



Impact of Science

14-15 June 2018, Ottawa

MacDonald Room, 13.45-15.00

Collaboration with Industry

Yuko Harayama (Chair)

Magnus Gulbrandsen

Ridha Ben-Mrad

Collaboration with industry

Yuko Harayama

*Former Executive Member, Council for Science, Technology
and Innovation (CSTI), NEDO-TSC Fellow, Japan*

III Parallel sessions: Collaboration with Industry

**Chair: Yuko Harayama
Former Executive Member
Council for Science, Technology & Innovation
NEDO-TSC Fellow**

Our menu

- Introduction
- **Presentation 1: Magnus Gulbrandsen**
 - Centre for Technology, Innovation and Culture at the University of Oslo, Norway
- **Presentation 2: Ridha Ben-Mrad**
 - Chief Research Officer and Associate Academic Director, Mitacs Inc., Canada
- General discussion and **Q&A**

Many channels of “collaboration”

- Technology transfer
 - University start-ups
- Collaborative research
 - Joint research program
 - Joint research lab
- People-centered collaboration
 - Internship
 - Mobility of people
- Use of intermediaries
 - Incubators, Accelerators, Science Park, Industrial Parks, ...

Beside many
diffuse or informal
interactions!

Expecting that ...

- From the Industry side



- Collaboration with Science ➡
 - Developing technologies
 - As a source of innovation
 - As a source of **inspiration**
 - A way to address **societal challenges** (e.g. partnership with social sciences & humanities)

- From the Science side



- Collaboration with industry ➡
 - As a source of funding
 - A mean to translate into economic value
 - As a source of **inspiration**
 - A way to address **societal challenges** (e.g. entrance to the real world)

Challenges

- How to ensure that their relationship is mutually beneficial?
 - “Advancing science” goes hand-in-hand with “Empowering industry”?
- Sharing a common goal of “societal challenges” could be a “glue”?
 - “Societal impact” as a long-term guiding principle?

Collaboration with industry

Magnus Gulbrandsen

*Oslo Institute for Research on the Impact of Science & Centre for
Technology, Innovation and Culture at the University of Oslo, Norway*

Explaining the stability of university-industry relations

Magnus Gulbrandsen, Professor

Oslo Institute for Research on the Impact of Science (OSIRIS), TIK Centre
for Technology, Innovation and Culture, University of Oslo

Conference: AESIS Impact of Science 2018

Ottawa, 14-15 June 2018

Starting point

- University-industry interaction is widespread and involves many firms, many academics and most higher education institutions
- Interaction takes many forms including commercialisation, collaborative research projects, consultancy, informal interaction and training
- These forms of interaction are often seen as essential for creating impacts from research
- Policymakers all over the world have taken initiatives to improve, expand or intensify university-industry interaction

The puzzle

Indicators of university-industry interaction show remarkable stability over time, despite increased policy emphasis on interaction

What are the main explanations for this stability?



- Share of research in higher education institutions paid for by industry is stable across most of the OECD area (and in most countries around 5 per cent)
- Individual-level surveys show a stable share of academic employees interacting with industry
- Industry data like the European CIS survey show that the share of firms collaborating with universities is stable, and the importance they grant universities is low and stable

Example: Norway

- Many policies to promote university-industry interaction the last two decades:
 - Tax credits for industrial R&D double if cooperating with a university
 - Large-scale university-industry collaborative research centres and other funding mechanisms that require active partnerships across sectors
 - Increased funding of commercialisation
 - Legislative changes – since 2003 the universities have a wider and more explicit responsibility for ensuring that their research is put into use
- But the indicators we have of interaction – among individual academics, research units, firms and the support structure – show a remarkable stability in the same period

Four possible explanations

- Saturation
- Problems with the policies
- Weak understanding of the barriers to collaboration
- Insufficient indicators of interaction and impact

1: Saturation – the glass is full



- The firms and academics who are able to and interested in interaction are probably already engaged in it
- These actors may have little to gain by intensifying their interaction (perhaps even the opposite due to the many inverse U-shaped relationships)
- Increasing the level of university-industry interaction in a region may depend upon getting firms and universities with weak preconditions for interaction to join forces – is this realistic?

The triple multiplier rule

5

per cent of industrial funding of university research in Norway

15

per cent of Norwegian tenured academics involved in collaborative research with industry

45

per cent of these academics involved in industry collaboration in general

2: Policy problems

- Main emphasis on formal research collaboration, especially as large-scale formal research consortia, and on commercialisation of research
- These are the least common forms of interaction
- Consortia collaboration often quite loose with problems of commitment rather than motivation
- Lack of more bottom-up initiatives and incentives?

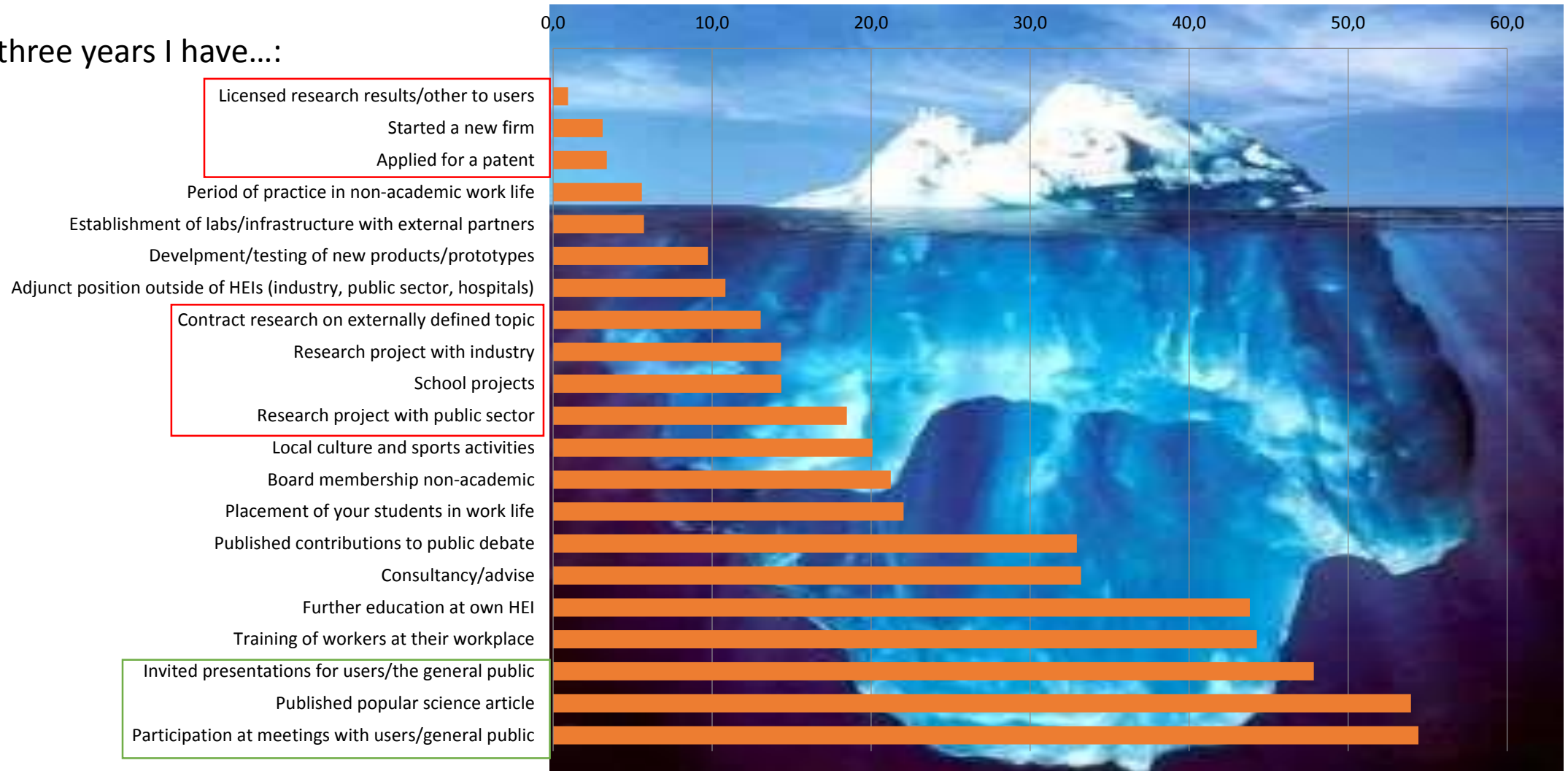
Example: hybrid research and innovation centres

- Large-scale collaborative centres involving many firms and with combined goals of excellent research and innovation have become common in many countries
- The activities in them are often contested, and firms tend to leave prematurely (but not because they are unhappy)
- Centres become research machines but struggle to meet their own goals of innovation
- A linear and radical innovation model is part of the problem

Source: Gulbrandsen et al. (2015)

4400 Norwegian researchers

In the last three years I have...:



3 Failed understanding of barriers

- Is the belief in synergies and overlap between universities and industry exaggerated?
- Mutual understanding of differences and mutual respect are required – but how can this be achieved?
- Preconditions for impact probably rest more on the industry side, but initiatives target the university side
- How can we deal with differences between sectors, industries and so on?

4 Insufficient indicators



- The most important aspects of university-industry relations may be difficult to capture in quantitative indicators highlighting input-output relations and cost-benefit analyses
- We know that impact takes time and that it is a complex, evolutionary process
- By improving university-industry relations today, we lay the foundation for future impacts – and patience is therefore needed



- Effects are based on interaction that often stretches back decades
- Impact is easier when there is a powerful firm that “owns” the problem and has the funds and competence to do something about it
- Policies for interaction create a fluid infrastructure that shapes networks and actions of organisations and individuals



A Bluestar Company



Main messages...

- Huge policy and academic interest in university-industry interaction
- Many practical attempts at funding and otherwise supporting increased interaction
- These do not seem to have had strong effects on interaction
- Some important explanations
 - Interaction already works quite well at a sufficient level
 - Policies target the most difficult and least common forms of interaction
 - We lack a thorough understanding of the barriers to interaction
 - Our indicators of this phenomenon are poor

Thank you



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Collaboration with industry

Ridha Ben-Mrad

*Chief Research Officer and Associate
Academic Director, Mitacs Inc., Canada*



*Inspiring innovation
Inspirer l'innovation*

A light gray world map is centered in the background of the slide, showing the continents of North America, South America, Europe, Africa, Asia, and Australia.

Collaboration with Industry

The Mitacs Way

Dr. Ridha Ben Mrad
Mitacs

What is Mitacs?

➔ National research network in Canada, 19 years in operation

 **\$145M**
PRIVATE-SECTOR AND NOT-FOR-PROFIT
INVESTMENT

 **4,250+**
INDUSTRY PARTNERS

 **33,000+**
STUDENTS CAREER-READY

 **60+**
UNIVERSITY PARTNERS

 **20,000+**
INNOVATIVE RESEARCH
COLLABORATIONS

 **3,600+**
INTERNATIONAL STUDENT
RESEARCH INTERSHIPS

 **1,450+**
PROFESSIONAL SKILLS WORKSHOPS



➔ Each Mitacs-funded collaboration requires:

- A university researcher (professor, graduate student/postdoc) and a company partner
- A cash contribution from the company
- Active participation by the company
- Graduate student/postdoc to spend time on site at the company offices

Success essentials: Boots on the ground

- Mitacs has a dedicated sales team
 - 50 strong with advanced degrees from coast to coast
 - Build relationships with university researchers and companies engaging in R&D

Match-makers between
universities and
companies



Success essentials: Peer-review

- **Every** project proposal is peer-reviewed for research excellence
 - **College of Reviewers: 20,000+** researchers conduct reviews. Recommend projects for approval or rejection
 - **Research Review Committee:** Leading academics who ensure research excellence through the development and implementation of a fair and transparent evaluation process
 - **Research Council:** Provides research expertise to the Mitacs Board. Advises on strategies, initiatives and issues related to Mitacs research

Success essentials: Mutual benefits

Companies

Access the latest university research advances

Solve a real-life business challenge

Test-drive working with academia

Connect with potential future employees and collaborators

Universities

Work on real research challenges faced by companies

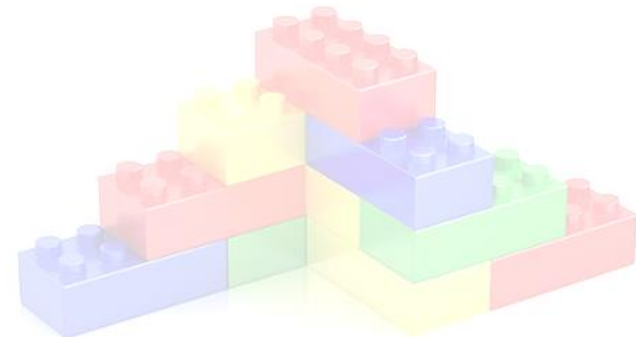
Provide funding, novel opportunities for grad students and postdocs

Test-drive a collaboration with a company

Open the door to longer-term partnerships with a company

Success essentials: Scalable & flexible

- One size **does not** fit all
- Mitacs offers project funding from \$15,000 to \$2M+
- Build a project to suite the nature and scope of research required
- Company partners can be in Canada or abroad
- Projects can involve multiple graduate students, post-Docs, professors, companies and disciplines



The result:

In 2017-2018, Mitacs co-funded
5,900+ collaborations between
universities and companies

Goal: **10,000** per year by 2020

Project Spotlight

- **Challenge:** Lakes, popular with swimmers, are prone to bacterial and viral contamination
- **Team:** McMaster University biochemistry researchers & start-up company, InnovoGENE
- **Solution:** A testing kit that can turn around water sample analysis in **2-3 hours** instead of 2-3 days



Project Spotlight

- **Challenge:** Sprinklers on large fields can waste up to 50% of water spray in windy conditions
- **Team:** University of Alberta Mathematical Sciences researchers & IntelliRain
- **Solution:** An algorithm to program sprinklers to stand up to windy weather. Improved sprinklers are up to 200% more efficient



Partner spotlight: Trojan Technologies

- **Trojan:** A developer of novel water treatment solutions
- ➔ **Now:** Co-funding largest Mitacs research project to date, valued at \$2.19M over 3 years. Includes 7 Canadian universities.

By tapping into the expertise of the researchers, we gain valuable in-house skills and knowledge that we wouldn't have otherwise.

Ted Mao, Vice-President, Research at Trojan

