ScuDo
Scuola di Dottorato ~ Doctoral School
WHAT YOU ARE,TAKES YOU FAR

PhD in Italy and Europe

Flavio Canavero

Outline

- Context and State of the Art
- Salzburg I
- Salzburg II
- Innovative Doctoral Training (IDT)
- The decade 2005-2015
- Challenges and Salzburg III
- Industrial Doctorate

Context

Universities and society have long acknowledged the important contribution of doctoral graduates in the ***creation of new knowledge.***

Doctoral studies are among the ***most advanced*** and specialised forms of ***education and training*** available in modern societies.

Their purpose can be defined in terms of ***providing society with the capacity for carrying out high quality research,*** and of ***producing highly-qualified graduates*** with options to engage in their careers with the skills acquired during education and training through research.

Context

Collaborative doctoral education is of growing importance, given the increased focus on innovation through R&D in order to advance towards a more "knowledge-based" economy.

Today transdisciplinarity is also recognised to be essential for innovation and ***universities are unique environments where high academic standards and a vast range of disciplines meet and flourish, and R&D oriented business are becoming more aware of its potential.***

Drivers behind the development in European doctoral education

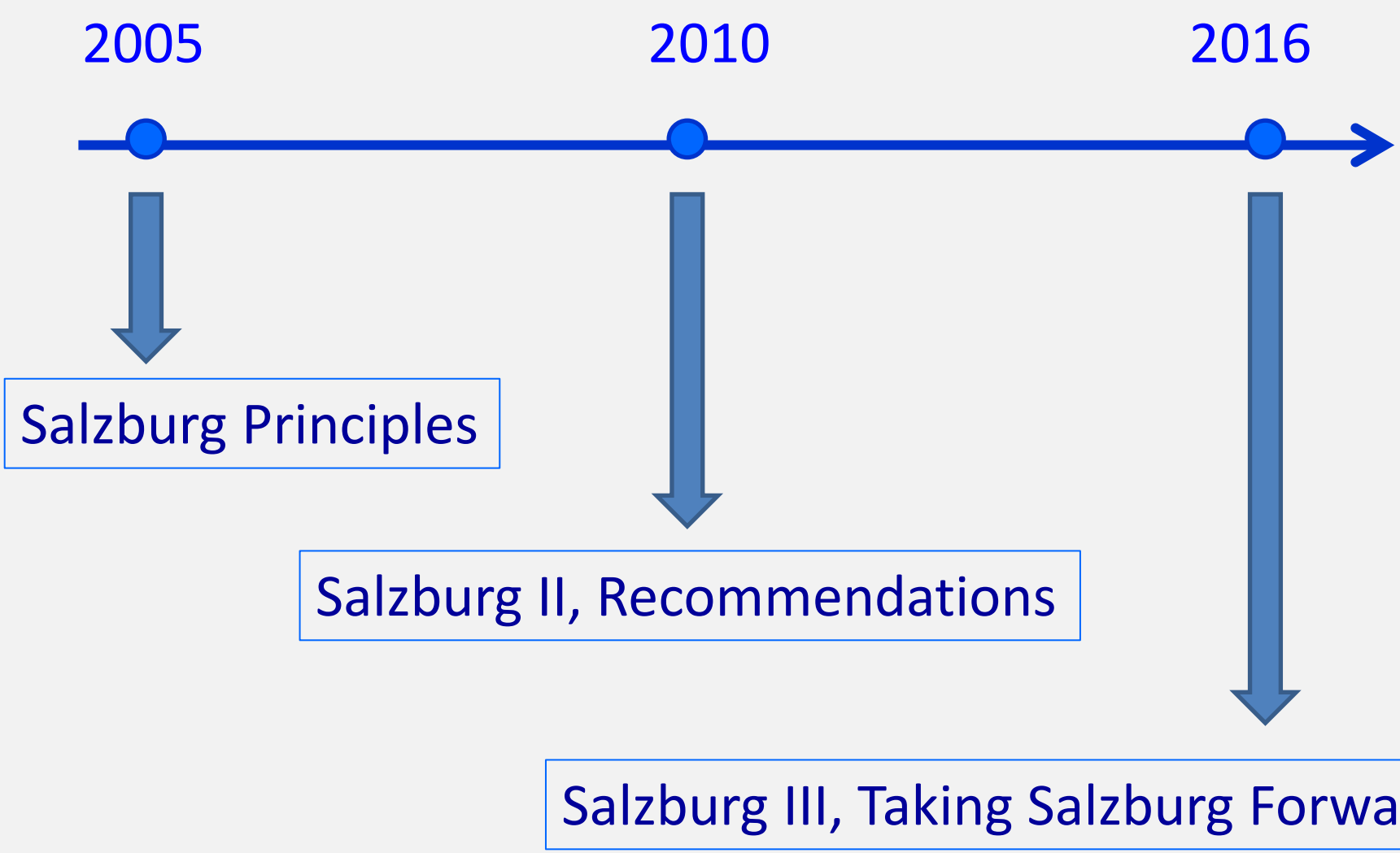
- The Bologna Process
  - Inclusion of doctoral education as 'third cycle' 2003
  - Salzburg Principles 2005
- The European Research Area
  - "Europe-wide open space for knowledge and technologies in which transnational synergies and complementarities are fully exploited"
  - Linked to..
- Lisbon Strategy/Europe2020
  - Europe as a high level knowledge economy
  - "Smart sustainable and inclusive growth"

Universities have responded

- Since 2005, we have seen a 'quiet revolution' in doctoral education
  - Professional management: The ***Rise of the doctoral school***
    - 30 % of universities had a doctoral school in 2007
    - 65 % in 2009

- Reform of doctoral programmes
  - Interdisciplinarity
  - Transferable skills
  - Mobility components

State of the Art - Milestones



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Salzburg Principles and recommendations

- Salzburg Principles from 2005 – outcomes of an EUA-led project and a Bologna seminar
  - The doctorate is research-based
  - Importance of institutional strategies
  - Diversity
- Salzburg recommendations 2010 – from consultations with CDE members
  - Research as the 'basis and the difference' from the other two cycles
  - Space for individual development
  - Autonomy for the institution to choose mission and strategy and to set up the appropriate structures

The Salzburg Principles (2005) I-III

- **"The core component of doctoral training is the advancement of knowledge through original research"**
  - This is the most important principle – everything else must be related to this
- **Institutional strategies**
  - This means that institutions take responsibility and manage doctoral education more professionally – it is here that we have seen most progress
- **Diversity**
  - Very important – many different models, but common ideas of 'quality and sound practice' (one goal, different routes)

The Salzburg Principles (2005) IV-VI

- **Doctoral candidates as early stage researchers:** should be recognized as professionals – with commensurate rights – who make a key contribution to the creation of new knowledge.
- **The crucial role of supervision and assessment:** in respect of individual doctoral candidates, arrangements for supervision and assessment should be based on a transparent contractual framework of shared responsibilities
- **Achieving critical mass:** Doctoral programmes should seek to achieve critical mass and should draw on different types of innovative practice being introduced in universities across Europe...

The Salzburg Principles (2005) VII-X

- **Duration:** doctoral programmes should operate within an appropriate time duration (three to four years fulltime as a rule)
- **The promotion of innovative structures:** to meet the challenge of interdisciplinary training and the development of transferable skills
- **Increasing mobility:** Doctoral programmes should seek to offer geographical as well as interdisciplinary and intersectoral mobility and international collaboration
- **Ensuring appropriate funding:** the development of quality doctoral programmes and the successful completion by doctoral candidates requires appropriate and sustainable funding

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Salzburg II Recommendations (2010)

- Large consensus about the research basis of the doctorate
  1. Original research as the basis of the doctorate and as the difference from the other two cycles
  2. Space for and focus on individual development
  3. Institutional autonomy to choose the mission and strategy and to set up the appropriate
- Trend towards **structured programmes** and **doctoral/ research/ graduate schools**
  - The rise of the doctoral/ graduate/ research school (30% of institutions 2007 to 65% 2010, now more than 75%)

Salzburg II – Organization and Structures

- **Doctoral/ graduate/ research school is an independent organizational unit with a clear effective administration, strong leadership and specific funding supporting this structure**
  - The aim and role of doctoral schools: to create a critical mass, stimulate research environment, strengthen doctoral candidates community, enhance interdisciplinarity and inter-institutional and international collaboration and mobility, improve time-to-doctorate, improve quality while keeping diversity and flexibility

Salzburg II – Supervision and Assessment

- **Supervision** – a major topic of the debate – an important aspect of quality:
  - Arrangements based on a contract btw PhD candidate, supervisor and institution with rights and responsibilities = good practice in many High Education Institutions
  - Multiple supervision encouraged
  - Supervision should be recognized as a part of workload
  - Increased need for professional skills development for supervisors (training of supervisors)
- **Assessment of the thesis** – objective and transparent, done by university expert committee (pref. with international rep) without the supervisor as a member; public defense

Salzburg II – Outcomes

- The main outcome of doctoral education – doctoral graduate – is a **person with numerous skills** that make him/her employable in various sectors
- Then main outcome of doctoral research – a **dissertation/ thesis** that can have a form of a publishable monograph or several peer reviewed published articles with an introductory chapter
- Open questions: language (English only? – this leads to weakening of scientific terminology in national languages), length, conditions leading to the defense (how many published papers?)

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In the implementation process of Salzburg principles, Universities, together with European and national policy makers, have made certain elements of PhD training more explicit.
In 2011, the European Commission published the seven principles of Innovative Doctoral Training (IDT).

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR RESEARCH & INNOVATION

Directorate B - European Research Area
Unit B.2 "Skills"

Brussels, 27/06/2011

Principles for Innovative Doctoral Training[1]

Based on expert advice, the European Commission, has defined the seven Principles of Innovative Doctoral Training as follows:

1. Research excellence
2. Attractive institutional environment
3. Quality assurance
4. Interdisciplinary research options
5. Transferable skills training
6. Exposure to industry and other relevant employment sectors
7. International networking

Transferable Skills Development

- Transferable skills training should be an integral part of first, second and third cycles
- The aim at the third cycle: to raise awareness among doctoral candidates of the **importance of recognising and enhancing the skills that they develop and acquire through research**, as a means of **improving their employment prospects & career development inside & outside academia**
- Adequate funding of transferable skills training – crucial
- Teaching transferable skills should be recognised in evaluation of academic staff involved

Internationalization and Mobility

- Universities are encouraged to enhance their efforts to support **international institutional cooperation and mobility** at doctoral level as part of their institutional strategies:
  - joint doctoral programmes, co-tutelles, European doctorates, …
  - Trans-sectoral mobility (doctoral programmes and collaboration with industry)
  - internationalization inside universities such as recruiting more international staff, organization of int. summer schools and conferences; using new technologies for e-learning or teleconferences, etc.
  - mobility as brain circulation rather than brain drain (partnerships)
- Mobility has to be recognised as an added value for career development of early stage researchers

Quality Assurance

- "It is necessary to develop specific systems for quality assurance [for doctoral education]... there is a **strong link between the assessment of the research of the institution and the assessment of the research environments that form the basis of doctoral education**."
- Development of systems that **combine** quality of research, quality of structures and take into account "the professional development of the researcher as well as the progress of the research project."

European Quality Assurance: Overview

- There does not exist one European QA, but standards and guidelines providing framework for good practice sharing
- Suggestions
  - Main responsibility for QA lies with the institutions
  - Context sensitive (institutional and disciplinary diversity)
  - Fitness for purpose approach
  - Enhancement oriented
  - Internal and external evaluations or QA processes should be complementary
  - Transparency and co-operation
- The goal should be an institutional quality culture supported by the QA processes, not the processes themselves

Development of New Doctorates

- A range of innovative doctoral programmes are emerging as a response to the changes of a fast-growing global labour market (professional doctorates, industrial doctorates, European doctorates, doctorate in performing arts etc.)
- Diversity of doctoral programmes reflects diversity of European High Educational Institutions that have autonomy to develop their missions and priorities
- Consensus: **original research has to remain the main component of all doctorates**
- No consensus on new doctorates in Europe (esp. professional doctorates in the UK - further debate on new doctorates as well as new vision of the doctorate is needed).

Funding-related issues

- Financing of doctoral schools
  - Securing and developing critical mass of research (excellence and capacity building)
  - Funding for experiments such as physical space, inventive career development etc.
  - Funding for grants/salaries for doctoral schools with excellent research and structures
  - Matching funding with research and supervisory capacity

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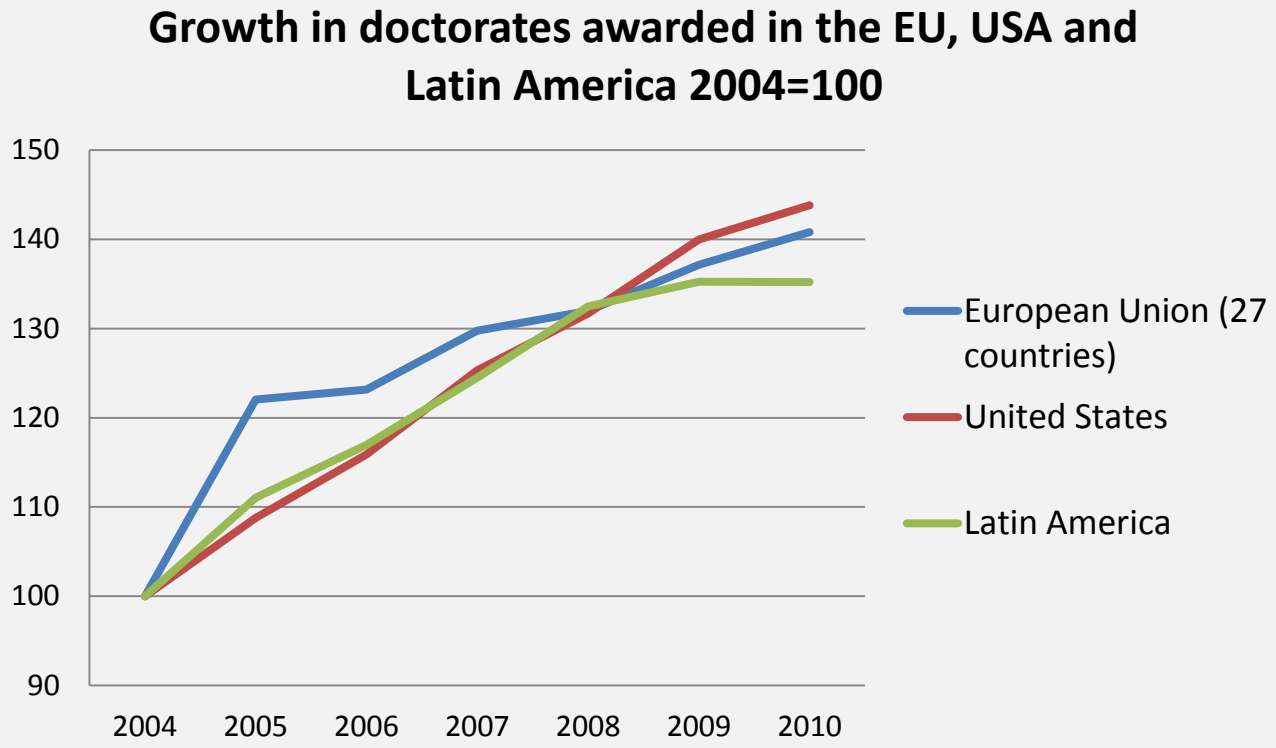
A lot has been done!

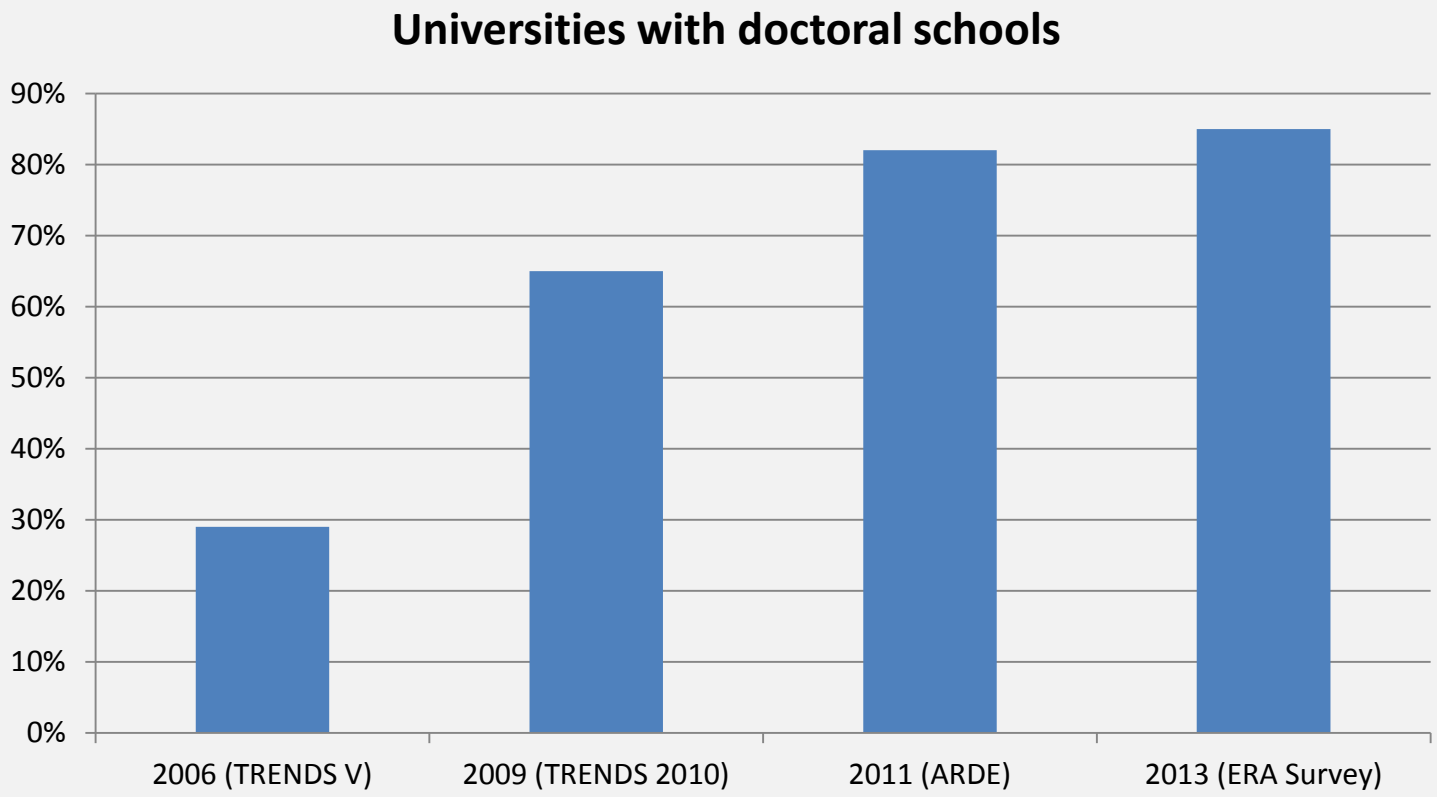
On a structural level

- Relevant documents, common policies
- Establishing a framework for doctoral education
- Establishment of doctoral schools

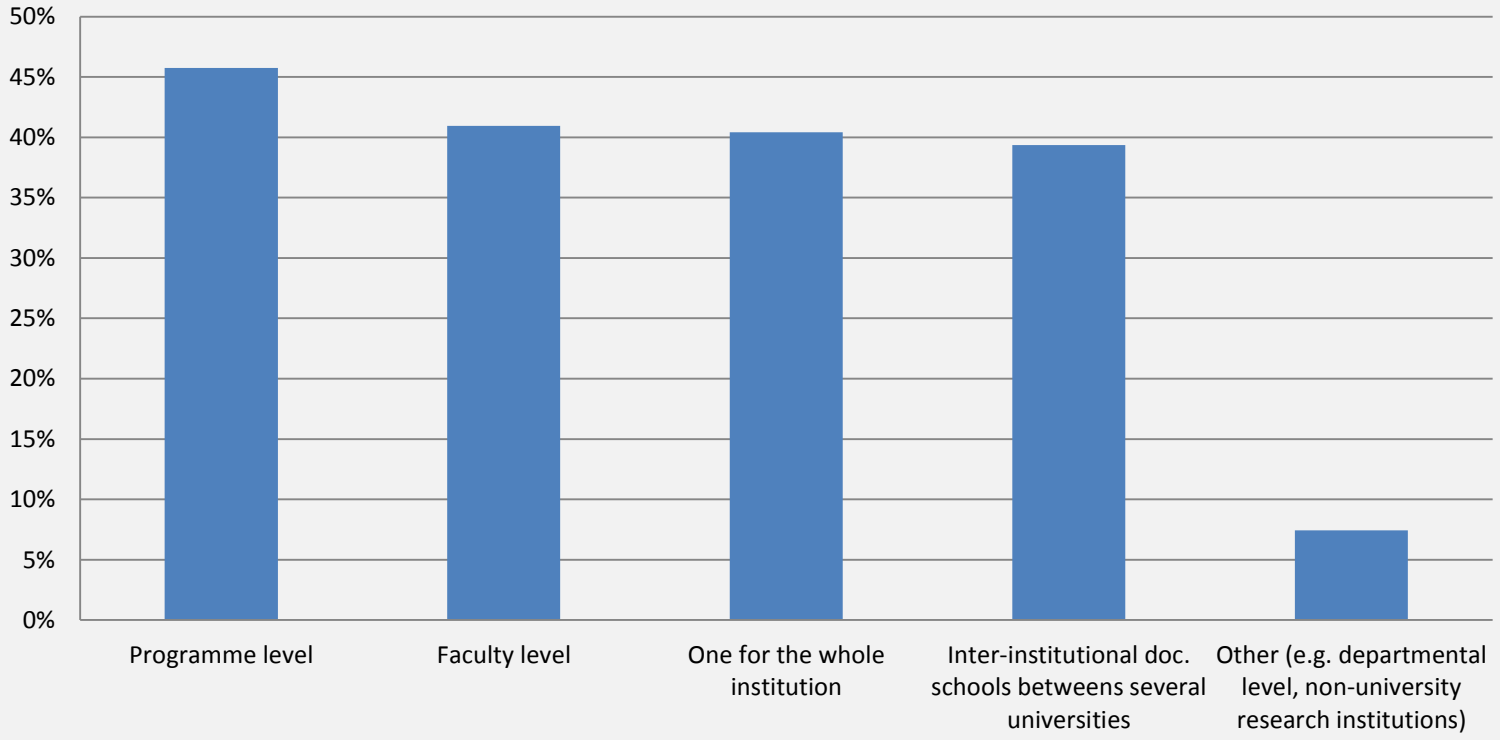
Convergence – Growth → we have seen remarkable growth over the last decade



The rise of doctoral schools

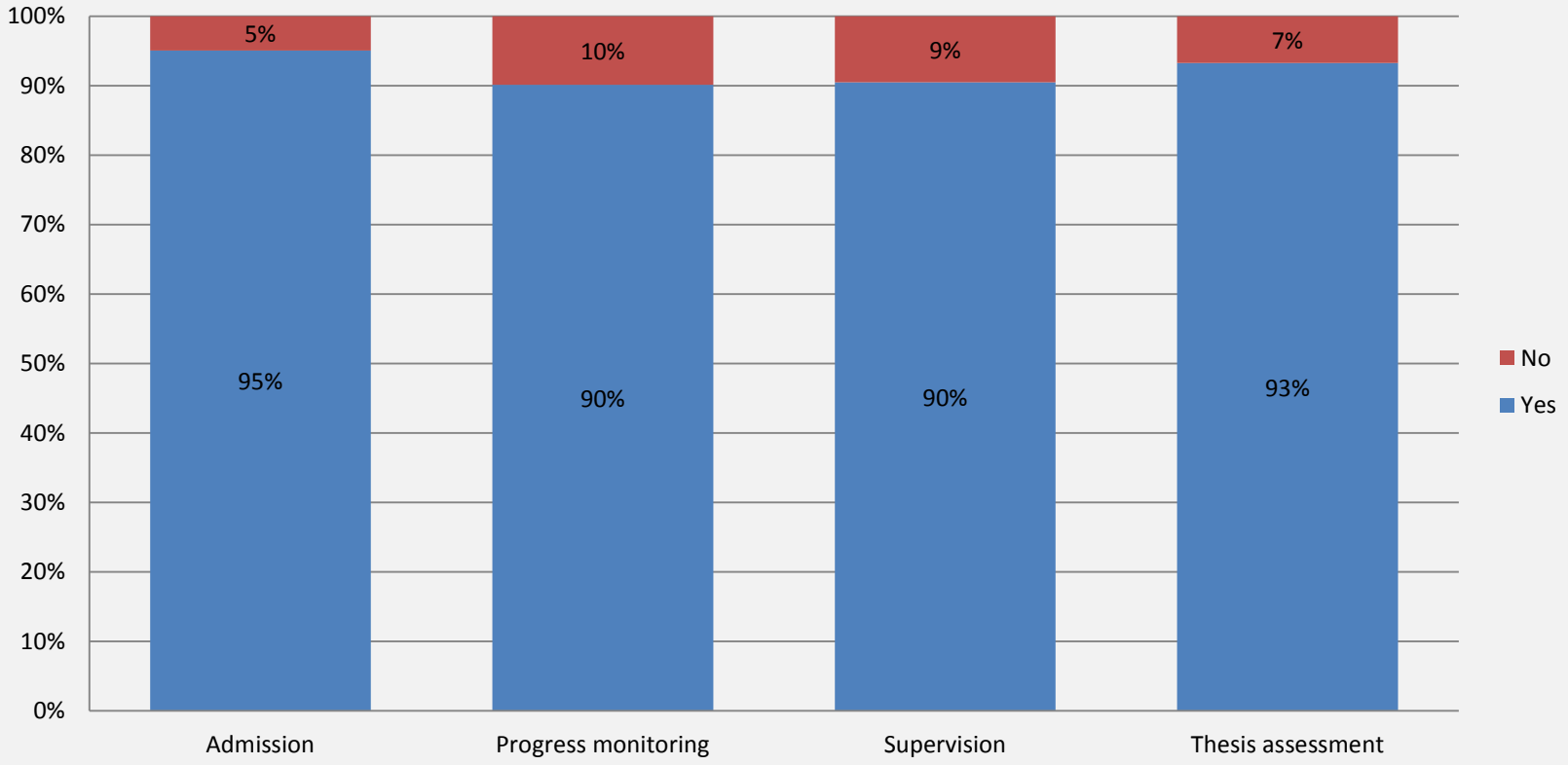


Organization of doctoral schools



Source: ERA Survey 2013

Procedures (internal QA) universally implemented



Source: ERA Survey 2013

Europe's universities have come a long way in creating institutional support for doctoral education, *but*

- Did we do enough?
- Are doctoral education/schools fit for purpose?
- Do established structures facilitate a good quality doctoral education?
- Are the established structures ready to meet new challenges, a new research era?

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There are still many challenges within institutions to achieving the full potential of the Salzburg Principles and Recommendations:

- Research will be very different for new generations
- Doctoral candidates will work very differently from the supervisors, and there will be different challenges

More challenges in Europe (and globally)

- Continuous new demands on universities and researchers
- Higher Education Institutions will go through further diversification process
- High pressure for more doctoral education
- To manage good quality doctoral education across Europe
- Demographic changes …

Doctoral schools need to provide flexible and sustainable framework for good quality doctoral education

Taking Salzburg Forward (2016)

- New set of recommendations concerning doctoral education
- This is a future-looking document, identifying new challenges for doctoral education:
  - **Ethics and research integrity**
  - **Digital challenge (open science, open data)**
  - **Global challenegs – internationalisation and institutional capacities to develop it**
  - **Engaging with other non-academic stakeholders**

Challenge I: Ethics and Integrity

- Research happens in an increasingly competitive context – less resources, more stringent constraints
- Pressure to perform – can weaken integrity
- New tehniques, big data, privacy, cultural differences – all have ethical components
- Doctoral candidates need a sound research culture from the start; they need training, and more….
- Explicit rules, sound daily practice

Challenge II: Digitalization

- Open research, open education (MOOCs), socal media, big data, etc
- Doctoral candidates already born and trained in this digital environment
- Universities need to provide adequate framework and coherent policies for technical, legal and ethical aspects, and supervisors must be aware
- There is a huge potential benefit, but a framework is needed

Challenge III: Globalization

- Research is rapidly becoming global – and doctoral education is in the center of this globalization
- Globalization goes much wider than mobility – it is a structural issue for the institution as a whole
- Universities should activey cultivate the benefits of internationalization
- Take responsibility as an entry point for foreign talent for society as a whole

Challenge IV: Engaging with other stakeholders

- Doctoral education connecting universities and society
- Mobility across sectors
- Sharing knowledge between universities and non-academic sector
- Individual professional development

Summary

- The reforms of doctoral education have been impressive – but it might be too soon to rest on the laurels
- The spirit of Salzburg can help universities meet these challenges – it needs to be taken forward

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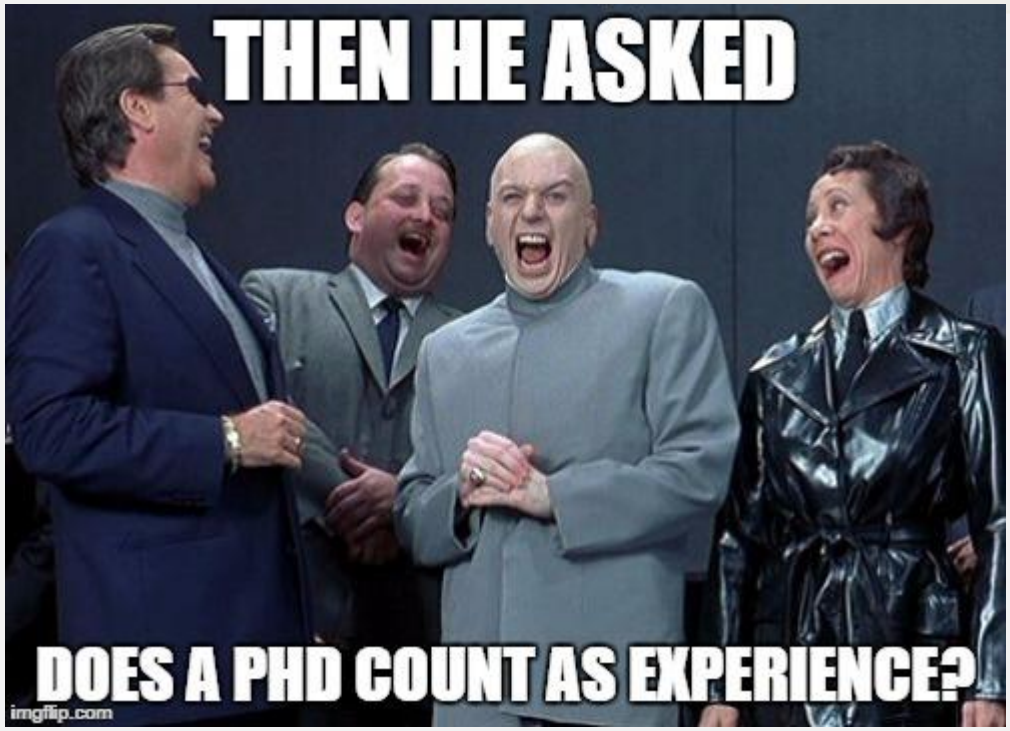
Why Industrial PhD?

In recent years there has been increased recognition that a ***majority of PhD graduates neither follow nor necessarily intend to follow an academic career*** as well as acknowledgement of the role of doctorates in career development in professions other than academe.

(Flint and Costley, 2012)

Industry-oriented PhD's



→ Responding to the need for innovation and research of businesses

→ Employability

→ Changes in professions themselves

→ Informing relationship between academia and practice

An International Comparison

Worldwide, the ***conventional PhD is recognized and appreciated by Industry***, that hires PhD's for top research and management functions.

In Europe, a special model of PhD studies, focused to industry and often called ***Industrial PhD***, is implemented. However, all doctoral degrees are considered at the same level and share the same characteristic outcomes.

Denmark

An Industrial PhD project is a ***three-year industry focused doctoral project*** conducted in cooperation with a private company, a PhD student and a university. The Industrial PhD student is ***employed by a private company*** and the company applies for a ***subsidy from the Danish Agency for Science, Technology and Innovation to cover part of the wage*** intended for the PhD student.

The Industrial PhD program was initiated in 1971 but was transformed in 1988 to allow the students to achieve a doctorate upon completion.

Germany

A country where senior executives with doctorates is the rule, rather than the exception
(Minzberg, 2004)

- ***Individual*** doctorates
- Working at the same time as conducting doctoral research
- Candidates are ***(often part-time) employees of the company***
- A **professor** + **in-company tutor** supervising the project

France

- **Industrial Agreements for Training Through Research (*CIFRE*)** aim to develop public-private research partnerships

- **Research is *jointly financed by firms and the National Association for Research and Technology*** (ANRT)

- The company and the student enter into a ***three-year work contract***

Italy

- ***Individual*** doctoral candidates, with their ***scholarships paid by private companies***, are part of collaborative projects with industry
- ***Doctoral programs based on apprenticeships***
  - ✓ doctoral candidates are hired by the company as apprentices and take part in a Ph.D. program
  - ✓ they are employees, entitled to take leave to attend courses
- Specialized doctoral programs in collaboration with companies are also allowed by the law (but so far not implemented)

European Industrial Doctorates (EC Marie Curie Actions)

- A ***joint doctoral training*** project between an academic participant and a company
- Doctoral researchers from any nationality are ***employed*** by at least one of the participants and spend ***at least 50% of their time in the company***
- Open to all research fields

Document 20 JAN 2016 of German Professors

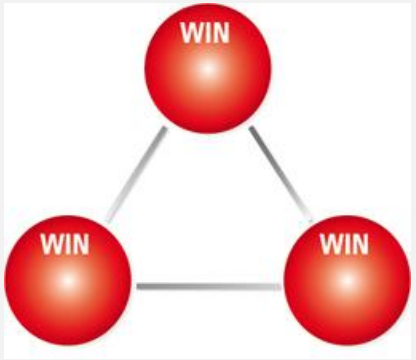
DEUTSCHER HOCHSCHUL VERBAND
Köpfe die Wissen schaffen

For the supervising university professor to reject a doctoral candidate becomes problematic because

- *the topic for the doctoral thesis is frequently predetermined and defined within the firm*
- *the right of the examiner to openly scrutinize and revisit the data and sources of a dissertation is frequently ruled out by confidentiality clauses*
- *it will do considerable harm to the doctoral student's career prospects (...) because the firm's hiring commitment not infrequently hinges on the student earning the degree*

Recommendations

Dialogue between university and industry on ***collaborative research provides opportunities for*** effective action to promote ***durable relations between the academic and business worlds***.



A win-win-win scenario is

- the academic value of the research will meet the necessary academic standards for the candidate to receive a doctoral degree
- the company will consider that the work has made a valuable contribution to its own R&D objectives
- the candidate will have gained some additional skills and understanding beyond that provided by a standard doctorate.

Recommendations

To make a doctorate holder more employable outside an academic context

- ***Valorize the skills acquired*** during the doctoral process:
  - ✓ adaptability
  - ✓ capacity to deal with complex problems and to engage in multidisciplinary work
  - ✓ experience of working in international environments
- Always ***provide skills*** related to
  - ✓ communication
  - ✓ negotiation
  - ✓ management

Conclusion

From the Closing Remarks of an Industry Manager at an event on Innovative Doctoral Training

- *It's not the "number of ideas" we are lacking of…*
- *It's the ability to connect ideas coming from different fields that is critical to success*

We need a new generation of researchers, in industries and universities, able to respond to this challenge

(A. Pisoni, GM, 2015)