Transformative Science, Technology and Innovation Policies: what, how and why

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Questions and issues to be covered

1. What are Science, Tech, and Innovation policies?
2. How have STI policies evolved and what can we learn from their evolutions? Weaknesses?
3. What is inclusive innovation? Why is it important?
4. What are some of the approaches to promote inclusive innovation
5. Why are Inclusive Technology and Innovation Policies (ITIPs) needed?
6. How can we ensure that STI policies are transformative?
7. Policymaking, policy processes, policy instruments, policy mix
8. What roles for policymakers' transformative STI policies

1. Scope and Definitions

- [Public] Policy
- Policymaking
- Science (or research) Policy:
- Technology Policy
- Science and Technology Policy (S&T) Policy
- Innovation Policy
- STI Policies
  - Why combine S, T, & I policies? Justifications, advantages? Possible weaknesses?
  - Other considerations or issues that STI policies are trying to address?
- What roles for Asia-Pacific policymakers' in *promoting, supporting, and achieving* transformative STI policies?

2. How have STI policies evolved?

Frame	Frame 1: R&D & Regulation	Frame 2: NSI and entrepreneurship	Frame 3: Transformative Innovation Policy (TIP)
Time of dominance	1950/60s-1980s	1980s-today	**Emerging**
Main geographical focus	National	National plus regional	Multi-scalar: focus on grand challenges
Focal actors	Government, scientists and industry actors, large firms priority	Interlinked configurations of govt, science and industry; priorities unis, entprs, mkets	Government, science, industry, civil society, end-users and non-users
Justification for policy intervention	Fixing market failures: industries fail to conduct basic scientific research	Fixing institutional system failures	Fixing transformational socio-tech system failures: R&D, Inov. Systs, comcialisation., TC
Focal areas	High tech, stress on the creation of radical novelty	Radical and incremental product and process innovations	Socio-technical systems, stress on transformation of system architecture
Typical policy activities	R&D stimulation, IP, STEM Edu., Science comms., foresight	Linkages, learning-by-doing, -using, -interacting, DD-side instrmts., sectoral/reg. NSI	Stimulatn of experimentation, routines change, scale-up, RRI, inclusion, policy mixes…
Underlying model of innovation	Linear: invention / research > innovation (commercialization) > diffusion (adoption)	Interactive: chain-linked, feedback loops, evolutionary, path-dependency, DD-pull consumers drive innovation	Socio-technical, experimental: quasi-evolutionary, selection, feedback loops, interactions actors-networks-insts-techs
Basic assumptions about innovation	Clear division of labour; govt fund, scientists discovers, firms applies, consumer adapts; hi R&D	Division of labour: multiple closely interacting actors, roles overlap, hi syst perf, govt facilitate fix/create markets,	Division of labour: blurred boundaries, multiple actors crossing domains & roles overlap, **co-production** of STI.

3. What is inclusive innovation? Why is it important? What issues is it trying to address?

- *Harnessing STI know-how to address the needs of excluded or marginalized groups (mostly low-income, also high income populations)*
- Still emerging. Definitions and conceptualisations are still muddy; nevertheless, it incorporates the following:

- Innovation in terms of product (goods and services) and process that addresses the needs of excluded or marginalized populations.
- New to the sector, country or new to the world; and may involve a variety of excluded populations
- Activities in the production, and consumption processes, or in the innovation process itself, by promoting the agency of the excluded
- Contribute to social and environmental sustainability; not in all cases
- Mostly focuses on poor as consumers; less interest in poor as producers
- Inclusion does not necessarily mean radical transformation – it often means modification

4. What are some mechanisms to promote inclusive innovation? Roles for policymakers?

These might include…

1. Strategic STI Policy Approaches
   - i. Governance of STI policies
   - ii. Transformational and Challenge-led Innovation Policies
   - iii. Mission-oriented Innovation Policies
   - iv. Policy Approaches aimed at Addressing Inequality
   - v. Conducting Tech. Appraisals, Foresights and H. Scanning
2. Gender-sensitive STI Policies and Approaches
   - i. Supporting Women and Girls in STEM Careers
   - ii. Gender in Scientific Research
3. Building Research Capabilities for Incl. STI Policies and Policymaking
4. Frontier, Future, and Emerging Technologies (FETs)
5. Policies for Inclusive Innovations and Inclusive Growth
   - i. Inclusive Innovations: Frugal and Grassroots Innovation
   - ii. Inclusive Markets and Inclusive Growth
   - iii. Social Innovations and Inclusive Public Sector Innovation

5. Why are ITIPs needed?

Inclusive Technology and Innovation Policies (ITIPs) can...

1. Encourage formal innovation systems to focus on the “poor” (defined here as “excluded and marginalised populations”)
2. Help the poor and low-income actors to adapt, diffuse and use innovations
3. Address structural roadblocks and reduce (or remove) barriers to STI
4. Make STI more accessible to the poor
5. Promote the development of STI that address the needs of excluded groups
6. Enable marginalised groups to better participate in STI, socioeconomic, and development activities
7. And many more…

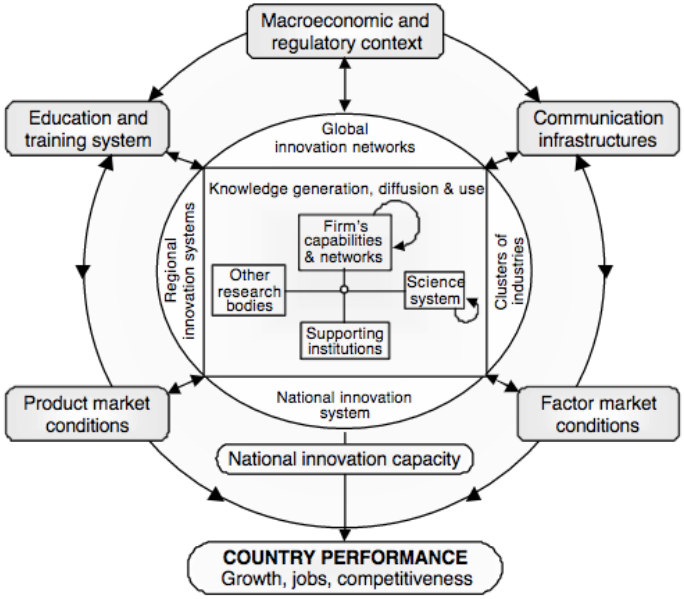
What roles for policymakers? Implement, formulate, evaluate, govern…ITIPS and/or transformative STI policies

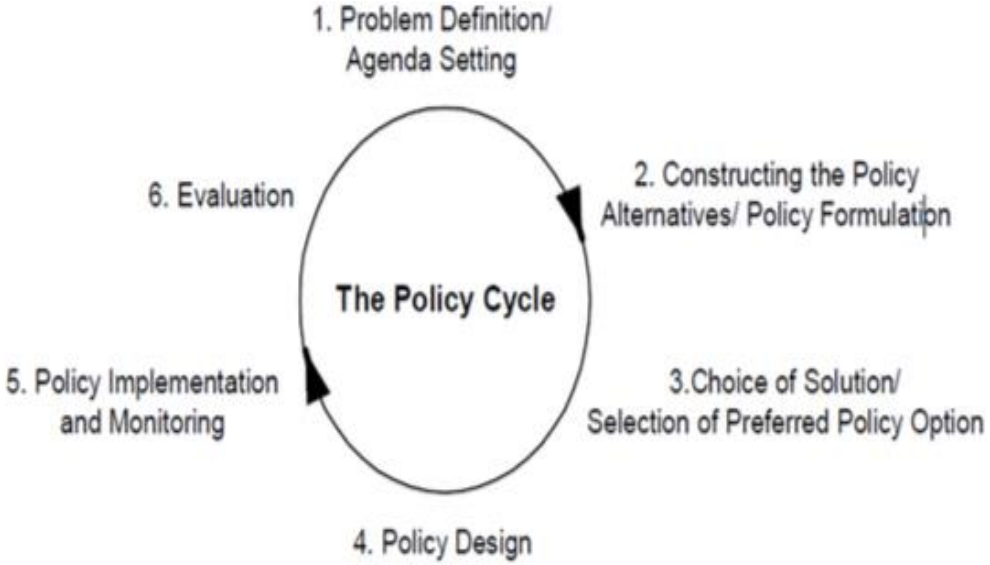
6. Transformative STI policies. How? Why?

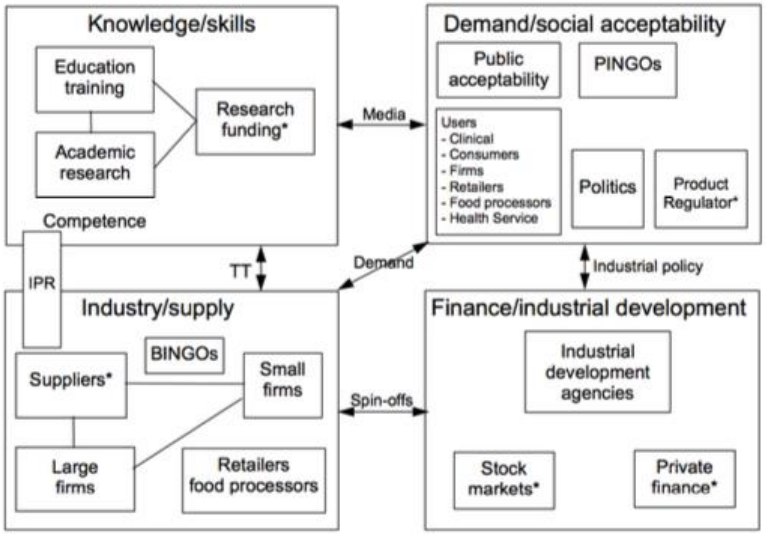
TIP Criteria

1. **Directionality**: Did the policy suppose non-neutrality or were a wide range of technological options considered and did it address which social and environmental issues they would provoke? Did the project and policy consider the non-neutrality of technology?
2. **Societal Goal**: Did the initiative focus on grand societal challenges such as those encompassed in the United Nations' Sustainable Development Goals?
3. **System-level Impact**: Does the initiative address change on the level of socio-technical systems? Does it have wide impact?
4. **Learning and Reflexivity**: Does the project allow for 'second order' or 'deep' learning?
   Is the opportunity for this embedded within the policy and project?
5. **Conflict vs Consensus**: Were differences in opinion between stakeholders acknowledged and encouraged?
6. **Inclusiveness**: Have civil society actors and/or end-users been included?

7. The 5Ps: policy cycle, policymaking, policy processes, policy instruments, policy mix







8. Conclusion: Roles for Policymakers in Transformative STI Policies

1. Formulate, implement, evaluate/review, and govern ITIPs and/or STI policies for transformative change. But how?
2. Issues are complex; not linear but systemic, socio-technical
3. The principle behind modern innovation (STI) is not *necessarily* engineered for the poor
4. High growth coexisting with (absolute and relative) poverty
5. Inclusive innovation and relationships to: inclusive growth, development, inequality, unemployment
6. Research, data/evidence, metrics, enhanced capabilities for policymaking, and improved understanding of policy processes, policy instruments and policy mix needed
7. Capabilities, experimentation, co-creation, and learning… vital
8. What ***more*** roles for policymakers' in transformative STI policies?