



MEMBRO

Euro-CASE

Academia de Engenharia

Relatório e Contas **2013**

Plano de Actividades **2014**

Relatório e Contas 2013

Relatório de Actividades 2013

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anexo

Boosting Innovation in Europe: USA-EU - Why the innovation gap? Horizon 2020, How to boost Innovation?



**PORTUGUESE
ACADEMY OF ENGINEERING**



The Portuguese **Academy of Engineering** is a private non-profit association owning the public utility statute.

Object

- To contribute to enhance Engineering valuation by Society and to encourage research development in technical and scientific areas, particularly those that can better foster national progress;
- To promote the cooperation in the field of Engineering in Portugal, in the European Union and other countries, in order to gather efforts towards Society problems resolution and for the development of research concerning this goal;
- To advise government on important matters relevant to Engineering;
- To cooperate with Euro-CASE (European Council of Academies of Applied Sciences, Technologies and Engineering), the Academy of Sciences of Lisbon and other similar academies;
- To cooperate with Ordem dos Engenheiros (Portuguese Association of Engineers) in issues of mutual interest, namely those related to the enhancement and development of Engineering and the Engineering Profession;
- To serve the Country in any important issue in the field of Engineering;
- To recognize outstanding contributions provided to the Country by individuals or prestigious institutions;
- To pursue any other adequate issues coherent with the institution objectives.

Members

Shall be individuals or institutions elected by the General Assembly who share Academy's objectives and that have given significant contributions to Engineering, namely of academic, scientific or technical nature.

President of Honour



The President of the Republic of Portugal

Academy Members

Decanus 1

Member Nr. 1 - Professor Armando Lencastre

Honorary Members 2

Ordem dos Engenheiros
(Portuguese Association of Engineers)
Laboratório Nacional de Engenharia Civil
(National Laboratory of Civil Engineering)

Emeritus President 1

Emeritus Members 44

Efective Members 81

non resident Members 5

Academy topics

- Change education to change Portugal
- Engineering and Innovation
- Setting up of large companies
- Transparent electronics
- Innovation in solar thermo-electricity
- Membrane Engineering
- Risk in Geotechny
- Stormwater management in future cities
- Challenges of the deep offshore
- Factory of the future: Production of polymers out of wastes using microorganisms
- Engineering today? The culture of experimentation in collaborative networks: industrialisation, scientific development and qualification
- Reorganisation of national higher education networking
- Engineering and Heritage management
- Engineering Education in Portugal
- Engineering and Technology for the Development of Portugal: Perspectives and Strategy (2000-2020)

Academy Past Presidents



**Professor
Armando Lencastre**
(1995 - 2001)



**Professor
E. Maranhã das Neves**
(2001 - 2007)



**Professor
Carlos Salema**
(2007 - 2010)

2013

Av. António Augusto de Aguiar, 3-D - 1069-030 Lisboa
Tel.: 213 132 609
Fax.: 213 132 605
E-mail: academia@ordemdosengenheiros.pt

www.academia-engenharia.org



Relatório de Actividades 2013

Sumário Executivo









Em 2013, a Academia manteve o seu normal funcionamento, tendo sido realizadas três Assembleias Gerais.





Foram efectuadas eleições para os Órgãos Sociais, tendo a respectiva composição resultado inalterada relativamente à do triénio anterior.

Das actividades desenvolvidas, destaca-se a organização da Conferência Anual do Euro-Case, a qual foi precedida por dois debates preparatórios.

O Dia da Academia de Engenharia foi assinalado, tendo coincidido com a última Assembleia Geral do ano.

1 Em 2013, as actividades da Academia centraram-se nas principais linhas previstas no Plano de Actividades, como a seguir é indicado.

AR - Actividades Regulares	Concretização	Observações
A.R.1 - Relatório e Contas de 2012, a apresentar à Assembleia Geral, após submissão à apreciação do Conselho Fiscal.		
A.R.2 - Prémio “Academia de Engenharia”		Apesar da Galp Energia SA ter aceite patrocinar o Prémio, ainda não foi possível concretizar este apoio.
A.R.3 - Admissão de Novos Membros		Esta actividade transitou para 2014.
A.R.4 - Eleição dos Órgãos Sociais		A eleição teve lugar na Assembleia Geral de 22 de Novembro, mantendo-se a composição dos Órgãos Sociais por reeleição dos respectivos Membros.
A.R.5 - Euro-Case		A Academia participou nas reuniões do Board; O Presidente da Academia foi eleito para o <i>Financial Committee</i> .
A.R.6 - Encontro com novos Membros		Foi realizado um almoço debate.
A.R.7 - Dia da Academia de Engenharia		Foi assinalado na última Assembleia Geral do ano, na qual tomaram posse os Membros que compõem os Órgãos Sociais.
AE - Actividades Extraordinárias		
A.E.1 - Conferência Anual do Euro-Case		A Academia organizou a Conferência Anual, em Lisboa.

 Não realizada
 Em curso
 Em fase de conclusão
 Realizada

Actividades Específicas	Concretização	Observações
A.X.1 - Posições da Academia		No âmbito do tema da Conferência Anual do Euro-Case foi preparado um <i>position paper</i> sobre “Boosting Innovation in Europe: USA-EU - Why the innovation gap? Horizon 2020, How to boost Innovation?” (Em anexo)
A.X.2 - Potenciar a vocação dos jovens para a Engenharia		Actividade em curso, embora se venha constatando ser muito difícil congregiar meios para a realização de uma iniciativa (encontro), com expressão significativa, dirigida aos jovens pré-universitários.
Outras Actividades		
O.A.1 - Actividades em Curso		Concluída a reformulação do Portal; Não foi possível concluir a publicação referente aos <i>curricula</i> dos Membros; Mantem-se em análise a possibilidade da Academia passar a dispor de espaço próprio.
O.A.2 - Actividades Culturais		Não foi possível concluir o processo relativo à homenagem a prestar, pela Academia, a grandes vultos da Engenharia Portuguesa

2 Apesar de não ter sido possível concretizar todas as actividades previstas no Plano de 2013, algumas das quais deverão ser concluídas em 2014, considera-se que a AE manteve o seu normal funcionamento.



Assembleias Gerais

| 2 de Julho de 2013

Ordem de Trabalhos

1. Apreciação da Acta da reunião anterior
2. Aprovação do Relatório e Contas de 2012
3. Outros assuntos

| 22 de Novembro de 2013

Ordem de Trabalhos

Ponto Único - Eleição dos Órgãos Sociais

| 19 de Dezembro de 2013

Ordem de Trabalhos

1. Informações
2. Posse aos dos Órgãos Sociais
3. Dia da Academia de Engenharia



Eleição dos Órgãos Sociais

Na sequência do acto eleitoral realizado, os Órgãos Sociais mantiveram a composição do triénio anterior, designadamente:

Assembleia Geral

- Eng. Carlos Pimenta - Presidente
- Prof. Doutor António Lamas - Vice-Presidente
- Prof. Doutor Manuel Collares Pereira - Secretário

Direcção

- Prof. Doutor Fernando Santana - Presidente
- Prof. Doutor João Bento - Vice-Presidente
- Eng. Jaime Melo Baptista
- Prof. Doutora Laura Caldeira
- Prof. Doutor João Goulão Crespo

Conselho Fiscal

- Dr. António Gomes Coelho - Presidente
- Eng. Rui Correia - Vogal



Encontros com Novos Membros

Academia de Engenharia

Encontro com Novos Membros

24.Outubro.2013

A reorganização da
rede de ensino
Superior

Prof. Doutor António Cruz Serra

Almoço Debate • Hotel Altis • Lisboa



Debate “Como Potenciar a Inovação”

30.Maio.2013 | Faculdade de Ciências e Tecnologia, UNL



Academia de Engenharia

como
potenciar a
Inovação

Ciclo de Debates
2013



Conferência Anual
Boosting Innovation in Europe
Lisboa, 10 | Dezembro | 2013

Este debate foi realizado no âmbito da preparação do tema da Conferência Anual do Euro-Case.

Painel: Prof. Doutor Clemente Pedro Nunes (Moderador)
Professor Sir William Wakeham
Prof. Doutor L. Sousa Lobo
Prof. Doutor Daniel Bessa



Actualização do Portal

<http://www.academia-engenharia.org/>



ACADEMIA DE ENGENHARIA

Academia

Membros

Actividades

Eventos

Publicações

Contactos



Euro-Case

• Encontro em Lisboa da *Innovation Platform* do Euro-CASE (30 e 31.Outubro.2013)

Neste encontro foi debatido o *position paper* “Boosting Innovation in Europe: USA-EU - Why the innovation gap? Horizon 2020, How to boost Innovation?” (em anexo), no âmbito da preparação do tema da Conferência Annual do Euro-Case, tendo sido apresentado pela Prof. Doutora Paula Diogo, a convite da Direcção.

Boosting Innovation in Europe

**Euro-CASE Innovation Platform
Lisbon Meeting
30-31st October, 2013**

agenda

30 October, 2013

13:00 **Welcome** of Participants

13:15 Lunch

14:00 **Opening**

Prof. Dr Fernando Santana
President of the Portuguese Academy of Engineering
Prof. Dr Bjorn O. Nilsson
Chair of the Euro-CASE Innovation Platform
Prof. Dr Paulo Sá e Cunha
Vice-President of Agência de Inovação

15:00 EU-Foresight activities (Request from Anne Glover)

16:30 Coffee Break

17:00 Introduction to the topic “Boosting Innovation in Europe”
Prof. Dr M. Paula Diogo

17:30 Discussion

18:45 Closing remarks

20:00 Dinner

31 October, 2013

08:45 Arrival of participants

09:00 Working on the text and finalizing the Euro-CASE policy papers:

09:15 Innovation Procurement (Sweden)

09:45 Financing Innovation (UK)

10:15 Innovation and Changing Industry Structure (Finland)

10:45 Transforming Manufacturing (Spain)

12:30 Discussion about the meeting in France



Euro-Case

• Conferência Anual do Euro-CASE (Lisboa, 10.Dezembro.2013)

Boosting Innovation in Europe

Lisbon, December 10, 2013

Participaram todas as Academias que integram o Euro-Case.

Royal Flemish Academy for Science and the Arts	- Belgium
Académie Royale des Sciences, des Lettres et des Beaux-Arts	- Belgique
Academy of Engineering	- Croatia
Engineering Academy	- Czech Republic
Academy of Technical Sciences	- Denmark
Technology Academy	- Finland
National Academy of Technologies	- France
National Academy of Science and Engineering	- Germany
Technical Chamber	- Greece
Academy of Engineering	- Hungary
Academy of Sciences	- Poland
Academy of Engineering	- Ireland
Council of Applied Science and Engineering	- Italy
Academy of Technology and Innovation	- Netherlands
Academy of Technological Sciences	- Norway
Academy of Engineering	- Portugal
Academy of Technical Sciences	- Romania
Academy of Engineering	- Slovenia
Real Academia de Ingeniería	- Spain
Royal Academy of Engineering Sciences	- Sweden
Academy of Engineering Sciences	- Switzerland
The Royal Academy of Engineering	- UK

European Council of Academies of Applied Sciences, Technologies and Engineering



Euro-CASE

Resumo *(in Portal do Euro-CASE)*

Innovation has long been one of the key areas for Euro-CASE. The Innovation Platform that was established in 2011 has conducted, until today, five meetings and has been continuously working on drafting policy papers on various relevant topics related to innovation. During the runtime of the Platform **it became obvious that despite excellent research that is being conducted all across Europe, it seems difficult to capitalize on the results in form of marketable products. This situation of excellent research results and little economic exploitation has become known as the European Paradox.** Other regions in the world, most notably the US but also dynamic countries in Asia, are much more prone to entrepreneurial activities and economic exploitation of research results. On average, Europe is doing well when it comes to producing goods with medium-high technological content but falls short when considering manufacturing of high-tech products. These perspectives led to the decision to organize this year's Euro-CASE Annual Conference on the topic **"Boosting Innovation in Europe: EU-USA - Why the innovation gap?"**

Opening Ceremony and Conference Program

The Annual Conference was convened by the Portuguese Academy of Engineering (Academia de Engenharia) and took place in the magnificent surroundings of the historic Palácio Foz in Lisbon, in the presence of about 90 invited guests.



Chegada de S. E. o Ministro da Educação e Ciência, Prof. Doutor Nuno Crato, tendo à sua direita o Presidente do Euro-Case, Prof. Doutor Reinhard Hüttli, e à sua esquerda o Presidente da Academia de Engenharia, Prof. Doutor Fernando Santana.

The event was opened by keynote speeches by Fernando Santana, President of the Portuguese Academy of Engineering, followed by Reinhard Hüttli, Chairman of Euro-CASE and the honourable Minister of Education and Science of Portugal, Nuno Crato.

The first session, chaired by Manuel Carrondo, member of the Portuguese Academy of Engineering, was devoted to the topic "Filling the gap through innovation". The participants largely agreed with the opening statements that **the main difference in innovation between the EU and the US can be found in cultural aspects mainly regarding the culture of risk taking**. Especially, creation and disappearance of SMEs and the ways the society deals with successes and failures, are noticeable differences.

In his speech "Promoting Corporate Innovation in Portugal" Professor João Bento, President of COTEC (Association of Enterprises for Innovation) Portugal, pointed out to the fundamental importance of the EU when it comes to comparative data. He also emphasised that **many of the advances in terms of innovation in Portugal have been swept through the devastating financial crises over the recent years**.

Jan Marco Müller, Assistant to Anne Glover, Chief Scientific Adviser to European Commission's President José Manuel Barroso, also concurred that culture matters and highlighted the differences in risk perception, taking EU do produce excellent scientific results but should be

as an example genetically modified crops. Actors across the considering the risks also in relation to potential rewards.

Ulla Engelmann, Head of Unit for Stakeholder Relations of the Joint Research Centre (JRC), introduced the activities of the JRC and its similarities to Euro-CASE when it comes to science-based policy advice. Just as Mr. Müller, she highlighted the qualities of European research. She also underlined the fact that there are countless research cooperation between the US and the EU. For the EU level the most important present areas for cooperation are E-Mobility and Smart Grids.

In the following lively discussion participants mentioned the main differences in the areas of creativity and research, intellectual property, diversity across Europe, and culture. The latter was also emphasised by Euro-CASE chairman R. Hüttli who claimed that **social acceptance of modern technologies is also driven by communication. Scientists in Europe should be more open towards the public as they are also dependent on marketing their own respective research**. He also claimed that scientists might need some time to adapt to their new role but there are high rewards to be expected as, for example, the dialogue forum in the German academies' project "Energy System of the Future" clearly shows. When it comes to science- and technology-based policy advice, scientists should be thinking more in terms of policy options rather than conclude in simplistic recommendations.

The innovation gap can be filled by extensive training of people for business creation, strengthening the entrepreneurial culture in companies, continuing to build trust between politics and business sectors and to make use of the diversity in the EU. It was emphasised that Europe must be careful not to exaggerate the role of the state when it comes to economic research activities.

The afternoon session, chaired by W. Wakeham, Senior Vice President, Honorary Secretary for International Activities, Royal Academy of Engineering, started with an outline of the discussion paper "Boosting Innovation in Europe: USA-EU - Why the innovation gap?, Horizon 2020 - How to boost Innovation?", by Maria Paula Diogo, New University of Lisbon. Following that introduction Björn Nilsson, Chair of the Euro-CASE Innovation

78

Participantes

Institucionais: 29

Membros AE: 23

Euro-Case: 26

Platform and President of the Royal Swedish Academy of Engineering Sciences, introduced the Euro-CASE Innovation Platform and the Global Entrepreneurship Monitor. The latter indicates that **the gap is closing but there continue to be large differences in terms of entrepreneurship attitudes and especially the fear of failure** which is considerably higher in the EU than in the US.

Ian Ritchie, Honorary Treasurer, Royal Academy of Engineering, provided a detailed overview of the differences in the provision of venture capital. **The financial crisis almost led to a collapse of the venture capital system in the EU which, in turn, led to an increase in public funding schemes that are neither able to contribute to growth nor to help ailing SMEs.** The question remains why

European SMEs can't grow big (such as e.g. Amazon, Facebook, etc.). During the discussion the participants largely agreed that **in the EU there should be put more emphasis on tax incentives and co-funding and less focus on firm survival.**

In his speech on funding mechanisms Manuel Heitor, former Secretary of State for Science in Portugal, **seized the opportunity to call for more public expenditures on R&D.** Except for Germany and the Nordic Countries, Government expenditures on R&D are shrinking in Europe due to the financial crisis with negative consequences for European innovation systems. During the following discussion it was mentioned that business expenditures of R&D are equally if not more important for innovation and that different framework conditions among EU member states need to be taken into account.

While during the Panel discussion, Dominique Peccoud, member of the NATF, provided valuable input to the paper by Maria Paula Diogo, Jean-Louis Migeot, President of the Royal Academy of Belgium (ARB), claimed that **an entrepreneurial spirit is missing in Europe. Public incentives and support programs do not help to overcome the gap in terms of risk taking.** Also social acknowledgement of entrepreneurial undertakings is lacking. SMEs should be given a much more prominent role in EU funded research projects. **Much more efforts are necessary in terms of education and cultural change to strengthen the entrepreneurial spirit.**

ANNUAL CONFERENCE

Boosting innovation in Europe

through the understanding of the gap when comparing with USA

LISBON, DECEMBER 10, 2013
Palácio Foz

Programme

09:30 Registration

10:00 Opening Session

President of Portuguese Academy of Engineering

Professor Fernando Santana

President of acatech, Chairman of Euro-CASE

Professor Reinhard Hüttli

Minister of Education and Science

Professor Nuno Crato

10:30 Coffee Break

10:50 Chair: **Professor Manuel Carrondo**

(Universidade Nova de Lisboa, Portuguese Academy of Engineering)

Introductory Note: **"Filling the gap through innovation"**

"Promoting Corporate Innovation in Portugal"

Professor João Bento

(President of COTEC-Portugal, Vice-President of Portuguese Academy of Engineering)

"The challenge of creating an innovation-friendly societal environment

- and why Europe differs from the US"

Dr Jan-Marco Mueller

(EC, Assistant to the Chief Scientific Adviser)

"The role of the Joint Research Centre of the European Commission

in innovation sectors: concrete examples and international cooperation"

Dr Ulla Engelmann

(Head of Unit, EC Joint Research Centre)

Open Discussion

12:30 Lunch

14:00 Chair: **Professor Sir William Wakeham**
(Senior Vice President, Honorary Secretary for International Activities,
Royal Academy of Engineering)

"Boosting Innovation in Europe: USA-EU - Why the innovation gap?"

Horizon 2020, How to boost Innovation?"

(Input paper for the Euro-CASE Annual Conference)

Professor Maria Paula Diogo

Discussing Panel

Professor Manuel Heitor

(Former Secretary of State for Science)

Professor Björn O. Nilsson

(Chair of Euro-CASE Innovation Platform, President of Royal Swedish Academy

of Engineering Sciences)

Professor Ian Ritchie

(Honorary Treasurer, Royal Academy of Engineering)

Dr Bruno Revellin-Falcoz

(Honorary President of National Academy of Technologies of France,

Director of International Relations)

Dr Jean-Louis Migeot

(President of Royal Academy of Belgium)

16:00 Coffee Break

16:20 **Open Discussion**

17:30 **Conclusions**

President of Portuguese Academy of Engineering

Professor Fernando Santana

President of acatech, Chairman of Euro-CASE

Professor Reinhard Hüttli

Member of Portuguese Government

18:00 **Close**

Guided tour to Palácio Foz

20:00 **Conference Dinner**

Sponsors





Sessão de Abertura: (Da esquerda para a direita) Presidente do Euro-Case (Prof. Doutor Reinhard Huttli), S.E. o Ministro da Ciência e Educação (Prof. Doutor Nuno Crato), Decano e Presidente Emérito da Academia de Engenharia (Prof. Doutor Armando Lencastre) e Presidente da Academia de Engenharia (Prof. Doutor Fernando Santana).



Presidente da Academia de Engenharia, Prof. Doutor Fernando Santana



Presidente do Euro-Case, Prof. Doutor Reinhard Huttli



S.E. o Ministro da Ciência e Educação, Prof. Doutor Nuno Crato



Aspecto da assistência à Conferência



Chairman, Prof. Doutor Manuel Carrondo, Membro da Academia de Engenharia



Presidente da COTEC e Vice-Presidente da Academia de Engenharia, Prof. Doutor João Bento



Head of Unit, EC Joint Research Centre, Dr Ulla Engelmann



EC, Assistant to the Chief Scientific Adviser,
Dr Jan-Marco Mueller



Chairman, Professor Sir William Wakeham, Vice-Presidente da Royal Academy of Engineering e Membro da Academia de Engenharia



Apresentação do *Position Paper* preparado pela Academia de Engenharia (Prof. Doutora Paula Diogo)



Prof. Doutor Manuel Heitor, Membro da Academia de Engenharia



Chair of Euro-CASE Innovation Platform, President of Royal Swedish Academy of Engineering Sciences, Prof. Doutor Bjorn O. Nilsson



Dominique Peccoud, member of the National Academy of Technologies of France



Jean-Louis Migeot, President of the Royal Academy of Belgium



Sala dos Espelhos, Palácio Foz

Comunicações apresentadas na Conferência Anual do Euro-CASE
(disponíveis no portal da Academia de Engenharia <http://www.academia-engenharia.org/euro-case-conference/presentations>)

- "Promoting Corporate Innovation in Portugal"
Professor João Bento
- "The challenge of creating an innovation-friendly societal environment – and why Europe differs from the US"
Dr Jan Marco Mueller
- "The role of the Joint Research Centre of the European Commission in innovation sectors: concrete examples and international cooperation"
Dr Ulla Engelmann

Discussing Panel

- "The emerging Euro-CASE position for improving Innovation in Europe"
Professor Björn O. Nilsson
- "How to form your very own Silicon Valey start up"
Professor Ian Ritchie



- 1 Por decisão da Direcção, a partir de 2005 o *valor da quota mensal* dos Membros Efetivos teve um acerto de 4 cêntimos, ficando fixado em €15,00 por mês, valor que se tem mantido.

A receita total da AE no ano de 2013 foi de 29 047,60 €, sendo proveniente de:

- Quotas dos Membros	13.680,00 €
- Donativos (Membros Eméritos)	359,14 €
- Donativos a Eventos	15.000,00 €
- Juros	8,46 €

A receita cobrada pela AE no ano de 2013 foi de 34 582,47 €, sendo proveniente de:

- Quotas dos Membros de 2008 a 2013, recebidas em 2013	9.199,87 €
- Quotas dos Membros de 2014, recebidas em 2013	15,00 €
- Donativos (Membros Eméritos)	359,14 €
- Juros	8,46 €
- Donativos (Patrocínios CGD, EPAL e Uninova)	25.000,00 €

Os custos totais do exercício de 2013 foram de 27 364,97 €, correspondentes às seguintes despesas:

- Quota do Euro-CASE	3.233,98€
- Despesas com “encontros com membros”	1.224,50€
- Despesas diversas com reuniões e funcionamento	6.125,16€
- Despesas com Cerimónia “Dia da Academia Engenharia 2012”	1.854,35€
- Despesas com Cerimónia “Euro-CASE Annual Meeting”	14.792,80€
- Diversos	134,18€

No final de 2013, o activo da AE tinha o valor de 110.438,29 €, distribuindo-se por:

- Depósitos à ordem	22.024,46€
- Depósitos a prazo	4.481,97€
- Novo fundo de obrigações	10.457,90€
- Dívidas de terceiros (quotas em atraso)	73.473,96€

O capital próprio da AE era, em 31 de Dezembro de 2013, de 109.414,34 €, correspondente a:

- Capital próprio em Dezembro de 2013	107.731,71 €
- Saldo do Exercício de 2013	1.682,63 €

- 2 Como decorre das contas referidas no número anterior, o exercício de 2013 conduziu a um resultado de 1 682,63 €. A Direcção propõe que este resultado seja levado à conta de resultados transitados.

Lisboa, 17 de Julho de 2014

Direcção

Fernando Santana
(Presidente)

Jaime Melo Baptista

João Bento
(Vice-Presidente)

Laura Mello Caldeira

João Goulão Crespo



Plano de Actividades 2014

Introdução

O âmbito e tipo de actividades da Academia depende, principalmente, dos meios de que dispuser para a sua concretização. A Direcção, com a preocupação permanente de preservar o património financeiro que lhe foi confiado, vem procurando ajustar essas actividades ao montante gerado pelo pagamento de quotas e por alguns patrocínios conseguidos, nomeadamente de € 10 000 e de € 15 000, respectivamente em 2012 e 2013. Este último foi despendido na realização da Conferência Anual do Euro-Case, em Lisboa, organizada pela Academia, a qual, na opinião do Euro-Case, terá superado as edições precedentes na generalidade dos aspectos (número de participantes, acolhimento do evento, etc.).

Num contexto socio-económico de crise, como o que o País actualmente atravessa, tem-se revelado particularmente difícil obter patrocínios, como é compreensível.

Ainda assim, para o ano de 2014, foi recentemente possível obter um apoio de € 10 000, o que veio permitir que se proponha uma intensificação de actividades para o 2.º semestre, como a seguir é indicado.



Plano de Actividades 2014

Actividades Previstas

1. Homenagem a Grandes Vultos da Engenharia Portuguesa

Esta actividade deverá ser concluída em 2014, segundo metodologia a aprovar em Assembleia Geral, a realizar durante o mês de Setembro.

2. Prémio Academia de Engenharia

Prosseguir-se-ão os contactos com a Galp Energia SA, no sentido da concretização do apoio acordado, de modo a que o Prémio possa ser entregue no Dia da Academia de Engenharia.

3. Admissão de Novos Membros

A composição da Comissão de apreciação de propostas de novos membros será submetida à Assembleia Geral, a realizar em Setembro, bem como o calendário para apresentação de propostas e correspondente eleição.

A imposição de insígnias aos novos Membros deverá efectuar-se no Dia da Academia de Engenharia.

4. Encontros com novos Membros

Prosseguir-se-á esta actividade, no formato já utilizado (almoço/debate), prevendo-se realizar três encontros.

5. Dia da Academia de Engenharia

Em data a fixar pela Assembleia Geral, convocar-se-á o Dia da Academia de Engenharia, no qual se incluirá a cerimónia de entrega do Prémio da Academia de Engenharia e a imposição de insígnias a novos Membros.

6. Potenciar a vocação dos jovens para a Engenharia

Dar-se-á continuidade ao esforço iniciado no sentido de encontrar apoios que permitam realizar esta actividade.

7. Actividades em Curso

Espera-se poder concluir a publicação referente aos *curricula* dos Membros da Academia, de modo a poder ser apresentada no Dia da Academia de Engenharia.

Igualmente, prosseguir-se-á a análise relativa à possibilidade da Academia vir a dispor de espaço próprio.



No final de 2013 a AE era constituída por 130 Membros, distribuídos pelas seguintes categorias:

- 76 Membros Efectivos
- 47 Membros Eméritos
- 5 Membros Não-residentes
- 2 Membros Honorários

- D** Decano
- MH** Membro Honorário
- PE** Presidente Emérito
- ME** Membro Emérito
- MEf** Membro Efectivo
- Mnr** Membro Não-residente

MH Ordem dos Engenheiros

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IN PERPETUUM

ME 108 **Manuel Leal da Costa Lobo** (1929 - 2013)

anexo

Position Paper apresentado pela AE

- “*Boosting Innovation in Europe: USA-EU - Why the innovation gap? Horizon 2020, How to boost Innovation?*”
Professor Maria Paula Diogo



Input paper for the Euro-CASE annual conference

“Boosting Innovation in Europe: USA-EU - Why the innovation gap? Horizon 2020, How to boost Innovation?”

Introduction¹

In his controversial and mediatized 1989 essay, *The End of History*, Francis Fukuyama claimed that society had reached the final stage of its evolutionary process, by crystallizing itself in the so-called liberal democracies. Twelve years later, in 2002, Fukuyama wrote another essay entitled *Our Post Human Future: Consequences of the Biotechnology Revolution* in which he presented technological evolution, notably the area at the crossroads of bio/nanotechnologies and artificial intelligence, as the most substantial risk to 21st century society. He brought to social analysis John von Neumann's concept of *technological singularity* – meanwhile popularized by science fiction authors such as the mathematician Vernor Vinge –, that is, techno-scientific change with such a deep impact as to transform not only our habitat, but also ourselves. The concept of *technological singularity* enlarges the former concept of *Anthropocene*, coined by ecologist Eugene F. Stoermer and popularized by the Nobel Prize, Paul Crutzen, to describe a new geologic era (that began with the Industrial Revolution and speeded up during the 20th century) shaped by human activities that have had a significant global impact on the Earth's ecosystems.

Although often evading one's perception, since the second half of the 20th century we live times of revolution, which has changed in unprecedented ways, the world around us by instilling in it an eminently technological nature.² Today's natural world has such a deep technological structure that one does not even realize it when using technical devices and apparatuses as “naturally” as we breathe. This change has been so radical and “surreptitious” that the world before World War II became a distant memory, almost bucolic, with which we can hardly identify. Writing an e-mail or texting a message in a mobile phone, downloading a film or searching for a street in Google maps have become so natural, not in the general sense of the term, but in that it became part of our identity as human beings.

¹ This paper was originally written by Maria Paula Diogo and Fernando Santana (Faculty of Science and Technology, NOVA – New University of Lisbon). The present version includes the suggestions and comments raised during the discussion of this position paper by the members of the Euro-CASE innovation platform.

² Rosalind Williams, *Retooling: A Historian Confronts Technological Change*, Cambridge (Mass.): MIT Press,

In our days, words like change, innovation, entrepreneurship, became omnipresent worldwide not only in political discourse, but also in daily routines. The use one makes of these expressions, however, is often abstract and simplistic, ignoring the density of their interrelationships in different geographic, historical and civilizational contexts, and the *boomerang* character of today's world.³

In order to address the topic of this conference – *Boosting Innovation in Europe: USA-EU Why the innovation gap? Horizon 2020, How to boost Innovation* – we suggest a brief albeit deeper reflection on the meaning of these words, which have become common currency in meetings, lectures and seminars, and on how engineering may contribute to a new European research agenda.

In 2000, when confronted with complaints on gender discrimination in MIT, Provost Robert Brown, professor of chemical engineering responded: “But (...) this is the MIT. We are engineers. Engineers solve problems.” These words are not that different from those of Sheldon Cooper, Doctor in theoretical physics at Caltech, a character of the TV series *The Big Bang Theory*, who while conversing with his friend Howard, precisely a MIT mechanical engineer working for a NASA project, described the engineers as “So, this is engineering, huh?” Engineering where the noble semi-skilled labourers execute the vision of those who think and dream.

In completely different contexts, these two sentences synthesize the distinctive essence of engineering: the importance of doing and intervening in the world of things. It is the very identity of engineering, which determines its relationships with the knowledge of nature. On this account, one should recall the old Baconian idea “knowledge is power” – in the sense of a capacity of transforming, changing and manipulating – or the Cartesian concept “knowing nature to dominate it”, which substantiate engineering's close relationship with invention and innovation.

Although distinct, but traditionally used together, the concepts of inventions and innovation have drifted apart from one another. Today one mostly hears about innovation and for the lay public this means basically new technical solutions available in the marketplace. The reasons behind this perception of innovation are simple: the social character of innovation and the fact that it is deeply linked both to the markets and a measurable concept of success, which feeds itself in a vicious circle, since market-driven innovation imposes its own continuation. This weight of the market has narrowed the concept of innovation to the universe of entrepreneurship, innovation's cognitive dimension being lost on the way. One often recalls Steve Jobs and Bill Gates, first as young men inventing personal computers in a garage and subsequently tycoons in the world of computing, but one easily forgets John Bardeen, William Shockley and Walter Brattain inventing the transistor in the Bell Labs.

However, the concept of innovation is much broader broad encompassing both breakthroughs and incremental changes and covering a diversity of areas, such as technical, marketing, operational, and organizational. At its core lies the ability of

³Ulrich Beck, *World Risk Society*, Cambridge: Polity Press, 1998.

thinking differently while approaching a set of problems or needs, the capacity of being a “wild spirit”, as used by Schumpeter.

In 2000, precisely inspired in Schumpeter’s ideas, the Lisbon Agenda devised a ten years plan for the European Union’s economy aiming at making the EU “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.”⁴ The topic of this conference shows that most of the Lisbon Agenda goals were not achieved. Our contribution thus follows the Europe 2020 initiative that aims at “smart, sustainable, inclusive growth”⁵ taking as a benchmark the United States of America and the BRICS, particularly China.

USA-EU Why the innovation gap?

The reasons for the innovation gap between the USA and Europe are multiple starting with the fact that the US are a federal republic and Europe is a space dominated by Nation-States each staunchly defending its specific interests: (1) the total value of the investment in R&D; (2) the organization of research; (3) education system; (4) cultural values concerning risk and citizenship.

Up to the 1930s, the USA mainly adapted inventions, but with World War II, and later the Cold War with its spatial programme and military interventions, investments grew substantially, above 3% of the GDP. The American government, in particular its military sector, joined forces with universities and companies in order to make the USA the world leader in techno scientific innovation, in the context of the country’s affirmation as one of the main world superpowers.

A key-factor was the immigration and settlement of European scientists, who were organized in innovative ways around specific research objectives and had at their disposal considerable private and public funds, the so-called research-oriented projects such as the Manhattan project; synthetic rubber GRS; the trilogy Mercury, Gemini and Apollo; Star Wars and Arpanet; the transistor of the Bell Laboratories or the IBM computers. They were all linked to the military-industrial complex with massive investments in research carried out in universities such as the MIT, Caltech and Columbia, and in corporate laboratories of which the government was the main customer.

On the other hand, also after the World War II, a new type of investment was created in America – the venture capital - to support at an early-stage high-potential and high-risk start-up companies.⁶ Due to its characteristics, venture capital is especially suitable to support fast-growing high-tech business and research areas, such as

⁴ *European Union Parliament Website Lisbon European Council*, 23 and 24 March. Conclusion. http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/00100-r1.en0.htm. Retrieved 16 November 2013.

⁵ *Europe 2020: Commission proposes new economic strategy* http://ec.europa.eu/news/economy/100303_en.htm. Retrieved 16 November 2013.

⁶ The first two US venture capital firms were founded in 1946: the American Research and Development Corporation (ARDC) and the J.H. Whitney & Company.

computer and bio technologies and thus played an instrumental role in developing many of the major Silicon Valley technology companies.

Both the state and private highly funded research centres are at the core of the US network of excellence. An agile and protectionist patent system added to the above features.

As far as European investment in R&D policy is concerned, World War II left a landscape of destruction, with most of the industrial fabric at the brink of exhaustion. The recovery was largely based on the Marshall plan, which, in turn, emphasised American world leading role. Although traditional industrial sectors, such as steel and the chemical industry were able to recover and consolidate (Europe matched the US productivity in the 1980s⁷), the post-war Europe, divided by the so-called Iron Curtain, was no longer a leading player in the new globalised world. Investment in scientific and technological research remained a small percentage of the GDP (reaching a maximum of 2% for the former EU15) and innovation in industry was closer to the concept of improvement, i.e. doing the same thing better, than of doing something really different.

The absence of a strong and continuous investor, such as the defence industry in the US, the weakness of the venture investment (in 2008, in the UK, 4% of British investment went to venture capital, compared to about 33% in the U.S) and the fact that in competitive worldwide economies getting to the top first is critical to assume future leadership by setting the standards, prevented Europe to close the R&D gap to the US.

Concerning the education system, particularly in the area of engineering and sciences, the United States and Europe are also quite different.⁸ The US adopted the so-called Anglo-Saxon paradigm, following the British tradition, pursuing a utilitarian view of science and encouraging a pragmatic market-driven approach to education and knowledge, a model suitable to the American economic, social and political reality, based on a strong private industrial initiative. In this context, the training of engineers and scientists was much more inductive and pragmatic. Engineers had often an informal training (workshop-culture and hands-on training) and their individual prestige laid mostly on their role as engineer-entrepreneur, through market mechanisms such as patents. Although the informal profile of engineering training in the US gave way to a more formal education, the hands-on gene continued to be a hallmark of the Anglo-Saxon education. In this context, the relationship between business and research (institutionalized at US universities and research centres) is easily accepted and the idea of university professors being simultaneously businessmen is perceived as a virtue, not as a sin.

⁷ Werner Roeger, Janos Varga and Jan in' t Veldy, *How to close the productivity gap between the US and Europe. A quantitative assessment using a semi-endogenous growth model*, Brussels: European Commission/Directorate-General for Economic and Financial Affairs Publications, 2009. http://ec.europa.eu/economy_finance/publications/economic_paper/2010/pdf/ecp399_en.pdf. Retrieved 16 November 2013.

⁸ Maria Paula Diogo, "Engineering", in P-Y Saunier, A. Iriye (eds.) *Palgrave Dictionary of Transnational History*, London: Macmillan, 2007, pp.330-333.

In turn, in the 19th and 20th centuries, Europe has distinct experiences in education patterns, ranging from British model, favouring practical teaching oriented to industry, to the strong and influential French model of the selective and rigid *grandes écoles* oriented to public works (which dominated most of Europe and turned engineers and their corps into a true *noblesse d'État*⁹), and the German *Technische Hochschulen* associated with chemical industry. Following the long period of European supremacy, which extended to its empires, the two world conflicts, the Marshall Plan and the Cold War reformulated the matrix of European engineering, which in the West was inspired by the American example and in the East by the Soviet model.

The European educational model, which grew largely apart from the business world, has a much more reluctant approach to the relations between business and research. The idea of an enterprise-like University and the danger of commodification of higher education, with the consequent loss of intellectual freedom and subjugation to the business world, is increasingly a pressing and unavoidable question in international debates over University life.¹⁰

Last but not least, there are significant cultural differences between the US and Europe as far as risk and citizenship are concerned. In a dynamic economy, where finding financing is easy, such as the American one, failure is easily accommodated and regarded as part of a process of maturing. In the European case, not succeeding in business is viewed as a personal failure and it is not easy to have another go. These social differences in perceiving risk taking and risk management are critical to the attitude of younger generations towards innovation and entrepreneurship.

On the other hand, the European public opinion is much more active and sensitive to topics such as environment, sustainability and privacy. The concept of European democracy itself rests upon the idea of citizenship as shaped by the French Revolution, thus implying a strong engagement of citizens in governmental decisions that may affect their lives.

To put it in a nutshell: the US have: a dynamic economy of scale with little state intervention, but where national and federal governments are strong clients; the US role as a world superpower relies on its military leadership, thus creating favourable conditions to fund research particularly relevant to the defence industry; a utilitarian view of science and an engineering teaching oriented to practice; high-level expensive private universities; an agile and protective patent system. Europe, on the other hand is a fragmented space dominated by competing Nation-States with different national interests and specificities, economic settings and cultural traditions.

The rising of the BRICS, particularly China placed further pressure on the EU economy and R&D policies. China has been increasing its GDP percentage devoted to research and training, the venture investment increased 50 percent (while venture

⁹ Pierre Bourdieu, *La noblesse d'État: grandes écoles et esprit de corps*, Paris, 1989.

¹⁰ Derek Bok, *Universities in the Market Place*, Princeton: Princeton University Press, 2003.

funding is dropping both in US and Europe).¹¹ In addition, technological innovation is becoming increasingly global, and patents less protective; laboratories of western large companies delocalize to China and investors and entrepreneurs' confidence in overseas markets and companies is growing; American and European professors are contracted to serve Chinese higher education; Chinese students are sent to prestigious American Universities. Many refer to this trend as the new Self-Strengthening Movement (China, 19th century) and wonder about the future results.

Horizon 2020, a European *Wakon Yousai*?¹²

To emulate the United States in Europe is useless. The European Union has to design a strategy that takes into account European history, mainly that Europe is not a unified political entity and that there were and there are asymmetries and tensions between states and regions. Both the Lisbon and the Europe 2020 agendas present Europe as a homogeneous identity, as an abstract concept that hardly matches reality. The biggest challenge for Europe is to learn how to deal with diversity and overcome the gap between the EU discourse, which is always plural, and its practice that is applied in a monolithic way.

The concept of collaboration is, thus, critical. The EU soon realized the importance of technology to its integration agenda. The construction of transnational infrastructures, the collaboration of experts in European projects, the adoption of common technological standards, unveil a more united Europe than conventional political practices.¹³ Research funding has been consolidating in Europe, but it is obvious that innovation has not yet reached its intended role, very much because of political and economic reasons beyond the issues of research itself.

How can engineering schools contribute to modify this situation, in particular, in what sense the programme *Horizon 2020* can harbour effectively this new strategy? The answer is to be able to think ahead, to anticipate what we need for the future. The report of the US National Academy of Engineering when referring to the engineers for the year 2020 (*The Engineer for 2020*) – whose purpose is to anticipate the way in which engineering schools can contribute to sustaining the high rates of innovation, which can be compared to *Horizon 2020* – draws attention to the need of creating new curricula:¹⁴

If the United States is to maintain its economic leadership and be able to sustain its share of high-technology jobs, it must prepare for a new wave of change. While there is no consensus at this stage, it is agreed that innovation is the key and engineering is essential to this task; but engineering will only contribute to success if it is able to continue to adapt

¹¹ <http://venturebeat.com/2009/02/18/international-venture-funding-rose-15-percent-in-2008/>. Retrieved 16 November 2013.

¹² The term “Wakon Yousai”, which was coined during the modernization of Japan, means “Japanese spirit and Western technology”

¹³ On this “hidden integration agenda” see *Tensions of Europe/Making Europe*. (<http://www.tensionsofeurope.eu/www/en/research/tie-project>).

¹⁴ *The Engineer for 2020*, p.51.

to new trends and educate the next generation of students so as to arm them with the tools needed for the world as it will be, not as it is today.

These new curricula have to educate students by promoting creativity, agility of reasoning and a critical understanding of the social world and its reflectivity. Obviously, the matter is not reducing the technical and scientific dimensions of engineering teaching; rather it is the need to realize that encyclopaedic knowledge no longer holds. At the speed of technological change in today's world, striving to teach everything to the students is totally unrealistic. What is really needed is to train students how to think and solve problems from a core base of solid instruments; anticipate new problems; retrieve information and measure the impact of their work in global terms; teamwork with colleagues from other fields of expertise and from different cultural traditions.

Creativity, which is at the core of invention and innovation, is twofold as it is simultaneously individual and collective. The complexity and diversity of technologies in the 21st century and the interactive multiplicity of their impacts requires the capacity of working in interdisciplinary teams. One is facing a tentacular technological world, in which traditional disciplinary boundaries crumble, and the organization of research changes in order to accommodate new dimensions, notably technological policies.

As mentioned before, for the first time one is at a crossroads of no return, in areas such as environmental problems and climate change; energetic and resource management and new materials; information technologies and privacy, freedom and surveillance of migration; or as bio/nanotechnologies and artificial intelligence with the dangers of inequality at a global scale introduced by trans-humanism.

The programme *Horizon 2020* can only be effective if integrating and responding to these challenges by promoting innovation, creativity and social awareness. The great amount of funds allocated to techno-scientific research, covering a variety of fields, including those associated with climate change, energy and resources sustainability, is an important step towards repositioning Europe in terms of innovation leadership. However, it is the *quality* of research and its capacity of reflecting the above mentioned civilizational aspects that will be decisive. A variety of studies and reflections carried out in American universities, such as Cal Tech, MIT, Columbia or Harvard, show that an excessive commitment to the business world can, for reasons of secrecy or of interest in moving too fast in order to patent first, undermine the academic research ethos, which also entails a commitment to society. The question is not "abhorrence" for the world of profit, but a real need to maintain the independence between these two spheres, which should communicate with one another, but never merge. Universities are not corporations and universities governance should be, therefore, different from corporative governance in a profit-seeking business. In the academic world, whose mission is to produce knowledge in the service of society, efficiency means excellence in research and teaching, and the pursuit of values such as independence and intellectual honesty and social conscience and ethics.

Europe has a diversified potential for innovation and a strong commitment to environmental issues and sustainability, which should be valued. Questions such as environmental protection, low-carbon energetic alternatives and transportation; the study and management of water resources and climate change; food safety; public health; aging and consumers' rights are transverse in Europe and with the potential of gathering together national efforts in common European projects.

Horizon 2020 should capitalize on the multiplicities and differences in Europe in order to be successful. The projects to be funded should be transnational, interdisciplinary and encompass Europe's historical experience, by reviving the notion of a Republic of Letters, an entity so characteristically European, which would enable the creation of a space where scientists, engineers, sociologists, historians, economists and anthropologists can cooperate and work on problems defining our future, by bringing in distinct but complementary perspectives regarding their solution. Undoubtedly, the success will be in the Europeans' capability of thinking locally and globally about the problems and beyond the short run.

What is the contribution of engineers and engineering course-syllabuses to endow Europe with an innovation structure? There is no doubt that engineering borders are increasingly more blurred. Today, the engineer of the 19th century first engaged in railway construction and then in electricity, and the 20th century chemical engineer, have no equivalent. One talks more about techno-science rather than about science and technology, and has to adapt to new research areas, emerging at a faster pace. Consequently, our teaching paradigm has to change in order to train "innovators" rather than engineers.¹⁵ Curricula have to adapt by notably changing the workload between core disciplines and those which enable students to integrate technological innovation with organizational innovation and ethics. Training engineers with innovation in their DNA, however, is not making them entrepreneurs in the narrow sense; rather, it is to develop an entrepreneur-spirit (the schumpeterian *Unternehmergeist*), by encouraging them to risk new solutions to solve problems. It should be in the latter direction that Europe needs to go.

Engineering continues to be a crucial element to the development of civilization, as historically it has ever been, but its profile needs to keep changing and adapting to a world that challenge us constantly by posing unexpected questions with no straightforward answers. A major concern of today's educators is the decline of interest among young people in science and technology. These areas suffer the impact of a certain *zeitgeist* that, on one hand, emphasizes the value of money, attracting many young people to economics and management courses hoping to earn high salaries, and, alternatively, nourishes the desire for an active engagement in changing society, thus favouring social sciences courses. To be a scientist or an engineer is perceived as a difficult career, uncertain, dull, not necessarily well paid and technocratic, where civic intervention is marginal.¹⁶

¹⁵Williams, *Retooling*, p.63.

¹⁶ See Euro-Case Position Paper on the Future EU 2020 Strategy.

If we succeed doing justice to dynamism and social conscience, which traditionally have characterized engineers, we will be able to attract young people to scientific and technological areas, allowing them to be “scientists and engineers with an attitude”, participating in an inclusive society. If we create the conditions of job stability for young researchers and provide them with the capacity of not only exchanging ideas in a truly and borderless European space, but also technical, social and ethical instruments to think their research in the 21st century, Europe will be able to restore its leadership.

As to Horizon 2020 as leverage for European innovation, the Euro-Case Position on the *Common Strategic Framework for Research and Innovation* should be object of reflection.¹⁷ Horizon 2020 should bring a new life to the *European Research Area* (ERA) and the European Institute of Technology (EIT). These should not be perceived by researchers, and mainly young researchers, as one more bureaucratic organization like those often harshly criticized by European citizens and in particular by the young; rather EU should commit to light and flexible structures promoting debates around research, either actually being carried out or intended, by congregating small groups whose mission would be analysing and brainstorming. By using the military metaphor, Europe needs not a conventional army, but guerrilla groups, agile, short-lived and in variable locations. These *pop-up* groups can hub small and temporary think-tanks bringing together universities, research units and companies, avoiding the traditional governmental appointment, in order to avoid the interference of political clienteles. To some extent, the Euro-CASE Innovation Platform is a fine prototype for temporary organizations of this kind. The very European Institute of Innovation and Technology (EIT) can work as a hub for these *think-tanks*, but it has to become more active, decentralized and agile.

A second aspect that Horizon 2020 should take into account is that Europe cannot equal or overcome the USA and countries like China by copying them. The European model has to be different, by using its own specificity – cultural diversity, including scientific, and the importance of citizenship and sustainability. History shows us that mere importation and imitation of foreign models is useless in the long term and that efficiency is better achieved when local specificities are used to build a global model. In this sense, one of the fundamental tools should be transnational and trans-disciplinary research oriented by principles of sustainability, and focused on particular niches such as transport, energy and health which bring together expertise from different industrial sectors, including the traditional ones.

Although political decision-makers have largely failed their project of creating a European ‘nationality’, it is possible to materialize it in the realm of techno scientific research. The collaboration between scientists and engineers, even in hostile periods such as that of the Cold War, went beyond the constraints of national borders. Europe has privileged conditions for the creation of a new generation of researchers, a sense of unity in diversity and citizenship in democracy, which on par with more substantial funding, are Europe’s main assets. Thus, Horizon 2020 should not be

¹⁷ See Euro-CASE Position Paper on the Common Strategic Framework for Research and Innovation.

seen as merely funding, but as an opportunity to innovate from the organizational point of view European research, which should have its own identity strengthened in a global world, rather than being a degraded image of other models.

Can schools of science and technology contribute to the repositioning of Europe in world innovation? Absolutely! The key is the restructuring of traditional curricula, by encouraging the capacity to think and learn. We need to endow our future scientists and engineers with the capacity of thinking in European terms, not necessarily by means of physical dislocation, but by using new information technologies and online debates; we need researchers who share a European agenda based on human sustainability on the planet, and whenever facing new challenges and situations are capable of understanding them and generate appropriate answers.

Specific Recommendations

1. Think in a transnational way and use European diversity as an asset to approach globalisation;
2. The precautionary principle needs to be tempered in order to accommodate and encourage innovation;
3. Consider public procurement as an efficient method to promote the development and deployment of innovations both in the public and the private sector;
4. Create ecosystems for innovation in EU that respect European values while promoting cultural change;
5. De-bureaucratize and “democratize” the European innovation landscape, by privileging small, agile, and temporary structures instead of the traditional huge, heavy, and time and money consuming institutions; overcome the distrust of population in the EU use of taxes;
6. Recognize that to train students to be innovators is not just a matter of adding one more course to the curricula; students have to learn how to think differently. The use of their professional historical memory may provide inspiring examples of how to deal with new problems (introducing the topic of success and failure), as well as a closer contact to “entrepreneurs in residence”, which can strengthen a culture of entrepreneurship.