith, Gar Jones, Jan Karlsson, Bob Kavanagh, Noel Lindsey, Guy Neave, Brian O'Neill, Malcolm Skilbeck, Jacqueline Smith, and Richard Yelland, albeit all errors and omissions are hers.*

The ***Programme on Institutional Management in Higher Education (IMHE)*** *started in 1969 as an activity of the OECD's newly established Centre for Educational Research and Innovation (CERI). In November 1972, the OECD Council decided that the Programme would operate as an independent decentralised project and authorised the Secretary-General to administer it. Responsibility for its supervision was assigned to a Directing Group of representatives of governments and institutions participating in the Programme. Since 1972, the Council has periodically extended this arrangement; the latest renewal now expires on 31st December 2006.*

The main objectives of the Programme are as follows:

- *to promote, through research, training and information exchange, greater professionalism in the management of institutions of higher education; and*
- *to facilitate a wider dissemination of practical management methods and approaches.*

Table of Contents

List of boxes

List of tables

List of figures

ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Executive Summary

This international study investigates the processes and strategies being pursued by new HEIs across OECD and non-OECD countries to develop research. It has three objectives: 1) to provide guidance for institutional decision-making about the strategic management and organisational issues and challenges required to grow research capability and capacity; 2) to make recommendations for institutions and policymakers to enhance the participation of all higher education institutions (HEIs) as partners in a nationally balanced socio-economic strategy; and 3) to focus specifically on higher education institutions established post-1970, henceforth referred to as new HEIs.

The book identifies some of the main issues and challenges facing new HEIs, and discusses how they are being addressed. A number of key questions are pertinent to this investigation:

- To what extent has the institution identified research priorities or responded to national priorities? What structures, policies, procedures, resources and strategies has the institution used/introduced to help develop and encourage the growth of a research environment and profile?
- How does the institution balance the scholarship of teaching with the scholarship of research? How has the institution balanced the different demands of basic vs. applied research, individual vs. collaborative research, department vs. institution research priorities, postgraduate vs. staff research, etc.? Does the institution have a formal model for allocating resources internally between various research activities?
- What role have research centres or units played in promoting/developing research? Has the institution an affiliation to a technology or business park? To what extent have these centres or links played a role in the research and development strategy?
- To what extent have professional, personnel, industrial relations or human relations factors impacted on the research processes, procedures, strategies and/or structures? To what extent has the institution introduced or used personnel or incentive policies or procedures? What other (unofficial) practices have been adopted, and how have they worked? How has the institution coped with tensions stemming from the development of the research strategy?

- To what extent has government policy or strategy facilitated or hindered the development of an institution's research strategy or ambitions? To what extent have existing collaborative partnerships or networks helped or hindered the institution's entry into research at a national level?
- To what extent has the institution learned from, adopted or adapted the experiences of other institutions? What particular difficulties has the institution experienced/faced in developing and encouraging research?
- To what extent do new HEIs share a common set of issues that transcend national boundaries or circumstance because of their status as late-developers and newcomers? If Governments desire a greater contribution from higher education to economic and social development, then what actions and policy instruments would be helpful to this process?

Chapter 1 offers an overview of higher education in the post-WW2 decades and in particular looks at the growth of tertiary participation through a mixture of new and (expanded) old institutions. It identifies the global and national challenges which face higher education institutions in order to learn how new HEIs, in particular, are responding to and share their "good practice" experiences. Chapters 2 to 5 provide an in-depth analysis of the many issues confronting the institutions that took part in the study (henceforth called participant HEIs), focusing on the strategic, organisational and managerial choices they are making. The study concludes that the outcome depends on many factors, including decisions taken by institutions themselves but also by government. Drawing on case studies, Chapter 7 offers recommendations for higher education managers while Chapter 8 focuses on policy recommendations. There is a need to bridge the gap between government policy and institutional aspirations and strategies.

New higher education institutions

Higher education has long been recognised as contributing to the social, cultural and intellectual life of society by improving the level of human capital. In recent years, national competition for greater shares of the global economy has led governments around the world to think much more strategically about the economic significance of academic knowledge production and dissemination. Many governments are currently reviewing the structure of their higher educational system, institutional missions and funding. Their focus is on resource allocation for research and development, the formation of human capital through education and training, and the necessary management and institutional arrangements thereof. In turn, the status and prestige of individual institutions is being determined by the quality and quantity of their research. HEIs are reorganising themselves to meet these new challenges.

While all institutions are under pressure to expand their academic output within tighter financial constraints and calls for greater accountability, new HEIs are particularly vulnerable. Many new HEIs were established or grew up in the post-1970s, in response to government initiatives for the massification and democratisation of higher education, labour market demands and other socio-economic factors. Over the years, advances and innovation in knowledge and the professionalisation of disciplines compelled institutions to offer postgraduate programmes and strengthen their research capabilities. Today, they offer comprehensive higher education underpinned by growing expertise in research, development and consultancy.

To some observers, these developments represent a breakdown in national higher education systems through a process of convergence or dedifferentiation – the tendency towards uniformity and decreasing levels of diversity. Newer institutions are often accused of adopting the accoutrements of traditional universities by actively copying their research profile and teaching programmes. Governments have reacted differently; some have created a unitary university system while others have chosen to retain the binary divide as the key policy instrument determining differentiation and diversity. In either case, many new HEIs believe they face "barriers to entry", experiencing all the disadvantages of starting late from a poor base, and competing against the strength of established providers who have built up a firm relationship with policy makers and dominant groups. Tensions have arisen between institutional mission and government policy.

Research strategy, management and organisation

Participant HEIs have identified the need to strengthen research capacity and capability as critical to their institutional mission and to their survival as an institution. Accordingly, all participant HEIs are busy devising a research strategy in order to grow research activity and to organisationally support and manage the research enterprise within the institution. While research is dependent upon the work of individuals, research activity is now a serious business for both faculty and their institutions. This is reflected in institutional priority setting activity, the establishment of a research office and graduate school, and an emphasis on sustainable research groups operating through centres and in partnerships with other institutions or organisations.

Given their academic and pedagogical focus and the expertise of their faculty, new HEIs are embracing a (non-hierarchical) continuum of activity, including: traditional academic investigation (whether basic, applied or strategic), professional and creative practice, and knowledge and technology transfer. They are questioning traditional definitions of research and scholarship, and

the metrics used in national and supra-national evaluation systems. Despite these concerns, institutional priorities strongly reflect national priorities and funding agency criteria. Strong preference is given to applied research, followed closely by research in domains particular to the HEI or region to enable them to develop a competitive advantage. Each institution is working out its own combination of research and scholarship along a spectrum from extremely research-led to extremely-teaching led.

Developing research is not without difficulty. Participating HEIs feel public or government funding is often "politically and historically decided" or weighted in favour of established universities and traditional academic research activity and outputs. Without alternative funding sources and greater autonomy, they feel vulnerable to priorities set by others. Identification of research priorities and the introduction of research allocation models have given rise to tension. Several participants mentioned morale problems while others have experienced industrial relations problems. In response, participant HEIs are developing a human resources strategy as an essential ingredient of their overall research strategy.

New HEIs as late-developers

Evidence from the case studies uncovers a common set of difficulties which act as "barriers to entry" inhibiting institutional progress and success. These factors include their relatively poor resource base and scale of production/activity and lack of undemonstrated capacity. Participants believe that government policy intentionally or unintentionally favours established institutions, reinforcing this imbalance. Their experience suggests that difficulties impeding the growth of research at new HEIs are not likely to be overcome by conventional means because capacity and capability take considerable time to build. Without active and selective use of policy instruments, new HEIs will find it increasingly difficult if not impossible to overcome problems of late development because "the pecking order of research activities is not easy to change". This has implications for government efforts to move beyond the elite phase of higher education and to widen access to the knowledge society. There are lessons for institutions and governments.

Recommendations for institutions and government

Today, society is demanding more from higher education. In turn, the agenda of most HEIs has moved on from a desire to simply increase the general education level of the population and the output of scientific research; there is now a greater concern to harness higher education and research to specific

economic and social objectives. The study suggests it will be difficult for government to reach its targets without fully embracing new HEIs within a nationally balanced socio-economic plan as the traditional university sector alone is neither capable nor appropriate. Success, however, depends on change within institutions and within government.

All participant HEIs are making difficult choices, learning how public sector organisation need to operate within a globally competitive market. With some exceptions, they do not wish to become a research-intensive institution but they do desire to intensify their research. Drawing on the case studies, institutional strategies embrace the following characteristics:

- Investment strategy and realignment of budgets.
- Appropriate organisational structures, including formation of a graduate school.
- Performance indicators to benchmark against international standards and shape priorities.
- Priority-setting to preferentially support internationally competitive or niche fields.
- Research clusters and centres capable of winning external funding.
- Resource allocation and recruitment aligned to research priorities;
- Strategic alliances with other HEIs or industrial Partners.
- Endorsement of research strategy by senior management and boards of trustees.
- Wider definition of scholarship to recognise variety of faculty ability.

To enable new HEIs to meet their objectives, government actions and policy instruments are critical to this process. In this way, government could facilitate research and innovation across all HEIs while also supporting its objectives for diverse institutional missions. Based on institutional experiences, policy recommendations are grouped under three objectives.

- *Widen Access to the Knowledge Society*: remove legislative constraints and establish an investment fund as part of regional/spatial strategy.
- *Overcome Late-development*: provide "head start" or "catch-up" grants to build infrastructure, *e.g.* laboratories and research libraries, and strengthen management and leadership capabilities.
- *Benchmark to Support Diversity*: provide baseline research funding as part of negotiated contract between government and HEI, re-examine definitions of research and criteria/rules for competitive research, and recognise and reward improvement and potential.

ISBN 92-64-00694-X
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Developing Research in New Institutions

Chapter 1

Introduction

1.1. The new higher education context

It is widely accepted that higher education in the 21st century across the OECD is operating in a changed and challenging environment. The emergence of a global knowledge-based or information society is dramatically transforming the modes of production and social organisation of advanced societies. Knowledge and the creation of new knowledge are now perceived as the essential generators of material benefit for individuals and nations in much the same way that agriculture, manufacturing or capital were previously. There is a more clear understanding of the innovation process with its dynamic links between the production of new knowledge, knowledge transfer and economic performance; knowledge has become a commodity. Not surprising in this scenario, national governments are now purposively attaching much greater strategic importance to capacity-building decisions and investment. Policy focus is increasingly on resource allocation for research and development, the formation of human/intellectual capital through education and training, the necessary management and institutional arrangements (intellectual property and producer services), and the ability to "capture and apply these intellectual products" (Turpin *et al*., 1996) Indeed, this strategic focus and resulting expenditure are now seen as critical to national geo-political positioning. Today, the production and dissemination of knowledge, often referred to as research and development, is viewed as a public asset.

This changed perception of the role and importance of higher education has gone hand-in-hand with calls for greater institutional accountability and responsibility. Once perceived as "the training ground for professionals", universities are increasingly being "treated more like other organisations and professionals more like workers" (Slaughter and Leslie, 1997). This has meant more emphasis on and questioning of institutional mission, outputs, and value for money. However, this re-evaluation is occurring at a time when government and public support for the financial underpinning of higher education – and other public services – has waned. Hence, there is a growing gap between increasing demands and diminishing funds. For the first time, higher education institutions are being asked to justify their existence and funding levels – "to grapple with the fact that we are not an end, we are a means […] through which our society educates itself and shapes itself […]" (Australian White Paper quoted in Adams, 2000). There is a new emphasis on

market conditions, competition, the adoption of business practices, and the birth of the "entrepreneurial university" with its emphasis on alternative funding sources.

Government is not the only group asking questions. Students, and their parents, are also making more demands. In proportion to education's significance for social and occupational mobility, the value of educational attainment and competence has risen to unprecedented levels. The gap between the average earnings of degree graduates and the rest of the population is widening as a result of credentialism and the disappearance of well-paid (especially unionised) manual jobs in favour of more poorly paid service work (Calhoun, 2000). At the same time, sophisticated labour market requirements for enhanced qualifications have steadily transformed elite higher education into mass universal and compulsory undergraduate education, while specialisation and professionalisation are increasingly elements of postgraduate programmes. In this environment, it is not surprising that students want assurances that the educational quality, for which they are paying (in increasing instances) and upon which their future knowledge-wealth lies, is guaranteed. League tables have entered the popular vocabulary, and inter-institutional rivalry is prevalent.

As higher education institutions have reorganised and restructured themselves to meet these new challenges, the academy has also come under pressure. The content of academic work, the role of faculty,[1] the balance between teaching, research and service responsibilities, are, arguably, being restructured, reconfigured and redefined. For academics within traditional universities, pressures for accountability and social relevance are challenging what many have valued as "their autonomy" and "academic freedom". Faculty within newer colleges and institutes have come under different pressures, most notably to spend more time conducting research. For both groups, participation in research teams, research output and earned research income are now critical metrics for academic recruitment and promotion, and the privileges and opportunities that flow.

> "Since most faculty teach, and many faculty perform public service, but fewer win competitive research funds from government or industry, research is the activity that differentiates among and within universities" (Slaughter and Leslie, 1997).

These factors are putting pressure on the Humboltian teaching and research nexus. For some, current conditions favour separate institutions and academic career paths, while others argue that to meet societal needs there must be greater

> "institutional commitment to ensuring greater linkages between teaching and research activity. Reputations for teaching and research are

also becoming intertwined as universities position themselves competitively and define their particular and distinctive approaches to learning" (Zubrick, Reid and Rossiter, 2001).

In the midst of these debates, all faculty are coming under pressure from students, often perceived as clients, consumers or customers. Accordingly, intra-institutional tensions have surfaced wounding traditional collegial relationships.

If the last century was arguably focused on massification and democratisation of education within a primarily domestic (even local) context, the 21st century is about the global. The global economy, enabled by new technology, and especially the internet, has dramatically transformed the way many of us go about our daily lives, do business, and enjoy leisure. Education, especially higher education, no longer operates within its own boundaries and HEIs are in global competition with each other. Students and faculty move physically *and virtually* around the world, enrolling at different universities and colleges, applying for jobs, attending conferences, exchanging ideas and conducting research. As a result, many international partnerships and strategic alliances are emerging, facilitated and encouraged by government and supranational organisations (*e.g.* EU, OECD, UNESCO), funding and other policy instruments. A key factor driving these initiatives is the necessity to enhance institutional (and national) presence based on the realisation that knowledge generation and knowledge development are no longer possible either within one institution or one state. For some higher education institutions, the objective is to develop strength through size (research output and student numbers) while for others the emphasis is strength through niche or mission. Either way, inevitably there will be winners and losers in this process.

These powerful and parallel forces are influencing and setting the agenda for higher education, influencing in a very directive way how governments and individual institutions are organising and managing themselves. More critically, these forces are helping shape and reshape government and institutional strategies about higher educational systems and the role that individual institutions play within their national and the global system. In turn, the contribution and prestige of nations and HEIs is being determined more and more by the quality and quantity of their research. As a result, HEIs are considered essential institutions within OECD societies and economies – a key component of national economic strategy and no longer simply an element of social expenditure or socio-cultural institutions for the elite. As economic and geo-political concerns move up the national agenda, research capacity and capability has become the formative indicator for higher education, arguably playing a critical role in drawing a new fault-line – or binary divide – within and across HEIs and the educational marketplace. In turn, if HEIs are to fulfil their mission, and contribute more effectively and efficiently to economic growth, innovation, and human and intellectual

capital, then research capacity and capability are no longer optional extras. Accordingly, the task of growing and managing research has become a focus for both governments and HEIs. In recent years, attention has turned to the processes and strategies that can maximize or grow research capacity.

Governments are considering a range of responses to this new environment. Most notable is that almost all governments across the OECD are currently reviewing the structure of their higher educational system, institutional missions and funding (Hazelkorn, 2004). Concerned to "expand their higher education systems beyond the elite phase of development", they are looking at how the different (higher and further) educational institutions fit within the system and their relationship to each other (Parry, 2003). Governments, policy-makers and some universities are also beginning to review the teaching-research nexus. Driven in part by considerations of cost and a sense of urgency to expand output, questions are being asked about whether research activity and funding should be spread equitably across all HEIs or whether it makes more sense that only a few concentrate on research.

> "We need to identify much more clearly the great research universities, the outstanding teaching universities and those that make a dynamic, dramatic contribution to their regional and local economies. The funding system flows from the conclusions" (Clarke, UK Secretary of State for Education, 2002).
>
> "To what extent do scholarship, teaching and research [...] mark a university [...]? Should Australia aspire to have one or two universities ranked in the world's top fifty [...]? Can funding arrangements appropriate to further strengthening the role of smaller regional universities enable innovation and specialisation within the sector?" (Brendan Nelson, Australian Minister for Education, Science and Training, 2002)

Those favouring such an approach argue that only those institutions with a proven track record or with the potential to be world leaders or centres of excellence should continue to be funded for research, while the rest should focus on teaching and training. Proponents argue this policy would favour greater diversity, creating a comprehensive system with a combination of elite and mass HEIs, or research-intensive and teaching-intensive institutions, linked via knowledge transfer networks or regional federations. Some institutions would act as (undergraduate) feeder institutions to others. There are many implications that could arise from such re-structuring, including the impact on the type and level of qualifications offered, conditions of academic work, intra- and inter-institutional diversity, mission differentiation, and social and status stratification. Considerations for funding would follow. (For criticism of this approach, see Chapter 7.)

Underpinning higher education's role as a key economic driver, governments are also placing greater focus on science and technology disciplines, on the balance between basic and applied research, on knowledge and technology transfer activities, and intellectual property. Institutions able to match research priorities with national priorities, as determined by variations of technology foresight studies, are well rewarded. HEIs are encouraged to be more entrepreneurial, and to either compete for funding and/or exploit other, preferably commercial, opportunities. Other changes being contemplated are in the relationship between government and universities, and specifically issues of institutional governance, financial management and funding. There is some trade-off between autonomy and accountability, with governments anxious that HEIs respond much more quickly and directly to national goals. Accordingly, some governments are using formulaic methods as a policy lever, tying core funding more directly to measurable outcomes, such as widening access, number of students graduating rather than being admitted, and research outputs. Despite varying national contexts and circumstances, and political party in power, there is a remarkable similarity in the approach being adopted by governments across the OECD.

How are higher education institutions responding to these challenges and trying to shape their future? Like governments, national and institutional contexts can be significant. Moreover, higher education institutions are neither a cohesive nor homogeneous group. A crude typology demonstrates great diversity by categorizing HEIs according to: mission and strategic focus, governance, accreditation status, funding model, level and number of qualifications awarded, range of disciplines offered, etc. The most comprehensive typology is the US Carnegie Classification System, developed in 1971 under the leadership of Clark Kerr and currently under review, which describes ten categories of institutions and characteristics of students and faculty members. Another way of distinguishing between institutions is through a simple but formal binary system; for example, Ireland's system differentiates two categories: universities which deliver a traditional education, with faculty expected to engage with research and academic values, and Institutes of Technology which are vocationally focused originally on sub-degree programmes with faculty expected to concentrate on the needs of the workplace, course relevance and community links. Over time classification or stratification models have provoked debate not least because, as the Carnegie Foundation states, "many people perceive the Classification as a ranking system" (Carnegie Foundation; McCormick, 2000) influencing students, employers, the wider community and policymakers. A hierarchical system has developed which, reinforced by today's geo-political pressures to prioritise research capacity and capability has had the effect of rendering "different activities differently valued, such as research over teaching and

sciences over humanities" (Gumport, 2000). The result is to "encourage a sense of failure in many institutions rather than success" (Shattock, 1996). (For further discussion, see 6.2).

Because these classification systems were devised for particular national purposes, there is an inherent danger transposing them into, or for other purposes. Notwithstanding this caveat, a key feature missed by both typologies is the impact of global competitive pressures on the classification and status of institutions; for example, "it is possible to envisage a larger and still more varied array of providers, both public and private, national and international, global and corporate, campus-based and virtual" (Skilbeck, 2003, 2001). In addition, both systems find it difficult to recognise diversity within institutions, where for example, an institution may straddle the line between categories – specialist art schools which also award masters degrees and conduct research or dual-sector institutions of Ireland, Australia, Africa, and Canada which offer both further and higher educational programmes.

While there may be little argument with the view that "no sensible structure of higher education can forgo some sense of a caste structure", the question is the extent to which a rigid division of labour between universities, and between universities and further educational institutions, along with a corresponding lack of multiple matriculation paths, reinforces institutional stasis or social stratification (Douglass, 2004). Thus, typology systems have a tendency to ignore institutional development or change in institutional status due to government policy, historical trends, responsiveness to the economic or regional environment or labour market, or mission or academic drift – different circumstances which are often subsumed into the latter, single explanation (Meek and O'Neill, 1996). Indeed, institutional change has occurred for many reasons, including massification, globalisation, harmonisation, and advancements in knowledge. For example;

> "Doctoral programmes […] once rare or non-existent in many universities have expanded to their present scale only in recent decades and research as a major component of universities is a relatively modern phenomenon" (Skilbeck, 2003).

In other words, an unintended consequence of classification systems is that they effectively present (national) institutions and the environment in which they operate to be at best stable and at worst stagnate. Yet, recognising institutional diversity is critical to understanding the challenges faced by government and HEIs by the growing importance of research and intellectual capital.

1.2. Approach to the report

By focusing on new HEIs, this book provides a unique profile of the experiences of a group of institutions which has hitherto been unidentified

and unexplored. While all HEIs are finding the current economic and political environment at best challenging and at worst difficult, established universities are likely to be better placed to exploit the demands of the knowledge competitive global environment and meet government objectives. To some extent this is due to the vagaries of history – they are older, with origins or maturation in an arguably less competitive and more benign policy environment. These factors have enabled them to build-up a strong position, resource base and credentials in key domains, in addition to establishing a close relationship with dominant policymakers and often acting as a cartel. In contrast, newer institutions are *ipso facto* late-developers or newcomers. Despite institutional and national differences, they share many common experiences with respect to funding, infrastructure, human resources and research capacity, which equate to "barriers-to-entry". This combination of factors makes this a very interesting group to study. Moreover, given the drive for massification and democratisation of higher education around the world, there are experiences to be shared and lessons to be learned not only for similar institutions but also for developing countries, the latter of which, it could be argued, are effectively late-developers or newcomers.

Given the juxtaposition between the increasingly competitive and geo-political significance of higher education and research, and the under-developed profile of many new HEIs, this study seeks to examine the processes and strategies being devised by new HEIs to grow research. It is fundamentally about institutional mission, strategy, organisation and management, and the way these elements interact with each other. In contrast to other studies which focus on broader macro issues of research management, policy and national science systems, this study looks at the micro experience. In particular, it seeks to understand research management and organisational strategy within institutions, and how university operations are actually carried out.

Throughout the book, prominence has been placed on letting the institutions speak for themselves about the factors that affect their ability to grow research capacity and capability. By identifying issues and challenges faced by a particular group of institutions, the study gives voice to a particular set of concerns. In this way, it aims to provide the basis for institutional decision-making and government policy-making. As two participants stated: It is important to "keep our research growing without losing momentum and secondly how we should get organised." Learning from other "university models of good practice in research nationally and internationally" can be helpful.

The study is the result of an investigation during 2001-2002 involving 25 higher education institutions across 17 OECD and non-OECD countries: Australia, Belgium, Canada, Czech Republic, Denmark, England, Finland,

Greece, Hong Kong/China, Hungary, Ireland, Japan, New Zealand, Portugal, Scotland, Spain and Sweden.[2] Participants were contacted via several methods, including the Directing Group of the OECD's Programme for Institutional Management in Higher Education. Inclusion was based solely on the fact that the institutions met the general parameters of the study – *i.e.* they had been established circa. 1970 and were seeking to develop a research strategy. Because research is now a predominant concern of higher education management everywhere, several older HEIs asked to participate. Participants completed a comprehensive questionnaire or case study (see Annex B) which was sub-divided into five sections. Chapters in this book map these sections:

- Historical background, policies, and strategies of institutional research activity (Chapters 2 and 3).
- Mechanisms and criteria with regard to priority setting (Chapter 4).
- Organisation and funding levels (Chapter 4).
- Human resources (Chapter 5).
- Challenges faced by new and emerging higher education institutions (Chapter 6).
- Challenges faced by government are discussed in Chapter 7 along with recommendations.

The case study was completed by either the Vice-President or Pro-Vice Chancellor for Research (or equivalent) or the Head of Research within each institution. A round-table seminar was convened in Dublin, hosted by the Dublin Institute of Technology, in March 2001; fourteen participants attended the two day discussion which followed the format of the case study. The round-table seminar enabled participants to share experiences, and provided further illustration of the various issues pursued by the formal questionnaire. Each session was led by one of the participants, with responses from others, so everyone had a chance to make a presentation. During 2001, nine institutions were visited; a series of meetings was arranged with the Vice-President or Pro-Vice Chancellor for Research or the Head of Research, and with active researchers and, in some instances, research students. Given the geographic spread of the study, the choice of institutions visited coincided with other travel arrangements.

The study uses both qualitative case study and quantitative methodologies. Conducting an international comparative study involving so many countries with their inherent differences is far from direct and unproblematic. The case study methodology is often criticized for its lack of rigour and generalization from a small sample (Yin, 1994). Individual experiences involve several interrelated factors often unique to the institution, society or context and comparisons can be problematic. Yet, such

studies can also contribute uniquely to our knowledge of individual, organisational, social and political phenomena by enabling us to generalize from specific experiences. In this instance, it can provide an insight into institutional decision-making, enabling lessons to be learned and shared about strategies and processes that have worked well or badly.

Comments by participating institutions are placed in italics throughout in order to highlight their significance and distinguish them from academic or other commentary, and to protect their confidentiality. The data used in the Tables and Figures is also drawn directly from information supplied by participants of the study. There are some caveats to this data. Trans-national and intercultural studies are complex not least because linguistic interpretations may influence how different respondents answer particular questions. For example, some questions asked for specific data while others asked institutions to rank their views or actions. Respondents interpreted the request to rank choices differently; to get around this problem, some tables present answers only according to first and second preferences. In other instances, individual HEIs may not have replied to a particular question or their response may have been insufficient to be included. Hence, the number of HEIs included in each table or Figure may vary. Thus, percentages are used rather than the actual number of replies. Nevertheless, the emphasis throughout is on presenting a picture of trends, helping to illustrate what is happening across a group of higher education institutions rather than telling individual institutional stories.

Another difficulty with international comparisons is the use and definition of terminology. In acknowledgement that the boundaries between institutions are blurred and changing, the generic term Higher Education Institution or HEI rather than "university" has been widely used throughout. Likewise, for simplicity, the North American word "faculty" has been used to refer to academic staff, while department (and sometimes college) has been used to generically denote an academic unit regardless of whether it is actually a faculty (in the European sense), school or department. Institutional and individual identity has, as promised, been protected. The words "participating" or "participant HEIs" is used to refer to the group of 25 HEIs. Finally, this report brings together preliminary comments and data already published (Hazelkorn, 2002, 2003, 2004).[3]

Notes

1. For consistency, the word "faculty" is being used throughout to refer to all categories of academic staff.
2. Scotland and England are considered separately because of differences within the way higher education is treated within the United Kingdom.

3. That data was based on reports by 20 HEIs; Tables and Gs in this book now comprise 23 HEIs – two did not complete these questions – which accounts for some slight variation in the results.

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 2

New Higher Education Institutions

2.1. Problematising new HEIs

There is little dispute amongst policy-makers or in the literature that the post-World War Two (WW2) post-Sputnik era ushered in a period of rapid and tremendous change in higher education structures, provisions and demand across almost all OECD countries. Indeed, the import of these changes has been marked by terms such as massification, democratisation, diversification, harmonisation, internationalisation and globalisation. Several factors are pointed to, including the economic and demographic boom, the significance of scientific discovery, the heightened importance of educational attainment and career opportunity, the birth and subdivision of academic disciplines and the professionalisation of academic careers. A combination of domestic and external pressures and actors, including the active engagement of supra-national agencies such as the EEC/EU, OECD, UNESCO and World Bank have played a part in fostering these changes. Between WW2 and the late 1970s, the number and type of students seeking higher education accelerated rapidly alongside the number of academic and support staff, and public investment.

The history of this rapid growth in the range and type of educational opportunities and institutions has been well documented. Issues of social equity and access were however underpinned by a growing disappointment with what was perceived as the structural and organisational inertia of universities. The latter seemed unable or uninterested in responding to economic and technological change and societal demand for greater skills. Hence, non-universities, polytechnics, fachhochschulen, advanced colleges of education, institutes of technology, community colleges, etc. as well as *ab initio* universities emerged to cater for a wider range of socio-economic groups and educational requirements. They emphasised particular skills and training to meet employment needs generated primarily by practical skills and vocational orientation.

With their birth, policymakers and educational managers began to talk of a higher education *system*. Universities offered advanced post-graduate study and conducted research, answerable to a worldwide academic community; teaching focused on the abstract and was less concerned with immediate needs. In contrast, non-university institutions catered variously for vocational or undergraduate needs, often with a regional or community bias; their

emphasis was on training, and faculty were expected to concentrate on specific workplace needs. The difference was:

> "[…] not so much inherent as secured by fiat, since colleges were not funded for research and only after some time, were permitted to enrol a few coursework masters students. Staff in federal and state higher education agencies were constantly trying to stem the college tide […] Then there was the artificiality of the divide between technological and trade courses […]" (Meek and O'Neill, 1996).

As part of an integrated national system, (elite) universities and (mass) colleges and institutions enhanced social mobility, met the needs of the labour market, and offered opportunities for innovation. Its comprehensiveness provided opportunities for most students. Some transferability between sectors was permitted, but the awarding of advanced degrees and the title "university" were strictly monitored. The binary divide, whether *de jure* or *de facto*, was enforced.

By the late 1970s, however, strains and countervailing pressures began to appear as the social and economic environment in which higher education operated began to change. The 1972 UK White Paper described the new pressures: "The ideals of the 1960s that education should develop individual potential were augmented by demands for economically useful skills and industrial relevance" (Pratt, 1997). These views were not contrary to those of many new HEIs. They had been established to develop a form of higher education relevant to national economic and industrial needs, and to do so at lower costs than universities. They were committed to growth at a time when many traditional universities had opted for consolidation. Ministers spoke of their "track record in meeting demand" via practice-based learning, of courses "characteristically related to the needs of industry and commerce" and "bringing the benefits of higher education to many who would not otherwise have enjoyed them" (Pratt, 1997). While these were pioneering features in the 1970s and 1980s, by the 1990s, they were "increasingly attractive". Arguments are often made that the new HEIs sought to copy academic activities of universities, but the adverse is also true. Universities began to develop a strong professional focus in many of their programmes; the most notable has been the rise of the business school. The dual or binary system with its sharp boundaries between elite and mass education, vocational and academic, technological and traditional, and undergraduate and (post)graduate began to come under scrutiny and strain, and in some instances break down or become altered.

Innovative fields of knowledge and new courses, such as business and management, applied sciences, nursing and social care, built environment, tourism, catering and food science/nutrition, the media, and the creative arts

emerged and gradually became professionalised, fuelled by, and in turn fuelling, a rapidly expanding academic literature. Initially, most of the newer institutions offered certificates and diplomas. By the late 1970s, in line with academic and discipline developments, "most were issuing degrees, and over the following decade began to be involved with postgraduate degrees and with research" (Everett and Entrekin, 1994). In reality, the massification of undergraduate education "increased the percentage of those equipped to attend postgraduate study and the desire to do so" (Reisman, 1996). In response, new HEIs "found it necessary to strengthen their research capabilities" (Turpin *et al.*, 1996). Research had been seen as one of the legitimate and defining characteristics of universities for which they had a separate budget line, but over time research funds and opportunities became more widely available. While the amounts were modest, a new principle was established and research soon became an important activity in new HEIs also (Skoie, 2000). Many charted significant careers in applied or industrially relevant research and consultancy, and began to win a sizeable share of government and industrial funding. The original intention had been to recruit people not involved in research. However, as faculty became more involved in advanced level teaching, they began to spend more time on research and compete for research funding. Partnerships were formed with business and other public sector organisations in support of both applied and long-term R&D relationships. Hence, according to Pratt (1997), research within UK polytechnics succeeded, "in the way intended, not just in the success rate of research students, the topics they study and their relation to industrial purpose, or to the extent of external funding [...] but as a support for the teaching base".

Across the OECD, governments responded differently to the emergent tensions between the higher education system and socio-economic needs. For example, both the Australian and UK governments opted to create a unified higher education system, in 1987 and 1992 respectively. Eighteen "newer" universities were established in Australia between 1987 and 1996, and 41 UK institutions became universities in 1992. The change in their role and status meant that faculty previously in teaching-only positions were now expected to engage in research. In Australia, many of the former Colleges of Advanced Education (CAE) had little experience of research. This did not prevent the newcomers developing specific research niches and shifting resources to develop research centres which often cut across traditional departmental or disciplinary boundaries in an effort to join the competition. Recognising historic and institutional unevenness, the Australian government resisted cries to give preferential research funding to established, pre-1987 universities, by establishing a five year Research Infrastructure programme (Mechanism B). Moreover, the Report of the Committee to Review Higher Education Research Policy (known as the "Smith Review Committee") (1989) argued that market forces would be used to enforce diversity in academic programmes and research

activities: "demonstrated capacity" would be the determinant. Critics argued that despite transforming CAEs into universities and encouraging mergers between other institutions to form universities, Australian universities were:

> "[…] not all equal, neither in terms of their perceived 'status' nor in terms of their infrastructure or indeed in the research credentials of their staff [faculty]. This imbalance was grudgingly recognised by [government but it] […] could not […] overcome decades of infrastructure neglect […]. insufficient duration or level of funding to make substantial difference […]" (Deane and Jones, 2001).

The UK experience is similar. The relabelling of polytechnics in 1992 changed the higher education landscape overnight. Polytechnics were entitled to become universities, but by doing so they were also to be funded according to the same criteria as long-established universities. They were not offered additional funds to enhance either their teaching or research and had to compete directly with the other universities for public resources.

> "Most [polytechnics] *look* like universities; environmentally many remain a quantum leap away from a university campus culture. Their students are taught, *pro rata*, on half the budget accorded to their next door neighbour university" (Price, 1996).

Some critics argue that this process of creating a unitary university system effectively deregulated the higher education sector, using market forces as a means of exposing all institutions, including the established universities, to greater competition in recruitment, research and teaching activities (Parry, 2001). Price (1996) suggests however that the "binary policy had served its primary purpose" and it now suited the government's desire to "squeeze university costs in the drive towards mass higher education". Over time, clear differences have emerged between teaching and research universities. In both the United Kingdom and Australia, the more established institutions, with historically accumulated research resources, experience and skills have tended to dominate research funding output and finances, with some notable exceptions.

In contrast, the Irish government chose to retain the binary divide as the key policy instrument determining differentiation and diversity. The two higher education sectors, universities and institutes of technology, continue to exist side by side, but with different funding models, governance structures, missions, conditions of employment, etc. The latter institutions "soon found themselves called upon to cater increasingly for third-level demand" (Coolahan, 1981). Two intermediate institutional-types appeared during this period for which different solutions were found; the two National Institutes of Higher Education, originally conceived as the predecessors to today's technological universities, formally became universities (University of

Limerick and Dublin City University) in 1989, while the Dublin Institute of Technology (1992), with doctoral-awarding authority, has remained uniquely positioned on the binary fence (Duff, Hegarty and Hussey, 2000; White 2001). Demands of the labour market and students for enhanced qualifications have, however, induced tensions similar to those experienced by the Australian and UK unitary systems, causing aspects of the national higher education system and the role that different institutions play to come under scrutiny. Similarly, critics have argued that over time "the division has proved very difficult to maintain [...]" (STI/OECD, 1999).

To some observers, these developments represent a breakdown in national higher education systems via a process of convergence or dedifferentiation – the tendency towards uniformity and decreasing levels of diversity (Skilbeck, 2001). Newer institutions have been accused of adopting the accoutrements of traditional universities, actively copying their research profile and teaching programmes, and engaging in "academic" or "mission" drift. Skoie (2000) refers to the "contagious effect" or the "tendency to ignore the real requirements of a diversified education and the practical parts of such education in particular". Terms such as "mockers and mocked", "institutional chameleons" and pseudo-universities are also used. This process is particularly acute when the "nature, number and distribution of organisations at any given time is dependent on resource availability and on competition within and between different species of organisations". Rather than develop distinctive profiles, Huisman (1998) claims that:

> "[...] institutions lower in prestige try to emulate higher status institutions (often the status of the university). Examples can be found in the history of the four year public colleges in the US and in the technical colleges in England."

Becher and Trowler (2001) also describe "lower status...[institutions] following higher status ones just as the snake's body follows its head". Within this institutional hierarchy, research is perceived by government and the public as more highly valued than teaching and newer institutions as second-class citizens. Convergence towards a single model of university, "is the result of political competition between academic professionals and external lay groups, and government policies that structures these processes of competition" (Rhoades, 1998). Thus, in this set of arguments, institutions which seek to develop their research capacity and capability are seen as engaging in mission or academic drift, rather than forging new directions.

An alternative view is presented by Dill and Teixeira (2000), Geuna (1999), and Pham (2000), who each seek to explain institutional change as an outcome of rational choice theory. Borrowing from economics, they argue that in a competitive environment, institutions will identify their own niche, build

academic and research capacity accordingly and use national and international networks to move to next stage. The emphasis here is on innovation and the development of "new products, new ways of delivering or organising them, and the use of new resources". For example, because reputations for teaching and research are becoming intertwined, universities are positioning themselves and re-organising their institutional structures accordingly. Research is necessary to ensure that disciplines keep pace with sophisticated labour market demand. As social and economic organisations, HEIs are focusing on building unique competencies in order to position and differentiate themselves. Finding a specific niche in the research market is one such approach. Maassen and Potman (1990, quoted in Huisman, 1998) argue that "institutions will, as a consequence of competition, search (and find) their own niche and develop their own mission and institutional profile". Lipset (1994) explains that in the US less prestigious and teaching-oriented colleges have:

> "[…] accommodated the university research culture […]. They cannot hope to compete with the research elite […] but many of them try to secure a small group of scholarly distinction to give their campus national visibility, so as to compete with others at levels similar to their own […]."

In this scenario, competition leads to diversity not conformity.

A third interpretation borrows from the literature on late- or new-industrialising countries and competitive advantage. This view sees these tensions and changes as part of the natural or inevitable process of institutional development (OECD, 1991) and historical change, or a further step in the democratisation of the "Humboltian ethic" (Neave, 2000). Polytechnics and similar new HEIs, with their applied education mission, have traditionally been expected to engage in practical and vocational teaching rather than theoretical or basic research. As they have grown to become more comprehensive institutions offering advanced degrees, strains have arisen between the expectations of students, society, government, faculty and institutional mission. In recent years, the relevance of practical or practice-based and industry-related curricula and research activities has received wider public acceptance and policy changes are beginning to reflect the financial and organisational conditions for such enterprises. As the previous model suggests, research activity is an essential consequence of the professionalisation of vocations. Geiger (1993) outlines aspects of this process and identifies the role of mentors and role-models:

> "In the 1960s, known as the post-Sputnik era because of the amount of research funding and attention generated by the space race, established universities were pressurised to take advantage of the 'new abundance' […].

> For the second tier of universities, conditions now permitted the emulation of more prestigious models. Beyond them, particularly among newer, expanding state institutions, it was possible to enhance academic status by establishing doctoral programs and attracting funds for research".

Elements of a trajectory or path of development can be observed; in this context, new HEIs can be viewed as *late-developers or newcomers*. Today, new HEIs are experiencing all the disadvantages of starting late from a poor base, and competing against the strength of established providers who have built up a firm relationship with policy makers and dominant groups. In response, they have sought to devise strategies for survival, "developing new products, new ways of delivering or organizing them, and the use of new resources" (Dill and Teixeira, 2000). In this way, new HEIs have endeavoured to overcome open and hidden barriers to entry or what Geiger (1993) also refers to as the "insuperable advantage of established institutions and the immutability of the university hierarchy". If recent changes are understood as the next stage in the evolution of higher education institutions and systems or part of a "delayed catching-up process" (Barry, 1999), then barriers to entry can be recognized as such and appropriate action taken. (See Chapter 6 for a fuller discussion.)

If massification and expansion in the 1960s differentiated the second stage in higher education development from its elite origins, then the late 1990s marked the beginning of the third stage.By then, it was clear that a broadly educated population could no longer be formed by and within universities alone. In contemporary society, where knowledge creation and dissemination are both highly privileged and integral to personal, national and institutional prestige and standing, advanced learning and research capacity are allied and critical. The

> "[…] trend from simple to complex knowledge, arguably more important than the trend from elite to mass higher education, forces universities to position themselves between knowledge expansion and student expansion, with emphasis increasingly placed on the knowledge dimension" (Clark, 1996).

These developments are putting greater responsibilities on HEIs. The relatively simple and well-meaning triangulation between research, teaching and service is arguably coming under pressure to meet the needs of the 21st century knowledge society. Today, HEIs are required to produce new knowledge workers (teach), to produce new knowledge (conduct research) and to produce new producers of new knowledge (train postgraduate research students) in ever increasing numbers. Fulfilment of these tasks challenges traditional assumptions that research is primarily basic or pure knowledge discovery conducted almost wholly within the university for theoretical

outcomes rather than applied or practice-based activity conducted in active engagement and collaboration with and for society, the wider community, civil society, industry and/or the region. Paradoxically, by seeking to conform to their mission, to be responsive to the social and economic needs of the community, new HEIs have inevitably outgrown the straitjacket of their birth and parentage.

2.2. Participant profile

Universities, colleges and institutes participating in this study match the broad pattern of birth and maturation described in the previous chapter. With two exceptions, the University of Helsinki and the University of Porto, all participants were born in the post-WW2 era.[1] Six universities were established just prior to 1970, 18 since 1970, and almost half, 11 out of 25, since 1990. These dates mask the fact that, for many HEIs, their pre-history dates back to the 18th century, with origins as technical institutes, trade, craft or mechanics schools, often with deep roots in their local community. Seven were established as *ab initio* universities, in other words, from the beginning. In contrast, the other HEIs came about through the merger, amalgamation or transformation, over time, of several vocational, technological or specialist colleges into a single entity. Individual institutions within this latter group have gone through various changes in status and title, commensurate with the cohort of disciplines, mission, economic factors and/or government policy. For example, some were colleges of technology, then polytechnics and then became universities (RMIT University, Napier University); others shared a similar lineage but their title changed to match an enlarged regional or national focus (Technical University of Catalonia, Szechenyi Istvan University or University of the Arts) (see Table 2.1).

As a group, the institutions were established in response to demands from society, and various political-economic contexts. Institutional missions are reflective of the fact that the key drivers have been public rather than private factors and benefactors. Geography, either the city or region, emerges as the most influential motivator influencing origin and shaping institutional development. Seven participants mentioned links to the surrounding region while four mentioned the cities in which they are located. Other responses identified the need for "*innovative partnerships*" with industry and the community as underpinning and defining their pedagogic niche and research activities; these are characterised by a "*multidisciplinary approach*" with strength in "*high tech degree courses in science and technology*". All of the participating HEIs are actively seeking to grow research capacity and capability, with a disproportionate emphasis on applied rather than basic research, to align their research with their region and to develop strategies for innovation and technology transfer. Their role is to "*fuel the region's knowledge-based economy by*

Table 2.1. **HEI biography**

Name	Birthdate as HEI	History of origin	Role of research/unique contextual factors
Aarhus School of Architecture, Denmark	1965	*Ab initio* by Danish Ministry of Culture.	Formally became research institution in 1986 but no systematic research until 1990s: introduction of PhD and new job structure.
Aalborg University, Denmark	1974	*Ab initio*, desire for regional university.	Research and teaching part of university's mission.
Auckland University of Technology, New Zealand	2000	Origin as Auckland Technical School in 1895. Department of Education created separate college and polytechnic divisions and the Auckland Technical Institute became a tertiary institution in 1960, and renamed Auckland Institute of Technology in 1989. Became Auckland University of Technology (AUT) on January 1, 2000.	Goals 5 and 8 of AUT Charter specifically mention research.
Carleton University, Canada	1942	*Ab initio*; citizens of Ottawa wanted non-sectarian university.	Carleton has a reputation for excellence in several programs including Public Administration and Management, Architecture, Industrial Design and Engineering, and is well known for its innovation in research. Its graduate studies programs are well recognized and have collaborations with local, regional, national and international groups.
Coventry University, United Kingdom	1992	Origin as Coventry College of Design in 1843; in 1970 amalgamated with Lanchester College of Technology and Rugby College of Engineering Technology to become Lanchester Polytechnic. Name changed in 1987 to Coventry Polytechnic and became a university via government legislation in 1992.	Mission statement includes research.
Dublin Institute of Technology, Ireland	1992	Earliest origin in 1880s as six different colleges. Legislation marking amalgamation of 6 colleges into integrated institution.	Prior to 1992, DIT was administered under the Vocational Education Act 1930; overall research was largely absent but individual researchers, primarily in the sciences, developed R&D activity.
Hogeschool Gent, Belgium	1995	Merger of 16 colleges for higher education, in the region of Gent in 1995, many with long history; Academy of Fine Arts celebrated 250th anniversary in 2001.	Hogeschool Gent has a mission statement that refers to the explicit link between teaching activities and research and service processes, included research in the Arts.
Hong Kong Polytechnic University, Hong Kong, China	1994	Formerly known as Hong Kong Polytechnic, assumed full university status in 1994.	Mission is to provide application-oriented education and research.
University of the Arts London, United Kingdom	2004	Federation of 7 individual art schools in 1986 to become The London Institute; incorporated in 1988, with further mergers in 1990 and 2000. Taught degrees awarded in 1993; granted university status 2003; inaugurated May 2004.	Research not part of mission until 1996 when entered RAE. Decision to appoint 1st Dean of Research made in 1997; started in 1999.

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Table 2.1. **HEI biography** *(cont.)*

Name	Birthdate as HEI	History of origin	Role of research/unique contextual factors
Macquarie University, Australia	1964	*Ab initio.*	Research and teaching part of mission; Research Office et up in 1984.
Napier University, Scotland, United Kingdom	1992	Originally technical college, with strong subject bias towards vocational education in applied science and technology; institutional autonomy part of nation-wide move in 1992.	History has influenced the scope of current teaching and research activities.
Örebro University, Sweden	1999	Established initially as subsidiary campus of the Uppsala University in 1963. The "university college concept" developed in 1970s "from pressure of explosion in number of students". University status granted in 1999.	Development of evidence of research competence and ability after 1977 critical in re-designation as university. Today, main objective is to continue process of transition from "teaching college to research university".
RMIT University, Australia	1992	Began as the Working Men's College in Latrobe St, Melbourne in 1887 and has been known by a number of over the years; it has merged with several institutions, *e.g.* Philip Institute of Technology (1992), Melbourne College of Printing and Graphic Art (1997) and Melbourne Institute of Textiles (1999). University status gained 1992.	During 1970s, individual researchers; as part of university status, RMIT formally encouraged to grow research. Focus on research is relatively recent. Committed to undertaking research program which address real-world issues.
Technical University of Catalonia (UPC), Spain	1984	Merger of existing schools of engineering and architecture in 1971 followed by other incorporations of technical institutes in area. Given wide regional presence, Technical University of Barcelona changed name in 1984 to become Technical University of Catalonia.	Since 1984 has developed strategic planning process with defined strategies for research, innovation and technology transfer.
Technical University, Liberec, Czech Republic	1995	Technical College of Mechanical Engineering established in 1953; Faculty of Textile Engineering added in 1960; four new faculties were added between 1990-1995. University title granted in 1995.	Foundation of research activity logical result of economic and cultural development of the region.
Széchenyi István University, Hungary	1968	University of Applied Sciences founded in 1968 as Polytechnic of Transportation and Telecommunication. University has had the name of István Széchenyi since 1986.	After 1990 change of political system, university, as well as the traditional training areas, focused on meeting labour expectations of economy of region and demands of multinational companies which had settled in the region.
University of Crete, Greece	1973	*Ab initio* in response to political pressure of people of Crete. Established as research oriented university in 1973 "outside traditional Greek academica" and started functioning in the academic year 1977-78.	Modelled on US research universities; organisation and administration of research based on principle of autonomy.
University of Porto, Portugal	1911	*Ab initio* as "Humboltian institution".	The "focus on research really represents [recent] change in institutional mission" given previous political situation in the country, historical isolation and level of development.

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Table 2.1. **HEI biography** *(cont.)*

Name	Birthdate as HEI	History of origin	Role of research/unique contextual factors
University of Québec, Chicoutimi, Canada	1969	Established as regional university. It is one of the six universities which form the University of Quebec.	Mission to undertake research linked to region present since university's establishment.
Unitec, New Zealand	1976	Formerly Carrington Technical Institute which had split from Auckland Institute now University of Technology; Unitec name adopted in 1994.	Development of diplomas to doctorate research "began" 10 yrs ago. Recent efforts to merge with AUT in order to side-step legislative ceiling on number of universities failed in 2003. Application for reclassification currently active.
University of West Bohemia, Czech Republic	1991	Decree of Czech National Council; Merger of Institute of Technology (Mechanical and Electrical Engineering) in Plzen and Institute of Education – former established in 1949 as branch of Czech Technical U (independent as of 1953) and latter in 1948 as part of Charles U in Prague.	Integration of research and HE after 1989. Prior to this, research concentrated in Academy of Sciences and other research institutes. Research at UWB linked to region, and co-operation with industry. Recently, colleges of Applied Science, Economics, Law, Humanities have been established, and Ph.D. studies implemented.
University of Western Sydney, Australia	1989	Established as federated network university comprising Nepean CAE (1973, 1977), Hawkesbury Agricultural College (1891), and Macarthur Institute of HE (1975, 1983). Legislation in 1988 brought UWS into existence; in 2000, a unitary structure focusing on T and R was established.	Established with political imperative to provide increased access to university education to a region with characteristically low rates of retention/participation. Research has been prime focus since University of Western Sydney Act, 1987.
University of Tsukuba, Japan	1973	Relocation (transformation) of Tokyo University of Education into new University of Tsukuba to meet demand from domestic and international universities.	From beginning, strong wish to be world-class research university among top 30 in Japan.
Victoria University, Australia	1990	Result of merger of various institutions, established via Victoria University of Technology Act, 1990, and now known as Victoria University. One predecessor institution commenced in 1916.	Dual sector (FE + HE) university combining vocational and academic skills and research. Prior to 1990, it was a teaching only institution but some faculty did research anyway.
University of Helsinki, Finland	1640	*Ab initio*. Founded in Turku in 1640; moved to Helsinki in 1828.	"The mission of the university is to promote free research and scientific education, and to provide higher education based on research." It aims to be leading university in the Baltic Sea by 2015.

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turning innovative ideas into commercial success stories" and ensure that the "*research enterprise is tightly interwoven with the region's advanced technology industry*". The description of their institution's mission reflects these influences:

> "*[Ours is a] national institution with international perspectives, but it gives particular attention to the economic and social well-being of its local and regional environment.*"
>
> "*[We do not want] to become an 'ivory tower university' and hence the determination to interact with the community by conducting research of a kind which can contribute to economic and social development of the society*."
>
> "*[Our view is that] universities should represent not only a centre of education within the region, but also a prominent institution (company) capable of implementing its products (education, know-how, R&D) at the market, this is the university of the future*."
>
> "*[We are] a university that is globally active but locally responsive*."

The specific context in which the institutions were established has sharply determined their institutional character. As one institution put it, they see themselves as having been established "*outside the traditional constraints*" of academia.

Table 2.2 provides a generic overview contrasting the archetypal models of a new university with those of a traditional university. Participating HEIs believe they are being driven towards a single definition of university and research activity, which is dictated by the established universities and disciplines, by policy-makers' own experiences, and in response to single or narrow funding streams. As long ago as the 1960s, Reisman (1996) suggested that insistence on a national standard enforced via funding mechanisms and the external examiner system, in countries such as the United Kingdom, had unwittingly created an almost monolithic concept of a university which has made it difficult to create alternative or diverse models. By comparing archetypal models, Table 2.2 seeks to widen the definition of "university" to one more appropriate to and reflective of the socio-economic, professional, academic and cultural, needs of today's society.

Figure 2.1 attempts to explain these distinctions through an adaptation of the teaching, research and service triangle. In some instances, new HEIs have re-phrased this as teaching, research and development, and practice. Each angle illustrates a specific institutional approach. By positioning new HEIs in the centre of the triangle, the diagram seeks to illustrate that many participating HEIs are attempting to pedagogically integrate all three components. In so doing, they are mapping out new terrain, but they are also setting themselves a particularly difficult task with respect to the demands on their institution and their faculty.

Table 2.2. **Archetype models of a "New university" and a "Traditional university"**

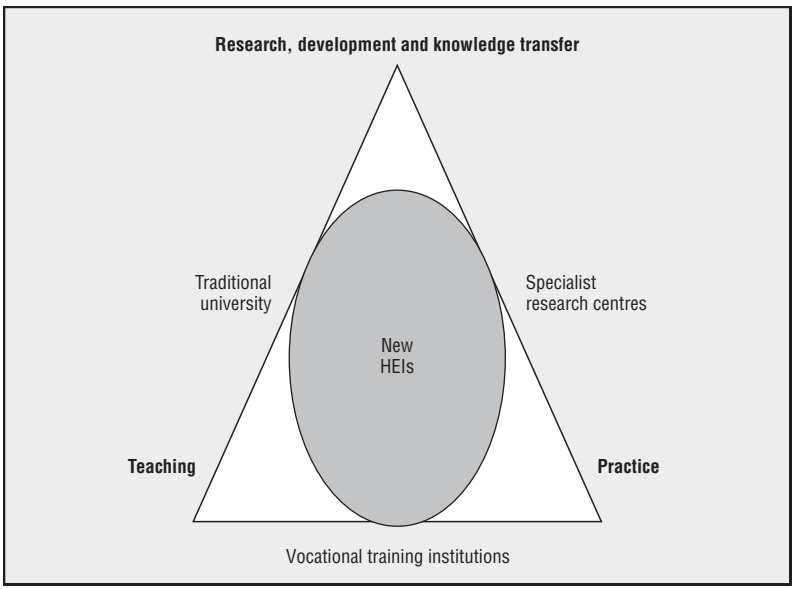
	"New University" (sometimes called a "university of technology")	"Traditional University" (sometimes called a "research university")
HISTORY	Origins as technical institutes/trade/craft/mechanics schools over last 150 years. Generally younger	Origins as "universities" with centuries of tradition dating from 12th century. Generally older, well established
FOCUS	Vocation/practice/employment Primary teaching/learning focus	Theory/knowledge generation/social Primary research focus
STUDENTS	High part-time load (2.5 students per EFTS[1]) Significant proportion of non-traditional students High proportion of work experience Av. Age: 28	High full-time load (1.1 students per EFTS) Low proportion of non-traditional students High proportion of school leavers Av age: 23
PROGRAMMES	Vocational/professional/specialised Comprehensive: Certificates to postgraduate degrees Staircasing/articulation/CPD	General/traditional/professional Almost entirely degrees: undergraduate and postgraduate Self contained/sequential
RESEARCH	Applied/practice based Technology transfer	Basic/pure Theoretical
TEACHING	Student centred Practical/co-operative education Practice and research informed	Lecturer centred Theory based Research informed
STAKEHOLDERS	Industry/Employers Emerging professions Community	Society Traditional professions
STYLE	Innovative Responsive Relevant	Conservative Traditional Independent

1. EFTS refers to effective full time student, sometimes referred to as FTE or full-time equivalent. This is used as a mechanism to compare part-time and full time students.

Source: Codling, 2001.

Despite these similarities, there are some features which divide the group between institutions formed via a process of transformation and those formed *ab initio*. The instigation for the latter came primarily from government, with a possible disclaimer for Orebro University, Sweden which started life as a subsidiary campus of Uppsala University in 1963 and the University of West Bohemia, Czech Republic, which was a merger in 1949 as a result of a decree from the Czech National Parliament. All the others progressed through a series of mergers and amalgamations. It could be argued that they were the instigators of this process, albeit it is clear that government policy and direction were required to formalise the various steps. Of the seven *ab initio* institutions, only one – Aarthus School of Architecture, Denmark – is in the early days of growing research despite being established in 1965. In contrast, the other six universities have had a teaching and research mission since birth.[2] While this study does not involve any evaluation of research output, evidence from the case studies

Figure 2.1. **Institutional position and the teaching, research and practice nexus**



would suggest that these HEIs have the strongest profile. Clearly, institutional history has been a key factor in determining the ways in which research capacity and capability have developed.

Drawing upon the matrix above, the following three vignettes offer contrasting but fairly typical pictures of institutional progression:

> "Carleton University, Canada: Established *ab initio* in 1942 by the citizens of Ottawa who wanted a non-sectarian university. Its aim was to make 'higher education accessible to the less privileged'. Initially, it offered only part time programmes; fulltime programmes in journalism and public administration were introduced in 1946, followed by core disciplines of arts and sciences. Today, Carleton is a moderate sized provincial university 'shaped by provincial regulations'. Its research and scholarship is 'tightly woven with the region's advanced technology industry' which helps ensure linkages to the wider world. Today, there are over 19 000 undergraduate and almost 3 000 graduate students."
>
> "University of West Bohemia, Czech Republic: Formally established by decree of the Czech National Council in 1991, the university grew from a merger of the Institute of Technology (Mechanical and Electrical Engineering, established 1949) in Plzen and the Institute of Education (established 1948). It officially became the University of West Bohemia in

Pilsen in 1999 after the introduction of the Higher Education Act. Its 'main focus is on students from West Bohemia because it is the only institution of higher education in that part of the country'. Research activity is relatively new and is linked to the region and co-operation with industry; prior to 1989 research had been concentrated in Academy of Sciences and other research institutes. Today, there are 13 000 students and almost 500 PhD students."

"University of Western Sydney, Australia: Established initially as a federated network university in 1989 comprising three colleges: Nepean, Hawkesbury Agricultural College and Macarthur Institute. Today, the university operates as an integrated structure. Its aim is to 'link arms with community, public services, industry and business across Greater Western Sydney to exchange knowledge, harness community expertise and energy to our mutual benefit and to contribute to the region's development, prosperity and social capital'. While research had not been a key facet of academic activity in the previous colleges, today the development of its research capability, increase in research income and research commeralisation are priorities. There are 32 000 students."

Another common characteristic is what participants claim is their "sheer under-development of [their] teaching and research profile" (Deane, Jones and Lengkeek 1997). The following description provides a broad over-view of the context in which many new HEIs see themselves operating:

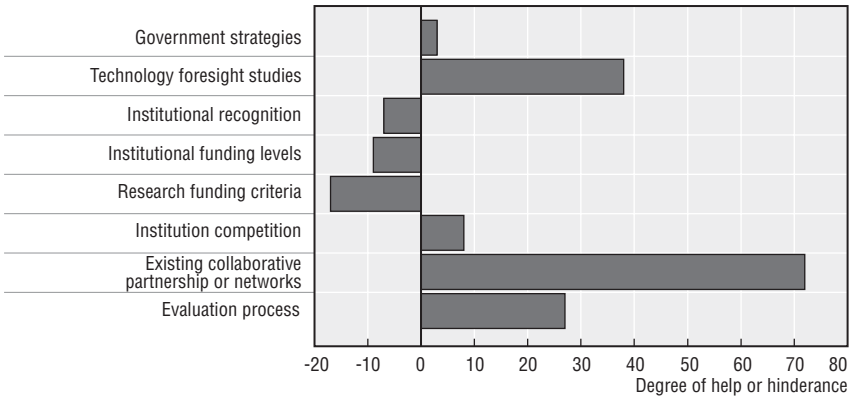
"*It is difficult for the smaller, newer universities to compete with the larger, older ones in at least two respects. First, they have less income from private sources (e.g. alumni and private investments), and they do not have the infrastructure, particularly in the sciences, where infrastructure can be very expensive and vital. Government likes institutions to share, but this is usually at the disadvantage of the smaller one.*"

The source of some difficulties may be external to the institution, but they may also be internal; and some factors may help as well as hinder. Figures 2.2 and 2.4 illustrate the complexity of these issues, while Figure 2.3 identifies problems or tensions experienced by HEIs in setting institutional priorities, often termed priority-setting. Replies are grouped under five themes: government – institution relations, management issues (*e.g.* investment and infrastructure), human resources, new disciplines and the research tradition, and research culture.

Government – Institution relations

Government strategy and policies are key factors influencing the higher education environment, and shaping the role that individual institutions will play within that environment. Government can also act by influencing third-party factors – such as research councils, research funding or evaluation

Figure 2.2. **External factors: help or hinder the growth of research activity?**[1]



1. This chart was calculated as follows: 1) The number of HEIs that made a response to each criterion. 2) The per cent of respondents that ranked each criterion as a 1 or a 2. 3) The final degree of positivity or negativity was calculated by subtracting the hindered responses from the helped responses. 4) The result was plotted as degree of positivity or negativity per criterion.

criteria. Hence HEIs sit in the midst of a complex set of relationships, whose destiny is relative to a particular set of changing circumstances not all of which are in their control. Participant responses suggest a semi-permanent tension between government policies and institutional strategies (see Figure 2.2). For example:

> "*Government strategies both help and hinder with the greatest significance. They help because the budgets of universities are determined to a fair extent by the competitive research performance. They hinder because the government sees us as a new university and does not encourage us to do too much research (which indirectly affects our funding)*."

> "*Institutional recognition has also helped and hindered at the same time. Our university is recognised by [...] industry as the most accessible university and therefore most of the research funds from industry come to us. The Government is aware of this, therefore they do not give us enough research budget thinking that we get most of what we need from industry*."

Government foresight studies can play a similarly ambiguous role; they can set the direction for research and programme funding, but these benefits can have a negative impact by focusing on a narrow range of research themes and/or skewing the research agenda of higher education in favour of the "*specific short-term applied knowledge needs of research buyers*".

Management issues (investment and infrastructure):

Unlike established universities, research activity in many participant HEIs was either not recognised or supported or was formally proscribed by legislation,

the result of a *de facto* or *de jure* binary divide. Accordingly, almost a quarter of all participants named investment and poor infrastructure as a hindrance to development and a problem impacting on the institutions ability to set priorities. They claim that because they were not traditionally resourced for research, they lack sufficient or significant research infrastructure and technical support. Despite recent changes to their status and mission, a funding gap remains and differences between the new and established HEIs has widened. Participants claim that they have to draw heavily on the regular budget of the university, which is based solely on the number of students in programmes – for basic research infrastructure: space, heating and general commodities. In addition,

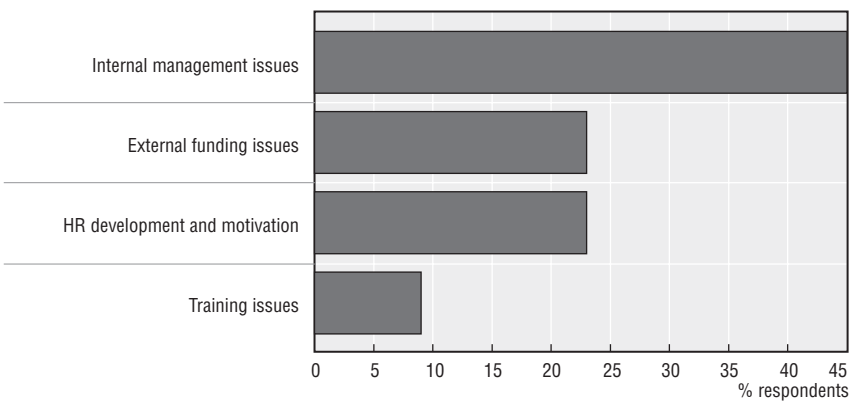
> "*many of grants and programmes only fund a part of overall expenses and they expect at least some contribution from the university. It is not always simple for the university to cover this share of expenses and up to now, no consistent strategy existed*."

One person described the difficulties of trying to keep pace as running as if a lead-ball was attached to one's ankle.

Human resources

Respondents identified problems associated with faculty ability and capacity as a significant difficulty because many faculty and their terms of employment were "*inherited from a previous era*" (see Figure 2.3). Faculty at new institutions have "typically come from work experience in their profession rather than the traditional academic progression from doctoral student to apprentice academic" (Adams, 2000). Faculty were hired originally and specifically to teach and, as a consequence, often lack the necessary prerequisites, *e.g.* a research postgraduate qualification (most notably a doctorate) and research experience or expectations. As a result, conceptions of academic work – whereby research is an

Figure 2.3. **Problems and tensions affecting setting research priorities**



integral part of teaching – may also be questioned. There are also workload issues, which means that faculty often feel research is being built on the back of heavy teaching commitments relative to traditional university colleagues, producing, in some instances, internal tensions and morale difficulties. These conditions are compounded by salary and career differentials which inhibit faculty-building strategies. The latter include retraining faculty to enable them to engage in research, retaining good researchers, and recruiting new researchers. This involves significant transitional HR issues including contractual arrangements, in which the new reality may not be recognized in the old agreements. These changes can involve serious costs, in addition to culture change. Two participants described their situation:

> "*[…] staff [faculty] who may at one point have been appointed on the basis of their professional practice may, for reasons too numerous to identify here, have become 'inactive'. Increasing workloads and the historical lack of recognition of and investment in infrastructures for the support of research meant that staff [faculty] very often perceived research and the RAE [UK research assessment exercise] as simply another burden*".

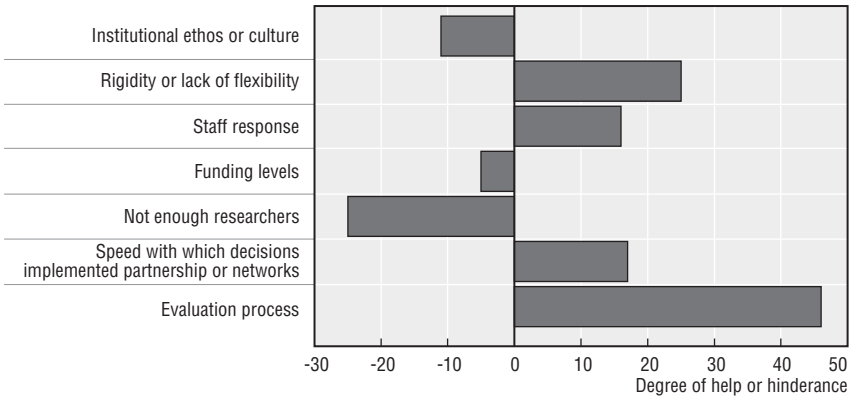
> "*Our major tasks are to energise our staff [faculty] and to ensure very clever recruiting. Teaching loads remain high and, along with administration, are the most often quoted reason for research inactivity. A real challenge remains, to convince those charged with ensuring the delivery of a wide range of (often new) teaching programs that it can be achieved whilst at the same time formally (that is within a written work plan) recognising that time and resources are available for research and development*."

Consequently, many new HEIs lack a sufficient number of qualified researchers and research supervisors (see Figure 2.4). "*Scale and impact in terms of the number of researchers who can be nationally competitive is a real issue for us.*" There are also issues of retention and recruitment; experienced researchers are often less attracted to come or remain in an institution which does not have a good profile. Finally, while management may point the finger at faculty, management, not surprisingly because it shares the same pedigree, may also be slow to recognise the research potential or opportunities of new disciplines or to support more ambitious faculty.

New disciplines and the research tradition

Many new HEIs have parented and overseen the academicisation or professionalisation of vocational disciplines, most of which have little or no research or scientific tradition. As aforementioned, these include business, the creative arts, social work/social care, architecture, and other professional courses of study. In many cases, given their origins, the emphasis has been on applied rather than basic, and interdisciplinary rather than disciplinary, research. While

Figure 2.4. **Internal factors: help or hinder growth of research activity?**[1]



1. Figure 2.4 was calculated as per Figure 2.2.

evaluation processes are viewed as helping institutions guide their setting of priorities, most new HEIs believe that national evaluation processes are innately conservative and often "prejudiced" in favour of established disciplines and older research universities (*cf.* Figures 2.2 and 2.4). Peer-reviewers, consciously or unconsciously, act as gatekeepers (Becher and Trowler, 2001), reviewing activity from within the discipline itself which can prohibit "major innovations since these by definition do not fit within the existing paradigms" (Wickham, 2004). Technology foresight studies can act similarly, contributing to narrowing the fields of investigation. This is further complicated by the fact that research in new HEIs is often conducted in association with industry or other client groups, yielding commercialisation or evaluation outcomes which are not easily assessed via the traditional peer-review process.

> "*The generation of much enhanced performance in peer reviewed R&D, that is the national competitive grants schemes and international journal publications, […] are the key measures most often used by policy agencies when formulating new initiatives and coming to a view about a university as being 'seriously into R&D'. Hence [we have] difficulty still about being recognised on this radar despite very effective performance around industry related R&D and research student training, despite the fact that these areas most often feature in current innovation rhetoric.*"

For some participants, the evaluation process may unintentionally combine all these factors, especially if international benchmarks are used without reference to national context: *e.g.* new researchers in new academic disciplines in new HEIs in less developed HE markets and national economies. The biggest challenge, said one HEI, was "*to overcome prejudices on the part of the research councils*" whose organisational cultures can be very difficult to change. One way around these entrenched views is via membership in collaborative

networks which can act as an important vehicle for easing entry and mentoring new researchers.

Research culture

Institutional ethos and culture can act as a major inhibitor, presenting particular difficulties, especially in circumstances when infrastructure and faculty capability may also be unsatisfactory. Emphasis on applied and professional pedagogy has caused other perhaps unforeseen challenges. Research universities recruit and "attract high level students and encourage/facilitate their development as research managers and scholars"; in contrast, newer HEIs recruit and attract students who wish to focus on practical, vocationally or professionally biased programmes. The learning outcome for each group of student is different; graduates from research universities emerge

> "with the Cartesian certainty that 'I think therefore I am' for the historian, or 'I do sponsored research therefore I am' a physicist, [while those emerging from newer or].' less privileged campuses have acquired a sense of themselves as workers and have come to recognise their work as labour […]" (Gumport, 2000).

As a consequence, some new HEIs experience difficulty navigating from undergraduate and taught postgraduate programmes to research doctoral or post-doctoral activities (Geiger, 1993). One participant HEI said they were actively trying to

> "reorganise postgraduate programs and [create] new graduate schools that transformed smaller and narrower programs into new larger and multi-disciplinary ones."

In this way, graduate schools are becoming critical actors in the process of growing a research culture. "It takes more than just money [to develop research]; it takes a will to change and a will to really accommodate what is essentially a cultural shift."

These five features (government, institution relations, management issues, human resources, new disciplines and the research tradition, and research culture) can be considered characteristics of the process of institutional formation, which has seen many of the participant HEIs transform themselves from an institution with a local and vocational focus to one with a national or international and professional focus. Yet, the picture is not completely one-sided. Some *ab initio* participants, with a good teaching and research profile, claim they have also experienced inadequate (infrastructure) resources relative to well-established universities. Participants also point to a more fundamental issue; that both the processes and challenges associated with institutional development have not been appropriately recognised and provided for.

Gumport (2000) refers to the "Matthew Effect"[3] to explain what participants see as mounting differences and difficulties:

> "[…] it becomes apparent that persistent status differentiation among certain classes of individuals *and institutions (my emphasis)* is due to a latent dynamic, the Matthew Effect, where the elite receive disproportionate credit and resources, as they are caught in a virtuous cycle of cumulative advantage."

The downside of the "Matthew Effect" is that poorer institutions get poorer. The "effect of receiving a low assessment score […] is to further reduce the chances of funding for collaborative research with industry and so to reinforce the downward spiral" (Henkel, 2000). Similarly, the best students (usually of higher social class) are attracted to the best university, defined as a centre of research excellence; in turn these graduates achieve the most rewarding careers, and are able to contribute generously as alumni to the university's endowment fund and/or to influence policymakers and public opinion about their *alma mater*. Others suggest that because it is more costly to engage in research at teaching-intensive institutions than their research-intensive counterparts, "the more a university grew its research activity, the more it met financial difficulty, and was at risk of failure" (Westbury, 2004). This occurs due to heavier teaching dependency and to the fact that university research has tended to be under-funded. Thus, participants claim that their status as either *late-developers or newcomers* has left many of them at a continuing disadvantage.

Notes

1. These two universities are not "new HEIs" but asked to participate in the study as the challenges of developing research today are experienced by all higher education institutions.
2. Aalborg University, Denmark; Carleton University, Canada; Macquarie University, Australia; University of Crete, Greece; University of Porto, Portugal; University of Helsinki, Finland.
3. The "Matthew Effect" is based on a line in St. Matthew's Gospel that says, "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (Matthew 25:29). This line has often been summarised as: "The rich get richer, and the poor get poorer."

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 3

Research Mission and Culture

3.1. Research mission and strategy

All participant HEIs claim that developing research capacity and capability are key to both their institutional mission and to their survival as an institution (see Box 3.1). Many new institutions were established with a strong regional economic remit. They were required to focus on local and regional needs, and specifically to develop and help "*retain an educated manpower in the area*". To meet this objective, their role was originally viewed as "teaching only" with a specific commitment to relevant knowledge and applied learning. Some were allowed to undertake limited research activity, but often with an emphasis (only) on development and consultancy. However, over time, and commensurate with the global significance of the knowledge-economy, the participant HEI's commitment to providing "*economically useful skills with industrial relevance*" and ensuring that "*academic activities are aligned with the economic development of their region*"has become inextricably bound to offering advanced qualifications and growing research capacity. In other words, research is viewed as essential to improving and sustaining the quality of degree teaching – in other words, the research informs teaching argument. The following are typical comments:

> "*Research is essential to our mission to build an institution that responds to the needs of its region and enhances the region's cultural, economic, environmental and educational development.*"

Box 3.1. **Why do research?**

- "Sustain academic and professional reputation in knowledge-based economy"
- "Align academic activities with economic development of region"
- "Provide economically useful skills with industrial relevance"
- "Develop research based teaching and education in graduate programmes"
- "Academic excellence in a professional context"
- "Eligibility for specific funding opportunities"
- "Retain and improve position"

> "*[We must be] active in research that informs and enthuses our teaching, our society and the industries that can benefit from this knowledge. We encourage entrepreneurial and innovative thought*."

> "*[Research capability and competence] has been important in order to be recognised as a true university by the surrounding world including the funding authorities […]*"

In addition, many of the disciplines the new HEIs parented now require a more sophisticated response to economic and labour market pressures; hence the institutions state that they engage in research to ensure "*academic excellence in a professional context*" including "*research of an applied nature relevant to industrial, commercial and community needs*".

> "*Previously the architect profession and education primarily developed through transfer of experience from one generation to the next. However the social and the technological developments are so fast today that a research based knowledge is necessary if the profession and the education shall keep up with the development – much less be abreast of developments*."

By being truthful to their mission – to serve and respond to specific training and more general needs at the local and regional level – new HEIs have needed, and have been called upon, to adopt policies, practices and strategies that could be construed as straining their original role, thus potentially bringing them into conflict with other policy imperatives and government.

A second reason cited for engaging in research is related to institutional status and in turn to students and faculty. In this respect, new institutions are no different from their more established colleagues. As institutional status becomes increasingly linked to survival, inter-institutional competition has sharpened. Success at research is viewed as being one of the determining attributes which relates directly to competitive position: it is necessary to "*sustain academic and professional reputation in a knowledge-based economy*" and to "*retain and improve their position*" *vis-à-vis* their competitors.

> "*[…] it is now expected that universities should lead the way towards a greater generation and integration of knowledge, and better preparing critical thinkers who can identify and solve problems with creativity from a broader perspective*."

Research is vital to the HEI's mission, to the creation of a stimulating learning environment, to attract and retain high quality faculty and students, to maintain cutting edge curriculum, to help sustain relationships with other academic institutions, the professions and industry, to expand the boundaries of knowledge and understanding within and across the disciplines, and to appeal to philanthropy.

These views are mirrored in other studies. Calhoun (2000) says that despite arguments that research is often done at the expense of teaching,

> "research universities remain very attractive to undergraduates, and many of the most talented in each year's cohort of high school graduates choose research universities over liberal arts colleges in which they would receive more attention from faculty members, but where those faculty would be less well-known researchers."

Elsewhere, American "universities found that enhancing their reputation for research paid dividends in terms of attracting better students, projecting a positive image of public service, and enlarging voluntary support" (Geiger, 1993). A study of UK polytechnics argued similarly; research activity was necessary "to sustain academic reputation, to attract the right sort of staff [faculty], to enable course development, to attract students (undergraduate as well as postgraduate) and to provide an extensive consultancy service for the region" (Pratt, 1997; Downes, 2004).

Responding to what might appear to be a policy wedge – caught between the demands of their mission and the problems of late development – new HEIs are busy devising strategic plans to help grow research capacity and capability. Their actions correspond with a general trend across OECD countries towards strategic management in higher education, wherein many governments require HEIs to submit a strategic plan as a pre-requisite for core and/or research funding. Participant HEIs were asked to identify external and internal factors which were influencing the adoption and content of their research strategy, albeit it is apparent that both factors are interlinked. For example, political-economic conditions within society are linked to macro level issues such as globalisation, which in turn can help determine the availability of the resources which the institutions need to form and pursue their strategy. Hence there is a tiered effect: external factors set the parameters within which institutions respond; the nature of this response is shaped and determined by internal factors.

Boxes 3.2 and 3.3 cluster participant replies according to external and internal factors. Externally, government policies at the federal, national, international (including EU) and global level, finance and funding, and institutional position are all strongly inter-connected. Institutional ability to respond to the national and global requirements of the knowledge economy is seen as critical. There is also an increasingly international dimension to benchmarking and evaluation exercises, which in turn influence funding and institutional position. For some participant HEIs, it is a question of finding the correct balance between activities at different geographical levels – the region, the nation and the global – a judgment which can be influenced by the presence and actions of other institutions (HEIs, research institutions) and government.

Box 3.2. **External factors influencing institutional research strategy**

Political-economic

- Globalisation
- Knowledge economy
- National research strategy

Financial

- External funding mechanisms and policy instruments
- International/supra-national research programmes
- Benchmarking

Institutional position

- Socio-economy of region
- Demands from industry/government
- Presence of other institutions
- Consultancy and entrepreneurial activities

Box 3.3. **Internal factors influencing institutional research strategy**

Mission and strategy

- Requirement of funding body
- Change of status
- Self-perception

Human resource and institutional structure

- Availability of competence
- Funding opportunities
- Recruitment/retention of students

Research profile

- Aspiration to develop profile and status
- Research-teaching nexus
- Relationship with industry

Internal institutional factors also play an important role, both as a positive or negative influencer. They can help shape the strategic choices that an institution makes. Replies were grouped into three categories: mission and

institutional formation, human resources, and structural or profile issues. For example, all participant HEIs stress the importance of "*engaging in the growth of research and development*" and "*interacting with the community by conducting research of a kind which can contribute to economic and social development of the society*". However, institutions may be confined in their ability to fulfil mission or strategy objectives due to the absence of an appropriate management structure or sufficient number of researchers available. There may also be an absence of a consensus within the institution on the direction to take or more fundamentally why research is critical to the institution. The availability and quality of infrastructural and financial resources are equally vital prerequisites. Hence, while institutions point to the various internal factors which are encouraging and supporting their research strategy, they can also act as inhibitors to that strategy.

In this context, how are institutions defining the objectives of their research strategy? Asked to identify the most important objectives of their strategy, it is clear that strengthening research capacity is the most critical and primary goal. Other objectives, which effectively define the framework yet go beyond the development of research capacity *per se*, include encouraging a research culture, enhancing the learning environment, raising revenue, linking research to wider societal responsibilities and enhancing institutional profile. The replies are grouped under three headings: growing research activity, organisation and management, and institutional status and mission (see Box 3.4).

Box 3.4. **Objectives of institutional research strategy**

Grow research activity

- Increase the number of researchers and research students
- Grow/recruit research active faculty and students
- Expand research activity
- Promote national/International partnerships and collaboration

Organisation and management

- Increase research funding
- Allocate resources to facilitate research productivity and excellence
- Establish centres of excellence

Institutional status and mission

- Enhance institutional profile
- Foster innovation and entrepreneurship
- Ensure strong research-teaching nexus

Given that research is fundamentally based on individuals, the quality and ability of the faculty ranks highly. Institutions propose to boost that capacity while also using recruitment strategies to augment this capability. They envisage HR strategies being supplemented by national and international co-operation and other strategic collaborations – with other HEIs, with industry, with the community, etc. They also identify the need to accentuate existing capacity by building critical mass via centres of excellence or applied research institutes. Underpinning this effort, and given their historic and relatively poor infrastructural base, they single out the need to improve the physical environment and related facilities. Political realism of a different kind underlies their funding strategies; respondents talk of the need to "*substantially increase external research income*" and to promote "*self-funding in R&D*".

Attention is also given to the need to devise resource allocation models which can tie the allocation of financial and physical resources to productivity and excellence using internal competitive funding mechanisms. Participant HEIs say they will be able to measure the success of their strategy against a heightened institutional profile which is itself tied to the socio-economic progress of the region. This includes the creation of a vibrant teaching and learning environment underpinned by the results of applications-based research, measured by such performance indicators as output, income and employability of graduates. The following two excerpts illustrate the top priorities for two participating HEIs:

Example 1:

1. To increase the number of peer-reviewed research outputs by 20 %.
2. To increase internal contestable [competitive] research funding.
3. To further develop the number of, and funding for, research activity within the university.
4. To increase the value of research grants from external sources.

Example 2:

1. To develop subject groups of research active staff [faculty] across the institution.
2. To significantly develop physical research environment and development of research centres in areas of significant mass and proven strength.
3. To enhance support for research development, exploitation and external income generation.
4. To further develop external links and collaboration.

3.2. Defining research

Defining research and measuring its output has become a somewhat controversial issue in higher education, both between and within HEIs, and

between HEIs and evaluators and funding agencies. Traditionally, university research has been associated with discovery or the search for something new, in other words basic research, with the results of sustained enquiry submitted to the critical questioning of others via, for example, peer-reviewed publications. In contrast, the broader concept of scholarship may include the ability "to glean information" and "respond critically to what has already been done in the field" (Neumann, 1993). These definitions are arguably discipline-specific; the sciences normally emphasize the discovery of new facts while the humanities offer critical commentary and the social sciences include a range of methodologies, *inter alia,* data collection, surveys and observations. The creative arts and some other newer disciplines have traditionally been ignored.

In recent years, several factors have contributed to widening these definitions:

1. New HEIs, with a mission for regional and community engagement, have developed new professional disciplines which focus on applied questions raised by particular groups, and/or emphasize issues of professional and creative (arts) practice.
2. The Mode 2 model championed by Gibbons *et al.,* acknowledges that more and more research is interdisciplinary, conducted outside universities and in the context of application (*i.e.* knowledge is created within the context of being useful) (Gibbons *et al.*, 1992). In contrast, Mode 1 activity is organised along disciplinary lines, in the absence of practical goals which may or may not follow.
3. Boyer's (1990) concept of four equivalent scholarships (discovery, integration, application and teaching) has validated and recognised a diversity of faculty activity.

Efforts to codify these conceptual arguments have raised some interesting issues. While they reflect and are arguably favourable to the history and mission of new HEIs, the distinction between research and scholarship may often be simply pedantic. For example, Boyer's critical significance was that he gave due recognition to research activity which was not confined to basic, scientific discovery or investigation but included synthesizing, problem-solving or policy-oriented and pedagogical studies – an important intervention at that time. However, all four "scholarships" could still be considered research, and many people today use the words interchangeably.

In contrast, many new HEIs are seeking to enhance or go beyond Boyer. They are embracing a (non-hierarchical) continuum of activity, including:

- traditional academic investigation (whether basic, applied or strategic, and whether using quantitative, qualitative, practice-based or other methodologies);

- professional and creative practice (including architecture, visual, performing and media arts, and consultancy and related activities, etc.);
- knowledge and technology transfer (including development projects and other forms of innovation, commercialisation, software, prototypes, including evaluation and other externally commissioned contracts, etc.).

In this way, they are seeking to give due recognition to the "mosaic of talent" (Boyer, 1990) within their faculty, many of whom have a vocational and professional bias.

> "We have defined scholarly activity and research in broad terms and we have challenge of trying to hold everybody in equal esteem whether they are doing research or something like consultancy or specialist development work with industry."

They are also challenging "*the assumption that in order for research to have academic credibility, the outcome of that research had to conform to the norm of text-based publications in refereed journals to the neglect of other professionally or industrially warranted work*". Thus, they speak of building "a culture of scholarship" rather than simply a research culture. This practice is most notable in Australia and New Zealand.

A difficulty, however, with this approach is that funding agencies and governments still rely upon traditional definitions and academic metrics, such as peer-reviewed publications, research income earned, PhDs graduated, etc. It perceived as activity conducted in large laboratories and usually by men wearing white coats. In these circumstances, wider definitions of scholarships are definitely not perceived as research. A further consequence is that some governments are beginning to use these terms to distinguish between teaching and research HEIs, potentially translatable, respectively, into those institutions which successfully focus on scholarship rather than research:

> "Should all universities continue to have the dual role of teaching and conducting research? This arrangement is, of course, not the norm everywhere [citing] French *grandes écoles* and US arts colleges which successfully focus on scholarship rather than research" (Dempsey, 2004).

It may be that a distinction needs to be made between "the brute reality of the many reasons why actors – academics and universities [and governments] – want to emphasise research" and what Boyer and others are saying about what ought to be the situation.[1] Thus, by focusing on scholarship, new HEIs may find that they have unwittingly created a new institutional category (or binary divide) wherein scholarship is supported as a cheaper and hence less valued alternative to research.

To get around the differences in outputs between research and scholarship, some participating HEI are reconfiguring the evaluation

categories. For example, one participant HEI makes a distinction according to "research methodologies", *viz*: research intensive which is largely built around expert faculty, supported by post-graduate research students and measured by traditional key performance indicators (KPIs), and "communities of practice" which is largely built around practising professionals. In the latter instance, KPIs are measured through enterprise involvement, invitations or awards, advances in enterprise innovation and number and types of students engaged. Other HEIs include the creative arts as research when it meets certain conditions – when it genuinely contributes to new knowledge – or as development work – *viz*. "artistic development work", thereby making a distinction between "simple maintenance of practice and research".[2] Thus, "*research does not have to be text based but it does have to be in a form that is appropriate to the discipline*". In this respect, there is some similarity to the debate around consultancy – some participant HEIs specifically do not count consultancy as research but others include it under the "other scholarly activities" category (see for example Figure 4.3).

There is a mixed view among participant HEIs as to whether distinctions within research – between basic, applied, strategic – remain helpful today. Some HEIs are endeavouring to end these divisions while others use them to help define their niche. Responses from a number of survey participants demonstrate this.

> "*The combination of basic science and application-oriented science gives [the university's] research a dynamic approach and flexibility, which is characteristic for [sic] the university […].*"
>
> "*We distinguish between basic research and applied research. We support both, but the emphasis is on applied research.*"
>
> "*Research means all creative activities in the fields of science, engineering and art. We do not distinguish between different kinds of research.*"
>
> "*We do not distinguish.*"

Despite these differences, it is clear that participant HEIs have developed a pragmatic approach towards defining and developing research. They are strongly influenced by their history, institutional context and mission, and the academic strengths of their faculty (see Box 3.5). Accordingly, each institution is working out different combinations of research and scholarship along a spectrum from extremely research-led to extremely-teaching led. Turpin *et al*. (1996) using slightly different criteria identify three versions:

1. Teaching-based: research emerged from teaching histories and experiences of the institutions.
2. Industrially-directed: strong links with industry developed.
3. Vocationally-directed: research emerged from professional culture/activity.

Box 3.5. **Definitions of research**

"Our main focus is applied research […] with outcomes in consulting and experimental production."

"We normally use the term research and other scholarly activities […]"

"For government, we distinguish between basic and applied research and development. However, our activities are so diversified […]"

Research which "informs and is informed by learning, teaching and professional practice" and is "tightly interwoven with the region" via innovative partnerships and commercialisation.

"[…] increased focus through collaboration across disciplines and institutional 'barriers'. Our research strategy is built around making a difference to all R&D partners – be they enterprises, industry sectors, government or communities [….]"

It is equally clear that government and funding agency criteria are influencing the way in which all institutions define their activities. In the words of several participant HEIs, they have adjusted their disciplines and activities "*according to the character of research at the area [sic] of the ministry […]*", using one set of criteria to statistically report to government and another set for their own internal purposes. Nevertheless, there appears to be a strong correlation between policy instruments and institutional behaviour.

3.3. Developing a research culture

Creating a research culture or environment is a critical but essential step for all higher education institutions, but depending upon context, it can also be a daunting task. Simply put, a research culture is the intellectual seed-bed required for sustainable and productive research activity. In an ideal environment, faculty understand the importance of the nexus between research and teaching, and endeavour to balance these different activities, while the institution facilitates, encourages, recognises and rewards research activity and output. It will generally recruit and promote faculty on the basis of achievement across the twin domain of teaching and research, however the balance of recognition given to each may vary from institution to institution. In this respect, institutional definitions of research play an important role in establishing the framework within which a research culture will flourish. Hence, a research culture is more than, although it is partially dependent upon, the provision of good physical and financial resources. While factors influencing the individual researcher cannot be overlooked, organisational issues of collegiality, collaboration, availability of resources and work load are significant contributing factors. Studies "support the

view that while research productivity is primarily driven by individual aspirations it is critically influenced by the work environment" (Deane *et al.*, 1999). Bland and Ruffian (1992) identified twelve characteristics of a "productive research environment": clear goals for co-ordination; research emphasis; distinctive culture; positive group culture; decentralised organisation; participative governance; frequent communication; resources, particularly human; group age, size and diversity; appropriate rewards; recruitment emphasis; and leadership with both research skill and management practice. Participant HEIs mentioned most of these issues, although not necessarily comprehensively.

One HEI described a research culture as one where research activity underpins teaching and all other activities; it is a "*vibrant educational environment*" wherein the "*synergetic effects of teaching and research*" co-exist with the objective of improving both of them. Others stated the objective was the "*growth of a research culture across all areas*":

> "*We regard research and development as providing 'scholarship renewal' for programs taught across all areas as well as discovery and application in our areas of focus*."

> "*The university has made it its goal to develop an organisation better suiting the functions and administration with a new concept of education and research highly international in character, rich in diversity and flexibility, and capable of dealing sensitively with the changes occurring in contemporary society*."

In some manner, all participants articulate the importance of a strong teaching-research nexus.

The issue of critical mass is fundamental to any discussion about research culture and building research capacity and capability. Critical mass is the objective of bringing individual faculty, researchers and research students together to create a "community of scholars", wherein individuals can

> "[…] benefit from informal discussions with colleagues, in-house advice on papers in early draft, reaction through seminars on ideas still being formulated, or the competition and rivalry of colleagues in proximate fields" (Hoare, 1995).

Also referred to as a "peer review culture", the emphasis is on creating a collaborative environment in which researchers share ideas in an intellectually supportive, constructive and conducive environment. In this context, the term "critical mass" is used to describe a situation wherein a significant proportion of the faculty are research active. Participant HEIs identified enlarging the number of research staff [faculty] and research students, and hiring new and young researchers as essential objectives of their strategy.

> "*[We] supported existing staff [faculty] by consolidating them into subject groups… to enable them to actually promote some kind of research culture*

[…].[N]ew staff [faculty] were appointed […] aligned to the evidence of strength and potential strength existing within the institute…A number of collaborative projects were other HEIs in the United Kingdom and abroad were established […] That in itself not only heightened the profile of the institute but it also enhanced the level of external funding and sponsorship."

But critical mass can also refer to a particular policy of building research groups or teams in specific domain. In both instances, leadership and productivity are critical metrics by which to measure success.

Sustainability is vital; the secret is to create a dynamic environment of cascading research activity and projects which build upon each other and generate vitality and opportunity rather than a series of independent actions that need to be repeated each time. Participant HEIs stressed the importance of establishing "*institutional research networks in order to obtain professional as well as economic sustainability within the research efforts*" and creating "*the basis for continued development and renewal of the university's research areas*". This can be dependent on a variety of issues, including the financial framework in which the researchers and the HEI operate. One HEI declared itself:

"*[…] committed to maintaining a substantial research program, to be research intensive in its chosen areas of strength, and to maintain and develop a substantial research training program, while also seeking to develop the next generation of research active staff [faculty]*."

Brennan (1995) identified two dimensions to a research culture. One understands research as an *institutional* (my emphasis) activity, conducted in order to maintain the intellectual rigour of the institution and its constituent academic units. The alternate sees research as part of a *national* (my emphasis) research and development system, connected with issues of commercialisation, national economic benefit and competitiveness. Institutions which are able to connect the two activities are likely to operate increasingly at an international level of excellence. Its research activity will be sustained via the benefit of significant research funds. In contrast, those which focus primarily or only on the former are likely to continue to struggle to maintain even a modicum of "effective research".

Building a research culture is not a once-off project but rather the result of an on-going series of strategic policies and actions that seek to develop, underpin and build. It is not without its challenges especially in those institutions where research is relatively new or fragile.

"*It is rather difficult to increase participation of staff [faculty] members in research. Research is still not understood by many of them as one of the basic activities of the university teacher. Due to general under funding of the universities…, the research/teaching load of some members of the staff [faculty] is not well balanced*."

Skoie (2000) cautions that the task of introducing research should "be approach[ed] carefully to generate an effort with reasonable standards. The time horizon should be carefully set". Likewise, Johnston, Jones and Gould (1995) state that with careful planning of academic activities, new institutions can realize the appropriate scale and foster an ethos which reinforces their mission of research and related teaching. Cognisant of the frustration of losing good researchers to other universities (Berrell, 1998), senior managers are balancing their strategic objectives against the existing environment.

Notes

1. Correspondence from Burton Clark to author, 28 July 2003.
2. See criteria for art and design; drama, dance and performing arts; and music. (Research Assessment Exercise, United Kingdom).

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 4

Research Management, Organisation and Funding

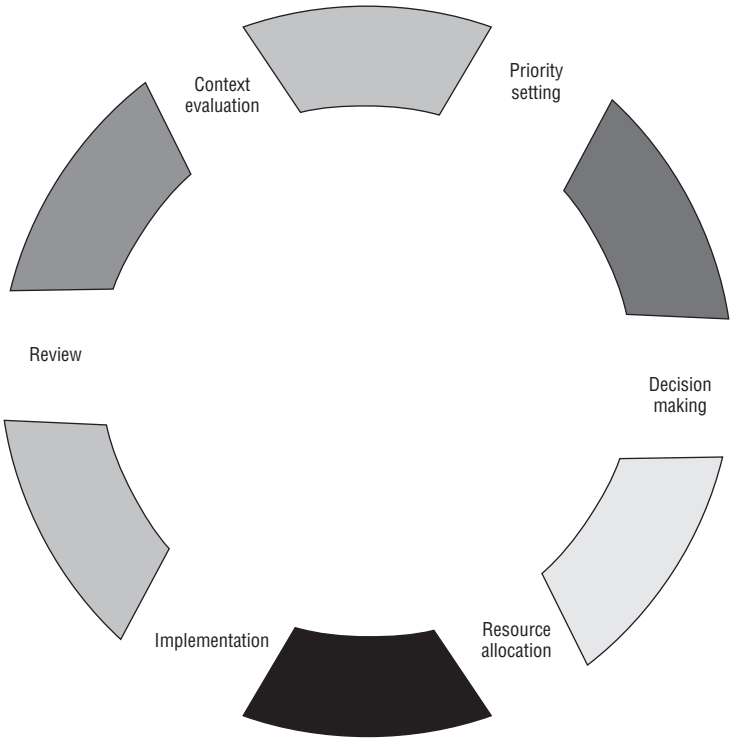
4.1. Priority-setting

Global change and institutional diversification are forcing many institutions to assess their strengths in order to seek competitive advantage. At the same time, research disciplines are evolving, and demands for research relevance and outputs are changing and growing. Government core funding to institutions is being matched by demands for increased accountability. These forces are changing the ways institutions organise and manage themselves. In line with the general trend towards strategic planning, higher education institutions are actively setting priorities to help shape what they should do, not simply what they can or are best equipped to do. But not all strategies are equal or experiences transferable and any major plan must also be realistic. All higher education institutions have histories and traditions, and limited resources. Thus, priority-setting seeks the optimal use of scarce resources (financial, human and physical), by aligning institutional competencies with the external environment and national aspirations. It endeavours to distinguish between competing sets of priorities. There is also a need to balance existing capability with potential, in other words priorities need to be shaped not just by current successes but also future possibilities.

Figure 4.1 illustrates the planning process in circular format, to emphasise its dynamic quality, and that robust review and evaluation must feed into each iteration of the process. The entire planning process ultimately raises questions about how well people can look into the future and determine which areas will become important. However, priority setting is an important exercise in future-proofing not future-gazing. It is within this context that 90% of participant HEIs said they were actively developing research strategies and setting priorities.

Priority-setting is viewed by participant HEIs as both as a "*good and indispensable practice*". It has forced and facilitated them to make tough choices between external, institutional and researcher priorities. Ideally, institutions seek to accommodate all three factors but with reductions in government funding, identifiable national priorities, and benchmarking and other evaluative criteria, meeting two of these criteria is probably more realistic. In addition as institutional survival and status has become intrinsically linked, competitive positioning is strongly influencing institutional priorities. For many HEIs, this has meant highlighting applied, interdisciplinary research

Figure 4.1. **Concrete stages of research planning**



which is "tightly interwoven with the region" via innovative partnerships and commercialization. Participants identified the following criteria:

> "*The main criteria of priority setting are emerging and important areas of research, and the social relevancy of the research.*"
>
> "*General management stipulated general guidelines as to the need for connecting research items closely to the teaching and training needs*."
>
> "*All priorities are set according to performance indicators in research. Everyone accepts the approach. Yet there is continuing debate on what kind of performance indicators should be used*."

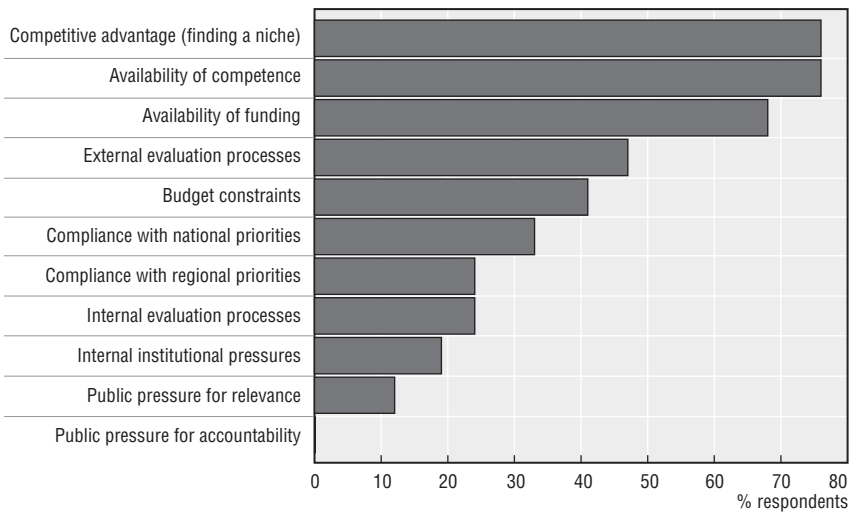
Another key factor influencing institutional priority-setting (and related issues of funding allocation models, research structure and planning processes, and recruitment strategy) is the timeframe in which institutions feel they have available to grow research. Many new HEIs feel that the enhanced competitive environment has spawned a tremendous sense of urgency generated by a strong belief that global factors and government policies are reshaping higher educational systems along a research fault-line.

Concern that the window of opportunity may be closing is forcing many HEIs to scrutinise their options carefully.

Participant HEIs were asked to rank the factors influencing institutional priority setting. Not surprisingly, their responses indicate that the availability of competence and competitive advantage/finding niches were the two most important factors influencing their research agenda (see Figure 4.2). Equally interesting, compliance with national priorities (30%) is more important than regional priorities (18%) despite the history and mission, and sometimes the language, of the participants; only two institutions mentioned regional priorities as more significant (*cf.* Section 3.1). Likewise external or national evaluation processes were seen as more influential than internal processes or institutional pressures. These responses illustrate that while government at all levels plays a significant role, national government plays a dual role. Government sets priorities and establishes funding regimes, and ask HEIs to respond by developing plans and setting their priorities accordingly. Not surprisingly, there is a strong correlation between the two, which enables governments to influence both the direction and content of institutional priorities and strategies.

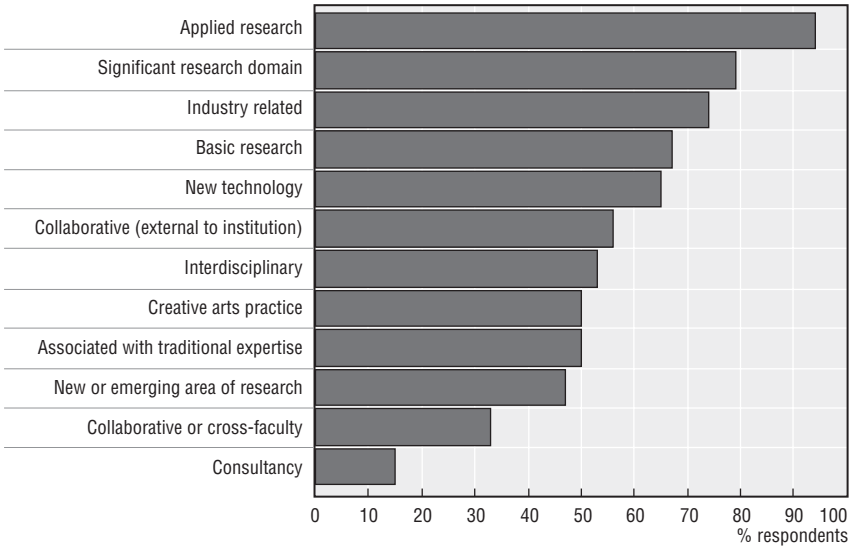
Figures 4.2 and 4.3 illustrate how new HEIs translate these concepts into identifying specific research priorities. Allowing for interpretation and overlap, strong preference is given to applied research, followed closely by research in domains particular to the HEI or region – which corresponds

Figure 4.2. **Factors influencing priority-setting**[1]



1. Each column is calculated as the per cent of respondents who ranked this category as 1st or 2nd in order of significance.

Figure 4.3. **Priority research domain**[1]



1. Each column is calculated as the per cent of respondents who ranked this category as 1st or 2nd in order of significance

closely with institution's identifying research competence that will enable them to develop a competitive advantage. Not surprisingly for these HEIs, basic research ranks fourth. There is stronger emphasis on external rather than intra-institutional collaboration, and on interdisciplinarity activity in recognition of new knowledge generation but also potential niche fields. These preferences are to be expected in response to government and supra-government pressures and funding for such partnerships. Moreover, it is not surprising that researchers prefer collaboration with partners external to the institution rather than within. Anyone familiar with institutional tensions and competition has probably experienced the reality that collaboration outside one's locale and country are usually easier.

Responses also suggest that while applied, collaborative and regionally-focused research is increasingly prioritised by government and industry and forms a key element of diversified mission, external funding agencies and evaluation exercises continue to favour basic or "academic" research with traditional outputs. Traditional universities often criticise moves towards applied research, but new HEIs criticise the fact that applied research is too often evaluated through a traditional lens. This presents a dilemma, as government is effectively both the policy-maker and the funding agency (see Chapter 2 above). Another paradox is evident in the research examples given by the participant HEIs. Despite various claims to widen definitions of

research and research activity, indicative research activity is primarily science and technology based. What has happened to the arts, humanities and social sciences? Does this reflect inherent biases within the research community or the way in which government and research funding opportunities and international benchmarks have successfully influenced institutional research priorities?

Priority-setting is not without its difficulties. Accordingly institutions are identifying ways to manage these tensions and ensure that the process of setting institutional priorities retains meaning and impact. Transparency and operability of the process, or the lack of, has the capacity to either lend credibility to the institution's research strategy or to undermine it. Problems and tensions identified can broadly be categorised as follows.

Institutional issues

Discordance amongst faculty can arise because of perceived or actual preferencing of particular discipline groups or themes over others – a process which carries with it resource allocation implications. This may be due to uneven conditions or opportunities between different disciplines, such as between the sciences, and the arts, humanities and social sciences:

> "*[…] some of the teachers get better possibilities for doing research than others. It is partly solved by allocation of qualifying development funds so that the teachers who do not do research will have a possibility of qualifying their teaching through in-service and further training.*"

> "*[The university] experiences uneven conditions for the three faculties, which are a result of external factors like funding, and there are very little reallocation of funds between the faculties. The lack of reallocation of funds is a barrier for setting priorities at institutional level.*"

> "*Territoriality is probably the biggest problem facing [the institute]. There are six faculties and a significant tendency to divide resources in six. This creates problems for priority setting. It also has an adverse effect on inter-faculty co-operation and quite often it is easier to get inter-institutional co-operation.*"

In such circumstances, institutions may decide not to "abandon" traditional areas of research, for "human reasons" because "involved scientists are not able to find new fields with their capabilities".

External funding or external pressure issues

The size of the government core grant is often "*politically and historically decided*", and a large gap may exist between funding available to new and long established institutions. Moreover, changes in government fiscal policy internationally has seen a significant reduction in direct government grants in favour of externally competitive funding. In these circumstances, either

Table 4.1. **Example and rationale for priority research domain**

Research domain	Example	Rationale
Basic research	Mathematics, Physics; Physics Research; Each Disciplinary Area; Neuroscience; Cell Physiology.	Maintain and develop contacts with the state-of-the art research; high impact on education and image; most important mission for the university; generates credibility in research excellence through peer review grant schemes.
Applied research	Mechanical and Electrical Engineering (Robotics, Numerical Control, Circuit Switching, Industrial Engineering…) ; University-Industry Cooperation Centre; Broadband/Wireless; Animal Vaccine for Bacterial Infections.	Traditional fields of research with strong link with industry (regional and national); knowledge transfer activities with commercialisation opportunities: returns to drug suppliers, primary producers and a variety of retail market consumers.
Creative arts practice	Design Research; Art and Culture (Music, Film, Art History); Fashion and Modernity; Sonology.	Collaborative, interdisciplinary activity funded by research agency; application of leading edge technology (engineering and physics) to the arts domains.
Consultancy	Construction Consultancy; Software Engineering; Business Management Systems.	Provides opportunities for new research training projects and avenues for graduating students.
Industry-related	Computer Modelling for Automotive Industry; Particulate Trap For Emissions From Diesel Vehicles; University-Industry Cooperation Centre; Broadband Wireless; Aerospace; Sizing Project (LCF); Eco-Design.	Industries with the strong multiplication effect; projects conducted with major partners; national enterprise funding opportunities; Enables HEI to make major contributions across a wide range of enterprises emphasising the benefits of technology developed within the triple bottom line domain.
New technology	New Technologies: Biomechanics, Surface Layers…); Wireless Communications; Advanced Research; Polymer Opto-Electronics; Management of Large Data Base Systems.	Established capacity and there is strong and potentially lucrative exploitation through established partnerships; significant impact on educational activities and on HEI image.
Significant research domain	Chirotechnology; Particle Physics, Digital Design.	"Catalysing the development of a major precinct embedding digital design into all aspects of IT".
Collaborative or cross- faculty	Biomedical Engineering; Environment; Globalisation and Cultural Diversity; Co-operation degree programmes.	Central to the way of the world! Need to understand where these initiatives are taking society.
Collaborative (external to the institution)	Social Work; Environment; High Performance Computing; Water, Polymers, Microtechnology, Advanced Telecommunications, Smart Internet, Advanced Composites, Construction Innovation, Aerospace.	Australian Government is bringing universities, industry and others together to form Co-operative Research Centres focussing on outcome related R&D.
Interdisciplinary	Environmental Research; Environment; Sensing Technology in Human Health and Environment.	Sensors are hybrid devices (biology, chemistry, physics, electronics) with applications in many areas and impacting on many social aspects of modern life (health, security, privacy, etc.).
New or emerging area of research	Rehabilitation Science Research; Emerging Materials; Bio-Informatics.	Diverse discipline capacities and potential for local enterprises; collaborative, international projects relating science and the arts.
Associated with traditional expertise	Mathematics; Native Studies; Complementary Medicine.	Limited capacity but growing relevance.
Associated with region/ local community	Textiles Research; Economic Development and Volunteerism; Water Quality in Regional Lake System.	Community and government imperatives; common projects with City Council, regional development agency, business innovation centre, etc.

directly or benignly, external forces are having an increasing influence on institutional priorities, including in some instances preferencing research with a strong focus on national strategic objectives.

> "*External influences are forcing staff [faculty] to increasingly seek financial support from external sources – this gives rise to tensions between the humanities/social science faculties vs the science faculties – granting agencies are seen as favouring science and technology* (i.e. *there are few sources available for humanities/social sciences). The University has tried to redress this situation in the use of its internal* funding, while balancing those allocations with support of deserving science projects."

Evaluation criteria can have a similar influence on priorities.

> "*Possible tensions in setting priorities are the limited budget from external financing organisations, the evaluation rules that are sometimes used by the governmental organisations for ranking the project proposals, and the limited time for writing and preparing proposals*."

Human resources or training issues

As discussed in greater detail in Chapter 5, many new institutions lack qualified researchers and research supervisors. Incentives are often available to encourage faculty to develop such expertise and identify research opportunities. Given finite resources, institutions are choosing between providing enhanced facilities, supports and training to research active faculty or to all faculty. This has provoked its own set of tensions, as the following institution explains:

> "*The establishment of a […] Register of Research Active staff [faculty] has caused considerable angst regarding workload allocations and access to internal funding support and supervisory opportunities with regard [postgraduate] students*."

4.2. Institutional research management and organisation

The Research Office is now virtually universal within all institutions seeking to grow their research capacity and capability. Led most often by a Deputy or Pro Vice-chancellor or Vice-President for Research or Research and Development, it has an explicit role to manage, organize and improve the competitive performance of research. The formulation of a research strategy is the primary starting-point, on the basis of which each institution seeks to identify a selected number of research priorities or interdisciplinary themes. Depending upon the institution, the Deputy/Pro vice-chancellor/Vice-President for Research is the institutional link and co-ordinator between and across faculties and management, and via Deans and/or Research Committees.

Institutions were asked to explain the process by which priorities are identified, the extent to which priority-setting is co-ordinated across the

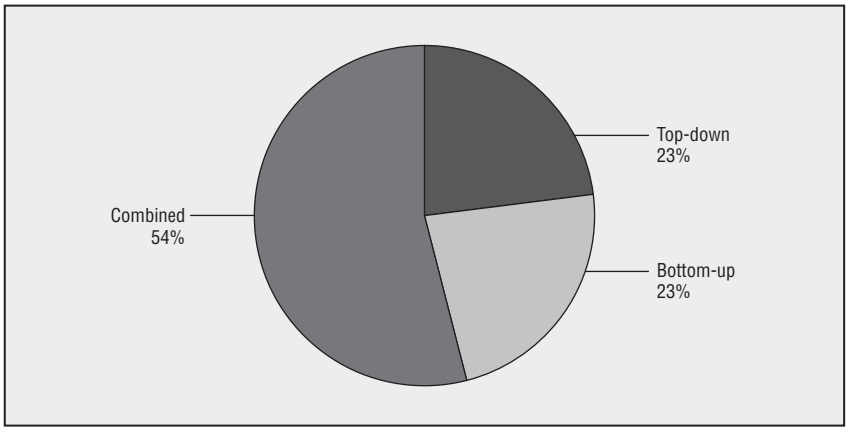
institution, who is involved and to what extent researchers participate. Because there are often informal or unofficial factors influencing the process, participants were also asked to identify these factors. Through their responses, it is clear that the organisational and governance structures are significant influences on the internal institutional processes by which research priorities are set. Three decision-making processes were identified: centralised or top-down, de-centralised or bottom-up, and a combination (see Figure 4.4). Over half of the participants favoured the latter process which sought to integrate the concerns of both researchers and senior management. The other participants divided evenly between those favouring a strong top down, and those in favour of a bottom-up approach. Sixty per cent of institutions said researchers were actively involved in the process.

1. Centralised or top-down approach – priorities and funding are determined primarily by the Pro-Vice Chancellor for Research (or equivalent). Evidence suggests that this process is compatible with other institutional decision-making processes or it has emerged because of an acknowledged urgency to develop research within a short timeframe.

2. Decentralised or bottom-up approach – priorities are set mainly by individual researchers or departments. A subsequent process may then take place distilling priorities to create an institutional set of priorities. This method is more likely to be the product of older institutions with a strong tradition of individual scholarship or those institutions with a "long tradition of respecting and promoting the autonomy of academic units".

3. Combination of top-down and bottom up processes – priorities are set via the involvement of different levels or committees of university personnel and boards, *viz.* Rector, Pro Vice Chancellor, Senate, Deans, Directors of Research,

Figure 4.4. **Who sets research priorities?**



Directors of Research Centres, Research Committee, Academic Executive (Deans and VCs Group), Academic Board, Planning Working Party, research committee, sub-groups of academic council, research groups, and individual researchers. Co-ordination is maintained at institute level, and the Research Office generally plays a key role in this.

The following descriptions illustrate the three approaches, respectively:

"*The Strategic Planning Committee sets the broad strategy for every University function for the next 6 years, once every 6 years. The Research Committee then sets strategy and policy for research and research programmes. The President is consulted on important matters. Researchers' views are heard on relevant matters.*"

"*The research priorities are usually set up in a bottom-up process, starting with the initiatives of researchers or research groups them. These initiatives are then evaluated at the level of departments, faculties and the university as a whole against various criteria, among them: compliance of the initiative with the strategy at all levels, viability of the proposal, links to education, possibility of funding, and potential for commercialization.*"

"*The Office of the Vice-President (Research) chairs a committee of Associate Deans of Research […] [which represents] the members of faculty as a whole and perform strategic outlook exercises to determine future priorities. Faculty members contribute to the exercise via departmental or faculty sessions and in some cases through participation in University, enterprise-wide priority setting exercises. Individual researchers overall are a crucial part of this process.*"

In addition, there are informal factors, such as peer pressure, historical reasons and other perceptions which are at work and can play a significant role in defining priorities, often effectively over-ruling or undermining institutional preferences. Disciplinary approaches to research can also influence priority setting; for example, in the arts and humanities, priorities have tended to be set by individual stand-alone researchers, while scientists are more accustomed to responding to and bidding in response to external priorities as part of a research team.

Regardless of the process for decision-making, the overwhelming majority of participant HEIs indicated that they had some kind of co-ordination mechanisms – this includes those with a decentralised model. Only four indicated that such structures were loose or non-existent. Various co-ordinating mechanisms, structures or processes were indicated, such as the Research Committee at both institution and department level; Management Committee; reporting system within the university; University scientific board, or the Pro-Vice Chancellor or equivalent acting as the co-ordinator. To ensure that research strategy is co-ordinated with and across other activity, one institution

requires the direct involvement of the Vice President of Research in the recruitment process, either approving appointments or sitting on the board.

> "*Co-ordination is important for implementation of research strategies and also for assessment of research activities*."

> "*Co-ordination of research strategies are embedded in the principles for allocation of basic research funds and in the goals stated in the development contract*."

> "*The process is informal and spontaneous. This is due to the historical legacy. The key action of the Rector is to have a reliable continuous process of monitoring all the performance indicators. A Vice-Rector coordinates the data gathering task*."

> "*I am in the process of trying to centralise and co-ordinate in an attempt to improve strategy, quantity and quality*."

For some HEIs, co-ordination with external agencies, including international, European, federal and provincial funding agencies, industry and policy makers is also or equally important. Some participants specifically mentioned the roles played by an industrial liaison office/office of business development in managing industrial linkages and commercialisation issues. One institution has an equivalent Deputy Vice President, others have a specialised office while another distributes this role among various groups under "*the common umbrella of the vice-rector for research*". The Deputy Vice Chancellor of one participant HEIs is on the Board of the University's commercialisation company and in another s/he chairs the university Committee for Intellectual Property. Elsewhere,

> "*Commercial activities linked to industry and consultancy are managed through a reporting line to the university's Director of Finance. We are working to integrate this work more closely with the Research Office's work*."

These different mechanisms are attempting to secure the interface between the institution's internal organisational structure and its external partners, in other words to ensure that research and development activities are fully integrated with each other and within the institution.

Institutions differ as to whether postgraduate or research students are an integral part of research strategy and policy. Several institutions state that "*postgraduate students are members of research groups…fully integrated into the research activities*", that they are "*included within research division*", and that the "*[…] research portfolio encompasses our postgraduate research programs […] including new research degrees – Master and PhD by project and professional doctorate, workplace and exchange with enterprise initiatives, and on-line modules*". Some distinguish between taught and research postgraduate activity, seeing the activities and needs as distinct. An example of how one institution co-ordinates research and development and research training is presented below:

> "*Currently the PVC (Research and Development) chairs the Research and Development Executive Committee (RDEC) comprising other PVC's (Teaching/*

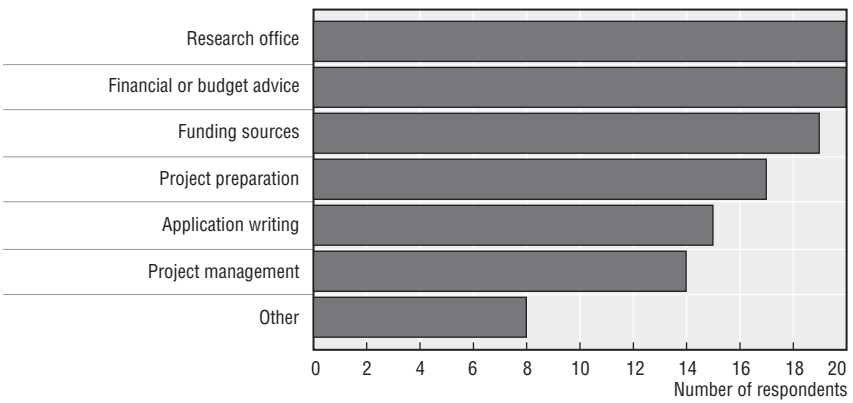
Learning and International), Deans of all seven Faculties, and the Chair of Research and Graduate Studies (R&GS, appointed by the PVC [R&D]) – the Research and Graduate Studies committee also has broad university representation and is the key university Committee for research students/research training."

The increasingly competitive research environment and the trend towards a managerialist approach in higher education has transformed research activity from something that individual faculty do into a serious business for both faculty and their institutions. The move away from research activity by individuals or within departments to cross-disciplinary centres of excellence, institutional research centres, interdisciplinary groups and problem-focused institutes, strategic partnerships with other institutions or with industry means that there is a greater need for institutional co-ordination than heretofore (STI/OECD, 1999). In addition, the new competitive environment is placing pressure on "universities to develop more sophisticated and well-managed organisations for the procurement, support and administration of contract research" (Dill and Sporn, 1995). In contrast, "the absence of a strong Central Research and Management Administration" can lead to institutional disorder or

> "academic entropy [...] [or] corporate identity among the faculty members, which in turn produces both considerable difficulties in developing corporate research policies and a high probability of institutional dislocation" (Pinto, 1996).

Today, the Research Office is at the centre of an increasingly professionalised approach to institutional planning, co-ordination and management, providing services to individuals and teams of researchers, and audit functions for both the institution and government agencies. Figure 4.5 illustrates that the overwhelming majority of participants have formally

Figure 4.5. **Research office and support services**[1]



1. Not all respondents completed this question.

established a Research Office, providing a range of services or functions, including "*project troubleshooting for large, long-term, multi-institutional projects*" and providing "*legal/para-legal advice for agreements*" for such projects. Emphasis on entrepreneurship, commercialisation and technology transfer means the Research Office is likely to deal increasingly with issues around intellectual property, patents, and contract management. Moreover, given the relative immaturity of the research enterprise, functions such as researcher and supervisor training, and mentoring may also fall within its remit.

4.3. Funding and resource allocation

Because funding is one of the major underpinning forces for the development and shaping of research, this study sought to investigate questions related to institutional funding, and the mechanisms for distributing funding within the institution. The latter can provide important means for encouraging, facilitating and supporting research activity, and thus provide an insight into how the various participant HEIs are seeking to grow research capacity and capability. Again, the focus is on internal institutional mechanisms. Participants were asked two different but inter-related questions about their institution's research funding: 1) what percentage of the institutional budget is directed towards research and 2) what are the different sources of funding that comprise the total research funds available to the institution.

Identifying the percentage of the institutional budget directed towards research proved difficult to answer, and different interpretations were used to calculate the figure. For example, some institutions include all personnel costs, while others do not. Some HEIs include all research activity within the research funding purview, while others only include the budget available to the research office and management team. For example:

> "*It is not possible to state this in a way which will permit external comparisons, as all academic staff [faculty] are expected to engage in scholarship, which cannot explicitly be distinguished from 'research'. They are not required to identify 'research time' so it is impossible to say what proportion of the university's funding supports research. The Finance Director likes to quote an impossibly large proportion of the university's effort as devoted to 'research', but we dispute her definitions. At a guess, I would say 15%.*"

> "*The budget for Education covers the salary of researchers (almost all are professors at the University) thus it is estimated that the 40% of the money is devoted to research. The budget for grants and projects comes directly from the Science Budget directly to the research centres (the Rector and the Deans have no clear knowledge on this).*"

> "*[The university] allocates 4.4% of its total operating budget to research. [This] is basically the funds allocated to the Office of Vice-President (Research) for salaries,*

operating expenses, and graduate students teaching assistantships […]. The University does not encourage an internal research funding structure […]."

Interestingly, the figures quoted in the extracts above do not appear to bear any relationship to the size of the institution's research enterprise.

Bearing these caveats in mind, participating HEIs allocated a median value is 9.5% of their budget for research. However this figure cloaks the fact that the range deviated from as little as 0.8% to as high as 50% – for example, the latter figure, which includes salaries, is from a research intensive *ab initio* university while the former institution does not include salaries and has a small research profile. Eight participant HEIs expect a growth in their institutional research funding, via "*a dramatic and continued investment in research*" or "*Research Investment Plan (ca AUD22 million over the next three years) aiming at growing R&D capacity/capability corresponding to a doubling of the sustainable research expenditure (and hence sustainable research income)*". Others anticipated that institutional research funding would remain at the same level. There was continued reference to future trends, which are likely to change the balance between institutional and external funding due to "*cutbacks in funding from the Ministry*" and a more competitive financial environment for higher education.

The current financial climate and its impact on research funding was also evident in participant responses to identifying the different sources of funding that comprise the total research funds available to the institution. Again, there are some caveats to understanding the data as noted above; in addition, external or local factors often have had a role in skewing the balance between funding sources in any particular set of years. For example, researchers in one of the participant HEIs were less ambitious about entering European competitive bids because of the sudden availability of new national funding. Nevertheless a trend is apparent. (see Table 4.2) As one participant stated:

"*The principal problem continues to be the lack of sufficient resources to promote research and knowledge transfer. This is reflected in reduced budgets, which often make it impossible to develop an authentic scientific policy, and in academic and research staffing levels far below what are needed.*"

Table 4.2. **Change in research funding (1995-2001) as a function of funding source (%)**

	Core funding	Grants	Contract or project funding	Business	Other	Total
2001	33	27	26	8	6	100
1995	37	30	24	6	2	100
% change	–4	–4	2	2	4	0

With few exceptions, all HEIs experienced a reduction in core funding from government and grants from research councils or similar agencies, and an increase in competitive funding from external sources (including EU contract or other project funding) for the years 1995-2001. On average, participant HEIs experienced a 4% drop in institutional and grant funding with one participant suffering a 30% reduction and another 20% reduction in core funding towards research. There are other variations amongst the participants: for example, one HEI was especially endowed with a very significant rise (60%) in other (public sector) funding – probably due to some particular projects or tenders – while another experienced drastic a decline in EU contracts but its business income increased.

While the reductions in funding paint a grim scenario for all HEIs, any slippage in the core-funding base is likely to be proportionately more serious for newer HEIs. Their research base is much more fragile, and they are less likely to have built up either a financial reserve – perhaps via endowments, named fellowships or chairs, etc. – or a self-sustaining research enterprise. Accordingly, participant HEIs named funding or the lack therefore as one of their greatest challenges.

> "*Perhaps the biggest challenge is the identification and procurement of significant seed funding*."

> "*[…] as a relatively young university [we] still need to develop procedures and practices for administration and support of R&D activities. In the current situation, when HEI are strongly under-funded in comparison with our EU counterparts, it is especially important to diversify the funding of the universities by commercialization of its R&D*."

The key question is the extent to which the gap can be bridged. Moreover, earning external funds via competitive grants carries its own challenges.

> "*A key then to [our] sustained participation as part of Australia's university research […] will of course be resources: undeniably there will need to be an increase in the fraction of 'internal' resources allocated to R&D as well as growth in external funding for R&D. As well we will be planning to generate an increasing flow of funds through the commercialisation of our R&D outcomes*."

Participating HEIs felt funds were often "politically and historically decided" or weighted in favour of established universities and traditional academic research activity and outputs. Without alternatives, they were overly dependent on government at regional, national and EU levels, and vulnerable to priorities set by others. Many new HEIs face a double-bind or "chicken and egg" scenario, unable to invest sufficiently to subsidise researchers and research time which might ultimately make them attractive for external funding. Diversifying the funding base therefore emerges as a key priority for many institutions and their success rate varies.

Participants operate various resource allocation models (RAM) as a means to distribute research funding within the institution. Almost half of all participants used some combination of performance indicators via an internal competitive selection process to distribute funding (see Table 4.3). Surprisingly, 36% of respondents had no formal resource allocation model albeit one institution explained that the absence of a RAM was due to the fact

> "*that the University does not operate as a granting agency for research. Rather, it encourages faculty members to obtain external funds in support of research and assists in facilitating that process*."

Table 4.3. **Resource allocation models (RAM) used to distribute research funds within HEI (%)**

Performance	41
Relevance to Strategic Plan	9
Via faculty/departments	14
No RAM	36

The benefits of a formal model, in the view of one HEI, was that it provided a "*balanced evaluation and [was] transparent*" while another said it "*stimulated the ability to take in external funding*".

Institutions used slightly different processes and combination of metrics to evaluate and allocate funds and resources internally. This may involve top-slicing to establish a research budget which is then dispersed. Assessment is conducted either at institute or department level or by an internal selection or evaluation committee. Institutions in Australia and the United Kingdom sought to match institutional criteria with national evaluation criteria or the institution's strategic plan; many European institutions and national agencies mapped institutional (or national) criteria against European Union research priorities as identified in the Framework programmes. Metrics focus on traditional success factors: publications, research income, citations, PhDs supervised/completed, etc. Ironically, given the debate around widening definitions of research and scholarship, participating institutions appear to use the same metrics for which they criticised national and international funding agencies. The reason may, as discussed above, be quite rationale: institutions believe it is important use external factors in order to help researchers reach external standards, especially because the latter guide funding opportunities.

The following excerpts give a fuller and contrasting picture of institutional processes and models:

> "*In recent years […] [the university] has developed a system for evaluating technology transfer and research activities. The system works by calculating Research Activity Points (PAR) and Technology Transfer Activity Points (PATT). The University Research Committee is responsible for determining and monitoring the research evaluation criteria. Each department and institute enters data about their activities on a database run by the University. The information is then checked by the data management and research offices. The annual results of the evaluation are used for internal decision-making at the individual level (staff applications and promotions), as well as for the research centres and departments (allocation of budget resources for departments and institutes, authorisation of resources for equipment maintenance and the purchase of new scientific material, etc.). The planning contracts for each unit also establish the resources agreed upon for the development and consolidation of RDI activities. These are reviewed annually by the Vice-Rector of Science Policy and the management team of each academic unit.*"

> "*We have a simple model for allocating financial resources to encourage research activities. The main parameter is the success of research groups in grants activity back to previous three years.*"

> "*We have two types of research activities that we fund on a mass scale: research projects and research student programmes. We use a performance-based model to determine what amount of resources each department gets for each exercise. This approach has worked fine because it has forced departments to improve their performance. For other activities like supporting research infrastructure or postdoctoral fellowship, an allocation to departments is not made and applications are considered on a competitive basis by the Research Committee.*"

Participants were also asked to identify the mechanisms used to encourage or facilitate research across the institution. For example, are there special incentives to encourage new or inexperienced researchers, encourage interdisciplinary, cross-departmental or cross-institutional research, and/or help researchers apply for funding from different/external funding agencies? Replies are grouped under three headings: human resource development, commercialisation and start-ups, and partnerships and collaboration to grow critical mass. Several institutions use funding as an incentive or to seed new and inexperienced researchers or "*areas underrepresented […] but […] of equal*

importance to the university". Table 4.4 provides an indicative list of initiatives and incentives under each of the headings:

Table 4.4. **Indicative research funding initiatives and incentives**

	Indicative Initiatives and Incentives
Human resource development	Conference travel Grants for publication New and inexperienced researchers PhD scholarships Professional development fund Research Achievement Awards Research-only posts, including fellowships Short term funding of pre-competitive groups Support for membership in scientific societies Teaching relief for supervisors Training programmes Undergraduate research
Commercialisation and start-ups	External, competitive research applications Innovation funds for new areas Potential commercialisation Seed funding for biotechnology collaboration
Partnerships and collaboration	Cross-faculty proposals External collaborative funds Match or top external research funds Network and participate in cross-institutional projects Potential for international-level research, mobility and co-operation Shared resources with other external public and private bodies Thematic and regional technology centres

4.4. How research is organised within the institution

While research and scholarship is still grounded on the activity of individuals, it is less and less conceived of as an individual activity. Accordingly, most institutions are actively developing strategies and policies to shift the locus of activity away from individuals working on their own and towards teams or clusters of researchers. Emphasis is placed on the importance of growing a critical mass or community of scholars conducting interdisciplinary research and achieving grant-awarding reputations with timely outcomes. Organizationally this translates into using institutional funding to preference interdisciplinary and collaborative research across the HEI or with other HEIs or organisations, and within research centres, centres of excellence or latterly in industry/science parks. Higher education institutions view research centres or similar units as providing an important foci and stimuli for research activity and for the growth of a research culture, especially for new researchers and postgraduate students.

These views concur with international trends. For example, the great explosion of university research in the US during the 1980s occurred

> "while the academic base on which it rested was fairly static […].Much of the growth in research consequently took place outside of academic departments in separate ORUs [organised research units] […] It was also consistent with other trends…universities eager to expand research, creating client-oriented ORUs to attract programmatic funds was perhaps the most direct means […]" (Geiger, 1993).

Credited by Geiger as having contributed to the rise of the great American research university, the number of research centres is growing exponentially.* In addition to providing a physical space in which researchers can come together to work on cognate projects and share ideas and results, such centres create a "powerful intellectual cohesion", with the potential for a self-sustaining and self-financing researcher community.

> "The most efficient and powerful intellectual cohesion is attained when a majority of scholars in a concrete environment work with similar theoretical and methodological assumptions… Intellectual community can also emerge through preoccupation with a *limited* range of problems in an environment, that is, in a *limited research agenda*… Finally, intellectual cohesion can be measured through the presence of intellectual discussion and assessment in a *joint seminar*" (Bennich-Björkkman, 1997).

New projects, joint authorship and close collaboration between faculty and postgraduate research (principally doctoral) students, and occasionally originating and administering designated postgraduate taught programmes, are the usual hallmarks of a research centre.

An advantage of these formalised centres compared with research groups within departments is their flexibility. This extends to personnel. Many centres employ non-faculty professionals as contract or permanent staff – a situation which raises other issues regarding the contract researcher's career prospects and employment rights (Cabiaux and Thys-Clément, 2004). Operating at a slight distance from "bureaucratic" and academic procedures, research centres are perceived as able to respond and innovate more quickly. Such benefits can be an Achilles heel, widening the nexus between teaching and research and inducing greater disengagement from university governance

* The Research Centers and Services Directory provides a comprehensive source of detailed information on over 27 500 organisations conducting research worldwide. It includes information on 14 000 university-based and other nonprofit research facilities in the United States and Canada, 9 700 non-US research organisations in approximately 145 countries, and more than 5 500 research units of the US and Canadian federal governments. It also accounts for approximately 800 newly identified research centers. *http://library.dialog.com/bluesheets/html/bl0115.html#top*.

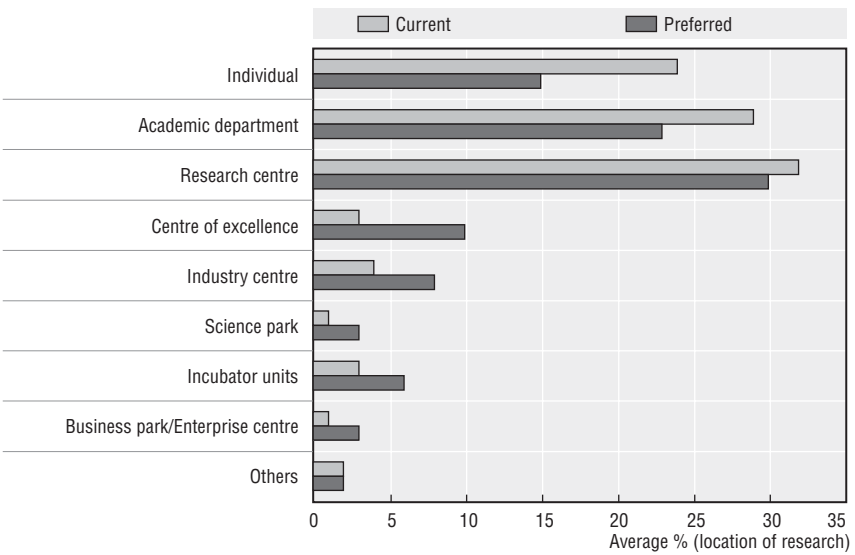
(Mallon, 2003). Nevertheless, research centres are becoming the staple research organisation within higher education, responding to economic, societal needs and interests, and calls for greater collaboration with external partners. These networks are placing higher education at the centre of a dynamic learning region between higher education, industry and government, often referred to as the "triple helix"; the

> "comparative advantage" of the university [over the autonomous Institute] is that the knowledge-base is continuously developed because there is a flow through of students on the higher-education side. As one technology transfer officer said in an interview, "Each year I have 3 000 potential new inventors" (Etzkowitz and Leydesdorff, 1997).

In the language of Burton Clark (1998), they are examples of the "expanded developmental periphery" opening up new opportunities while providing a means to generate additional income.

Figure 4.6 illustrates the veracity of these trends. Participant HEIs were asked to indicate where most research activity is conducted today and where they would strategically prefer research to take place in the future. The results show that today research is primarily conducted either by individuals, or within academic departments or research centres. Only limited activity takes place in outward-looking or boundary crossing units, such as industry centres, science parks, incubator units or business parks – albeit the differences between these categories may be more a matter of terminology and varies

Figure 4.6. **Where is research conducted?**



amongst countries. Two institutions mentioned that research is organised via groups and projects. In contrast, participating HEIs forecast that the per cent of research conducted by individual researchers and within academic departments will decline sharply in the future, while activity within research centres will remain fairly static: a "*key principle driving our research programmes is that they will be industry or sector response*". The big trend is towards greater emphasis on collaborative research within industry centres, science parks, incubator units or business parks.

Creating research and development centres is real a priority for the participant HEIs. There is some variance in how such centres will operate – whether they should be affiliated with an academic unit, cross-institutional or "virtual". Nevertheless there appears to be unanimity that these centres have a major role to play as the:

> "*focus for research and consultancy funding which will allow concentration of applied research and consultancy expertise, enhance synergies, create critical mass and encourage networking and cross-disciplinary interaction.*"

Twenty-eight per cent of participant HEIs mentioned contact and collaboration with the local and/or regional economy as paramount in developing programmes and other activities which could support sustainable applied research. They identified geography and the desire to form "innovative partnerships" with industry and the community as critical factors underpinning the establishment of their institution and its mission going forward. One of the participants specifically mentioned the virtue of

> "*proximity to the nation's political bodies, policy makers and ambassadorial collective has provided a perfect environment.*"

Associating Figure 4.2 above with Table 4.1 provides further evidence of the strategic focus of new HEIs who cited the attributes of competence and technology as key rationale for identifying or developing a particular domain. Participant HEIs are actively putting into place the various personnel and organisational structures, such as industrial liaison services, incubator units and commercialisation facilities, in order to foster greater interaction with industry via collaborative research and research networks.

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 5

Human Resources

5.1. Human resources issues in an embryonic research culture

While higher education institutions are busy encouraging the formation of teams of researchers, there is no getting away from the fact that research is ultimately dependent upon individuals. Institutions or departments with high research activity and performance are generally populated by individuals with intellectual curiosity and high career motivation, who are eager to undertake research and to interact with others. Yet, many participant HEIs and commentators describe how the development of a research strategy and identification of priorities has given rise to tensions, human relations and industrial relations issues. Likewise, the daily routine of the academic is undergoing change. New expectations about academic employment are influencing academic workload, tenure, salary, career and promotion considerations, creating challenges for and anxiety amongst faculty. There are growing gaps between national and institutional expectations for research, "the research aspirations of staff [faculty] and the resources available to support research across the institution" (Coaldrake and Stedman, 1999). Growing research is not without human costs.

Participants report that faculty express uncertainty and disquiet over the nature and mission of the institution, the content of academic work and terms of employment, and the balance between teaching, research and service. For some new institutions, the circumstances of institutional formation and development have provoked a clash of cultures, between the vocational and the academic, between teaching and research. Even within *ab initio* HEIs, established from the beginning to undertake both teaching and research, faculty are experiencing new and growing pressures for more output, accountability, social relevance, collaboration and research income – metrics which some may not have formerly associated with an academic culture or to the extent to which it is now a critical component of their work. Critics use the term "academic capitalism" to describe an environment in which faculty are required to spend an increasing portion of their time competing for research projects and grants (Slaughter and Leslie, 1997).

For many faculty in new HEIs, research was neither a criteria of appointment nor part of their contract. Their career and educational credentials were often in the professions or in non-traditional academic careers. Many have a taught (or non-research) masters degree in disciplines which were new, and often without a strong academic focus or research ethos. In some disciplines,

such as nursing, media production, art and design and architecture, postgraduate qualifications are only now becoming the norm (Jones and Lengkeek, 1997). As a consequence, many faculty lack the requisite research background or experience and have limited capacity to compete for funding or produce the required outcomes. Moreover, they were appointed initially to a teaching-only role in an institution which did not prioritise research or scholarship: "*teaching undergraduate students is the main activity here*."

> "*[Many faculty] were not hired to pursue research […] and are neither equipped [to] nor desirous of engaging with a research environment*."

> "*In the past, many members of the teaching staff [faculty] claimed that a high effort, which is needed for their teaching responsibilities, did not permit them to invest energy in research or related activities […].The former includes a more open attitude towards research, since the teacher is more a coach and not a 'fact-provider'*."

> "*All staff [faculty] are expected to engage in scholarship, but for up to half this could just mean keeping their teaching refreshed and up-to-date*."

Focus on teaching over/rather than research has also had an impact on the type and quality of facilities in which many new HEIs operate, resulting in particularly inadequate office and/or research space. Age, or length of service within the institution, may also be factors. Some, or a combination of these factors, result in some faculty finding the new research environment alien; many simply do not consider research as part of their job.

Conditions and terms of employment between traditional universities and new HEIs often differ. Given the emphasis on teaching, student contact levels and work loads are often high; some faculty in many new HEIs teach 16-18 plus hours per week compared with research-oriented universities which average less than 8-10 hours per week; others teach somewhere between these two bands. For some, the culture and practical element of their mission and programmes has helped maintain small class sizes and hands-on teaching.

> "*Our contact hours are high (16 hours a week). […] The culture here is small classes and a considerable amount of 1:1 time*."

Others experienced larger student numbers in addition to their high workloads. The latter combination did not take into account what is known as the "iceberg effect" of additional marking, preparation, administrative duties, and teaching groups.

> "Polytechnic staff [faculty] received inferior pay and suffered worse conditions of employment than their university counterparts for virtually the whole existence of the polytechnics, and the differences were taken with them into the new unified system of higher education in 1992" (Pratt, 1997).

Even today, there is great disparity in conditions of employment, including career paths and salary scales between research/doctorate institutions and

teaching/baccalaureate institutions (Wilson, 2004). There are also differences in perceptions of academic work. Faculty in research-intensive or traditional universities perceive themselves as performing several tasks: teaching, research and service. The balance between the activities may change from time to time but nevertheless, teaching and research are inter-related (Altbach and Lewis, 1996). Faculty in some new universities do not share this view. Moreover, some enjoy relatively long summer holidays, often protected by trade union agreements. As one participant noted:

> "*[…] the teaching staff [faculty] are mostly on contracts which guarantee them long holidays, and which foster a 'trade union' style orientation towards their careers and workloads*."

In comparison with colleagues in research universities, there may be little or no stipulation or expectation, on behalf of faculty or management, that this non-teaching period should be used for research or scholarship.

The picture described above is not uniform across all new HEIs or all faculty within each participant HEIs. While some faculty show little interest in or are openly hostile to research, others have been actively building a research profile "to maintain the viability of their academic career" (Deane and Jones, 2001) and perhaps move on to another more research-focused university. Many have been pioneers in their research fields, achieving high productivity despite their relative disadvantage when compared to colleagues in other or traditional universities or the incredulity and suspicion of their own colleagues. Many are eager to develop their research capabilities and become involved in the "*generation of new knowledge (research) and the transmission of knowledge (teaching)*". Indeed, it could be argued that their success helped pave the way for many of their institutions to successfully transform themselves to a stage where government has formally granted university designation. It could equally be argued that the ability or willingness of some faculty to engage with the new research environment has led to tensions within the academy and with their institution.

Difficulties associated with building research capacity transcend institutional history and formation. All participants identified tensions arising from the shift from individual to collaborative, from basic to applied and from Mode 1 to Mode 2 research, from research as self-discovery to research in response to national and institutional priorities, and research in the humanities/social sciences and in the sciences. Methods for defining research activity and evaluating research output can also be controversial. Respondents expressed "*difficulty in reconciling individual, college [and wider institutional] objectives and aspirations*".

> "*Excellent researchers tend to be individuals that do not easily cope with others unless they have the control over the situation.*"

"*RDI activities are still considered as individual in nature, emerging from the initiative or will of a particular lecturer or researcher. Greater effort needs to be invested in promoting stable groups of excellence, facilitating joint interdisciplinary projects and developing the infrastructure for shared research.*"

Another participant identified pressures associated with the more externally directed and competitive research environment:

"*There is […] external pressure for staff [faculty] to move from basic research to applied. This is resisted, as such applied research is not seen as a great motivation to become an academic in the first place. Most academics see their main role as educational, teaching at undergraduate and postgraduate levels. They do not see assisting industry as their primary function.*"

Other problems include insufficient funding which impacts on the lack of permanency of some research posts or alternatively in the growing number of contract researchers, inadequate rewards for active researchers, and including sabbatical leave or release from teaching.

One of the greatest liabilities, identified by all participants, including *ab initio* HEIs, is the amount of time available for research. Harris and Kaine (1994) suggest that people who cite teaching commitments as a reason for not engaging in research are more likely to be people with weak motivation and who believe that research achievement is a function of external circumstances. Nevertheless, UK and Australian studies found that academics from universities tended to be more motivated than colleagues from the former polytechnics or Colleges of Advanced Education (Deane *et al.*, 1999). The latter continue to have "student contact hours greatly exceeding those of academic staff [faculty] at the original universities" (Adams, 1998). While poor facilities may often be used as an excuse rather than an explanation for research inactivity, teaching loads are one of the biggest disincentive for research. Participants' responses concur.

"*The primary concern expressed by faculty who provided input to the task force was the lack of time for research.*"

"*A heavy teaching load, leaving little time for staff [faculty] to do research.*"

"*The allocation of Government funding for teaching and research is often confused. Staff [faculty] require adequate release time and funding for research.*"

"*Teaching loads remain high and, along with administration, are the most often quoted reason for research inactivity.*"

"*With decreasing government funding, academic staff [faculty], who are mostly teaching/research are finding it increasingly difficult to dedicate time to research.*"

Greater emphasis on research is altering the internal institutional dynamic by challenging the "ideal that all academics are equal members of a scholarly community" (Coaldrake and Stedman, 1999). As governments and

institutions commence assessment of academic performance via performance-related pay and/or other benefits, a new competitive element is being introduced into what was formerly, at least theoretically, a unitary and collegial academic structure. That structure provided a common "*comfort base*" from which decisions about recruitment, promotion and distribution of work, often underpinned by seniority, were made. Today, faculty may be recruited in line with market conditions for particular disciplines or positions. Across all disciplines, "*new research-active faculty are being brought in on-top of older faculty*". Tangible rewards in terms of promotion, salary, special resources and status exist for active researchers, especially those who can win sizeable external funding, while others may find themselves teaching ever larger numbers of students. There is some (often deep) disquiet among faculty, especially those who because of professional background, age or attitude, feel "*left out*" or "*sidelined*" by the new environment. In contrast, one institution remarks that such changes "*have been of considerable assistance in the job satisfaction of female members of staff [faculty]*".

5.2. The academy's response to growing research and priority setting

Rowley, Lujan and Dolence (1997) suggest that adapting to change can be much more difficult for people who are only engaged in teaching rather than both teaching and research. The latter face new ideas and participate in a peer-review culture as a normal part of their academic practice, while the former are primarily didactic, instructing students, and operate relatively on their own.

> "[…] naturally staff [faculty] disagreements […] do occur, particularly in traditional branches of education which have not until recently had a place at the academic end. Often, most faculty members in these branches were hired without consideration of research skills and future research activities in mind […].naturally this may generate tension" (Skoie, 2000).

Versions of this assessment are evident throughout the case studies, the interviews and the literature; all point to the fact that restructuring and refocusing an institution and faculty towards research represents a "fundamental challenge" because they are suddenly confronted by "new sets of expectations" (Deane, Jones and Lengkeek, 1997).

Priority-setting is a process of mapping institutional competencies against the external environment and national aspirations. A key element of the process is having an understanding of institutional competencies, which are strongly contingent upon the ability and capability of faculty.

> "*If you asked the question: do we have the right mix of people to continue to be a significant research player in the environment, the answer is clearly No. So unless we*

significantly upgrade our research capacity in terms of the sorts of people we have in our institution, we will not survive in the research environment […] We must undertake significant new investment to bring better people into the institution."

Table 5.1 illustrates one institution's method of describing research potential among faculty. The typology solicits important questions about which human relations policies and other strategies an institution might adopt. This typology can be understood as follows.

Table 5.1. **A faculty typology**

• Research active
• Research oriented
• Research minded
• Research inclined
• Research defunct
• Research negative

The *active researcher* (first two categories) is supportive of the research strategy of the institution and shares many of the concerns and frustrations of management. S/he may agree that the institutional culture is inappropriate or insufficiently supportive of research, but may also criticize the institution for progressing too slowly and providing no effective management of the transition from a teaching to a research-active institution. Correspondingly, they will recognize that there are problems with the physical environment, the quality and/or quantity of research space, insufficient funding and supports, high teaching loads with inadequate time for research, and the absence of a critical mass of fellow researchers. Active researchers may also have concerns about the way in which priorities are identified and the impact this may have on their research activity:

"*The most common problem that we face in setting strategic priorities is the anxiety of individual faculty member, (mostly) chairs of departments and, sometimes, deans that their research activities will be compromised if their work is not labelled 'strategic'.*"

"*Review of research concentrations was a major exercise, undertaken by external experts and involved significant uncertainty both during and after its results were announced.*"

The active researcher is often concerned about salary and career differentials as compared with traditional universities, particularly the fact that career structures may not adequately reward their efforts. In addition, many claim that while the institution purports to value research, undergraduate

teaching is still paramount. Active researchers may also be critical of their respective Head of Department or colleagues because they may "*see research as a hassle*" that gets in the way of their primary duty or disrupts the timetable routine. Given this environment, "*many of our passionate researchers would say they have been able to pursue quality R&D despite*" the institution.

The *uneasy researcher* (the next two) is often apprehensive because in many instances the act of doing research is new. As a consequence, s/he may be uncertain about how to get started (or re-started in the case of faculty whose research activity has lapsed) and how the changes and new demands will impact on her/his workload, position, and promotional and career opportunities.

> "*[There is an] emphasis on recruiting research-active staff [faculty] but not [on] spending money on existing staff [faculty] […].*"

> "*The younger, more ambitious staff [faculty] now entering with PhDs are more committed to developing their own scholarship and publications, to foster their career development, but the older ones may be fearful of getting started on research and lack the necessary confidence*."

S/he may be concerned about institutional proposals to align funding to priorities, to review research strengths and to codify research activity. Some of this anxiety may arise from the definition of research and research output being used, with its emphasis on peer-reviewed publications, income earned, PhDs graduated, citations, etc. In this respect, the uneasy researcher shares concerns with the active researcher, both of whom accept the need for performance indicators but want to debate the metrics used. They may also be uneasy about the perceived balance between research and teaching, as they feel teaching remains the core mission of the institution and their job.

> "*There is some concern that the increased research activity will be at the expense of the teaching. On the other hand, the research offers a possibility for professional development for the benefit of the teaching*."

> "*There is a major tension between staff [faculty] time spent on teaching and related administrative work, and time for research*."

To a large extent, the uneasy researcher is a product of the institution's history and a potential contributor to its future. The key characteristic is this person's willingness to engage with the process, a willingness which may also be contingent upon the supports and rewards that the institution offers.

The *research negative* person (last two) is either antipathetic or openly hostile to research activity or is simply unsure why research is important. S/he was most likely recruited because of professional or vocational experience, and may have neither the academic prerequisites nor the experience required in the new paradigm. Given this background, s/he may "*believe that research is*

unnecessary as they have been teaching for twenty years and don't need to change". There is also a belief that "*research is something people are being asked to do extra*" or "*over and above*" their real job which is teaching at undergraduate level. Some are particularly unhappy at the way new faculty are being recruited or promoted to higher-level posts over existing faculty, including themselves. The research negative person may have been in either of the above two categories earlier in his/her career but because of age or the institutional culture in which s/he has been operating has moved, by default and as a result of inactivity, to this group. "*Fearful of getting started on research and lacking the necessary confidence*" or simply unable or unwilling to change can be a strong factors.

These vignettes portray a complex human resource milieu for HEIs as they seek to develop research capability and capacity, or as one commentator says, "to squeeze research out of people and departments that have no training, aptitude or inclination for research" (Skoie, 2000). Others feel that faculty "*don't understand the national picture. [Our task] is to get individuals to realise their role*".

> "*Many staff [faculty] have little experience of research. We have to work with them to help them to get started, and to manage this staff [faculty] development activity so that they gradually progress to do more prestigious and demanding research-related activities, moving perhaps from team or group work to individual projects.*"

Several participants mentioned morale problems, while another, in contrast, mentioned the social culture as a critical factor supporting institutional goals. Some participants experienced industrial relations problems, a feature of whether the institution is bound by national or enterprise (local) negotiations and whether it negotiates with a general educational or academic trade union or a general staff association. Only one used the words "*strong resistance*" and that was to describe responses to "*a strategy to codify research active status*". In contrast, most participant HEIs report that the move towards a more research-focused environment has been greeted positively by the majority of faculty. Nevertheless, they are mixed views as to whether faculty responses are helping or hindering the research strategy.

> "*Due to the positive impact of the industrial relations, it has been possible to speed up the build up of research environments […].*"
>
> "*Staff [faculty] significantly acknowledge the culture shift which the Institute has undergone during the last three years, and this is widely appreciated amongst [faculty].*"
>
> "*Generally the academic staff [faculty] respond well to the institutions/faculties [sic] research strategy. There is unity in regard to the overall priority setting.*"

> "*The response of academic staff [faculty] has generally been very positive. They have been very supportive of the University's initiatives and activities in support of strengthening the research infrastructure.*"

Adams (2000) offers the following somewhat caustic observation of another institution:

> "I have watched new academic staff [faculty] at this University over the past five (sic) years working hard and long hours to establish themselves and their credibility with students and with colleagues within the University and within the disciplines. The dropout rate has been small, with only three choosing to leave the university [...]. None has been motivated or 'driven' by policy or regulation […]. [Rather] the interest and commitment of these new academics is to their students and their subjects. It is this commitment that has pushed them to work long hours to reach the standards of teaching and research that they wished to achieve. It seems that the industrial policies of the current government, and the managerial practices of the University are 'flogging a willing horse'."

Undoubtedly, the process of growing a culture of research can be challenging, difficult and potentially lengthy, for both management and faculty. One respondent suggests that institutions were "*facing a generational change among the academic staff [faculty […]*", while another stated it was not possible to "*create a research culture in less than 20 years*". There is, therefore, a real need for institutions to look carefully at the human resource strategies which underpin their research plans. It is also critical, as Meyer and Evans (2003) warn, that institutions "analyse conceptually what could emerge as unintended negative outcomes […] rather than naively assuming that only the intended positive result will eventuate".

5.3. HR "Good practice"

For all participant institutions, a strong research profile is critical not just for institutional mission but also for status and survival. They mentioned their growing tendency to favour research activity, to align recruitment, promotion and career structures to research outputs, to measure performance on the ability to generate revenue and intellectual property, and to link academic workload to research performance and teaching level.

> "*The university goal is to increase the participation of staff [faculty] members in research activities and* ***to reasonably*** *balance teaching and research responsibilities*" *(my emphasis)*.

> "*Research activity including [postgraduate] supervision is part of the Enterprise Agreement between the academic union and the university. The university wishes to see research as an integral component of the workload, not an add-on that active researchers somehow have to do in their own time. Differential*

teaching loads will emerge ***over time*** *as this new direction and focus is implemented" (my emphasis).*

From where these institutions began, developing research represents a significant strategic redirection. Accordingly, many new HEIs have adopted a pragmatic approach to achievement.

"*Some members of the staff [faculty], due to heavy teaching loads, cannot significantly engage in research; some are not much interested in research; functioning of an institution as a university is strongly influenced by inertia and old habits, we try to find new models of involvement and motivation.*"

"*In the past, many members of the teaching staff [faculty] claimed that a high effort, which is needed for their teaching responsibilities, did not permit them to invest energy in research or related activities. The aim is to change these attitudes by focusing on competence training, and not so much on fact-teaching. The former includes a more open attitude towards research, since the teacher is more a coach and not a 'fact-provider'.*"

"*According to the new job structure, research qualifications have a priority in case of new jobs—that is also an occasion of debate. Until the job structure has been fully implemented, [the institution] compensates the teachers who do not do research with qualifying development funds. Likewise the teaching area is compensated via release in connection with externally financed research.*"

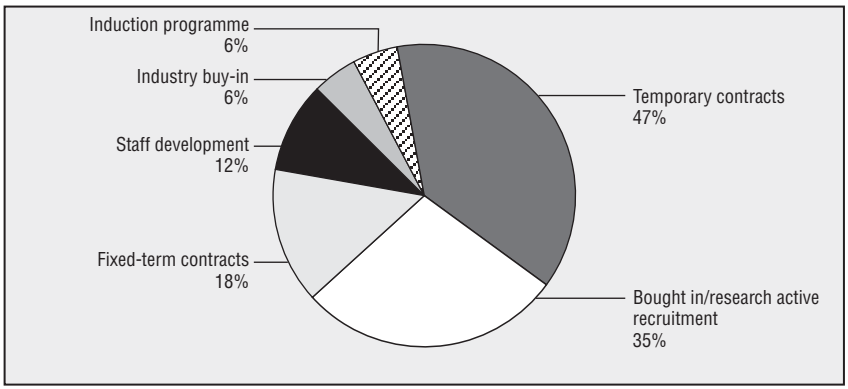
One of the biggest challenges is how to encourage research within a system which in some cases has traditionally favoured teaching, where faculty were hired primarily for teaching, and the government grant covers (undergraduate) teaching.

"*Clearly teaching duties do have priorities [sic] if only because they are clearly expressed in the union contract… while there is no such clear rule in the union contract about research except that one duty of the professor is research.*"

While half the institutions surveyed said they did not differentiate between research and teaching posts, most of the new HEIs are nevertheless busy devising strategies to re-balance these twin responsibilities. The "*constant drain of experienced researchers to other institutions*" and "a*n ageing population of staff [faculty]*" also pose challenges. Figure 5.1 and Table 5.2 illustrate the range of HR-related strategies being considered and introduced. The extent to which institutions emphasize one or other of these approaches is influenced by various factors, such as government policy, internal competencies, level of competition and their sense of urgency. Institutions have mixed views on whether it is possible to grow research from their existing base or whether they need to rely more heavily on other strategies.

"*The need is to grow engagement across current staff [faculty] and disciplines whilst recognising that the strategic timeframe within which to grow our R&D*

Figure 5.1. **Respondents identifying particular strategy (%)**



base is relatively short (maybe around five years). Such pressing growth is more likely to be achieved largely through focussed recruitment, that is, not through the large scale re-orientation of staff [faculty]."

The following discussion considers different human resources strategies for developing intellectual capital and growing research capacity which are being adopted by participating HEIs.

Table 5.2. **Reconfiguring the people mix**

HR strategy	Indicative actions
Recruit	Align recruitment strategy to priority areas via experienced researchers, post-doctoral or other senior professorial posts, sometimes on contract and but accompanied by relatively generous support funds and salaries, and supported by good induction programmes.
Re-invigorate	Incentivize, reward and recognize research performance via promotion, salary and other benefits, including career stream choices and new academic contracts which include research or research-only positions; they should have clear promotion criteria and performance indicators measuring both quantity and quality across disciplines.
Train	Implement faculty development strategies or faculty-building plans to assist new researchers, including facilitating PhD attainment, mentoring, application writing, etc.
Re-orient	Encourage involvement in new fields or large-scale interdisciplinary research teams – involving the community or industry – via incentive schemes.
Enable	Enhance research facilities and opportunities, including flexible workload schemes to meet different abilities and capabilities over a faculty member's career, sabbatical leave, research scholarships and fellowships, and gender specific initiatives, *e.g.* family-friendly workplace and a women's register. Establish a Research and Technology Transfer Office to provide direct support to R&D groups and faculty in the formulation and financial management of projects, communication tasks, marketing and connections with the technological, industrial and economic environment, etc.

Many institutions favour the introduction of a new career structure, with differentiated workloads or *research focused posts*.

> "*Tenure track faculty positions are expected to be fully engaged in innovative and creative research ventures. Adjunct positions are also encouraged to fully engage in creative research with tenured faculty and also to be fully committed to teaching, where possible*."

> "*The main part of the teaching staff [faculty] […] is [sic] originally employed as teachers. Three years ago a new job structure was introduced. According to this associate professors and professors have a right and an obligation to do research […].The distribution between research and teaching will gradually be regulated in line with the implementation of the new job structure*."

> "*All academic staff [faculty] who teach degree and postgraduate programmes are required to do research (80%). Those who mainly do sub-degree teaching (20%) are expected to be involved in other scholarly activity which may not be research. Our university has adopted the total workload concept where everyone's load is nearly equal; for those who are better at teaching rather than research do more teaching, and vice versa . In the near future, we will phase out the sub-degree programmes; then everyone will be expected to do research*."

Others are adapting Boyer's (1990) "creativity contract" whereby faculty are timetabled according to different abilities. A good example of this approach is the following:

> "*Throughout their careers, academic staff will at various stages focus most on one aspect or another of their remit, whether that be research, scholarship and teaching, or administration. It is important therefore that all have parity of esteem. To this end the Institute has recently implemented new 'research' or 'teaching' focused contracts which, during annual appraisal process, enable staff to determine the appropriate proportion of roles*."

A variation on this model is represented by three other institutions, who say that the balance between teaching and research "*is monitored by heads of departments and professors*", "*is a matter between faculties and departments*" or is "*left to individuals and chairs*". Reflecting a different situation, another institution states that "*Not all academic staff are expected to engage in research, some teachers are completely involved in teaching*". While some participants said that the situation had not changed over the years, most institutions stated that the focus on research and performance represented a significant change in the terms, conditions and expectations of academic work.

Promotion based on research and other indicators, such as ability to generate income and intellectual property, are key elements of all HR strategies. Almost all participant HEIs are considering introducing or negotiating changes to the conditions of employment and career structures. Research outputs are a critical part of this process. Workloads reflect research

active status including less teaching, postgraduate supervision, targeted funding and other resources or supports.

> "*Nearly all academic appointments are teaching/research. All such staff [faculty] are expected to be research-active. This has not changed much in recent years. Wherever possible new recruits are chosen who have research experience/ potential. Recent changes to conditions have recognised research performance in allocating teaching load.*"

> "*As […] [we] move towards the establishment of a formal Research Domain – in which staff [faculty] in particular focus largely on research, we will develop a new career stream through which performance will be largely assessed on research outcomes.*"

> "*In addition to the new contractual arrangements […], the Institute has a policy of allocatingadditional teaching relief to 'high flyers', normally in the form of Research Fellowships.*"

Accordingly, institutions are developing "policies that focus on using active researchers in our research and research training effort". Despite desires to maintain a strong nexus between teaching and research, institutions are beginning to favour creating research only or research-focused posts, within the normal academic career structure as Readers and Professors, or via parallel career tracks or contract posts. While research chairs are usually externally funded positions which can be used as magnets for building strategic research groups, they do signify a particular status within the academic hierarchy. While many of these posts existed in research centres they are now becoming a reality across the institution.

Recruitment is another tool. Institutions are pro-actively developing policies to recruit active or high profile or "*high flyer*" researchers, from "*around the globe*".

> "*We give a lot of importance to recruit [sic] active researchers. Nowadays, almost all new recruits are active researchers. Previously, being an active researcher was not a top priority in recruiting academic staff.*"

> "*The Institution had adopted a policy by which new appointments are expected to be research active. Additionally, all new staff undergo an induction and mentoring process whereby they are integrated into the research culture.*"

> "*As of 2001 there is a specific policy around the need for an established research track record (according to best practice sector indicators) for any and all new appointments into either of the proposed research domains.*"

Given institutional financial constraints and the time-bound nature of externally financed research projects, many institutions are also appointing temporary or fixed term researchers, either linked with industry and/or as part of a Research Fellowship or Eminent Professorship scheme. These latter positions may be located within academic units or in research centres. One

institution, however, stated that it preferred to hire "young but very promising researchers" rather than "already high profile researchers". To ensure co-ordination between recruitment and research strategy, the appointment procedure at one participating institution involves the V-P for Research or requires his approval.

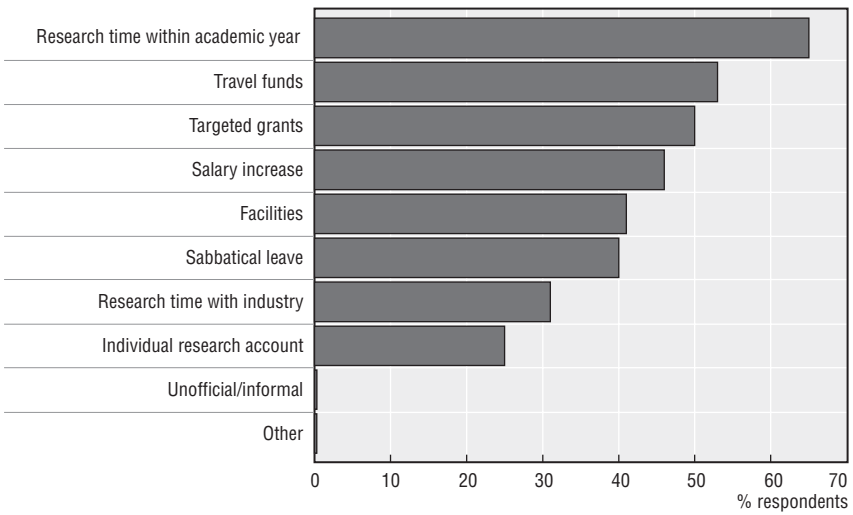
Many participating HEIs offer reward and award systems. Figure 5.2 illustrates the way in which institutions rank the importance or impact of particular initiatives. Noticeably research time is considered the most important and effective incentive for researchers, followed by travel funds, targeted grants, salary increase and facilities. One institution offers financial payment for a published refereed paper and for national grants, which can be put into a personal research fund. Others offer Achievement or President's Awards:

> "*For a number of years, [we] have regularly offered research achievement awards to recognize research excellence among faculty and/or to provide support to research projects of excellent potential. Currently, the number of Research Achievement Awards given out each year is ten at USD 15 000. Faculty members can use part of the award for teaching buy out.*"

Finally, one institution suggests that informal incentives such as public recognition can also be important.

Staff [faculty] development or training initiatives are another important part of all HR strategies. Initiatives range from programmes for established faculty to induction programmes for new staff so that they can be integrated into the research culture. Most institutions said that their PhD programme,

Figure 5.2. **Incentives and assistance**



often with fee remission and reductions in teaching, has the greatest impact in terms of encouraging and supporting researchers. Mentoring is also common, and has proven particularly successful in the preparation of national and EU funding applications.

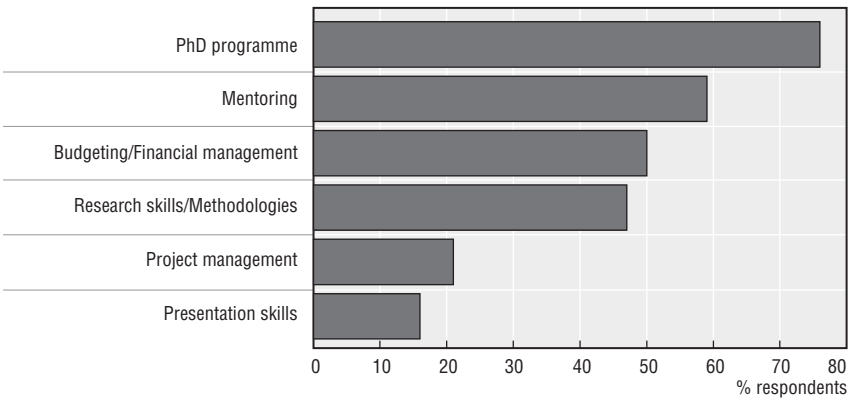
> "*The Research Office provides on request workshops to Departments on any research-related subject* e.g. *ethics, grant writing skills, intellectual property, budget preparation, etc. On an individual basis, grant applications undergo review by Research Office staff, as well as 'mentors', experienced researchers in a relevant field. In these endeavours, the Research Office is backed by the University's Centre for Professional Development.*"

Having "*experienced researchers on the senior management team is proving essential to support and drive forward the necessary changes*". It may also act as an informal part of the collegiality or normal information and experience sharing process between colleagues. In some instances, only faculty who have completed supervisor training programmes and who "*maintain their skills through active supervision*" are placed on the Supervisor Register. Thus, there is a carrot and stick element to some initiatives. Figure 5.3 ranks training programmes according to an institution's assessment of their impact on promoting and supporting research.

Building a research strategy, especially for many new HEIs which do not have financial reserves or endowments, has significant financial implications.

> "*There is a tension between teaching and research, since the financial basis of the university depends on student fees and student-number-driven government funding, so 'doing more research' calls for hard decisions about where the staff [faculty] time required will be found.*"

Figure 5.3. **Significant research training activities**



"*[The development of new research posts ties up]…a large part of the research allocation of the institution and mean less funds to seek for teachers with no right to do research. For this reason this group is asked to apply for external research allocations*."

"*[O]ften the drive towards income generation through teaching programs leads to the discouragement of research*."

"*The main problem encountered with success in developing research is the increasing weight of research on the regular budget of the university if only in terms of basic infrastructure (space for research, heating, general commodities) while the regular budget of the university is based solely on the number of students in programs*."

To enable research active faculty to engage in research, their teaching responsibilities are often shifted either to faculty who do not engage in research or to:

"*sessional lecturers who are recruited and hired to deliver a specific course or program […] [or] graduate students, research assistants or post-doctoral fellows [who] deliver instruction to first and second-year students*."

Most externally funded research projects enable the principal investigator to buy-out their teaching time, through such recruitment. Indeed, time release is the key ingredient which both faculty and HEI managers agree is the foremost requirement for growing an active research environment. On the other hand, the lack of funding and competition for available resources brings its own difficulties and tensions. Faculty require or desire better facilities or particular support mechanisms, such as sabbatical leave, further reductions in teaching time or seed funding, the lack of which can create loss of morale or undermine participation in research. Institutions are therefore making clear policy decisions to shift resources to support research activity. This trend looks certain to continue.

In summary, new HEIs are facing different kinds of problems and tensions developing research and setting priorities. In different ways, they are actively developing a human resources strategy as an essential ingredient of their overall research strategy. One institution describes its comprehensive approach, which includes a research secretariat, research education, research administration, reductions in teaching, guidelines and guidance, as "*being central and necessary conditions for a fruitful research environment*". Some institutions ultimately see all faculty as being research active, while others foresee "selective faculty research involvement as more realistic and agreeable for institutions with strong vocational commitments and large groups of

practice-oriented teachers" (Skoie, 2000). These different approaches are reflected in both *ab initio* and transitional new HEIs. Regardless of which approach, participants appear to echo Altbach's (2000) view:

> "The professoriate is at the heart of the academic enterprise. Without a committed faculty, no university can be successful nor can effective teaching and learning take place."

It could be argued that the process of growing research is a mutual enterprise in a globally competitive higher education environment with responsibilities to both the institution and the researcher.

> "*[The] university has taken giant steps toward becoming a research-intensive university. Today, the entire […] Community enjoys this prestigious status, but also recognizes the challenges to maintain and solidify it.*"

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 6

Challenges for Institutions

6.1. HEIs as late developers and newcomers

Conventional wisdom about economic development and growth has argued that the free operation of markets leads to the efficient and rational use of productive resources of capital and labour. In this scenario, underdevelopment, at a national level, is generally believed to arise from structural or other difficulties within the country itself because the external environment (the wider or global economy) is not acknowledged as problematic. According to this view, the market works best when there is least interference by supra-government, government or other policymakers. Any country or individual can participate by seeking to trade or set up business, but the market can be a tough, self-regulating "winner-take-all" environment. However, efficient countries, individuals, companies and institutions, responsive to demand, can excel and survive successfully. There may be difficulties along the way but growth is generally viewed as progressing in a linear pattern.

This account is at variance with the literature on the difficulties faced by late-developers (see summary in Table 6.1). According to this view, a common set of difficulties can act as barriers to entry significantly inhibiting full participation and success. These factors include structural features such as their relatively poor resource base and scale of production/activity and lack of undemonstrated capacity. Many new entrants operate outside important networks, and often find policy and funding mechanisms unfavorable. While established providers share strong competitive advantages, late developers and newcomers have the disadvantage of starting late in a congested marketplace. Hence, contrary to the view that market entry is open, it can be constrained because resources and influence take considerable time to build.

Table 6.1. **Comparative features of development**

Conventional view of development	Late development
Competition → efficiency → survival	Competition → devastating impact on late developer or newcomer
Intervention can impede growth and lead to underdevelopment	Policy interventions to overcome barriers to entry
Growth follows linear pattern	Winner-take-all environment
Entry is free	Entry is constrained

The concept of late industrialisation has most commonly been invoked to examine the growth experience of what were previous described as underdeveloped economies, such as the Asian Tiger (Singapore, Malaysia or China) or, more recently, the Celtic Tiger (Ireland). The literature describes a series of disadvantages associated with starting late compared with the advantages of having an early lead over other competitors. As O'Malley (1989) states:

> "Arguably, the established competitive strength of the developed countries has constrained the industrialisation of the modern generation of late comers in the less-developed world, since they would find it difficult to match the established competitive capabilities of more advanced economies."

New HEIs are often cast into a similar situation. They face particular difficulties and their case studies highlight common experiences arising from starting late from a poor resource base; undemonstrated capacity and operating outside important networks; policy and funding mechanisms which reinforce institutional imbalances; and human resources and industrial relations tensions specific to late development. In addition, the environment in which they operate is globally competitive.

> "For the first time, a really international world of learning, highly competitive, is emerging. If you want to get into that orbit, you have to do so on merit. You cannot rely on politics or anything else […]" (Kerr, quoted in Clark, 1998).

> "The idea of competition is frequently seen as inapplicable to higher education […] [however] competitive behaviour has become an important reality for daily institution and system life in higher education" (Dill and Teixeira, 2000).

O'Malley's analysis is useful to help understand the experience of HEIs who are operating in this increasingly competitive global marketplace. If barriers to entry are recognised as such, appropriate action and policy decisions can follow.

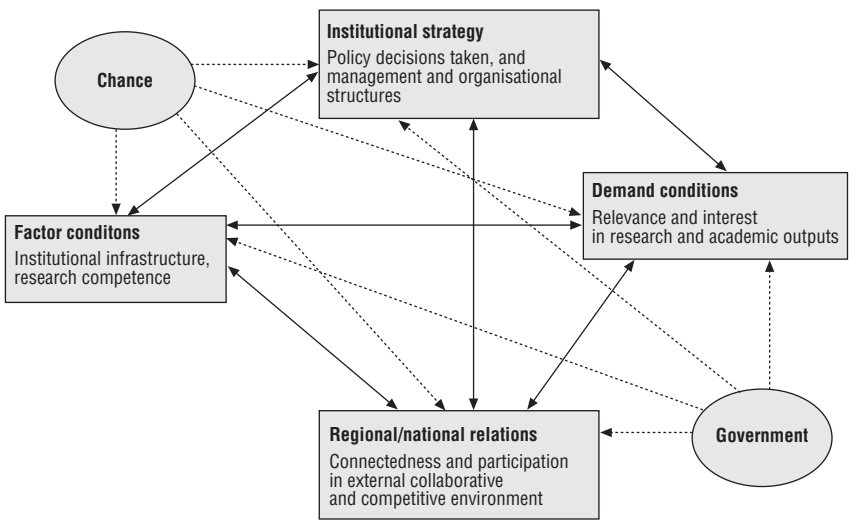
Porter's (1990) diamond model of competitive advantage provides another way of understanding the complex environment in which new HEIs are now operating and why some institutions are more successful at research. Porter's model seeks to go beyond comparative advantage which usually consists of inherited factors of production, like cheap labour or energy, or natural resources to consider *competitive* advantage which is created. Widely adopted in the 1990s as a framework for shaping regional and national industrial strategies, it was conceived around the concept of the "home base". Essentially, the economy, rather than being understood as a whole, is considered in terms of specific industries or, preferably, industry clusters. He cites four interlinked factors that define a cluster: factor and demand conditions, organisational strategy and spatial or regional/national relations.

The discussion below and Figure 6.1 adapts this model to reflect the experiences and actions of participating HEIs.

- Factor conditions: includes adequate infrastructure and funding, availability of research competence and capability, etc.
- Demand conditions: includes relevance and interest in the research and academic output, as measured by published papers, patents, commercialisation opportunities, consultancies, etc.
- Organisational strategy: includes the management and organisational structure, such as support services, and decision-making and policies choices.
- Regional/national relations: includes membership and participation in collaborative networks and partnerships, with other HEIs, industry or the wider public sphere, and the extent to which the HEI is fully conversant with global factors and competition.

Two factors located outside the diamond but critical to it are government and chance. Regarding the latter, there is no magic wand for being successful, and there are always unknown factors which can arise from time-to-time which can tilt the balance towards success or failure. For Porter, this is the concept of chance. For HEIs, the role of government can be pivotal; it determines the higher educational system and the role of individual HEIs including mission, governance structures, funding and fees structures, student numbers, and evaluation of outputs.

Figure 6.1. **Adaptation of Porter's diamond of competitive advantage to HE research experience**



Source: Adapted from Curran (2000).

Porter's model works by illustrating the complexity of a dynamic and competitive environment. Ideally, all factors are contingent upon each other, and no single factor is capable of achieving success.

> "Advantages throughout the 'diamond' are necessary for achieving and sustaining competitive success in the knowledge-intensive industries that form the backbone of the knowledge economies."

There is a menu of institutional or enterprise strategies. The organisation's role is to create the conditions whereby the four corners of the diamond work together, but the role of government (and chance) can also be critical. Porter's diamond has "enriched policy discourse" by introducing a "richer understanding of the sources of industrial development and a menu of industrial policy options that are obscured or denied, by the market failure framework". (Best, 2001) To paraphrase Best: every HEI strives to develop a distinctive mission, but every HEI also operates within a national and increasingly global higher education system. Drawing on the experiences of participating HEIs, the model illustrates that the process of growing research is far from direct and unproblematic but involves a number of interrelated factors. Some of these factors may be transferable from other institutional experiences. Some may be embedded in the institution or society/region, while others may be unique and non-reproducible. This kind of analysis raises critical questions for HEIs and government. The next sections look at the various components of the diamond. The sections titled strategic choices and good practice look at the broad range of factors which arguably fall within the remit of the institution, while the final section looks at the role of government.

6.2. Strategic choices

The rapidly changing dynamics of the global economy mean that the higher education institution is now widely recognised as an integral part of the national innovation system. "An important aspect of the innovation system relates to the reproduction of the knowledge of individuals or collective agents" as in, for example, through the close interaction between science, research and development (Lundvall, 1992). An institution's ability to contribute to learning and the structure of production depends on a combination of internal and external factors. Institutional history and mission are important; was the HEI established as an *ab initio* university or is it an institution in transition? The complexity or comprehensiveness of the higher education system, whether it is a unitary, binary or comprehensive system, and the role of individual HEIs within the system, including governance structures, have a large bearing on the ability of individual institutions to respond to external determinants. The stage of economic development and

the porosity of national economic borders, the strength of regional economies, socio-economic and demographic trends, and the dynamism of the labour market are also critical factors which influence an institution's mission and strategy. In addition, those institutional goals are shaped by ideological (free market *vs* social democratic) directions, political considerations, and the value systems which underpin society, public institutions and education. In an era characterised by globalisation and internationalisation, HEIs operate within and are determined by a complex policy-making environment. How are they responding? How much room does an institution have to manoeuvre – to set its own mission agenda? What kind of institutional strategic choices or organisational changes are they making? What other initiatives are they introducing? What good practice models are they developing or learning from colleagues?

All the participating HEIs state that their future lies in research. Among their stated goals for the future, developing and raising the profile of research are paramount. But what does this mean? The Carnegie Classification System differentiates HEIs in the United States according to research output thereby indirectly establishing a university hierarchy. The UK Research Assessment Exercise, and accompanying league tables which appear in the various newspapers including the *Times Higher Educational Supplement*, also differentiate and rank HEIs according to various metrics in which research is prominent. Higher educational systems which differentiate between the mission, role and title of institutions often have the same intent and effect. A nomenclature has grown up around these differentiations that are arguably having a wider impact than the originators may have intended. In other words, it is clear that an institution's position within the higher education system strongly influences student choice, funding agencies, employers, industrial and other partnerships, and membership in some discipline and sector organisations (nationally and inter-nationally).

Many new HEIs feel that such classifications or ranking systems contribute to a prevailing attitude amongst well-established universities and society's powerbrokers towards new universities: "*[there] is very aggressive competition and very little co-operation between traditional and modern universities, and the traditional universities maintain control of the whole system*." They perceive themselves as being placed into a "second tier sector of teaching institutions relying on hand-me-down learning from a closed shop of wealthy research universities" (King, 2002). Thus, for many, there is a great sense of urgency influencing their decisions. One participant anticipated that "*a lot of institutions are going to have enormous problems surviving in the research environment in the next very short period of time*". Accordingly, another believed it had only five years while a third said it had only three years to "get teachers to national research recognition [level] or lose funding" (also Reed and Deem, 2002).

Table 6.2 seeks to identify possible institutional objectives, based on commonly used language. Participating HEIs believe that an active research agenda is a mandatory requirement of all higher education institutions and that "research excellence is non-negotiable" but they are critical of assumptions that try to simplistically link a research agenda with a secret desire to become like Harvard University – in other words, to become a research intensive university. With few exceptions, this is not the desired objective even though all participants do see their status linked to greater research intensity. Thus, Table 6.2 seeks to establish a level playing field between diverse objectives using various common descriptors, albeit there are clear differences between the first and last.

Table 6.2. **Institutional objective**

• Teaching-only
• Research informed
• Research based
• Research active
• Research led
• Research intensive
• Research-only

Based on the 25 case studies, it is evident that institutions are making strategic, management and organisational choices according to their objective and asking themselves where are we going and how do we get there? Drawing on material discussed in previous chapters, Table 6.3 illustrates some of these strategic choices in the form of a polarity. This approach aims to convey a continuum delimited by two poles rather than simply two stark choices. Higher education managers are making decisions along this spectrum in order to respond successfully to the new global environment. What is the appropriate balance for each institution?

Table 6.3. **Strategic choices**

• Recruit *vs* grow?
• Research culture *vs* culture of scholarship?
• Teaching *vs* research?
• Decentralised *vs* centralised research structure?
• Targeted/niche *vs* seed-corn/universal funding?

Recruit vs grow?

The extent to which institutions are choosing to focus recruitment strategies or faculty development policies is partially conditioned by several factors: ability to recruit good researchers, availability of competence, available funding, and the responsiveness of faculty. Decisions are also influenced by a sense of urgency informed by an assessment of the extent to which external factors such as government policy, funding levels, demographic changes, competition, etc. are opening up or constricting institutional opportunities? In other words, is it possible to grow research from the existing faculty? Is there time to grow research? Or should a greater reliance be placed on recruitment strategies? Participant HEIs and the literature are divided on this issue, although there is little disagreement that research activity is conditional on highly-motivated individuals. "*Our major tasks are to energise our staff [faculty] and to ensure very clever recruiting*." However, factors influencing these individual researchers cannot be overlooked. Both Deane *et al., (*1999) and Geiger (1993) illustrate that research productivity is critically influenced by organisational conditions because "star scholars" are "not an end in themselves but rather a means". Having recruited "stars" the emphasis shifts to retaining them which in turn poses the question: what is the institutional culture? Institutions complain that without appropriate facilities and resources, proximity to knowledge centres, involvement in discipline networks, and appropriate salary and career structures, it is difficult to retain good researchers. On the other hand, many comment that the process of growing research from a modest basis can be lengthy. The appropriate balance between these two poles can be complex, and can engender other human resources or industrial relations responses.

Research culture vs culture of scholarship?

According to Clark (1995), the nexus between research and teaching too narrowly describes higher education's role as a place of inquiry. A few years earlier Boyer (1990) had also rejected the dichotomous view of research *vs*. teaching to pose a broader understanding of "scholarship". Gibbons *et al.,* (1994) provided another leg to this frame, recognising and amplifying the intellectual and strategic importance of collaborative and interdisciplinary work focused on useful application, with external partners including the wider community. Greater inter-action between the university and industry has been further endorsed by government policy across the OECD and beyond, underpinned theoretically by references to concepts such as the triple helix and national innovation system. Together these arguments embrace the concept that higher education's contribution to knowledge production goes beyond traditional interpretations of research, and that it is more than basic

blue-sky discovery. It follows appropriately that academic work should also reflect this diversity of activity:

> "[A]cademic work is defined, all too frequently, in single-dimensional terms, with research and publications used as the yardstick by which success is measured. In such a climate, those who don't publish with regularity are often considered 'deadwood', as if professional commitments are narrow and unchanging" (Boyer, 1990).

Many new HEIs have, often unwittingly, adopted this approach by widening definitions of research to embrace a broader concept of scholarship. Hence some talk openly of fostering a "culture of scholarship" rather than simply a "research culture." Others talk of "*adjusting ministerial criteria*" to fit their disciplines, and moving non-hierarchically across the boundaries to include innovation and creativity, traditional publications and creative/professional practice, and cross disciplinary and industry relevant activity. In recognition of their history and mission, some HEIs are defining themselves within the triangle of teaching, research and practice, rather than simply between teaching and research. Some participating HEIs acknowledge that to convert everyone to (active) researcher status may not be appropriate, and are developing their strategies accordingly.

> "[T]he important point is that an institution has groups of faculty actively involved in research, not necessarily all staff members or the majority of staff members […] '[S]elective faculty research involvement' is seen as more realistic and agreeable for institutions with strong vocational commitments and large groups of practice-oriented teachers" (Skoie, 2000).

While it may be difficult to draw any conclusions regarding any relationship between the average annual teaching load of individuals and their total productivity, studies suggest that there is a lag between initial employment and "productivity pick-up", a factor which HEIs should examine when promotion and tenure are being considered (Deane *et al.*, 1999). These difficulties are especially problematic for women. Thus, to what extent should or can everyone be involved in research? Can an institution afford to support or develop research across the board if its resources are limited? Given pressures for research productivity, what is the appropriate balance between these two poles to ensure that an institution can embrace all abilities, roles and career changes?

Teaching vs. research?

Given that research practices are changing and the pressures to deliver significant outputs are intensifying, "[t]he key question is how to structure and organise teaching and research in the universities" (Gibbons *et al.*, 1994). The case study evidence suggests that despite institutional objectives to

maintain strong links between teaching and research, other factors are undermining this nexus, *inter alia*: the desire to group individual or novice researchers, to grow teams of researchers focused on timely outcomes, to enhance interdisciplinary objectives, and to establish clearer links with industrial or other partners. To effect these strategic objectives, participant HEIs favour research taking place within centres and the appointment/promotion of research active faculty. Table 6.4 attempts to illustrate the organisational, academic and career implications of these developments.

Table 6.4. **Structure and organisation of teaching and research**

Model	T-R Nexus	Organizational structures	Career
Type 1	T = R	Inclusive departments	Integrated
Type 2	T & R	Undergraduate + Units/Graduate schools	Active and inactive
Type 3	T | R	Department + (semi)Autonomous centres	Parallel pathways
Type 4	T ≠ R	University + Autonomous institutes	Separate careers

Source: Adapted from Clark (1997).

Type 1: In the early stages, institutions and academics favour a close relationship between teaching and research, perhaps spawning small research groups which are retained within the department. Faculty are likely to have both teaching and research responsibilities, and promotional opportunities may be awarded on the basis of research activity and a teaching portfolio, albeit evidence suggests that increasing emphasis is being placed on the former rather than the latter.

Type 2: As a critical mass develops and external pressures increase, the needs of the research team and the strategic needs of the institution begin to favour a more formalised structure for research. Different terms, such as unit, lab or centre are used to give formal recognition to this stage of development. Institutions may also bring together postgraduate activity under the title "graduate school", perhaps for administrative purposes but also as an identity for the programmes, while continuing to draw teaching resources from the departments. In addition, the ability of institutions to attract substantial external research funds is increasingly conditional on highly productive teams and timely outputs, factors which are potentially inhibited by normal academic workload issues. Initially, faculty may move seamlessly between teaching and departmental commitments and the centre, but there may be efforts to second or buy-out research active faculty to work for a greater part of their time in the centre. To guarantee sustainability, many institutions are reviewing academic workloads and recruiting strategically.

Type 3: Research centres, institutes or campus companies, located either on the institution's campus or in science/industrial parks, are favoured when the research group has reached a sise effectively incompatible with the routine academic demands of the department. This arises usually because the number of researchers and the income generated enables the group to move into other, sometimes rented, accommodation. The centre operates as an integrated but semi-autonomous part of the institution. Its organisational or physical distinctiveness provides dedicated space, facilitates interaction with academic, industry and other partners, and encourages greater entrepreneurial responsibilities. These centres are initially expected to be income-generating but tasked with becoming financially self-sufficient if not profitable. Strategic plans are required. At this stage, the nexus between teaching and research begins to widen. Many faculty may continue to teach on a reduced workload supervising postgraduate students but others may not. The centre will also house many dedicated researchers, and there may be shared seminars and conferences. Depending on how the relationship is maintained, the traditional integrated link may weaken.

Type 4: Wholly autonomous or independent research centres or institutes are not a common feature of higher education, and were not widely favoured by participants. These centres are often established and favoured by government or industrial development agencies that desire more focused and timely outcomes. Accordingly, there is usually a clear separation between teaching and research. Some support postgraduate students, and many offer post-doctoral opportunities. This post-Humboltian model is perhaps best associated with France and Eastern Europe. This type of centre may be sited on the campus but is often located in its own environs. As HEIs search for new sources of income, they may choose to either rent or sell space or land to industrial or other independent research centres. In this way, both can benefit without become interconnected.

This model works on three levels. The diagram suggests a developmental and organisational relationship between each of the four types.

1. The process of growing research reflects a natural progression from individual → cluster (unit) → larger cluster (centre). Heretofore, this process has been *organic*, but pressures to grow research means that universities are now looking to *manufacture* the research process, and to reduce the timescale from birth to maturity. Many factors can influence the speed and desirability of this process, including academic contracts and workload, reward systems, public recognition and status, and pressures for timely outputs. While there remains a strong desire that research activities should reinforce the academic role of the university, the more an institution moves down this road the more it encourages "two parallel structures within universities: one for teaching and another for research". (Coaldrake and Stedman, 1999).

2. Philosophical and pedagogical arguments underpin advocacy for a strong nexus between teaching and research. The "blending of scholarship with teaching" is a fundamental principle and distinguishing characteristic of a university (Duderstadt, 2000). The "structuring of research activities must serve to reinforce the academic role of the university" (Gutiérrez, 1996). Yet, growing research and meeting the demands now being placed on institutions and individuals is arguably facilitating greater separation between teaching and research.

   "*[T]he demands of the education and training of a student population whether it be in research or research methodology or at [the] undergraduate level and those of an industrial taskmaster or market are often in conflict.*"

   The question confronting institutions is how to meet these demands while avoiding the incremental fragmentation of universities as places of inquiry.

3. As research grows, faculty and HE managers are looking at academic workload or career implications. Almost all participant HEIs mentioned that they were reviewing or renegotiating contracts, offering preferential agreements to "star" researchers, and so on. These developments are supported by research active faculty, whose prime complaint is insufficient time for research or lack of "head-space"/time to think. They wish to have contracts and conditions which more adequately reflect and reward their research activity. Separate or parallel career paths are increasingly desired and becoming common.

There are many strategic reasons why institutions might favour one Type over another. New institutions wishing to develop a "culture of scholarship" from a relatively green-field site may wish to retain larger groups within departments. On the other hand, large scale or interdisciplinary projects, academic contracts and reward systems, or other institutional issues may favour the formation of physically distinct research centres much earlier. There is also the issue of urgency: can the process of growing research by buying-in large-scale projects or "star" researchers (and their team) enable institutions to leap-frog the competition? Such centres or institutes could provide the basis for a self-sustaining intellectually-charged research environment but they could also de-motivate and isolate teaching faculty and students by removing or unduly favouring research active faculty. Depending on the stage of development and assessment of institutional and external factors, institutions may choose to facilitate different research organisational types.

Decentralised vs centralised management structure?

Professional management and support is critical to the success of research. As previously stated, the case studies show that the establishment of a research office, led most often by a Deputy or Pro Vice-Chancellor or Vice-

President for Research or Research and Development, is now common place. The latter usually has responsibility to manage, organise, and improve the competitive performance of research, including raising external funding. The emphasis has been on transforming what was once regarded as part of an individual researcher's tasks into a professional activity which carries huge strategic responsibilities. The managerial revolution which is arguably affecting all aspects of higher education is now casting its eye across research management asking to what extent functions such as research decision-making, strategic planning, priority setting, and distribution of resources should be led from the top or by the faculty. HEIs often impose a financial overhead on all externally funded research projects to cover basic costs such as heat, light, telephones, fax, rent, etc, and to effectively make a formal declaration about the relationship of the researcher to the institution. While the majority of participating HEIs operate a decision-making model that involves the wider research community and various institutional committees, there is little doubt that the research agenda is steered by central management teams. One institution stated that it is now "*telling its researchers*" what the institution's strategy and priorities are, while another acknowledged that its "*[…] culture is such that academic staff follow the leaders without much question*". HEI managers are examining the appropriate balance between collegial and management decision-making in an environment in which research outputs are contributing increasingly to institutional status.

Targeted or niche vs seed-corn or universal funding?

Government policy across the OECD is decoupling funding for research and for teaching. All participating HEIs recorded a significant reduction in government and similar core grants, placing a greater obligation on universities to compete externally for research and other funding. For new HEIs, the key question is the extent to which they can make up the difference by diversifying funding sources. This has placed increased pressure on institutions to develop their research application and management skills in order to be more successful, and to develop resource allocation models to support institutional choices regarding the distribution of institutional and external funding. Investment in research, "*juggling their budgets and putting aside funds*" requires strong institutional leadership and the "*political will to do that*". In some instances, participating HEIs indicated that they did not provide any institutional funds and all faculty were encouraged to seek external research opportunities. But most participants are trying to adjust internal budgets, contemplating whether research funding should be targeted at only winners or likely winners? Should it be targeted at research priorities – institutional or national – or should it encourage as many as possible to grow, including new research areas? Should external funding won via national

competitions, such as the UK Research Assessment Exercise, be directed to those who were successful or ranked highest or should it be used to cross subsidise other areas which are new or less likely to win funding? Should specialist or niche areas be given preference?

Each of these choices can potentially raise intra-institutional tensions. The choices may not be so stark in real life, but rather represent a combination of options. Institutions may decide to allocate a percentage of funding for new ideas or new researchers or they may decide to use a seed-corn approach for a given number of years to enable some kind of Darwinian natural selection to emerge. Targeted funding will then be used to further develop those who succeed. The applicability of metrics can also be contentious. HEIs may wish to expand the definition of research to embrace all scholarship, but if the funding agencies only recognise traditional fields or activities, should institutional metrics match them? In other words, to what extent can institutions reward or support areas which may not be well-recognised or financed outside of the institution? There are no easy answers to these questions. HEIs are making choices about which areas to fund knowing that decisions may under-privilege or disadvantage other fields of activity.

6.3. "Good practice"

Despite differences in origins and context, and the obvious challenges, new HEIs, like their more established counterparts, are actively grappling with the complexities of research management and capacity building. While newer institutions have not been well resourced for research or fared as well as their traditional colleagues in competing for external funds, this has not deterred them. They "have found it necessary to strengthen their research capabilities, and [...] have gone about it in a variety of ways" (Turpin *et al.,* 1996), by fair means or foul, and often contrary to government policy.

Most of the participating HEIs say that institutional networking and cooperation, including sharing best practice has played a formative role in the development of their strategy and policies. Others refer to the benefits of grand parenting experiences, whereby another institution mentors them at particular stages of development, regarding accreditation, higher degree supervision, research benchmarking, etc. New universities are looking for inspiration to very well-established world leaders and also to other new universities, although there is also a realisation that "*it is very difficult to model after a single or even a few institutions*":

> "*[We have] found inspiration and experience from the universities, especially from [local universities] [...] but also higher education and research institution in Scandinavia and the rest of Europe have been models.*"

> "*Institutions which have been influential in developing our research strategy include seven new universities, together with some partner institutions in Europe. Of particular significance in developing research strategy has been the involvement of comparable institutions in applied research.*"

> "*The research administrators in Canada and United States, at various levels, meet on various occasions and exchange ideas and practices.*"

Universities or higher education systems most often mentioned are those in the US, Scandinavia and the United Kingdom, in addition to specific neighbouring institutions. Others point to the benefits of personal membership on boards or panels of other HEIs or evaluation teams, "*in-depth conversations*" or collaboration with industry or other external partners, and participation in EU programmes.

> "*[Membership in] networks of technological universities of prestige, […] has facilitated the adoption of good practices in the areas of research management and promotion, and knowledge transfer. Likewise, many departments and research institutes collaborate with reference centres and institutions, which enable them to keep abreast of good practices within their professional fields and knowledge areas. Nevertheless, we consider it still necessary to encourage with much greater energy comparative and benchmarking activities with international reference centres and the establishment of more stable and permanent networks of relations and collaboration.*"

The Modern Universities Group in the United Kingdom and the New Generations University Group, which has hosted two international conferences, provide similar functions. One institution specifically mentioned the influence of the Boyer scholarship model, while another said that external influences were "*not worth mentioning*". The key lesson is that while experiences vary, new HEIs are actively seeking to "[…] to keep in contact with our partners abroad, study their experiences, and transfer and adapt their best practice to our conditions. This is also the main reason of [sic] our participation in this project".

What kinds of experiences are institutions sharing or learning from each other? Summarising initiatives mentioned in previous chapters, it is possible to identify nine thematic actions which new HEIs are using to grow research capacity and capability (see Table 6.5). It could be argued that actions 1-7 represent a determined positioning of research activity at or near the centre of an Institute's agenda while the last two focus on the broader concepts of leadership and institutional culture. The following discussion looks in more depth at examples of "good practice" drawn from individual success stories.

Table 6.5. **"Good practice" initiatives to develop research capacity**

Institutional policy	Indicative actions
1. Invest	Investment strategy, and realign budgets to support research and/or to disproportionately support research active staff or internationally competitive research.
2. Establish appropriate organisational structures	Establish organisational structure with designated positions at college/departmental level, including a graduate school, and provide appropriate research facilities.
3. Apply performance indicators	Match internal evaluation processes with external processes to ensure research is meeting international standards and use the results to help shape priorities, funding mechanisms, recruitment, etc.
4. Limited number of research priorities	Develop institutional agenda-setting mechanisms to preferentially support internationally-competitive domain only.
5. Research clusters and centres	Funding and support mechanisms used to encourage the growth of research groups, capable of winning siseable external funding and recognition.
6. Align funding, recruitment, etc. to research priorities	Ensure that organisational priorities at teaching, funding and support level reflect the priority domain.
7. Strategic alliances with other HEIs or industrial partners	Identify key industrial and civic/government organisations which match research strengths and establish partnerships.
8. Leadership	Endorsement of research strategy by senior management and boards of trustees.
9. "Culture of scholarship"	Proffer wider definition of scholarship which recognises that not everyone needs to be involved in research.

Invest

It is not surprising that securing research funding was mentioned as critical to success. Many participating HEIs are developing an investment strategy based on a dynamic research and development plan and a strong budget commitment to research and research development led by the senior management team. Twenty-two per cent of participants highlighted the benefits springing from success in national/international competitions and, for Europeans, in EU programmes. Increased funds are usually distributed internally via a resource allocation model, using performance indicators, to unashamedly support research active faculty, niche fields, interdisciplinary or new fields of investigation, etc.

> "*Research resource allocations to departments by using performance indicators with prominence being given to the number of active researchers and the quantity of refereed research output.*"

> "*[We] allocate significant in-house resources via a Research Investment Fund – with investment focused on audited/demonstrated research performance (*i.e. *the identification of our strong researchers) and with outcomes focused across a selected number of sectors (promoting focus through collaboration). One of the most important actions taken so far has been the definition of the criteria and mechanisms*

for evaluating research activities and technology transfer. These criteria have been used in the allocation of resources to the departments, applications for promotion and workforce stabilisation, etc., and they have facilitated a quantitative and qualitative increase in RDI activities."

Success in such activities is credited with breeding further success; more funds give institutions the ability and latitude to grow more research in their chosen niche fields with greater success. Hence, the target – easier said than done – is to grow sustainable research.

Establish appropriate organisational structures

A professional approach to research organisation and management is a widely applauded success story. This includes the appointment of a pro-vice chancellor (or similar level post) to lead research and development, and the establishment of a research office. Together they provide a coherent strategic approach to research, and a wide range of services and activities, such as project preparation and application writing, financial or budget advice, project and financial management, contract negotiations, supervisor registration and training, audit of publications, industrial liaison, technology transfer, intellectual property and due diligences. Some of the participant HEIs confirmed these strategies:

"*The key […] is achieving effective research management at local level, backed by a strong central infrastructure*."

"*The construction of a research organisation, including a research secretariat, research school, report system and a 'mentor' arrangement*."

"*[We have appointed a] Deputy Vice chancellor Research and Development [and established] University Faculty Research Office*."

The designation of research positions at college or departmental levels is also seen as organisationally significant. Some HEIs strongly favour the establishment of graduate schools as a critical building block of a research culture.

Apply performance indicators

While performance indicators and other metrics can often be contentious issues, participating HEIs are using these and other international benchmarking activities to help improve quality by aligning research with international best practice. Performance indicators are also used for this purpose, and to help target institutional funding and provide special support to research active faculty.

"*Research resource allocation to departments is based on performance indicators, one of which is the quantity of refereed research output. There has been an ongoing*

debate about how to measure quality. We are in the process of overcoming this problem by having reached consensus in the Research Committee."

Other institutions are utilizing external review or evaluation processes or conducting their own regular reviews of research activity. The results of these evaluations help set the "*broad landscape for the next five years*", and enable both potential and achievement to be rewarded. While new HEIs are critical of external evaluation processes because they are seen as favourable to research universities and established disciplines, they are using the results of these or their own evaluation exercises to influence priority setting (see Figures 4.2 and 4.3 in Chapter 4). Hence, there is a dual strategy: mapping external metrics to ensure the institution competes successfully for research funds while also questioning the metrics used by funding agencies.

Limited number of research priorities

Traditionally, universities had research strength across many disciplines. Today, given the level of competition and limited resources, the perceived wisdom is that future success is a function of specialisation or establishing niche areas in natural fields of advantage, which are influenced by national priorities and local considerations. New HEIs are choosing to focus on these priorities, and align teaching and other activities accordingly.

"*We have been forced to specialise in specific research areas, and there we do the very best we can to be world-class. We also concentrate on inter-disciplinary activities.*"

"*[We] need to have a co-ordinated research strategy and to identify areas where a small number of centres of research excellence can be created as well as a wider number of small groups to act as seed corn for possible future centres of critical research mass*."

"*The most practical and relevant way for the new and emerging HE is to concentrate [on] some specific research fields and devote their effort to recruit excellent researchers and provide much resource into those fields*."

This approach is often matched by decisions to target financial and physical resources to the limited number of research priorities or subject groups and research active faculty. In this way, institutions are seeking to establish pockets of excellence which may have far-reaching effects on the rest of the institution.

Research clusters and centres

Research centres, which bring cognate researchers together, are strongly supported by almost all participating HEIs.

"*A major achievement in developing and encouraging research is the development of research centres, which provide important foci for research activity and stimulate*

research amongst newly qualified staff. The development of research centres has been very helpful in a number of RAE successes."

These centres are also used to support "*new and exciting areas of research activity*" and to promote interdisciplinary or "*cross institutional research*" projects. Research centres act as the central spine of the research organisation and management infrastructure, and provide important vehicles through which to grow research. They promote a collaborative approach, which has other benefits for other joint activities:

"*This has led to the establishment of networks and research co-operations with a number of universities and higher education institutions* […]."

Successful centres can also generate national recognition, which in turn can bring added benefits, in the form of public recognition and philanthropy, to the university.

Align funding, recruitment, etc., to research priorities

There is a strong desire to ensure coherence between institutional strategy and decision-making, particularly with respect to research. Some HEIs are taking this exercise further by:

"*formulating and signing strategic planning agreements with the academic units. The strategic planning agreements determined the objectives and specific activities for the future of each unit, as well as the areas of scientific output, technology transfer, promotion of RDI, and the quantitative and qualitative growth of research activities*."

In addition, HEIs are ensuring that recruitment policy is fully aligned. Many institutions commented that the absence of "appropriately experienced staff [faculty]" is a drawback to future development. Hence the strategy is to grow "the pool of active researchers who can successfully compete for major external funding". For example:

"*To date the most successful initiative has been around the focused recruitment of high profile researchers. One recent example, an Innovation Professor in spatial architecture, has managed to raise the university R&D profile very effectively and quickly, generating new competitive research grants, galvanising students and emerging researchers into a new research cluster, and winning a major government- funded infrastructure [grant]*."

Some institutions remarked on difficulties hiring new/young researchers and to retaining researchers because "*change is slow*". In response, institutions are using mentoring programmes and reward systems, including promotion.

"*[The institution has focused on] the targeted recruitment of research performers into a supported research environment which will encourage them to stay. Alongside this agenda then is the plan to develop a separate career structure*

through which researchers can grow successful careers and achieve rewards based predominantly on research performance, much less on teaching and administration."

Strategic alliances with other HEIs or industrial partners

Contact and collaboration with the external partners and the (local and/ regional) economy is considered paramount to developing programmes and sustainable research. Participants are using formal and informal mechanisms to establish close contacts between the HEIs, local and regional policy makers, and industry. Several institutions specifically singled out the establishment of an industrial liaison or technology transfer office or knowledge transfer activities, while many others emphasised the broader importance of collaborative research networks or centres, especially with industrial partners.

"*[They encourage] researchers from the university and the industry [to work] together with post-graduate students. The Center can, on the one hand, use the facilities of the University (library, computing center, etc.); on the other hand the participation of the university researchers in the advanced technological projects, often in international cooperation, enriches the education, helps to extend the networks and improves the public image of the university.*"

"*One further action that has been implemented with success is the consolidation of the University's Technology Transfer Centre, which acts as a management body and interface between the technologicaland industrial sector and the academic and research activities of the University.*"

Collaboration with other similar HEIs is also vital. These relationships act as a vehicle for developing research opportunities through bringing together collective capabilities while also providing a mentoring service.

"*Our newer technological universities have formed an alliance […]. From the R&D perspective this is beginning to promote collaborations, such as in Applications for major government funded Research Centres, in the preparation of policies around research students (e.g.: promoting mobility) and in the preparation of generic on-line modules for research students (e.g.: around IP management). […] Regarding the development of R&D capacity…the…network is currently discussing 'emerging R&D areas' where it may be feasible to follow co-ordinated recruitment of high profile researchers,…assembling a co-ordinated team in a given area […].and [share] appointments, in areas (such as IT) where the costs in attracting the best researchers might be prohibitive for any one institution.*"

Several HEIs mentioned that unofficial processes can also be highly valuable in building research links, and fostering encouragement and confidence.

"*Networking although often done on an ad hoc basis in the early days led to many contacts and ultimately contracts of a collaborative nature in research. In*

the early days… current research capacity commenced through participation in EU schemes. This was achieved through a combination of official and unofficial channels, through formal promotion of participation by semi-state bodies, especially the National Board for Science and Technology and through personal contact building often leading to an ability to be a subsidiary partner in a research project."

Another commented that the

"*institution has had significant success in developing close contacts and partnerships with industry/commerce, because of its background. Many teaching staff already had effective contacts with their external counterparts because of the vocational degrees we provide.*"

In this respect, new HEIs have particular advantages and opportunities which may be exploited.

Leadership

Several institutions said that the key to success is to embed research into the culture of the institution. This means ensuring that research is seen to be a clear objective of the senior management team, and most importantly and prominently, the president or vice chancellor. Lack of management coherence can be an inhibiting factor. Two participants explained:

"*Frequent pronouncements by senior management (including Heads of Departments) that research is one of the two most important activities of academic staff, and that research performance will be given heavy weighting in deciding on promotion, contract renewal, etc. (This has helped establish a strong research culture in all departments).*"

"*The strongest support [has come] from the Vice-Chancellor over the last 15 years, who has made research a priority.*"

The role of the Board and the local/regional political environment is also critical, as one participant explains:

"*You have to secure the background of your vice chancellor but also your board of trustees. We have a very strong and active board of trustees, a lot of industry players but also a lot of people from our region who constantly reinforce the fact that this is a university that is committed to research and that is important to have.*"

"Culture of scholarship"

Faced with a diverse faculty, new HEIs are adopting various strategies to support all faculty while strongly endorsing a research agenda. This strategy calls for careful balancing between motivating, mentoring and facilitating research-active faculty, while also ensuring that teaching-focused faculty do

not feel marginalised. For some, the strategy is to bring about "*slow culture change*", ensuring a strong link between teaching and research.

> "*A new vision on competence-driven teaching in which the need for doing research and service applications is perceived as a necessary pre-requisite for such teaching processes*."

This approach may be too slow for some, but a "culture of scholarship" is often proposed to recognise and reward a wider conceptualisation of research and academic work.

Experiences elsewhere and throughout the literature suggest a similar list of targeted actions. Zajkowski, and Dakin (1997) identify the importance of research leadership, tying performance employment status to promotional opportunities, and establishing a critical mass to ensure the "dynamics of the research group". Geiger (1993) illustrates how both Georgia Institute of Technology and the University of Arizona, both of which had "operated in a milieu in which research was little understood or appreciated", were radically transformed by consciously exploiting comparative advantages, adopting the mantle of regional economic development, and having a flexible administration which was receptive to innovation.

> "Late-developing research universities like Arizona typically found opportunities to advance in expanding specialised research areas, which were often outside of the mainstream of the discipline" (Geiger, 1993).

A UNESCO seminar on research management reached similar conclusions: focus on strategic planning, human resources training, international co-operation, expanding the teaching-research link, and increasing the social recognition of research are all essential elements of a comprehensive and successful approach to developing research capacity and capability (Gutiérrez, 1996). Yet, if there is a broad consensus around the list of key actions, why are some institutions more successful than others at growing research?

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

Chapter 7

Challenges for Government

7.1. Policy constraints

While many of the difficulties cited by new HEIs may not be unique to them, many of the participants expressed the view that policy instruments are explicitly or implicitly being used to reinforce the position of established institutions. There is a strong belief that government policy appears to favour these institutions, that the criteria and rules for research funding are antipathetic to new disciplines and new HEIs, that insufficient regard is given to the needs of late-developers or newcomers, and that government policy facilitates operational differentiation.

> "*The problems largely consist of external attitudes and financial constraints. These problems very largely derive from inadequate funding for education […] commensurate with the aspirations of successive governments to increase the participation rate of undergraduates. Until more funding is injected into the system many problems will remain. However they will also be exacerbated by what we perceive to be prevailing attitudes amongst the academic establishment.*"

> "*A significant problem has been the basic and enduring inequality between 'old' and 'new' universities. In the former about half of their funding from the government has been to support research, whereas the former polytechnics (now 'new' universities) had access to no such funding until 10 years ago and so have had to develop their research performance through internal investment. Some now compete successfully with the old„ universities […] but as we improve our performance in this national competition, so the funding available decreases […].*"

> "*Eight large rich research universities are driving the research agenda. Together with government, they act as a club. These eight vice-chancellors act as a group within the […] Vice-Chancellor's group; their ideas are now government policy.*"

> "*There are many challenges faced by new emerging HEIs to develop and grow research. Perhaps the biggest challenge is the identification and procurement of significant seed funding. As things stand most new institutions have to compete with those with a well-established research track record.*"

Whether this is the result of deliberate policy or alliances – the word cartel is occasionally used – which have inevitably developed over time, many new HEIs believe the effect is to prevent them competing with older research universities.

> "*We use apparently rational arguments for why you should be where you are and why you should stay there […]. If they were doing this to individuals they would*

be prosecuted under the discrimination act but they do it to institutions and they get away with it."

These views correspond with other observations. For example, Clark claims that

> "governments often seek to muddy the waters of differentiation when they seek to call all higher education institutions by a single name university, and to declare that all institutions are common parts of a single unified national system…But the river of reality runs in the other direction, fed by the massive tributaries of differentiation […] and [sic] by government policies that deliberately encourage operational differentiation" (Clark, 1996).

Meek and O'Neill (1996) state that older universities are resentful at having to share the "research spoils" with new institutions.

> "[T]o some in the universities, their virtual monopoly of government research resources is […] the highest form of academic quality. University values ought to dominate the sector, they believe because their teachers are cleverer, they recruit brighter students, they can handle more sophisticated concepts and they encapsulate the true 'idea' of the university. The fact that polytechnics have been allowed, for 'trade' reasons, to share their title should imply, some of them confidently assert in the privacy of their common rooms, neither access to their research resources nor equality of esteem in mission" (Price, 1992).

Efforts to reinforce or reintroduce a binary divide into unitary HE systems in order to "concentrate research funding in research universities" can also be interpreted as nothing less than government endorsement of a "self-interested claim" (Coaldrake and Stedman, 1999). Many argue that the criteria and rules appear to be introduced and altered to meet the needs of the established universities and to "deliberately" disadvantage new institutions. Clark (1995) says the demands for research are very strong but:

> "governments simply won't pay the cost of having all institutions function as fully invested research universities. [Instead t]hey reduce basic institutional support, force universities to compete for research funds, and promote further differentiation of the research and teaching combination, from heavily research-centred to completely teaching-centred […] a continuum between 'research-first' and 'teaching-first' becomes more extended and full of more institutional niches. The amount of research support becomes a basic differentiating item."

However, allowing all HEIs to engage in research and compete for research funding without providing newer institutions with the resources to achieve them means they are in effect competing in a game they cannot win.

This international study reveals that, across the OECD, new HEIs are facing many challenges associated with their status. While there are national contexts and circumstances which cannot be ignored, there are sufficient similarities to suggest that the experiences cross national boundaries and operate almost irrespective of the political party in power. As higher education systems, nationally and internationally, become more competitive, barriers to entry are also rising. Experience strongly supports the view that difficulties impeding the growth of research at new HEIs are not likely to be overcome by conventional means. In other words, without active and selective use of policy instruments, new institutions will find it increasingly difficult if not impossible to overcome barriers to entry because "*the pecking order of research activities is not easy to change*". Ideally, new institutions need a less competitive and more co-operative or regional educational economy, but that is unlikely.

> "[…] the type of strategy most likely to achieve the best results would involve active and selective state policies to build up industries capable of overcoming barriers to entry" (O'Malley, 1989).

This conclusion arises from the fact that the competitive advantages of older institutions have built up over time – some have and continue to play a significant role in nation-building (OECD, 1999) – and are by now very great. Some institutions are better placed for success than others as a result of the value society places on research, their ability to identify and exploit exceptional and niche advantages and to align competence with national/regional strategic goals, enhanced access to funding sources and the management of internal organisational and HR issues.

7.2. Recommendations

Increasing evidence shows that knowledge-intensive industries hold the key to economic growth, and inversely that "knowledge rich countries will grow faster than knowledge poor countries […]" (Best, 2001). Given the interconnectedness between new knowledge production and the global positioning of nations, growing research capacity and capability is both an institutional and a national strategic objective. If Governments wish to encourage a greater contribution from all HEIs to balanced national social and economic development, then Government actions and policy instruments are critical to this process. Based on institutional experiences, the next sections suggest some policy recommendations which could help underpin and build diverse HEI missions and promote teaching, research and service (see Table 7.1). Actions are grouped under three policy objectives: 1) Widening access to the knowledge society, 2) Overcoming late-development, and 3) Benchmarking to support diversity.

Table 7.1. **Policy recommendations to develop research in new HEIs**

Policy	Indicative actions
Widening access to the knowledge society	• Remove legislative and other constraints on operation and development of HEIs. • Target grants to enable new HEIs to meet 21st century mission obligations. • Increase capacity and competence at sub-national level. • Support linkages between HEIs and region/community and SMEs. • Establish investment fund as part of regional/spatial strategy.
Overcoming late-development	• Provide "head start' or "catch-up' grants to build infrastructure, *e.g.* laboratories and research libraries. • Target funding for staff development, mobility and HR strategies. • Support research training and flexible career development opportunities, particularly aimed at new researchers and women. • Strengthen institutional/research management and leadership capabilities.
Benchmarking to support diversity	• Provide baseline research funding as part of negotiated contract between government and HEI. • Re-examine definitions of research and criteria/rules for competitive research. • Recognise and reward/fund improvements and potential in research. • Head-start, differentiated and targeted funding, over reasonable growth periods, for new HEIs and disciplines.

Widening access to the knowledge society

Across the OECD, governments are "responding to increased competition for shares of the global market" by asking how higher education can be restructured to more effectively and efficiently be an economic driver (Slaughter and Leslie, 1997). Many governments are responding by focusing research resources on a small number of elite universities or departments, and on a selected number of research themes. This approach is coming under criticism as evidence suggests that concentrating research capacity in a few centres could suck innovation out of the regions. The UK Lambert Report on University-Industry Collaboration (2003) warned:

> "[...] proximity matters when it comes to business-university collaboration. SME's in particular, find it difficult to work with research departments on the other side of the country. If resources are increasingly concentrated on a small number of world-class research departments, there is likely to be a negative impact on the level of business-university collaboration in the UK."

Other studies have also suggested that a significant event-horizon, or the greatest knowledge and technology transfer, occurs within 50 km. A study of the Swedish economy argued that access/participation to the knowledge society is critically dependent on geographical proximity to access research and knowledge expertise (*Lindbeck*, 1994) while a report from the German Patent Office revealed that people who filed patents relied significantly on people within their immediate region as exemplars of "prior-art". Because

higher education institutions (their staff – both academic and non-academic – students and graduates) are important generators of wealth, producers of new knowledge and new knowledge workers, and consumers of products and services, HEIs are a major actor within a "learning region". Thus, in order to widen access to knowledge and participation in the knowledge economy, it is not irrational that all HEIs participate in knowledge production and dissemination. It makes little sense, says Clark (1995), to "keep research entirely out of vocational or undergraduate programs and to thereby confine half or more of postsecondary institutions to a posture of "teaching only". Yet, within the participating group of countries, only Sweden and Denmark remained committed to the tradition of research-based teaching.

The implications of this debate are particularly significant for all HEIs and especially newer institutions since many of them were established in areas – outside and inside urban conurbations – previously under-serviced by established universities. The regional remit with strong links to industry (which tend to be SMEs), the community and the public sphere, has been a strong mission focus. While some participating HEIs are happy with a "regional" or "community" designation, others fear that at a time when the boundaries between regional, national and global are getter more difficult to distinguish, such designation may effectively relegate them to a second tier of institutions. They claim industry will continue to seek out research-intensive HEIs for applied research wherever they are located. Other tensions will arise as competition with the long established and much larger universities grows in the context of demographic and other socio-economic changes such as, population shrinkage in the regions *versus* population growth in large cities. In these circumstances, the ability of "regional" institutions to remain attractive – especially if they do not remain at the cutting-edge – will raise challenges for both institutions and government.

There is growing consensus that governments and institutions need to develop "glocal"[1] strategies for the sub-national level (OECD, 1999). Governments need to unlock higher education's potential by removing legislative and other governance constraints which heretofore have impeded the ability and capacity of many HEIs to respond quickly to new opportunities. They also need to ensure policy moves beyond the 20th century binary between education and training, and reflect trans- and inter-disciplinary thinking. Consideration should be given to targeted "glocal" policies and initiatives that enhance and widen participation in the knowledge society as part of a nationally balanced socio-economic strategy. That strategy should aim to encourage and support partnerships between the academy-industry-government-community, exchanging and co-generating knowledge and understanding, and enhancing innovation. Partnerships should build upon and link national, European and international innovation systems by embedding the various elements and relations of creating, preserving,

transmitting and applying knowledge (Etzkowitz and Leydesdorff, 1997). Practical steps include the introduction of targeted funding or incentive programmes aimed at supporting the breadth of research endeavours, including university and business/community partnerships, regional or sub-national focused projects, and collaboration with other institutions. Formulaic funding has met with mixed reviews because it is often seen as reinforcing the existing vagaries of history and institutional status. Instead, governments need to formulate models that focus on both potential and outcomes, and which can tolerate asymmetrical inputs.

Overcoming late-development

New HEIs face particular challenges associated with late development. While all higher education institutions face difficulties operating in the new global competitive environment, all participating HEIs claimed that they face particularly high hurdles relative to more well-established or mature universities. As noted throughout this report, these include: inadequate facilities and infrastructure, lack of research capacity and competence, employment and career issues, and funding for new(er) disciplines, among other things. These factors have contributed to the creation of an uneven playing field, especially in the competition for research funding, enabling the "Matthew Effect" to flourish. Some governments offer targeted funds for newer institutions to "catch-up" but the timeline is usually too short and too little to overcome significant gaps. Government policies and initiatives need to cater to both issues through a significant investment strategy. In this respect, governments must avoid simply mimicking the facilities and fiscal standards that have evolved for traditional institutions. Instead, it should encourage HEIs to become models for innovative facilities development, planning and partnership strategies, as well as benchmarks for accountability.

Benchmark to support diversity

Many participating HEIs believe they are being driven towards a single definition of university and research activity which is dictated by the established universities and disciplines, by the personal experiences of policy-makers and in response to single or narrow funding streams. The research university has become the "default mode".[2] As long ago as the 1960s, Reisman (1965-66) suggested that insistence on a national standard enforced via funding mechanisms and the external examiner system in countries such as the United Kingdom had unwittingly created an over-centralised higher education system with an almost monolithic concept of what a university is which made it difficult to create alternative or diverse HE models.

Today, evaluation systems provide useful benchmarks but they also act as "gate-keepers", restricting entry to new researchers, newer disciplines and new HEIs in general. Technology foresight studies act in a similar manner, contributing unwittingly to narrowing the fields of investigation, new ideas and new theories. The UK Research Assessment Exercise suggests itself as a useful alternative model – awarding funds across 69 discipline groups – but the result has also been to introduce a league of "star" researchers who compete for the highest salaries and narrow the range of winners.

> "*This hugely disadvantages 'new' universities, who lose their best researchers to these elite institutions and find it difficult to secure access to these funds. It also perpetuates the stagnation of certain subjects with a long research history, advantaging areas such as religious studies and disadvantages new subjects (which are disproportionately based in the new universities) such as media studies, sport and leisure studies, women's studies, etc.*"

Thus, participating HEIs claim that despite policy arguments for greater research relevance (meaning applied, collaborative and regionally-focused research), funding agencies and evaluation exercises continually weigh traditional "academic" outputs more highly. There is also a strong tendency to equate research with expensive basic scientific discovery conducted in research-intensive universities. These developments may also reflect intra-governmental tensions between ministries of education and enterprise, each of which has a slightly different perspective on the role of research and its relationship to higher education. The former usually favours multi-disciplinary research within higher education institutions and as indispensable to teaching while the latter's focus on its economic and commercial value is at best neutral or at worst critical of research within HEIs which operates according to different deadlines and conditions of employment. Thus, basic enabling sciences are being squeezed as much the arts and humanities, a problem impacting on both established and new HEIs. According to one commentator, the real role of research evaluation and funding is to help "control expenditure […] [and] to legitimize decisions" (Frederiksen, Hansson and Wennedberg, 2003), while another believes it used as a "*useful tool*" to enforce institutional differentiation, enabling government "*select some of the institutions as the research intensive universities and leave the majority as the teaching oriented universities and colleges*".

Accordingly, critics argue that the policy effect (or purpose) has been two fold: 1) to reinforce or re-introduce a binary divide between institutions, distinguishing between research-based teaching and learning and non-research-based teaching and learning (Clark, 1995), and 2) to privilege traditional definitions of research and to ignore the implications of new knowledge production. Moreover, depending upon the answers to the questions of whether world-class research happens only in world-class

universities and whether world-class experts can be found only in world-class universities, serious challenges are posed for both new HEIs and government.

Governments should consider adopting a variety of measures that will genuinely facilitate and support research and innovation across all HEIs and support diverse institutional missions. This means, in the first instance, clarifying the purpose and intent of evaluation exercises. Participating HEIs suggest that government and funding agencies should fully endorse the equal importance of basic and applied research, professional and creative practice, and knowledge and technology transfer activities, and then fund accordingly. The range of research prioritised by new HEIs is impressive (see Table 4.1), and illustrates that innovation also occurs in the humanities and social sciences. For example, one of Europe's major growth sectors is the cultural industries, including design, a field that has been largely ignored by funding agencies.[3] As one participant argues:

> "*[…] there is an immense amount of interesting and possibly important things to investigate, things that may be studied with scarce equipment and current expenses budget […]. It would be very good for universities,* i.e. *for students and the quality of their education, that a system to fund non-expensive research was implemented at a large scale.*"

Another participant suggests that "*the most practical and relevant way for the new HEIs is to concentrate on some specific research fields and devote their efforts to recruit excellent researchers and provide resources into these fields*". For many new HEIs, the issue is not the quality of the research but rather problems associated with research of different scope and scale.

The central question is the relationship between government or the funding agency and the institution. It is increasingly impractical to suggest that institutions will have the resources to fund whatever strategic or research direction they choose. In response, many governments are introducing the concept of negotiated output based contracts. Within this scheme, it would seem reasonable to incorporate block research funds or "free funding" which could be used for research designated by the HEI – the course of direction would need to build strategically for the future. Such an approach might ease policymakers' concern for "mission drift" while providing essential baseline funding. Critically, governments need to ensure that appropriate and reasonable time-lines are fixed to enable new HEIs to overcome barriers of entry.

Notes

1. The word "glocal" is adapted from the environmental movement's slogan: think global – act local.
2. I am grateful to Merle Jacob for this term.

3. Today, these industries – as identified in EU *Interreg*, *IST* and *Culture 2000* programmes – are among Europe's major wealth creators and sources of employment. Recent studies show that 7.2 million workers or 4.6 % of total EU employment are engaged in the production of cultural products and services. See Brown, 2004: "Reports for the Greater London Authority note that the creative industries sector is the third largest employer in London, the second biggest source of jobs; it has added GBP21billion annually to London's output and has grown much faster than other industries." See also EU, 2001; UK Government, 2001.

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ISBN 92-64-00694-X
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Developing Research in New Institutions

Chapter 8

Conclusion

The nexus between higher education and research has been one of the unwritten rules since Humboldt first conceived the "unity of teaching and research as the centrepiece of his new idea of a university" (Schimank and Winnes, 2000). Since then several models of the relationship have developed, with the French promoting a pre-Humboldtian systemic divide between teaching and research. This debate has become heated in recent decades. Some people argue, *inter alia*, for the coexistence of such activities as the best way to ensure knowledge transfer or based upon the dynamics of the global knowledge economy/society and the public good, while others argue for their increasing incompatibility based on differences in capacity and capability, quality, working conditions and needs or constraints of the public, the institutional and/or national financial purse. While this particular debate is not the subject of this book, the role of research lies at the heart of almost every discussion about higher education.

Today, governments are thinking much more strategically about research because the role of knowledge production is now intrinsically linked with the geo-political positioning of nations. The task of growing research capacity and capability has become a key focus of government and public policy. Accordingly, government is becoming much more directive in the role it believes higher education should play now and in the future. Many governments are using carrot-and-stick policies, shaping priorities and linking research funding to outputs. However, there is also increasing evidence that knowledge production is no longer the special preserve of the academy. Today, new knowledge is produced by a number of organisations in the public and private spheres, and in partnership between these spheres. Higher education is only another player – albeit an important one – in a complex global knowledge industry. In response to these different pressures, HEIs are (re)examining their mission, strategies and organisation. It is no longer possible for either policy-makers or educational leaders and managers to see these two activities as discrete. Growing research is both an institutional and a national strategic concern. While tough questions are being asked of all institutions, this book focused primarily on HEIs established after 1970. Why?

The last decades have witnessed an explosion around the world in the number and type of higher education providers. New higher education institutions have been established under the auspices of both public and private benefactors to meet broader socio-economic and political objectives in

contrast to older universities which had primarily served as the breeding ground for the elite. As a consequence, the missions and academic programmes of these new HEIs reflected a strong commitment to these objectives. As these institutions matured, the disciplines they spawned have matured synergistically with changes in society and the economy, demands of the labour market, and advances in knowledge and knowledge production. Today, in contrast to other institutions often included within the tertiary sector including the growing number of specialist private for-profit educational providers in many countries, these HEIs offer comprehensive higher education underpinned by growing expertise in research, development and consultancy. But, the world in which they operate is changing rapidly; it is visibly more competitive and the stakes are higher.

This international study of 25 HEIs across 17 OECD and non-OECD countries has investigated the processes and strategies being pursued by new HEIs to develop research capacity and capability. Its focus is on institutional decision-making in order to identify the global and national challenges they face, to learn how institutions are responding, and to share their "good practice" experiences. As a sub-group of all HEIs, participants encompass a wide variety of institutional histories and experiences. There are some differences between those new HEIs which were established as *ab initio* universities and those which have been transformed or "emerged" over time. Some are cross-sectoral institutions, providing both further and higher education and articulation between these levels although the majority of participant HEIs offer undergraduate and postgraduate programmes. Those without formal "university" designation speak of the particular difficulties and prejudices they (their faculty and students) experience despite the fact that they undertake all the activities appropriate to a "university". However, almost regardless of country of origin, the participants share many similarities which transcend national boundaries and go beyond date of origin.

There are common experiences with respect to mission, curriculum and teaching, and more recently, with respect to the challenges of growing research. Individual case studies reveal shared concern about the impact of government policy, and the difficulties associated with inadequate investment and infrastructure, inherited faculty, newer disciplines and the absence of a research culture. The depth of these problems is nuanced by national circumstance, level of maturity, and cultural and political milieu, including party political and ideological perspectives. Nevertheless, most of the institutions pinpointed issues which they believe are associated with their status as late-developers or newcomers. In others words, they believe that they face particular challenges because of their relatively recent entry into the higher education marketplace in relation to other more established national institutions.

Institutional responses to the new demands and their circumstances are also very similar. All participant HEIs are busy making critical strategic choices concerning the research environment, the teaching-research nexus, organisational and management structure, funding and resource allocation, and human resources (recruitment, retention and faculty development). As research activity is linked increasingly to institutional status and survival, it is no longer viewed as something to be left to individual researchers. Hence, participant HEIs are rethinking and changing their organisational and management structures to more effectively and efficiently deliver their objectives and meet targets. Many have established research or industry centres, incubator units, science parks or "centres of excellence" and have recruited high-profile "star" researchers. Institutional priorities show a strong correspondence to national and international priorities, which is not surprising in the context that government, either directly or indirectly, is both the policymaker and the funding agency. They have identified and exploited niche or exceptional advantages associated with their expertise, region or sectoral competencies. Many have achieved success nationally and internationally in specific and new fields, underpinned by developments in technology, in partnership with industry and the wider community, and aligned with national/regional strategic goals. Interdisciplinarity has become one of the important defining characteristics of the new HEIs albeit inter-institutional partnerships seem easier to create than intra-institutional or cross-departmental collaboration. Accordingly, it could be argued that these institutions anticipated (and influenced) Mode 2 methodologies, and contemporary debates around definitions of research and scholarship.

But, there are no easy answers to the range of challenges now impacting on HEIs. Senior managers and faculty are having to learn how public sector enterprises must operate in a global competitive environment. This means making choices in ways they may not previously have encountered or anticipated. Should they develop a comprehensive range of academic programmes, research and support activities or promote a small number of areas of strength to the level of critical and self-sustaining mass, with high national and international profile and bidding to become genuine centres of excellence? As participant institutions work out their own strategic position, tensions are emerging between the demands of teaching and research, within the institution and between institutions and faculty. Research active faculty are perceived by others to be enjoying preferential benefits: promotion, reduced teaching and enhanced facilities. Institutions – both new and established – are finding that these pressures are forcing realignment within the institution, creating two parallel sectors often at variance with each other.

While the problems of growing research capacity and capability are universal and faced by many higher education institutions around the world,

the research intensive and competitive environment is putting new HEIs in particular under the spotlight. Institutional ability to overcome barriers to entry appears to be especially limited when the policy environment in which it operates is perceived as either hostile or constrained. While Porter's diamond shows interlinking pressures, many new HEIs believe that their ability to make the four corners of the diamond – factor and demand conditions, organisational strategy and spatial or regional/national relations – "mutually reinforcing" is complicated by government which often acts as an inhibiting factor. This has led to tensions between institutional mission and government policy, suggesting that in many instances what a number of HEIs want to do may not necessarily be what government wants. Thus, many HEIs appear to be pursuing research by fair means or foul. As they seek to prioritise and develop research, governments are also making choices. New HEIs are often accused of "academic" or "mission" drift. Is research an essential element of the higher education mission? In a more competitive market place, can everyone be involved in research? Can every HEI afford to be in research? Can it afford not to? Can government afford to have everyone in research? In this respect, this study has contributed to a wider debate about what characterizes a university and what defines research.

Diversity and differentiation between institutions is an important characteristic of every education system. Governments have sought to promote and maintain institutional difference through a combination of regulatory or market-steering mechanisms. Yet even where the latter has been introduced, for example deregulation as practiced in the United Kingdom and Australia, it has arguably been limited to only removing differences of institutional designation. Government has continued to control the products, providers, prices and incomes in ways which many new HEIs claim are overtly in the interests of the established players and reinforced a "structure of inequality" (Grubb, 2004). Their interpretation of these actions takes different forms. Some participants fear their distinctive applied research expertise and track-record – another defining characteristic of many new HEIs – is threatened because preferential weighting is given to established researchers or problem-solving research activity is being usurped by traditional classical universities. Thus, they worry that government policy appears to facilitate "reverse mission drift" enabling the latter institutions to adapt the professional and applied characteristics of new HEIs. Others suspect that funding and regulatory mechanisms are in effect encouraging institutional isomorphism or de-differentiation. Like Laredo (2003), they believe "research universities are the implicit reference model of most policy makers and most public debates" and that all institutions are being measured against this single metric. In either case, participants fear a new binary divide or new division of labour is emerging between institutions based on a

differentiation of knowledge production and/or dissemination is emerging as governments seek to compete globally by concentrating resources around a select few "world class" universities or departments.

In response, new HEIs are challenging the prevailing wisdom. They are actively (re)defining the University for the 21st century, professionalizing new disciplines, introducing new student-centred pedagogical practices and interdisciplinary methodologies, and broadening research activity. Participant HEIs believe there is a compelling case to be research active in order to underpin human capital and (advanced) learning, and "forward linkages" such as "the production and dissemination of knowledge within the local economy, the employment of young graduates and partnership relations" (Mille, 2004). If universities are a major supplier of "technological breakthroughs with the promise of big commercial payoffs" (Florida and Kenney, 1991), their capacity to participate in knowledge and technology transfer activities is critical. With some exceptions, participant HEIs do not wish to become a research-intensive institution but they do desire to intensify their research.

Today, society is demanding more from higher education. In turn, the agenda of most HEIs has moved on from a desire to simply increase the general education level of the population and the output of scientific research; there is now a greater concern to harness higher education and research to specific economic and social objectives (OECD, 1999). There is often an underlying assumption that the higher education market place is unfettered, and that failure to succeed is due to individual or institutional failure. Evidence from the case studies suggests however that opportunities can be constrained because capacity and capability take considerable time to build. If governments genuinely desire higher education to move beyond the elite phase, and address the needs of and widen access to the knowledge society, positive policy intervention is required (Hazelkorn, 2004). Indeed, it will arguably be difficult for government to reach its targets without such an approach as the traditional university sector alone is neither capable nor appropriate. The elite university cannot abandon its social responsibilities but neither can the mass university be "discounted as research-producing institutions" (Nowotny, Scott and Gibbons, 2002). While the study illustrates that policy instruments and other regulatory or monitoring mechanisms, especially when funding is attached, can and does influence institutional behaviour – albeit not always in the way intended –, governments need to move away from a simple carrot-and-stick approach.

Participants favour much greater dialogue between government and HEIs as part of a nationally balanced socio-economic plan. Institutions should be empowered to exercise enhanced autonomy and make appropriate choices within the framework of an agreed or negotiated "contract". To enable them to meet their objectives, new HEIs need the appropriate resources to help

overcome problems associated with late development. In this way, government could truly facilitate research and innovation across all HEIs while also supporting its objectives for diverse institutional missions. The process entails bridging the gap between government policy and institutional aspirations and strategies. This approach poses challenges for both institutions and governments, but it equally offers the opportunity to unlock potential.

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ISBN 92-64-00694-X
University Research Management
Developing Research in New Institutions

ANNEX A

Material Received from Participating HEIs

Aalborg University, Denmark

- Case Study Framework
- Aalborg University Corporate Report, 2000
- *Forskningsberetning* (Research Report), 1999 and 2000
- Presentation, Case Study Seminar, Dublin, March 2002

Aarhus School of Architecture, Denmark

- Case Study Framework
- Research Plan
- PhD. Handbook
- Presentation, Case Study Seminar, Dublin, March 2002

Auckland University of Technology, New Zealand

- Case Study Framework
- Faculty of Arts and Te Ara Poutama, *Research and Scholarship,* 2001
- Notes from Institutional Visit, Summer 2002

Carleton University, Canada

- Case Study Framework
- Building a Research-Intensive University. Report of Carleton University's Task Force on Research (2000)

Coventry University, UK

- Case Study Framework
- Notes from Institution Visit, December 2002

- Research Strategy, June 2002
- Presentation, Case Study Seminar, Dublin, March 2002

Dublin Institute of Technology, Ireland

- Case Study Framework
- DIT Policy on Research and Scholarly Activity, 2000
- Strategic Plan for Research in the Dublin Institute of Technology, Draft June 2002
- Presentation, Case Study Seminar, Dublin, March 2002

Hong Kong Polytechnic University, China

- Case Study Framework
- Notes from Institutional Visit, Summer 2002

Hogeschool Gent, Belgium

- Case Study Framework

University of the Arts London, United Kingdom

- Case Study Framework
- Notes from Institution Visit, December 2002
- Research Policy Statement
- Presentation, Case Study Seminar, Dublin, March 2002

Macquarie University, Australia

- Case Study Framework
- Macquarie University News, June 2002
- Notes from Institutional Visit, Summer 2002

Napier University, Scotland, United Kingdom

- Case Study Framework
- Corporate Management Team – First Steps Towards the Implementation of the Research and Scholarly Activity Strategy, 2002-2005
- Response to HEFCE committee on research degree programmes (June 2003)

Örebro University, Sweden

- Case Study Framework – annotated version
- Presentation, Case Study Seminar, Dublin, March 2002

RMIT University, Australia

- Case Study Framework
- Research and Research Training Report, 2001
- Neil Furlong, Australia's Technological Universities – Research Strength with Flexibility and Co-ordination, 2000
- Notes from Institutional Visit, Summer 2002
- Presentation, Case Study Seminar, Dublin, March 2002

Széchenyi István University, Hungary

- Case Study Framework

Technical University of Catalonia (UPC)

- Case Study Framework

Technical University, Liberec, Czech Republic

- Case Study Framework – reply by David Lukáš, Rector
- Case Study Framework – short reply by Přemysl Pokurnŷ, Vice-dean Faculty of Mechanical Engineering)
- Case Study Framework – reply by Jiři Kraft, Vice-dean Faculty of Economics
- Yearly Report, 2001
- Presentation, Case Study Seminar, Dublin, March 2002

UNITEC, New Zealand

- Case Study Framework
- Research and Development Centres at UNITEC
- Research Fellowships. Policy and Procedure for Appointment (2002-2003)
- Criteria for Research Active Staff
- Contrast between Archetype Models of a "University of Technology" and a "Research University"
- Jacqueline Rowarth, "Feeding excellence from the roots", *NZ Education Review*, 18-24 September 2002.
- Research and Development Report, 2001-2002
- Notes from Institutional Visit, Summer 2002

University of Crete, Greece

- Case Study Framework
- Presentation, Case Study Seminar, Dublin, March 2002

University of Helsinki

- Presentation, Case Study Seminar, Dublin, March 2002

Universidade do Porto, Portugal

- Case Study Framework
- Presentation, Case Study Seminar, Dublin, March 2002

Université du Québec à Chicoutimi, Canada

- Case Study Framework

University of Tsukuba, Japan

- Case Study Framework
- Outline of the University of Tsukuba, 2001-2
- Presentation, Case Study Seminar, Dublin, March 2002

University of West Bohemia, Czech Republic

- Case Study Framework
- Long-term Strategy of the University of West Bohemia in Pilsen
- University Spin-Off Implementation Scheme in Czech Republic- Audit Report
- University of West Bohemia (brochure)
- Presentation, Case Study Seminar, Dublin, March 2002

University of Western Sydney, Australia

- Case Study Framework
- Research and Research Training Report, 2001
- *The UWS Research Landscape,* Vice-Chancellor's Institutional Review Committee Report, November 2001
- Various papers associated with Key Research Centres, External Review of Research, 2001
- Notes from Institutional Visit, Summer 2002
- Presentation, Case Study Seminar, Dublin, March 2002

Victoria University of Technology, Australia

- Business ethics research unit, annual report, 2000
- Notes from Institutional Visit, Summer 2002

ANNEX B

Case Study Framework

Processes and Strategies for Growing Research at New and Emerging Higher educational institutions

Name of Institution

Contact Person

- Name
- Position
- Email
- Telephone Number

In this paper you will find five different sets of questions, relating to:

a) Historical background, policies, and strategies of institutional research activity.

b) Mechanisms and criteria with regard to priority setting.

c) Organisation and funding levels.

d) Human resources.

e) Particular challenges faced by new and emerging higher educational institutions.

A. Questions relating to the background, policies and strategies of institutional research activity.

The role of higher education is changing in the global knowledge economy. The development of academic research capacities is becoming an important factor in determining the status and quality of institutions and their contribution to economic and social development. For some, the ideal teaching and learning environment requires strong inter-action or *integration*

between the activities of knowledge dissemination and knowledge production. Others argue that research or "the search for truth is an essential function of (all) institutions of higher education", as stated in one government report.

New policies, organisation and management structures are required to encourage and facilitate research. Answers to the following set of questions should enable us to identify the particular circumstances which new and emerging HEIs face.

1. What were the most important factors (not more than five) responsible for your institution's origins and development?

Please provide an outline of your institution's growth.

1.

2.

3.

4.

5.

2. What are the most important factors or events, internal and external (not more than five), influencing your research strategy?

Does your institution have a mission statement with respect to teaching and research? To what extent does the focus on research represent a change in institutional mission?

1.

2.

3.

4.

5.

3. What are the most important objectives (not more than five) of your institution's research strategy?

Please provide copies of relevant documentation.

1.

2.

3.

4.

5.

4. How does your institution define "research"?

How relevant is the Boyer model of scholarship (discovery/application/integration/learning) for your institution? Do you distinguish between basic and applied research, consultancy, experimental production or creative practice?*

5. Institutional Research Profile.

Please fill in the table below as far as possible. Feel free to add additional categories based upon your answer to No. 4 above. (Please provide figures for the most current year in which data is available and your projected target for 2006 or nearest date.)

* Ernest L. Boyer, Scholarship Reconsidered. Priorities of the Professoriate. The Carnegie Foundation for the Advancement of Teaching, 1990.

Research data	19_ _	2006
Total number academic staff (fte)		
% Active researchers		
% Experienced research supervisors		
Total number postgraduate research students (fte)		
% PhD students		
External research funding earned		
Number of patents		
Number of contracts		
Number of publications in refereed journals		
Number of books		
Number of refereed conference papers		
Number of exhibitions/performances		
Number of Industry Projects		

fte = full time equivalent.

For reference, please give total number of students (fte):

B. Questions relating to mechanisms and criteria with regard to priority setting.

Global change and institutional diversification are forcing many institutions to assess their strengths in order to seek competitive advantage. At the same time, research disciplines are evolving and the demand for research is changing. Budget availability is matched by demands for increased accountability. These forces are changing the ways institutions organise themselves and set research priorities. As "newcomers" or "latecomers" into research, new and emerging institutions face particular challenges. How are they responding?

1. Does your institution set research priorities?

2. How does your institution set research priorities?

Who is involved in priority setting e.g. which post-holders, groups or units within your institution? To what extent are researchers involved in this process? Are there informal or unofficial factors influencing the process If so, what are they? Please describe the decision-making process/planning mechanisms at the institutional level and at the faculty/department or unit level.

3. Is research strategy and policy co-ordinated across your institution?

How is this co-ordination facilitated and monitored? Are other functions (e.g. industry links, postgraduate studies) linked to research? If possible, please draw a diagram the structures.

4. What are the main factors influencing the research priorities in your institution?

Please rank 1, 2, 3, 4, 5 in order of significance, where 1 = the most significant, and 5 = the least significant.

Priority-setting influences	Order of significance
Competitive advantage (finding a niche)	
Budget constraints	
Availability of funding	
Availability of competence	
Compliance with national priorities	
Compliance with regional priorities	
Public pressure for accountability	
Public pressure for relevance	
Internal institutional pressures	
External evaluation processes	
Internal Evaluation Processes	
Other (please explain)	

5. *What are the priority research domains for your institution?*

Please rank 1, 2, 3, 4, 5 in order of significance, (where 1 = the most significant, and 5 = the least significant), give an example and explain the rationale.

Order of significance	Research domain	Example	Rationale
	Basic research		
	Applied research		
	Creative arts practice		
	Consultancy		
	Industry-related		
	New technology		
	Significant research domain		
	Collaborative or cross- faculty		
	Collaborative (external to the institution)		
	Interdisciplinary		
	New or emerging area of research		
	Associated with traditional expertise		
	Associated with region/local community		
	Other		

6. How is research activity organised in your institution?

Please indicate the % of research activity that takes place under the following headings in your institution. Please also indicate which is your institution's strategic preference.

Unit of research activity	Current distribution (%)	Strategic preference (%)
Individual		
Academic faculty/department		
Research centre		
Centre of excellence		
Industry centre		
Science park		
Incubator units		
Business park/enterprise centre		
Other		

7. What kind of problems or tensions does your institution face in setting priorities?

Please give examples of recent experiences that highlight the kind of problems/tensions faced, and approach taken. Please indicate if you consider this approach good practice.

C. Questions relating to organisation and funding levels.

Funding is one of the major driving forces for the development of research. Answers to these questions should give us an indication of how different funding schemes can encourage, facilitate and grow research, and how funding methods reflect the complexity of the issues involved.

1. What percentage (%) of your institutional budget is directed to research?

If institutional funding has decreased, has this had a major impact on research in your institution? Have there been changes recently? What changes are likely in the future?

2. What are main sources of research funding at your institution?

Please fill in the table below.

Income sources for research (as a percentage of overall funding)

Funding source	%	
	1995	2001 (or most recent year)
Institutional funding		
Grants (*e.g.* from research councils or similar agencies)		
Contract or project funding from external sources		
Funding from business		
Other types of income (*e.g.* private non-profit, patent licenses)		
Total	**100%**	**100%**

3. Does your institution have a formal model for allocating financial or other resources to different research activities?

How do you evaluate the impact that your funding mechanisms have had on research activity? Please, give examples of best practices, and indicate why you consider this good practice.

4. What funding mechanisms does your institution use to encourage or facilitate research activity, at different levels?

What internal funds or programmes are available? Are there special incentives to encourage new or inexperienced researchers, encourage interdisciplinary, cross-faculty or cross-institutional research, and/or apply for funding from different/external funders? Other?

D. Questions relating to human resources.

Research depends on researchers. Higher educational institutions provide facilities and services to aid and encourage researchers. However, global competition is placing more pressures on academic staff, many of whom, in new and emerging HEIs, may have been hired originally as teachers and not researchers. The following questions are meant to help us understand the extent to which human resources issues impact on research activity.

1. Have the terms and conditions or expectations of academic employment changed/are they changing in your institution?

Does your institution have specific teaching or research posts? Are all academic staff expected to engage in research? How does your institution balance teaching and research responsibilities? How has this changed over the last few years? What changes do you expect in the future?

2. Does your institution have specific policies to recruit active or high profile researchers?

Does your institution recruit temporary research positions? How has this changed over the last few years? What changes do you expect in the future?

3. Does your institution offer incentives or assistance to encourage or facilitate researchers? Please evaluate their impact.

Please rank 1, 2, 3, 4, 5 in order of impact where 1 = greatest impact and 5 = least impact.

Incentives/assistance	Impact
Promotion	
Salary increase	
Individual research account	
Travel funds	
Targeted grants	
Research time within academic year	
Research time with industry	
Sabbatical leave	
Facilities	
Unofficial/informal (please explain)	
Other forms of recognition (please explain)	

4. Does your institution have a training programme to encourage and facilitate researchers? Please evaluate their impact.

Please rank 1, 2, 3, 4, 5 in order of impact where 1 = greatest impact and 5 = least impact.

Training programme	Impact
PhD. programmes	
Project management	
Presentation skills	
Research skills and methodologies	
Budgeting/financial management	
Mentoring	
Other:	

5. Does your institution have a research office? Does your institution provide support services?

Please tick (✓), if relevant.

Support services	✓
Research office	
Project preparation	
Application writing	
Financial or budget advice	
Project management	
Funding sources	
Other:	

6. From your responses to No. 3, No. 4 and No. 5 above, please give one or more examples of best practices. Please indicate why you consider these good practices.

7. How have academic staff responded to your institution's research strategy and priority setting?

What do academic staff say are the main factors obstructing or facilitating research activity? To what extent have industrial relations or human relations issues impacted on implementation of your research strategy? Have other tensions or problems arisen? If so, how has your institution coped? Please give examples of best practices, and indicate why you consider this good practice.

E. Questions relating to particular challenges faced by new and emerging higher education institutions.

Traditional universities have been best placed to respond to the knowledge-competitive environment. In contrast, new and emerging institutions are operating under very different and often difficult circumstances. These questions address particular difficulties, internal and external, which these institutions face. Examples of strategies and processes that have worked well or badly are most welcome.

1. To what extent have external factors helped or hindered the development of your own research strategy or ambitions?

Please rank 1, 2, 3, in order of significance (where 1 = greatest significance and 3 = least significance) and evaluate the impact of these external factors on your institution's research activity.

External factors	Helped	Hindered
Government strategies		
Technology foresight studies		
Institutional recognition		
Institutional funding levels		
Research funding/criteria		
Institution competition		
Existing collaborative partnership		
or networks		
Evaluation process		
Other:		

2. To what extent have internal factors helped or hindered the development of your own research strategy or ambitions?

Please rank 1, 2, 3, in order of significance (where 1 = greatest significance and 3 = least significance) and evaluate the impact of these internal factors on your institution's research activity.

Internal factors	Helped	Hindered
Institutional ethos or culture		
Rigidity or lack of flexibility		
Staff response		
Funding levels		
Not enough researchers		
Speed with which decisions implemented		
Evaluation process		
Other:		

3. To what extent has your institution learned from, adopted or adapted the experiences of others?

Which institution(s) have been most influential for your own research strategy, procedures or organisation? Which author(s) or individual(s) on higher education have been most influential? In what aspects do you consider what the institutions have done or the authors/individuals have written/done as good practices?

4. What problems have your institution experienced/faced in developing and encouraging research?

Please give an example of an experience that highlights the types of problems faced by your institution. Please explain if any changes or reforms have been introduced to overcome the problem. In what aspects do you consider these changes or reforms as good practices?

5. *What achievements have your institution experienced in developing and encouraging research?*

Please give an example to highlight the types of achievements experienced by your institution. Please explain why you think the outcome was so successful? Can you indicate any specific policies or initiatives that your institution introduced that led to this result? To what extent have informal or unofficial processes been particularly helpful? In what aspects do you consider them as good practices?

6. *What are the outstanding problems?*

Please identify the most important outstanding problems to be tackled. Do you anticipate any difficulties resolving these problems? If so, what are they?

7. *What are your institution's future policy goals?*

Please identify the most important research goals to be reached? What new initiatives are planned? Do you anticipate any difficulties? If so, what are they?

8. *What are the two most significant actions that your institution has implemented which have underpinned your research activity to date?*

To what extent have informal or unofficial processes been helpful? In what aspects do you consider them as good practices?

1.

2.

9. *Please feel free to make any further comment or observation on the particular challenges faced by new and emerging HEIs to develop and grow research.*

ANNEX C

Research Strategy and Structures Documents – Examples of "Good Practice"

Aarthus University of Architecture, Denmark

Carleton University, Canada

RMIT University, Australia

Unitec New Zealand

University of the Arts London, United Kingdom

Aarhus School of Architecture, Denmark
Organisation Structure and Research Strategy*

History and present structure

The Aarhus School of Architecture is an institution of higher education under the auspices of the Danish Ministry of Culture and was established in 1965. The school has at present about 850 students and 190 employees. In 2004 a number of about 40 full-time equivalent research works were produced, of these about 14 were full-time equivalent PhD. works.

Research at the Aarhus School of Architecture gained momentum with the introduction of the PhD. degree in architecture and the establishing of a PhD education at the school in 1992. With the introduction of a new job structure in 1999 with research right and obligation for professors and associate professors, and subsequent adaptation of the architectural education to the recommendations of the Bologna-declaration, including the introduction of ECTS and the division of the education into a Bachelor and a graduate education (Bachelor's/Master's of Arts in Architecture), it was at the same time decided to introduce a new academic-organisational structure at the Aarhus School of Architecture with five departments, each with their academic-strategic area of responsibility.

Overall development strategy

The departments are responsible for teaching as well as research within their respective area of responsibility. The overall strategy is to make the architectural education more research based and to strengthen the possibilities of the school to be part of an inter-disciplinary teaching and research cooperation with other institutions and the business sector, nationally as well as internationally. The task of the departments is in their respective fields to create sustainable and clearly profiled research and

* This document has been specially edited for inclusion. It is based upon the contract with the Danish Ministry of Culture for 2003-2006, a development strategy document from November 2001 (updated April 2002) and titled "*Samlet udviklingsstrategi for Arkitektskolen i Aarhus 2002-2005*" and a research strategy document from February 2004.

teaching environments that can form the basis of this cooperation and attract external research grants, as the aim is that at least 33% of the research activities must be externally financed.

Research strategy

The five departments at the Aarhus School of Architecture have on the background of their respective academic-strategic areas of responsibility drawn up research platforms that are realised in a number of focal areas as the basis of actual prioritizing of the research efforts and allocation of resources. The research platforms that together constitute the research strategy of the Aarhus School of Architecture are briefly described below. The research profile may at present seem rather broad, but we expect that it will become more focussed in the coming years as it will appear which focal areas can develop sustainable research environments, possibly in cooperation with other institutions.

Further information about the Aarhus School of Architecture and the research activities of the departments can be seen on *www.aarch.dk*.

Department of Architecture and Aesthetics

Strategic and academic areas of responsibility

The department is responsible for wording and pursuing strategies for the maintenance and strengthening of the cognitive, cultural and physical significance of architecture in society.

Furthermore, the department attends to the accumulation and communication of knowledge within the field of architectural theory.

Research platform

The department conducts research and development within the core fields and basic elements of architecture – including, among others, space, light, materiality, tectonics and functionality – from artistic, theoretical and practical approaches alike. The research conducted at the department is based on both basic theoretical research and artistic development work.

Focus areas

1. The autonomy of architecture
   Topics are: architectural quality, the concept of authenticity and work analysis.

2. Basic parameters of architecture
   Topics are: architectural space, light as a tectonic element, architectural transitions and architecture as communication.

3. New tasks in architecture
   Topics are: safety *and* security in architecture, learning spaces, shopping, eventscape and new strategic tools in architecture.

Department of Landscape and Urbanism

Strategic and academic areas of responsibility.

The department is responsible for wording and pursuing strategies for planning politics and spatiality for the development of cities, urban areas, public spaces, landscapes and infrastructural installations in relation to societal processes of change.

Furthermore, the department attends to the accumulation and communication of knowledge within the field of social sciences.

Research platform

The department conducts research and development within the field of urban development, both nationally and internationally, in relation to both the cultural and the natural basis for residence and localisation of economic, technical and educational infrastructure. The perspective of the work is both strategic/urban political and administrative, and approaches are sociological, environmental, historical, aesthetic, and from the vantage point of planning theory.

Focus areas

1. Urbanisations
   The term "urbanisations" is used to cover major building and park facilities in urban areas, the establishment of these as projects, and their effect as products, *cf*. annexes to the description of the department concerning urban intensity agglomerates.
2. Transformation
   The focus area deals with the changing of existing physical structures, *e.g*. new use for abandoned industrial areas, roads, railways, ports and – in the suburbs – the future of single family houses.
3. Urban expansion
   The focus area deals partly with the establishment of new urban areas (new suburbs) in connection with the growth of big cities (*e.g*. Orestaden or Lisbjerg), and partly with the type of urban development taking place in connection with junctions (traffic, commercial centres) in the urban landscape of the expanding city.

4. Urban landscapes
   The focus area deals with urban and landscape development in urban areas, which are connected – internally or externally by large infrastructural installations. An example would be the development of villages and landscapes in proximity to big cities.
5. Rural landscapes
   The focus area deals with the development in rural areas and villages outside of urban areas. The focus area deals with a multitude of aspects: the landscape as a resource for (agricultural) production and utilisation (of raw materials), the landscape as a territory for building and infrastructure, the landscape as a space for reproduction of nature, the landscape as a space for aesthetic experience and experience of nature, the landscape as a representation of the history of the development of nature and culture.
6. Transverse/inter-disciplinary focus areas: Process, administration and virtual cities.
   Transverse/inter-disciplinary focus areas comprise general matters pertaining to processes in planning and citizen participation, matters pertaining to the significance of administrative structures in urban- and landscape development as well as the emergence of "virtual cities", i.*e*. spatial relationships, in which various territories are connected via electronic networks.

Department of Architectural Heritage

Strategic and academic areas of responsibility

The department is responsible for wording and pursuing strategies for development and renewal, respectively, protection of existing buildings nationally and internationally in interaction with the cultural, historical foundation and societal development

Furthermore, the department attends to the accumulation and communication of knowledge within the field of architectural history.

Research platform

The department conducts research and development work within the fields of maintenance, renovation and conversion, as well as urban renewal and restoration of existing buildings and urban areas, from strategic, technical, aesthetic/culture historical, environmental and administrative perspectives.

The research conducted in the department is based on basic theoretical research, application-oriented research and development work.

Important focus areas are, among others, matters pertaining to maintenance and renovation of the existing mass of buildings, as well as

documentation of the physical urban and building culture, including accumulation and historical/geographical systematisation of knowledge of craftsmanship, materials and style.

Focus areas:

1. Valuable cultural environments and areas with valuable architecture
   A cultural environment is a defined area in which the natural basis, cultural landscape, history and architecture reflect significant features in societal development.
2. Restoration and instauration of protected buildings and buildings worth preserving
   Architecture is a key element in the interdisciplinary administrative collaboration, which is a condition for the administration of protected buildings. In Denmark there are approx. 300 000 buildings deemed worth preserving. The responsibility for the administration of these lies with the municipalities.
3. Urban renewal
   Encompasses old urban areas in big cities with major urban renewal problems in the form of worn down buildings with significant lacks in installations and functionality, areas in small towns where urban development is necessary, including villages and urban areas that are not overly burdened, and in which the effort is mainly preventive.
4. Transformation of urban areas and buildings
   Societal development, changes and visions make up the conditions for building in established urban contexts as well as transforming and extending existing structures and buildings.
5. Architectural heritage in foreign cultures
   It is the goal of the focus area to exchange experience and knowledge with foreign research- and development institutions within areas pertaining to the architectural heritage of foreign cultures.
6. Basic research
   Architectural design: aesthetics (the geometry of aesthetics), design (new form in relation to existing form and interpretation of existing form into new form).
   Theory: theories of restoration and conversion.
   Analysis and history: architectural history, urban and building archaeology, cultural history, historical building techniques and supporting constructions.
   Documentation: documentation of buildings and urban areas, condition registration and assessment, documentation of context.
   Process: planning and controlling of construction, urban and building technology, materials, economy and legislation.

Department of Design

Strategic and academic areas of responsibility

The department is responsible for wording and pursuing strategies for optimisation of design processes and methods in relation to product, building component and communications design. Furthermore, the department attends to the accumulation and communication of theoretical and historical knowledge within the fields of product, building component and communications design.

Research platform:

The department conducts research and development work within the fields of product design, building component design, systems design – including adaptation systems – as well as interface and communications design (e-design) from product and process-oriented approaches alike. It is the task of the department to establish a design theoretical and historical platform as well as to accumulate, systematise and communicate knowledge of specific conditions of design and production, technologies, etc.

The research conducted in the department is based on both basic theoretical research, application oriented research and development work, including artistic development work.

Focus areas:

1. Healthcare
   With special attention to the social and technological development in the welfare society, this focus area deals with existing and future health and treatment systems – with the objective of developing activities of improvement in prevention as well as monitoring and treatment.
2. Learning and communication of knowledge
   This field focuses on how new technologies in information and communication, alongside physical space and artefacts, can support the learning processes and communication of knowledge, for example through augmented reality and pervasive computing. The field is typically rich with inter-institutional research collaborations involving user groups, organisations and institutions such as research institutions, schools and libraries.
3. The home
   The home and the everyday life have changed drastically from the focus of the industrial society on the nuclear family and its clear division of labour and leisure, to the present, as represented by divided and split-up families where work and leisure activities are interwoven in network-like interrelations, and where interaction between adults and children is determined by situations rather than by locations. This challenges the architectural and design structures of the home, both in terms of space and artefacts, to support a cohesive everyday life.

4. Work
   The massive growth in communications technology, along with the development of new collegiate relations and social patterns, has caused the boundaries between work and leisure to deteriorate. The theme deals with the possibilities we are given and the challenges we face when our work situation is detached from time and space. Focus must be placed on the development of new qualities in the ever changing conditions for production and reproduction, including the development of a new framework for the work situation.
5. Mobility
   A theme which is attached to the mobile in contrast to the fixed/immobile. An example could be the establishment of mobile units (*e.g.* housing for refugees, mobile work equipment, etc.). Another example might be flexibility in adaptation where there is a need for visual or architectural elements in connection with the communication of information or messages, or where accommodation may be given as parts of carcasses that may be developed through different principles in adaptation, etc.

Department of Architectural Design

Strategic and academic areas of responsibility

The department is responsible for wording and pursuing strategies for the development of building and design processes as well as concepts for different purposes for buildings, seen, among other things, in the light of the growing internationalisation and the rapid technological development. Furthermore, the department attends to the accumulation and communication of knowledge in the fields of types of process, technique and function.

Research platform

The department conducts research and development work within the fields of conceptual, technological, functional and environmental problem areas pertaining to construction for residence, industry and institutions, in relation to developments in demographics, welfare, business structures and needs and possibilities in communication. It is the task of the department to establish a theoretical and a historical platform as well as to collect, systematise and communicate knowledge of methodology and tools regarding concept development, project planning, processes in production in relation to a societal framework, ethical and theoretical sets of positions as well as the creation of architectural value through an integrated, inter-disciplinary process. The research conducted in the department is based on basic theoretical research, application-oriented research and development work.

Focus areas

1. Architecture and environment
   The focus area deals with architectural design with special concern for the environment, in the sense of existing conditions at a given location, culturally, climatic, technologically, socially and in regards to society, as well as the conditions for living in the physical framework created by architecture. Architectural design is based on inter-disciplinary, theoretical knowledge and innovative architectural design and involving traditional disciplines related to space, light, form, structure, materials and context, as well as disciplines related to environment, including energy, comfort, durability, functionality and health.
2. Materials, form and technique
   The focus area deals with the creation of architecture based on the interplay between the materials, form and techniques in architecture, also known as the tectonics of architecture.
   The object is to unite aesthetics and technique in a synthesis of architectural qualities through an integrated collaboration between architecture and engineering.
   The field, in which the work is conducted spans from the abstract, theoretical vantage point, through programming planning and project planning of concrete architectural installations, to the development of technical methods of production and technology connected to building.
3. Architecture, process and IT
   The focus area deals with the interplay between the creation of architecture, processes of creation and tools in "new industrialisation".
   Theories are developed surrounding the interplay between architecture, aesthetics, techniques and new forms of production. And principles and methods for the development of the overall architectural methodology and design of components and the composition of components in systems and totalities in building, based on IT-tools and inter-disciplinary design processes and project management.
4. Architecture and programming
   The focus area deals with the problem areas in programming and functionality in relation to validation criteria, including demands on flexibility. An important field is the development of theories aimed at the terminology and development of methodology within the discipline. This may supplement the industrial and application-oriented research and teaching in the department.
5. Housing development
   The focus area deals with the development of different types and qualities of housing in accordance with global technology, as well as the climate and culture of the location, including developments in demographics, forms of life and welfare.

Carleton University, Canada
Strategic Research Plan

Introduction

In October 1996, the Administration of Carleton University published a report intended to clarify the University's mission and set it on a well-defined strategic path. Entitled *Steps Towards Renewal*, the report offered a set of recommendations that were adopted in due course by the Board and the Senate. The actions that followed would allow the Administration to redirect resources and concentrate external fund-raising efforts on targeted areas.

The key to the university's strategic future was to be found in part in its past. Since its foundation as a small college during World War II, Carleton's curriculum and the activities of its faculty have together reflected the broad character of the Ottawa region and the national capital. In the early days, the requirements for a general education for the citizens of a growing and modern city called initially for the development of the core disciplines of the arts and sciences. But in addition, Carleton provided for specialization in fields of study such as public administration and journalism associated with governance, public life, and the national institutions of Canada. Later, Carleton added engineering and its several disciplines with the result that by the 80s information and high technology had become prominent specializations of the University as the region itself became the high-tech centre of Canada.

So Carleton's key description of its character and mission, drafted initially in *Steps Towards Renewal*, says that Carleton is now a research-intensive university and a "national leader in the study of public affairs and management and the study of high technology". The statement goes on to say that the University offers "outstanding programs in both undergraduate and graduate studies in the major disciplines of the Arts and Social Sciences, and Science and Engineering".

There are two modifications to the foregoing strategic statement, called for by the requirement to plan for the Canada Research Chairs. First, the term "high technology" is understood in the university to refer not only to information technology, but more broadly to advanced technologies. Secondly, although our central research thrusts are dependent on the core disciplines of the Arts, Social Sciences, Science, and Engineering, they are inherently

multidisciplinary. Among other things, Carleton has taken advantage of the erosion of traditional disciplinary demarcations to establish a unique multidisciplinary foothold on the local, provincial, national and international scenes. The University has mobilized the resources provided by the basic disciplines into a set of applications that have a special relevance to the further advancement of Canada.

Objectives of the strategic research plan

The primary objective of this plan is to facilitate the further development of research activities reflecting Carleton's special strengths. It will allow Carleton University to strengthen its research capacity in strategic areas by securing and retaining critical masses of outstanding researchers. Furthermore, it will promote additional research and training partnerships with other institutions in the public and private sectors in Canada and abroad.

Major thrusts for research and research training

Each of our research thrusts is cross disciplinary. Thus individual academic units may have researchers in more than one category. These strategic goals recognize the advantage of a coherent multidisciplinary approach that facilitates strong partnerships with other academic institutions, with private industry, and with public sector research units. Carleton has positioned itself to ensure that there is sufficient latitude in the faculty and research programs to respond to a dynamic research landscape.

Brief descriptions of these research thrusts are provided below and a table of allocations is appended to this document.

Civic institutions, processes and policies

Governments, business, social institutions, the media and the economy are changing as are the relationships between and among them. By examining the institutions, organisations, and processes that allow Canadians to live together, do business with one another, and talk to one another across distance and time, we are able to understand more profoundly how the world works and thereby promote regional, national and international prosperity.

Carleton has strong links with the Canadian federal government departments, the national press corps, export-focused high tech companies, foreign embassies, and scores of not-for-profit organisations that have their headquarters in Ottawa.

Research initiatives in this thrust can be summarized under topic areas that focus, from historical or current perspectives, on policy, institutions of governance, management, and citizen engagement. These broad topic areas

include social justice, democratic institutions and practices, citizenship and social cohesion, and the changing role and structure of the nation-state. These topic areas are viewed at Carleton from international and Canadian perspectives. While a good deal of research activity takes place within established disciplines, emphasis in this plan is placed on research approaches that cross disciplinary boundaries. The capacity of several organized research units will be strengthened to undertake additional large collaborative research projects. These units include the Centre for Trade Policy and Law (CTPL), Centre for the Study of Training, Investment and Economic Restructuring (CSTIER), Carleton Research Unit on Innovation, Science and Environment Policy (CRUISE), Carleton Survey Centre, and the recently established Centre for Voluntary Sector Research and Development. Interdisciplinary research, involving faculty and graduate students from a number of departments, and often involving external research partners, constitutes the primary activities of the research thrust. Eligible doctoral program affiliations include Economics, Communications, Geography, History, Management, Political Science, Public Policy, and Sociology.

Advanced technologies

Advances in technology are changing the way we travel, the way we communicate with one another, the way we do business and the way we live. Many of these advances begin in university research laboratories or as a result of partnerships between universities and industry. Carleton has the advantage of being next door to the largest concentration of high technology companies in Canada. At least 30 of these high tech companies have built their successes on innovations developed by Carleton scientists and engineers.

Carleton will continue to invest in the research enterprise with such results in mind. The University will target for expansion sectors where we have established strengths such as the broad areas of telecommunication systems and networks, software engineering, digital multi-media design, transportation and aviation technologies and high performance computing. Additionally, photonics, wireless communications, and microelectronics are experiencing explosive growth. Thus the expansion of existing research programs in these areas will enable Carleton to capitalize on and promote this growth.

We intend also to increase our activity in such emerging and expanding technologically based fields as biomedical electronics, sensors and micro electro-mechanical devices.

The explosive growth of information and high technologies has also led to rapid changes in the areas related to the management of such innovation in the private and public sectors and thereby include cross-disciplinary research focusing on the human and cognitive dimensions of information technology.

Doctoral programs in this thrust include Aerospace Engineering, Cognitive Science, Computer Science, Electrical (including Systems and Computer) Engineering, Psychology, and Mathematics.

Advanced materials and structural science

Closely linked to Advanced Technologies is Advanced Materials and Structural Science, a third research thrust in which Carleton specializes. The University is especially strong in the engineering and science associated with the production of gas turbines, aircraft, spacecraft, ground vehicles, fabrication, manufacturing, and nuclear power. We are leaders in the synthesis, design and application of new materials and have played a major role in high-energy Physics.

Research in the area of mechanics-materials includes: stress, vibration, fatigue, and fracture analysis of machines and structures, including lightweight and off-shore structures; smart structures; spacecraft dynamics and control; vehicle performance and dynamics, robotics and automation, intermetallics and superalloys for gas turbine applications at elevated temperature and the fabrication of titanium metal matrix composites. Carleton's Transportation Research Centre conducts extensive research in the area of pavements analysis, design and construction. The Organic, Polymeric and Molecular Electronics Research Group at Carleton focuses on electro and optically active polymers for application in a new breed of devices.

Structural sciences at Carleton focus on both fundamental and engineering aspects. Engineering focuses on practices and the development of technologies related to infrastructure design, management and renewal for buildings and bridges and other engineering facilities, including the efficient use of energy. Operational engineering practices such as life-cycle management of civil and environmental, mechanical and electrical engineering facilities, and the mitigation of hazards related to the design, operation and maintenance of these facilities is an area we are strengthening. We also enjoy a strong presence in the field of earthquake science and engineering, from developing innovative technologies for the measurement of earthquakes to the design, construction and measurement of the effects of earthquakes on structures. In fundamental structural sciences, Carleton University is a member of the TRIUMF consortium and is heavily involved in the A Toroidal LHC Apparatus (ATLAS), The Omni-Purpose Apparatus at LEP (OPAL) and the Sudbury Neutrino Observatory (SNO) projects. Doctoral programs incorporating this thrust include Aerospace Engineering, Chemistry, Civil Engineering, Earth Sciences, Mechanical Engineering, and Physics.

The life sciences

With more than 18 000 people employed in life sciences in both the public and private sector, The Ottawa Region is a site for cutting edge research in this area. In the past five years, the private sector has expanded to more than 100 life-science based companies. This growth is fuelled primarily by discoveries in university research laboratories.

Life Science at Carleton involves a number of disciplines. Research in neuroscience identifies the neural mechanisms presumed to underlie human psychopathology and neuropathology with pharmaceutical implications. In the College of Natural Sciences, research groups in Medical Physics collaborate with local hospital and research centres to provide unique interdisciplinary approaches to problems in these areas. The quality of life associated with air quality, both indoor and outdoor, is a multidisciplinary research thrust encompassing natural sciences and engineering.

Research in engineering science leads to the development of biomedical devices and sensors, micro and nano-technological methods and devices. Our focus on environmental research is developing through collaborative partnerships with industry and government and by incorporating an integrated approach employing multidisciplinary research groups. The broad areas of conservation, ecology and reclamation are performed at molecular, microscopic, geological and engineering levels and also through space and time to address such issues as resource exploration, global warming, northern and cold regions, genetically modified organisms and biodiversity in developing areas. Doctoral programs associated with this thrust include Biology, Earth Sciences, Electrical Engineering, Environmental Engineering, Geography, Physics, and Psychology, (which includes a collaborative Specialization with Biology in Behavioural Neuroscience).

Modern culture: structures, technologies, and texts

Transdisciplinary work in the humanities and social sciences points to the interaction between new media/technologies and cultural artefacts and practices. These technologies have been instrumental in creating new cultural forms and audiences, promoting new approaches to traditional objects of study, and raising questions about how the new cultural forms and emerging moral ethos mediate our individual, collective and Canadian identities.

The study of the new culture, arising in part as a consequence of the electronic revolution, involves integrating the study of literature, visual culture, music, and social theory. It incorporates studies of image-making, new models of historical understanding, changing definitions of community and nation, and addresses the presence of diasporic cultures and the construction of differences (gender ethnicity, social class). Doctoral programs involving such research include Canadian Studies, Communications, Cultural Mediations, History, and Sociology.

Management and support of research chairs

Deviation from the Tri-Council Steering Committee allotment

The total allotment of research funding derived from the MRC for Carleton University does not include recent major grants totalling in excess of CAD 630 000. The area of neuronal dysfunction is one of continued growth at Carleton and we have recently hired one additional researcher in this area. Also, we are actively discussing major projects with partners in this area that will result in the hiring of further researchers. Accordingly, we plan to apply for a Tier I Canada Research Chair in this area rather than a Tier II. A concomitant change of a Tier I position to a Tier II is proposed.

Support for the development of research and research training

In the case of each thrust, the platform of research, training and curriculum are in place. Carleton currently has 23 Ph.D. programs and 51 Master's level programs. A Canada Research Chair will be able to rely on a wealth of intellectual resources. At the same time, it is expected that Chairs will provide a transformative presence, initiating and inspiring new directions in applied and theoretical investigations. In each case, the research activities associated with Ph.D. programs are in place. These programs will profit immensely from the leadership, direction, and attention of internationally renowned scholars.

Faculty renewal is ongoing at Carleton, with a large number of new hires joining Carleton during 1999. Carleton plans to hire approximately 120 new faculty over the next four years. These faculty members are in part in response to the development of focused, strategic research and teaching strategies. New undergraduate and graduate programs continue to be developed to meet constantly changing research challenges.

Recent developments include the introduction of the Computer-User Research and Evaluation (CURE) program, which is concerned with research, teaching and consulting on human-computer interaction using a user-centred design approach. The CURE graduate program was the first human-computer interaction program based in a Psychology Department in Canada. Additionally, we have the first industry supported Chair in User-Centred Design in Canada.

A new Ph.D. in Cultural Mediations highlights the interdisciplinary and cross-disciplinary research thrusts emerging from within traditional disciplinary boundaries in the arts, humanities, and social sciences at Carleton.

The University is a member of seven Centres of Excellence both at the Federal and the Provincial levels. There are at present seven externally funded Research Chairs in our priority areas, and six more strategically identified Chairs are being developed with potential partners. Externally sponsored research is currently at approximately CAD 30 million and industrial partnerships continue to grow rapidly.

In the 2000-2001 budget the University set aside a financial investment for the research enterprise to support our Canada Research Chairs, CFI and similar applications.

Partnerships and opportunities

Carleton University has traditionally enjoyed close relationships with other universities and the public and private sectors. Our Ottawa location enables many partnerships to flourish. For nearly 15 years there have been joint graduate programs in all Science and Engineering disciplines and in Economics with the University of Ottawa. In addition both institutions share a Chair in Women's Studies, a Chair in Women in Science and Engineering and the Centre for Trade Policy and Law (CTPL).

A recent successful CFI, OIT, ORDCF award was made for the support of the multi-institutional National Capital Institute of Telecommunications (NCIT). This initiative joins together the research strengths of Carleton University, the University of Ottawa, the National Research Council (NRC) and the Communications Research Centre (CRC) together with major local industries and the municipal government to address long term basic and applied research problems associated with the future need in telecommunications. This project was conceived and planned in collaboration with the Ottawa Centre for Research and Innovation (OCRI), a local multi-institutional consortium of academia, industry and government.

The Ottawa region provides a critical mass for productive research partnerships and opportunities through its highly developed networks of contacts and organisations that recognise the power of collaboration. Carleton University is a full member with other Universities in ongoing initiatives on various fronts such as microelectronics packaging, earthquake monitoring, polymer design for information storage and display, environmental policy and community development. These specific areas are presently either funded or are part of applications to agencies such as the CFI, OIT and ORDCF or to private foundations. Very close ties exist with policy and science units of Ottawa based federal government departments. These create opportunities for the pursuit of joint research, student supervision, and placement, and facility sharing. It is to be noted the presently over 100 Government researchers are appointed as Adjunct Professors in all of our research thrusts.

The presence of a highly successful high technology industry and a rapidly growing life science sector in the Ottawa region leads to a very close relationship with industries of all sizes. Nortel Networks is our largest partner, but direct research ties are evident in at least 30 other local industries. A recent "family tree" of Carleton based contributions to the local technology (including life sciences) industrial scene reveals there are 31 companies with a

total workforce of over 900 and with annual sales in 1999-2000 of over CAD 180 million whose existence depends as a direct result of Carleton University's research contributions.

A major strategic direction for our research enterprise is to maintain and strengthen our existing partnerships across all sectors addressing both basic and applied research opportunities. Based on our experience to date and the existence of a focused research strategy, we believe that there will be major benefits to the research climate of Canada.

Planning, approval and performance monitoring

The Strategic Research Plan, prepared by the University Executive Committee, identifies the strategic thrusts within which candidates will be sought, the distribution of Chairs, and a schedule of proposed appointments. Divisional Resource Planning Committees – one for Engineering and Science and the other for Arts and Social Sciences – will begin the process of selection by determining whether candidates will be internal or external and how such candidates will be sought. Divisional resource planning committees comprise the Dean of Graduate Studies as the Chair, and faculty Deans.

The selection process for internal appointments will involve the re-convening of the faculty and university promotions committees. The proposed procedure is to ask faculty committees to make preliminary screenings and recommendations to the University Promotions Committee, which will make the final recommendations. External appointments will be advertised in the normal way.

Carleton University will be actively tracking and measuring the effectiveness of the Canada Research Chair program through a number of performance measures. These will include an assessment of:

- new appointments, in place, and fully functional according to the strategic research plan;
- additional strategic alliances formed in the research area of the Chair position(s);
- additional research networks generated in the research area of the Chair position(s);
- memberships in additional networks, centres of excellence (national, provincial, international);
- the increase in numbers of graduate students in strategic areas;
- the increase in grant funding in strategic areas with Chairs as principal investigators;
- the increase in funding from external sources, private and public sector; and
- yearly reports to the Tri-Council Steering Committee.

Proposed allocation of Canada research chairs

Strategic area	2000-2001 Tier		2001-2002 Tier		2002-2003 Tier		2003-2004 Tier		2004-2005 Tier	
Civic institutions, processes and policies	I	II	I	II	I	II				
Advanced technologies	I	II	I	II	I	II	I	II	I	II
Advanced materials and structural sciences	I			II		II			I	
The life sciences	I	II	I				I			II
Modern culture structures, technologies and textes				II	I					

RMIT University, Australia
RMIT Research and Innovation Strategy 2005 – 2010
Approved by RMIT University Council, December, 2004

Consolidation of recent achievements – more focused growth going forward

Strategy headlines

- Research underpins the very essence of a sustainable university within the various future scenarios for the changing nature of academic work. A sustainable RMIT will therefore incorporate a viable Research and Innovation (R&I) portfolio, one that adds value to economic, environmental and social capital. Our R&I endeavours will serve the aspirations of our staff, research students and partners in placing RMIT as a recognised player within the Australian innovation sector. This recognition will flow from our strong research performance as a leader within the Australian Technology Network. In so doing we will add value to the Australian innovation sector as an essential complement to the traditional "research intensive" university – one built more strongly on outcomes from cross-disciplinary collaboration; one built on flexibility to provide solutions. The Research and Innovation Portfolio will also enrich our teaching and learning programs through interactions between research engaged staff and undergraduate and VET students and the alignment of research activity with areas of disciplinary strength.
- This new Strategy targets the continued strengthening of research at RMIT – a process commenced nearly a decade ago; one which has accelerated during the past three years and now requires continued concerted effort over the next five years. By 2010 research and innovation at RMIT will have about doubled in scale, be financially sustainable and effectively integrated into RMIT's other core businesses (Quality teaching and learning, International reach, Community engagement).
- RMIT's research performance is essentially driven by the passion and intellect of our researchers. This Strategy therefore aims at ensuring such researchers are recruited to RMIT and policy, process and investment strongly recognise the research achievements of all staff. Moreover this Strategy aims to provide the infrastructure to enable these researchers to flourish – at the

level of individual excellence as well as clusters through which research impact can be enhanced. It is envisaged that RMIT will continue to strengthen its long-standing reputation around industry partnerships as well as reflecting other imperatives within a changing external landscape. Such "responsiveness for success" will be supported by streamlined decision making to support the rapid development of the RMIT research brand: "areas of research in which RMIT is nationally leading the pack."

Summary

Scale and scope

The Strategy encompasses the theme "consolidation of recent achievements – more focused growth going forward". It proposes a balanced research mix across the discovery/application spectrum accompanied by focus on areas of strength through university wide Virtual Research and Innovation Institutes (VRIIs) and Academic Portfolio-based Research Centres. These clusters will deliver scale as well as to our selected areas. It is recognised that RMIT's "Higher Education" Schools will remain the focus of research growth. However key elements of the Strategy connect with the VET domain at RMIT and growth in VET-related research is expected.

The role of virtual research and innovation institutes (VRII) and research centres

The VRIIs represent sectors which reflect national and global research priorities and within which our discipline diversity will work collaboratively to deliver relevant research outcomes. They are expected to change from time to time in line with our own priorities and capabilities as well as those of our key stakeholders. They are currently designated as Biotechnology/ICT-Interactive Information/Globalisation/Global Sustainability. The VRIIs will represent externally a key feature of the brand of research and innovation at RMIT. The Research Centres provide bases for discipline development. Both VRIIs and Centres will deliver excellence and scale at least at national best levels. RMIT's research strengths will be further developed in alignment with competencies identified through Academic Portfolio mapping (see Annexes) as well as those priorities set by Governments and other key stakeholder/client groups. Alongside the VRIIs and Centres RMIT will support excellent and emerging researchers/research groups to promote their growth. RMIT's research assessment framework will reflect indicators aligned with the external funding environment and the outcomes valued by RMIT's research clients whilst also supporting the development of research capability across RMIT's diverse discipline base. It is also clear that we will be looking to bring value across the so-called "triple bottom line" domains in ways that support the

aspirations of our staff, students and partners. Underpinning the research portfolio will be simplified research management processes and an appropriate RMIT research assessment and risk framework.

Implementation

This Strategy is supported by an Implementation Plan with the aims and timelines for a range of priority actions for 2005. This is to ensure we continue the momentum of the past 3 years and address areas where growth has been less than expected despite targeted initiatives, and that we continue to focus on areas of current and emerging strength and relevance. Key performance indicators and targets to 2007 are aligned with this Plan. Targets and supporting initiatives will be reviewed annually. A more detailed exposition of the drivers influencing the strategy, the philosophy and principles supporting research and innovation at RMIT and an assessment of recent RMIT research performance is available at *www.rmit.edu.au/rd/*.

Research and innovation at RMIT – The strategy going forward

Research mission

To provide outcome-related research and consultancy services that address real world issues.

Goal

To be a sustainable university characterised by research excellence and achievement in selected areas, and to make a difference in the communities in which we work in Australia and internationally.

Value propositions for research and innovation at RMIT

- To undertake outcome-related research and development in our areas of strength, and to support innovation to underpin future economic, environmental and social development in the communities in which we operate,
- to be valued by research clients through the delivery of useful, timely and cost effective research outcomes that are characterised by excellence.

These propositions relate to key stakeholder expectations – an analysis of the latter is included in the Background paper (*www.rmit.edu.au/rd/*).

Current position

Key university sector data is collected retrospectively according to the 3 indicators in the following Table. The data describe RMIT's research ranking over 2000 to 2002. The only 2003 data currently available is that for RMIT.

Indicator	RMIT – 2000 ranking	2002 ranking	Comments re 2003
DEST (Department of Education Science and Training) research income	*14*	*17*	*Given an average sector growth rate of ca 9% (2000-2002) RMIT's 24% increase in 2003 should see an improvement in our ranking.*
DEST publications	*23*	*17*	*Given an average sector annual growth rate of ca 9% (2000 – 2002) RMIT's 30% in 2003 should see our ranking further improve.*
HDR completions	*8*	*9*	*The impact on the sector of the DEST Research Training Scheme will again be seen in sector wide increases in completions compared with 2002. Predictions re RMIT's ranking are not yet reliable.*

Some key sectoral comparisons

The "Group of 8" Australian universities, plus the Australian National University, head the research income list; collectively they

- Increased their research income by an average 20% over 2000-2002.
- Earned 45-50% from national competitive grants (including medical); these schemes have been releasing significantly increased funds in the past few years (particularly nh&mrc).
- The Australian Technology Network (ATN) universities (including RMIT) now sit clearly in the next category, with an.
- Average increase in research income (2000 – 2002) at ca 14% – the same growth rate as that experienced by the group including Flinders, Newcastle, Griffiths, La Trobe, Wollongong, Murdoch and Macquarie universities.
- Average 20-30% of funds from national competitive grants.

RMIT's objective in this Strategy is to at least sustain our relative positioning within the increasingly competitive Australian sector over the period to 2010 and establish ourselves as the research leader of the ATN. During this period we will develop our research capability more broadly across our Schools and in so doing establish enhanced capacity to deliver better outcomes consistent with the distinctiveness of research at RMIT, *viz*: our focus at the interfaces between "technology and people" and our capacity to work across disciplinary boundaries. By implementing this Strategy we will establish a sustainable base for research and innovation at RMIT.

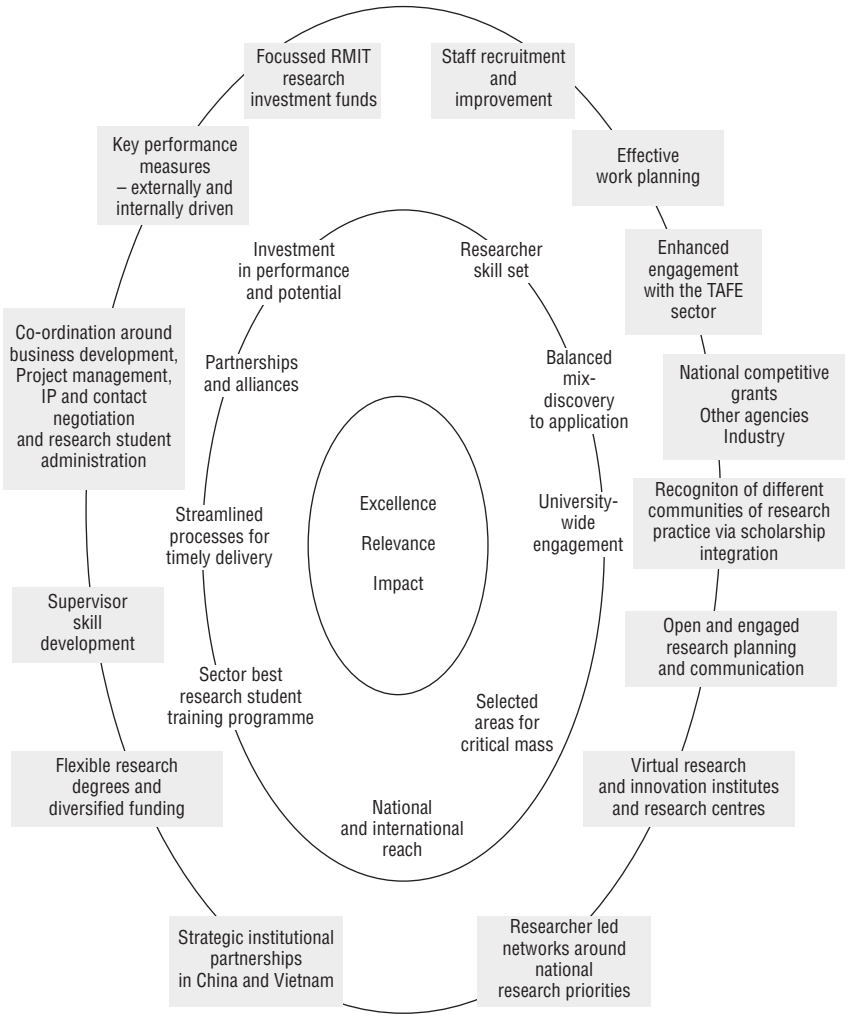
It is recognised that the above performance comparisons at institutional level do not reflect variable performance, including trends, across RMIT – information of significant importance when seeking improved understandings of key performance parameters across RMIT's diverse discipline base. A key planning/investment tool for RMIT will be the use of such parameters including via those involving external benchmarking.

Weaknesses/Threats to RMIT's on-going research success – responses

RMIT maintains policies and processes specifically to manage research-related risks in occupational health and safety, ethical practice, codes of conduct and conflicts of interest. Threats specific to the "growth imperative" underpinning the Research and Innovation Strategy, and responses are:

Weakness/Threat	Strategy thematic response
• An inability to reward and resource on-going recognition for excellence and relevance in an increasingly competitive external research funding environment.	• Strengthening of emphases on research excellence via agreed indicators, enhanced focus of resources to grow critical mass. Critical mass across diverse disciplines will be established via national benchmarking.
• Lack of financial robustness in research funding mix – given that some elements of research endeavour (*e.g.* national competitive grants) do not provide full funding yet need to be pursued for a rangeof other reputational and credibility reasons.	• Ensure research activities university-wide represent a balance between those where university co-investment is required for positioning reasons (*e.g.* national competitive grants) and those where a financial margin is feasible (*e.g.* industry contracts).
• The variable engagement with research across RMIT – leading to an imbalance in research performance – particularly regarding revenue generation and return on investment.	• Continuing assessment of financial returns from investment to ensure on-going performance is rewarded, enhanced multi-disciplinary collaboration across schools, targeted investment into schools to support their investment in research growth under emerging new academic portfolio competency frameworks. • Development of initiatives to foster emerging areas with research potential and emerging researchers. • Recognition that research specialisation might result in variable levels of research performance across RMIT.
• Failure to recruit and retain appropriately skilled staff, particularly in light of the current dependence on senior researchers.	• Enhanced focus on research in all academic staff recruiting and workplanning; recognition of research performers through investment.
• Insufficient government funding to support the current load of research students.	• Enhanced internal funding through a move to partial fee waivers and diversified non-government research student funding.
• Lack of co-ordination around contract management and project delivery – including those associated with exploitation/ commercialisation.	• Enhanced focus on strategic planning and support for researchers. • Co-ordinated interactions with potential commercial partners – for example via the implementation of research and innovation portals.
• Lack of funds for the maintenance of effective equipment and infrastructure, including the need to ensure on-going investment for replacement.	• Enhanced focus on leveraging through partnerships with other research providers.

Overview of the key hierarchy of strategic priorities for research and innovation at RMIT: 2005 to 2010



RMIT recognises that current external drivers are shaping university research in Australia towards:

- Greater accountability, leading to emphasis on outcome related research (return on investment).
- Demonstrated critical mass in expertise and research infrastructure in selected areas.
- more effective contributions to the exploitation of ideas and research outcomes, with some emphasis on commercialisation.

Within this context five key planks of the RMIT strategy for research and innovation are as follows:

- Build and sustain excellence in selected areas – and to understand our excellence using outcomes based performance measures.
- Promote a research culture – in particular to strive to build this culture more broadly across RMIT.
- Contribute to national innovation through applied research – understanding the needs and priorities that are current.
- Align to industry and client needs – and ensure effective delivery to our range of partners.
- Position students for rewarding professions and careers – though a high quality and outcomes focussed research training experience.

With the key goals in the period of this strategy (2005 to 20010) to

- Grow our research, as measured by increased research funding, increased impact and the increased participation of our staff in all schools.

In order to achieve these objectives we need to continue to:

- Accelerate the implementation of simplified and robust research management processes.
- Develop research impact indicators that reflect the range of positive outcomes that flow from RMIT research, across the triple-bottom line domains.
- Continue with fair and transparent mechanisms for identifying areas of focus and emergent research strengths.
- Respond flexibly to the needs of research-active staff and students and our research partners.
- Continue to improve our awareness of research priorities within our external operating environment.
- Further enhance the engagement of RMIT's researchers with our chosen areas of focus, through the VRIIs.
- Participate in national and international policy debates to support strong risk management/mitigation strategies.
- Enhance our overall staff time allocation to research – including the strategic development of research-only staff.

The research portfolio at RMIT will be recognised by our staff, students, peers and partners as one of sustainable capacity to be nationally leading in those areas that we designate for focus. This will be at the multidisciplinary university-wide level, and within disciplines located within our academic portfolios. Our research portfolio will be:

Successful implementation of this strategy over 2005 through 2010 will see:

- Further embedding of RMIT's relative position as a *research-active university* within an increasingly competitive funding/accountability environment. By 2010 RMIT expects its annual research income to be around 10% of total institutional expenditure.
- RMIT branded as "national best" (*excellence and impact*) in our chosen areas – as indicated by our performance via internal partnerships such as the Virtual Research and Innovation Institutes (VRIIs) and via key external partnerships and alliances (such as Co-operative Research Centres).
- Strong support for our emerging competencies and stakeholder priorities via Research Centres and other appropriate research clusters.
- The establishment of a *balanced research* "*mix*" (discovery through application) – reflecting our aspirations alongside those of our partners and other stakeholders. This will ensure financial viability and sustainability – through established understandings of costing/pricing imperatives and enhanced co-ordination of processes.
- All of RMIT's Schools, including TAFE, positioned for staff engagement in active research in ways appropriate to institutional and School diversity.
- A quality research training program with a cohort of significance of at least 4-5% of the total on-shore undergraduate student load.
- RMIT better organised to develop "exploitation opportunities" proactively and flexibly.

RMIT Academic portfolios: Disciplinary strengths and emerging competencies

RMIT's Academic Portfolios have identified their current and emerging disciplinary strengths and competencies – they are listed in the Table below. These strengths/capabilities relate in varying ways to the mix of teaching and research programs and the interfaces between these programs.

Academic Portfolio	Themes	Comments
Design and social context	• Communications • Creative arts • Design • Education and social and regional development	• Linking idea to audience • From traditional arts to digital • From architecture to fashion to products
Science, engineering and technology	• Environment and sustainability	• Including environmental engineering, water treatment and waste management, renewable energy, land rehabilitation/management, surveying, building, mining, environmental monitoring/risk assessment/eco-toxicology, sustainable resources management, geographical visualisation and risk and sustainability
	• Health and well-being	• Including complementary health treatments, nursing, human movement and nutrition, psychology and disability, pharmacology, anatomy, clinical neurophysiology, food science, wellness, occupational health and safety and biomedical engineering
	• Advanced technologies	• Including computer science, manufacturing (automotive and aerospace), mechanical, civil, chemical and software engineering, information security, bioinformatics, gene technology, geodesy and molecular biology, materials and materials processing
Business	• Knowledge management/ e-business	• Effective management of knowledge and information by business
	• Financial markets and applied econometrics	• Application of econometrics techniques to understand financial markets and the wider economy
	• Health services management	• Action research into management in the health sector
	• Transport and logistics	• Including supply chain management
	• Infrastructure management	• Effective management of infrastructure in a sustainability framework
	• Practice-based research	• Understanding and contributing to professional practice
	• Organisational policy, practice and market effect	• Including SMEs, family business, fast growth companies, brand and corporate entity, notable financial markets
	• Entrepreneurship and innovation	• Understanding the entrepreneurship process in SMEs, science and technology areas and socially

UNITEC New Zealand
Research and Advanced Practice Strategy – 2005-2010

September, 2004

Introduction

Unitec New Zealand has articulated its desire to provide work-ready graduates skilled in current knowledge and practice within their chosen profession, industry and community. This is particularly relevant to degree-level teaching at Unitec at both undergraduate and postgraduate levels. It is also a requirement of NZQA that those involved in teaching these degrees are active in related research. Our educational focus, therefore, determines our research and advanced practice focus. For both components, the focus is towards application.

Either directly (through technology transfer) or indirectly (through our graduates) our applied research and advanced practice should serve the professions, industry and the community. Our graduates will not only benefit from the knowledge and practices informed by the research and advanced practice of Unitec staff and students, but additionally benefit from the discipline of independent and critical thought central to the enquiring mind. Unitec's strategic focus in research and advanced practice must therefore be directed towards goals and subject areas that fit the institute's educational vision.

It is also recognised that research and advanced practice has the additional benefit of contributing to global knowledge and understanding. Such credibility accrues to the individual as well as to Unitec, and is crucial both to the success of our application for university status, and participation in the Performance Based Research Fund (PBRF). Unitec wishes to recognise all forms of research activity and output, and reward staff appropriately. Respecting the rights of, and opportunities for, all culturally-diverse groups in conducting research and advanced practice is a value Unitec upholds.

Unitec wishes to provide a supportive environment within which research and advanced practice are undertaken. The provision of support services and facilities, electronic resources such as specialist software and internet access, library resources, research and advanced practice leave, and timetabling to enable block time to conduct research and advanced practice, in addition to

application of the work-load policy, will complement the training given to staff to enable them to conduct high quality research and advanced practice. Unitec recognises that research and advanced practice takes on many forms in all disciplines, and is synonymous with creativity, innovation, experimentation, assessment, invention, investigation, inquiry, critique, scholarship, design and development. Whatever the process, the outcome of activity is new knowledge, technology, understanding, wisdom or information.

In this definition Unitec aligns with the PBRF.*

> "Research is original investigation undertaken in order to gain knowledge and understanding. It typically involves enquiry of an experimental or critical nature driven by hypotheses or intellectual positions capable of rigorous assessment. It is an independent (noting that the term does not exclude collaborative research), creative, cumulative and often long-term activity conducted by people with specialist knowledge about the theories, methods and information concerning their field of enquiry. Its findings must be open to scrutiny and formal evaluation by others in the field, and this may be achieved through publication or public presentation. In some fields the results of the investigation may be embodied in the form of an artistic work, design or performance."
>
> "Research includes contributions to the intellectual infrastructure of subjects and disciplines (*e.g.*, dictionaries and scholarly editions). It also includes the experimental development of design or construction solutions, as well as investigation that leads to new or substantially improved materials, devices, products or processes."

Advanced practice is included in the definition of research. It describes the engagement of staff from Unitec in the activities of industry and/or professions at the leading edge of practice. Staff at Unitec apply their unique expertise to engage in work which industry or professions cannot do. In this way, Unitec is able to influence industry and professional development and enhance its reputation with industry and the professions. By operating at the leading edge of practice, new knowledge can be gained, through case studies, experimentation, or exhibition, which may then be suitable for publication. Quality assurance is provided through such avenues as peer-reviewed publication, industry demand and or recognition from the appropriate profession through invitations and awards.

The connection between teaching and research is strongest in the education of postgraduate research students. Support for this growing community is important, as postgraduate research students will provide a productive and

* PBRF refers to Performace-Based Research Fund, and is NZ's equivalent of the UK Research Assessment Exercise (RAE).

contributory sector of our research community. Staff training for the supervision of postgraduate research students is provided as required. In addition, experienced researchers are encouraged to mentor those relatively new to research and advanced practice or to those staff requiring specific new skills.

Finally, there are inevitably opportunities that arise out of research, advanced practice and expertise which are amenable to further commercial exploitation. Consultancy, patents, licensing and royalty income opportunities are some of these. Unitec has an enabling Intellectual Property Policy which allows these opportunities to be realised where appropriate.

In this strategy, Unitec is aligning clearly with the Government goal to achieve excellence and relevance in research in Tertiary Education Institutes. It is also aligning with the Growth and Innovation Framework (innovation is a key driver in transforming our economy and society) and with the Minister of Research Science and Technology's aims to increase links between research and industry.

A vision for Unitec research and advanced practice

Unitec wishes to encourage:

- an overall increase in research and advanced practice activity;
- all degree-teaching staff to be active in research and/or advanced practice;
- alignment of research and advanced practice activity topics with educational programmes;
- rigour, professionalism, ethical standards and quality;
- productivity (efficiency);
- communication and information sharing;
- links to other research and advanced practice providers;
- links to, and service to, professions, industry and the community;
- participation in externally funded projects;
- optimal technology transfer opportunities;
- optimal use of intellectual property.

Research and advanced practice mission 2005

Unitec wishes to become an internationally recognised provider of research and advanced practice. The themes under which our research and advanced practice is conducted will be aligned with those of our educational programmes and the industries and communities we serve. Performance measures of our research and advance practice processes and outcomes will meet international standards and hence the requirements of university status and PBRF.

Research and advanced practice goals

Goal 1: To focus on research and advanced practice

1.1. that serves professions, industry and the community;

1.2. such that an increasing share of our activity interacts directly and closely with professions, industry and the community.

Goal 2: To develop core areas of leadership and advocacy

2.1. to identify strategic areas of competence and positioning opportunities as potential Key Centres for Research and Advanced Practice;

2.2. to target resources required to implement Key Centres;

2.3. that align with our educational themes.

Goal 3: To enhance Unitec's research and advanced practice environment

3.1. to encourage research and advanced practice activity;

3.2. to develop the research and advanced practice skills of staff.

Goal 4: To resource and manage our research and advanced practice activity adequately and efficiently

4.1. to manage Ministry of Education research funding effectively;

4.2. to increase funding from external sources, including professions, industry and the community;

4.3. to enhance Unitec's infrastructure for the communication, administration and reporting of our research and advanced practice activity.

Goal 5: To meet international standards of excellence in research and advanced practice

5.1. to comply with ethical standards of research and advanced practice;

5.2. to increase collaboration with peers on a national and international level;

5.3. to increase quality assured publication;

5.4. to optimise use of intellectual property;

5.5. to increase our activity as a critic and conscience of society through informed public comment, policy statements and submissions.

Research and advanced practice strategies, performance measures and targets

Goal 1: To focus on research and advanced practice

1.1. that serves professions, industry and the community.

Strategies

1.1.1. by identifying key professions, industries, sectors and businesses which we can support with research and advanced practice;

1.1.2. by supporting research that informs teaching and learning at Unitec and elsewhere;

1.1.3. by promotion of our capabilities and expertise, via, *e.g.*,

- advisory committees and boards,
- Web site and other promotional material, including expertise listing,
- research and advanced practice reports,
  - ❖ Annual Report,
  - ❖ Advance – the Unitec magazine for innovation and research,
- sector meetings or events,
- conferences,

1.1.4. by interacting with sectors in the strategic planning for their research and advanced practice needs;

1.2. such that an increasing share of our research and advanced practice activity interacts directly and closely with professions, industry and the community.

Strategies

1.2.1. by conducting joint projects with professions and industry, involving their staff and/or facilities;

1.2.2. by publishing in professional/industry/sector journals/media and in joint authorship with personnel from professions and industry;

1.2.3. by appointing adjunct professors who are active in research and advanced practice and who will encourage publication with staff.

Performance measures and targets

	2005	2010
sector focus stated in RAP plans	Of all departments	All plans updated
Advisory committees and boards	All disciplines active	All disciplines active
Expertise listing published	Created	Updated
Annual report published containing RAP data	Disseminated	Disseminated
Advance published quarterly	Disseminated	Disseminated
Industry/community funding for projects (NZD)	25 000	200 000
Publications in industry journals	80	110
No. of RAP-active adjunct professors	6	12

Goal 2: To define core areas of leadership and advocacy

2.1. To identify strategic areas of competence and positioning opportunities as potential Key Centres for Research and Advanced Practice.

Strategies

2.1.1. by adopting a position of national leadership in key areas;

2.1.2. by matching expertise with demand from professions, industry, community and research sectors;

2.1.3. by identifying niche opportunities through selectivity and concentration;

2.2. To target resources required to implement Key Centres.

Strategies

2.2.1. by allocating funds and capital for a realistic but limited start-up period;

2.2.2. by encouraging centres to be self-sustaining within five years;

2.3. That aligns with our educational themes.

Strategies

2.3.1. by focusing on those activities which contribute to degrees and higher degrees taught at Unitec.

Performance measures and targets

	2005	2010
ID areas of leadership	3	6
Internal key centre funding	360 000	1 000 000
External key centre funding	550 000	1 500 000

Goal 3: To enhance Unitec's research and advanced practice environment

3.1. To encourage research and advanced practice activity.

Strategies

3.1.1. by recognising, promoting and rewarding the activity and outputs of staff;

3.1.2. by resourcing projects adequately;

3.1.3. by providing adequate time for research and advanced practice to be conducted;

3.1.4. by providing research and advanced practice leave where appropriate;

3.1.5. by supporting academic exchange;

3.1.6. by supporting a culture of innovation;

3.1.7. by attracting RAP-active staff;

3.1.8. by fostering a culture of collaboration.

3.2. To develop the research and advanced practice skills of staff.

Strategies

3.2.1. by supporting research-based qualification upgrades of staff;

3.2.2. by training staff in the use of software relevant to research and advanced practice;

3.2.3. by providing resources that assist researchers (*e.g.* library facilities and holdings, software availability, internet access, statistical advice);

3.2.4. by creating a strategic academic staffing policy designed to ensure that, within the designated timeframe:

a) our degree programmes are taught mainly be people active in research and advanced practice; and

b) our staff members continue to reflect and reinforce the professional and vocational character of the institution.

Performance measures and targets

	2005	2010
Unitec awards for research and advanced practice	3	3
Specialised software introductions	2	2
Number of visiting scholars	20	30
Number of Unitec staff being visiting scholars	10	30
Unitec-wide seminars	5	12
% of academic staff with masterate qualifications	55	75
% of staff with doctoral qualifications	9	20
Number of projects funded (<NZD 10 000)	20	80
Number of projects funded (>NZD 10 000)	20	60

Goal 4: To resource and manage our research and advanced practice activity adequately and efficiently

4.1. To manage Ministry of Education research funding effectively.

Strategies

4.1.1. by managing the fund through a central and contestable system;

4.1.2. by communicating information about available internal funds to staff;

4.1.3. by resourcing Key Centres to achieve adequate activity, outputs and outcomes;

4.1.4. by auditing internal fund expenditure.

4.2. To increase funding from other external sources, including professions, industry and the community.

Strategies

4.2.1. by communicating information about available funds to staff;

4.2.2. by implementing quality assurance procedures for external fund applications;

4.2.3. by collaboration with other research and advanced practice providers;

4.2.4. by sourcing direct funding for research and advanced practice from professions, industry and community;

4.2.5. by sourcing third-party funding for applied research and advanced practice.

4.3. To enhance Unitec's infrastructure for the communication, administration and reporting of our research and advanced practice activity.

Strategies

4.3.1. by alignment of school research and advanced practice plans with the Unitec strategy;

4.3.2. running an efficient infrastructure for ethical approvals and monitoring;

4.3.3. by operating efficient systems for research and advanced practice administration.

Performance measures and targets

	2005	2010
Unitec RAP funding	NZD 1.5 million	NZD 4 million
External research and advanced practice funding	NZD 800 000	NZD 3 500 000
% of external grant applications successful	10%	15%

Goal 5: To meet international standards of excellence in research and advanced practice

5.1. To comply with ethical standards of research and advanced practice.

Strategies

5.1.1. by running an efficient infrastructure for ethical approvals and monitoring;

5.1.2. by promoting and supporting ethical standards throughout Unitec.

5.2. To increase collaboration with peers on a national and international level.

Strategies

5.2.1. by increasing external funding for travel;

5.2.2. by encouraging collaborative or multi-disciplinary projects.

5.3. To increase quality assured publication.

Strategies

5.3.1. by increasing the proportion of articles in quality assured and internationally circulated journals;

5.3.2. by appointment of professorial positions as leaders in research and advanced practice, and supporting their research and advanced practice with time, money and RAP associates;

5.3.3. by offering staff training and mentoring in research and advanced practice skills;

5.3.4. by assisting postgraduate students to publish;

5.3.5. by appointing RAP-capable staff at all levels.

5.4. To optimise use of intellectual property.

Strategies

5.4.1. by acquiring patents and other forms of protection;

5.4.2. by exploiting commercial opportunities;

5.4.3. by fostering projects with potential application for end-users;

5.4.4. by promoting awareness of intellectual property issues to staff.

5.5. To increase activity as a critic and conscience of society through informed public comment, policy statements and submissions.

Strategies

5.5.1. by publishing responses to sector policy statements;

5.5.2. by interaction with the general media;

5.5.3. by promoting our expertise and competencies to the media.

Performance measures and targets

	2005	2010
no. of general media and policy statements	75	150
no. of international researchers visiting	20	50
% of publications refereed	20	50
professorial appointments	10	15
no. of current patents	2	5
income from IP	NZD 5 000	NZD 50 000
Staff PBRF active	22%	50%
QA outputs with external co-authorship	10%	20%

University of the Arts London, United Kingdom Research Strategy, 2005

The University will build upon its recent achievement of a Grade 5 in the Research Assessment Exercise by further enhancing its research performance and reputation. It will not seek in the medium term to become a research led institution but during the course of the next three years it will:

- Be an internationally recognised centre of excellence for research and research degrees in its subject areas;
- have consolidated research in areas of existing strength, and further extended research into areas where there is the potential to undertake research at an international level of excellence;
- have increased support for research development and significantly increased external research income;
- have enhanced the research environment and supporting structures for research.

To achieve this the University will:

- Extend the number of research areas performing at international levels of excellence to reflect the full diversity of the University's activities (including the consolidation of our work at the science/arts interface);
- establish a Research and Enterprise Office to enhance the support structures available for research development so as to maximise funding opportunities and provide quality advice in areas such as contracts, finance, project management, law and copyright;
- develop a range of Research Centres which will be centres of research excellence offering the opportunity for collaboration between Colleges and/or external bodies;
- enhance the research culture and profile by:
- developing the skills and experience of new and existing researchers;
- providing additional opportunities for post-doctoral employment;
- increasing the percentage of full-time staff in those areas where there is potential for international-level research activity;

- recruiting staff from the U nited Kingdom and internationally who are research active at a high level, including establishing professorial and reader posts to lead research in a number of key subject areas;
- establishing a system of sabbatical research leave and increasing opportunities for other kinds of research leave;
- ensuring an active relationship between research and learning and teaching;
- harnessing the new contractual and appraisal procedures in order to underpin the research effort and to provide accountability;
- developing a research review procedure providing peer review of research quality and progress. This procedure to be in place on a pilot basis for 2002/3.
- improve the research infrastructure including developing and improving access to our archive and special collections as well as the provision of improved equipment, accommodation and other facilities;
- develop collaborations with other HEIs, industry and other organisations and increase external research income;
- increase external research income;
- provide a supportive and challenging environment for the research degree student community;
- increase dissemination of research outcomes.

Our aim is to raise the profile of research in the Institute through the dissemination of research outcomes including support for academic journals, exhibitions, publications and performances.

OECD PUBLICATIONS, 2, rue André-Pascal, 75775 PARIS CEDEX 16
PRINTED IN FRANCE
(89 2005 04 1 P) ISBN 92-64-00694-X – No. 54195 2005

University Research Management
DEVELOPING RESEARCH IN NEW INSTITUTIONS

It is widely accepted that higher education in the 21st century across the OECD is operating in a changed and challenging environment. The last decades have witnessed an explosion around the world in the number and type of higher education providers. New higher education institutions (HEIs) have been established under the auspices of both public and private benefactors to meet broad socio-economic and political objectives. This is in contrast to older universities, which had primarily served as the breeding ground for the elite.

However, new HEIs are facing many challenges associated with their status. As higher education systems, nationally and internationally, become more competitive, barriers to entry are also rising. Governments are asking how higher education can be restructured to be a more efficient economic driver. Students and their parents are also making more demands. Defining research and measuring its output has become a somewhat controversial issue, as questions are being asked about which institutions should do research and what kind of research they should do. How are higher education institutions responding to these challenges and trying to shape their future?

Given the increasing competitiveness and greater geo-political significance of higher education and research, and the under-developed profile of many new HEIs, this study seeks to examine the processes and strategies being devised by new HEIs to grow research. By focusing on new HEIs, this book provides a unique profile of the experiences of a group of institutions that has hitherto been unidentified and unexplored. It analyses results drawn from an in-depth study of twenty-five HEIs from across sixteen countries: Australia, Belgium, Canada, Czech Republic, Denmark, Finland, Greece, Hong Kong China, Hungary, Ireland, Japan, New Zealand, Portugal, Spain, Sweden, United Kingdom.

ISBN 92-64-00694-X
89 2005 04 1 P

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