Course 1.3
Innovation Theory and Concepts, National Systems of Innovation (NSI) and the SDGs

UN-Wide Capacity Building Workshop on Technology for Development: Innovation Policies for SDGS in the Arab Region

15 April 2018, Amman, Jordan
National Systems of Innovation and SDGs

1. What is a National System of Innovation?
2. How do we know the NSI is operating?
3. What problem does NSI solve?
4. How does the NSI relate to SDGs?
5. What are key technologies for SDGs?
6. Exercise: Innovation policy in Norland
1. What is a **National System** of Innovation?

**Not a new concept**

- Friedrich List 1789-1846
- Thorstein Veblen 1857-1929
- Joseph Schumpeter 1883-1950

---

**OECD**

Marshall Plan

Asian catch-up
Common wisdom: Linear Innovation Model

Interactive model of innovation (Rothwell, 1985; Trott, 2011)
Some definitions:

“... network of institutions in the public- and private-sectors who import, modify and diffuse new technologies.” (Freeman, 1987)

“... relationships which (enable) production, diffusion and use of new, and economically useful knowledge ...” (Lundvall, 1992)

“... institutions and economic structures affecting the rate and direction of technological change ...” (Edquist and Lundvall, 1993)

“... system of interacting private and public firms, universities, and government agencies aiming at the production of science and technology. (Niosi et al., 1993)

“... institutions, incentive structures and competencies, that determine the rate and direction of technological learning (Patel and Pavitt, 1994)

“... system of interconnected institutions to create, store and transfer the knowledge and skills and artefacts ...” (Metcalfe, 1995)
National System of Innovation

• Firm-centric
• Interaction in the socio-economic environment
• Institutions
• Relationships
• Not an STI policy
Q: Is the NSI operating?
Q: Is the NSI operating?

Linkages
Interactions
Relationships
Quantity
Quality
Stakeholders
Capability
Capacity
Learning
Knowledge flows

Information gatekeepers

Government
Environmental interests
Social interests
Firms
Academia, education
Consumers
Civil society
Knowledge Systems of Innovation and Major Stakeholders in India

Saurabh, Bholia and Guin (2014)
Innovation entities in China's national innovation system

Acha and Martin (2011)
3. What problem does a National System of Innovation solve?

A1: Provides a **framework** for developing and implementing **policy**

A2: Includes firms, markets, institutions and interests... **and SDGs**

A3: Moves STI policy thinking beyond funding R&D
Denmark – a nation of solutions

Enhanced cooperation and improved frameworks for innovation in enterprises

December 2012

The Danish Government

NATIONAL INNOVATION SYSTEMS: FINLAND, SWEDEN & AUSTRALIA COMPARED
LEARNINGS FOR AUSTRALIA

NOVEMBER 2005

REPORT PREPARED FOR
THE AUSTRALIAN BUSINESS FOUNDATION BY

CORAN ROOS, LISA FERNSTROM AND OLYER SUPTA
Intellectual Capital Services Ltd.

40 Church St. Framingham

Londonderry NH 03053

E-mail: icns@icnay.com

International Conference on Research Paradigms Transformation in Social Sciences 2014

Features of the Advancement of Science as an Integral Part of the National Innovation System in Modern Russia

Chernyshev Alexander*, Abuzhara Musaev

Institute of Social and Political Science, Orenburg State University, Orenburg, Russian Federation

ABSTRACT

The paper deals with the Russian government policy in the field of science and innovation development. The study is based on the analysis of scientific literature on science and innovation policy in Russia, as well as the results of the research undertaken by the authors in the course of the development of the National Innovation System in Russia. The study is aimed at identifying the main trends in the development of science and innovation policy in Russia, as well as the factors influencing these trends. The study also addresses the question of the role of science and innovation in the development of the economy. The study is of great interest to policy makers, researchers, and practitioners in the field of science and innovation policy.

REFERENCES


Evaluation of the Finnish National Innovation System
Policy Report

www.evaluation.fi

Science, Technology & Innovation Policy Review

UNCTAD

Science, Technology & Innovation Policy Review

UNCTAD
4. How does **NSI** relate to SDGs?

- All require knowledge, technology and innovation
- All require interaction and partnerships as formulated in SDG 17
- Many, most, require sustainable action by firms-entrepreneurs
SDG 17 is analogous to NSI framework at a global level

"Strengthen the means of implementation and revitalize the global partnership for sustainable development"

SDG 17 has specific technology targets:
17.6 on international collaboration
17.7 on promoting environmentally sound technologies
17.8 on innovation capacity-building (focus on LDCs)

Underscores the complexity of the task in terms of linkages and relationships
NSI > STI > SDGs: Aiming at quick and profound transformation driven by fast-evolving and converging technologies

1. No definitive list of technologies

2. Common features of new technologies relevant to Agenda 2030
   - Fast change and short adaptation cycles
   - Lower costs and wider choices
   - More open science, technology and innovation
   - New forms of work and inclusiveness
   - DISRUPTIVE INNOVATION
5. What are key technologies for SDGs?

- **Precision agriculture**: SDGs 1, 2, 9, 12, 15
- **Water management, wastewater treatment and nutrient recovery**: SDGs 6, 9, 11, 15
- **Circular economy**: SDGs 6, 7, 13, 14, 15
  > residual, waste = resource for products, energy
- **Transformative technologies**: SDGs 3, 4, 8, 9, 10
  > exponential growth, impact, strong links with ICTs
  (e.g.: AI, IoT, robotics, autonomous V, blockchain, 3D printing-additive mfg.)
Current concerns, way forward

• Big issue is SDG 5: Gender Equality

• Q: Are SDG actions sustainable?  
  A: Innovation and entrepreneurship

• Q: What to do?  
  A: Get policy fundamentals right
  > strengthen NSI – framework for STI (do an STI Policy Review?)
  > support innovative firms (accelerators, finance, fiscal, HR...)
  > strengthening education and training
  > build domestic and international linkages
  > demand-side science, technology and innovation policy
  > inclusive, grassroots, social, open > SDGs-relevant