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Current Issues in Doctoral Education in the context of Innovation Policies Looking beyond One's National Horizon



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Background and Lens



U.S. Surveys of PhDs Career Paths

1. Science/Engineering PhDs—Ten Years Later (1997)
2. PhDs in Art History –a Decade Later (2002)
3. Social Science PhDs- 5+ Years Out (2005/6)

International Conferences on Doctoral Education

- | | |
|----------------------|---------------------------|
| 2005 US, Seattle | 2007 Australia, Melbourne |
| 2009 Germany, Kassel | 2011 Malaysia, Penang |

Books on Doctoral Education

1. *Internationalization, Diversity, Intellectual Risk-Taking in Doctoral Education Worldwide (in progress 2016)*
2. *Globalization and its Impact on the Quality of PhDs Worldwide (2014)*
3. *Towards a Global PhD? (2008)*
4. *Graduate Education in the United States(1997)*

Source: M. Nerad University of Washington at Seattle; University of Ljubljana, May 25, 2016

Overview



- 1. Connection between national innovation policies and doctoral education**
- 2. Effects of innovation policies and globalization: macro-level and micro-level reforms/changes in doctoral education worldwide**
- 3. Conceptual approaches to the training of PhDs**
- 4. A paradigm shift: “communities of practices” – efforts at many levels**
- 5. Quality Control in Doctoral Education – Tensions?**

What is the Connection between Innovation Policies and Doctoral Education ?



- Economic theory of the knowledge economy are embraced by governments worldwide.
- **Innovations** (science, organizational, social) and technical changes are seen as means of economic growth.
- Doctoral education is expected to educate **innovators** for many sectors of society.
- New knowledge has to be disseminated too.
- Governments want **world-class research capacities** in order to attract investment and create new jobs.

Effects of Innovation Policies

Macro-level Reform Trends Worldwide (1-5)



1. **Increase in PhD Production** (women, part-time, international, older)
2. **Linking universities closer to society (not only industry)** → *knowledge transfer*
 - a. A change in the mode of research production – **mode 2 (research triangles)** national grant proposals call for collaborations
 - b. Establishing separate funding tracks for university start-ups by national research councils - translating academic knowledge into societal use (ideas, products, mechanism) and employing local staff as an economic driver → *income generating*

Increase in PhD Production 1991-2008

Source: NSF Science Indicators 2012/13

<u>Country</u>	<u>1991</u>	<u>2004</u>	<u>2008</u>
Australia		5,000	6,500
Brazil			10,700
China	2,000	23,400	43,800
Germany	22,000	23,100	25,600
India *(2006)		17,850	18,700*
Japan* (2007)	10,000	16,900	17,300*
Russia		29,850	27,700
South Korea	1,000	7,950	9,400
Vietnam			9,500
UK	8,000	15,300	16,600
US	37,000	48,500	61,700
World Total			381,453

Effects of Innovation Policies

Macro-level Reform Trends Worldwide (2-5)



3. Introducing national **Flagship** programs /grants for doctoral programs that are theme-based, interdisciplinary and problem solving → *new models of research training*

→ *versatile researchers*

4. Seeking worldwide co-operative agreements for research and dual/joint degrees

→ *getting the best minds*

Equipping doctoral candidates for participation in international networks, (EU/ITN, Atlantis program, US/ NSF -NIH) funded by research councils

→ *global researchers*

Effects of Innovation Policies

Macro-level Reform Trends Worldwide (3-5)



5. Aiming to become *world-class universities*

→ *heightening a country's status, attracting excellent students and academic staff &*

→ *attracting investment*

- Excellence Initiative – Germany
- APEX university selection – Malaysia
- Centers of Excellence – US, Japan
- Project 985 – China (9 universities -now 40)

6. Implementing international quality standards

→ *assuring international mobility and employment*

- 1990 - Australia/ New Zealand/ UK
- 1995 – US, 2000 Canada - 2004 Japan
- Latin America – Brazil - 2009 South Africa
- 2010 Europe

Source: M. Nerad University of Washington at Seattle; University of Ljubljana, May 25, 2016

Effects of Innovation Policies

Macro-level Reform Trends Worldwide (3-5)



7. Attracting researchers back home

→ brain circulation

Germany: Humboldt Professors, annual postdoc fair in the US

France: annually postdocs get flight paid to look for job at home

South Africa: - National Academy Professors

Chile: *CONISYT* requires PhD fellows to return max. 2 years after degree completion;

China and India: attractive return package for all level of scholars (PhDs, postdocs, senior scholars)

Source: M. Nerad University of Washington at Seattle; University of Ljubljana, May 25, 2016

Changes in **micro-level** Practices in Doctoral Education Worldwide (1-4)



A. Selection and Admission

1. **English** has become the language of doctoral education (attract international students, publishing in major academic journals)
2. Some Access to PhDs **after Bachelor** (fast track)
3. Admission process - **defined, formalize, competitive.**
4. Countries/universities offer **several years of funding** (3 years) with benchmarks and performance evaluation.
5. Funding of campus visits for admitted students before they make decisions

Practices in Doctoral Education

Worldwide **micro-level** (2-4)



B. Program Elements

5. **Students work with more than 1 supervisor**
6. **Many countries expect a 3-year doctoral completion**
7. **Introduction of oral exams where not existent (Australia)**
8. **Dissertation panels (3-5 persons) on all exams & dissertation review,**
9. **Choice** between traditional dissertation or compilation **of several peer reviewed articles** (Econ, Bio sciences)
10. **Ethics training integral in all fields.**

Practices in Doctoral Education

Worldwide - **micro-level** (2-3)



C. Doctoral Education for Career Preparation

13. Doctoral students prepare for a variety of careers, **in business, government, non-profit, academic**
14. Career planning and development as part of doctoral studies. Development of 'road map' at beginning of doctorate (Doctoral/Career development plan -UK).
15. Increase in offering of **professional/transferrable/translational** competencies.
16. Many countries have **career center** with service for PhDs
17. Increase in **professional practice doctorates**
18. Countries/institutions start **PhD career tracking (ESF, NSF, CGS)**

Source: M. Nerad University of Washington at Seattle; University of Ljubljana, May 25, 2016

Practices in Doctoral Education

Worldwide- **micro-level** (4-4)



D. Attracting and Serving International Students

- 19. Recruiting of International doctoral students at international fairs**
- 20. Some countries charge no tuition+ minimal fees for out-of-state students (Norway, Germany)**
- 21. Welcome centers for international students**
- 22. Introductory class to graduate education of the host country for international and new doctoral students**
- 23. Writing Centers for international students**

More is Asked from the Next Generation of Researchers



1. Academic research skills

Skills developed in **completing the PhD**: critical thinking, research design + methods, data analysis/synthesis, writing, publishing), research ethics = responsible conduct in research.

2. Professional competencies

Teaching, team-work, presenting, grant writing, managing people and budgets, working in multi-disciplinary teams, translational skills, conflict management, leadership skills.

3. Inter-cultural competencies

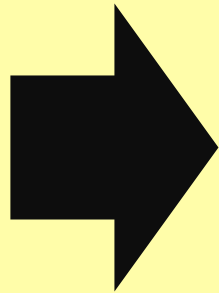
Effective and appropriate interactions skills with those from different backgrounds, race/ethnicity, cultures, religions, perspectives

The *Silent* Paradigm Shift in Doctoral Education



The **paradigm shift** from:

a concept of **you and your doctoral student to**



‘Communities of Practice’ (Lave & Wenger 1988)

= a multi-level advising/ mentoring system
with a focus on **creating appropriate
learning environments**

Global Village Approach (Nerad 2012, *Alternation*, Nerad 2011, *Acta Academia*, see also CIRGE website)

Source: M. Nerad University of Washington at Seattle; University of Ljubljana, May 25, 2016

Conceptual Approaches to the Education of PhDs



1. Apprenticeship model- **one to one- does it fit for learning all competencies?**
2. Professional socialization- **disciplinary values and norms –yes, but top down!**
3. Peer Learning - **partners in learning**
4. Communities of practice - **situated learning.** It takes coordinated effort of many levels of the university and beyond.

Six Levels of the Communities of Practice Approach



1. Main professor/supervisor – and PhD candidate apprenticeship approach → traditional academic research skills, lab work, advising, from a “knowledge consumer to a knowledge producer,” from a novice to junior colleague
2. Department level and laboratory –Professorial supervisor and advisees: transparent disciplinary socialization and community of practice approach → disciplinary professional competencies disciplinary professional development activities, social community building

Six Levels of the Communities of Practice Approach

continuing



3. Central Office of Graduate Studies– Experts and PhDs student groups : **professional socialization in multiple learning contexts +communities of practice approach → professional competencies, multicultural competencies**

- Career development (career center),
- Learning of Teaching
- Professional skills workshops by major fields
- Preparatory workshops for international research stay (different research customs, ethics training)

The Communities of Practice Approach continuing



4. Peer Communities: **peer learning partners**
horizontal learning, based on reciprocity,
→ **team approach, multi-disciplinary learning**
→→→ **sharing workspace, organizing multiple interactions**

5. National Research Associations- Beyond the University: discussion of disciplinary curricula changes and offerings of professional development activities → **academic + professional discipline specific competencies**
→→→ **support local department chairs**

The Communities of Practice Approach continuing



- Beyond the university – Internships, field trips, national+ international Conferences :**
applied research, practical experience
→ **academic + professional + inter-cultural competencies)**
traveling and living internationally,
encouraging PhD students to organize symposia, network, present internationally,
→→→ **learn planning skills in international contexts**

National Examples of Communities of Practice Approaches-Flagship Programs



- a. European Union funded, Marie- Curie, **EU/ITN** International Training Programs
- b. Germany- **Excellence Initiative DFG/ Excellence Graduate Schools**
- c. Netherlands **National Graduate Schools**
- d. Australia- Government funded **CRC- Cooperate Research**
- e. U.S. - NSF/**IGERT/NRT**= National Research Training Programs, **PIRE** = Partnership in International Research Education
- f. Japan - MEXT –Ministry **Leading Graduate Schools**
- g. Chile - **BECAS-Chile** -Conicyt- National Fellowship (**Brazil, Columbia, etc.**)

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Characteristics of Government-funded Flagship Programs



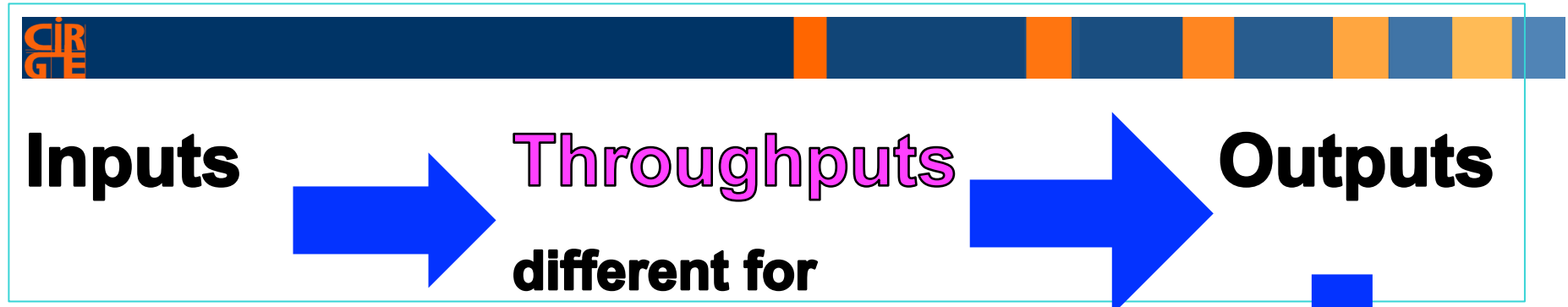
- a. Imbedded in national research grant schemes - well funded
- b. Well-funded stipends for 3 years + extra research allowance including international conferences
- c. Connection to outside world (internship, secondment, international research visits)
- d. Ample professional competencies development
- e. Rich networks (national+ international) established within programs
- f. Small seminars, special attention by university administration

EFFECT: A bifurcation of doctoral education: Flagship governmental programs ↔ run-of the mill programs

Quality Assurance Model in Doctoral Education

A Move to Global Standards

Most Common Quality Assurance Model in Doctoral Education (see



different for

**lab and library intensive fields
for structured & unstructured programs**

Applicants
Professors
Infrastructure
Political context

- Advising/supervision (contract, training, not automatically chair)
- Course work & General Exam, research ethics
- Professional skills
- External Doctoral Program Reviews
- External examiners

Independent Scholars, PhD Degree
Dissertation Research

Outcome

Difference made by output

Careers tracking

Societal Impact

The Artful Balance Acts in **Supervision** within the Communities of Practice Approach



- **Understanding the responsibilities of POWER in the relationship**
- **Guidance/ Independence/freedom**
- **Tailoring the guidance to the various phases of a doctoral study**
- **Actively training in publishing**
- **Fostering interdisciplinary network building within the department as well as outside**

The Artful Balance Acts in Supervision



- **Fostering DIVERSITY and active integration of international and (im)migrant students**
- **Career preparation and continually discuss individual career planning**
- **Knowledgeable about funding**
- **Creating a culture of TRUST**

Taboos in Doctoral Education

What doctoral candidates will not tell their supervisors



*That they do NOT want to become
PROFESSORS (except in engineering)*

WHY? Fear of:

- Being treated as second class citizen
- Being not taken seriously
- Not getting financial support (RA/TA)
- Being perceived as not smart enough

Current Tensions!



If we want professional and innovative people and innovative research for all sectors of society:

1. Are we fostering **socially relevant research** and also creating room **for basic research**?
2. Do our new managerial **structures** (funding schemes and efficiency measures) allow for **intellectual risk taking**?
3. Do we allow our doctoral students to learn from mistakes?

Intellectual Risk-Taking

Policy Recommendations (CIRGE network)



1. Universities, departments, and programs develop a **research culture** that **values and rewards** innovation and creativity
2. Doctoral program train doctoral candidates to know **limits** and **strengths** of their **disciplines** by exposing them to other disciplines through team-building opportunities.

Forthcoming CIRGE book, *Internationalization, Diversity, Intellectual Risk-Taking in Doctoral Education Worldwide* (2017)

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Thank you!



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CIRGE website

<http://www.cirge.washington.edu>