Research Design for Innovation Studies

(Innovation System Engineering)

Sotaro SHIBAYAMA

School of Engineering, University of Tokyo

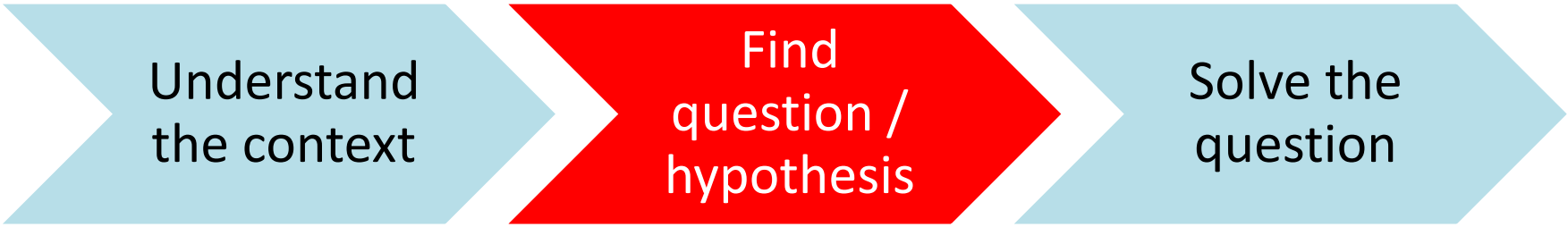
Oct 5 2015

OVERVIEW OF COURSE

Objective

- To develop skills of research design, or more generally, of problem finding.
  - As an example subject, we use “Innovation studies”.

Positioning of this class



Example of other courses:
- IP management
- Innovation management, etc.

↑ This course

Example of other courses:
- Math methodologies
- Econometric analysis
- Global business, etc.

Motivation

- Many students GIVEN research questions by supervisors - lack of opportunity to come up with your own problem
- Research questions often not elaborated – too broad, ambiguous
- Technically motivated but theoretically poorly justified
  - Unless you intend technical progress, applying state-of-the-art techniques to damn questions is not clever way of using your precious time.

Structure

2. Student Project (Second half)

Goals:

- To find your own research questions on innovation studies
- To propose your research proposal: elaborate your question and articulate in a proposal

1. Research Seminar (First half)

Latest research on innovation studies

Goals:

- To observe how scholars find problems
- To have some inspiration for your project
- To learn a bit about the context of innovation studies

Student Project

- Based on your own interest
  - Broadly related to innovation studies, S&T policies, etc.
  - Not have to be related to topics covered in the seminar
  - Topics different from your thesis is recommended
- Individual basis (depending on enrollment)
- Weekly feedback for each student
- Step-by-step approach to reach final proposal
  - Tips for research design instructed every week
- What this project does **NOT** do:
  - To answer the question you raised

  (different set of skills needed, beyond the scope of course)

Examples of past project subject

- *University ranking systems' influence on educational quality*
- *Novel approach to IP protection for research tools*
- *Language: an important influencing factor of the international students' academic performance*
- *Impact of university policies in preventing conflicts of Interest in research/academia*
- *Impact of researcher mobility between industry and academia on R&D performance evaluation methods*
- *How does group size affect creativity of research in different fields*
- *University-industry collaboration as an incentive of academic innovation*

Research Seminar

Goals:

- To observe how scholars find problems
- To have some inspiration for your project
- To learn a bit about the context of innovation studies

Process:

- Examples of latest research presented in a seminar style
- Students read speaker's and/or related papers in advance
- Participate in the seminar
- Related policymakers, etc. are invited as audience (the seminar is open to public)

LOGISTICS

Grading

- Participation in seminar (50%)
  - Read assigned papers and ask questions
    - Specifically about the paper or more generally related to the topic covered
  - Submit the question to TA in advance
  - You can ask questions in class, time permitting.
  - For good questions given bonus points
- Project (50%)
  - Based on term paper (details explained later in class)

Calendar (Tentative)

1	Oct. 5 (today)	Introduction
	Oct. 12	National holiday
2	Oct. 19	Seminar 1
3	Oct. 26	Seminar 2
4	Oct. 29	Project introduction
5	Nov. 2	Seminar 3
6	Nov. 9	Seminar 4
7	Nov. 16	Seminar 5
	Nov. 23	National holiday
8	Nov. 30	Project 1
9	Dec. 7	(Schedule to be announced later)
:	:	

Misc.

- Language policy
  - Delivered in English.
- Class information
  - http://sotaroshibayama.weebly.com/
- Office hour
  - By appointment
  - shibayama@tmi.t.u-tokyo.ac.jp

INTRODUCTION OF SEMINARS

Scope of Seminar

Economics of Science & Innovation

"The modern knowledge-based economy heavily relies on the advancement of science and technology (S&T) originating from the public sector, where universities and public research organizations play a pivotal role in producing knowledge and intellectual workforce. Traditionally, academic science tended to be basic, driven by curiosity, but has become increasingly interlinked with society. Contemporary economic policies regard science as the engine of economic growth, and the role of S&T policies has never been more important. Nevertheless, it is arguable if the current policies live up to such high expectation. Sustainably coordinating science and innovation system is formidable, especially when the nature of science is becoming more complex, interdisciplinary, and multi-national."

※Though focusing on science, this course aims to develop GENERAL skills in innovation studies.

※No science or engineering knowledge is required.

Why science?

- Important sector in knowledge-based economy
  - Core of Innovation System: a key player in innovation system (Freeman 1995)
  - Increasingly incorporated into other sectors of society
- Interesting to study
  - By definition, the participants in the sector should be creative.
  - Studying the behavior of intelligent people is of a greater interest (for me)
- Dynamic and transforming industry
  - Massification
  - Globalization
  - Privatization & commercialization

Why science?

- Practical interest for some of you
  - Obvious implications for those who will stay in academia
  - Analogous to R&D-intensive firms, consulting biz, start-ups
- Unusually rich micro-data for empirical study
  - Output (outcome): measured by publication/patent (bibliometric data).
  - Input (intervention): funding data, student
  - Other: career of scientist (curriculum vita)

Topics Covered (Tentative)

- Production of knowledge; Knowledge management in science
- Management of scientist team, organizational design in science
- Cooperation and competition
- Entrepreneurship & commercialism in science
- Fund-raising; resource allocation
- Evaluation of scientific production
- Employment & human resource management in science; globalization
- Misconduct, research integrity

… etc.

Management of scientist team

- Team science
  - Done in laboratories
  - Division of labor between members
- Collaboration
  - Big science; e.g., CERN,
  - Consortium across sectors; NEDO in Japan

- Some questions
  - How to organize lab work among members?
  - How to balance education and research?

Entrepreneurship

- Hybrid science; academic entrepreneurship
  - Practical utility emphasized
  - Integration of science and commercial sectors
  - Bayh-Dole Act, TLO, etc.
- Academic's participation in commercial activities
  - Conflict of interest

- Some questions
  - How to facilitate the translation of science into practice?
  - How to address the conflict between commercial and scientific logics?

Evaluation of Science & Resource Allocation

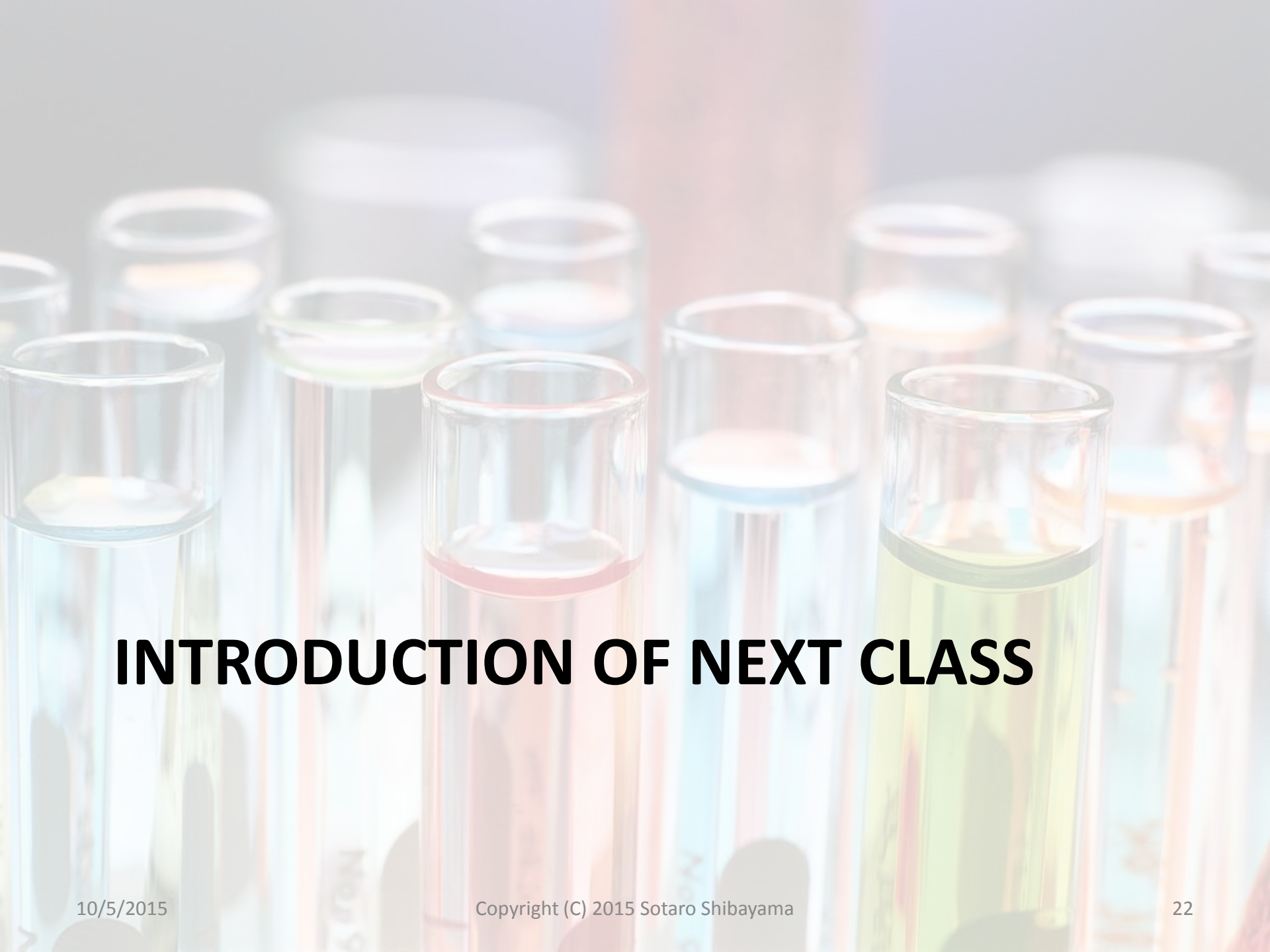
- Science costs (a lot)!
  - Laboratories are like a start-up firm; Fund-raising is vital.
  - E.g., In Japan, the revenue of national univ: 3 trillion JPY.
- Science takes human resources (a lot)

- Some questions
  - How to measure the productivity of science?
  - How to distribute resources to maximize production?

Production of Knowledge

- Peculiar form of production
  - Patenting
  - Publication
  - Secretive R&D
- Peculiar issues
  - Conflict between Open science vs. Secrecy
  - Verification issues: e.g., RIKEN scandal
  - …etc.

- Some questions
  - How to maintain the integrity of science?
  - How to balance openness and secrecy of science?



INTRODUCTION OF NEXT CLASS

“Organizational Design of Academic Laboratories and Conflict of Research and Education”

- Shibayama, S., Baba, Y. & Walsh J.P. (2015) Organizational Design of University Laboratories: Task Allocation and Lab Performance in Japanese Bioscience Laboratories. ***Research Policy***, 44(3): 610-622.

- Shibayama, S. (2015) Production of Science vs. Scientists: Case of Life Science Labs. ***Atlanta Conference on Science and Innovation Policy***, 17th-19th September, Atlanta USA.

Outline

- Context
  - Lab: fundamental unit of science production
  - Joint work of senior and junior members, with different skill sets for different tasks
  - Conflict between education and research in the lab context
- Question
  - What task allocation maximize performance?
  - How can the balance be taken between two missions: education and research?
  - How can lab heads be incentivized for education?

Assignment

- Read the paper & submit question
  - Student ID, Name, and Question
  - Email to mrkiran16@gmail.com (TA: Mysore Ravi Kiran)
  - By 9am on Oct 19 (Mon)

- Notes:
  - One question is fine, but many questions are fine, too.
  - The question does not have to be exactly about the paper.
  - You can ask questions in class without submitting the form (also counted as participation).
  - In class, don't hesitate to ask questions.

Tips for reading academic paper

Typical structure of empirical paper

1. Introduction
   - General problem about to be discussed
   - Why the problem is worth studying
2. Theory & Hypothesis
   - What is known & what is unknown
   - Hypothesis to be tested
   - Justification for the hypothesis
3. Method & Data
   - Data & approach to test the hypothesis
4. Result
   - If the hypothesis is supported or not
5. Conclusion & Implication
   - Summary of results
   - Implication: what the result means to policymakers
   - Limitation
   - Future research directions

- To observe how scholars find problems
- To learn a bit about the context of innovation studies
- To have some inspiration for your project

http://sotaroshibayama.weebly.com/

Seminar Series on Economics of Science and Innovation

講師： 柴山創太郎　特任准教授　工学系研究科/科学技術イノベーション政策における「政策のための科学」教育・研究ユニット
時間： 10/19～11/16の毎週月曜日　16:50 – 18:50
場所： 東京大学本郷キャンパス 工学部3号館3階 第32講義室

Speaker: Sotaro SHIBAYAMA - Associate Professor, School of Engineering, University of Tokyo / Science, Technology and Innovation Governance Education & Research Program
Time & Date: 4:50 – 6:50 pm, every Monday of Oct 19 – Nov 16
Venue: Lecture Room 32, Sch. Eng. Bldg. 3 (3rd floor) Univ Tokyo Hongo Campus

Misc.

- Classroom: same as today
  - It may change. See the website.
    - In case of room change, I will slightly delay the class to allow you to move to a new classroom.

- STIG (Science, Technology, and Innovation Governance) education program
  - Mandatory course: starting at 4:50pm, Oct. 7 @ Room 203, Sch. Law Bldg.
  - http://stig.pp.u-tokyo.ac.jp/program.html