



ScuDo

Scuola di Dottorato ~ Doctoral School

WHAT YOU ARE, TAKES YOU FAR



INDUSTRY AND DOCTORAL EDUCATION

Flavio Canavero

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.



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.**

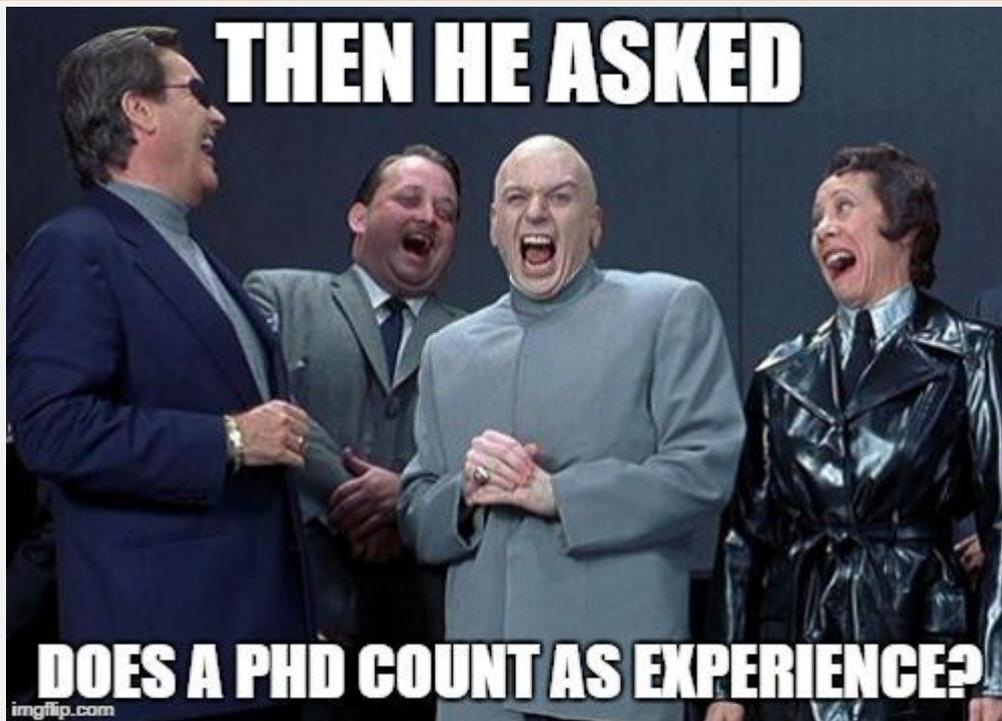


Why Industrial PhD?

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)





- 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)

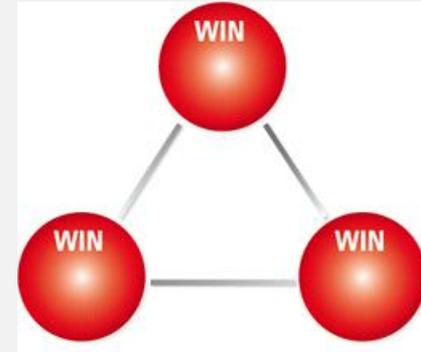
- A **joint doctoral training** project between an academic participant and a company
- Doctoral researchers from any nationality are **employed** by at least one of the participants and spend **at least 50% of their time in the company**
- Open to all research fields

Document 20 JAN 2016 of German Professors

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*

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.

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



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)

