Industrial Doctorate @Politecnico di Torino

Politecnico di Torino

Industrial doctorate: several options

General objectives: fostering industry-academia collaborations, employability and skill development

Doctorate programs in collaboration with industry can be implemented at different levels

1. As **Industrial Doctorate** as defined by law (DM226/2021, art.10)
2. As Regular Doctorate with **scholarship funded** or co-funded **by industry**
3. As **Executive or Apprenticeship Doctorate**
4. As **«Innovative Doctorate»** as defined by PNRR (National Recovery Funds) and related decrees

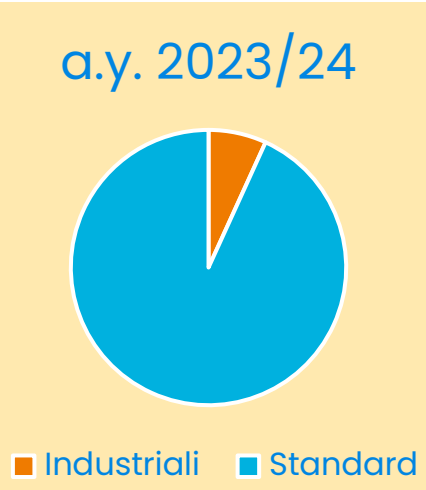
Industrial doctorate (DM226/221, art.10)

Very restrictive definition of Industrial Doctorate: imposes severe constraints (by law)

- Industry participation defined by signed agreement, required for the national accreditation of the program
- Industry must commit to fund a minimum number of scholarships (yearly)
- Industry must demonstrate a qualified R&D activity
- Industry must nominate its representatives in the Academic Board of the doctorate

Not used at Politecnico di Torino, limited interest nationwise

- Excludes SMEs, but also large companies are not interested
  - Must commit to a single doctoral program, which is then «tied» to a specific company
  - Requires R&D infrastructures that are often not present: this is why companies need universities!
  - Excessive structure: companies like to work project-based, not top-down constraints



Doctorate with scholarship funded by industry

By far the most common situation at Politecnico di Torino

Company signs an Agreement with the University, committing to fund a scholarship (from 33% up to 100%)

Scholarship is advertised and included in the call for application

Company agrees the research program with Supervisor and (typically) co-supervises the PhD candidate

The PhD candidate confirms commitment by accepting the scholarship

IP is regulated by the Agreement

Light structure, within the standard regulatory framework of all doctorates at Politecnico di Torino

In particular: all PhD candidates to spend at least 18 months at Politecnico di Torino

Executive or Apprenticeship Doctorate

Reserved to company employees, with the main objectives of continuing education and upskilling

- **Apprenticeship**: PhD candidate is hired as PhD is started, with apprenticeship contract (3 years). Very convenient for companies (special tax rates apply). Funded by local government entities
- **Executive**: preexisting employee applies for a PhD position without scholarship. If candidate is eligible upon evaluation by a dedicated commitee, Company signs agreement and pays tuition fees to University.

PhD candidates remain company employees during the PhD

Project-based

Companies must waive regular job duties of PhD candidates to allow them to carry out training and research activities that will lead to the PhD degree

Time spent in university and company regulated by Agreement. Flexible.

«Innovative Doctorate» as defined by PNRR decrees

After COVID (starting a.y. 2022/23), massive injection of funds from Italian Ministry of University, exploiting National Recovery Funds.

At Politecnico di Torino (data collected in a.y. 2025/25), out of 1443 active PhD students, a total of 268 candidates fall in this class (DDMM 352-117-630)

Funding scheme: each scholarship co-funded by Companies and National Recovery Funds (in some cases with extra contribution from University budget)

Requirement for (most) PhD candidates: spend at least 6 months in a Company and at least 6 months abroad)

Pros: massive increase (+33%) of PhD candidates. Paradox: more scholarship than candidates!

Cons: no vision (at national level) on career development of these PhD graduates. Big wave of PhD graduates will hit the job market in the next 2-3 years. Bureaucracy and reporting extremely heavy, both for candidates but especially for Doctoral Schools.

Some numbers

16 local Doctoral programmes (Engineering and Architecture)

1443 active PhD candidates

Around 500 PhD candidates involved in some industrial doctorate

More than 203 Companies involved (e.g. Eni, Stellantis, Dumarey, Leonardo, etc.)

- Some with general framework agreements involving PhD and multiple scholarships funded per year
- Some with single-scholarship co-funding

Sectors: energy, ICT, mobility, aerospace, basically all engineering sectors

Not only companies, also Public Administration

- «industry» to be extended in scope and generalized as «external entity»

General regulations

Same regulations apply to all PhD candidates, with no exceptions

Minimum requirements for admission to PhD defense

- Documented training: at least 100 hard skill (PhD-level courses) and 40 soft skill hours
- At least one published journal paper (some doctoral courses have additional requirements on journal ranking or additional publications, based on suitably-defined indicators)

These requirements apply also to industrial PhD candidates

- But a general discussion on the suitability of these requirements is to be started (publications/open access vs patents, protection of results and IP vs publications, etc.)

Key findings and outcome

Strong interest from Companies

- Facilitated by massive national co-funding
- Will pose difficulties starting from a.y. 2025/26, since National Recovery Funds will stop
  - Number of available PhD positions likely to drop significantly
- Many companies still lack «vision» and see PhD candidates as low-cost workforce
  - Especially in presence of a financial contribution from public funds (EU, national, regional)

Key findings and outcome

Challenges and general issues

- IP regulation and agreement with Companies
- Make PhD (in general) attractive for potentially good candidates (local, national, international)
- PhD scholarship in Italy is not competitive to several other European contries: limited internationalization
- Politecnico di Torino still not able to track Alumni effectively, very limited data on career evolution
- Executive doctorate not regulated by any national law! Solutions and implementations are local