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Technology Transfer: An Ecosystem Approach

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Presentation Outline

I. Economics of Tech Transfer
II. Contextual Challenges
III. Framework
IV. Project Experiences
V. Main Takeaways
I. Economics of Tech Transfer: Institutional and Market Failures

Information Asymmetry

- Valuation of discovery
- Uncertainty about appropriation

Incentive misalignment

- Short-term/incremental improvements versus academic achievements
- Legal and regulatory framework and the incentives for collaboration

Access to specialized resources and support mechanisms

- Information: matching, valuation, market intelligence
- Finances: bridging the “valley of death”
- Skills: commercialization specialized skills

(Zuniga & Correa, 2013)
II. Contextual Challenges of Tech Transfer in ECA

**Legacy issues:** readjusting research orientation
- RDIs traditionally designed to serve SOEs
- Linkages to SMEs were absent

**SMEs’ limited capacity** to identify tech., organizational, and managerial needs
- Demand for tech transfer (*its nature & channels*) strongly determined by level of economic development in the region
- Low levels of private R&D investment amplifies role of publicly-funded R&D

**Commercialization specialized skills and technical capacity**
- Importance of tacit knowledge and learning by doing

**Entrepreneurial culture & institutional framework**
- Incentive structure, risk taking, research governance, IPR regime, access to finance, degree of internationalization
III. Framework: Tech Transfer and Shaping Conditions

(institutional & legal framework incentives) → Entrepreneurial Culture → (economic development & industry demand) → Public Research and Education → (research capabilities and orientation) → Intermediation support → Industry Innovation and New Tech. competences → Framework & business conditions

(adapted from Zuniga & Correa, 2013)
III. Framework: Formal and Informal Channels for Tech and Knowledge Transfer

Public Research and Education

- Scientific publications
- Conferences, seminars, workshops, etc.
- Joint research, centers of excellence
- **Education and training**
  - Consultancies, contract research, ext. services
  - Tech licensing to new startups
  - Spin offs

Industry Innovation and New Tech. competences

(adapted from Zuniga & Correa, 2013)
III. Framework: Tech Transfer as Leverage for Upgrading Firm Capability – The Big Picture

FIRM CAPABILITY

- Access to Skilled Labor & Talent (STEM)
- Linkages to knowledge diaspora - Mentorship
- Access to Tech / R&D
- Access to Global Managerial skills
- Business Dev. Services
- Competitive Markets
- Trade Logistics
- Linkages to GVCs
- Access to regional/global markets
- Gov. Procurement

MARKETS

- Crowdfunding Platforms
- Debt/Credit Facilitation, SME funds, Early stage VC
- Emerging market PE funds
- Seed Grants
- Angel Investors Networks
- Venture capital
- Seed/startup funds
- Incubators & Accelerators
- Entrepreneurial Universities
- Competitive Trade regime
- Bi/multilateral Trade agreements
- Skilled Work Force
- Functioning IPR regime
- Adequate R&D capacity
- Functioning hard/soft infrastructure
- Active university-industry linkages
- Dynamic Innovation and Entrepreneurship Ecosystems and Enabling Policies

FINANCE

- Pre-Seed/ Seed
- Start-up
- Early growth
- Growth
- Developed/ Established

ENVIRONMENT

- Professional Training
- Quality & Standards
- Advisory for Fund Managers

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## IV. Project experiences (1) Serbia: Piloting Interventions through the Innovation Fund

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<th>Main Challenges</th>
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<td>• Low TRL (2 - 3)</td>
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<td>• Lack of clarity on IP legal framework: Legal puzzle on ownership (faculty/institute/university)</td>
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<td>• Lack of demand pull from private sector</td>
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<td>• Lack of funding and other support from gov.</td>
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<td>• Lack of skilled personnel and commercialization/tech brokers (valuation, market intelligence)</td>
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<th>Primary Objective</th>
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<td>• Design and pilot elements of the NIS that can facilitate commercialization of public R&amp;D and support collaborative research with private sector</td>
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### Interventions

**Technology Transfer Facility (TTF) – Supply side:**
- One stop shop
- Service provider for monetization of invention
- Financial support for IPR protection, patent filing, prototyping, proof of concept (10k/project)
- Valuation and Market intelligence services and tools
- Training on disclosures, valuation, technical assessment

**Collaborative Grant Scheme (CGS) – Demand side:**
- Co-financing joint research projects by SMEs and PROs (SME-led, Max 5 consortium members)
- 70% of total project budget (300k/project over 2 years)
- Technical review by int. peer reviewers, investment committee
IV. Project experiences (2) Kazakhstan: Piloting a mini-NIS through Tech Commercialization Project (2008-15)

Main Challenges
- Legacy issues, weak linkages with SMEs/market
- Bureaucratic processes and Grant distribution lacking merit
- Outdated research infrastructure
- Weak IPR regime
- Lack of skilled personnel and commercialization/tech brokers (valuation, market intelligence)

Primary Objective
- Strengthening the scientific base and the relationship between science and market

Interventions
Providing support for:

Establishment of the Technology Commercialization Center (TCC)

Grant Program:
- Financed Senior Scientist Group (SSG) & Junior Research Group (JRG)
- Financed proof of concept, industrial prototyping
- Trained commercialization managers

Technological audit:
- Created a “Research Portal”, tech proposals with commercialization potentials

Legal framework improvement:
- 2 laws on commercialization of scientific research

Knowledge dissemination:
- Workshops, trainings, awareness campaigns, outreach and brokerage
IV. Project experience (3) Croatia: Commercialization of Publicly-funded Research (2006-12)

Main Challenges

• Decline in public R&D investment and deteriorated scientific performance
• Business R&D investment decline after privatization of SOEs
• Limited appetite for RDI restructuring

Primary Objective

• Enable R&D institutions to commercialize research outputs and increase ability of SMEs to invest in R&D

Interventions

Research excellence:
- UKF: research funding, research collaboration (EU framework programs, ERA objectives). Cooperability program to mobilize scientific diaspora

Commercialization of publicly-funded research:
- TTOs: Commercialization of research outputs (spin-offs) – Ruder Boskovic Institute (RI)
- SPREAD: Improved scientific and technological cooperation (research contracts with industry and licensing)

R&D financing program for enterprises:
- BICRO: Proof of Concept program
- RAZUM: mobilize business R&D spending. Increased volume of Firms’ investments in R&D
V. Main Takeaways

• Tech transfer is **more than establishing TTOs**
  ➢ Train (*applied*) researchers, maintain industrial competitiveness, upgrade SMEs, establish new ventures
  ➢ Informal knowledge transfer is as important, and not captured in metrics

• **Adopt an ecosystem approach** when designing interventions
  ➢ Intelligent public interventions should address bottlenecks on the supply and the demand sides

• **Don’t underestimate the culture**
  ➢ It takes time to overcome legacy issues through building public institutions’ capacity and learning by doing
Thank you

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