

MUTUAL LEARNING & CAPACITY BUILDING EXERCISE ON R&I STRATEGIES AND POLICIES



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OACPS R&I

Session 2: STI Policy Instruments for SDGs A taxonomy of policy instruments

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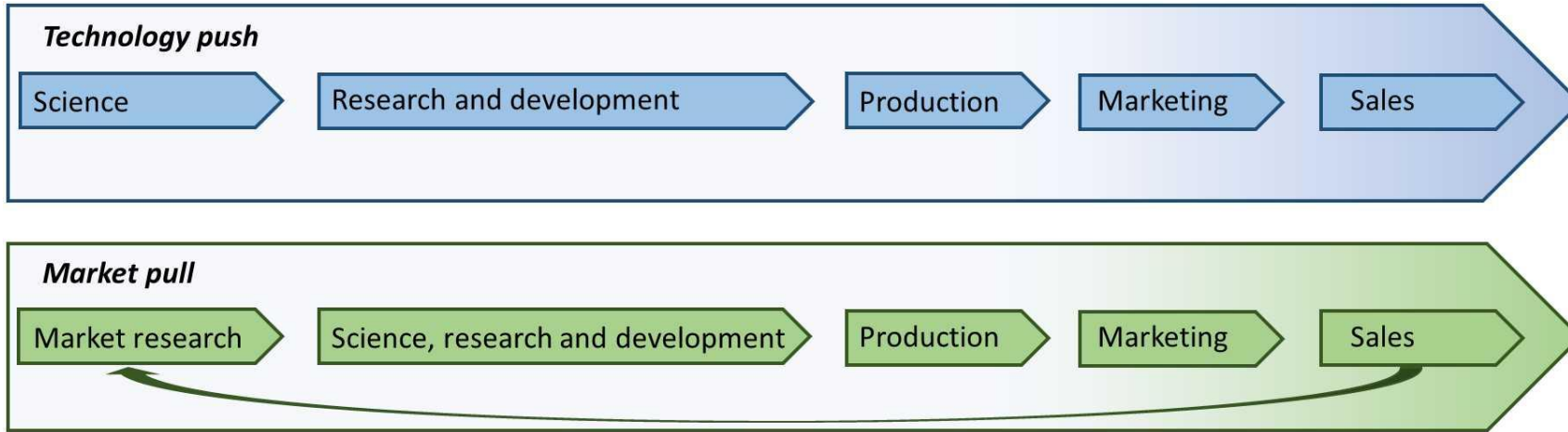
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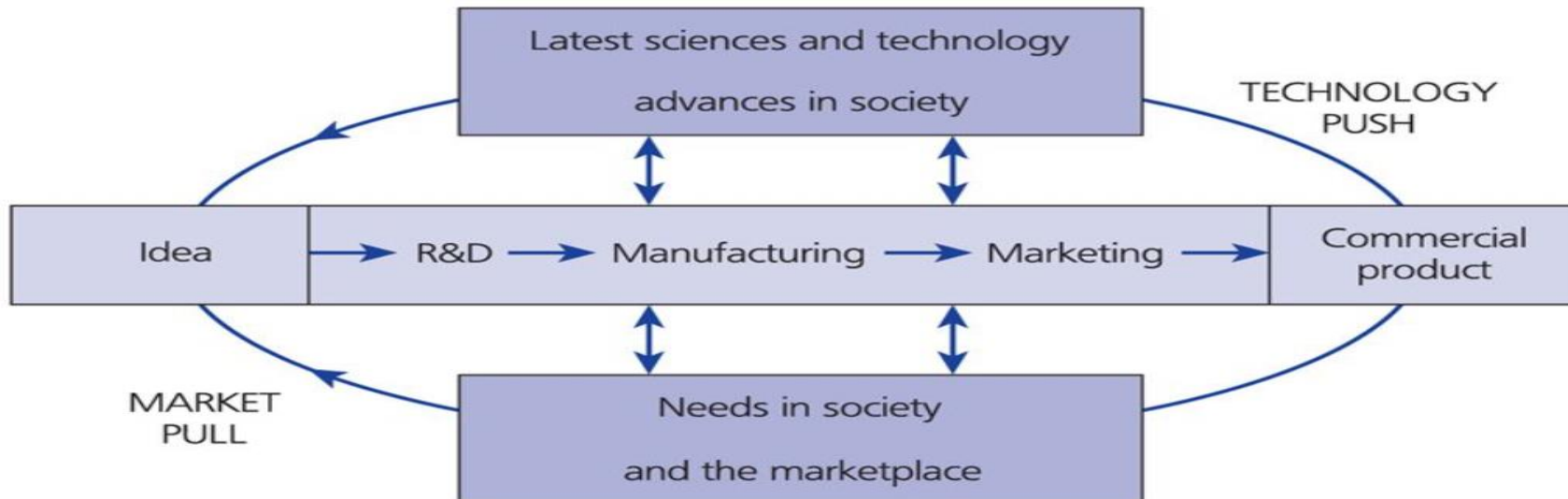
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Linear Innovation Model



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



Common wisdom: Linear Innovation Model



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



National System of Innovation

- **Model of STI activities**
- Firm-centric
- Interaction in the socio-economic environment
- Institutions
- Relationships
- **Not an STI policy, but a FRAMEWORK**

Q: Is the NSI operating?

Networks

Linkages

Interactions

Relationships

Quantity

Quality

Stakeholders

Capability

Capacity

Learning

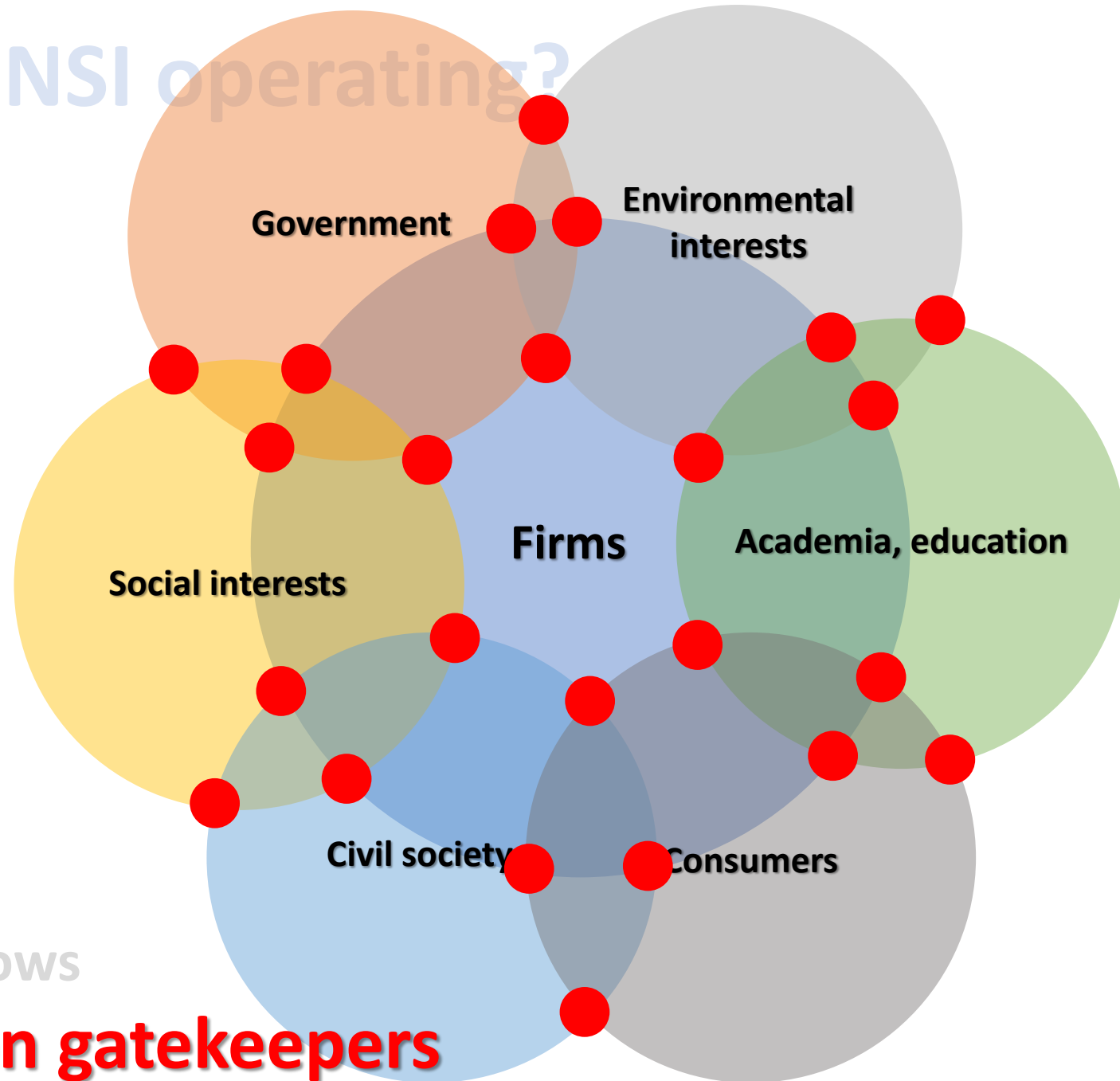
Knowledge flows

Information gatekeepers



Q: Is the NSI operating?

Linkages
Interactions
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Quantity
Quality
Stakeholders
Capability
Capacity
Learning
Knowledge flows



Information gatekeepers

WHAT ARE POLICY INSTRUMENTS?

STI Policy instruments are used to shape:

- **economic activities, and**
- **institutions**

... to reach STI policy goals:

- ✓ Promote innovation
- ✓ Funded or initiated by the public sector
- ✓ Programmes, incentives, initiatives, rules, etc..
- ✓ Policy mix, policy portfolio
- ✓ Creative destruction (structural transformation)
- ✓ Disruptive innovation
- ✓ Responding to change



Designing policies and a policy instrument mix

- 1) What are the goals? Priorities?
- 2) What is the current situation of the NIS and existing policy instruments?
- 3) What are the economic sectors and institutions that need to be shaped to reach the goals?
- 4) What are the key actors of the NSI involved in these sectors and activities?
- 5) What are the supply and demand factors that need to be changed?
- 6) What is the level of intervention in the supply and demand sides?
- 7) Who is responsible for the policy instruments?



Why is it complex?

- Systemic nature of the objectives (STI-led growth, SDGs)
- Diversity of actors
- Diverse policy instruments and agencies
 - STI policy instruments (by STI Ministry and other Ministries)
 - Other policy instruments that affect innovation unintentionally
- Policy mix
 - Intentional (e.g. clusters)
 - Co-evolution



Policy domains for STI

- Agriculture
- Business facilitation
- Competition
- Defense
- Energy
- Environmental regulation
- Exchange rate
- FDI
- Fiscal
- Financial services
- Food security
- Health
- Industrial
- Labour
- Land management
- Monetary
- Public finance, budget
- Public procurement
- Science
- SME support
- Legal, regulatory
- Standards, safety
- Subsidies
- Technology transfer
- Telecoms, Internet
- Trade
- Transportation



Key principles

- Identifying failures > Directionality
- Participatory process of policy instrument design
- Major role: coordinate the implementation
- Open to experimentation
- Monitoring and evaluation is key
- Continuous process



What types of tools?

- Sectoral
 - the benefits go to a specific knowledge discipline, technological area, productive sector or a specific issue;
- Horizontal
 - the benefits go to all the disciplines, areas and sectors



What types of tools?

By target group within NIS

- Private sector
 - Stimulate innovation in existing innovative firms
 - Enlarge the base of innovative firms
 - Attract innovative firms from abroad
 - Promote new firms within existing sectors
 - Promote new sectors
- Financial sector
 - Increase capacity to finance innovation
- Civil society
 - Increase social innovation
- Public sector
 - Increase innovation in the public sector
- Academia and research
 - Increase scientific capacity
 - Increase technological learning



What types of tools?

By type of innovation

- Product innovation
 - New goods and services
 - Improved goods and services
 - New to the world, new to the country, new to the firm
- Process innovation
 - Improved processes in the production of goods and services
 - Technology, business models
- Institutional innovation



What types of tools?

By level of intervention

- Supply side
 - Incentives (tax, subsidies)
 - Provide infrastructure
 - Coordinate action
 - Production
- Demand side
 - Information (labels, certifications)
 - Incentives (tax, incentives)
 - Direct procurement

What types of tools? By action areas

	Policy instruments	How can they support innovation for sustainable development?
Regional innovation strategy & networks	Clusters, industrial zones, and science and technology parks	Encourages smart specialization in innovation and technological areas relevant for societal challenges in regions with high potential and/or need for goods and services with environmental and social benefits
	Technology platforms and networks	Promotes information and knowledge sharing on innovation
	Roadmaps and technology foresight	Creates shared vision, commitments and roadmaps for experimentation, investment and development of eco-innovation, “wires up” the innovation system
Capacity building and information provision	Business advisory services	Promotes skills and knowledge relevant for innovation
	Local entrepreneurship and business incubation	Promotes local entrepreneurship and local innovation
	Technology transfer and matching	Promotes identification and transfer of innovative technologies relevant for tackling specific challenges
	Capacity building for governments	Promotes building up government capacity to design, implement, coordinate and evaluate STI policy with a view of its support for sustainable development
	Market intelligence services	Promotes information, data and knowledge sharing on innovation trends related to sustainable development (reduces information asymmetry)
Information and cultural Instruments	Education and awareness raising	Campaigns or programmes can ‘popularise’ science, technology and innovation and – if appropriately designed – enhance democratic inputs to innovation policy
	Network facilitation and enhancement	Aids lesson learning and sharing e.g. events such as Fuck-up Nights, Start-up weekends etc
	Virtual and material infrastructure/ events for innovation network-building	Hackathons, maker spaces, transformation labs

What types of tools? By action areas

	Policy instruments	How can they support innovation for sustainable development?
Economic instruments	R&D funding	Provides direct support for R&D underpinning sustainable innovation
	Innovation funding for companies	Provides direct support for innovation activities aiming in the areas relevant for sustainable development
	Equity support to venture & seed capital	Provides equity dedicated to innovation; de-risks innovation investments
	Feed-in-tariffs and similar subsidy schemes	Provides financial incentives to adopt and diffuse innovative technologies in selected technology areas (e.g. renewable energy)
	Tradable permit systems (e.g. emissions trading)	Allocates or sells emission rights to polluters which can be traded. The price for emission rights and prospect of reduction of emission rights creates incentives for innovation
	Removal of subsidies for unsustainable activities	Removes distortion from markets that inhibits sustainable innovation (e.g. subsidies for fossil fuels)
Fiscal instruments	Tax incentives for R&D for companies	Tax reduction (CIT) for companies undertaking R&D underpinning innovation
	Tax incentives for technology adopters	Tax reduction (CIT) for companies adopting innovations with environmental and social benefits
	Environmental taxation	Tax reduction (CIT) for companies undertaking R&D underpinning innovation
	Removal of tax reliefs for unsustainable activities	Removes distortion from markets that inhibits sustainable innovation (e.g. subsidies for fossil fuels)
Trade policy	Trade tariffs	Removes barriers to trade in innovative goods and services which contribute to the SDGs; opens access to knowledge important for adoption and diffusion of technology; also imposes barriers on environmentally and socially harmful goods and services

What types of tools? By action areas

	Policy instruments	How can they support innovation for sustainable development?
Demand support	Sustainable public procurement	Creates markets for goods and services with positive impacts on the local community in the areas relevant for sustainable development (e.g. Green Public Procurement)
	Pre-commercial procurement (R&D and innovation procurement)	Creates markets for innovative goods and services and stimulates experimentation of new application of emerging technologies
	Support to private demand	Provides incentives (e.g. vouchers) for consumers to purchase innovative goods and services with demonstrated positive social and environmental impacts
Education & training	Adaptation of formal education curricula to address the SDGs	Adapting higher education and vocational training curricula to consider sustainable development challenges. The curricula may be developed jointly with industry and other organizations. Provides qualified and skilled workforce
	Placement schemes and staff mobility	Supports learning, knowledge exchange and connections between actors in the innovation system with a focus on actors active in promoting sustainable innovation.

What types of tools? By action areas

	Policy instruments	How can they support innovation for sustainable development?
Regulatory framework	Environmental and health protection regulations	Provide incentives to innovate to comply with regulatory framework (e.g. substitution of harmful chemicals). Provides disincentives for free riders by introducing penalties.
	Product and industrial process standardization	Provide incentives to innovate to comply with environmental and social performance standards for products and processes
	Consumer protection, labels and certification	Promotes innovative products and processes by providing information on environmental and social performance of products and services to customers
	Intellectual property rights	Encourages firms to engage in innovation activity by protecting their knowledge; and opens access to knowledge and technologies contributing to sustainable development
	Competition Law	Prevents the emergence of monopolies or cartels that can stifle innovation and hold back its benefits for consumers or the environment
	Bankruptcy Law	Can help to engender a risk-taking, entrepreneurial culture, protecting investors, firms and consumers against some of the negative effects of failure