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Doctoral Education in The Netherlands and Italy

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Doctoral Studies: the role and importance

- The integral and the key activity in many universities worldwide
- Not a 'service', but a process of strategic national interest
- Producing new researchers seen as a guarantee for the future (Knowledge-based society, economy, identity, suzerainty, ..)
- Most governments have systematic policies and strategies for supporting doctoral educations
- Different models, but with a common denominator:

Well organised, systematic activities, maintained by governments by continuous regular financing and other programmes

Motivations

"Educating PhDs is the main priority of European universities and EUA..., and in the centre of efforts to create Europe of Knowledge,...."

(G. Winckler, President of European University Association, EUA)

- The No of promoted PhD is the **first** prerequisite and criterion for success and prestige of a university
- **PhD students are the main workforce in research**
- Together with the overall research output (publications, patents,..) the No of PhDs is the **major** prerequisite for acquiring research funding from national and international agencies and industry
- **In all developed countries the No of PhD counts in periodic evaluation, but even more do the publications and citations scores that emerge from PhDs (Web of Science, SCOPUS)!**

Public Image of Science in NI

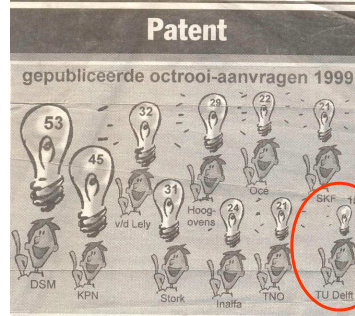
Ranking, "Beans counting" comparing,..



Universiteiten scoren hoog op ranglijst EU

Duits onderzoek:
Nederlandse universiteiten in top Europa

Nederland zit met wetenschappelijke artikelen in top-10

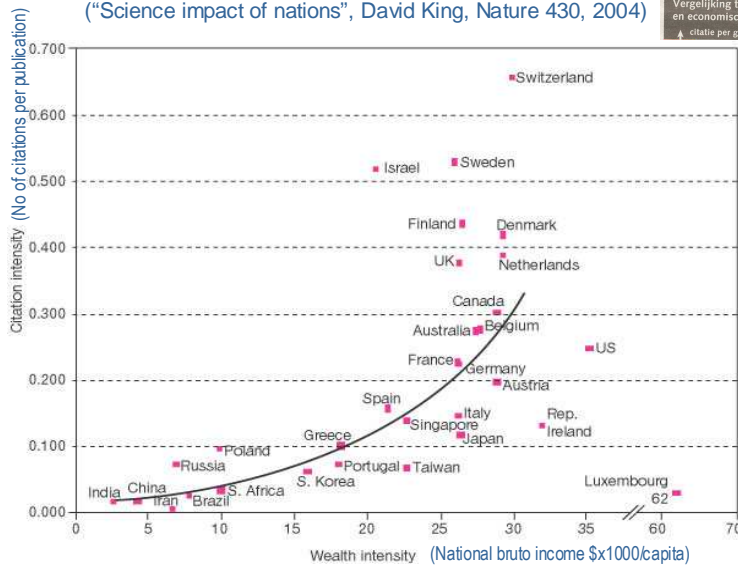


WETENSCHAP-WERELDRANGLIJST (1992-1996)

Landen waarvan onderzoek het meest wordt geciteerd	Gemiddeld aantal citaties per artikel	Aantal artikelen	Aantal citaties
1 Zwitserland	5,66	55.213	312.564
2 Verenigde Staten	5,03	1.239.188	6.234.157
3 Nederland	4,45	80.016	356.025
4 Zweden	4,38	61.072	267.685
5 Denemarken	4,36	30.719	134.016
6 Groot-Brittannië	4,19	300.577	1.259.427
7 België	3,94	38.095	150.208
8 Finland	3,93	26.998	106.151
9 Canada	3,88	157.326	611.114
10 Duitsland	3,78	258.946	979.523

Correlation between the science and economy effectiveness

("Science impact of nations", David King, Nature 430, 2004)



Incentives, Stimulations

- In NI, no direct funding of PhD students, but the Ministry of education awards a university 50.000€ for each finished PhD, (distributed between the university, faculty, department and the research unit)
- In Italy: through universities the Ministry of education allocates a number of PhD scholarships (for details see below)
- All PhDs, irrespective of the source of funding, are obliged to spend some time in tutoring undergraduate and master students (no teaching assistants!)
- In NI, this is up to 25% of their time; duties assigned by pro-deans for education (may or may not consult supervisor, group leader)!

Tradition and new trends, Bologna process

- In Western EU countries, the third Bologna cycle least demanding, but still controversial (though not serious nor critical):
- **The main postulate/goal:**
the regular, full-time, financed studies already long in practice (in contrast to most South-East European countries, including BiH)
- **Controversies:**
 - Duration: 3 or 4 years? In NI 4 years and in Italy 3 years, but it takes longer (e.g. in NI 5-6 years, Italy 4-5 years! Penalty: extra fees, now relatively small, ...)
 - Courses and examinations: the needs recognized, disagreements on the course load versus thesis project ("results and output is what matters!")

Doctoral Education in NL and Italy: examples*

Delft University of Technology, NI TUD

(applied sciences and engineering, founded in 1842/1968)

University of Leiden, NI

(general studies but no engineering, founded in 1575)

Similar in size, both “research-intensive”, but different (complementing) profiles and focus; established special partnership

‘La Sapienza’ University of Rome

(just about everything, except theology, founded in 1303)

All three considered as “research (intensive) universities”

* Not necessarily representative, the choice is personal!

TU Delft and Leiden University (in numbers, 2009)

	TUD	LU
NO of faculties	8	7
Bachelors programmes	16	49
Master programmes	30	95
No of students	~16.500	~ 18.800
No of PhD students (foreign in%)	~2.000 (70%)	~2.500
Academic/resresearch personnel	2400	3920
Budget (2009) in mill €:	518,1	477,8
‘1st stream’ (Government):	73,8%	71.7%
‘3rd stream’ (external):	26,2%	28.3%

Doctoral Studies and Research Output

	TUD	LU
No of PhD students	2000	2500
Academic (scientific) personnel	2400	1121,1*
Total (inclusive research-support staff)		3920
Personnel involved in research (fte)		1069
PhD promotions	264	320
No of Graduate Schools		8
Scientific publications	6.943	4897
Professional publications	1.145	

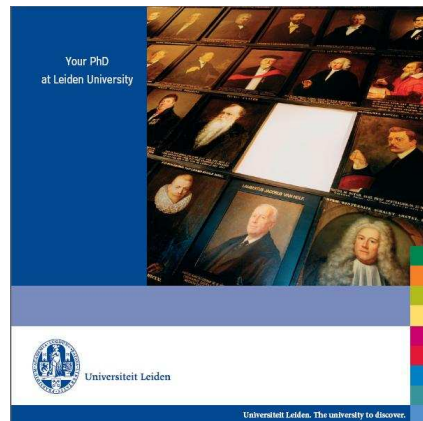
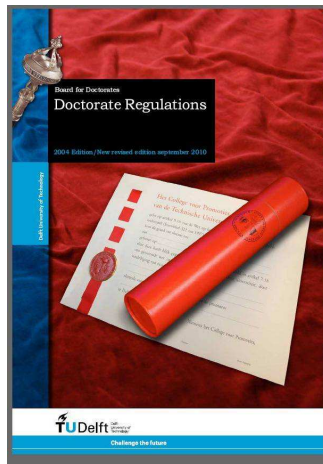
*Medical School excluded

SAPIENZA UNIVERSITY OF ROME / Faculty of Engineering (in numbers)

	Sapienza	FEng
No of faculties	12	
)	150.000	10.000
No of PhD students (2007/08) (foreign in%)	2779 (6-14%?)	
Academic/research personnel (Involved in PhD programme):	~4000	~450 (~50%)
PhD promotions (foreign in %)	798 (5.7%)	
Budget (2009) in mill €:	~860	
'1st stream' (Government):	80%	
'3rd stream' (external):	20%	

Regulations in NI: (available in Dutch and English)

Organized through or by Research Schools, Institutes, Faculties,...



Procedure and steps in NI (TUD, LU)

- Step 1: "Find a supervisor!" (from PhD webpage Leiden Univ.) (advertized vacancies, or contact Faculty, School, Institute)
- Step 2: Apply for PhD position
 - Prerequisites: a Master degree from a reputable university, proficiency in English (*not necessarily in Dutch!*)
 - No specific admission test, but a rigorous, selective, personal interview
- Step 3: Admission
The Doctorate Board ("College voor de Promoties")
(Deans of the faculties, Rector Magnificus as its chairman).
- Step 4: Research, Writing a thesis
- Step 5: Admission to the defence
- Step 6: Public defence of the thesis

PhD Thesis at TU Delft (similar at all NI univeristies)

- Published as a book (with ISBN number) in 100-250 copies, at personal costs, (could be subsidised by the dept. up to 50%)
- Usually in English (at least in natural and eng. sciences)
- Cover page design, a challenge for the candidate
- Prior publications in journals (min 2) and edited volumes
- Recent trend: collection of publications with an Introduction (Scandinavian model)
- Dutch specialty: “Propositions” (these *must* be also in Dutch)

PhD Defence Committee: minimum 6 members, usually 8!

1. Rector Promotor (Rector, Vice-Rector, Acting Rector)
2. Promotor (Mentor, Supervisor) (Full Professor)
3. Co-Promotor (Full or Associate Professor) (optional)
4. Assistant promotor (“Begeleider”, Tutor) (docent, associate professor, junior professor), and *at least*:
4. One professor from the same faculty, but **different department**
5. One professor from **another faculty** of the same university
6. One professor from **another (domestic) university**
7. One professor from **abroad (optional)**
8. .??....

Doctoral studies in NI: some specificities

'Propositions' (Stellingen)

- To be submitted to the Supervisor before the final approval of the thesis, to be forwarded to the Dean (who may test them?)
 - at least four propositions relating to the subject of the dissertation,
 - at least four scientific propositions relating to the field of the thesis
 - and at most four propositions on subjects of the candidate's choice.
- Propositions must be defensible with scientific arguments

Supervisor (only full professors!)

- Broad prerogatives ("his/her" project/money/responsibility)
- Supervisor's reputation at stake: public defence, 8 members of the Defence Committee, thesis (100-250 copies) distributed worldwide

Examples of Propositions from TUD:

- The only top meetings that make a difference are those held by alpinists! (Lucas Thielen, 2003, paraphrasing Luis Trenkler)
- The big challenge of mankind in this century concerning global issues is to learn from awareness instead of experience. (Maarten van Reeuwijk, 2007)
- The statement "The teacher should not descend, but the scholar should ascend" (F. Borderwijk, 1934) should be an obligatory motto in the Dutch educational system. (Jos Verdoold, 2010)
- Having a large number of ideas about a particular research subject can mean having no good ideas. (Ibrahim Hadžić, 1999)
- Contrary to the physical world, the economic and social theories cannot be disconnected from the perceptivity of the humans. Due to reflectivity these theories are imminent to be erroneous. (Muhamed Hadžić, 2006)

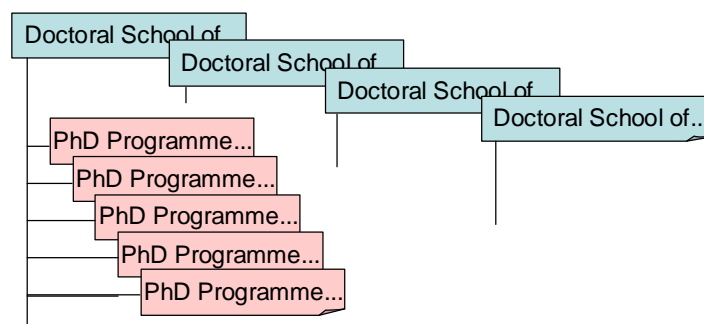
"These propositions are considered opposable and defensible and as such have been approved by the supervisor Prof...."

PhD Regulations in Italy (available only in Italian!)

- In contrast to NI, the supervisor has very limited prerogatives (different culture!)
- Officially more formal, more steps, all decisions by various committees / boards
- Strict dates (beginning/finishing, 2-3 options yearly, tied to semesters)
- Stimulations: university scholarships for a number of PhD, distributed among doctoral programmes and then among groups/sections/chairs
- PhDs are generally NOT employed, but have a status of a student, receive (nontaxable) stipend of up to 12000€/yer (often less), but with full national (and health) insurance
- Many PhD are fully or partially supported from projects funded by national or regional research and development agencies, or industry;

Doctoral studies: Practice in Italy (e.g. Sapienza Univ.)

(Dottorati di Ricerca, Scuole di Dottorato, Corsi di Dottorato)



- In total 168 Programmes! Not coincident with departments! (recently reduced by merging to 115!)
- School governance: Director, Secretary, Board of School ('Consiglio Direttivo')
- Programme governance: Coordinator, Programme Board ('Collegio dei Docenti')

Requirements for approving a Doctoral Programme

Every school and programme approved yearly by the Senate

Prerequisites (approval based on):

- Evaluation of the scientific programme, coherence and objectives, sufficient number of active professors and researchers in the field
- Established and approved Programme Board (“Collegio dei Docenti”, CdD), (min 10 profs, assoc profs, docents, but all must be active researchers and have a continuous research output)
- Establishing a webpage within the department that runs the Doctoral Programme
 - research and educational activities,
 - list of publication and of doctoral dissertations,
 - overview of annual activities in the field of doctoral programme

Programme Board (‘Collegio dei docenti’)

The key body! Decides on almost everything apart from allocation of PhD positions and scholarships (which is done by the Rector’s Office)

- Defines research strategy, guidelines for research, evaluates proposals,..
- Approves admission and evaluates yearly the progress of each doctoral project (report, oral presentation)
- Assigns **supervisor(s)**, decides on any issues between supervisor and PhD student
- Decides on suspension of the project (thesis), based on yearly evaluation
- Decides on the final admission of the thesis and admission to final exam /defence
- Nominates **External Reporters** (obligatory in some programmes)
- Proposes 3 members of the **Defence Committee** (external examiners) (for all doctoral projects in the programme for a period, usually one year)

Procedure and steps at Sapienza

- Public Call for Applications for PhD studies (July-Aug) ('Bando di doctorati') (open 30 days)
- Applicants apply for a specific PhD programme
- Admission test: a **written essey** on a topic of general relevance to the PhD programme (not known in advance), plus oral 'exam' (interview)
- Collegio dei Docenti (CdD) nominates a Commission for the Evaluation of esseys and for conducting interviews; makes a **rank list**
- During the interview the applicant expresses his/her preference for the topic and research group/section/supervisor (based on prior contacts)
- CdD decides on **admission** of the top-ranked candidates within the allocated number of positions
- CdD **defines the research topic** for each accepted applicant, **nominates a supervisor and a tutor**

Courses: general remarks

- Most doctoral studies expect from a PhD to attend some courses (typically 4-6 as a "partial fulfillment"), but **the focus is on the thesis**
- Courses/workshops are usually organised as short, intensive (3-5 days, 3-4 weeks), 'summer/winter' schools, but also as full-semester courses
- A PhD candidate may be advised to take some *master* courses in more fundamental areas, or to get practical ('hands-on' research skill, e.g. measuring, or computational methods, analysis)
- No regular/conventional exams, but certificate of attendance, seminars, written essey,..

General courses for PhD students at TU Delft

(how to start, organize, search for information, communicate, relation with supervisor and colleagues, acquire scientific attitude,...)

- **Academic information courses :**
(offered by TUD Library to train PhD candidates to use correctly and effectively scientific and other information)
- **Communication and didactical skills (include workshops)**
 - Getting started in a Ph.D project (40 hrs)
 - (ENG) Presenting Scientific Research (40 hrs)
 - Writing a Dissertation (*originality!*) (20 hrs)
 - Scientific Writing in English (20 hrs)
 - Research Design (60 hrs)
 - Scientific Integrity (*case studies*) (60 hrs)
- **Fee, typically 500-750€ per course** (paid from the project)

General courses for PhD students at TU Delft

- **PhD Start UP: Introduction program for new PhD candidates**
 - A. Working towards your PhD**
 - Project and process management; how do I manage my PhD?
 - Stages in the PhD process
 - Highs and lows (how to deal with setbacks)
 - B. Personal leadership**
 - Effective communication styles (f.e. assertive communication)
 - Influencing skills: how do I manage my supervisors?
 - Defining moments
 - Presentation skills
 - Personal development for the future (Education and Supervision Plan).
 - C. Culture of cooperation**
 - PhD candidates cultural backgrounds
 - Intercultural communication and cooperation
 - Working at the TU Delft (Code of Conduct)

Doctoral courses at Sapienza University

- Contrary to TUD and Leiden Univ, no general doctoral courses at the *university* level (Sapienza is much larger, more versatile,...)
- No general courses also at the Faculty of Engineering (I have no information about other faculties)
- Every doctoral programme offers periodically special semestral courses (2-3 per semester) (often by visiting professors)
- Periodic short intensive courses in specific (**emerging**) topics
- Every PhD is advised by the CdD to attend such courses plus some master courses in the same or other departments/MSc programmes
- No conventional exams, but individual or group seminars or workshops
- Frequent seminars by visitors

Financing doctoral studies in NI

Three categories/options

- fully funded, employed as research assistants (more than half);(salary: ~2000-2600 €/m, taxable+social contributions)
Note: total funding for 4 years: ~160.000 €
Source of funding: National research agencies/foundations, macro-projects/programmes, EU projects, industry, university,..
- external/personal funding (**required a proof of sufficient funds for 4 years**)
- external PhD student (**not employed, research conducted elsewhere**)
- No (significant) tuition fee (yet), for domestic and EU students!

Financing doctoral studies in Italy

- University grants (scholarships ~1000€/m netto) allocated by the Ministry) (+ up to 50% for experience abroad):
- In 2011 Sapienza Univ: 496 scholarship; ~8 mill €/year
- In addition about 30% sponsored from other sources (industrial projects, personal, foreign government,...)
- Typically No of positions per Doctoral Programme 4-10 of which ~50% with scholarships (aver. 3 per programme)

Common denominators

Despite large differences, there are many common features:

- Serious and systematic organization and regulations, under the auspices of the University (Senate and Rector)
- Striving for high quality, originality and creativity
- Striving for high productivity and dissemination, 'publish or perish' (everyday motto)
- 'Beans counting' (citation score and impact,..)
- Responsibility and accountability
 - In NI: resting more on an individual's credibility (supervisor!)
 - In Italy: various committees (more stages and more evaluators involved)
- Systematic and continuous governmental financing and support
 - Scholarships (Italy), research funding, bonuses and awards (NI)
 - Special programmes (macro and multi-disciplinary projects, building infrastructure, .., international (EU) projects,..)