Policy Challenges for the Portuguese Polytechnic Sector

A report for the Portuguese Polytechnics Coordinating Council (CCISP)

Jon File
Egbert de Weert
Hans Vossensteyn
Frans Kaiser
Ben Jongbloed
Leo Goedegebuure
Don Westerheijden
Paul Benneworth
Seppo Hölttä
Jürgen Enders
Dermot Douglas
Svein Kyvik
Leon Cremonini

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Contact:
Jon File
Centre for Higher Education Policy Studies (CHEPS)
University of Twente
P.O. Box 217 7500 AE Enschede
The Netherlands
T +31 53 – 4893244
F +31 53 – 4340392
E j.m.file@utwente.nl
W www.utwente.nl/cheps

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1   Introduction

Jon File

Jon File is Director: Development and Consultancy at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

This report was commissioned by the Portuguese Polytechnics Coordinating Council (CCISP). CCISP had developed an initial set of policy guidelines intended to clarify and strengthen the role of public polytechnics in the Portuguese higher education system (in the long-term but also cognisant of current financial austerity measures). These guidelines were far reaching and covered a broad spectrum of policy areas including:

- *Institutional designation (a change of name from Polytechnic Institutes to Universities of Applied Science or Polytechnic Universities).*
- *Reorganisation of the polytechnic network primarily through mergers to create a smaller group of institutions with greater critical mass.*
- *Clarifying and sharpening the identity of the university and polytechnic sectors in Portugal by the development of different programme profiles for each sector based on different training models. This would include the incorporation of the short-cycle Technological Specialisation Courses within higher education institutions, primarily in the polytechnics. These profiles would apply to all 3 cycles of education and the designation of degrees would reflect the different profiles. These profiles should make professional and vocation qualifications and specialisations more attractive by offering distinct titles and degrees from post-secondary education to the doctoral level. Professional doctorates[1] would be concentrated in a small number of campuses/departments, possibly on a graduate school model.*
- *Rationalisation of the number of 1st cycle programmes offered by the public polytechnic sector*
- *Ensuring the viability and sustainability of the polytechnic sector via a balanced distribution of student places between the two sectors and the optimisation of financial resources.*
- *Strengthening the role of polytechnic institutions in applied research (including the creation of cross-institutional Applied Research Centres – linked to the private sector), cultural activities and innovation, and the provision of specialised services to the community.*
- *Extending the international activities of the polytechnic sector in general and within Europe and the Portuguese speaking world in particular.*

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[1] For a useful introduction to professional doctorates see the web-site of the International Association for Professional and Practice-led Doctorates (IAPPD): http://www.professionaldoctorates.org/

The request from CCISP to CHEPS was for a comparative analysis of these proposed policy changes/reforms in Portuguese higher education in terms of the experience of other countries (such as Ireland, the Netherlands and Finland) with reforms of this nature or with alternative policy approaches designed to achieve similar outcomes.

Our point of departure was that CCISP would benefit from a study that went beyond a set of "system descriptions" of how the university of applied sciences sector is defined, structured, regulated, governed, funded and staffed in other (European) countries. What would add value to CCISP's policy discussions would be analyses of the specific policy issues identified by CCISP (e.g. institutional mergers; distinct programme portfolios…) as well as analyses of the success or otherwise of national policies in other countries designed to achieve similar outcomes.

To achieve this we have developed this report as a "university of applied sciences policy dossier" for CCISP. This report is structured as follows:

- *An introduction to the challenges faced by the Portuguese polytechnic sector. This introduction also served as the briefing document for the experts who agreed to contribute the different chapters of the report. (Chapter 1)*
- *An analysis of trends in the **University of Applied Sciences** sectors of European higher education. (Chapter 2)*
- *An exploration of diversity within Portuguese higher education based on the U-Map activity profiling tool developed by CHEPS. (Chapter 3)*
- *Reflections on three of the CCISP policy issues from higher education experts in these specific areas: mergers in higher education; the maintenance of different sectors through distinct programme portfolios; applied research and regional development. (Chapter 4)*
- *Reflections on the CCISP policy proposals from national higher education experts in countries of interest to Portugal: Australia, Finland, Germany, Ireland, the Netherlands and Norway. (Chapter 5)*
- *A concluding summary that draws together the major insights flowing from the chapters above with a specific focus on the policy issues identified by CCISP. This chapter also draws on discussions held with the Presidents of Portuguese Polytechnics at a CCISP-CHEPS workshop held in Lisbon on 4 April 2013 to discuss a draft version of this report. This conclusion does not make any policy recommendations – it is intended to assist CCISP in further developing and refining its proposals. (Chapter 6)*

In February 2013, during our study, the European University Association released an "independent appraisal of the problems and challenges facing the Portuguese Higher Education system" at the invitation of the Portuguese Universities Rectors Council (CRUP). (Portuguese Higher Education: A view from the outside, EUA/CRUP) *This report was made available as further background reading to the authors of this report but we have not commented on the specific recommendation it makes as this was beyond our brief.*

1.1 Background: the Portuguese higher education system and the role of the polytechnic sector within it[2]

In terms of systemic diversity Portuguese higher education is fairly diverse as regards the types of institutions that constitute the system. There are three major lines of institutional differentiation: a binary distinction between universities and polytechnic institutions[3], a distinction between specialised schools typically with a single focus area and larger integrated multi-focused institutions, and finally the co-existence of both public and private sectors of higher education. The current system comprises in its public sector 14 universities and a non-integrated public University Institute represented (together with the Catholic University) in the Portuguese Rectors' Conference (CRUP); 15 public polytechnic institutes and some non-integrated specialised Polytechnic Schools, represented in the Council of Portuguese Polytechnic Institutes (CCISP)[4]; and some public Higher Education Schools (Military Schools, Police Academy, the Navy School, the Air Force School and Health Schools). The private sector is represented by 40 universities (some of them with various campuses in different geographical areas) and university schools and sixty Polytechnic Institutes and Schools.

Table 1.1:   Portuguese higher education institutions by type

Categorisation of Portuguese higher education institutions - 2012				
	University Education		Polytechnic Education	
	Universities	Other Schools (not integrated)	Polytechnic Institutes	Other Schools (not integrated)
Public	14	5	15	7
Private	40[5]		60	

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[2] This chapter is based on Jon File (2008), *Higher Education in Portugal*, CHEPS International Higher Education Monitor Country Report, and on information supplied by CCISP, ADISPOR and the public polytechnics in Portugal.

[3] The binary line is a complex one: 18 polytechnic schools are part of universities.

[4] Significantly the polytechnic institutes were the last public institutions to be established. Many were created in regions with as yet no higher educational institutions and with a regional development focus. Seven of the 15 public polytechnics are located in the underdeveloped interior of Portugal.

[5] Including the Catholic University which has a special legal status.

Table 1.2:   Student enrolments by institutional type, 2005 and 2012

Student enrolment in Portuguese higher education institutions – 2005 & 2012				
	University Education		Polytechnic Education	
	2005	2012	2005	2012
Public	174,000	198,000	108,000	107,000
Private[6]	67,000	56,000	32,000	24,000
Total	241,000	254,000	140,000	131,000

The distribution of Portugal's higher education institutions is shown in the two maps that follow. (Please note that there have been a number of changes since these maps were made, notably the mergers of the Health Schools in Lisbon, Port and Coimbra into a single school in each city.) The universities that appear on the polytechnic map include polytechnic schools.

2012 enrolments in the public polytechnics are shown in the table 1.3 that follows the maps.

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[6] Nine private higher education institutions have closed since 2005.

Public Polytechnic Network in Portugal

UNIVERSIDADE DE TRÁS-OS-MONTES E ALTO DOURO

INST. POLITÉCNICO DE VIANA DO CASTELO

INST. POLITÉCNICO DE BRAGANÇA

INST. POLITÉCNICO DO CÁVADO E AVE

UNIVERSIDADE DO MINHO

INST. POLITÉCNICO DO PORTO

ESC. SUP. DE ENFERMAGEM CIDADE DO PORTO
ESC. SUP. DE ENFERMAGEM DE D. ANA GUEDES
ESC. SUP. DE ENFERMAGEM DE S. JOÃO

INST. POLITÉCNICO DE VISEU

INST. POLITÉCNICO DA GUARDA

UNIVERSIDADE DE AVEIRO

INST. POLITÉCNICO DE COIMBRA
ESC. SUP. DE ENFERMAGEM BISSAYA BARRETO
ESC. SUP. DE ENFERMAGEM DO DR. ÂNGELO DA FONSECA

INST. POLITÉCNICO DE CASTELO BRANCO

INST. POLITÉCNICO DE LEIRIA

INST. POLITÉCNICO DE SANTARÉM

INST. POLITÉCNICO DE TOMAR

ESC. SUP. ENFERMAGEM DE ARTUR RAVARA
ESC. SUP. DE ENF. DE CALOUSTE GULBENKIAN DE LISBOA
ESC. SUP. ENFERMAGEM DE FRANCISCO GENTIL
ESC. SUP. ENFERMAGEM DE M.ª FERNANDA RESENDE
INST. POLITÉCNICO DE LISBOA

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ESC. SUP. DE HOTELARIA E TURISMO DO ESTORIL
ESC. NÁUTICA INFANTE D. HENRIQUE

UNIVERSIDADE DE ÉVORA

INST. POLITÉCNICO DE SETÚBAL

INST. POLITÉCNICO DE BEJA

UNIVERSIDADE DO ALGARVE

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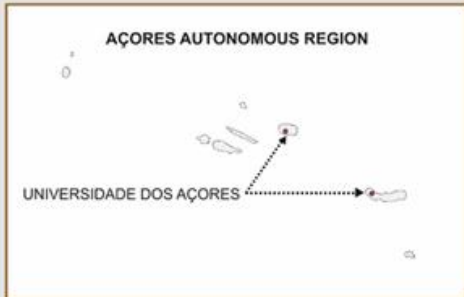
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UNIVERSIDADE DE LISBOA
UNIVERSIDADE NOVA DE LISBOA
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UNIVERSIDADE DE ÉVORA

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Table 1.3: Enrolments by level at public polytechnics in Portugal
(Information provided by the institutions themselves)

Public Polytechnic Higher Education Institutions	Total enrolment 2012	CET[7]	Masters
Instituto Superior Politécnico (ISP)de Beja	2.887	196	253
ISP Bragança	6.573	732	814
ISP Castelo Branco	4.436	259	650
ISP Guarda	2.987	350	326
ISP Portalegre	1.843	50	243
ISP Tomar	2.726	511	334
ISP Viseu	5.652	207	598
Sub-total interior ISP	27.104	2.305 (9%)	3.218 (12%)
ISP Cávado e do Ave	3.740	90	413
ISP Coimbra	10.606	362	1.366
ISP Leiria	10.975	1.466	1.177
ISP Lisboa	14.313	38	2.791
ISP Porto	17.828	0	3.148
ISP Santarém	4.088	194	485
ISP Setúbal	6.191	311	692
ISP Viana do Castelo	4.508	431	691
Sub-total littoral ISP	72.249	2.892 (4%)	10.763 (15%)
Escola Superior (ES)de Enfermagem de Coimbra	1.758	0	454
ES Hotelaria e Turismo do Estoril	1.949	174	67
ES Náutica Infante D. Henrique	712	89	112
ES de Enfermagem do Porto	1.624	0	316
ES de Enfermagem de Lisboa	1.803	0	473
Total	107.199	5.460 (5%)	15.403 (14%)

1.2   The Binary System

The basis of the binary distinction between universities and polytechnics is a multi-faceted one. The network of polytechnic institutions took shape in 1979 and 1980. This binary organization of the higher education system was confirmed by the Education Framework Act of 1986 (Law 46/86, 14 October) referred to also as The Comprehensive Law of the Education System. The 1986 Act demarcated the roles of the universities and polytechnics. This demarcation is considered by many to be not sufficiently clear and to be one of the underlying reasons for subsequent academic drift. The Act stipulates that:

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[7] Short-cycle technical specialisation courses (see below)

> "University education is designed to ensure a sound scientific and cultural background and to provide technical education equipping people for administering professional and cultural activities and furthering the development of comprehension, innovation and critical analysis" (article no.11.3)

> "Polytechnic education is designed to provide a sound higher education level of cultural and technical education, develop a capacity for innovation and critical analysis and inculcate theoretical and practical scientific knowledge and its application to the exercise of professional activities" (article no.11.4).

Decree-Law 74/2006 re-established the programme distinction between universities and polytechnics in the context of the Bologna three-cycle qualification structure. Both universities and polytechnics offer (the new) *Licenciado* and Master Degrees[8], only universities offer the doctorate. University *Licenciado* degrees are 180-240 ECTS while those in polytechnics are 180 except in very specific cases where national or European regulations or practice require this. Furthermore, the Decree-Law indicates that polytechnic first degrees

> "must value particularly training actions targeted at the practice of a professional activity, ensuring a component of application of the knowledge acquired to the actual activities of the respective professional profile".

At the master degree level polytechnic degrees must

> "ensure predominantly that the student acquires a professional specialisation"

in contrast to university degrees that must

> "ensure that the student acquires an academic specialisation resorting to research, innovation or expansion of professional competences".

The research function, like PhD studies, is seen as a university responsibility with polytechnics having an important role in R&D linked to local industry and regional development. (OECD, 2007)

An important pathway to higher education is a range of "Technological Specialisation Programmes" (CETs). These programmes lead to a diploma of technological specialisation and are offered mainly to students that have completed upper secondary education or hold an equivalent vocational qualification. The programmes are offered by secondary and technical schools, technological schools, training colleges, and universities/polytechnics. In 2005/6, 170 such programmes were offered nationally of which 24% (enrolling more than 2000 students in 2006/7) were offered at universities or polytechnics. By 2013 this had risen to 589 programmes of which 450 programmes enrolling 6900 students are offered by higher education institutions. 228 of these programmes and 5460 students are located at the public polytechnics. While the primary aim of the programmes is professional education students are eligible to proceed to higher (and particularly polytechnic) education.

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[8] The introduction of the new Bachelor-Master structure allowed polytechnic institutes to offer masters programmes (the first 20 programmes were approved in 2006).

One of the questions the Portuguese Ministry asked the 2006 OECD review team to address was "How can the binary model (university – polytechnic) best meet the needs of Portuguese society in Europe, given the historical context in which these higher education institutions developed?" The recommendation of the review team was:

> Within the broad binary framework confirmed in Decree-Law 74/2006 the primary institutional location of first- and short-cycle professional programmes (CETs) should be the polytechnic sector. Yet the aspirations of many in this sector are in the opposite direction: the further development of Master programmes, an increase in the proportions of staff holding PhDs, an attempt to secure the right to offer PhD programmes, the expansion of research programmes and eventually the achievement of university status. To some extent these aspirations reflect traditional academic values (that drive academic drift in many countries), but they are also strategic responses to the inadequacies of the current policy environment within which the polytechnic sector works. The mechanisms for resource allocation, levels of institutional autonomy, programme accreditation procedures and human resource management policies all need to be reformed to create a policy environment in which professionally orientated polytechnic institutions can create a sustainable future that is distinct from traditional universities. Equally important is the corollary of the creation of this new policy environment: universities should not be rewarded for entering programme areas that are outside their core area of business in an attempt to recruit students in an increasingly competitive market. In short, the Review Team proposes that the binary framework be maintained and strengthened. The major mechanisms for doing this should be the negotiated performance contracts outlined above as well as the significant changes in institutional autonomy and governance proposed for both universities and polytechnics. (OECD, 2006)

Some progress has been made in this regard. The new 2007 law governing Higher Education Institutions (RJIES) applies to both subsystems and has granted more autonomy to institutions (previously there was a Law applicable to university education and another applicable to polytechnic education). The Teaching Career Statute of Polytechnic Higher Education has been aligned to the University Teaching Career Statute and includes the position of Head Coordinator Teacher (Professor Coordenador Principal) which can be equated to the Full Professor (catedratico) in the university subsystem.

1.3 Other contextual issues

1.3.1 The Private Sector

Private higher education institutions, according to the law on private higher education, may be established on the initiative of firms, cooperatives or foundations created specifically for the development of higher education and must be officially recognised if they wish to award national degrees.

Assisted by the political decision in 1988 to relax the minimum entrance requirement to higher education, private institutions rapidly increased their proportion of Portugal's students. In 1983-84, this was approximately 10% of the country's overall enrolment; by

1989-90 this was 22%; and private enrolments (including the Catholic University) reached a peak of 36% in 1996 before starting to decline due to a decrease in the number of candidates as a result of demographic changes and higher entrance requirements. By 2012 this had dropped to 21%. No private university has been established since 1996 and no private polytechnic since 2001.

1.3.2 Demography, geography and enrolment trends

Portugal has experienced a massive expansion of its higher education system over the last three decades. Student numbers rose from 30,000 students in the 1960s to over 400,000 by the end of the 20th century. The dramatic increase began in the early 1970s when the system was opened to young people of all social classes. Enrolment doubled over the 10 years period ending 2002/3 but has begun to decline since then, primarily as a result of a demographic decline in the number of young people in the Portuguese population – the number of 20-24 year olds is expected to decrease from 783,000 in 2000 to 610,000 in 2010 and 565,000 in 2020.

In terms of the proportion of tertiary graduates in the 25 – 64 year old population, Portugal at 15% is significantly below the EU 21(28%) and OECD (30%) averages despite a high average annual growth rate of 5.7% over the period 2000 to 2010. (OECD, 2012)

Regional location is an important factor as regards demographic changes: four of the 14 public universities and seven of the fifteen public polytechnic institutes are located in the interior of mainland Portugal, while two public universities are situated on Portugal's islands. In general, these institutions are experiencing the brunt of the declining number of entrants and the increased competition for students that this has brought with it. Portugal's higher education capacity is heavily concentrated in the two major cities: 42% of public and 76% of private higher education places for new students are offered by institutions in Porto and Lisbon. While this mirrors demographic trends (in 2005 the United Nations estimated that 85% of the Portuguese population may live in these two cities by 2015) it raises a series of questions concerning the role of higher education in regional economic development.

Portugal has a comparatively high drop-out rate from secondary education, a comparatively low proportion of higher education graduates in the population, a low proportion of adult learners in higher education and significant social class inequalities in access to higher education.

1.3.3 Postgraduate students

The number of postgraduate students in Portuguese higher education remains relatively low in European terms although this has grown significantly over the past 15 years. Masters students constitute some 42% of the students in public universities and PhD students a further 9%. Masters enrolments rose from 11 500 in 2004 to 121 000 in 2012 primarily as a result of the introduction of the Bachelor-Master degree structure. 15 000 of these Masters students are at public polytechnics.

The number of Doctoral degrees awarded by Portuguese universities over the period 1990 until 2010 increased six-fold, from 250 degrees awarded in 1990 to 1670 degrees awarded in 2010. At the same time the proportion of Portuguese PhDs gaining their degrees from foreign institutions has declined. In 1990 this figure was 87 (26% of all PhDs awarded) while in 2010 it was 170 (10%). Eight universities – all in major coastal cities - produce around 75% of the PhDs awarded by Portuguese universities.

1.3.4 Admission

While the possession of a secondary education diploma makes students eligible for access to higher education, actual access is highly dependent on two further factors: national higher education entrance examinations and the *numerus clausus* system for all (public and private) higher education programmes. Both require further explanation.

Before April 1974, access to higher education was restricted to a privileged few. After the revolution, the expectations of the population were raised and the pressure on the system increased dramatically. This increase in demand and the limitations of available facilities and academic staff led the Government to impose the *numerus clausus* system in 1977 as a way of preventing a loss of quality in education provision. Despite the subsequent increase in the capacity of the higher education system through the creation of polytechnics and new universities, the public system was unable to provide the number of places required to meet demand. This fact encouraged an increase in the number of private providers of higher education, especially from the second half of the 1980s onwards (Eurydice, 2005).

In terms of the national entrance test for higher education, candidates are required to sit national examinations in a set of subjects relevant to their proposed programme of study. In order to qualify for the award of a place a candidate must achieve above a national minimum score on this test, although individual higher education programmes may set requirements that exceed this minimum, particularly where there is high demand for the programme in the context of its *numerus clausus* enrolment ceiling. The level at which this national minimum score has been set has varied, and has been an important instrument of access policy.

Since 1998 the government has become more concerned with quality than with quantity, and more demanding conditions for access to higher education were again introduced. These conditions, together with demographic changes produced a sharp decrease in the number of candidates qualified to enter higher education, thus shrinking the market for private institutions.

In summary, the Ministry of Education following consultation with the higher education institutions responsible for the study programmes, annually establishes the value of the *numerus clausus* for each programme. New students must compete for a vacancy on a national tender, each student applying for a maximum of six study programme/institution combinations, ranked in his or her order of preference. Students are then placed according to their preferences and their relative marks in the national entrance examination. These conditions apply also to private higher education institutions.

Candidates aged 25 years old or over, who do not hold a secondary education diploma, may sit a special entrance exam to enter higher education. Until 2005 this test was administered and set nationally but Law 49/2005 decentralised decisions on whether to admit mature students to the higher education institutions to which they have applied. From the academic year 2005/6 this special dispensation has been extended to candidates aged 23 years or older. This had a significant impact on access with the number of mature students entering higher education programmes via this route increasing from 550 in 2004/5 to 10,900 in 2006/7 although this has now fallen to 5900. This access route has been most important in the private and polytechnic sectors.

Over the past five years the Ministry has sought to reduce the number of study places ("vacancies") for new students in the system by reducing the number in fields of "saturated employability", and by encouraging higher education institutions to reduce the number of study places at their own initiative. Another important change has been requiring applicants for most engineering programmes to pass entrance exams in both Mathematics and Physics/Chemistry (previously only one was required) which has significantly reduced the intake into these programmes.

1.3.5 Academic staff

There are main categories of teaching staff in public universities are full professor (*catedratico*), associate professor (*associado*) and assistant professor (*auxiliar*). In public polytechnics, the main categories are senior coordinating professor (*coordenador principal*), coordinating professor (*coordenador*) and assistant professor (*adjunto*). In 2007 provision was made for the appointment of "specialists" – senior polytechnic positions for people with industrial or professional experience.[9]

The number of places for academic staff in public universities and polytechnics is regulated in detail by the government. One notable trend is the high proportion of polytechnic staff hired on special part-time contracts (over 50% in 2012) as the number of approved places is well-below that required in practice.

A significant effort has been put into increasing the proportion of academic staff holding a PhD; the number of academic staff in Portuguese public universities holding a PhD increased from 3232 in 1993 to 6500 in 2011 representing 69% of all academic staff. The corresponding proportion for public polytechnics is 29%. A further 26% of polytechnic teachers are currently enrolled in PhD programmes.

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[9] Performance targets in terms of staff qualifications in the polytechnic sector often refer to the percentage of teaching staff with PhDs or holding specialist appointments.

2 Trends in Universities of Applied Sciences in Europe

Hans Vossensteyn ♦ Egbert de Weert

Hans Vossensteyn is Director of the Center for Higher Education Policy Studies, University of Twente, the Netherlands and Professor of Higher Education and Science Management, Osnabrück University of Applied Sciences, Germany

Egbert de Weert is a Senior Researcher at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

2.1 Place and development of the UAS sector in higher education

Between the late 60s and the early 70s "diversity" in types of institutions was seen as one of the key features of European higher education. Some countries decided to develop binary or multi-type systems (Teichler, 2008; OECD, 1973). As such, the British polytechnics were established in the early 1960s rapidly followed by the French *Instituts Universitaire de Technologie* (IUT). The German *Fachhochschulen* sector followed in 1969/1970. The regional colleges in Norway were set up in the early 1970s (Kyvik, 1981). In the mid-70s Australia and Ireland followed with, respectively, the Tertiary and Further Education (TAFE) sector and the Institutes of Technology. The Flemish Colleges, Danish University Colleges and Portuguese Polytechnics date from the early 1980s. The Netherlands established the Colleges in 1986. The Finnish Polytechnics (1991), the Austrian *Fachhochschulen* (1994), the Swiss *Fachhochschulen* and the Czech Polytechnics (late 1990s) are relatively young (De Weert and Soo, 2009). These sectors are often referred to as *non-university higher education*, *short cycle higher education* or *alternatives to universities* (OECD, 1991). This indicates that the UAS institutions were often seen as second best next to the "university sector".

Table 2.1:   UAS different sectors and their national and international designations

	National term	International designation
Austria	Fachhochschulen (FH)	Universities of Applied Sciences
Denmark	University Colleges	University Colleges
Estonia	Kõrgkool	College, Academy, University of Applied Sciences*
Finland	Ammattikorkeakoulu (AMK)	Universities of Applied Sciences
France	Instituts Universitaire de Technologie (IUT)	Instituts Universitaire de Technologie (IUT)
Germany	Fachhochschulen (FH)	Universities of Applied Sciences
Ireland	Institutes of Technology (IOT)	Institutes of Technology (IOT)
Lithuania	Colleges of Higher Education	Colleges of Higher Education
Netherlands	Hogescholen (HBO)	Universities of Applied Sciences
Portugal	Instituto Politecnico	Polytechnics
Switzerland	Fachhochschulen (FH)	Universities of Applied Sciences

Source: De Weert en Soo, 2009.

Table 2.1 shows that, internationally, the term University of Applied Sciences to indicate the "alternative to the university" is relatively young. This is in part because of the different role the UAS sector had (and still has) in several countries vis-à-vis the research universities. Moreover, in many countries there has been an almost incessant discussion about other forms of diversity (e.g. more vertical and horizontal diversity between and within institutions of the same type) as well as a call for more unitary systems (Teichler, 2008). For example, in 1992 the British Polytechnics were upgraded to universities. Aside from universities in many countries there were "colleges" or professional schools which were not part of "higher education". Therefore, the creation of the UAS sector was often an upgrade of already existing "professional colleges". Such an upgrade was advantageous in that the "new" institutions could be established relatively quickly and cheaply through adapting existing structures without a search for new audiences and labour market segments (Teichler, 2008). Another advantage was that the inter-institutional diversity through creating of a new sector of higher education avoided complicated (political) processes of intra-institutional differentiation within the university sector.

2.1.1 Some key data

Therefore, in many countries the UAS sector was intended to absorb "new groups" of students thus enhancing diversity in higher education. The number of institutions and the proportion of the student population in the UAS sector varies considerably between countries, as can be seen in table 2.2. Unlike most other countries, the Netherlands and Flanders have about two-thirds higher education students attending UASs. After establishing UAS institutions, many countries started to merge a relatively large number of small and regional colleges into fewer and larger UASs. For example, this has been the case in the Netherlands, where the number of colleges went from about 150 in the 1980s to today's 39.

Table 2.2: Institutions and students in the UAS sector (2007/08)

	Number of institutions (UAS)	Number of students	Students in BA programmes	Students in (professional) Master programmes	% of total higher education	% part-time/ evening/ sandwich higher education
Austria	20	31,063*	17,184	2,754	12%	32%
Denmark	10	68,512	68,512	0	34%	0
Estonia	21	21,224	21,131	93	32%	10%
Finland	28	134,400	131,000	3,400	46%	2.4%
France	116	122,000	122,000	0	5%	n.a.
Germany	126	545,000*	242,000	22,500	29%	n.a.
Ireland	13**	52,295	51,360	595	44%	38%
Lithuania	27	60,096	60,096	0	29%	55%
Netherlands	39	378,585	365,882	12,637	65%	19%
Portugal	20	96,391	12,383	81,843 licent 2,165 master	40%	n.a.
Switzerland	9	60,800*	47,900	2,100	34%	28%

Source: De Weert en Soo, 2009. Notes: (1) By 2012 enrolments in Portuguese public polytechnics had risen to 107,199 including 15,403 in masters programmes (see page 10). (2) The Portuguese data for 2007/8 are pre-Bologna reform; 94,226 students were in first degree programmes of which 81,843 were 4-5 year Licenciatura students.

2.1.2 Types of programmes

With the introduction of the bachelor-master structure according to the Bologna process, typically also UAS offer Bachelors and Masters. In most countries (for example, Finland, Ireland and Switzerland), UAS Bachelor is professionally oriented and usually takes three years to attain. In other cases (Germany and Netherlands) students must study for four years. Unlike for universities, a UAS Bachelor degree is typically a final vocational and labour-market oriented qualification. In many systems, e.g. in Germany, Ireland, Portugal, Austria, Switzerland, Finland, Norway and the Netherlands, UAS also offer Masters. Such Master programs usually last 3-4 semesters, and include one semester of practical experience (internship) and are frequently referred to as "professional masters", as opposed to the academic university Masters (Beerkens-Soo *et al.*, 2010). In Switzerland, and to a lesser extent in Finland, one must do market research to explore the demand for a programme before a professional Master may be established. In Sweden and the UK the qualifications are usually linked to regulated professions through professional associations, which also influence the content of the programme. In Finland and in the German Weiterbildungs Masters applicants must have 2-3 years of relevant work experience before they are admitted.

In most countries (e.g. Germany, Ireland, Denmark, Lithuania, Finland, Norway and the Netherlands) UAS Bachelor graduates can also transfer to a University Master programme (Lepori & Kyvik, 2010), but often face additional requirements, undergo a selection procedure and may have to follow bridging programmes. Interestingly, in Norway, UAS Masters are free to apply for university PhD trajectories and some UAS even offer their own doctoral programs. Moreover, in Norway UASs, may gain University status, albeit under strict conditions (Lepori & Kyvik, 2010). So far two UASs have done so.

2.1.3 Steering of the UAS sector

In some countries, such as in Norway, the differences between UAS and Universities are relatively small. Also in Ireland the Institutes of Technology are developing in the direction of Universities and in Flanders the UAS must increasingly collaborate in "associations" with universities to become more academic (called "*academiseren*"). In Switzerland, the UAS and university sectors are strictly separate, each with its own rules and regulations. Also in Finland, Germany and the Netherlands the UAS sector is relatively separate from the universities. In some countries, such as in Finland, Flanders, the Netherlands and Germany, a single law regulates the entire higher education system. In Switzerland in 2014 the new Federal Act on Funding and Coordination of the Higher Education Sector (HFKG) will regulate the whole higher education system. In other countries, there are separate laws and regulations. In federal countries (e.g. Germany and Switzerland) local governments (Länder / Cantons) play a significant role in controlling and steering of the UAS sector.

In certain countries both UAS and universities are represented by a single umbrella organization, which can help in the coordination of different positions on important policy issues. This is the case of, *inter alia*, Germany (HRK), Norway and Sweden. In other countries, e.g. the Netherlands, Switzerland, Ireland and Flanders, the two sectors are

separately represented by their own organizations. The latter may lead to a politicization of views but also to a more clear profile of each sector.

2.2   Regional role of UAS

The OECD (2011) recognizes that higher education plays a key role in the regional development and innovation. The missions of UASs are expected to focus on regional embeddedness and innovation more than the missions of universities, also because in many countries UASs are more evenly spread across the nation and train students for professions with a relatively regional extraction. Thus, UAS maintain close ties with the regional business and their training is more tailored to regional needs (Jongbloed, 2010). National case studies (Kyvik & Lepori, 2010) show that the UAS' degree of regional embeddedness differs by country. In the Czech Republic, for example, UAS focus strongly on regional educational needs but little on research; in Ireland the Institutes of Technology have at their disposal more resources for research than their Czech fellow institutions but they nonetheless compete fiercely with universities on cooperation with regional partners. The "academisation" of Flemish UAS was supposed to lead to *regional* partnerships with universities, but in fact led to *national* partnerships. The Dutch universities are currently in transition, set to become key players in the regional innovation process thanks to incentive programs (e.g. lectorates and the RAAK program). The German and Finnish UAS have long been active in research aimed at regional development and innovation in collaboration with SMEs (Jongbloed, 2010). The position of Norwegian and Swiss UAS is different because in addition to their educational mission, they also have publicly funded research tasks. Norwegian UASs should focus their research on solving regional problems.

Another issue related to the research function of UAS is the *research mission*. On the one hand it can focus very strongly on regional development and SMEs (this is especially the case of Finland, Switzerland and the Netherlands). The advantage of this position is that the UAS can focus on niches and build specific competency profiles for its staff rather than compete with universities. Due to limited resources, universities also seek to acquire more applied research. On the other hand, there are countries where university status and research are the reference point for the UAS, e.g. in Norway, the Czech Republic and Ireland. In such systems, the fate of the UAS lies mostly in the government's hands, and because of the increasing interest in rankings the UAS sector risks becoming "second-best".

In addition to teaching and research, the third mission of higher education (i.e. the generation, use, application and exploitation of knowledge beyond the academic environment) is increasingly relevant (Laredo, 2007). The interaction of the UAS and other knowledge institutions in their region is therefore of great importance. A UAS must interact with various target groups, companies and civil society organizations in its external environment, forming partnerships and networks with external actors. Since UAS have "naturally" a regional function, these networks and partnerships also focus on the stakeholders in the region. In many European countries national and regional authorities promote the cooperation between UAS and industry through innovative programs which subsidize both SMEs and UASs and support them in their research, the dissemination of knowledge and building networks. In Switzerland there are several incentive programs for

cooperation between UASs and SMEs. In Norway a basic research budget is provided to UASs, which decide autonomously how to use those resources. In addition, the Norwegian Research Council has project funds for cooperation between knowledge institutions and SMEs, but allows competition between the UASs and the generally stronger research universities. The Dutch RAAK budgets are available for UAS - SME cooperation. The budget, however is limited and covers the entire UAS sector.

An inhibiting factor in developing interactions between UAS and regional partners is that the prestige and the potential for performance (as well as promotion opportunities for UAS staff) generally lie more in the educational performance than in the research output.

2.3   Research at Universities of Applied Sciences

Many UASs have a research mission, besides their educational mission. In the Netherlands research within UASs is still quite experimental: though research is on the agenda, relatively little research is actually being conducted at UASs, and there is often only a select group of UAS professors who are engaged in research (Lepori & Kyvik, 2010:301). From a European perspective, specific characteristics of the UAS research mission can be distinguished. For example, the UASs, as opposed to traditional universities, profile themselves by a) providing region-specific knowledge and b) the role of research in improving the quality of professional education (Lepori & Kyvik, 2010:302). De Weert and Soo (2009) identified the following characteristics of the research profile of UAS: 1) meet the needs of the knowledge economy, 2) promote regional innovation 3) focus on SMEs; 4) relevance to professional education; and 5) relevance to professional practice.

2.3.1   Research as core or supporting education

Different countries have different approaches to the research function within the UAS sector. For example, in Switzerland, Germany, Austria, Ireland and Norway the UASs are seen as both education and research organizations. In contrast, the UASs in the Netherlands, Flanders, Finland and Estonia are mainly considered mass education institutions. Countries such as Denmark, Ireland, Portugal and Finland occupy an intermediate position where the UAS sector is seen as an official partner in research networks. The inclusion of R&D outputs in the performance agreements with individual UASs has strengthened this role (Lepori & Kyvic, 2010). Especially in the 1980s and 1990s a gradual movement of academic drift took place across Europe whereby, in its endeavours to become more similar to universities, the UAS sector increasingly claimed a research role. In the last decade, that trend changed towards more focus on applied research in niche areas in collaboration with regional enterprises. According to UAS employees the key benefits of the research function in UASs are the development of staff and improving education quality (De Weert and Soo, 2009).

2.3.2 Types of Research

In countries with binary systems the emphasis on the research function of UASs is increasing. The on-going *academic drift* means that UAS try to imitate universities. But the research within the UAS has swiftly shifted in the direction of regional knowledge development and improvement of professional education (Lepori & Kyvik, 2010). The question is no longer whether the UAS sector should engage in research, but rather whether it can develop its specific profile on the basis of *use-inspired* research. Experience shows, however, that, to succeed specific skills must be in place and a critical mass must be generated. As a result there are often specific knowledge centres with professionalised staff focused on applied research in specific areas in cooperation with SMEs.

In most other European countries, the UASs are currently seen as regional institutions where research is mainly conducted in cooperation with companies. This is also stimulated by various government subsidies, for example in Finland, Ireland, the Netherlands, Switzerland, and to some extent in Germany (Lepori & Kyvik, 2010). The emphasis is on creating focus and doing contract research in cooperation with industry. In Belgium, Finland and Norway UAS research is mainly aimed at strengthening professional education. In these systems, the research function of teachers is more prominent. Thus research funds are more broadly distributed, though the overall budget remains minimal. If teachers in European UASs conduct research, they do far more applied or experimental development research than fundamental research as shown in Chart 2.1.

Chart 2.1: Types of research that UASs perform
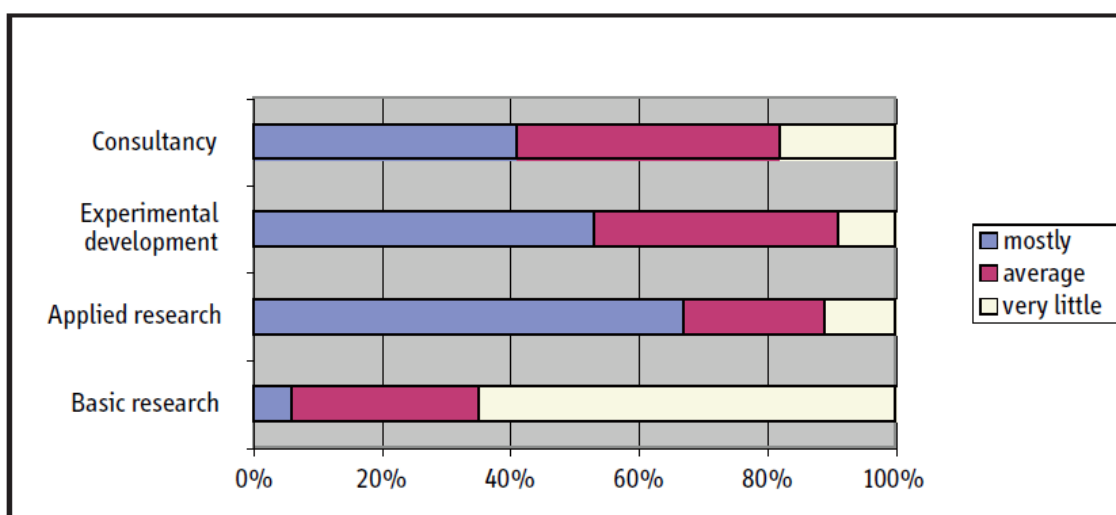
Source: De Weert and Soo, 2009

2.3.3 Broad research versus priority areas

From what has been said above, it is clear that in many countries UAS research is characterized by its potential application for regional companies. Only in some countries (Norway, Germany and – to some extent – Ireland) do UASs focus on basic research or on

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education-related research (Belgium, Finland and Norway) (Lepori & Kyvik, 2010). A broader (intrinsic) focus on research makes it easier for teachers from different disciplines to develop research activities, which can also improve teachers' didactic performance, help them remain up-to-date, and boost the image of the UAS. A stronger focus on research priorities may respond better to the questions and problems of regional economic partners, which can make UASs interesting partners. Focus also enables creating critical mass, which in turn usually leads to a higher quality and output of the services provided and a higher profile – all of which attracts more professionals or contract work. On the other hand, the main disadvantage rests in a possible deepening of the "researchers versus teachers" divide, with each group focusing unilaterally on its tasks. Moreover, if teachers conduct little or no research, they may not fully develop their professional skills and teaching is not research inspired.

2.3.4 Disciplinary focus

Where UAS research is seen especially in the context of regional development, the focus often is on "market relevance" of the research for companies or other social organizations. Hence, research mainly occurs in technology, design, economics and health (Lepori & Kyvik, 2010). UASs normally cannot use operating education funds for research. This implies research can only be performed if there is sufficient (regional) research marketability. This leads to an uneven development between disciplines. Successful disciplines as regards research will show greater embeddedness with social partners, more revenues and a stronger image. Only in Norway, a substantial UASs basic research budget means that 50% of research funds are used in the humanities and social sciences.

2.3.5 Research and regional interaction in institutional strategies

Countries differ in their research policy. In Finland, Norway and Switzerland there not only is a relatively larger focus on research (including funding), research is also integrated into UAS institutional strategies and UASs are explicitly recognized as research actors at national level. Furthermore, in these countries priorities and profiling help to reach a balance between regional interests, participation in national and international research networks and education. Here, UASs have active policies to acquire contract research and build research skills and research careers of their staff.

Countries such as Belgium, the Czech Republic and the Netherlands are still largely in an "experimental" phase, where UAS research might be high on the political agenda but is performed by relatively few staff. Germany and Ireland are somewhat in the middle of these extremes and research is slowly integrated into UAS strategies (Lepori and Kyvic, 2010). Research of De Weert and Soo (2009) shows that research is part of the official mission of 74% of the UAS in Europe, but only 40% of the UASs have an explicit strategic plan for research. Many institutions indicate there is increasing priority given to (De Weert and Soo, 2009; Hazelkorn, 2005):

- The organization and management of research activities
- The competencies of staff, the recruitment policy and human resources development

♦ (Research) policy to allocate resources, including for 3rd stream activities
♦ Collaboration with other research organizations and external stakeholders

2.3.6 Relationship between research and teaching

The higher education debate is often framed in terms of the effects of research activity on the quality of education (Hedges et al, 2010). Governments and professional organizations often indicate that research improves the quality of professional programs and the knowledge base of professional work. On the other side, sceptics contend that too much attention to research at UAS impairs the careers and employability of graduates of practical trainings. In general, four arguments are brought forth to support the role of research for professional programs (Hedges et al, 2010):

1) Education is enhanced when teachers are active in research (research-based teaching)
2) Students learn more when they get into contact with research (research-based learning)
3) The professional practice improves as professionals learn during their training to deal with research-based knowledge (research-based practice)
4) Professional programs have a duty to provide the knowledge to improve practice by conducting research (research-based knowledge production)

The literature in this field is, however, not so clear-cut and the relevance of research for good education and supporting students' passion for the subject remains somewhat controversial (Hedges et al, 2010; Trowler and Wareham, 2008; Marsh and Hattie 2002; OECD, 1998). Still, the dominant paradigm among academics and social actors in higher education, including professional bachelors programs, is that education should take place in an "research atmosphere" (Barnett, 2005 and Brew, 2006), even though the impact is not visible for all teachers (Karseth & Kyvik, 1999; Larsen & Kyvik, 2006). In addition, the rhetoric of research-informed practice is often in contrast with the traditional idea of academic freedom of research. Because basic research is often said to be detached from practice, the UAS sector can fulfil a mission here (Hedges et al, 2010).

2.4   Funding of Research at UAS

When research became more important in the UAS sector, the availability of funds became a salient issue as well. Research funding in UASs usually focuses on project funding (e.g. in the Netherlands, Flanders, Ireland, Germany, Finland and to a lesser extent in Switzerland). Only in the Czech Republic and Norway program funding is not as relevant.

National R&D funding in the UAS sector varies between 2.3% in the Netherlands (which is remarkably low given the size of the Dutch UAS sector) to 9.5% in Switzerland. In almost all European countries the research budget in the UAS sector has grown (up to sevenfold in in Switzerland). Main sources of funding are government stimuli and (in some cases) basic funding. "Third stream" resources mainly come from ministries, companies and agencies. Research Councils for UAS are usually not very relevant; only in Finland the European

Structural Funds represent a major financial engine for research in the UAS (Lepori, 2010). (See Table 2.3 and Chart 2.2)

Table 2.3: R&D budgets in UAS and sources of research income

	R&D in UAS (m€)	% basic funding	% contract Funds	mainly through	right to basic R&D funds
Belgium	58	20%	82%	ministries	yes
Germany	674	45%	55%	private org's	yes
Finland	100	25%	75%	EU & ministries	no
Ireland	33	0%	100%	UAS funds	no
Netherlands	82	19%	80%	lectorats / RAAK	no
Norway	157	79%	18%	RC & ministries	yes
Switzerland	217	62%	40%	private & CIP	yes

Source: CHEPS from data in Kyvik & Lepori, 2010

Chart 2.2:   Financial sources for UAS research
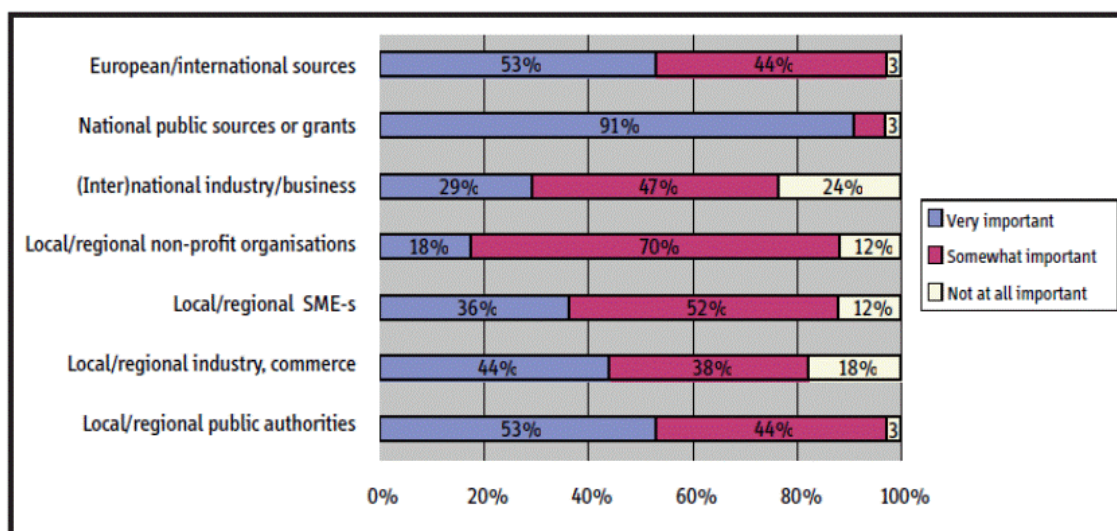
Source: De Weert and Soo, 2009

2.5   HR Policy and Capacity

Building a research function in the UAS sector in countries where, until recently, research was a prerogative of universities only, requires serious HR policies (Hazelkorn and Moynihan, 2010). This implies that UAS teachers have to be increasingly involved in research and to change their aspirations and work patterns. To date, only in few countries (e.g. Norway and Germany) UAS teachers are expected to have a research role albeit "modest". The Swiss UASs have a different strategy. Here, recent bachelor graduates are often recruited as research assistants. They gain valuable work experience in view of better paid jobs in the private sector afterwards. The UASs benefit from a relatively "cheap"

labour force. However, this strategy allows professors to avoid "hands-on" research (Lepori, 2010). In addition, not in all countries UAS teachers are qualified to conduct research or to teach students how to conduct research. In some countries, few UAS staff have received research training as is visible in Chart 2.3.

Chart 2.3:   Education level of UAS staff
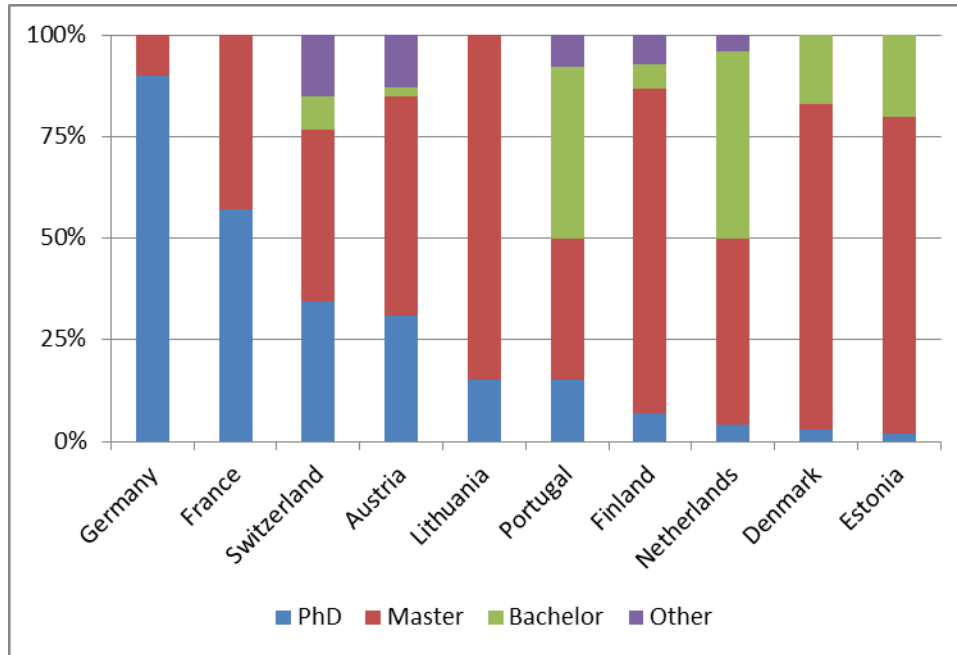
Source: De Weert and Soo, 2009.
Note: The data for Portugal include both public and private polytechnics. In 2011 29% of public polytechnic academic staff hold PhDs.(Source: REBIDES)

The chart shows that in countries such as Germany, France, Switzerland, Austria the qualification level of teachers is more geared towards conducting research and providing research-based education. To promote better research skills within institutions, Germany and – more recently – Ireland, the Netherlands and the Czech Republic require a Master qualification for incoming teachers (Hazelkorn and Moynihan, 2010). This requirement is often in addition to professional experience (e.g. in Belgium, Germany, Portugal and Finland) and can play a role in the accreditation of programs and institutions (e.g. in Finland, Switzerland and Germany). In Portugal the current position is that new polytechnic academic staff must hold a PhD degree with the exception of specialists drawn from industry.

HR instruments to improve teachers' research skills are also employed at institutional level, for example through internal research grants, sabbaticals to upgrade knowledge and skills, and facilitating the completion of a PhD. Finally, in German-speaking countries, a majority of teachers are appointed as "Professor". This is also because in these countries UASs may grant the title "Professor" to their permanent teachers holding a PhD. The advantage is that it boosts the status of the UAS institutions outside the field of higher education.

2.5.1 Time allocation on education versus research and other activities

To understand the nature of UAS it is important to look at the time spent on teaching versus research in different countries. Table 2.4 shows that overall, university academics devote about 40% of their time to teaching (the remaining 60% being for research, management, consulting, etc.). In the UAS sector, across the board, more time is spent on teaching (ranging from 51% in Switzerland and 90% in Germany and Belgium).

Table 2.4: Proportion of time that staff devote to teaching

	Universities	UAS
Belgium	40%	90%
Germany	40%	90%
Finland	43%	74%
Ireland	40%	80%-90%
Netherlands	40%	60%-80%
Norway	42%	58%
Switzerland	40%	51%

Source: Hazelkorn and Moynihan, 2010

2.5.2 Incentives for conducting research

Finally, in the context of HR it is interesting to note whether there are incentives for teachers to conduct research. First, promotion in UASs organization is generally limited and research is not deemed an important criterion. The survey of De Weert and Soo (2009) revealed that "intrinsic motivation", "prestige" and "professionalization" are the key drivers for doing research. Respondents mentioned to a lesser extent the use of research in staff assessments and the reduction of the teaching load as a stimuli to conduct research, while individual or departmental financial remuneration is only partly considered to be used as stimulation instrument (see Table 2.5).

Table 2.5: Incentives for academic staff to actively conduct research (%)

	Strongly	Somewhat	Seldom
Financial rewards for department/institution	9	44	47
Individual financial rewards	10	42	48
Part of personnel assessments	41	41	19
Professionalization of staff	64	33	3
Reduction of teaching load	34	41	25
Increase of prestige	47	53	0
Intrinsic (personnel) rewards	44	44	13

Source: De Weert and Soo, 2009

2.6   Indicators for research and knowledge transfer in UASs

To identify the research roles of UASs it is important to consider the uniqueness of their type of research. Traditional indicators used in universities are not always appropriate for the research activities and knowledge transfer activities of UASs. Chart 2.4 below shows the individuality of UASs and universities and their position within the knowledge infrastructure (Bergdoff *et al.*, based on Stokes 1997). University research focuses on fundamental research and some forms of use-inspired basic research; research at UASs is profession-oriented and is more applied oriented and use-inspired focusing on the development of new products and services.

Chart 2.4:   The identity of universities and UASs. The position in the knowledge infrastructure
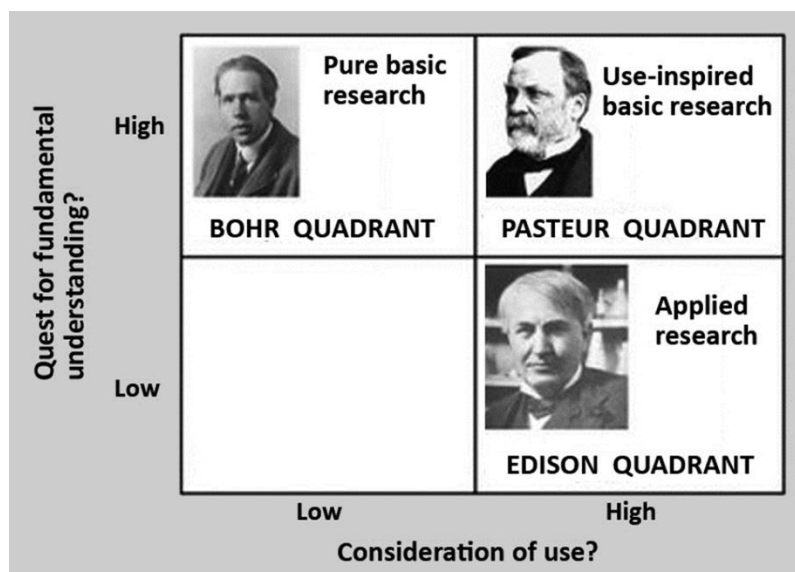
Emphasis on the *use* of practice-based research must be reflected in indicators for research in UAS. A narrower conception of research makes a distinction between research activities aimed at research communication within higher education and within the research community on the one hand, and research activities that focus on society as a whole on the other. From this point of view, "basic research" is considered *research*, while practical and experimental research is considered *knowledge transfer*. This distinction is further illustrated in Chart 2.5. Research generates new knowledge, which is reflected in publications and technologies on the one hand, but also in people who can apply knowledge and skills in other contexts. These contexts are on the right side of the model and the knowledge transfer activities are at the centre.
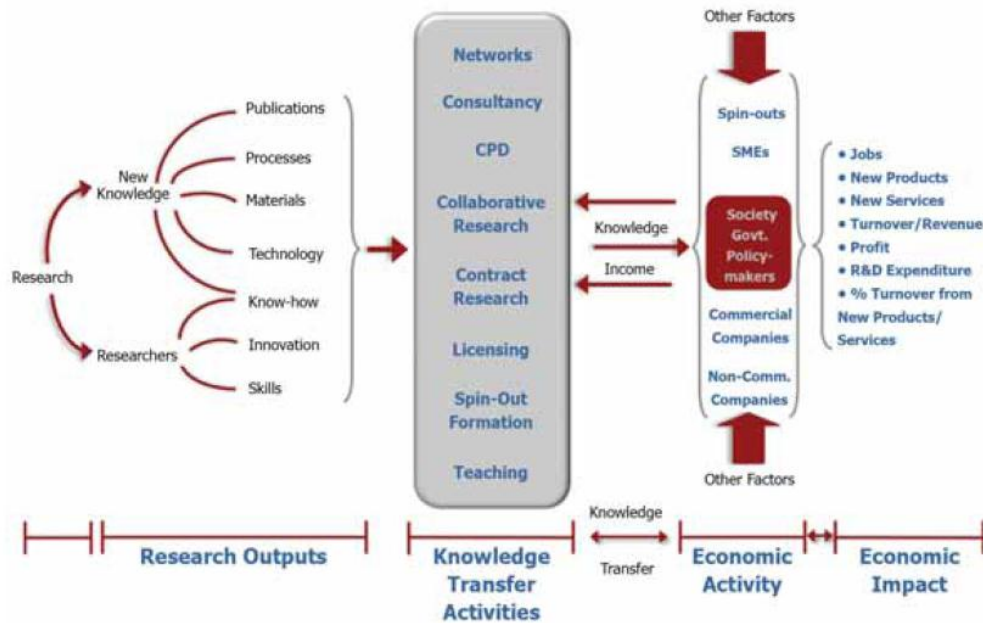
Source: Holi, 2008

Knowledge transfer has become increasingly important for higher education institutions because many countries and regions strive to make research relevant and useful for cultural, social and economic development. Research at UAS in this Chart should be located mainly in the context of knowledge transfer. Indicators for research and knowledge transfer activities and performance can be categorised in:

♦ Input indicators, which measure the resources, both human, physical and financial, devoted to research. Examples are the number (academic or research) employees or revenues as competitive project funding for research and knowledge transfer activities

♦ Output indicators, which measure the quantity of research products. Typical examples are the number of papers published, or the number of PhD doctoral students

♦ Outcomes: this depends on the level of performance, such as the contribution of research to the development of further scientific or professional knowledge

♦ Impact and benefits, which refers to the contribution of the research results to society, culture, the environment and / or the economy

Input and output indicators mainly refer to the quantity of knowledge transfer activities, while outcomes and impact indicators look at the quality of these activities. Because UASs focus so strongly on the use of practice-based research and knowledge transfer, the profile of the UAS is basically on the ultimate social impact of these activities.

3 Diversity in the Portuguese Polytechnic Sector: a U-Map Perspective

Ben Jongbloed ♦ Frans Kaiser

Ben Jongbloed and Frans Kaiser are Senior Researchers at the Center for Higher Education Policy Studies at the University of Twente in the Netherlands

This contribution will focus on the diversity in the Portuguese polytechnic sector. We will start by clarifying the concept of diversity and proceed by introducing the U-Map instrument. U-Map is a tool that can assist its users in presenting the diversity of a higher education institution's activities in a visually attractive and data-driven way. In the second part of our paper we will apply the U-Map instrument to a set of data submitted by Portuguese universities and polytechnics. The results for Portugal – in particular those for the polytechnic sector - will be confronted with the outcomes for other national higher education systems in Europe.

3.1 Diversity

Diversity is considered to be an important objective of higher education policy because, in their movement from elite to mass systems, tertiary education enrolments across the world have been experiencing a growing diversity of societal and student demands. This is why government policies have encouraged diversification of higher education institutions and/or programmes, with some creating more vocationally-oriented non-university institutions in a binary higher education system, and others encouraging a wider differentiation within an unitary (i.e. non-binary) system. In both cases, market mechanisms (e.g. more competition, more demand-driven funding mechanisms, more competition) may be introduced, with or without specific regulations and subsidies aimed at encouraging diversity in mission, reputation, price and ownership (Santiago et al, 2008, p. 76).

The higher education literature mentions several forms of diversity that are assumed to be relevant for understanding the dynamics of higher education systems. Birnbaum (1983) identifies seven categories of diversity:

- ♦ systemic diversity refers to differences in institutional type, size and control found within a higher education system;
- ♦ structural diversity refers to institutional differences resulting from historical and legal foundations, or differences in the internal division of authority among institutions;

- programmatic diversity relates to the degree level, degree area, comprehensiveness, mission and emphasis of programmes and services provided by institutions;
- procedural diversity describes differences in the ways in which teaching, research and/or services are provided by institutions;
- reputational diversity communicates the perceived differences in institutions based on status and prestige;
- constituential diversity alludes to differences in students and other constituents (faculty, administration) in the institutions;
- value and climate diversity is associated with differences in social environment and culture.

For our purposes two distinctions regarding diversity appear to be relevant. A first crucial distinction is between external and internal diversity (Huisman, 1995). External (or institutional) diversity refers to differences between institutions; internal diversity to the differences within institutions, particularly the differences in their programmes (of teaching and research). A second important distinction is between vertical and horizontal diversity (Teichler, 2007). Vertical diversity refers to differences between higher education institutions in terms of (academic) prestige and reputation, while horizontal diversity concerns differences in institutional missions and profiles. The distinction between vertical and horizontal diversity is part of the analysis of external (institutional) diversity.

In this contribution we focus on institutional and horizontal diversity. Our aim is to make use of the U-Map tool to visualize the variety of missions and profiles of Portuguese higher education institutions and place this in a European comparative perspective. U-Map focuses on the differences between institutions (institutional diversity) in terms of their missions and profiles (horizontal diversity).

Diversity has been identified in the higher education literature as one of the major factors associated with the positive performance of higher education systems. The following arguments are advanced in favour of institutional diversity (Birnbaum, 1983; Huisman, 1995). It is argued that increased diversity in a higher education system is an important strategy to meet student and other stakeholders' needs. A more diversified system is better able to offer access to higher education to students with different educational backgrounds and with varied histories of academic achievement. In a diversified system each student – if s/he wishes - is offered an opportunity to interact with students of similar background and find an educational environment that meets her/his wishes.

Portugal is 'modernising' its higher education system. Following the 2006 OECD review of tertiary education (OECD 2007), the Portuguese government implemented a number of reforms. The higher education institutions are expected to become more responsive to the needs of society and the economy. More autonomy and more accountability are keywords in this context. The issues that have been addressed since 2006 are new legislation, system diversity, quality assurance, loans schemes to facilitate more student participation and international partnerships in teaching and research (Ministry of Science, Technology and Higher Education, Portugal, 2011).

The new legislative framework is intended to facilitate an outward focus of institutions. Public universities are allowed to acquire an independent legal (foundation) status. To what extent this will help to create more effective university industry links is to be seen. Modernisation of the higher education system is interpreted also as strengthening and expanding the polytechnic sector. The main rationale is the stronger orientation of the polytechnic degrees towards the world of work. Combined with the wide regional dispersion of polytechnics this is supposed to enhance knowledge transfer and regional engagement. It is also expected to contribute to a greater social inclusion of students.

3.2   U-Map – the instrument

The rationale for U-Map lies in the desire to better understand the diversity that exists in the European higher education and research systems (see also van Vught 2009). Surely, this also holds for Portugal, where currently (see chapter 1) some 40 public and 100 private institutions are providing higher education and research in various forms, levels and settings. The U-Map tool can be used to describe this diversity. It enables various groups of stakeholders to comprehend the diverse institutional activity profiles of the Portuguese higher education institutions (HEIs).

The U-Map transparency instrument was created through an intense and interactive process involving many higher education stakeholders that began in 2005. A prototype of U-Map was piloted in 2009, and in 2010 and 2011 the instrument was implemented in the Netherlands. U-Map was implemented further through a series of projects covering HEIs in countries such as the Netherlands, Estonia, Portugal, and Belgium (Flanders). In its soon to be released updated version it will be also incorporate institutions from the five Nordic countries: Denmark, Finland, Iceland, Norway and Sweden. It will then cover more than 330 individual higher education institutions – mostly from Europe.

U-Map maps institutional diversity in the large and highly differentiated global higher education landscape. It does this by producing activity profiles for higher education institutions. By means of 'sunburst charts' (see figure 3.1, below) U-Map provides a snapshot of the extent to which a higher education institution is active in six key dimensions of institutional activity. Institutional involvement in these activities is measured using a set of 29 indicators. U-Map's on-line database and user interface allows users to select institutions to be compared and to explore the activity profiles in more depth. The diversity of each institution's activity is pictured in its *sunburst chart*, with six colours representing the six dimensions of U-Map. Each 'ray' represents an indicator – the length of the ray indicating the extent to which the institution is engaged in this activity. U-Map's indicators and dimensions have been tested for validity, reliability and feasibility through a detailed process of stakeholder consultations and a pilot test of the U-Map prototype involving 70 institutions which confirmed that these indicators work and are able to capture the essence of what institutions actually do.

Figure 3.1: The U-Map activity profile of an arbitrary higher education institution
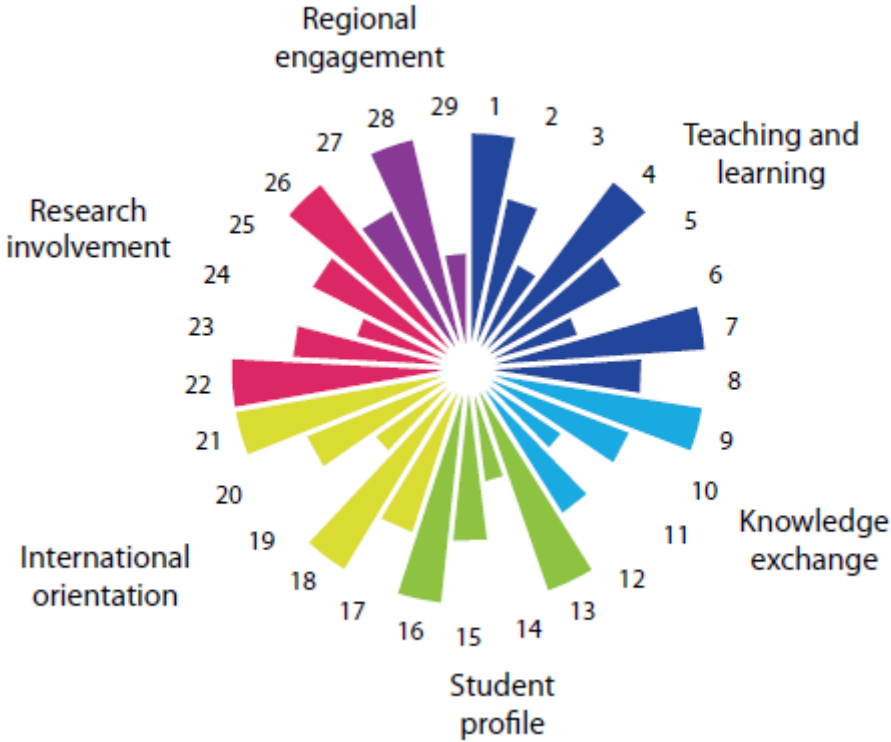
Table 3.1. U-Map dimensions and indicators

Teaching and learning profile	Student profile	Research involvement
Degree level focus (1-4) % of degrees awarded at doctorate, master, bachelor and sub-degree level	**Mature students (13)** % of mature (30+) students	**Peer reviewed academic publications (22)** Number of peer reviewed academic publications per fte academic staff
Range of subjects (5) Number of large subject fields (ISCED) in which at least 5% of degrees are awarded	**Part time students (14)** % of part time students	**Professional publications (23)** Number of professional publications per fte academic staff
Orientation of degrees (6-7) % of degrees awarded in general formative programmes vs. programmes for licensed/regulated and other career oriented programmes	**Distance learning students (15)** % of students I distance learning programmes	**Other research output (24)** Number of other peer reviewed research outputs per fte academic staff
Expenditure on teaching (8) Expenditure on teaching activities as % of total expenditure	**Size of student body (16)** Total number of students enrolled in degree programmes	**Doctorate production (25)** Number of doctorate degrees awarded per fte academic staff
		Expenditure on research (26) Expenditure on research activities as % of total expenditure
Involvement in knowledge exchange	**International orientation**	**Regional engagement**
Start-up firms (9) Number of start-up firms (new in last three years) per 1000 fte ac staff	**Foreign degree seeking students (17)** Number of students with a foreign qualifying diploma as a percentage of total enrolment	**Graduates working in the region (27)** % of graduates working in the region (NUTS2)
Patent applications filed (10) Number of new patent applications files per 1000 fte academic staff	**Incoming students in exchange programmes (18)** Number of incoming students in exchange programmes as % of total enrolment	**New entrants from the region (28)** Percentage of new entrants coming from the region (NUTS2)
Cultural activities (11) Number of concerts and exhibitions (co-)organised by the institution per 1000 fte academic staff	**Students sent out in exchange programmes (19)** Number of students sent out in exchange programmes as % of total enrolment	**Importance of local/regional income sources (29)** Income from local/regional income as % of total income
Income from knowledge exchange activities (12) Income from knowledge exchange activities (income from licensing agreements, copyrights, third party research and tuition fees from CPD courses) as % of total income	**International academic staff (20)** Number of non-national academic staff (headcount) as % of total academic staff (headcount)	
	Importance of international income sources (21) Income from international sources as % of total income	

(xx) refers to the number of the element of the sunburst chart (see figure 3.1)

Indicator scores are divided into four categories (typically *no, some, substantial* or *major* involvement in the activity in question). The boundaries between the categories are determined by *cut-off points* that depend on the distribution of the indicator scores across

the European institutions in the U-Map database. At the moment *quartile scores* are used to establish the cut-off points. The category in which an indicator score is placed is reflected in the length of the corresponding ray in the sunburst chart. Table 3.1 lists the indicators per dimension.

The dimensions *teaching and learning, research involvement* and *knowledge exchange* reflect the core functions of higher education institutions. The dimensions *international orientation* and *regional engagement* concern the extent to which these core functions are directed at international and regional audiences. The sixth dimension, *student profile*, focuses on various aspects of the institution's student body as well as its total student enrolment.

U-Map's activity profiles are based primarily on data submitted by the institutions themselves. The activity profiles of the higher education institutions are published in the U-Map online tool on the U-Map website. The website offers two tools (the Profile Finder and the Profile Viewer) that allow stakeholders to analyse institutional profiles and carry out specific comparative studies (benchmarking).

3.3 U-Map activity profiles of Portuguese higher education institutions

For the U-Map Portuguese project carried out by CHEPS in 2011, the recruitment of institutions was organised in close cooperation with CRUP (the Portuguese Rectors Conference), CCISP (the Council of Polytechnics) and the APESP (the Portuguese Association of Private Higher Education). All CRUP and CCISP member institutions were invited to join the project. Since there are more than 100 independent (private) higher education establishments in Portugal, an agreement was made with the APESP to invite about 30 private institutions. All in all, some 70 institutions were invited. Out of this sample, some 60 institutions responded and received access codes to the U-Map questionnaire in order to submit their data. Gradually, over a period from February 2011 until the end of 2011, the process of data-collection and verification of data was implemented. In a seminar held in Aveiro the preliminary outcomes of the U-Map project for Portugal were presented and discussed with representatives of the Portuguese U-Map institutions and some independent Portuguese experts /observers.

Towards the end of 2011, some 55 Portuguese institutions had provided a full data set, with more than half of these agreeing to have their U-Map profile published on the (password-protected) website devoted to the Portuguese U-Map project. It is these Portuguese U-Map profiles that we will now use to discuss diversity in the Portuguese higher education system. Applying the U-Map methodology to the data received from the Portuguese higher education institutions we constructed the U-Map profiles of the individual Portuguese higher education institutions. While the U-Map sample covers less than half the number of HEIs in Portugal it is a quite representative sample and holds a rich set of microdata on Portuguese HEIs that can be used to analyse diversity in the higher education sector.

Our presentation of diversity and U-Map activity profiles in Portugal will take place along the binary divide – distinguishing, on the one hand, the institutions that award doctoral

degrees (*universities*) from the institutions that do not award doctorates. These institutions consist of polytechnics and vocational schools The difference between universities and higher vocational institutions shows up in the activity profiles; most clearly in the length of the rays in the Teaching and Learning dimension, the Research Involvement dimension and the Student Profile dimension. For instance, between universities and polytechnics there are clear differences in terms of "indicator 1" (doctorate degrees awarded), "indicator 8" ('expenditure on teaching'), "indicator 26" (expenditure on research) and "indicator 22" (academic publications).

In table 3.2 we show the median values for some other European higher education systems that are represented in U-Map database – insofar as these systems make a distinction between universities and other (non-PhD awarding) institutions.

Table 3.2: Median size (in terms of student numbers) of U-Map institutions in seven European higher education systems (2009-2010)

	University sector	UAS sector
Portugal	8820	3160 (public)[10] 600 (private)
Netherlands	16100	3710
Denmark	12930	2750
Norway	6430	2620
Estonia	8960	700
Finland	8680	3710
Sweden	14490	N/A

The table illustrates that *for institutions in U-Map* the average private higher vocational institution in Portugal is much smaller than the average public polytechnic, while the latter has a size that is roughly comparable to the polytechnic institutions in other European (binary) higher education systems (except for Estonia – a much smaller country). The average university in Portugal has a size that is also comparable to the university size in six other European systems. Obviously, we do not show the dispersion of enrolment sizes across the institutions in a given country.

An important aspect of diversity is *programmatic diversity* – in terms of the subject fields covered by HEIs and the degree levels offered. In its Teaching and Learning dimension (the dark blue rays in the sunburst), U-Map has a number of indicators that touch upon these aspects (indicators #1 through 5). Using the information that the Portuguese institutions provided for U-Map about the degrees they award and the subject fields to which these degrees belong, we have calculated a *diversity index* (Ď, inspired by Simpson's index of diversity) that summarizes for each institution the distribution of its graduates across nine different subject fields:

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[10] The actual *average* (not median) size of the 15 public polytechnics is 6,624 (2012) and 5,360 if the five public polytechnic schools are also included. See Chapter 1.

$$\tilde{D} = 1 - D = 1 - \sum_{i=1}^{S} p_i^2$$

Where p_i is the number of degrees awarded in subject field i over the total number of degrees offered by a higher education institution. The following nine subject fields (i.e. educational domains) are included in the U-Map database: *Education, Humanities, Social Sciences, Science, Engineering, Agriculture, Health, Personal Services*, and *Other*. Most institutions have submitted data for U-Map on the degrees they confer (in 2010) and this information can be used for calculating the diversity index. Values of Ď close to 1 indicate high diversification, while values near to 0 indicate high homogeneity. The graph below show the Portuguese public polytechnics in order of their diversity index. The results show that 12 out of the 19 institutions covered here have a diversity index above 0,7. The remaining institutions are more specialised, with some institutions having an index of zero since they are only offering programmes in one disciplinary field.

Figure 3.2: Diversity of programme offerings by Portuguese public polytechnic institutions
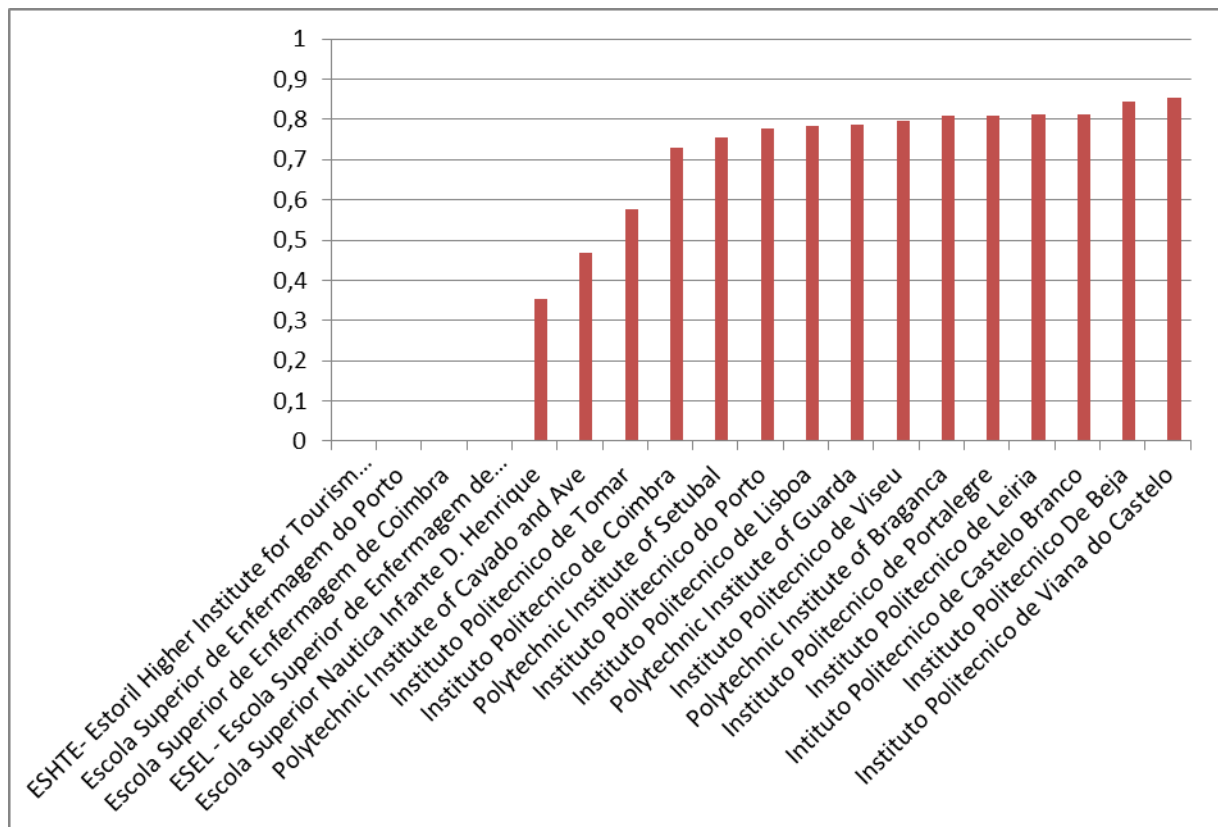
Table 3.3: Index of programme diversity for seven European higher education systems in U-Map (median values for year 2009-2010)

	University sector	UAS sector
Portugal	0,76	0,78 (public) 0,02 (private)
Netherlands	0,50	0,62
Denmark	0,72	0,38
Norway	0,72	0,73
Estonia	0,76	0,00
Finland	0,58	0,76
Sweden	0,68	0,22

The public polytechnics in Portugal have a median diversity index that is similar to that for the Portuguese universities, suggesting similar levels of diversity in terms of programme offerings.

Table 3.3 also illustrates that the average degree of diversity in the public polytechnics sector in Portugal is comparable to that for the Dutch system and two out of the four Nordic systems. The homogeneity in the Danish, Swedish and – in particular – the Estonian system is much bigger, suggesting that these countries have more specialised institutions compared to the public polytechnics in Portugal. The private vocational higher education institutions in Portugal are very specialised – we see diversity values that are similar to the value for the Estonian system (which also has quite a few private vocational institutions). Only the Dutch system has a lower degree of diversity.

Looking at programmatic diversity in terms of degree level – we can conclude that Portuguese polytechnics and other higher vocational institutions mostly award Bachelor degrees and short first degrees (e.g. the short technical oriented programmes). This is similar to the other European systems of universities of applied sciences. The exception is Ireland, where the Institutes of Technology also offer PhDs. In the Netherlands, the *hogescholen* (universities of applied sciences) increasingly are active in providing masters-level degrees, even though the numbers of masters students are not yet that large and government funding for such degrees is still relatively scarce. We should add here that for polytechnic institutions in Portugal the highest degree awarded used to be the long first cycle *licenciatura*, but masters enrolments have expanded rapidly since the implementation of the Bologna degree structure in Portugal.

Now that we have taken a relatively limited view on diversity it is time to turn to the U-Map profiles of the public Portuguese polytechnics. The U-Map activity profiles, presented here in the sunburst charts, aim to capture the multidimensional character of diversity. As such, the U-Map profiles present a comprehensive overview of an institution's many activities – in terms of teaching & learning activities, student body, research activity, international outreach, regional engagement and knowledge exchange.
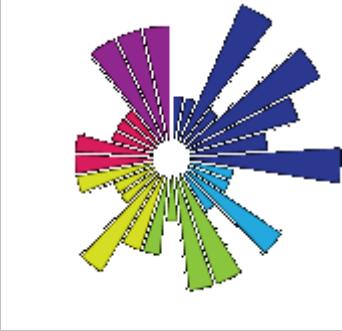
In Figure 3.3 we present the activity profiles for the set of 19 public polytechnics from Portugal included so far in U-Map. (There are 22 in the system.)

The length of the rays in the sunburst charts shows how a particular HEI differs from the 'average' European HEI included in U-Map. The latter means that for the 300+ European institutions so far included in U-Map we have calculated the quartile scores across the indicators and use these scores to categorise the indicator scores for an individual Portuguese HEI. Since the indicators (except for one – "total enrolment", no. 16) are normalised to account for the size of an institution (in terms of either student numbers, budget size, or the size of an HEI's academic staff), there is no 'advantage' for larger institutions when assessing the extent to which an institution is active in a particular dimension of U-Map's activity portfolio.

The institutions included in Figure 3.3 with a shaded background are located in the interior of Portugal. The others are littoral institutions. All seven such interior institutions are in our U-Map database.

Figure 3.3:   U-Map activity profiles for public Portuguese polytechnics

Teaching and learning

Knowledge transfer

Student body

International orientation

Research involvement

Regional engagement

ESHTE

Esc. Sup. Nautica Infante D Henrique

Politécnico do Cávado e do Ave

Esc. Sup de Enf. do Porto		Politécnico de Viana do Castelo
Esc Sup de Enf. de Lisboa	Politécnico de Leiria	Politécnico do Porto
Esc Sup de Enf. de Coimbra		Politécnico de Setubal
Politécnico de Beja	Politécnico de Lisboa	Politécnico de Coimbra

Politécnico de Viseu	Politécnico de Braganca	Politécnico de Portalegre
Politécnico de Castelo Branco	Politécnico de Tomar	Politécnico de Guarda
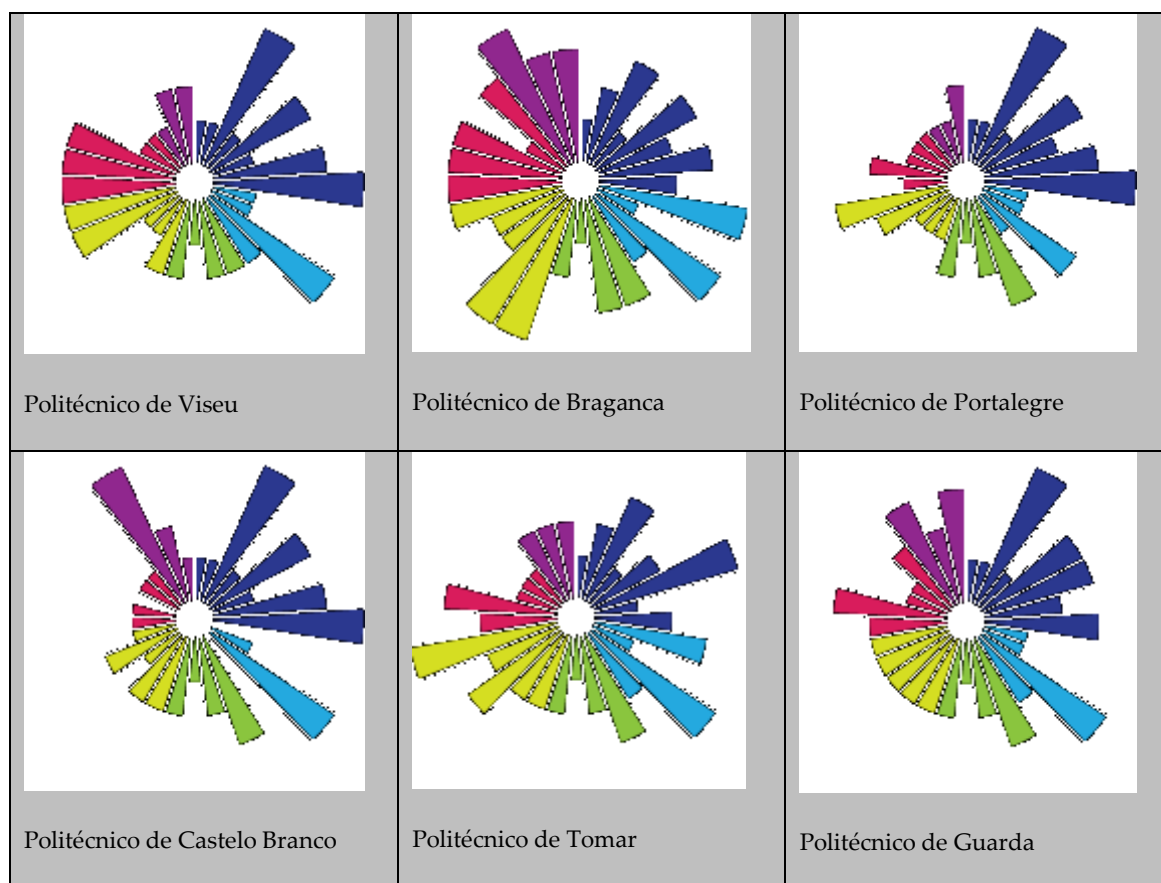
The institutional U-Map profiles from the Portuguese system presented in the preceding pages reveal a remarkable diversity. However, figure 3.3 also shows that there are no obvious differences between littoral institutions and interior institutions in terms of activity profiles. The Portuguese institutions all seem to have a quite strong orientation to their region (indicated by the three purple rays), but at the same time they can also be active in internationalisation activities (the yellow rays). Compared to the research universities, the polytechnics have however a less international character and are obviously less active in research.

The remainder of this section looks briefly at four other indicators:
- ♦ Expenditure on research (as a share of the total budget of the HEI)
- ♦ Academic (peer reviewed) and professional publications (per fte staff)
- ♦ The share of an institution's academic staff that is from abroad
- ♦ The share of an institution's new entrants from its region (using the NUTS2 territory definition)[11]

Again, we present the median values for the indicators for Portugal and the six other European higher education systems in U-Map.

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[11] See: http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction.

Table 3.4: Median value of the share of a polytechnic's expenditure on research and the number of publications (per fte staff) for seven European higher education systems (median values for year 2009-2010)

	Publications per fte academic staff	Share of expenditure on research
Portugal (public)	0,64	5,4%
Netherlands	0,13	5,0%
Denmark	0,12	7,6%
Norway	1,18	20,0%
Estonia	0,31	3,6%
Finland	0,21	14,7%
Sweden	0,58	22,7%

The public Portuguese polytechnics only have a modest research mission, mainly focussing on applied research. This is similar to the situation in countries like the Netherlands, Denmark and Estonia. Clearly, Norway, Sweden and Finland expect their polytechnics (or 'university colleges') to carry out research. Related to this, one has to remark that Finland and Norway are encouraging mergers between different types of institutions and see the boundaries between the two subsectors becoming more and more blurred.

The number of publications per staff member is still modest in most countries, with a clear advantage for Norway. Compared to other countries and in light of its relatively small research budget, Portugal also shows a relatively high research productivity. However, that statement needs to be interpreted in the light of the national definitions and underlying databases. In terms of the number of publications, some institutions are including publications that in other countries would be regarded as nether academic nor as professional publications. As always, indicators need to be interpreted in their national context.

Most public polytechnics have an explicit regional mission: they cater for the demand for well-trained professional labour in regional businesses and regional public organisations, including the health sector (e.g. hospitals) and local schools. Many polytechnics maintain close connections to their local business sector and their regional small- and medium sized enterprises. This is also clear from the indicator that looks at the share of the institution's new students coming from the region (see table 3.5). In Portugal, as well as in other European higher education systems, the share of the new entrants coming from the region is two-thirds to three quarters.

The international orientation of an institution is partially reflected in its academic staff and the share of foreign staff. Table 3.5 presents some data, showing the modest shares of international staff found in most European UAS sectors. Norway and Sweden have more of their staff coming from abroad.

Table 3.5: Median value of the share of UAS international academic staff and its share of new entrants from the region for seven European higher education systems (median values for year 2009-2010) in U-Map

	Share of international academic staff	New entrants from the region
Portugal (public)	2,5%	74%
Netherlands	2,8%	63%
Denmark	1,1%	83%
Norway	6,1%	60%
Estonia	4,0%	73%
Finland	0,9%	68%
Sweden	8,3%	77%

3.4 Final observations

Diversity exists between the groups of public and private institutions as well as between universities, polytechnics and other higher vocational education institutions. However, diversity is present not only between these groups; it cuts across the groups. If the focus of analysis shifts to another dimension, one may detect groupings of similar institutions that do not necessary fall within groups divided by the binary line or the public-private divide.

U-Map has some clear benefits to offer in the Portuguese policy context. The focus on system diversity is most interesting. Diversity is seen as a strengthening of the binary system. U-Map may help in bringing more nuance to this discussion. Although the responsiveness to the (local/regional) economy and society is a key element in the Portuguese modernisation agenda, there are other dimensions in the reform agenda that go beyond the traditional binary divide. International orientation and regional engagement are issues that may cut across the binary divide (as has become apparent in other countries). The divide between both 'types' of institutions regarding their activities in these areas may not be as sharp as suggested: universities may be active in 'professional' fields, polytechnics may be more internationally active than some universities, etc. Terms such as "unitary" and "binary" increasingly are becoming out-dated.

The results of our U-Map exercise for Portugal show, not surprisingly, that there is diversity on the relevant issues (regional engagement, international orientation, research orientation), but it is also clear that this diversity does not follow the binary divide in all dimensions. The closest 'fit' is in the dimensions 'Research involvement' and 'Teaching and Learning Profile'. Universities have in general a higher involvement in research and obviously have a strong focus on the doctorate/master level and a general formative focus in terms of the programmes they offer. In other dimensions, like international orientation' and 'student profile', it is quite difficult to find traces of the binary divide. It is clear that U-Map points out that the current discussions regarding institutional diversity and responsiveness should be broadened beyond the binary divide. Our 21stCentury

knowledge economies require citizens who are motivated, dedicated learners able to overcome unforeseen challenges of tomorrow – more "versatilists" and fewer specialists & generalists (Schleicher, OECD, 2010). This has implications for higher education and higher education institutions. One can speak of Mission evolution rather than simply mission creep or mission drift (Guri-Rosenblit et al, 2007), where higher education has evolved to take on a diverse range of functions and niches within and between institutions (Clark, 1983). There has been a gradual shift in the meaning of diversity - from simplistic differentiators to "diversification in institutions and programmes with different profiles" (van der Wende, 2009). But what stands out is the belief that institutional diversity is one of the main features of a healthy higher education system.

4 Reflections on Specific Aspects of the CCISP Policy Issues

4.1 Proposed Reorganisation of the Polytechnic Network Through Mergers: What we Know About Mergers in Higher Education

Leo Goedegebuure

Leo Goedegebuure is Professor and Director of the LH Martin Institute for Higher Education Leadership and Management, University of Melbourne, Australia

4.1.1 Introduction

In this section we summarize what we currently know about the pros and cons of mergers in higher education. The aim of this is to further the thinking of CCISP in its attempts to optimize the polytechnic sector in Portugal. In reviewing the literature on mergers in higher education, one can distinguish between *incidental* mergers and *policy-induced* mergers as I believe them to be quite different in nature, although one may result from the other. For obvious reasons our focus here will be on policy-induced mergers, although I will reflect briefly on the outcomes of incidental mergers. Given the specific characteristics of the Portuguese polytechnic sector and the nature of the reform proposals, some attention will also be given to the questions of cross-sector mergers and the operation of multi-campus institutions.

4.1.2 Policy-induced mergers[12]

Policy-induced mergers were a particularly popular approach to higher education system restructuring in the 1980s, 1990s and early 2000s. They featured prominently in the Netherlands, Australia, Norway, China, Hungary, Flanders and South Africa. All of them reflect policy responses to perceived deficiencies in existing systems that needed larger institutions to effectively deal with particular challenges. In the Netherlands the merger operation in the non-university sector was initiated to enable a highly fragmented and centrally (through a number of national ministries) governed and managed sector to effectively deal with a planned shift in the overall coordination of the higher education system, founded on principles of autonomy and accountability. In Australia, abolishing the binary system and creating one national system reflected the government's intent, amongst others, to increase participation, to decentralize the system with subsequent accountability and to introduce stronger competition (Meek, 2000) for which larger, stronger institutions were considered necessary. In Norway the merger of colleges was induced by a desire to

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[12] This section is strongly based on Goedegebuure (2012).

create a stronger sector as a viable, non-fragmented counterpart to the university sector, able to also deal with more autonomy through more professional institutional management (Kyvik, 2002). The Chinese reforms that affected some 500+ institutions also were driven by the combination of decentralisation, growth and increased competition, although the process was far more intricate because of specific governance arrangements (Mok, 2005, in particular pp.66-74). In Hungary the system reform followed the introduction of more market-oriented, decentralised forms of government coordination in the wake of the fall of the Berlin Wall. Flanders, very much like the Netherlands, went to through a large scale merger operation to restructure a highly fragmented *hogescholen* sector with increased autonomy and the potential for stronger, more professional institutional management. And the South African mergers equally were the resultant of substantive system restructuring following the design of a new, post-apartheid tertiary education system (NCHE, 1996).

There are strong similarities in the objectives underlying these merger processes. Essentially they are about maturing systems that need to be taken to the 'next level'. A level that overall is characterised by increased autonomy, increased responsiveness to accommodate increased student demand, a more balanced position vis-à-vis the established university sector, and a stronger emphasis on professional management. The latter is not surprising if one takes size into consideration. Larger and more complex organisations by definition require more structured and professionalised forms of management than small, simple ones. These similarities, however, should not blind us to the systemic differences that exist. The Australian and Chinese systems, e.g., have substantially larger institutions than do their European counterparts. Australian comprehensive and in some cases dual sector institutions (incorporating further and higher education, see further) are far more complex institutions than a Norwegian college. And the Chinese system still finds itself in a different and far more diverse developmental stage than would be the case for the Dutch or Flemish system, to highlight but some of these differences.

Also, we should not be blind to the unanticipated consequences that accompanied these policies. The results of the Dutch non-university sector mergers, for example, far exceeded anyone's expectations in terms of the relatively small number of (very) large institutions that emerged. This was primarily the result of institutions not wanting to be 'left behind' as some comprehensive and big institutions started to emerge from the process. This triggered a merger spiral that in no way could be related back to the minimum size conditions to be eligible for government funding specified in the original policy. The same was true for the Australian process which essentially was based on the same policy premises (Goedegebuure, 1992). And the Norwegian case, to name just one other example, originally was also intended to prevent academic drift through colleges aspiring for university status. Yet that has been exactly that which has subsequently happened (Kyvik, 2009). And many more of such examples could be provided. Thus, because of the complexities associated with large scale system restructuring that features institutional merger as an instrument, it is very unlikely that the outcomes will be as envisaged at the start. But what can be said in hindsight of the outcomes of these processes?

Clearly, mergers are not easy and trying to coordinate it at the system level is a challenge. All ministers who have initiated the system-wide restructuring processes referred to above

have come under political and stakeholder-initiated attack because they seriously upset the status quo. Or perhaps better formulated: the existing balance of power within the system. For despite the fact that our tertiary education systems engage in good and noble causes such as teaching and learning, professional preparation, knowledge dissemination and transfer, discovery and exploration, and community service, they ultimately also are political systems with delicate power and authority distributions. Any restructure will impact on these. Hence, initiating change and sticking to it, is – to quote Machiavelli – 'not for the faint-hearted'. This would appear even more so when a system-wide process is initiated by a peak body. The consequence of this is two-fold. First, one needs to be very clear on the rationale for the process: what are the ultimate objectives and how are they to be communicated. Second, it requires a well-thought through implementation and communication strategy. This means serious co-ordination capacity at the level of the peak body that is driving the implementation. For it is not only getting the individual organisations to buy into the process, it is also very much about creating a support structure that allows institutions and the staff involved to be able to effectively deal with the new roles and responsibilities. This in turns requires the development of a whole suite of enabling or training programs that deals with both the pre-merger, merger and post-merger processes and encompasses the full spectre of academic provision and professional management and support structures. This is going to require time, money and capable people, and if any of these three are lacking, the process is going to run into serious problems. It would be fair to say that in most system-wide restructures through merger these costs – including the costs associated with finding the right people to drive and support the process – are seriously underestimated, which probably is one of the key reasons why the economic benefits of merger in the short run are grossly overstated. There essentially are not going to be short term economic gains, and processes like these need to be seen as a long-term investment in a new 'institutional ecology'.

With respect to this long-term perspective it is uplifting to see what perseverance may result in. It would be far too simple to dismiss mergers as either a viable strategy to deal with certain critical developments in an organisation's environment, or as a purposeful government strategy to restructure and reposition its higher or tertiary education system. It may be difficult to attribute cost savings (economies of scale) to institutional mergers due to the vast investments in resources – financial and otherwise – over the time-span needed to actually consume the marriage, which normally is around the 10-year+ mark. And it may be difficult to balance synergies achieved (economies of scope) with the chaos created during the process in the form of an aggregate cost-benefit analysis. But few analysts would be willing to put up the argument that the mergers that created the present Dutch universities of applied sciences have not resulted in a vibrant sector that in no way resembled the disparate set of colleges and schools of the early 1980s. Likewise, despite all the misgivings as to the Dawkins induced unified national system of the early 1990s in Australia, few would argue that if only the system could have remained as it was, the overall higher education system would have been 'better'. And these arguments hold factually true for all systems that have experienced large-scale merger processes. Certainly, they have been painful and protracted processes at times, and they have been expensive in financial and non-financial terms, but what has emerged are different systems that have matured, that have to a large extent shed their original skins, and have created new dynamics largely unanticipated at the outset.

4.1.3 A brief look at incidental mergers

In contrast to policy-induced mergers, incidental mergers by their very nature are far more idiosyncratic in terms of drivers. An interesting overview of the rationale for mergers is provided by the Hong Kong University Grants Committee (UGC, 2004: 12-13), who also notes that motivators are about as varied as the types of mergers that exist (Table 1).

Table 4.1: Rationales for incidental mergers

Lift institutional profile, e.g., national standing and international reputation.
Address problems of non-viable institutions and institutional fragmentation.
Differentiate course offerings to cater for greater student diversity and offer more comprehensive courses.
Reduce competition for students and research funding among institutions with similar "geographic profiles".
Meet government targets and priorities in the overall direction of higher education systems, "especially to ensure that higher education systems serve more directly national and regional economic and social objectives".
Preserve and advance institutional standards in the face of cutbacks in government funding.
Increase efficiency of operation and effectiveness in delivery, especially to cope with rapid and substantial increases in enrolments.
Accept greater responsibilities for post-secondary education, particularly as a result of changing government policy.
Achieve critical mass to facilitate success in competition for quality staff and standing, particularly internationally.
Better utilise human resources, particularly through reaching critical mass, thereby limiting (but not necessarily averting) redundancy.
Better utilise physical resources including the sale of some assets to rationalise campus configuration.
Gain strategic advantage in a region where the partners are a good fit in terms of academic compatibility and complementarity.
Achieve greater coherence in research focus to enhance the prospects for funding.
Increase capacity to create new multi-disciplinary fields.
Improve student access and greater differentiation in course offerings to cater for more diverse student populations.
Generate revenue from new programmes that could only be offered through a larger and more strategically alert institution.

Whilst recognising the diversity referred to above, it is relatively easy to fit the above amalgam into the three main drivers identified by PWC (2010: 5-6): securing cost efficiency, optimising scale of operation (including success in attracting students and funding, increased research profile and enhanced international reputation), and brand leverage. Most of the motivators collated in the UGC overview appear to coalesce under the 'scale' heading. And most can also be found as part of either national tertiary education policies (multi-disciplinarity, research focus, critical mass, increased access and differentiation,

quality and standards) or institutional strategies (new programmes, act strategically, accept responsibility, critical mass, quality and standards, responsiveness). This in turn tells us a lot about the policy climate in which tertiary education currently is located. Yet again, we should not forget that none of this is absolute and all of it is context dependent. There is no such thing as an optimal size for an organisation. Whilst it is relatively easy to identify institutions that are 'too small' – because they become too vulnerable to changes occurring in their (resource) environment, it is virtually impossible to define 'critical mass' or a size that provides 'strategic advantage'. It really is dependent on the context in which they operate and this will vary from country to country and from state to state.

Incidental mergers no doubt will continue to be part of the tertiary education landscape and we will return to them in a moment when discussing cross-sectoral mergers. But first we briefly focus on a new series of policy-induced mergers that appear to have emerged in the second half of the 2000s. Mergers that have little to do with sorting out fragmented sectors and creating the capacity to deal with increased participation levels, but have everything to do with becoming 'world class'.

4.1.4   Becoming world class: the rise of international competition

The last five years has seen a surge in policy-induced mergers that best can be described as selective and prestige-inspired. In a way they followed the Chinese initiative aimed at creating world class universities. Despite the fact that above the Chinese merger process of the 1990s has been grouped with the other sector restructuring processes, part of that process was the ambition to create a limited number of world class universities – the so-called 985 Project. As part of that, researchers within the Jiao Tong University were given the task to identify what in fact made world class universities world class. The result of this was the Shanghai Jiao Tong University Index or the Academic Ranking of World Universities (ARWU) as it currently is known, and the rest, as we know, 'is history'.

Whether or not 'operating at the cutting edge of intellectual and scientific development' equates to 'world class' probably always will remain a point for heated academic debate. But there is ample evidence that governments indeed are purposely restructuring (parts of) their tertiary education systems to place them in positions from which they can – hopefully successful – compete at the top-end of the international markets for prestige, staff and students. And mergers again are a pivotal policy instrument in achieving this. Some high profile examples underpin this observation.

The Finnish government in 2007, as part of a more encompassing reshuffle of the tertiary education system, initiated the creation of an 'innovation university' to become known as the Aalto University, by merging the Helsinki University of Technology, the Helsinki School of Economics and the University of Art and Design (Aarrevaara, Dobson & Elander, 2009; Aula & Tienari, 2011; Markkula & Lappalainen, 2009). The university was set up as a private university with substantial start-up funding provided jointly by the government (EUR 500 million) and industry (EUR 200 million) and started operations in 2010. Its simple but ambitious goal is to 'be one of the leading institutions in the world in terms of research and education in its own specialized disciplines' and it intends to achieve this by admitting 'only the best students and researchers … to study and conduct research at the Aalto

University' (Aalto University homepage). Whether these ambitions will be fulfilled is an open question, but it is interesting to note that the approach taken by the Finnish government very much is in line with the conditions specified by Salmi as preconditions for a world-class university:

a) A high concentration of talent (faculty and students)
b) Abundant resources to offer a rich learning environment and to conduct advanced research
c) Favourable governance features that encourage strategic vision, innovation and flexibility 'that enable institutions to make decisions and to manage resources without being encumbered by bureaucracy' (Salmi, 2009: 19-20)

A similar approach is taken by the French government in creating the Campus Paris-Saclay. This multi-billion dollar initiative brings together 22 universities, research institutes and Grande Écoles and should have some 20,000 staff and 30,000+ students by 2020. It generally is seen as the French response to lagging in the international rankings and had the strong support of former president Sarkozy.

A third example of reshaping the system to better position it in the face of global competition is the Danish restructure of its university and research system. Initiated in 2006, the existing system of 12 universities and 13 government research institutes was reconfigured through merger to 8 universities and 5 research institutes. The official objectives of the restructure were 'more education, greater international impact of research, more innovation and collaboration with industry, the attraction of more research funding from the EU, as well as continued competent service in the area of government commissioned research' (Ministry of Science, Technology and Innovation, 2009: 13). As stated by the independent committee that evaluated the merger process, the overall goal behind the restructure was 'to develop a world class university system that can support the global competitiveness of the country's economy' (ibid: 17). Whilst the committee considers it too early to effectively comment on the results of the mergers in relation to the stated objectives, it notes that more autonomy has been achieved and that the decision-making capacity of universities has been improved. However, it also notes that Salmi's non-bureaucracy principle has not been part of the reform: 'this development [increased autonomy and strengthened decision-making capacity] has been accompanied by a dense set of rules and regulations, many of them too detailed.' (ibid: 10).

A fourth example would be the Excellence Initiative in Germany which has the stated objective of creating and stimulating world-class science by selectively injecting 2.7 billion Euros in the German system until 2017. Whilst merger is not an explicit policy instrument in the initiative, it has spurred the unique merger between the University of Karlsruhe and the Forschungszentrum Karlsruhe GmbH to form the Karlsruhe Institute of Technology (KIT). Further details can be found in the reference list that is attached to this section.

4.1.5 Merging and managing multi-campus and multi-sector institutions

A word of caution is needed when it comes to the creation of multi-campus or multi-city institutions through merger. To put it very simply, they are incredibly difficult to manage,

they create all sorts of problems in terms of trying to reap synergies, and they are very costly. Whilst there is a range of forces that would emphasize the benefits of multi-campus, multi-city institutions, and the regional card is the strongest in this respect, experiences would indicate it is extremely hard to make these arrangements work. Obstacles are: the head quarter issue – who is in charge and therefore who by inference and perception are the 'lesser brothers or sisters'; travel time associated with trying to overcome this issue, and despite all mod cons in terms of ICT solutions, face-to-face meetings remain crucial to 'foster the bond' and they simply cost; and different locations may require different priorities (and probably will) in terms of what one part of the institution needs to do versus another, and as we know competing priorities are hard to deal with. And all of this is leaving aside cultural differences.

The latter are a serious issue and sometimes a barrier when it comes to cross-sector mergers. Whilst one can find a very easy argument why seamless pathways are great, why exposing students to different educational philosophies and traditions is beneficial, why a combination of vocational and critical/conceptual is very exciting, there is no denying that there is another side to this coin that for many quickly gets in the 'too hard basket': cultural differences and people issues. These issues go all the way from curriculum design and pedagogy to governance and management, and that is leaving aside potentially complicating factors such as different regulatory regimes.

The lessons from experiences of the above would be to treat with caution in both multi-campus and multi-sector mergers: they are seriously complicated and difficult to bring to a success. Obviously there are instances when a yes or no choice is not a luxury that exists and it is a path to go down. But if that is the case, seriously careful planning and intricate implementation strategies are called for: cultural human and emotional capital cannot be dismissed.

4.2 Different Sectors, Different Identities

Don Westerheijden

Don Westerheijden is a Senior Researcher at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

This section looks at European experiences and possibilities in sharpening the identity of the University and Polytechnic sectors through the development of different programme profiles for each sector based on different training models.

4.2.1 Expected different identities

The binary higher education system in Portugal is supposed to be defined by different identities in the two public sectors of universities and polytechnics. In the introduction to this report we quoted the relevant legal stipulations. It was mentioned that this demarcation is considered by many to be not sufficiently clear and to be one of the underlying reasons for subsequent academic drift. The Act stipulates that:

> University education is designed to ensure a sound scientific and cultural background and to provide technical education equipping people for administering professional and cultural activities and furthering the development of comprehension, innovation and critical analysis (article no.11.3)

> Polytechnic education is designed to provide a sound higher education level of cultural and technical education, develop a capacity for innovation and critical analysis and inculcate theoretical and practical scientific knowledge and its application to the exercise of professional activities (article no.11.4).

Decree-Law 74/2006 re-established the programme distinction between universities and polytechnics in the context of the Bologna three-cycle qualification structure. Both universities and polytechnics offer (the new) Licenciado and Master degrees[13], only universities offer the doctorate. University Licenciado degrees are 180-240 ECTS while those in polytechnics are 180 except in very specific cases where national or European regulations or practice require this. Furthermore, the Decree-Law indicates that polytechnic first degrees:

> must value particularly training actions targeted at the practice of a professional activity, ensuring a component of application of the knowledge acquired to the actual activities of the respective professional profile

At the master degree level polytechnic degrees must: 'ensure predominantly that the student acquires a professional specialisation'. This in contrast to university degrees, which

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[13] The introduction of the new Bachelor-Master structure allowed polytechnic institutes to offer masters programmes (the first 20 programmes were approved in 2006).

must: 'ensure that the student acquires an academic specialisation resorting to research, innovation or expansion of professional competences'.

The research function, like PhD studies, is seen as a university responsibility with polytechnics having an important role in R&D linked to local industry and regional development. (OECD, 2007).

4.2.2   Some European experiences regarding different identities of different higher education sectors: education and (applied) research missions

4.2.2.1   Unitary approaches

The redefinition of polytechnics to universities in the UK, 1992

In the UK, polytechnics had existed as part of a binary higher education system since the 1960s. Like universities, they provided bachelor and master degree education. The character or orientation of their degrees was ambiguous. On the one hand there was the 'gold standard' idea, that a (UK) bachelor is a bachelor is a bachelor. On the other hand, polytechnics were expected to have a professional or vocational orientation (Silver, 1990). This was expressed in the founding documents of the body that controlled awarding the degrees in this new sector of higher education, the CNAA. The mission of the CNAA included 'the advancement of knowledge and learning, the diffusion and extension of the arts, sciences and technologies and the promotion of liberal, scientific, technological, professional industrial and commercial education'. The diplomas were to be 'academic awards' which

> Edinburgh Napier University started in 1964 as: 'Napier Technical College... About 100 academic staff taught around 800 full-time equivalent students, most of who were studying on part-time City and Guilds or National Certificate courses.'
> (http://www.napier.ac.uk/aboutus/foi/Pages/AboutEdinburghNapierUniversity.aspx, accessed 2013-03-22.)

must be 'comparable in standards to awards granted and conferred by universities'(quoted in Silver, 1990, pp. 45, 46). At first, polytechnics' diplomas were called 'DipTech' but from the mid-1960s onwards , degrees bearing the abbreviations 'BA' and 'BSc' were conferred, but also more specifically targeted designations like 'BEd', 'BSc(Eng)' and later 'BEng'. The universities agreed to recognise the first degrees from polytechnics for entry into university postgraduate courses (Silver, 1990, p. 56)

Entry requirements for students were the same as those for universities, although the polytechnic sector 'had a tradition of catering for "mature" or "second-chance" students' (Silver, 1990, p. 196), with alternatives to the 'A' levels.

In contrast to self-accrediting universities, the polytechnic degrees were initially awarded in the name of a national body overseeing all polytechnics, the Council of National Academic Awards (CNAA). Gradually, the polytechnics emancipated from this centralised tutelage. Under the enhancement-oriented supervision of the CNAA, they developed each their own approach to quality assurance of their degrees as a rule more managerial than

the academic, collegial quality assurance in universities based on external examiners from other universities.

Whether the association of the polytechnics with universities, and the formal weakness of regulating the differentiation in missions only in the CNAA Charter, contributed to the merging of the sector into a unitary higher education system in 1992, can of course not be established here. An almost implicit understanding existed that polytechnic courses were practice oriented. For instance, they could be 'sandwich' courses, with a year of industrial experience in between two periods of studying in the polytechnic. Some former polytechnics in the 2010s still have a strong offer of shorter and professional courses (e.g.: www.londonmet.ac.uk/courses/short-courses/short-courses.cfm). By taking up this professional orientation, polytechnics played a socially important role since the 1960s: 'it is the post-1992 universities that have really delivered mass higher education. They have done the heavy lifting in terms of overall student expansion – and in widening participation for students from "middle England", working-class homes and ethnic minorities' (Scott, 2012).

Once turned into universities in 1992, the discussion of academic drift of (former) polytechnics and of vocational drift of 'pre1992' universities took a different turn. The government expected polytechnics to mingle in the ever-tougher competition for research funding. They were thought to compete on an equal footing, except that mostly they did not have an established fundamental research base. Most 'new universities' were not successful and remained at the bottom of the institutions receiving only very little or no research grants; a few succeeded in becoming recognised research universities (Sharp & Coleman, 2005; Westerheijden, 2007).

On the other hand, universities exhibited 'vocational drift', trying (from an economic rationale) to catch a larger segment of students—or (from a public good rationale) responding to appeals for widening participation. Thus, Leslie Wagner, former vice-chancellor of Leeds Metropolitan University and in 1992 director of the Polytechnic of North London was quoted in *THE* saying that in the 2000s the whole higher education agenda had turned into a polytechnic agenda: '"If you look at the main policy drivers of teaching and learning, access and skills, these are the former polytechnic agendas."' (THE, 31-8-2007 'Former polytechnics spread their wings', see: www.timeshighereducation.co.uk/310328.article). Also, some higher education institutions in the 2010s are more than ever focused on providing their students with career possibilities—very much in the spirit of the 1960s debate on polytechnics. The report 'An avalanche is coming' gives a vivid example of a modern day approach (Barber, Donnelly, & Rizvi, 2013, p. 64):

> Michael was impressed on a recent visit to Exeter University [a pre-1992 university—CHEPS authors] by its Employability Centre, symbolically located at the heart of the campus in a spectacular new building. No student could possibly miss it (unlike the classic 20th century careers centre tucked away in a dowdy corner of a university and exuding lack of status). Any student accepted for a place at Exeter receives a calendar of the key milestones in achieving employability on graduation before they even start their course. Moreover, Exeter has the most successful volunteering programme of any university in England, and the administration of this is housed in the Employability Centre. The university has understood that an undergraduate degree programme on its own is simply not enough to guarantee employment on graduation.

Sometimes, opinions are voiced in the UK that the binary divide should return: leaving mass, professionally oriented higher education for the renewed polytechnics and elite, academically oriented education to 'real' universities. The British unitary higher education system is at the same time recognised as being very stratified informally: everyone 'knows' that 'Oxbridge' universities are in a class of their own, and clubs of institutions place themselves differently, trying to carve out separate niches in the higher education system, e.g. the Russell Group's classical universities. Rankings based on success in research evaluations (Westerheijden, 2008) and league tables in newspapers (THE, Guardian, etc.) reinforce this stratification, to a very large extent without informing the public if the stratification correlates with differences in orientation or quality of education, let alone differences in value added for (certain types or categories of) students. At the same time, it is recognised that in a number of 'research' universities, some departments have very little or no research; the research—education divide can be found at the level of departments as much as on the level of higher education institutions as a whole.

In sum, then, in the unitary British higher education system, different orientations are offered by institutions all called universities, and it takes inside knowledge to know which ones are 'post-1992' universities, most—but not all!—of which have maintained their old, professional-oriented education character.

4.2.2.2   Binary approaches

Germany's Fachhochschulen

The different roles of universities and *Fachhochschulen* (for ease, we will use the abbreviation UAS, or University of Applied Sciences) are formally laid down in laws of the sixteen states of the German federal system, because higher education is to a very large extent governed by the separate states. In the largest state, Northrhine Westphalia, the legal text states that UASs [CHEPS authors' translation]:

> … prepare [students] for professional activity within the country or abroad through application-oriented education and study, which needs the use of scientific knowledge and methods, or the ability of artistic creation. They [=UASs] engage in research and development, artistic and creative tasks and in knowledge transfer (especially scientific education, technology transfer).

The statement of the universities' tasks in the same law starts with: 'The universities aim at gaining scientific knowledge as well as at maintenance and development of the sciences through research, teaching, study, PhD study and knowledge transfer…' [14]

However, the federal framework also remains strong, so that the discussion in this report can be about Germany as a whole. UASs were established around 1970, sometimes building on previously existing professional education institutions.

According to these laws, all UASs base their education and research on scientific foundations, like universities, but unlike universities it is added that they do so with an orientation towards application. Their teaching is mainly in technical and professional areas.

In the pre-Bologna era, the different orientation was shown originally by different degrees, e.g. 'graduated engineer', *Ing. (grad.),* and later by adding the *Fachhochschule* abbreviation 'FH' to the degree, e.g. *Diplom (FH).* Since the introduction of reforms in the framework of the Bologna Process, all higher education institutions offer Bachelor and Master degrees, explicitly without distinguishing between UASs and other universities (federal law: HRG, § 19). The degrees are all accredited under the same federal framework. Nevertheless, the German qualifications framework maintains that the 'different educational aims of the types of higher education institutions should not be called into question, but should be used for the development of the new structures' (KMK, 2005, p. 4) . Accordingly, master degrees from UASs give graduates the right to apply for PhD projects just like Master degrees from universities, although in practice they may have a harder time proving that they are fit for the task (Bundesministerium für Bildung und Forschung, 2012).

Entry requirements for students into UASs are less stringent than for universities: so-called *Fachhochschulreife* used to take a year less than the preparation for the exam allowing entrance into university. With recent changes in the structure of secondary education in Germany, the year's difference has vanished, but still *Fachhochschulreife* can be acquired in more ways than the exam that gives right to entry into university, e.g. in more specialised types of secondary schools. The *Fachhochschulreife* as a rule also is limited to an area of knowledge in which the students have specialised in the last years of secondary education. This implies that students entering the UASs have a different academic aptitude and a different outlook on their studies.

UASs in the Netherlands

In many ways, the Dutch higher education system followed German traditions in the 20th century up until the 1980s. The development of a separate sub-sector of professionally-oriented higher education was one of the elements that the two higher education systems shared. In the 1980s, the UAS sector underwent a large-scale merger operation, leading to a conglomerate of around 60, now even less than 50, large, sometimes multi-campus, institutions that were much more able to offer high-level study programmes than the

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[14] *Gesetz über die Hochschulen des Landes Nordrhein-Westfalen (Hochschulgesetz – HG)* vom 31. Oktober 2006, § 3, 1-2.

several hundreds of sometimes very small mono-disciplinary professional schools that had existed until then (Goedegebuure, 1992).

Entry requirements for UAS education are the five-year type of secondary education or *havo* (for university, six-year secondary education or *vwo* is required).[15] This younger entry age is combined with bachelor programmes being 240 ECTS (4 year full-time) in UASs, in contrast to 180 ECTS (3-year) programmes in universities. UAS-bachelors have access to master programmes which are almost exclusively offered by universities. Quite often, UAS bachelors have to complete a 30 to 60 ECTS bridging programme, focusing as a rule on scientific research skills, which are not a prominent part of UAS bachelor education.

The higher education law defines the aim of 'higher professional education' as (WHW, § 1.1, d):

> focused on the transfer of theoretical knowledge and on the development of skills in close connection to professional practice.

In contrast, university education, or in legal terms 'scientific education', is: 'focused on the preparation for the independent pursuit of science or on professional application of scientific knowledge, and … promotes insight into the coherence of the sciences' (WHW, § 1.1, c). Concerning the institutions, the law prescribes that UASs (WHW, § 1.3.3):

> … are focused on providing higher professional education. They carry out design and development activities or research aimed at professional practice. They provide at least bachelor programmes in higher professional education, if appropriate they provide masters in higher professional education and in any case they transfer knowledge for the benefit of society. They contribute to the development of occupations to which their education is addressed.

Master programmes in UASs are limited to provision in areas where no university equivalent exists, e.g. fine arts and performing arts, or advanced nursing. Programmes of any level may only be offered if they are accredited and will only be funded by the government if they pass a 'macro-efficiency' test, showing an objective need for such a programme offered in that location (i.e. there must be demand in the labour market, and not too much provision of similar study programmes in the same region). Besides bachelor and, sometimes, master programmes, UASs may offer shorter (120 ECTS) diploma programmes, called after the US example *Associate Degrees*. UASs are offering only a limited amount of these programmes, ostensibly because the labour market does not demand these new degrees. Rumour has it that they are also not very keen on offering such programmes as it would lower their public image towards being institutes for vocational training.

The study programmes in the two sub-sectors of universities and UASs are accredited by a single accreditation agency, NVAO, and under a single accreditation framework. However, the Netherlands qualifications framework reinforces the legal differences in orientation

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[15]   Nevertheless, students who had six-year secondary education as a rule perform better in UASs than the official target group of five-year, *havo* graduates.

between universities and UASs. The criteria on a UAS education—at any level—contain (NVAO, 2008):

> – the final qualifications are derived in part from occupation profiles and/or professional competences drawn up by (or discussed with) the relevant occupational field, and/or any applicable national or international statutory requirements for the profession;
> – holders of HBO Bachelor's degrees have obtained the qualifications for the level of starter professional practitioner in a specific occupation or linked spectrum of occupations for which a HBO degree is either required or would be of use;
> – holders of HBO Master's degrees have obtained the qualifications for the level of independent and/or management level professional practitioner in an occupation or spectrum of occupations, and have reached the level needed to work in a multi-disciplinary environment in which a HBO degree is either required or would be of use.

In the process of developing early versions of qualifications frameworks at the turn of the century, CHEPS experts advised the national committee to have two columns in the framework, showing that at each degree level (bachelor, master) there were partially different requirements for professionally and academically oriented degrees. That idea was not taken up at the time, but a decade later, the separate mentions of UAS and university education in the Dutch qualifications framework does in essence the same.

Based on these requirements in the qualifications framework, in the accreditation procedure[16] attention is given to the question how the study programme assures itself that it takes the relevant viewpoints of the profession into account. Having a committee with representatives to maintain regular contacts between education and profession, which meets at regular intervals, is therefore in fact a must for all UAS programmes in the accreditation procedure. To safeguard the professional focus in the accreditation procedure, another measure is that the accreditation agency NVAO requires representatives of the profession to take part in the external evaluation teams that visit each study programme.[17]

To maintain the difference between professional and academic education at first glance for every 'user' of higher education, after the introduction of the bachelor-master structure in 2002, different titles were applied. In universities, degrees were '… of arts' (BA, MA) and '…of science' (BSc, MSc); in UAS programmes, these titles could not be used. Instead, the field had to be shown in the title, e.g. 'bachelor in engineering' (BEng) or 'bachelor in education' (BEd). The UASs maintained that this was demeaning, and worked against international recognition of their graduates. At the end of 2011, the UASs and the ministry of education agreed that under certain circumstances this difference would be ended. However, the law has not been changed until the moment of writing.

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[16] Each study programme must be accredited every six years.
[17] www.nvao.net/page/downloads/Leidraad_eisen_panelsamenstelling_aug_2011_Engels.pdf, accessed 2013-03-26.

4.2.2.3 Academic drift in Scandinavia? Norway as an example of fluid binarity

In Norway, accreditation is the way 'up and out' for professionally-oriented colleges that are found in many regions of the thinly-populated country. Through an academic, once-in-a-lifetime process, they may be able to gain higher status, eventually university status, if they fulfil academic criteria, i.e. focusing on producing successful Ph.D. holders. (For more information see section 5.6 on Norway).

The message from Norway in this respect is twofold:

1. The prestige of being a full university is too strong to withstand for many colleges
2. Providing a bridge between the two sectors (in the form of accreditation to gain university status) reinforces academic drift rather than supporting a separate, professionally-oriented higher education sector.

4.2.3 The importance of names: 'universities of applied sciences' and degree titles

Prestige is still measured on a single-dimensional ladder as 'getting to Harvard', even though there are early signs that the 'avalanche is coming' (Barber et al., 2013) and new education models may emerge in the next decades. Until now, though, it is prestigious to be as much as possible like a traditional research university. In the UK, as shown above: 'The former polytechnics that are considered to have done well are those that have climbed the university rankings and – like Nottingham Trent or Oxford Brookes – broken into key research fields'(Barber et al., 2013, p. 24). By the same token, polytechnics have adopted the university name when legal situations allowed it. Thus in Germany, *Fachhochschulen* started to call themselves universities of applied sciences (UAS). Their Dutch colleagues did the same, and especially in international communication, e.g. for recruiting students abroad, made 'university' as conspicuous as possible, hiding 'of applied sciences' in very small print, until the Ministry of Education recently made it obligatory to use the same font size for the whole phrase, in order to maintain honest information provision.

4.3 Portuguese Polytechnics and Regional/Rural Development: Lessons from Experience Elsewhere

Paul Benneworth

Paul Benneworth is a Senior Researcher at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

4.3.1 Overview

Increasing connectivity and competitiveness in the global economy are changing the nature of regional economic development. The success of regional and rural economies is increasingly dependent on their capacity to compete with innovative products, services and technologies in global markets. Regions must focus on upgrading their human capital and knowledge bases creating a new set of demands on the polytechnic sector for how to work with regional actors strategically to optimise regional performance. The higher education sector has become used to a paradigm of partnership within regions, but emphasis is shifting to how these regional partnerships can create global competitive advantage. Portuguese polytechnics need to adjust where necessary to this new paradigm, and the implications that it brings for HE regional partnerships, to ensure that they contribute to the development of regional smart specialisation in their home territories.

4.3.2 Introduction

Higher education can play an important role in regional and rural development, both in the polytechnic as well as the university sector. With increasing emphasis being placed on knowledge economy, higher education's role in helping to develop and exploit knowledge capital makes the sector critical drivers for regional development. Since the mid-1990s, it has become commonplace for territorial and HE policy makers to encourage the development of regional innovation strategies, to identify the possibilities for linkages between knowledge producers (HE), and knowledge exploiters (businesses). But there is an increasing recognition that innovation is a global phenomenon, and therefore territorial development relies on building up regional innovation partnerships that have strength in these wider global networks (global-local relationships). The Portuguese Polytechnic sector can best contribute to regional and rural development in Portugal by emphasising this global-local connectivity and helping to develop regional smart specialisation in the Portuguese regions.

The driver for this as been the increased importance of knowledge capital, and the fact that some knowledge ('tacit' knowledge or knowhow/ 'know-who') is most easily transferred through direct interpersonal contact. Evidence emerged in the late 1980s and early 1990s of the systemic nature of innovation, that is to say that regular co-operations between innovators made the exchange of tacit knowledge easier, leading these co-operative exchanges to have a systemic property. From the mid-1990s, policy-makers have actively

attempted to manage innovators in a region by encouraging system-forming, and in particular mobilising innovators – firms, government, universities and public laboratories – to come together and identify how they might develop better work together to create and exchange new knowledge, particularly in promising growth sectors. The role for higher education was clear, in bringing particular kinds of abstract technological knowledge to the region, and embedding it through knowledge exchange in regional firms through co-creative processes (IRE, 1999). There was a clear if sometimes implicit division of labour in the role for higher education, with polytechnics in these regional innovation strategies usually being responsible for technical consultancy, supply of skilled engineers, and business/ entrepreneurship education.

The practical result of this has been a rash of identikit strategies, the idea of 'Silicon Somewheres', as all regions have attempted to develop innovation systems based on a very limited number of emerging technologies, from micro-electronics and ICTs to biotech and nanotechnology (Hospers, 2007). Many of the collaborations that have been created have been driven by the availability of public funding, and not related to creating real competitive strengths in those sectors. There is now a recognition that alongside these 'regional innovation systems', global innovation takes place in wider, distributed technological innovation systems (TISs) linking through large scale research projects, corporate research activity and government programmes, firms, universities and public research organisations towards advancing the technological frontier at a global scale (Bergek *et al.*, 2008). Regional economic development is therefore dependent on building up a strong RIS which has a well-identified and clear advantage within a global TIS, the wider knowledge production network related to particular goods and technology markets. (Benneworth & Dassen, 2011)

The key challenge for policy makers more generally as well as the Polytechnic Sector more specifically is how to respond effectively and better support regional innovators to compete within the wider globalised knowledge economy. One answer which has been developed and adopted by the OECD and the European Commission is the notion of regional smart specialisation (Foray *et al.*, 2009). Regional smart specialisation takes the idea of the regional innovation strategy and focuses it specifically on developing these global-local connections. The basis for this is a process of 'entrepreneurial discovery' where firms and knowledge producers work together to identify the most promising areas of specialisation, and then develop a strategy to optimise their global orientation to exploit their local strengths. The emphasis shifts from creating linkages between partners in regions (e.g. between universities and firms) to identifying where there are missing linkages from regional actors to these TISs, and helping particular regional actors access knowledge in these TISs. At the same time, a key emphasis is focusing on regional strengths and related variety: for those regions which are not strong in biotech, nanotechnology and ICTs, the question is where is the innovation frontier of their strong sectors, and how can regional partners work together to transform these often traditional sectors into innovative and competitive nodes within wider TISs.

4.3.3 *Polytechnics contributing to regional smart specialisation*

The higher education sector is now comfortable with the idea of contributing to territorial economic development, and creating regional partnerships to help support regional innovators and entrepreneurs. Part of this has come through 'traditional' HE activities, such as research and innovation, enterprise and business development, human capital development and social equality (Goddard, 2011). Polytechnics have always trained highly skilled engineers and technicians who develop new products and create new businesses: polytechnics have long worked more systematically with particular key firms to tailor their curricula to firms' needs, ensure that their students receive useful placements, and to make their facilities and knowledge open to firms.

In the last quarter century, two new roles have emerged for higher education institutions (HEIs) in their regions, as identified in the 2007 OECD report:

- The first is a transforming role – that involves going beyond what firms currently need in terms of innovation, but helping those firms to upgrade their innovative capacity and become more innovative. Polytechnics have developed new incubator units and master class programmes to improve business innovative and growth rates: they have also become involved in more strategic initiatives, such as clusters, growth poles, science parks and technpolises, seeking to create common infrastructures facilitating and encouraging higher levels of interaction.
- The second is a collective leadership role, working with local and regional policy-makers, key regional businesses, unions, and the voluntary and charitable sector, to create a common agenda for action to deliver that transformation. Polytechnics may often be amongst the largest employers in regions, particularly in more remote rural regions, and strategically significant in terms of bringing large numbers of students into those regions, as well as large local stakeholder networks, conferring considerable moral authority on them in taking a lead in developing collective plans for change.
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The regular *modus operandi* in the last twenty years – in which Portugal has participated – has been the development of regional innovation strategies (Laranja, 2004). Polytechnics are usually positioned on the 'supply side' of the regional knowledge capacity maps, and regional partners have attempted to develop collective and collaborative arrangements to better link the supply and demand sides. A key problem for many regions has been what to do when their regional demand side is very weak and ill-fitted with the supply side, and with regional smart specialisation, this issue moves back to the fore. The challenge of regional upgrading is making these regional industries more innovative, and ultimately to become self-sustainingly competitive. This upgrading necessarily goes beyond applying new technologies in traditional industries – as has been common in the textiles industry, introducing new cutting, designing, logistics and management software to improve productivity. The issue for textiles, as with many other industries, is as employment in Europe declines, how to move the productive base into new technological areas that build on the old strengths of the sector, which might not necessarily be in 'textiles' but use the human and social capital in the industrial infrastructure as the basis for developing a competitive position. The key challenge for polytechnics in old industrial regions is how to work with regional partners to avoid lock-in, identify new opportunity sectors, and move

towards them with the minimum structural disruption possible. And this creates a whole new set of demands on the polytechnic sector.

A key issue for polytechnics in terms of planning their regional and rural engagement activities is the question of balance with other HEIs in their regions, particularly in a formal binary system where there can be questions of legal responsibilities and duties. Ultimately, it does not matter how knowledge comes into a region or how it is embodied in productive innovative activities, and co-operation between universities and polytechnics is most effective when it is managed constructively and seamlessly. The best divisions of labours of HEIs in rural and regional engagement are emergent and strategic, based on the respective talents and opportunities of those polytechnics and universities, the wider networks with which they are embedded, and how that can contribute to upgrading the region's innovative base. Particular care has to be taken to deal with any implicit vertical differentiation between HEIs (saying that regional engagement is a task for a particular – often subordinate – group of institutions). At the same time, carefully managing this issue helps to ensure that polytechnics do not use a 'regional mission' as part of attempts to develop prestigious blue skies research capacity and compete with universities for regional resources.

4.3.4 Concrete examples from around Europe

The most useful contributions which polytechnics can make to regional and rural development – and in particular to smart specialisation processes – are those contributions which promote a substantive regional change or upgrading. Much of the ways that contributions have traditionally been regarded are in terms of serving the needs of business, through the direct requests of businesses. But smart specialisation requires a shift from the 'business as usual' strategy, to increasing innovation performance and productivity growth across all sectors of the economy. There are several clear ways in which polytechnics can make this contribution, by supporting the linking of regional actors both within the region as well as with external partners. This role is common to higher education as a sector, and in a vertically differentiated sector, there is also a differentiation in the kinds of linking activities which universities and polytechnics respectively perform. EURADA cites the Goddard Smart Specialisation paper highlighting the wide range of contributions by which HE in general can contribute to smart specialisation processes. This diagram is reproduced below.

Mechanisms for universities to participate in the innovation/smart specialisation process

high

Helping the region articulate demand so the resources of the university can be mobilised in an holistic way to promote innovation

Facilitating networks & clusters

Stimulating innovation

Helping businesses articulate demand

Physical regeneration and capital projects

Human capital development

International links and investment

Cultural development & «place-making»

Complexity of the activity

Staff spin outs

Workforce development

Talent retention

Knowledge transfer partnerships

Talent attraction

Widening participation

Innovation vouchers

Technology transfer

Student volunteering & community work

Museums & galleries

Academic research

Graduate enterprises

Teaching

Consultancy services

Public lectures

low

transactional

Intervention type

transformational

Teaching & learning

Research & innovation

Social mission & engagement

Source: EURADA, 2011.

This diagram makes a clear contrast between interventions which are transactional as against transformational, and between activities which are simple to those which are more complex to deliver. Many of these activities will take place automatically simply through the presence of the HE actor, although polytechnics can do more to stimulate these kind of activities. In a context of scarce resources, the most important areas on which polytechnics might wish to focus are those in the upper-right hand quadrant of the diagram above. The nature of these activities varies with regional context, and in particular polytechnics in less successful, old-industrial, peripheral or declining regions may encounter particular problems for polytechnics engaging regionally, such as a lack of partner firms and other knowledge institutions, or even of a culture of innovation and collaboration in both public and private sectors. . There are five areas where we highlight that **polytechnics** are able to make a high-impact and distinctive contribution of smart specialisation processes, and present examples from where polytechnics in less successful regions have been able to make upgrading and transformational contributions to their regional environments:

a) *Stimulating innovation (Seinajöki Research and Development)*

The challenge for a Polytechnic in undertaking research is in persuading research funders that it has the competence and knowledge to add value and meet the users' specific knowledge needs, particularly in dual systems when polytechnics receive no core research funding. Whilst polytechnics may be training students in the latest techniques, there is no requirement for the teaching staff to have a scholarly as well as a pedagogic background. Indeed, in many polytechnic systems it is not a requirement for teachers to have a research qualification (M. Res. or Ph.D.) At the same time, because polytechnics are close to

businesses because of their teaching approaches, and face no pressure to engage in blue-skies research, there is a place for polytechnics in meeting particular kinds of knowledge needs. Finland is one of the countries that has been at the forefront of encouraging its polytechnics to become more engaged in direct knowledge transfer to and knowledge exchange with particularly regional businesses. Polytechnics (Universities of Applied Science) in Finland have a specific legal requirement to promote regional development, not just through delivering training relevant to regional businesses, but also engaging in appropriate research and technology transfer activities.

Seinäjoki University of Applied Sciences (SEAMK) is not atypical example of how polytechnics can move into distinct knowledge creation niches which benefit their regional business base. In 2007, SEAMK created a single unified office for its technology transfer activities (SEAMK R&D) which had previously been split between two offices, one for commerce and technology and the other for social and health care. The SEAMK R&D model is a matrix structure, in which there is a central outward-facing office and specialist technology transfer officers in the faculties. There is therefore a single contact point for business, with expertise in making collaborations work from an administrative perspective, and specialist faculty officers who are sensitive to the different kinds of technology transfer needs in areas as different as Technology, Agriculture & Forestry and Culture & Design. Although there is no blue skies research, a recent evaluation report found that there were activities in applied research, development and consultancy, including work in some international consortia (notably in health care and social work). Research intensity of SEAMK was relatively low (c. €700 per student) in comparison to the university sector, but nevertheless, some staff were active in scholarly activities including conference attendance and journal publishing. An important mechanism for technology transfer comes through student theses, in which they solve a real practice problem, which may include research such as the development of new operational models or an evaluation study. SEAMK works closely with the local University College network to deliver regional development goals

b)   *Talent retention (Lower Rhine UAS)*

Universities are becoming increasingly active in managing their alumni as a useful network for achieving their wider missions, and regional development actors are also interested in the roles that universities can play in dealing with human capital issues. One particular problem for non-core regions is of brain-drain, that of the outmigration of highly skilled migrants. There is a tendency to regard universities as a positive asset for a region, because they create human capital, and may attract students to a region. But the reality for peripheral regions is that universities and UASs may actually serve act to encourage outmigration, in equipping the most talented people in a less-successful region with precisely the skills and the experience they need to leave the region, often to so-called 'escalator regions' where they can accelerate their career development (Fielding, 1992). But at the same time, these emigrants may seek to 'step off the escalator' and settle down outside these very busy (expensive and sometimes not necessarily liveable) escalator regions. If HEIs retain connections to their graduates, then they may be able to bring these very highly—skilled migrants back to the region. Regional policy makers are likewise

increasingly turning their attention to the development of smart human capital policies for their HEIs that go beyond seeking to match existing provision and demand.

Gelsenkirchen UAS has been leading a research project to explore what UASs may do in order to achieve this (the BRAND project[18]). Research carried out within the project has identified that the main variable that influences whether someone will move to a region when faced with a set of choices is whether they feel a sense of attachment and belonging. Therefore HEIs do not really strongly influence their local students, whose sense of attachment and belonging will have been formed long before the study period. The one area where HEIs can make a distinctive contribution is in terms of the group of students that come to the region to study there and then leave. UASs can therefore attempt to ensure that students have a positive experience of their region whilst they are studying there, as well as creating alumni networks that attempt to support that feeling of place belonging, as well as ensuring The Lower Rhine UAS has set up an Alumni[19] office that operates on two levels – there is a central office informing graduates about developments in and around the university, but also a set of course-specific Associations registered as separate businesses. These each have their own services for students, graduates and businesses, including recruitment workshops, technology transfer, placements, and innovation schemes. One example is to carry course-specific employment opportunities, the idea being to create visibility for jobs in the Lower Rhine region for those that have studied and moved away, as well as for alumni that have stayed in the region, integrating talent retention as one activity within a broader suite of engagement activities.

  c) *Facilitating clusters (Dutch UASs and the RAAK rule)*

Clusters of innovative businesses can be highly useful ways for raising innovation rates and performance, allowing risk-sharing, the development of collective knowledge, economies of scale and opportunities for generating regional specialisation. HEIs can support the development of clusters and support increasing their overall innovation capacity, but where there are large numbers of inexperienced firms, then universities may not be the most useful partners for these firms who require other resources besides scientific knowledge in order to effectively innovate. There is a clear niche for polytechnics in working with clusters of firms in similar sectors with similar needs but without necessarily common high levels of competence in business innovation. These connections come about because the UASs work with these firms to meet their regular skills needs, but also to use those connections to identify common knowledge needs and the kinds of applied research and consultancy which might fill those needs. But the UAS sector is not always well-equipped with the staff who are able to work with firms both to deal with their current needs, but also to think more strategically about upgrading their capabilities for innovation.

Addressing this issue has been at the heart of the Dutch *Lectoraat* Programme. The idea was created in 2003 as a pilot scheme in which UASs bid for central funding to appoint Associate Professors (*Lectoren*) in particular fields where the UASs had close connections with groups of businesses, in the public or private sector. These Associate Professors

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[18] http://www.brain-flow.eu/sub-projects/brand.html
[19] http://www.hs-niederrhein.de/services/alumni/

would then assume responsibility for the UASs' business development in that sector, and as well as ensuring that the curriculum reflected business needs, develop collective programmes and secure funding for capacity raising activities. The Scheme was managed by the Innovation Alliance Foundation (SIA[20]). SIA were funded to create an additional finance scheme (RAAK) which makes funds available for users to undertake joint research projects with the UASs. These projects involve Lectoren, networks of firms and public sector organisations, and other knowledge institutions (including universities) where appropriate. In 2008, the experiment was turned into core funding for UASs, reflecting the success of this in creating genuine applied research capacity in the 450 Lectoren working in Dutch UASs.

d) Placemarking and Cultural Development (the Bohemian classes UK UASs)

Since the publication of Richard Florida's The Rise of the Creative Class (2002), there has been a huge interest in how to use creative industries to drive economic competitiveness, and how to attract the 'Bohemian Classes' associated with creativity driven growth. This has been expressed in a new policy paradigm (Evans, 2009), of the creative city, with urban policy makers seeking to initiate new 'creative quarters' as places where artists can congregate and produce positive economic impacts. Much of this work has focused on the physical development dimensions that this brings, and attempting to use things like 'creative factories' (artists' studios in derelict industrial buildings) as an engine of gentrification, raising land prices and local tax bases. HEIs have positioned themselves as important players in the creation of these new creative spaces, with Evans citing the following examples (Evans, 2009, p. 46-47):

- ♦ "Queensland University of Technology & Brisbane creative precinct and wider south bank regeneration;
- ♦ Pobra Fabra (University of Arts & Design) consolidating its six campuses into one mega-development in Barcelona's Poblenou industrial zone
- ♦ Humboldt University and Eagle Yard/Adlershof science & media park and village in former east Berlin,
- ♦ Simon Fraser University media campus in Downtown Eastside, Vancouver, and
- ♦ Helsinki University of Art & Design, Cable Factory and Arabianranta "virtual urban village"

But ultimately, the success of creative cities does not depend on physical development projects but on the communities and people they house, and their entrepreneurship, drive and risk-taking. Polytechnics are often sources of considerable numbers of 'Bohemian students[21]' – the holy grail of creative city strategies - (Comunian & Faggian, 2010) in terms of the numbers of students they have and their disciplinary range. Comunian & Faggian present data from the UK, in which they show that the top nine HEIs in terms of their number of Bohemian Graduates are all former polytechnics (new universities) or arts colleges, together accounting for 24.2% of the UK's Bohemian Graduate stock (around

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[20] http://www.innovatie-alliantie.nl/index.php
[21] "graduates who obtained a degree in a 'bohemian' subject (creative arts, performing arts, design, mass communications, multi-media, software design and engineering, music recording and technology, architecture and landscape design) (Comunian & Faggian, 2010, p. 193).

43,000 students). Together with the physical resources these institutions have for the promotion of arts, culture and the creative industries, polytechnics have a huge capacity to contribute to the growth of the creative sector. The key challenge is in ensuring that these students are connected during their study activities into regional cultural life, and able to cross-fertilise and engage with local cultural and creative industries. Smart management by polytechnics of their course requirements and facilities can greatly contribute to this process, and help to ensure that regions are able to benefit from the tremendous impulse which the creative sector can bring.

e)   Community engagement and capacity building (Brighton UAS in the UK)

One final area where UASs can make a substantive different is in terms of the creation of social capital within a region (Putnam, 2000). Social capital refers to the capacity that exists within groups to come together and be able to co-operate to achieve collective goals (bonding capital), but also to get those goals placed onto the agenda of external partners (bridging capital). There can be a particular problem for less successful regions, and UASs can play a role in addressing this. A good mechanism for creating social capital is through volunteering activities, and many universities have opportunities for students to work for or work on a problem for a voluntary and community sector organisation. However, it is possible for HEIs to more systematically contribute to social capital building within regions by managing that engagement activity more strategically. The RAAK programme in the Netherlands (*cf.* 1.4.3) has a number of collective research projects in which UASs are working with community organisations to stimulate innovation (for example in the use of social media to promote social integration and neighbourliness).

A good example of a polytechnic that has made it a central element of its raison d'être in the University of Brighton (formerly Brighton Polytechnic) and its Community-University Partnership Programme (CUPP) (Hart *et al.*, 2007, Hart & Aumann, 2013). The Vice Chancellor of the University was offered seed funding in 2003 from a philanthropic foundation to undertake an experiment in systematic community engagement, building on the substantial work already underway at Brighton. The CUPP model is to provide an infrastructure by which local community groups can access university knowledge, and in particular recognising that their needs are not always easy for universities to deal with nor important to university staff (Balloch *et al.*, 2007). Two important elements of this were providing access to education, both to people from excluded groups as well as lifelong learning for those working with community groups. A third element was in co-ordinating student projects in order to make them accessible; related to this was the fourth element, a helpdesk, as a single point of contact for voluntary and community sector groups. Following the establishment of the scheme, additional government funding was made available to run projects ranging from scoping studies to substantial research projects involving community groups.

5 Reflections on the Policy Issues identified by CCISP from the Perspective of Other "Binary" Higher Education Systems

5.1 Australia

Leo Goedegebuure

Leo Goedegebuure is Professor and Director of the LH Martin Institute for Higher Education Leadership and Management, University of Melbourne, Australia

5.1.1 The Australian higher education system

Australia is a relatively new nation and its university sector is young when compared with those in Europe and North America. Its first universities were established when 'Australia' was still a set of British colonies; the inauguration of Australia as a nation didn't occur until 1 January 1901. The 'model' followed by Australia's universities was distinctly British. In fact, it has been suggested that the early universities were established 'to recreate the social order and the institutions of the *Mother Country*' (DEET, 1993 p.1), rather than as a response to student demand. This also meant that the Australian university system had all the characteristics of an elite system along the classic British lines, and it followed the same path as England in establishing a binary system in the 1960s to deal with the expansion of the system through the colleges of advanced education.

The year 1989 represents a 'natural' point for analysing change in Australian higher education. This was the first year of the so-called 'Dawkins reforms', through which the then education minister sought to increase the opportunity for university attendance among people previously 'excluded' from higher education (Dawkins, 1988). These reforms are perhaps best remembered because of the reintroduction of tuition fees for domestic students ('HECS', the Higher Education Contribution Scheme), dismantling the binary system through institutional mergers and changes in the way research was funded.

Creating a unitary system and institutional mergers meant the end to the colleges of advanced education. Government statistics for 1988 list 44 colleges of advanced education and 19 universities (DEET, 1988, Table 3). These institutions transmogrified into 35 universities in a relatively short period, though a combination of mergers and take-overs (Goedegebuure & Meek, 1991). Few of the new institutions managed to avoid the considerable pressures to merge (Goedegebuure, 1992).

Notwithstanding the Dawkins' concept of the "unified national system", universities are not all the same, and perhaps the biggest point of departure from the 'average' university is the proportion of total research undertaken by a small number of them, locally known as the Group of Eight (Go8), which are the classic pre-Dawkins sandstone research universities. They account for approximately 75% of all competitive research funding available across the university sector. The Go8 would be followed by a second group of research universities comprising another 8 university, though with far less success in attracting competitive research funding, whilst another two groups can be discerned that have hardly any (10 universities) to virtually no competitive research grants (15) income. Thus, research intensiveness is *the* distinguishing feature in the sector despite the fact that by the very definition used in Australia, all universities are considered to be research universities.

The Australian higher education sector in 2013 is radically different from the one just twenty or so years ago. The major change worth elaborating on has been the radical growth in the sector. Student numbers increased from about 441,000 to over 1,000,000 in the period from 1989 to 2007, an increase of something approaching 130 per cent. The largest growth segment within that came from fee-paying overseas students to compensate for the decline in government expenditure over the same period. Australia has become one of the major destinations for foreign university students after the USA and Britain. In Australia, foreign students' proportion of all enrolments increased from less than 6 per cent in 1989 to over 26 per cent in 2007.

The current 'higher education' sector comprises 37 multi-disciplinary 'public' universities, a few single discipline public non-university higher education institutions, two private universities and a myriad of small private providers, many of which can scarcely be described as 'higher education'. We mention these because they feature in government statistics and reports somewhat indiscriminately, along with traditional universities.

When a Labour government returned to power in 2007 a further expansionist policy was adopted aimed at a 40% participation rate resulting in a so-called uncapping of student places and the introduction of a demand-driven system. This basically implied that universities could enrol as many students as they could attract and would obtain Commonwealth funding for them. Current enrolment figures have surpassed the 1.2 million mark which has raised two serious policy issues. This first is whether Australia can sustain this level of expenditure on higher education, with the most likely answer probably being "no". The second is whether universities now are admitting students who would have been better off in our vocational education and training sector, with the most likely answer probably being "yes".

For a more detailed, but still succinct overview of the Australian tertiary education system the interested reader is referred to Norton (2013).

5.1.2 The Australian Vocational Education and Training sector

Whilst not technically part of higher education Australia has a complex Vocational Education and Training (VET) sector that operates across a large number of qualifications

as recognised in the Australian Qualifications Framework (AQF), including higher education. To make things even more complex Australia also has a number of universities that operate extensively in the VET sphere, our so-called Dual Sector Universities. At the time of writing there are eight dual sector universities, primarily in the State of Victoria but with the dynamic market-like co-ordination arrangements let loose on the sector at both the Federal and individual State levels, there is a flurry of activity around both mergers between a university and a State-based vocational institute (in regional Queensland between Central Queensland University and the Central Institute of TAFE [Technical and Further Education – the public sector institutions in the VET sector]) as well as strategic alliances between universities and VET providers (e.g. between the University of Canberra and Holmesglen Institute of TAFE, a multi-State alliance) and between universities and private VET providers (e.g. Swinburne University and SEEK Learning). And where there is courting and proposals for lasting relationships, there also are failures such as the merger-that-wasn't-to-be between the Canberra Institute of Technology (CIT) and the University of Canberra, or the University of New England and Pearson Learning. The dynamics driving all of this are complex and beyond the scope of this brief paper (see Goedegebuure, 2012 for a more detailed analysis) but it would be fair to say that the prime drivers are capturing market share (in particular for the university partners in these relationships) and status acquisition (from the VET/TAFE providers who want to move further into the higher education sphere).

Thus, what on the surface appears a quite simple system in reality is a maze of complexities. For a good overview interested readers are referred to Wheelahan et al, 2012 and some of the preceding work referenced in that publication. To sum up what the institutional landscape in Australia is like, we have:

- Public vocational institutes (the TAFEs) offering only vocational education and training
- Private vocational institutes offering only vocational education and training
- Public vocational institutes (the TAFEs) offering vocational education and training and a (limited) provision of higher education
- Private vocational institutes offering vocational education and training and some higher education
- Public universities offering both vocational education and higher education (the dual sectors)
- Public and private universities offering only higher education

For institutions operating across both sectors life is complex. First they have to deal with different funding arrangements, with higher education being supported through the Federal government and vocational education and training through the States. From this flow different reporting requirements which are cumbersome for the institutions. From this arrangement also flow different QA regimes with the university part having to deal with the Tertiary Education Quality and Standards Authority (TEQSA) and the vocational part with the Australian Skills Quality Authority (ASQA) that work on different principles and with different degrees of regulation. As students also are supported through different systems and structures, this further increases the complexity at the institutional level. And to make the complexity complete, the industrial relations regimes are different for

university versus VET/TAFE staff. Yet market pressures and the potential to 'play' both games are sufficient drivers for institutions to be active in both spheres despite all of these constraints.

Yet probably the greatest obstacle for dual or mixed sector institutions is Culture. Vocational education and training comes from an entirely different background and philosophical tradition than higher education. Attempts to deal with this in integrated institutions has proven to be very challenging, in particular in areas such as academic governance, program design and quality assurance. Yet there also is evidence that dual sector institutions across both sides of the spectrum are effective in broadening access by catering for the more socio-economic disadvantaged groups.

What the future will bring for Australian tertiary education is quite an open question. Much will depend on the level of competition and resource scarcity let loose on the system. And much will depend on how the Federal and State governments can or cannot get their acts together in the face of increasing skills shortages, an economy that continues to grow, and a two-speed economy that is in dire need for a strong innovation drive to provide an alternative to the resources sector. The best guess of tertiary education policy analysts is a continued move towards blurred sector distinctions and an increasing number of institutions operating in both spheres. Yet the challenges in terms of staff professional development are huge, especially in the face of an ageing academic and teaching population, and budgets will remain tight to very tight for the foreseeable future.

5.1.3 Reflections on the CCISP policy issues from an Australian perspective

Policy Issue 1: institutional designation

This refers to a change of name from Polytechnic Institutes to Universities of Applied Science or Polytechnic Universities). The university label across the world is much sought after for its associated quality implications. With the massive move to universities of applied science the dam clearly has broken in Europe. Australians are very protective of the university title and in doing so seem to suggest that all Australian universities are based on the same principle of engagement in teaching and research. We demonstrated earlier that this is not the case. As a forthcoming analysis of diversity in the Australian university sector will demonstrate (LHMI/ACER, 2013), the sector is much more diverse than currently is assumed and the university label covers quite some variety across institutions.

Policy Issue 2: reorganisation of the polytechnic network

Referring primarily through mergers to create a smaller group of institutions with greater critical mass. See the Chapter on mergers as an instrument for system change and the words of caution there.

Policy Issue 3: clarifying and sharpening the identity of the university and polytechnic sectors

Clarifying and sharpening the identity of the university and polytechnic sectors in Portugal by the development of different programme profiles for each sector based on different training models would include the incorporation of the short-cycle Technological Specialisation Courses (CETs) within higher education institutions, primarily in the polytechnics. These profiles would apply to all 3 cycles of education and the designation of degrees would reflect the different profiles. These profiles should make professional and vocation qualifications and specialisations more attractive by offering distinct titles and degrees from post-secondary education through to the doctoral level. Professional doctorates would be concentrated in a small number of campuses/departments, possibly on a graduate school model.

This sounds good on paper but will be very difficult to effectuate. Sharpening sector identities requires different policy environments and those are difficult to create and maintain. E.g., simply calling something a professional doctorate does not make it attractive in itself. This needs to be valued as such on the labour market. Resistance from universities needs to be overcome. All of this is going to take time, strong coordination and stamina, which will mean that it is not going to be easy.

Policy Issue 4: rationalisation of the number of 1st cycle programmes

This proposal sounds sensible, but raises the following questions:

♦ How are the losers going to be compensated?
♦ What will be the basis, the set of criteria used, for this rationalisation?
♦ Who is going to enforce it?

Policy Issue 5: ensuring the viability and sustainability of the polytechnic sector

Ensuring the viability and sustainability of the polytechnic sector via a balanced distribution of student places between the two sectors and the optimisation of financial resources sounds sensible as well, but essentially the same questions as for Proposal 4, further bedevilled by the use of 'optimisation of financial resources': what does this mean and who is going decide on this??

Policy Issue 6: strengthening the role of polytechnic institutions in applied research

Strengthening the role of polytechnic institutions in applied research (including the creation of cross-institutional Applied Research Centres – linked to the private sector), cultural activities and innovation, and the provision of specialised services to the community is in principle a good initiative, but implementation is much more difficult than often assumed as it requires a cultural change within the polytechnics. So again, a long term perspective is needed and concerted action required to bring this to fruition.

Policy Issue 7: extending the international activities of the polytechnic sector

Extending the international activities of the polytechnic sector in general and within Europe and the Portuguese speaking world in particular: Australia's solution to almost any

problem faced in tertiary education is "increase international student numbers". But our international profile is an issue, and fostering serious international collaborations is an issue. So it is fine to have as an aspirational goal for the Portuguese polytechnics, but what does it mean and how is it going to be implemented?

5.2 Finland

Seppo Hölttä

Seppo Hölttä is Professor and Head of the Higher Education Group at the School of Management of the University of Tampere, Finland

5.2.1 The Finnish higher education sector

Universities and polytechnics

The Finnish higher education system consists of two complementary sectors: polytechnics and universities. The mission of universities is to conduct scientific research and provide undergraduate and postgraduate education based on it. Polytechnics train professionals in more direct response to labour market needs and conduct R&D which supports instruction and promotes regional development in particular. The higher education system, which comprises universities and polytechnics, is according to government, being developed as an internationally competitive entity capable of responding flexibly to national and regional needs.

Education and research have been the corner stones of the development policies of the national competitiveness, in particular since the 1990s when the national and regional innovation systems were defined as the frameworks of national developments. Investments in higher education and research were a central element of the national development strategy after the recession of the early 1990s. The expansion of the higher education system was mainly implemented by establishing the polytechnic sector with a strong regional development role.

The polytechnic sector was established quite late compared to most other European countries, i.e. in the 1990's. The university sector was expanded to cover the whole country in the 1960s and 1970s and adopted many regional tasks which had been given to the new non-university sectors by governments in most European countries like UK, Germany, the Netherlands, Sweden and Norway. The Finnish government took the establishment of the polytechnic sector to its agenda only on the second stage of the implementation of the tertiary education expansion as it set the target of extending the participation rate over 60 per cent in the early 1990s. The first polytechnics started to operate on a trial basis in 1991−1992 and the first were made permanent in 1996. By 2000 all polytechnics were working on a permanent basis, and their number was 29.

Institutional evaluations of the accreditation type were implemented before the institutions operating on a trial basis were provided the operation licence as a permanent higher education institution.

Students, programmes and degrees

Polytechnics are multi-field institutions focusing on contacts with working life and on regional development. Today the number of institutions is 25 and they have programmes at 60 locations covering the whole country.

The number of students at polytechnics is 147,000 out of which 110,000 are enrolled in regular degree programmes, 21,500 in adult education degree programmes, 6,000 in Polytechnic Master programmes, 3,800 in teacher education programmes, and 4,700 in specialisation programmes. The system of higher degrees (Polytechnic Masters) was put in place after a trial period in 2005 and the number of polytechnic Master's programmes is expected to grow in the coming years.

In 2012 there were 130 degree programmes in Finnish, 55 in Swedish and 66 in foreign languages (mainly in English). The Ministry of Education and Culture decides about the programmes based on the proposals of the institutions.

The university system enrols 130,000 students. Universities must promote free research and scientific and artistic education, provide higher education based on research, and educate students to serve their country and humanity. In carrying out this mission, universities must, according to the government, interact with the surrounding society and strengthen the impact of research findings and artistic activities on society.

Universities confer Bachelor's and Master's degrees, and postgraduate Licentiate and Doctoral degrees. The basic polytechnic degree is a Bachelor. Some institutions have the right to grant Master's degree in selected fields. The polytechnic Master's degree is, however, different from the degree granted by universities. It has a strong vocational and professional orientation instead of the academic orientation of a university Master's.

Each student entering a Master's programme has to have at least two years of relevant working experience. At the moment the annual number of degrees conferred is still quite low, about one thousand a year.

The principle of "equal but different" principle has been kept since the establishment of the polytechnic sector meaning among other things that the degrees are different although their formal status is equal, and the credits cannot be directly transferred from one sector to another.

Governance of the higher education system

The polytechnics are operated by the "maintaining organisations" in the sense that the government has granted the operation licence to the maintaining organisations and which are in charge of the governance of the institutions. There are four types of maintaining organisations, i.e. municipalities, associations of municipalities, foundations and limited liability companies. At this moment more than one half (15) are companies.

The Finnish Parliament decides the size of the higher education system including the relative sizes of the sectors in the Higher Education Development Plan. At the Ministry of Education and Culture, polytechnics are administered by the Division for Higher Education and Science. The main Ministerial steering instrument of the Ministry is the system of performance contracting. The Ministry and each polytechnic institution (the maintaining organisation) sign the performance agreement for the four year period and agree upon the main institutional goals, in particular the student numbers.

A very important feature of the government steering and governance model is emphasis of the model of interaction and dialogue between the Ministry of Education and Culture in the development of the system and pushing the institutions to make initiatives about concrete projects. This means that the main responsibility is in the hands of institutions, but the Ministry develops the monitoring criteria in collaboration with institutions. The results are taken into account in the funding of institutions.

The government funding for polytechnics is determined according to the student numbers and unit costs per student. The student number in the model is what has been agreed in the performance agreement, and the unit costs are decided by the Ministry. The total funding for polytechnics is composed of two components, one of the government and the other one of the municipalities from which the students come. The basic funding is based on the number of students and unit cost (programme based). The share of municipalities of funding of the sector in 2013 is €511.5 million and the share of Government is €385.9 million.

Under the new Universities Act, which was passed by Parliament in June 2009, Finnish universities are independent corporations under public law or foundations under private law (Foundations Act). The universities have operated in their new form from 1 January 2010 onwards. Their operations are built on the freedom of education and research and university autonomy.

The new law on polytechnics is under preparation, and some main existing sectoral differences in the governance of university and polytechnic sectors will be removed, in particular, the institutional autonomy and funding principles of the polytechnics will follow the model of the university sector. Following the model of the university sector it is the aim to make polytechnics independent legal entities.

In the bill for the new Polytechnic Act it is proposed that funding responsibility in the first phase of the reform would remain with government and municipalities jointly, as is the case today, but in the second phase it would be totally transferred to government.

In addition it has been proposed that the funding principles would be changed and that all the institutional duties defined in the law would be taken into account, and quality, impact and performance would be emphasised and that also efficiency, employability as well as research and development would influence funding. The number of degrees awarded would replace the student number indicator following the funding model for the universities.

The national quality assurance system covers the whole higher education system and the national system is coordinated by the Finnish Higher Education Evaluation Council. The approaches and methods equally applied to the both sectors have been developed from the dominance of the institutional evaluations towards auditing of the institutional QA systems.

5.2.2   Reflections on the CCISP policy issues from a Finnish perspective

Institutional designation

The official Finnish name "ammattikorkeakoulu" is coming from two parts, i.e. "ammatti" meaning profession and "korkeakoulu" meaning a higher education institution. In Finland and Finnish language the original name has been used since then, both in an official use and in media and by everyone, also by the institutions themselves and students.

In the 1990s the Ministry made an effort supported by, for example, by the OECD review group to use the official name "AMK-institution" in English to avoid the confusions with other European non-university institutions of higher education like the previous British polytechnic institutions, German Fachhochschule, Dutch HBO-institutions and Swedish regional colleges. The purpose was to show that the Finnish system and AMK institutions are different and unique.

From the very beginning it was important for government to keep the educational profiles of the two sectors different and to build up an independent polytechnic degrees, and the "name policy" had an important role in that. It is also reflected by the credit transfer policy. The credit transfer between the sectors have never been allowed directly, but the institutions and their units can allow the transfer by their own decisions. In practise the universities have been quite reluctant in allowing the transfers.

Gradually the Ministry of Education changed the practise and today it is using the name "polytechnic institutions" in its documents in English language. However, the institutions themselves changed the translation in the early 2000's and today they translate the name "ammattikorkeakoulu", following the practise in many other European countries, into "University of Applied Sciences", and all of them use this translation in their official communication and marketing in English.

It looks like this does not cause any problems in Europe, but sometime it is causing some misunderstandings, for example, in Asia. The author of this document has witnessed cases where some Chinese universities have entered institutional cooperation without understanding the difference between Finnish universities and universities of applied sciences.

The title of degrees in the polytechnic sector have still some roots in the secondary school system. As the first degree of universities is "kandidaati" (translated as Bachelor), the titles in the polytechnic sector refer to the corresponding profession like engineer, nurse or social worker. In some titles like engineer the abbreviation AMK is added to avoid confusions with the university degree, but also to the former secondary level degree. An example is

"insinööri (AMK)" from polytechnic institutions and "diplomi-insinööri" from the university sector before the Bologna reform. There are also some totally new names for degree like "tradenomi" for a polytechnic business degree referring to the profession. The abbreviation AMK is used after the degree to make difference between the polytechnic masters and university master.

Reorganisation of the polytechnic network

The most influential recent government programme for the development of the Finnish higher education system has been the Structural Development Programme. Its goal is to strengthen the quality of education, research and services, improve the effectiveness and increase their international competitiveness.

The concrete goals are that the number of universities and polytechnics will be reduced, they have clearer profiles, they will be larger units which are more effective, and that new strategic alliances, also crossing the sectoral lines, will be established on the geographic (economic) regions. This far there have been institutional mergers both at the university and polytechnic sectors.

As government emphasises "The dual model will remain but the new innovative forms of collaboration between universities and polytechnics and their programmes will be established. There will be diversity in the institutional and programme structures between regions, and collaboration will be increased also in the production of administrative and other services. Overlapping programmes will be closed."

The Finnish polytechnic sector was established mainly by merging the existing professional secondary level education institutions like technical, business and nursing schools and upgrading the level of curricula and teachers' qualifications. Originally the number of polytechnic institutions was 29. Many of them had different campuses based on the location of the original schools. Most of the established institutions were established on the regional basis so that different campuses were located within a city or within a province, but there is also one example of a polytechnic institution, the HUMAK University of Applied Sciences for humanistic and cultural studies, whose programmes and campuses are distributed throughout the country.

Later on some small polytechnics have been merged with the purpose of creating critical mass. This process continues as part of the structural development programme for the whole higher education sector. No cross-sectoral mergers have been implemented or planned. Institutional consortia, alliances and more loose cooperation structures have been established in the polytechnic sector. It is the government's policy to create larger multi-field units. For example, today in the Helsinki capital region there are only two polytechnics operating in Finnish and one operation in Swedish. Finland is a bilingual country and the official languages are Finnish and Swedish, and that is why the language policy has affected the institutional structures both at the university and polytechnic sectors.

Government has the goal of developing the higher education system as a whole and emphasises the importance of cooperation between academic and professional institutions expressing explicitly the need for more flexible forms of cooperation and taking jointly more responsibility on the social and economic regional development.

Strengthening the role of polytechnic institutions in applied research

As the polytechnic sector was established it was stated in the law that in addition to the educational tasks the institutions are supposed to conduct applied research serving and supporting the regional business and industries. Then exclusion of the academic research from the institutional functions was important in avoiding the academic drift and strengthening the regional profiles of the polytechnics. Within the last fifteen years they have found their roles and regional profiles in R&D with companies and developed models for cooperation also with universities in research. The national innovation policy, and for example, the establishment of the regional centres of expertise coordinated by the local technology centres and the European Union regional development programmes and recently other the strategic funding instruments have provided a framework for expanding applied research at polytechnics.

Extending the international activities of the polytechnic sector

In 2009 there were close to 7,000 students at polytechnics, mainly from Asia (2,600), Africa (1,900) and Europe (2,200), mainly in engineering, business and administration programmes. They all have established services for student mobility. They have trained their teachers actively to teach in English, more systematically than universities. The polytechnics have been very active in establishing programmes in English. At this moment they offer over sixty programmes in English and they are also popular among Finnish students.

Another aspect of internationalisation is the participation in the EU regional development programmes with other regional actors in Finland and other European countries as part of their regional tasks.

5.3 Germany

Jürgen Enders

Jürgen Enders is Professor and Scientific Director of the Center for Higher Education Policy Studies, University of Twente, the Netherlands

5.3.1 The German Higher Education System

Germany has a binary higher education system which can be divided into a university and a *Fachhochschul* sector. The higher education sector is composed of 415 institutions with about 2.4 million students (2011/2012). The *Fachhochschul* sector is constituted by 236 institutions with about 710.000 students, that is somewhat less than one third of the overall student population. Most of the universities and *Fachhochschulen* are public institutions while there is a growing number of private *Fachhochschulen* (currently about 100 institutions hosting about five per cent of the overall student population) that mainly offer distant education/online programs as well as executive (part-time) training for professionals. In addition, there are some 'dual higher education institutions' offering degrees that combine on the job training with a higher education training program. Fachhochschulen have also begun to offer such 'dual programs' combining academic and professional training.

The binary system was established in 1968 as a response to the expansion of the German higher education system. The universities should be responsible for basic research, research-based undergraduate and graduate education, and PhD training, while the Fachhochschulen should be mainly responsible for professional training with a clear focus on professional practice and labour markets in selected field of studies (e.g. business and management, engineering, social work) offering short, Bachelor-type study programs. However, over the last 15 years, differences between the two sectors in many ways became more blurred. First, the number and size of *Fachhochschulen* increased: in 1999 *Fachhochschulen* hosted 24% of the overall student population but 31% in 2011; currently about 36% of all new students enter *Fachhochschulen*. The average size of *Fachhochschule* increased from 3.600 students (1999) to 5.000 students (2011). Second, applied research with a focus on regional development has become another formally acknowledged and publicly supported task of *Fachhochschulen*. Funding of research by external parties (mainly business, industry and public bodies such as ministries) has strongly increased. Third, the Bologna process has led to a development where universities and *Fachhochschulen* both offer Bachelor- and Master-programs. *Fachhochschulen* are, however, not yet allowed to offer PhDs. Finally, the changing role of *Fachhochschulen* has been reflected in their re-labelling as Universities of Applied Science (UAS).

Universities and UAS have different career structures and teaching loads. Universities employ professors as well as many non-professorial academic staff, mostly employed on temporary contracts. The average teaching load of university professors is 8-9 hours in

classroom teaching per week. UAS employ professors mostly and some part-time lecturers (usually professionals from the respective field of study), the average teaching load of UAS professors is 18-19 hours in classroom teaching per week. The increase of externally funded research projects has led to the introduction of a new staff category of temporary research staff at UAS. Further, many UAS professors hold a PhD-degree that they completed in universities; a background in university-based research training that contributes to the academic drift of the UAS.

With the Bologna process, rules and regulations for accreditation of study programs, teaching evaluation and student admission have basically been unified for universities and UAS. Both types of institutions offer Bachelor- and Master-programs, the balance in program offering differs, however: about two third of the programs offered by universities are Master-programs compared to one third of the programs in UAS. Formally, both types of institutions can select students by introducing a *numerus clausus* whenever the number of student applications exceeds the number of study places on the national and/or the local level. Informally, higher education institutions also introduced certain tests and application requirements to inform the selection of students. Nearly all students in universities enter their programs with a traditional secondary school degree; in contrast about half of the UAS students are holding a vocational degree when entering higher education. UAS thus are seen as a mechanism to open up higher education to non-traditional students. UAS have also extended their study offer by introducing new programs in professional fields that were previously not included in higher education, such as in the field of media studies or nursing. Certain fields of study, e.g. in law, medicine or teacher training, are not yet offered by the UAS, and universities have so far successfully protected their exclusive right to offer these programs. The struggle of UAS to achieve the right to train and grant PhDs has so far not been successful. What has been achieved though is that a growing number of UAS graduates get special permission to enter PhD-training in universities with a UAS-degree.

According to governmental regulations, undertaking research is nowadays an institutional responsibility of UAS. A specific strength of UAS is seen in applied research, regional collaboration with small and medium size enterprises, and contributions to regional development. Special programs have been established by the Federal government as well as the Federal states to support the further establishment of research in UAS. Further, governmental programs support collaboration between UAS as well as between universities and UAS in research.

5.3.2 Reflections on the CCISP policy issues from a German perspective

Policy Issue 1: institutional designation

The CCISP recommends a change of name from Polytechnic Institutes to Universities of Applied Sciences or Polytechnic Universities. Based on the German experience, a change of name to Universities of Applied Science can be recommended while a change of name to Polytechnic Universities is likely to produce confusion in labelling in the international context. The experience of German *Fachhochschulen* has certainly been that the change in name to Universities of Applied Science has, on the one hand, reflected their change in function and has, on the other hand, led to a better international recognition of their institutions. Some UAS have, for example, been included in the European Association of Universities. Within Germany, the most common terminology used is still *Fachhochschulen* demarcating the blurring binary line between universities and UAS.

Policy Issue 2: reorganisation of the polytechnic network

The CCISP recommends a reorganisation of the polytechnic network primarily through mergers to create a smaller group of institutions with greater critical mass. This measure has so far not played a major role in Germany. The size of UAS ranges still enormously depending on regional circumstances and breadth of study offer: from institutions with a few hundred students to institutions with 15.000 students (the average size of a German university). Substantial growth of the sector as a whole as well as of some UAS has so far been due to growing student demand to study at UAS as well as the extension of study offers to Master programs and new fields of study. Growth of the sector and some institutions has certainly contributed to the visibility and political recognition of the UAS in the field of higher education as well as in certain regions with large UAS. So far, no political measures have been undertaken in Germany to stimulate mergers between UAS while the creation of networks between UAS as well as of platforms for collaboration between UAS and universities is on the political agenda.

Policy Issue 3: clarifying and sharpening the identity of the university and polytechnic sectors

The CCISP suggests to create a clearer distinction between the two sectors. In Germany, the development has been more mixed. On the one hand, professional drift of universities and academic drift of UAS have led to a blurring of the boundaries between the two sectors. On the other hand, UAS have a clearly distinct profile in teaching (less disciplinary-based, more practice oriented, better student-staff ratios) as well as a clearly distinct profile in research (applied, regional, R&D with business and industry). The teaching profile has led to a growing attractiveness of UAS for students. The research profile implies that UAS do not compete with universities for research council grants or recognition via international peer reviewed articles. Boundaries have thus been blurred while maintained, and German UAS have clearly benefited from this development.

Policy Issue 4: rationalisation of the number of 1st cycle programmes

There is obviously a large number of Bachelor programs in the Portuguese polytechnics that might lead to problems in the economies of scale. Mergers as well as agreements on division of work can help to overcome such problems. Distance learning and online courses might provide additional means to serve local demand in situations where program offers are geographically spread. The German experience points into another direction that depends, however, on specific context and conditions. The German UAS have substantially benefited from a) growing demand for higher education in general, b) growing demand for professionally oriented higher education more specifically, and c) a huge diversity in program offering and size depending on regional context and demand. In addition, UAS are increasingly picking up the German tradition of 'dual training' deriving from the vocational sector, i.e. offering a combination of on the job training and academic training in collaboration with (local) employers. This has led to a situation where UAS cannot offer study places to all applicants, and where it has so far been relatively easy for UAS to maintain a critical mass of students in their study programs.

Policy Issue 5: ensuring the viability and sustainability of the polytechnic sector

The CCISP also suggests that the binary system should be flexible. In Germany mutual recognition of credit points and degrees has been established while student mobility is mainly 'degree mobility in a one-way street', that is UAS Bachelor-graduates going for Master studies in universities. Bachelor graduates from universities moving to a Master program in UAS are still a rare exception. Also, certain fields of study are not yet offered in UAS, and they do not yet offer PhD programs (note that formally speaking Germany does not know 'professional doctorates'). Student mobility across the binary line does, however, imply mutual recognition and related adaptations in the program offering of UAS that should to some extent be compatible with further studies in a university. In fact, some experts argue that there are certain fields of study (engineering, business studies) where the Bachelor- and Master-programs of universities and UAS have become 'look alikes' due to UAS assuring university recognition and universities imitating the practice oriented profile of UAS. Such cross-sector harmonisation does not easily go together with the goal of strengthening the binary line between universities and UAS.

Policy Issue 6: strengthening the role of polytechnic institutions in applied research

This recommendation certainly reflects a general trend across Europe as well as the German experience outlined above to mandate and support the UAS to undertake applied research and development. In Germany, governments have increasingly integrated applied research into the institutional expectations for the UAS in order to contribute to regional development, to improved professional practice, and to improve research-informed teaching and learning. The emergence of applied research in UAS has benefited from the profile of their academic staff, i.e. many of them holding a PhD as well as having professional experience in R&D in the private sector prior to their employment in the UAS (most namely in engineering and science). The strong role of regional, small and medium sized companies in the German economy also aligns with the R&D function of the UAS. The growth and recognition of R&D in UAS is, however, not without problems: German UAS do not receive basic funding from the governments for research, funding is mainly provided by third parties in temporary contracts. The heavy teaching load of UAS

professors pushes research activities into their 'spare time'; infrastructural and administrative support needs to be established and built. Recent policy recommendations have thus pointed to the 'success story' of R&D in UAS while calling for further political and organisational support to strengthen their role on a more sustainable base.

Policy Issue 7: extending the international activities of the polytechnic sector

The CCISP suggests that the internationalisation of the polytechnic sector should be enhanced – especially with regard to recruitment of students and staff from other countries. European policies as well as national policies certainly encourage such a move that is not without practical problems also mentioned in the strategic document. In Germany, the experience has been that the UAS were among the early movers in terms of the internationalisation of teaching and learning: internationalisation of curricula, joint degree programs, teaching in foreign languages (most namely but not only in English) has for more than a decade been part and parcel of their profiling strategy. Many observers claim that UAS have been more open and flexible than universities when it comes to the internationalisation of teaching and learning, and that regional labour markets with companies increasingly operating on a global level appreciate some international element in the experience of the graduates. UAS have also become more active in establishing international collaboration in their R&D activities, namely with other UAS abroad but also with international universities. The internationalisation of staff (beyond other German speaking countries) has, however, not been an important trend so far.

5.4 Ireland

Dermot Douglas

Dermot Douglas is the former Director of Academic Affairs for Institutes of Technology Ireland and is currently a freelance Higher Education Consultant

5.4.1 The Irish Higher Education System

Irish higher education seems to have been undergoing continuous change for the last 40 years. As George Bernard Shaw said '*All progress is initiated by challenging current conceptions, and executed by supplanting existing institutions*'.

Ireland has a binary higher education system consisting of Universities and Institutes of Technology (IOTs). A small private higher education sector operates mainly in the same space as the IOTs.

There are 7 public universities in the state which received updated statutory underpinning in 1997 through the Universities Act. These are funded through the Higher Education Authority which was established under the 1971 Higher Education Authority Act

The first Institutes of Technology (IOTs) were established by the Department of Education as Regional Technical Colleges (RTCs) in 1970. Indeed, the RTCs were the only regionally planned higher education institutions in the country and were intended to provide technician and technologist training to underpin the quality of Irish goods and exports following accession to the European Economic Community. Awards, mainly at sub-degree level, were made by the National Council for Educational Awards. Over the years, the colleges grew in terms of number of institutions, student numbers and level and type of award. There are, currently, 14 Institutes of Technology (IOTs) in Ireland. Thirteen of these were established under the Regional Technical Colleges Act 1992 and the fourteenth was established under the Dublin Institute of Technology Act 1992. Legislation for these institutions was updated in 2006 with the Institutes of Technology Act, when they were removed from direct control and funding of the Department of Education and Skills and designated, alongside the universities, under the Higher Education Authority.

IOTs and Universities are governed by statutory governing bodies as laid out in the relevant legislative instruments. The relative size of the sectors is given below

Relative size of main sectors of Irish Higher Education - 2012		
Enrolments	**Universities**	**Institutes of Technology**
Full Time Undergraduate (of which short cycle awards*)	72032	61183 (5317)
Part Time Undergraduate (of which short cycle awards*)	7424	12414 (2137)
Total Undergraduate	79456	73597 (7454)
Full Time Postgraduate (of which PhD)	17896 (6959)	2691 (431)
Part Time Postgraduate (of which PhD)	8343 (966)	2636 (118)
Total Postgraduate (Total PhD)	26239 (7892)	5327 (549)
Distance Learning, e-Learning and In Service Learning		
Undergraduate	1457	1293
Postgraduate	577	326
Total Distance, e-learning and in service	2034	1619
Total enrolments	107729	80543

* Higher Education courses of at least 2 years that lead to a Higher Certificate Award

The maintenance of a distinct binary system was underscored in the 2004 OECD report on Irish Higher Education. The report found that *'one of the strengths of Ireland's tertiary education system is the extent to which a diversity of mission has been maintained between the university and the institute sectors, as well as within the sector'*. The report recommended *'that the differentiation of mission between the university and the institute of technology sectors is preserved and that for the foreseeable future there be no further institutional transfers into the university sector'*.

This is now established government policy, reiterated recently by both the Secretary General of the Department of Education and Skills and the Minister for Education.

The establishment of the National Qualifications Authority of Ireland (NQAI) in 1999 (under the Qualifications (Education and Training) Act) initiated the development of a National Framework of Qualifications (NFQ). This defines 10 levels of awards, from basic education to PhD, by standards of knowledge, skill and competence. Universities provide awards mainly at level 8 to Level 10. IOTs provide awards at Level 6 to Level 10. Some 47% of new entrants to higher education each year enter the IOT sector; 44% enter the university sector with the remaining 9% entering teacher training (Colleges of Education – soon to be amalgamated with universities) or private higher education institutes. The concentration of numbers and the quicker cycling of graduates through Level 6 & Level 7 awards accounts for the fact that the overall headcount is lower in IOTs than in Universities. The award structure, together with a modular, ECTS based programme structure provides a ladder of opportunity that permits students to ascend, exit and return to full time or part time

education in a manner that allows them exploit developing employment opportunities whilst permitting progress to the highest level of academic attainment.

Entry to both sectors is through the Central Admissions Office with the same minimum entry requirements being required for awards at the same level, irrespective of sector. As there are fewer places than applicants, entry is competitive and based on scores achieved in the national terminal examination from secondary school – the Leaving Certificate.

Quality assurance used to be separate in the sectors. Until 2012, the Irish Universities Quality Board was responsible for QA in the university sector. The Higher Education and Training Awards Council (HETAC – the successor body to the NCEA - set up as a result of the Qualifications Education and Training Act 1999, along with the NQAI) was responsible for QA in the IOT and private higher education sectors and the NQAI was responsible for QA in the Dublin Institute of Technology.

In 2012 the Qualifications and Quality Assurance (Education and Training) Act established a single body, the Qualifications and Quality Assurance Authority of Ireland (QQI), to assure quality in Irish education. This body is responsible for QA in both sectors and is currently developing policies and procedures –informed by what existed previously – to satisfy its remit.

A major policy platform of the government is that higher education should serve the needs of the economy. IOTs achieved this in their course provision through involving business and enterprise at all stages from concept, through validation, external examination and review. A policy of redundancy sees courses terminated once their employment relevance diminishes.

In recent years, universities have moved more and more into the vocational space. Indeed, it appears that the drift in this direction has been greater than the smaller drift of IOTs into humanities provision or other traditional areas of university delivery. An examination of the programme listing for each institution on the Central Applications Office website (http://www.CAO.ie) provides some support for this view.

5.4.2   Reflections on CCISP policy issues from an Irish perspective

Institutional designation and critical mass

The same arguments alluded to in the CCISP document, with regard to critical mass and institutional designation, have been articulated in Ireland over the past two years. Recently, the government commissioned a report entitled 'A National Strategy for Higher Education to 2030' (the so-called Hunt Report). With regard to its recommendations on the configuration of higher education, it stated categorically that no new universities (as provided for in the Universities Act 1997) should be created, thus closing off any ambition IOTs might have had to be designated in that sector.
As to IOTs it recommended that the 'sector should commence a process of evolution and consolidation to ensure that amalgamated institutions reached an appropriate scale and capacity' (neither *scale* nor *capacity* is clearly defined in the report). Further it recommended

that a process should be put in place to allow institutes of technology that have emerged from a process of consolidation to apply for designation as a Technological University. The report clearly envisaged that such new institutions would differ in mission and role from traditional universities.

The government accepted this report and it is now policy. HEA was given the task of implementing the policy and it has indicated how it will approach this task in a series of reports that include 'Towards a Future Higher Education landscape' and 'Completing the Landscape Process for Irish Higher Education'. These documents envisage the maintenance of the binary distinction but see rationalisation and consolidation within the IOT sector as a *sine qua non*. The carrot held out to institutions, following merger, is the possible re-designation as Technological Universities. To date three consortia ([22]DIT, ITTa and ITB in Dublin; WIT and ITC in the south east; and CIT and ITTr, in the south, have indicated that they intend to pursue this option. A western consortium (GMIT, ITS and LYIT) is in the early stages of development.

There is a tide flowing throughout Europe that seems to suggest that larger is better. This is a facile argument. Globally, many small, niche institutions exist that are at the cutting edge in their field. However, the majority of these seem to be privately funded. Where mass education is concerned, there is governmental pressure to achieve economy of scale by increasing institutional size. It is a case of 'he, who pays the piper, calls the tune'. This is a fair argument but it shouldn't be confused with one that equates size with quality – either at undergraduate or postgraduate level.

Sharpening sectoral identity and rationalisation of programmes

The 2004 OECD report on Irish Higher Education represents the last fundamental examination of the sectors. The Hunt Report of 2012 was much more cursory in its approach. OECD underscored the importance of the network of institutes of technology as a major infrastructural asset - because of their emphasis on technology and applied knowledge and their role in the provision of skills based education.

OECD were particularly impressed by the role the IOTs play in local economic development, encouraging wider participation provision of ladders of opportunity through different educational levels from Higher Certificate to PhD. Like subsequent reports, OECD endorsed the Irish binary higher education system and recommended that the success of the institute sector needs to be nurtured and celebrated so that its differentiation from the university sector is not seen as conferring lower status but defining it as an equal partner in a dynamic higher education system, which covers a diverse range of functions.

It is difficult to see how distinguishing between vocational, professional and academic degrees serves the promotion of parity of esteem. It has frequently been the case that the awards granted by traditional universities were held in greater esteem than those provided

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[22] Dublin Institute of Technology, Institute of Technology Tallaght, Institute of Technology Blanchardstown: Waterford Institute of Technology & Carlow Institute of Technology; Cork Institute of Technology & Tralee Institute of Technology: Galway-Mayo Institute of Technology, Institute of Technology Sligo & Letterkenny Institute of Technology

by more vocationally oriented institutions. Formalising such distinctions will not improve the situation. The development of national frameworks of qualifications, based on clearly articulated learning outcomes, provides a mechanism for convergence. It is axiomatic that, although they differ radically in content there is parity of achievement in obtaining an honours bachelor degree in history and an honours bachelor degree in science. The content differs but the intellectual development is equivalent. Nobody gainsays the parity of esteem accorded to a PhD in Philosophy and a PhD in Computing. Awards should be granted for the attainment of a high level of knowledge, skill and competence not for the use to which that knowledge will be put in later life.

In Ireland there is no distinction between awards granted by IOTs and Universities. Both must achieve the same standard set on the NFQ. Distinction, as to content, is available in the European Diploma Supplement and institutional transcripts. This is well understood by employers and underscores parity of esteem for similar achievement in either sector. Transfer between sectors frequently occurs – particularly at postgraduate level - and staff from both sectors act as external examiners at all levels across the sectors. This facilitates learners progressing to the highest level of academic achievement commensurate with their ability and desire.

University programmes at undergraduate level tend to be largely theoretically-based and designed to provide qualifications for entry to advanced research programmes and professions with high skill requirements. IOT (and presumable Portuguese Polytechnic) undergraduate programmes, while often classified at the same level of competency have a much greater practical content, are more clearly occupationally orientated and lead directly to labour market access. This frequently reflects the influence of employers who are involved in the design process of such programmes in an attempt to underscore their market-place relevance. Generally, these programmes are characterised by greater levels of class contact and lecturers usually have much higher teaching commitments than their university counterparts.

It is extremely difficult to legislate for a difference in provision between universities and polytechnics if the needs of economic, social and cultural development, particularly at regional level, are to be addressed appropriately. The OECD in its review of Irish Higher education had this to say:

> 'The 1997 Universities Act sets out admirably the objectives of a university (paragraphs 12 and 14) but this statement needs to be brought together with the much more instrumental wording of the functions of the institutes of technology in the 1992 Regional Technical Colleges Act (paragraph 5) so that while the different roles of the two kinds of HEIs are recognised the important and diverse roles of the institutes of technology are more fully set out…..Tertiary education needs to be seen as a unity with different kinds of institutions fulfilling different roles but contributing together to sustain Ireland'

The Difference in function of the sectors, as determined by legislation

Main Functions of Institutes of Technology	Main Functions of Universities
The principal function of a college shall be to provide vocational and technical education and training for the economic, technological, scientific, commercial, industrial, social and cultural development of the State with particular reference to the region served by the college	The functions of a university are to do all things necessary or expedient in accordance with this Act and its charter, if any, to further the objects and development of the university.
ensure as far as it can that the college contributes to the promotion of the economic, cultural and social development of the State and to respect for the diversity of values, beliefs and traditions in Irish society	to advance knowledge through teaching, scholarly research and scientific investigation
have regard to the statutory responsibilities of other education providers	to promote learning in its student body and in society generally
to provide such courses of study as the governing body of the college considers appropriate	to promote the cultural and social life of society, while fostering and respecting the diversity of the university's traditions
to enter into arrangements with any authority approved by the Minister from time to time for the purpose of having degrees, diplomas, certificates or other educational awards conferred, granted or given	to foster a capacity for independent critical thinking amongst its students
to enter into arrangements with other institutions in or outside the State for the purpose of offering joint courses of study and of engaging jointly in programmes of research, consultancy and development work	to support and contribute to the realisation of national economic and social development to educate, train and retrain higher level professional, technical and managerial personnel
to enter into arrangements, including participation in limited liability companies, to exploit any research, consultancy or development work undertaken by a college either separately or jointly	to promote the highest standards in, and quality of, teaching and research to disseminate the outcomes of its research in the general community
to engage in research, consultancy and development work and to provide such services in relation to these matters as the governing body of the college considers appropriate	to facilitate lifelong learning through the provision of adult and continuing education

Some understanding of the relative difference in provision in Ireland can be determined from the graduate output profiles provided below

ISCED Field of Learning[1]	% Graduates (Undergraduate awards)		% Graduates (Postgraduate awards)	
	Universities	Institutes of Technology	Universities	Institutes of Technology
General Programmes	99.5	0.5	81	19
Education	41	4	70	6
Humanities and Arts	65	24	79	13
Social Science, Business and Law	47	53	83	17
Science, Mathematics and Computing	50	50	83	17
Engineering, Manufacturing and Construction	24	76	80	20
Agriculture and Veterinary	41	59	100	0
Health and Welfare	50	41	77	4
Services	29	71	65	35
Combined	0	0	100	0

[1] *Please note that a number of additional broad fields have been added to the ISCED classification, to cater for students taking courses with balanced combinations of subjects. These are described at*
http://www.hea.ie/index.cfm/page/sub/id/976
[2]*Where numbers do not add up to 100%, the remaining graduates come from other publically funded colleges - mainly colleges of education.*

It is evident that what is needed is a more nuanced determination of the type of programmes that should be provided. This should reflect an appropriate needs analysis of regions and the economy; rather than being rooted in an artificial philosophical categorisation of education that is designed to protect a perceived intellectual elite - rather than serve the needs of learners and the nation.

In its review in Ireland the OECD noted that … 'The success of the institute sector needs to be nurtured and celebrated so that its differentiation from the university sector is not seen as conferring lower status but defining it as an equal partner in a dynamic higher education system which covers a diverse range of functions'.

It is important, in any reorganisation of tertiary education, to ensure that what is planned will produce something better than what went before. There is the danger that, in the rush for change, we could destroy those characteristics that made us unique in the first place.

Polytechnic viability and sustainability

In Ireland students apply through a Central Applications Office (CAO) for admission into tertiary education. Applicants select an ordered list of preferences reflecting their preferred institutions and courses. There is direct competition between IOTs, universities and private

higher education providers for students. This is healthy as the market determines where student will go. However, downsides are that student choice is frequently unrelated to the needs of the economy and this can lead to skill shortages in some sectors of employment and that some courses may also be significantly under-subscribed. The regional location of the IOTs is, in these economically tougher times, making the IOTs more attractive as students can no longer afford to travel long distances and live away from home.

While it is understandable that institutions would seek to have some guarantees about a minimum annual recruitment of learners, proposals to rebalance student distribution between institutions serves the institutional need but ignores the imperatives faced by students. Unless there is a well-funded support system to allow students travel to remote locations to access places, then a likely downside is that places may not be filled and resources may be wasted. If it is intended to capture students in a region then there is a risk that programme provision may not match the desires of learners or match the manpower needs of the economy and may well lead to greater levels of withdrawal and non-completion.

The best guarantee of filling available places is to underscore an institution's reputation for quality provision and graduate employment. Competition for students across and within sectors should drive quality.

Applied research

Participation in research, development and innovation should be at the heart of every higher education institution. The benefits to the development and reputation of the academy and the relevance of RDI engagement to the teaching programme cannot be overstated. It is not unusual, however, given the vocational nature of Polytechnics programmes that their RDI activity should mirror this emphasis. In Ireland, IOTs have a remit for Applied Research (http://www.ioti.ie/rdi/research-and-innovation-activity-across-the-institutes). A focus on industry-driven RDI means that such activities also have a strong alignment with the 14 Irish National Research Prioritised Areas.

Co-ordination of RDI activity is essential, particularly in order to facilitate cross institutional activity (i.e. with other IOTs, universities and Research Centres). To this end, the sector established a centralised office to support further growth in this area. This Office of Research, Development and Innovation has published a clear plan for further development to 2015 (see references).

The significant base of research development and innovation activity across the sector includes:

- 46 specialist research centres or groups, developed and supported by various funding mechanisms
- This portfolio of industry-focused research centres and initiatives supported 521 researchers and support staff in 2011, all actively engaged in research activities

♦ The current quality of IOT research resources is reflected in their ability to access a wide range of funding sources, including IRCSET, IRCHSS and TSR – at national level - and FP7 and Interreg from EU sources.

♦ Leading researchers in the IoTs have demonstrated their experience and reputation by accessing 34 Science Foundation Ireland awards since establishment of that organization, covering Principal Investigator, Research Frontiers, Stokes Professorships/Lectureships, Starting Investigator, ETS Walton Professor and TIDA feasibility grants.

♦ A substantial postgraduate student base is sustained through this research activity, with 871 recorded in 2011.

♦ €218mn in research funding was secured between 2006 and 2010, of which 66% was allocated toward research in ICT, Health and Biotechnology

♦ Institutes have collaborated both within the sector and with the university sector (both as lead investigators and as partners in consortia) to secure funding for major research projects.

Services to Industry

Specific collaborative research projects and activities with industry have been funded via schemes such as Enterprise Ireland Innovation Vouchers and Partnerships, Science Foundation Ireland TIDA grants and EU FP7 and Interreg supports; while a significant base of privately contracted research work has been built up from the specialist research expertise available within the Institutes.

♦ There are 15 on-site innovation and incubation centres that provide dedicated space, support, facilities and access to research expertise for up to 300 new and growing companies at any one time

♦ Funding has been secured from Enterprise Ireland for 13 Applied Research Enhancement Centres (ARE), which build on areas of specialist research capability across the Institutes

	2008	2009	2010	2011	Total
Industrial Collaborations	36	69	117	150	372
Innovation Voucher Projects	20	45	70	52	187
Innovation Partnership Projects	2	7	13	19	41
Projects Directly Funded by Industry	14	17	34	79	144
Income from Collaborative Projects	€570,000	€451,000	€1,550,000	€3,200,000	€5,771,000
Industry Contribution to Collaborative Projects	€226,000	€102,000	€615,000	€1,500,000	€2,443,000
Industry Contribution %	39.7%	22.2%	39.7%	46.7%	42.3%

IoTs Services to business include:

- ♦ Development of new business concepts
- ♦ One-on–one business counselling
- ♦ Access to technology
- ♦ Access to financial support
- ♦ Shared facilities
- ♦ Performance and strategic reviews
- ♦ Strategic Business Development Support
- ♦ Access to expertise
- ♦ Mentoring support
- ♦ Networking
- ♦ Bespoke training
- ♦ Business Incubation Facilities

Internationalisation

The OECD has identified a range of benefits from international student recruitment that include, *inter alia*, diversifying funding streams, broadening of staff experience, attraction on new and able students and staff and facilitation of research cooperation.

All developed countries have targeted international students. In this respect, Ireland is no different; it is government policy that we should increase enrolment from abroad. The Government strategy is aimed at increasing international student numbers in higher education by 50% and enrolments in English language schools by 25% by 2015. To this end, Ministers have led trade missions to Asia, North and South America and the Middle East to promote Ireland as an educational destination. Higher education institutions have stepped up their activities recently and have actively explored these markets, attended

educational fairs and recruited local agents. The Institutes of Technology have produced a brochure for distribution at these events which highlights the nature of the sector and what each college has to offer (See ref. 16) Four forms of delivery have been developed – recruiting students into Irish colleges directly; offering programmes that have the initial two years in the home country (where intensive English tuition can be provided) with lecturing support from the Irish institute and then the student transfers to the Irish institution for the final two years; setting up satellite colleges abroad; and distance learning initiatives. Activity is still fairly low, at about 16% of total enrolments, reflecting the highly competitive nature of the market and the significant amount of work small countries need to do to compete with the market leaders in Australia, the USA and the UK. The table below gives the total enrolment of international students – irrespective of mode of study (as reported by each institution).

Institution	No. of institutes	International enrolment (2011/2012
University	7	16546
Institute of Technology	14	6074
Other HE + Private Colleges	10	7115
Total	31	29735

Other issues

In terms of the targets outlined by CCISP for the newly established UAS it may be worthwhile to examine what has been set by the Higher Education Authority of Ireland in order for merged IOTs to be considered for Technological University.
A Technological University will –

♦ Be characterised by the breadth of its programme provision across higher education
♦ Have programmes of study that are vocationally/professionally oriented, with a strong focus on science and technology
♦ Have programmes of study that incorporate structured work placement
♦ Have programmes that address the social and economic needs of the region in which the university is located
♦ A combined minimum of 30% of all students in the applicant institution will be lifelong learning students enrolled on professional focused programmes and industry up-skilling, including part-time, work-related programmes and work-study programmes and/or mature learners
♦ Have sufficient resources and critical mass to ensure appropriate pedagogical and research quality and depth of faculty expertise to meet the mission of the institution
♦ Provide education at Levels 6 to 10 of the National Framework of Qualifications. The number of students at master's/doctorate levels "will not be less" than 4% of all enrolment. In addition, the college must raise these enrolments to 7% within a decade of designation as a TU
♦ 90% of full time, academic staff engaged in delivering higher education programmes in the applicant institution will hold a Level 9 qualification or higher

- At least 45% of full time academic staff will hold a doctorate level or the equivalence in professional experience, combined with a terminal degree appropriate to their profession; this is to increase to not less than 65% within ten years of designation
- In the fields of knowledge/study in which doctoral level training and research is on-going, the proportion of staff holding Level 10 qualifications will be in excess of 80%. As a general principle, only those with Level 10 qualifications will be engaged in the delivery and supervision of Level 9 programmes. Only those with Level 10 qualifications and with a sustained record of research publications and mission-appropriate research outputs will be engaged in the delivery and supervision of Level 10 programmes
- Maintain an active research policy primarily focused on applied, problem oriented research and discovery, with effective knowledge transfer alongside the provision of consulting/problem solving services that are particularly relevant to the region
- Support intensive and broad-based links with regional business, enterprise, professions and related stakeholders that inform curriculum, teaching and learning, assessment and research
- The international engagement of a technological university will specifically reflect its mission and orientation

At the time of application, an applicant will demonstrate a developmental trajectory for the enhancement of internationalisation related to teaching and learning, research and staff development and a sustainable range of international collaborations such as joint projects, student and staff exchanges including the collaborative provision of academic and training programmes.

5.5 The Netherlands

Egbert de Weert ♦ Hans Vossensteyn

Egbert de Weert is a Senior Researcher at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

Hans Vossensteyn is Director of the Center for Higher Education Policy Studies, University of Twente, the Netherlands and Professor of Higher Education and Science Management, Osnabrück University of Applied Sciences, Germany

5.5.1 The place of the HBO in the Dutch higher education system

Dutch higher education has a binary structure, which distinguishes universities from institutions for higher professional education, in English called Universities of Applied Sciences (UAS).[23] Universities and UASs developed under very different historical conditions and are based on different rationales. There are 13 universities, nine of which provide teaching and conduct research in a wide range of academic disciplines. Three of them have predominantly a technological focus and one is an agricultural university. In addition there is the Open University and a few specialised institutions with university status in areas of theology, business and economics.

Many *hogescholen* have a longstanding tradition, but the UAS-sector as part of tertiary education dates back to the 1960s, when colleges for higher professional training were upgraded. Formally, *hogescholen* belonged to secondary education until, in 1986, they were legally acknowledged as a subsector of the higher education system. Each college had its own field of study, e.g. college for higher technical education, for social work, for physiotherapy, for teacher training and so on. Because of the sector's fragmented character, the government initiated major reforms in the 1980s. These resulted in the merging of more than 400 smaller colleges into larger, multi-faceted institutions, currently providing a wide range of professional courses with a standard period of study of four years leading to the Bachelor degree.

By 1986 there were 150 UAS institutions which were further merged into the today's 38 publicly funded *hogescholen.* The number of students increased in less than 20 years from 259,000 in 1992 to 420,000 students in 2012. This is two-thirds of the total higher education student population against one-third for universities. The end of this growth is not in sight and it is expected that the UASs will have some 20% more first year students by 2020. The comparatively large share of the student body is partly due to the fact that the *hogescholen* cover a very broad range of subject areas and provide a large variety of study programmes.

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[23] In Dutch these institutions for higher professional education are called *Hogescholen voor Hoger Beroepsonderwijs or* HBO.

Although there are universities and UASs with a denominational foundation, they fall under the public system and are publicly funded. In addition to this public sector, there are some private for-profit institutions that are becoming more active on the HE market. They provide short-cycle courses and increasingly programmes on the UAS Bachelor degree level in a variety of vocational domains. These programmes are also subject to the standard accreditation procedures that apply to the public institutions. However, in the higher education system the private sector plays a very minor role.

The Government maintains the binary structure as a guarantee of institutional differentiation. Universities and UASs have been assigned a distinctive task which refers to the two basic orientations in the system, i.e. a focus on research and a focus on professions. The main task of the UAS is to provide theoretical and practical training with an explicit vocational orientation and to engage in close collaboration with the various employment fields. Despite this binary policy, both sectors are incorporated in a single Higher Education and Research Act of 1993, encompassing a range of regulations that apply identically to both sectors. Since 2001, UASs also have an explicit research task which is practice-oriented with a focus on transferring and developing knowledge for the benefit of mainly but not restricted to the regional industrial needs. From 2001 onwards the Government supplies the UASs with a modest but distinct budget for the development of their research.

Entrance requirements

In the Netherlands the possession of a upper secondary education diploma makes students eligible for access to higher education. There are in principle no additional entrance requirements such as an assessment of knowledge or skills prior to entering higher education.[24] However, secondary education varies greatly in type, tracks and degree of selectivity which streamlines the entrance to higher education. The six-year university preparatory education (VWO) qualifies for admittance to university and to UAS. For the UAS there are two additional routes from which the majority of students are drawn: the five-year general upper secondary education (HAVO) which is the most common route, and upper secondary vocational education (four year VET sector). Especially the intake from the latter sector has increased significantly in the last decade. Additionally, other entry qualifications are increasingly applied, such as work-related qualifications and other acquired competencies. These different entry qualifications imply that UASs have to deal with the demands of a very heterogeneous student population in terms of quality of students and interests, and they see it increasingly as their mission to deliver education that is tailored to the individual needs and capabilities of their students.

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[24] There are a exceptions, like entrance to numerous fixus studies like Medicine where results and grades of secondary school examinations are important selection criteria; Additional requirements can be set nationally for example regarding the level of language or arithmetic skills for teacher training or art sector where selection takes place on the basis of an assessment of abilities.

Degree structure

The standard UAS qualification is the Bachelor degree with a standard length of four years (240 ECTS) as compared to three years for a university Bachelor (180 ECTS). All programmes have to be accredited by the national accreditation organisation (NVAO). In addition to the Bachelor programmes, Masters have been introduced as well. When in 2000 the Bachelor-Masters system was introduced in the Netherlands, the right to provide accredited 'professional Masters' was unequivocally granted to the UAS, but these programmes were not eligible for public funding. However, in 2007 the Minister of Education decided to make a limited number of these so-called 'professional Masters' eligible for public funding which are deemed to be of 'urgent societal need'. These are mainly in fine arts, health, and teacher training. But also the number of privately funded professional Masters courses in Dutch UAS is now steadily increasing particularly in engineering and economics & management particularly for students who have some years of work experience. UASs have no degree awarding powers at the PhD level nor for professional doctorates. On the sub-degree level, several UASs have expanded their role in two-year Associate Degrees, which are cooperative programmes (work-based learning) and part-time education between UASs and upper secondary vocational schools.

5.5.2 Reflections on the CCISP policy issues from a Dutch perspective

Institutional designation

In the international context the *hogescholen* have adopted the name *Universities of Applied Sciences (UAS).* The Minister recognised this name for all multi-sectoral *hogescholen*, while institutions focusing on specialised areas may suggest their own names. The Minister motivated his decision by referring to the need for a univocal name of *hogescholen* in the international context. In his view the name UAS fits into the Bachelor-Masters structure, in which academic and professionally-oriented education can be distinguished. However, this label does not change the legal status of UAS or institutional status in the national environment: In the Netherlands *hogescholen* are legally not allowed to use the title of University which is reserved for the research universities only.

Programme profiles and titles

The course duration is standard four years for all bachelor programmes and 1-2 years Master programmes in particular fields. The profiles of all programmes have been determined through a consultation process on the national level. For every programme the level of knowledge and skills have been formulated which students have to meet. In addition, the UASs agreed to draw up a national educational profile for each programme that is offered by more UASs. Similar concepts are educational qualifications or for a cluster of programmes 'domain competencies'. The relevant employment field is closely involved in this process (e.g. branch organisations and professional bodies). In line with this, the UAS-council and the Confederation of employers' associations made agreements on how the programmes and the professional field have to be attuned. The profiles are regularly brought up to date.

In addition to these standard programmes, UASs provide short-cycle courses such as the two-year Associate-degree programmes (120 ECTS), particularly designed for those who have work experience and wish to continue their studies on an advanced level. Their previous educational level is mainly in the VET sector. The AD is an appropriate route to combine study and work and it is very well positioned in the UAS to link education and the needs of the world of work in a flexible way. The standard entrance requirements for ADs are similar to those for the UAS bachelor degree programmes. Originally started as a pilot period, the Associate-degree programmes were advised to become a structural part of the higher education system by the 2010 Commission on the Future Sustainability of Dutch higher education (Veerman *et al.*, 2010). The AD programmes have now been incorporated in the UAS degree structure and the degree has been recognised in legislation. The AD is a degree of its own with a separate competency level, in other words it is not conceived as part of a Bachelor degree. However, graduates are in principle eligible to continue their studies for the Bachelor degree, but it is to the discretion of the institution to determine how this transition occurs and whether additional requirements are needed.

Another new route is the 3-year trajectory for students who have the diploma of university preparatory education (VWO) to pursue a 4-year Bachelor degree at an UAS in 3 years. This is on the instigation of Government to make the UAS more attractive for students who also are eligible for university education.

The degree titles that should apply to UAS graduates in the Bachelor-Master structure has over the years been subject of intense political debate. As it stands now, the Minister proposes through legislation that graduates not only can use the title Bachelor or Master (as is currently the case), but also the addition 'of arts' or 'of science'. The reason is that the titles are recognizable on the (international) labour market. The proposed date for this change is in 2013-14. The Council of State, the authoritative body in the Netherlands to judge legislation, is very critical on this proposal. Using uniform degree titles for universities and UASs would imply a denial of the basic difference that exists between the two sectors. The fact that university and UAS graduates would use the same title would be very confusing and for employers. The difference is only recognisable when candidates submit the diploma supplement which refers to the type of institution that granted the degree. The Council requests the Minister to argue convincingly that this proposal will not lead to the abolishment of the binary structure, and if necessary to adapt the proposal.

Reorganisation and rationalisation

In the 1980s the Government aimed to strengthen the UAS sector in both the managerial and the educational field by enforcing an amalgamation process to replace the existing multitude of individual and often very small institutions by a limited number of multi-purpose institutions. The main objectives were a considerable enlargement of the size of the institutions with considerable autonomy and efficiency gains regarding the use of resources, staffing policy and structuring of educational programmes. Institutions were encouraged to merge by the imposition of three requirements:

♦ An institution should have a minimum enrolment level of 600 students

- An institution should function as an administrative and educational unit, implying one board of governors, one board of directors, and one participation body (formed by staff and students)
- There should be a 'reasonable distance' between the several sites of an institution.

Although the government was the principal initiator by using financial pressures, it was the sector itself coordinated by the UAS-Council to play a crucial role.[25] At the end of the merging process which took many years continuing until late in the 1990s the UAS sector has become more and more concentrated, both in terms of actual institutional size and coverage of educational fields. The mergers have resulted for the most part in multi-purpose UAS institutions, while some 15% of the institutions preferred to be mono-disciplinary institutions.[26]

HE institutions have been granted increased autonomy over the years, but they are not free to establish new study programmes. Although UASs tended to expand their course offerings as a response to student demand and presumably to respond to labour market demands, this process has always been subject of governmental control. For this purpose a national committee was founded to advise on the viability of the proposed new programme, whether it meets criteria of financial and labour market conditions, and whether it is efficient in view of the total provision in the sector ('macro-efficiency'). The role of this Committee has been taken over by the accreditation agency (NVAO) to assess new programmes against stated criteria. The present Minister advocates collaboration between institutions, for example regarding external validation of student assessments, student projects, but also on the programme level. There is also a movement to 'change' programmes. Some institutions intend to concentrate their programme provision that is more regionally anchored and better fit into the chosen profile of the institution.

A more drastic rationalisation has been proposed by a national committee to restructure engineering education[27]. The current 80 programmes in the technical sector should be amalgamated into a limited number of programmes with a broad basis and specialist options at a later stage. The main reason is that the large proliferation of technical programmes is not transparent for employers nor for new students who have to make a study choice. The recommendations would lead to a drastic renewal of the profile of engineering education in UASs.

Viability and sustainability of the UAS sector

A balanced distribution of student places between the university and the UAS sectors does not exist. In principle the Dutch system is open in the sense that everyone possessing the right entrance qualifications should be admitted.
The Committee on the future sustainability of the Dutch HE system (2010) concluded that the UAS had to accommodate an increased intake without a proportional rise in funds. A policy direction suggested was to accentuate the university profile resulting and to increase the appeal of UASs. Because of the high drop-out rates in the Dutch system as a whole, the

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[25] For further information about this process, see Goedegebuure 1992.
[26] Limited to one or two fields only, for example teacher training colleges or colleges of art.
[27] Committee Van Pernis (2012) "UAS Techniek in Bedrijf" (UAS Technology/ Engineering in Business).

government follows this line and focuses on a better match between the student choice and subject fields by allowing HE institutions to be more selective on the student intake. This may result in a smaller and more selective university sector, while the UAS has to accommodate the bulk of the growth in student numbers. This should entail a shift of resources between the two sectors. Given this growth, UAS institutions have attempted to link their educational provisions to the individual needs of students and to make this more attractive for new target groups. Especially participation of under-represented groups in higher education should be encouraged.

An important factor is that *hogescholen* differ considerably in scale. Some fifteen out of the 38 UASs are large comprehensive institutions, encompassing a broad range of fields of study with a student enrolment ranging from 12.000 to 35.000. Another fifteen focus mainly on one or two areas such as teacher training, fine arts, agriculture or hotel management; their enrolment will range from several hundreds to a few thousand students. The middle category of some fifteen UASs will cover more than one subject area, but have student numbers that do not exceed 10.000.

Role of research in the UAS sector

Although a research role for *hogescholen* already appeared in the 1993 Higher Education Law, the term was not defined in a clear way: "*Hogescholen have as a task to provide higher professional education. They can carry out research to the extent that this is connected with the education at the institution*". The law does not contain further regulations regarding research and in subsequent years no budget was available for this education-related research. This changed against the background of the public debate on the growing importance of knowledge utilisation and innovation in the context of the Lisbon agreement and the need to increase investments in research and education. Given the professional orientation of the UAS it seemed natural to assign to them a specific role in the innovation process by intensifying collaboration with industry and particularly with SMEs. Various national policy agencies stressed the particular role of UASs to develop new ways of knowledge transfer, knowledge circulation, and attempted to define a distinctive research function for the sector. All these reports laid the foundation for a further conceptualisation of research by UASs (see for an overview De Weert & Leijnse 2009).

Inspired by the national debate and policy, most *hogescholen* have in the last few years incorporated the research function in their strategic plans. Despite some institutional variance, UAS display a remarkably consistent and uncontested frame of reference on the nature and place of research in the organisation:

- ♦ Initiatives for research emanate from the needs of professional practice
- ♦ Research should be relevant for the quality and innovation of education and the professionalization of the teaching faculty (i.e. the interface between education and professional practice)
- ♦ Research should contribute to innovation through knowledge exchange with industry, especially with SMEs. It is practice-driven in that it is oriented to solve practical problems and to intensify collaboration with SMEs.

These three elements in combination mark the specific character of UAS research. The distinctive research function of UAS has been broadly supported by virtually all major stakeholders. The outcome of this debate is that from 2001 onwards the Government has supplied the UASs with a modest but distinct budget to ensure the development of the research function by two major funding streams.

Firstly, additional funds came available to create a new staff position of 'lector' and the establishment of the 'lectorate' as an organisational setting consisting of a number of faculty members around a lector. The lectorate aims to strengthen links and knowledge exchange with industry and other (public) organisations. Lectors are expected to contribute to knowledge transfer, to acquire contracts from third parties and to develop professional networks in their domain. At the same time they are expected to contribute to innovation in education and the professionalization of the teaching staff. In the recent past, UASs had to apply for funds to appoint a lector and to develop research activities by the lectorate. At present these funds are allocated to the UASs directly as a targeted part of their block grant.

The second funding source concerns government subsidies through the RAAK-programme (*The Regional Action and Action for Knowledge Circulation).* The objective of this programme is to stimulate regional collaboration between UASs and business, especially SMEs and public institutions with a view to develop joint innovation activities and stimulate knowledge exchange and circulation. The RAAK-programme has been managed by a national foundation[28] which also assesses project proposals submitted by UASs. The other part of the total project costs are financed by the co-operating SMEs and public institutions. This private co-financing covers in general about one third of the total project costs.

The collaboration with universities and other (applied) research institutions is also increasing, mainly in the context of regional consortia in which (usually smaller) companies take part as well. These consortia aim to strengthen the research function of UASs and to disseminate research results in the context of application. While universities take care of the fundamental aspects of the research, the UASs are keen to convey practical results to the companies involved.

An important question is the assessment and output of research. From the beginning *hogescholen* took the view that the measurement of research output solely in terms of

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[28]   The *Innovation Alliance (SIA)*, a foundation in which various partners are participating such as the Confederation of Netherlands Industry and Employers (VNO-NCW and MKB-Netherlands), the UAS-council, as well as some (applied) research institutions.www.innovatie-alliantie.nl

publications - as is common but not uncontested in university research - would do no justice to the specific character of practice-oriented research. This view was strongly supported by representatives from business who emphasise indicators that express the relevance for enterprises. For them publications in periodicals of sectors of industry or professional fields should be valued higher than publications in scientific journals. The research quality has been assessed by a special committee formed by experts in research, education, business and the public sector. The assessment procedure starts from the quality assurance systems of the institutions, and encompasses both the practical relevance and the soundness of the research.

The research funding in the context of the RAAK programme has now been incorporated in the regular funding by the Dutch research council and therefore subject to evaluation and monitoring processes. In order to safeguard the available resources stay in the UAS sector, allocation takes place within a separate stream that is not competitive with the funding of university research.

Academic staff

The majority of staff at UASs has been appointed as teachers who had no or few research skills. As they were not supposed to build any research capacity, this led to a lack of consistent investments in faculty quality. This was further strengthened by a steady growing teaching load and increasing student to faculty ratios. Given the extended research task there is currently much effort to upgrade the academic staff and equip them with a minimum of research training.

UASs strive to increase the share of academic staff with higher academic degrees by making a Masters degree the minimum requirement for faculty positions. To increase the quality of staff, targets are to increase the proportion of staff with Masters degrees from 55 per cent (in 2009) to 80 per cent (in 2016). At the same time PhD-trajectories have been created for sitting and new faculty, as well as personal development possibilities up to the Masters level across the faculty. Since UASs have no right to grant doctoral degrees and lectors do not possess the '*ius promovendi*', several UASs collaborate with universities to enable their staff to pursue a doctoral degree. The Government supports this financially through 'promotion vouchers', supplemented with subsidies by the institutions themselves. The university professor takes the formal supervisor's role and is responsible for the quality of the research, while the lector acts as the daily supervisor and co-promoter. Such a construction combines the methodological expertise provided by universities and the practice-oriented research orientation in UASs.

International activities

In order to allow both students and lecturers to get more freedom of movement in an increasingly internationally oriented knowledge society, the stimulation of research in UASs through the RAAK programme has been extended to the international level. The "RAAK-international" is a separate programme and offers financial support to SMEs, public sector professionals, students and (international) UASs in their joint, cross-border innovation projects. Dutch UASs act as project managers. After the recent abolishement of

the RAAK-international programme, project proposals in which one or more international parties are involved as partners can be submitted to the regular RAAK programmes.

The UASs are actively participating in the UASNet and the European project EDUPROF as well as international workshops to strengthen the role of UAS in Europe. These activities enable UASs to meet colleagues from other institutions abroad to discover possible collaboration, to build international networks and discuss engagement of researches and SMEs in research programmes such as FP7 and Horizon 2010.

5.5.3   Future challenges

A main challenge for the UAS sector is how to retain access for a large and heterogeneous group of students. Government policy aims to reduce the proportion of students who experience study delays or drop-out. In 2008 the government invested in increasing the study success of non-native students in the UASs in the four big cities in the western part of the Netherlands (Haagse Hogeschool, Hogeschool Utrecht, Hogeschool Rotterdam, Hogeschool van Amsterdam and Hogeschool INHolland). Performance targets were agreed upon and evaluated in 2010-2011. Though good practices were found, time was too short to experience improved statistics. The additional funding has been substantially reduced afterwards, but collaborative initiatives been started.

Another issue is to improve the transition from secondary education to higher education and to achieve that the right students enter into the right programmes. This means that there will be more room for selection in Dutch higher education. This is not to make access more difficult, but rather to assist the institutions to distinguish themselves and to give students the right place, taking into consideration their own learning style, motivation and interests. A stronger selection process by universities will undoubtedly lead to a higher demand for UAS programmes. In order to motivate students who are qualified for university education to enrol in a UAS programme, UASs are developing three-year programmes specially tuned to them. For the larger group of students, UASs are starting intake interviews or procedures to help students making the right study choice. This aims to improve the quality of the enrolment, to decrease drop-out rates, and to increase the number of graduates that are needed on labour market.

For the UASs it is a challenge to deal with the issue of entrance selection while guaranteeing access for a large and heterogeneous group of students with various socio-economic and ethnic backgrounds, and different educational experiences. The mission of the UASs is to accommodate a large variety of students who are interested in flexible short courses, continuing vocational education and associate degree programmes, not only to focus on the top level bachelor and professional Master programmes. The quality of the programmes is crucial in all activities. More contact hours between teachers and students, and more practice-oriented research in which students are participating through project work are deemed important methods to enhance the quality of education.

The further professionalization of the teaching staff is also a major issue and it is important to create a culture which challenges teachers to develop their qualities. One of the aims is to upgrade the quality of teaching staff with a Master diploma and for the higher ranks with a

PhD. There is a risk to increase the number of PhD staff by recruiting researchers who have been trained in university without any practical experience. They may pursue their academic interests rather than identifying with the aims of the UAS.

Regarding the research function there is a concern that the process by which lectors have been allocated tended to disperse the number of lector places equally across the different departments as a form of distributive justice. Also the OECD thematic review on the Netherlands (OECD, 2007) pointed at this potential fragmentation of resources. It may limit the capacity to build a critical mass of sufficient depth and expertise for UASs to function more effectively as innovation partners for enterprises. This picture, however, is changing rapidly. Gradually more coherence has been achieved in the objectives of the lectorates whereby systematic knowledge development through long-term research is the leading principle for the objectives and activities of the lectorates: a deepening of impact on education and professionalization of teaching staff, and enrichment of knowledge circulation with economy and society.

Several institutions are in the process of giving their research more profile and clustering their research activities around one principal or some well-defined knowledge domains or thematic areas linked to the educational profile. Such a clustering of lectorates in larger knowledge centres strengthens the research profile of the institutions. It is expected that this will increase the visibility of research on (regionally) relevant thematic areas, and will create more opportunities for multi-disciplinary research.

Given that the objective of research is knowledge exchange with industry, it is clear that the demand for problem solving knowledge from the side of professional practice dominates the agenda which in its turn makes the construction of a sustainable research infrastructure of prime importance. It is regarded as a challenge for UASs to combine effectively the development of their research agenda with curriculum development and innovation, and the active involvement of teaching faculty and students in research projects.

It appears that the RAAK-programme is an effective way of bringing together different parties in the region. It positions the UASs as an important knowledge centre in the triangle of education, research and innovation. The provision of research funding on a solid basis, without being competitive with university research, facilitates long term research projects and the building of a sustainable research infrastructure. This makes them also an attractive partner for collaboration with university research groups given the current emphasis on relevance and valorisation of university research. This will bring *hogescholen* in a position to gradually increase the size of their research activities.

One of the core themes on the current policy agenda – also expressed in the current proposals for a new HE law - focuses on a further differentiation in higher education. This involves more variation in types of programmes, more diversity in trajectories including short-cycle programmes (like the Associate degree), professional masters, more excellence trajectories for high achieving students, and the development of institutional profiles. This differentiation is part of a process in which the Minister negotiates with individual institutions about their missions, their plans and strategies in so-called performance agreements. This may lead to more diversity between institutions, not only between

universities and UASs, but also within each of these sectors. It is a challenge for the UAS sector as a whole to allow this diversity to flourish. This process does not alter the binary structure of the Dutch system. The explanatory memorandum on the Law very explicitly states that binarity should guarantee the basic distinction between the nature and orientation of University and UAS education.

5.6 Norway

Svein Kyvik

Svein Kyvik is Research Professor at NIFU (Nordic Institute for Studies in Innovation, Research and Education) in Oslo, Norway

5.6.1 The Norwegian Higher Education System

Norway has a binary higher education system which broadly can be divided into a university and a college sector. The university sector is composed of eight public universities and eight specialised university institutions, of which three are private (about 100,000 students). The college sector is constituted by 20 state university colleges primarily providing professional and vocational training at a bachelor's level, but increasingly also at a master's level, and 7 other specialised public colleges (about 75,000 students. In addition, there are about 20 small private higher education colleges (about 10,000 students).

The binary system was established in 1994 through large-scale mergers of professional schools and district colleges. The universities should be responsible for basic research, graduate education and research training, while the colleges should be responsible for a wide variety of short-cycle professional and vocational study programmes, and in addition take on some of the university programmes for undergraduate education. Within certain fields, where the universities did not offer similar programmes, the new colleges could offer graduate education. However, over the next decade, differences between the two sectors in many ways decreased (Kyvik 2009).

In 1995, a common career structure was introduced, and both universities and colleges now have two different career tracks; a research-oriented and a teaching-oriented track. The research-oriented permanent academic positions are *associate professor* and *professor*, while *lecturer*, *senior lecturer* and *docent* are teaching-oriented positions, but with the possibility of doing research. The *docent* position is a newly established top position for senior lecturers. *Lecturer* and *senior lecturer* are positions that are not widely used in the university sector. The position of *college teacher* is used in practice-related professional programmes, mainly in teacher training and health education, and the holders of this position do not have a master's degree.

In 1996, all public higher education institutions were regulated by a common act which specifically asserted that the colleges should engage in research and that teaching should be research based. Since 1999, the colleges have had the possibility to establish PhD-programmes if some specific criteria are fulfilled. Even though relatively few programmes have been established, the binary system has come under pressure from colleges with university ambitions, and at the turn of the millennium it was discussed whether the binary divide should be abolished. In 2000, a governmental committee on higher education addressed the issue of institutional drift, and argued for the possibility for colleges and

specialised university institutions to be classified as universities although with a narrower range of disciplines than the established universities. On certain conditions, institutions should be entitled to apply for university status. The Committee formulated a number of general requirements for a higher education institution to obtain university status, of which offering master's degrees in at least five different areas and PhDs in at least four different fields were the key conditions. The formal clarification of the criteria for becoming a university took place in connection with the resolution of the new Act on Universities and Colleges of 2004. The Act specified that the Norwegian higher education system should contain three types of higher education institutions – universities, specialised university institutions, and university colleges. Institutions could opt for the preferred status themselves, but had to be accredited by the Norwegian Agency for Quality Assurance in Education (NOKUT) to ensure the academic standards. The final decision regarding formal university status still needed governmental approval. So far, three of the colleges have attained this status. Many of the other colleges are discussing how they can obtain university status, either by themselves, by merging with other university colleges to create larger entities (which four colleges have done), or by merging with a university (which two colleges have done).

According to governmental regulations, undertaking research is neither an individual duty nor right, but an institutional responsibility. It is the institution that must determine the distribution of research time among staff, when determining the annual work programme for each individual. In the universities, the practice seems to be that staff can use as much time for research as for teaching, irrespective of their academic position. In the university colleges, a survey undertaken in 2006 reports that university college staff use an average of 20% of their time for research and development and 55% for teaching. However, time available for research differs considerably between individual staff members (Kyvik & Larsen 2009). The main criterion for allocating time for research seems to be status; the higher the rank, the more research time people have, but the criteria and principles applied in these processes vary considerably between colleges and also between faculties within the same institution (Kyvik 2009b). In most cases, full professors in the university colleges seem to have similar working conditions to professors in research universities, while young doctorate-level college staff seem to have less time available for research than their counterparts in universities.

5.6.2 Reflections on the CCISP policy issues from a Norwegian perspective

Policy Issue 1: institutional designation

CCISP recommends a change of name from Polytechnic Institutes to Universities of Applied Sciences or Polytechnic Universities. In Europe, the most common terminology is now Universities of Applied Sciences, and the second most common term is University Colleges, like in Norway and Sweden. I think it would be wise to choose the most common term, because a 'university college' can be misinterpreted as a college within a university. Similarly, the term 'polytechnic university' can be misinterpreted as a traditional university with emphasis in technology.

Policy Issue 2: reorganisation of the polytechnic network

CCISP recommends a reorganisation of the polytechnic network primarily through mergers to create a smaller group of institutions with greater critical mass. This measure has also been suggested in Norway. The possibility for university colleges to advance to universities, and the attainment of full university status by two university colleges in 2005 and 2007, led to a further blurring of the binary divide in higher education. The government was not comfortable with this development and set up a committee to address this problem. In its 2008 report, the committee suggested that the binary system should be abolished and a truly unified higher education system should be established, partly through mergers of colleges with existing universities, in order to avoid having the number of universities exceeding eight to ten establishments in the future. The government supported the suggestion for a reduced number of institutions, but left the institutions themselves to decide upon mergers. Thus, deliberate attempts by the state at maintaining a demarcation between the various institutions, while at the same time developing conditions for the possibility of hierarchical advancement, has resulted in decreasing institutional differentiation due to isomorphic tendencies at the system level (Pinheiro & Kyvik 2009).

Policy Issue 3: clarifying and sharpening the identity of the university and polytechnic sectors

CCISP suggests to create a clearer distinction between the two sectors, In Norway, the development has moved in the opposite direction. In 2002, a common funding formula for all public higher education institutions was introduced, shifting from an input-based to an output-based funding system. The new funding model was set up to advantage those institutions that do well in producing student credit points and are active in research. One of the outcomes of this policy is academic drift in the university colleges, partly due to the fact that a small but symbolically important part of the funding comes from the number of published papers in refereed academic journals. Moreover, university colleges have to compete with universities for research funding at the same terms in the single Norwegian research council.

Policy Issue 4: rationalisation of the number of 1st cycle programmes

There is obviously a large number of bachelor programmes in the polytechnics. This is also a critique posed to the university colleges in Norway from the government; the number of staff and students is too small to uphold a critical mass necessary to provide quality standards in teaching, research and education. One of the aims of the many merger initiatives between university colleges thus has been to rationalise the programme structure; i.e. to provide one programme in for example teacher training in the region instead of two programmes at different locations. The problem is that in sparsely populated regions with large distances between the colleges, it is not easy to close down a programme without creating problems for the recruitment of local students. Hence, there are a lot of conflicts and tensions related to this policy measure, making voluntary mergers between higher education institutions difficult to decide upon and implement.

Policy Issue 5: ensuring the viability and sustainability of the polytechnic sector

It is rather self-evident that in order to sustain the polytechnic sector, the level of funding and student places need to be maintained and strengthened. CCISP also suggests that while it is necessary to sharpen the distinction between universities and polytechnics according to their different missions in the Portuguese society, the binary system should be flexible. This policy recommendation has in many ways been implemented in Norway, which in geographic terms has much in common with Portugal, with a few large cities (with universities) by the coast, and many small towns (with university colleges). About half of the university colleges provide disciplinary university programmes, and most of the colleges provide bachelor degrees in economics and engineering, which can be used as the 1st cycle of master's programme provided by the university sector. Norway has developed a very flexible student transfer system across the two sectors (OECD 2006, Kyvik 2009). Students can bring their credit points across the binary divide and in both directions. However, this development also implies that university colleges and universities have had to mutually adapt their curriculum, leading to less difference between the two sectors. To enable the implementation of a credit transfer system, the initial work related innovations in the curriculum of many courses developed by the colleges thus gradually were adapted to the curriculum of their parallel university courses. These adaptations evidently may be interpreted as a response to the need for cross-sector harmonisation of programmes and courses, resulting in isomorphism in higher education. This is an obvious dilemma – the need for creating a flexible binary structure may in fact make it difficult to uphold the divide – like what has happened in Norway.

Policy Issue 6: strengthening the role of polytechnic institutions in applied research

In Europe, higher education institutions outside the traditional university sector have got an increasingly stronger political mandate to undertake applied research and development (Kyvik & Lepori 2010). In Norway, state authorities have formulated three principal objectives for the research mission of the colleges: (a) research shall contribute to regional development, (b) research shall contribute to improved professional practice, and (c) research shall aim at improving teaching and education of students.

The role of the colleges in regional innovation and development is an objective that increasingly has been underlined and is a task that is specified in the Act on Universities and Colleges. In 2005, a white paper on research policy stated that in order to contribute in the creation of a culture of entrepreneurship in the region, the institutions have to develop study programmes that fulfil the competence needs of the same region (Kyvik & Larsen 2010). Another aspect of the research mission is that the different programmes have an obligation to undertake R&D that strengthen and improve professional practice. Finally, the principle of research-based education is specified in the Act on Universities and Colleges. Over the last decade, the idea that undergraduate professional programmes should have a stronger research base has become more commonly accepted. The argument is that the principle of research-based education can be important in order to improve the quality of teaching and learning, and subsequently to the practice of professionals. Also various international organisations (OECD, EU), national authorities, and stakeholders in professional and occupational associations have argued that a stronger research orientation is important to improve the quality of professional programmes and the knowledge basis of professional work (Kyvik & Lepori 2010). Hence, the proposal by CCISP for a stronger

involvement of the polytechnics in applied research is in line with developments in Norway and many other European countries.

Policy Issue 7: extending the international activities of the polytechnic sector

CCISP suggests that the internationalisation of the polytechnic sector should be enhanced – especially with regard to recruitment of students and staff from other countries. This is a consequence of European policies in the higher education area, and there is not much to say about it, other than that there are practical problems related to the implementation of this policy, and which are also referred to in the document. However, in the list of recommendations on internationalisation issues, I miss an item on the need for enhancing international collaboration and funding in research and development in the polytechnic sector.

6   Concluding Summary

Leon Cremonini ♦ Jon File

Leon Cremonini is a Researcher at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

Jon File is Director: Development and Consultancy at the Center for Higher Education Policy Studies, University of Twente, the Netherlands

This report identified main characteristics of the UAS sector in several countries and looked into how policy challenges are being addressed—or have been addressed in the past. The fundamental goal of this exercise has been to pinpoint the key issues that the Portuguese polytechnic sector must face today amidst unprecedented restrictions on public spending. CCISP developed seven initial policy guidelines intended to clarify and strengthen the role of public polytechnics in the Portuguese higher education system. This concluding section both summarizes the main descriptive findings and identifies trends in relation to the CCISP guidelines.

In general, our international review shows that, while not infrequent, binarity in higher education is still a relatively young phenomenon, emerging over the last 50 years as opposed to traditional university sectors often dating back centuries. The questions Portugal faces today are, therefore, common to many countries although there are—and have been—almost as many answers to these questions as there are systems. The descriptive themes can be categorized into four main areas: (a) the status of polytechnics vis-à-vis universities (b) the research role of polytechnics vis-à-vis universities, (c) mergers of polytechnics and (d) the regional role(s) of polytechnics.

6.1   General Findings and Trends

The status of polytechnics vis-à-vis universities

There is often a perception that the status of a UAS is lower than that of a "traditional" university. While policy-makers and governments may go to great lengths to discount such a claim there is evidence that the underlying belief is persistent. For example, in most binary systems, such as the Netherlands, students face hurdles in transferring from a UAS to a university both horizontally (i.e. credit transfer in case of changing degrees) and vertically (from one level of education to the next, e.g. from Bachelor to Master). Where formal obstacles are less (e.g. Germany), university graduates rarely transfer to a UAS while UAS graduates keenly transfer to a university programme. In almost all countries, with the notable exceptions of Ireland and Norway, UASs are prevented from providing doctoral education. In the UK the 1992 reforms enabled polytechnics to "become

universities" under the "gold standard" assumption that all British qualifications (e.g. Bachelors or Masters) should have identical meaning, which in turn suggests that a polytechnic qualification was deemed less valuable[29]. Norway allows UASs to "upgrade" to university status (a strongly sought aim) if they fulfil criteria which pertain specifically to the university sphere, such as strong research intensity.

> *The cases point at two important issues for any discourse on UAS sectoral reform:*
>
> 1) *There is a persistent perception of inequality in status in all countries. We argue that this is largely due to an ill-conceived conception of diversity, which emphasises vertical differentiation (where identical indicators are used to compare different sectors) as opposed to horizontal differentiation (which acknowledges differences in missions and profiles). In terms of vertical differentiation, polytechnics are bound to be seen as "lower status" as certain measures—notably research—are predominant in this assessment (and are likely to remain so for a long time). It is clear that the "parity of esteem" discussed in the Irish chapter (and in the recent EUA/CRUP review) is not an easy objective to accomplish.*
> 2) *The nature of UAS sector, which focuses on education and applied research (see also later) does not* ipso facto *prevent UASs from providing the full range of degrees, from short (Associate) degrees up to Doctorates[30]*

The research role of polytechnics vis-à-vis universities

The UAS sector is often considered as mainly a response to "mass" higher education. In the Netherlands, for example, the UAS sector is considerably larger than the university sector and was seen as the answer to increased massification of tertiary education. This conception may stem from the fact that in many systems the UAS sector was in fact an upgrade from vocational secondary schooling, as was the case in the Netherlands. Therefore almost everywhere public funding for UAS-based research is less than for academic research (Norway being the key exception).

However, that UASs conduct research is today not only accepted, but even supported. Clearly, UASs have increasingly voiced their desire to engage in research (e.g. including it their institutional strategies) as global rankings emerged after 2003 to occupy much of today's higher education policy debates worldwide. But even before Shanghai's Tjao Tong University inaugurated the "global ranking race", UASs were eager to compete for research funding with universities. They often did so by increasingly drifting towards academia in what is commonly termed "academic drift", namely the attempt to imitate universities

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[29] It is noteworthy that former polytechnics often still lag behind universities on many indicators that are key to universities (e.g. research funding). This is considered a direct consequence of the 1992 reform that in fact denied (horizontal) diversity between the former sectors and forced polytechnics to compete against universities for research funding on identical conditions *de jure*, which did not translate in identical conditions *de facto* (former polytechnics started at a disadvantage)

[30] Particularly professional Masters /Doctorates are increasingly seen as a way to deliver the highest degrees while remaining faithful to the UAS missions. However, this development is impeded by perceptions that professional Masters/doctorates are "less worthy" and indeed there is evidence from Germany that graduates with professional Masters earn less than their counterparts with academic Masters.

(deemed more prestigious) with the ultimate goal of "becoming" universities—if possible (e.g. in Norway). Today, few would argue against UAS conducting research. The key differences relate rather to (i) what sort of research and (ii) what form of engagement?

Evidence from our international overview suggests that UAS remain overwhelmingly engaged in *applied research* mostly focused on specific areas contributing to regional and labour-market needs[31]. In some countries (e.g. Switzerland, Germany, Austria and Norway) a UAS is seen as an education and research organization; elsewhere UASs rather have active roles in research networks (e.g. in Denmark and Finland). There are also countries (notably the Netherlands and Flanders) where UASs are still seen as mass teaching institutions.

When thinking of developing/supporting UAS research two complementary levels need to be considered, i.e. the national (public) funding level and institutional strategies:

1) *Public funding must be adequate, hence there must be a common understanding of the role that UASs (can) play in research nationally. Indeed, national differences in UAS research are reflected in the funding trends (or vice-versa). Perhaps this is epitomized most plainly by the Dutch case. Globally there is a trend of increasing research funding for the UAS sector; however, in the Netherlands, despite representing 65% of tertiary education enrolments, at 2.3% the proportion of R&D funds spent on the UAS sector are the lowest in Europe*
2) *Building a research function in the UAS sector in countries where, until recently, research was a prerogative of "traditional" universities requires serious HR policies. UAS teachers have to be increasingly involved in research and must change their aspirations and work patterns if any UAS is to succeed in its research efforts[32]*

Mergers of polytechnics

Mergers across a polytechnic sector occur when there is a sense that the system must be taken to the "next level", where more autonomy, more student demand, better balance with universities are seen as necessary for the higher education system to progress. The possibility of mergers in the Portuguese UAS sector is, thus, not surprising and has been a trend for a long time in other countries. For example the Dutch mergers of the 1980s were meant to rationalize a cost-ineffective system of hundreds of very small colleges, which was inefficient and often created unnecessary duplications in programme offerings. Today, Ireland is promoting mergers among IoTs to create critical mass and support the establishment of "Technological Universities".

There are two main contextual risks, which must be borne in mind to implement successful mergers, namely (a) possible unintended consequences such as the merger spirals which

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[31] Norway is again an exception as UAS also conduct fundamental research being on an equal footing with universities and eligible to "become" universities under strict conditions related to their research activity

[32] Which is not an endorsement of academic drift: UASs can develop their research strategy remaining faithful to their missions in the same fashion they can provide the full range of qualification levels (see earlier footnote)

occurred in the Netherlands (where some UASs became extremely large multi-campus institutions, well beyond policy-makers' expectations), or the strong "academic drift" in Norway (where enabling colleges to aspire to become universities was intended to avoid academic drift, but in fact indirectly promoted it); and (b) misapprehensions about the short-term gains: despite frequent rhetoric justifying mergers on immediate economic grounds (e.g. in relation to current austerity measures), mergers are a *long-term investment* (the immediate effects of a merger are likely to be high costs and systemic chaos fuelled by stakeholder opposition)

This review indicates that, when considering mergers, the following two criteria have proven to be generally true:

1) *Successful mergers depend on a clear rationale, a good implementing strategy (including training staff on their new roles and responsibilities), and a good communication strategy (particularly though not solely, to overcome misunderstandings over the immediate consequences of the policy)*

2) *Because of the long-term nature of the benefits involved and because they basically consume financial and human resources as well as time, mergers should take place in times of stability and not as an* ad hoc *measure (e.g. to save money during an economic downturn)*

The regional role(s) of polytechnics

As practice-oriented institutions, polytechnics have traditionally been expected to contribute to the development of their region through collaborations with local businesses. This trend is not less real today, especially in peripheral parts of countries with areas at low population density (like Portugal, Ireland, Scandinavia and others). However, current understanding of these issues relates to the meaning of regional development and the way UASs can contribute.

In a globalized world, regions represent one node in an extensive network of international connections. "Glocal" strategies where a strong regional presence (e.g. of businesses) can enable a locality's competitiveness in the global market are often seen as a new paradigm ("think globally, act locally"). UASs can play key roles in this new world, capitalizing on their profiles as user-inspired and application-driven institutions.

In addition to collaborating with SMEs through business-inspired research, UASs can identify missing technological linkages and promote innovation where SMEs might not have the know-how or the resources to do so. This is commonly called "regional smart specialisation", and can take two different forms. First, UASs may help firms upgrade their innovative capacity ("transformational role of UASs"); second, UASs can actively contribute with local stakeholders (such as including businesses and policy-makers) to creating common agendas for strategic regional development ("collective leadership role of UAS"). This study identified five areas (preeminent though not exclusive) where UASs can make a positive contribution to regional development, namely (i) stimulation of innovation, (ii) facilitating clusters of innovative businesses, (iii) talent retention, (iv) cultural developments and place-marking and (v) human capital development.

In general, when it comes to the UAS sector's role in regional development, the cases and the workshop underscored two main elements in any UAS reform agenda:

1) *The regional role is still at the heart of the UASs' missions. This has great potentialities and should therefore remain a key activity.*
2) *However, because of increased global connections and competition the regional role of UASs is assuming a new meaning, namely empowering the regions to be globally attractive. The UAS sector is no longer simply collaborating with local industries or businesses but it increasingly contributes to (and indeed sets the) "innovation agenda" by initiating innovation where local businesses might be unable to do so because of lack of resources (this is all the more true in times of scarce resources)*

6.2 CCISP's Policy Ideas Revisited

CCISP identified seven possible public policy interventions intended to strengthen the Portuguese Polytechnic sector. This study has looked into a number of binary systems that have faced/are facing similar challenges, and has identified the main trends relating to CCISP's seven policy issues. These trends are synthesised in Table 6.1 below (for a more in-depth analysis per country see Chapter 5).

Table 6.1 Concluding Reflections on the CCISP Possible Policy Interventions

Possible policy interventions	Reflections based on six country-cases
Institutional designation	Different national designations are usually maintained but "University of Applied Sciences" is increasingly the internationally recognized designation. However, the term UAS does not *ipso facto* imply an "improvement" towards (academic) university status. Care must be taken not to create misunderstandings regarding the nature and profile of a UAS vis-à-vis traditional universities, especially for foreign students who might not be cognisant of their host country's binarity
Reorganization of the Polytechnic network	Mergers, collaboration and consortia are a common trend in the sector and have, *inter alia*, promoted innovative forms of cross-sectoral collaboration (UAS-University sector). Actual cross-sectoral mergers are rare (although suggestions for doing so—mainly with a view of unifying the system—have been voiced for example in Norway)
Sharpening the identity of Universities and Polytechnics	Trends are mixed. On the one hand there is an increased call for more professionally oriented degrees ranging from Associate to Doctoral degrees (for example in Australia, the Netherlands). On the other hand there is also a visible trend of convergence (academic drift of UASs *and* vocational drift of universities)

Possible policy interventions	Reflections based on six country-cases
	which nonetheless does not appear to threaten the distinctive features of the UAS sector, e.g. in applied research (see Germany)
Rationalizing the number of 1st cycle programmes	The call to reduce the number of redundant 1st cycle programmes is not unheard of, especially but not exclusively in countries with low population density (such as Norway). The cost of maintaining similar programmes in two or more sparsely inhabited locations as opposed to combining them in one location is often excessive. But in many countries there is also an understanding that the cost of commuting or relocation for students might be detrimental to participation (especially in times of financial crisis, e.g. in Ireland).
Ensuring the viability and sustainability of the Polytechnic sector	A balanced distribution of student places between the UAS and the university sectors implies the need for smooth transition options between these sectors (both vertically and horizontally). Countries differ on how they approach this question, but there is a general understanding that the issue needs to be addressed. Some countries are relatively successful (e.g. Germany and Norway); others less (e.g. the Netherlands). Reasons must also be sought in the antecedent conditions enabling access in the first place (e.g. the Dutch early tracking system in secondary school)
Strengthening the role of the Polytechnic sector in applied research	There is a keen understanding that the role of UASs in research is focused on applied research. This is being supported in most countries, and is leading, *inter alia*, to increased cooperation not only with businesses but also with the university sector (for example in the Netherlands and Finland)
Extending international activities	The trend of attracting international students is universal. It is a key profiling and branding strategy of higher education institutions worldwide, including UASs. The question is rather to what extent international recruitment should take place before a system becomes excessively dependant on foreign students as a source of income (as seems to be the case in Australia). Moreover, the internationalization of staff seems less prominent (e.g. it is limited in Germany), but is nonetheless a key issue. Finally, the internationalization of research (e.g. participating in international research networks or cooperating with international businesses—as is the case of the Netherlands—) is also increasingly important across the board

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