

Tertiary Education for the Knowledge Society

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Concluding Remarks by Manuel Heitor

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I would like to start these concluding remarks by acknowledging OECD and all those individuals and institutions that helped in various ways to bring this Conference to fruition. Let me acknowledge all the national delegations, speakers and the institutions represented in the Conference for their effort in making this event a very successful one.

Tertiary education systems are under pressure to meet demands imposed by a globalised knowledge-society without compromising quality deliverance. For example, in Europe, although most institutions and their staff have recognized the need for change for many years, the way institutions are organized, either internally, or through traditional links with society, as well as their structure of incentives, **have continuously delayed reforms**. Consequently, it is only in recent years that reforms have emerged directly conducted by governments in many different countries and political regimes. The Portuguese system is no exception to these mounting pressures and change has been recently introduced through governmental actions.

Over a year since the OECD's Education Policy Committee met in Lisbon to review Portugal's higher education policy in December 2006, a number of steps have been taken to follow up on the Committee's recommendations and a throughput legal reform of the Portuguese tertiary education system was completed. It considers significant changes in the internal system of governance of HEI's (including the management structure), as well as in their external societal relations (including, internationalization, research partnerships and business links, as well as external evaluation and accountability), which have been implemented together with a unique increase in the public investment in science and technology.

It is in this context that we are particularly pleased for the fact that this meeting has addressed main trends for reform in OECD countries, in a way that clarified the

diversity of challenges and opportunities facing tertiary education institutions, TEIs, and systems in coming years. The key role for policy makers and governments worldwide is to select priority actions and make the correct decisions: **where and how to start the reform process?**

Among the wide range of themes addressed in the OECD Report and discussed during the last two days, I would like to concentrate my attention in these concluding remarks in four selected and interrelated issues, namely: i) funding and equity; ii) students, knowledge transmission and learning; iii) knowledge production/diffusion and internalization; and iv) institutions and systems.

1. New funding schemes for improved equity in access: how to promote diversified systems and enlarged participation rates?

The **need to modernise funding mechanisms**, and ensure a **better balance between institutional and competitive funding** for tertiary education is leading the discussion in governments worldwide¹. It appears that more important than discussing the details of funding formulas for institutional funding mechanisms, it is to review the overall share of institutional and competitive funding sources, as well as to promote student support mechanisms. This certainly includes the need to preserve the **institutional integrity of the institutions**², as well as to create flexible financial mechanisms to **attract and secure new talents in our institutions** and to meet the global challenges of research and international competition. But it may also require, as recently argued by Paul David and Sten Metcalfe, **increased competition and collaborative patterns among funding agencies at an international level**³. In Europe, we certainly need to strengthen the role of the European Research Council and to foster additional competitive funding schemes with a transnational configuration by promoting collaborative arrangements among national funding agencies in Europe.

¹ Conceição, P., Heitor, M. V. and Veloso, F. (2003). "Infrastructures, Incentives and Institutions: Fostering Distributed Knowledge Bases for the Learning Society", *Technological Forecasting and Social Change*, 70(7), pp. 583-617.

² See Conceição, P. and Heitor, M.V. (2007), "Do we need a revisited policy agenda for research integrity? ...an institutional perspective", "World Conference on Research Integrity", Calouste Gulbenkian Foundation, Lisbon, Portugal, 16-18 September 2007. See also, Conceição, P. and Heitor, M.V. (1999), "On the role of the university in the knowledge-based economy". *Science and Public Policy*, 26 (1), pp. 37-51.

³ See also, David, P. and Metcalfe, S. (2007), "Universities and Public Research organizations in the ERA", prepared for the EC (DG-Research) Expert Group on "Knowledge and Growth", June 2007.

In this regard, it is clear that, by and large, the financing of tertiary education (and of science and innovation...) has occurred along rather traditional lines, at least in Europe. Governments directly undertake R&D or subsidize (directly or indirectly, through tax measures) R&D performance and technological innovation. Governments raise – or forego – revenue to pay for this support. Yet, the history of science is rich with varied means of financing science and technological innovation. More importantly, developments in the size, integration, and technologies available in global capital markets present **the opportunity to think about new financing possibilities**. These involve both the channeling of resources from the global liquidity pools to science and technology, as well as enhanced risk management tools that are as important aspects of “financing” as channeling money.

The question to be addressed is how far the different and innovative sets of incentives and funding mechanisms developed in modern financial markets during the last decade can be expanded and adapted to finance scientific progress and for attracting more people to tertiary education? What have we learnt about experiences with loan systems, venture capital, risk capital and tax incentives?

It should be clear that the main reason for governments to increase funding for tertiary education is to **increase participation rates** and **extend the recruitment base and the number of students in tertiary education**⁴. New opportunities will be needed to give students more flexible pathways across different types and levels of educational qualification, including through recognition of prior learning and credit transfer, in order to reduce repetition of learning. **Increased diversified systems** are required and this has led much of the current reform in Portugal. It has been driven to promote a binary system of tertiary education, with polytechnic education concentrating upon professionally-oriented and vocational training, while university education should be further concentrated on postgraduate education.

Non-university tertiary institutions are seen in many countries as nearer to the labour market and the more flexible arm of higher education. But, how to identify labour market needs and how to provide the necessary skills, qualifications and technical know-how? Are non-university institutions more regionally specific institutions and consequently in a better capacity to detect the needs of local industry

⁴ Nicholas Barr (2004), “Higher Education Funding”, Oxford Review of Economic Policy, 20 (2), pp. 264-283. See, also, N. Barr and I. Crawford (2005), “Financing Higher Education: answers from the UK”, Routledge.

and promote local and regional clusters of innovation?

Still, beyond the diversification of the systems, the key issue is how **to increase and balance loans and grants for students**, as well as to develop innovative loan systems and to combine them with **flexible legislation to accommodate reasonable student incomes through part time work**, namely at tertiary education institutions. Nicholas Barr, earlier today, remembered us that the goal is to provide **free education to all students, by guaranteeing graduates to share the costs**. The question is that the correct amount to be shared among the tax payer and graduates, as well as other private sources, is still to be shown (at least using scientific grounds...), relying very much in the socio-political grounds!

Although income-contingent loan systems are becoming a typical reference worldwide, as clearly acknowledge by the OECD, it should be noted that their applicability is particularly dependent on the characteristic of the existing fiscal system. This is why we have introduced last Autumn in Portugal an innovative system of student loans with mutual guarantee underwritten by the State, which complements the system of public grants, thereby improving access to higher education for all students. About 2000 loans have already been contracted through the banking system and this represents an important new achievement for Portugal and the Portuguese families, which follows current practices in modern societies at the OECD level.

Following Michael Gallagher⁵, “the Portuguese initiative satisfies the key policy criteria: it is a horizontally equitable scheme; it represents good value for students; it is financially sustainable at higher volumes of student take-up; it is low risk for government and financial institutions; it avoids the need for additional administrative infrastructure. The loan facility reduces disincentives to study by covering reasonable living costs while deferring repayment obligations till after graduation. The 10% guarantee offsets lack of collateral in financing human capital investments. The allowable repayment period (twice the period of study) is normally sufficient to permit students to make loan repayments without committing a disproportionate share of their income after graduation”. The loans scheme also has incidental benefits, by virtue of the progression requirements and the incentives for improving grade point averages. In particular, it should encourage students to progress their studies and

⁵ Michael Gallagher, March 2008, personal note.

complete their awards, and it may encourage students to undertake courses that are more likely to lead to positive employment outcomes.

2. The substance of learning and teaching: what do we need to know?

Changing the patterns of teaching and learning, promoting active (less passive) work by the students themselves and fostering **student-centred education** schemes are our ultimate goals. We need to allow students to determine their own learning paths and trajectories, namely along education cycles, but also across institutions in our different regions and countries.

To achieve these objectives, we must **learn from new research** and, certainly, we also need to foster **evidence based, project and experimental work**, as well as to focus our attention on the transferable skills students should acquire. But we also need to reduce drop-out (failure) rates in tertiary education and to involve students in research activities since their early stages at our institutions. In summary, we need to go beyond the structure of tertiary education and gradually concentrate our efforts in measuring and taking stock of the diversity and evolution of concrete student-centred parameters.

In addition, we need to increase the number of **adult students** in tertiary education by removing barriers to their entrance and success with due attention to its social and economic roots. This certainly reinforces the need for diversified systems of tertiary education, leading to greater differences in the learning and teaching systems in professionally-oriented and science-driven programs.

In Portugal, the implementation of the full regulation that aims to bring tertiary education in line with the Bologna process was carried very successfully, including the opening of Higher Education to new publics and the development of post-secondary education through the Polytechnic sub-system (i.e., Technological Specialization Courses – CET): i) In 2007-2008 school year, about 87% of initial training courses that opened places are already organized in accordance with the Bologna process principles; ii) The opening of Higher Education to new publics through the new access regime for those over 23 years of age resulted in the number of adults entering tertiary education by this means rising to roughly 10,850 in the 2006-07 school year, up from around just 900 adults that started in tertiary education in the 2005-06 school year; and iii) In 2007, a total of 190 Technological

Specialization Courses (CET) ministered in Institutions of Higher Education has been reached, with around 110 in public institutions, involving more than 4.000 admitted students.

It is also clear that we need to foster institutions that take absolute care of emerging scientific and technological developments, but also to pay attention to **societal changes and the continuous alterations of the labour market**. But we need also to look beyond our own institutions of higher education and monitor the employability of students along the various education cycles. This is because we have launched in Portugal last year a new observation system to steer student demand through the public divulgation, twice a year, of information regarding graduate job seekers registered in employment centers. In addition, under the new Higher education Act, tertiary education institutions are required to collect and publish annual information on the employment/career experiences of their graduates up to five years after graduation.

Certainly we need to harmonize quality assurance systems and we fully support the implementation, in Europe, of the new Register for Agencies of Accreditation and Evaluation across Europe.

3. Fostering academic research and internalization: Can we adopt worldwide the “American” graduate schools?

Let me turn now to the issue of **reinforcing the top of our tertiary education systems**, by fostering the internationalization of research universities and their specialization. This is because it has become a common place to argue that we need to foster academic R&D and the internationalisation of universities, namely by promoting **student mobility and university networks** able to foster attractive and competitive research and learning environments and to **attract and train highly qualified human resources**. The key issue is the creation of the conditions able to strengthen institutions and the necessary critical masses to compete at the highest international level. The discussion can be oriented in two different lines of discussion⁶.

⁶ For a more detailed discussion, see P. Conceição, M. V. Heitor, (2005), “*Innovation for All? Learning from the Portuguese path to technical change and the dynamics of innovation*”. Westport and London: Praeger.

First, the debate has confirmed that the progress of scientific and technological knowledge is a cumulative process, depending in the long-run on the widespread disclosure of new findings. For example, Paul David⁷ has systematically shown that **“open science is properly regarded as uniquely well suited to the goal of maximising the rate of growth of the stock of reliable knowledge”**. As a result, universities should behave as “open science” institutions and provide an alternative to the intellectual property approach to dealing with difficult problems in the allocation of resources for the production and distribution of information. Consequently, the main challenge for public policies is to keep the proper balance between open science and commercially oriented R&D based upon proprietary information. At what level should governments foster cooperative exploratory research, which is recognized to be vital for the sustainability of knowledge-driven economies, in reaction to the increasing demand from individuals, research units and private firms for incentives for non-cooperative, rivalry knowledge?

Second, at the institutional level, **Graduate Schools** have been developed progressively worldwide over the past decade in diversified ways, ranging from interdisciplinary structures and based in a single university (thus, closely resembling the US model), to subject-specific inter-university structures. In general they aim to provide **a better link between research training and research strengths** and, in a few cases, have provided flexible structures to attract and contract researchers and graduate students in a way far beyond that provided in traditional university departments. But, how far do we need to rely in structures beyond traditional departments in order to promote research universities? And, how to ensure that graduate schools permit better employability of their graduates? Can the skills be transferable? And how is quality assurance ensured?

Regarding the Portugal tertiary education, let me note that by the time the necessary legal changes were made, the Portuguese government has promoted its **“Commitment to Science”**, fostering public and private investment in science and technology, including a large program of international partnerships with leading institutions worldwide. Scientific output in Portugal increased by 18% over the last two years when measured in terms of the number of scientific publications

⁷ See, among others, Paul David (2007), “The historical origin of 'open science' - An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution”, Stanford Institute for Economic Policy Research, June.

internationally referenced. A strategic programme of “Partnerships for the Future” was initiated in 2006 and by September 2007 the first doctoral and advanced studies programmes were officially launched, bringing together several Portuguese universities and leading universities worldwide, including, MIT, Carnegie Mellon University and the University of Texas at Austin. Unprecedented in Portugal, these programmes facilitated the creation in 2007 of effective thematic networks of science and technology involving a large set of Portuguese institutions in collaboration with companies and internationally renowned institutions.

The overall goal is to facilitate a long term strategy to strengthen the country's knowledge base, to foster economic growth and to enhance the quality of life in Portugal, by promoting the **strategic coordination of public and private investments to explore international cooperation and industry-science relationships** with leading institutions worldwide, in a way to sustain strategic investments in people, knowledge and ideas.

We recognize that **scientific progress is a source of development**. Public resources invested under rigorous international assessment policies lead to new knowledge, better advanced training of new human resources for the society, new ideas and processes, which increasingly result in innovation, modernization of institutions, improved quality of living, economic productivity and better employment⁸.

4. Strengthening institutions and systems linkages: how to foster institutional autonomy and societal trust?

My final point is about **the need to promote dynamic and responsive institutions**, by widening the scope of diversity and of institutional autonomy, while ensuring effective accountability. Again, and always, preserving the institutional integrity of TEIs, at the same time new forms of knowledge production (namely in the way presented since the early 90's by Gibbons and colleagues⁹) should be considered in reforming tertiary education institutions and their links with society. We have seen that raising the level of autonomy for TEIs is one of the main objectives of sector reforms, especially in Continental Europe. Granting **independent legal status** to

⁸ Conceição, P., Heitor, M. V. and Lundvall, B.-Å. (eds.) (2003), *Innovation, Competence Building, and Social Cohesion in Europe—Towards a Learning Society*. London: Edward Elgar.

⁹ Gibbons, M, et al. (1994), *The New Production of Knowledge*, SAGE Publ.

TEIs is one means of giving greater autonomy: it gives TEIs greater autonomy to govern themselves and function as they see most appropriate, in a free and independent way, in pursuit of work that is deemed essential to society¹⁰.

It is in this context that the new Legal Regime of Higher Education Institutions approved by the Portuguese Parliament last September establishes the organizational principles of the higher education system, the autonomy and accountability of institutions, setting up governing Boards with external participation, diversity of organization and legal status of public institutions, namely as private foundations, establishment of consortia, recognition of research centres as part of University management framework.

And this must be achieved in a way that will promote **new leaderships** for our institutions. Attention has been called for the need to promote an international market of excellence for university leaders, as also a critical path to attract our best researchers to take the lead of our universities¹¹.

I would also argue that **strengthening external societal links and “system linkages”**, as referred by Paulo Santiago earlier in this Conference, are critical in making the institutional changes required to meet the needs of global competition and the knowledge economy. They consider, among others, public and private research organisations for universities and regional and business links associated with vocational training institutions.

By focusing governmental and political actions on the external dimension, higher education institutions are asked to strengthen their capacity to make the **critical internal changes** for modernising their systems of teaching and research within a path of diversity and specialisation, without compromising quality. Furthermore, by **enhancing their external links with society**, higher education institutions are asked to carefully improve their relationships with economic, social and political actors, thereby creating “new” reinforced institutions that have gained **societal trust**.

¹⁰ See, for detailed comparative analysis, Abrar Hasan (2007), “Independent legal status and universities as foundations”, Paper prepared for the Portuguese Ministry of Science, technology and Higher Education.

¹¹ See, for example, Goodall, A.H. 2006. Should research universities be led by top researchers and are they? *Journal of Documentation*, 62 (3): 388-411.

In this respect, and following some of the issues raised by John Ziman¹² many years ago and also noted by Nobel Laureate Richard Ernst (2003)¹³, as well as very much stressed in the course of this conference, one critically important and emerging institutional issue refers to the **training of students and young scientists** in order to provide them with core competencies that help them to become successful researchers and prepare them with the adequate “transferable skills” for the job market outside research and academia.

If any conclusion can be taken at this final moment, is that there is a consensus about the need, and the opportunity, to **accelerate reform of TEIs** in order not only to stimulate progress across the whole tertiary education system, but also to foster the emergence and strengthening of our institutions which can demonstrate their excellence at international level. But accelerating reform requires the need to concentrate tertiary education reform on a myriad of issues that will ultimately open the “Black Box” associated with all type of institutions, preserving autonomy while building-up a new set of relationships with society at large and introducing an “intelligent accountability” associated with a renewed structure of incentives.

To cope with such a variety of demands and with a continuously changing environment, we all know that the tertiary education systems, in particular, needs to be diversified. But the challenge of establishing **modern tertiary education systems** requires effective networks and a platform of research institutions, notably for stimulating the political debate among the various stakeholders and for assisting in the networking of national constituencies promoting the positioning of our institutions in the emerging paths of **brain circulation** worldwide.

I look forward to your ideas to trigger and inform the political decision-making process and, above all, I wish to thank OECD to stimulate the participation of higher education institutions, students, employers and governments at all levels in that process.

Thank you very much for your attention.

Manuel Heitor

¹² Ziman, J. (1968), “*Public Knowledge: The Social Dimension of Science*”, Cambridge University Press

¹³ Ernst, R. (2003), “The Responsibility of Scientists, a European View”, *Angew. Chem. Int. Ed.* 2003, 42, pp. 4434 –4439.