Multinationals, techno-entrepreneurs and the globalization of technology value chains

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Outline of the analysis

Technology Entrepreneurship (TechEntre):

- Offshore linkages to TechEntre depend on organizational change, human capital migration change

- Technology value chain of MNE & TechEntre is linked through “engineering creep” not strategy

- Onshore models are used offshore, but context may be different, outcomes uncertain → Creating competitors?

- Complements or substitutes for home country Technology Entrepreneurs?

- The future of innovation and national borders?
Themes, sample and partners

Themes: New dynamics of globalization, R&D/engineering strategies of firms, university responses and globalization strategies, emerging patterns of global technology entrepreneurship, changing migration dynamics

Sample: Triad MNEs with engineering facilities in China, Latin America, and/or India; Technology suppliers to these firms (N=25 MNE sites + ~12 small firms in 9 countries). Respondents: managers and engineers (N>200).

Industries: Electrical/Mechanical/Power systems; Autos and Aerospace (OEM and component/parts suppliers); Information Technology (hardware and software)

Partners: Cross-national collaboration: The Urban Institute, Case Western Reserve University, ISF-München, Universidad de las Américas, Puebla, and collaborators in China, Central Europe, India, Mexico, Brazil

The globalization of TechEntre: A convergence of trends

- S&T Human Capital Flows
- "Un-Locking" (De-integration) of MNEs
- New global tech Value chains
- Tech Rise of emerging economies
New Trajectories (I):
Human Capital

Demographic Trends in Graduate (M.S. & Ph.D.)

Foreign-born scientists and engineers in U.S. S&E occupations, by degree level and field: 1990 and 2000

Temporary Visa Share of Master's Degrees

SOURCE: National Science Board, Science and Engineering Indicators-2004
New Trajectories (II): “Unlocking” of Multinationals

Organizational “unlocking”/path dependency change of a century...

Value-chain spans *organizational* boundaries, overcome “Not Invented Here” (NIH) syndrome

Value-chain spans national and geographic boundaries

= iterative process of organizational change + human capital + technology to support offshore technology development

Firms de-integrate then, in combination with human capital capacity development and changes in migration flows, globally diffuse–

- *organizational* transformation leads to new conceptions of the firm
  - Outsource for cost
  - Outsource for innovation

- Then, *geographical* dispersion which is mediated and facilitated by human capital and technology
  - Offshore for cost
  - Offshore for innovation
New Trajectories (III): Offshore Tech Entre

Industry and country-specific patterns, but some common elements:

- Initially, indigenous firms develop to support local markets, in competition with, or isolated from MNEs

- Impact of MNE entry (SOEs/China, after liberalization/India; post-Soviet, post-NAFTA)

- Growth opportunities created through linkages to MNE value chain and markets
How MNEs support development of TechEntre in emerging economies

- **Human Capital**
  - Entrepreneurs
  - Employees

- **Technology & Processes**
  - Learning by employees
  - Support of suppliers

- **Customer base**
  - Market
  - Linkage to broader markets

- **Investment**
In IT & Engineering cases, MNEs initially contracted for low-end work and to “test the waters” offshore.

In IT cases, outsource TechEntre firms then move up value chain, taking on ever greater new development for MNE’s product:

- One continues as MNE supplier and develops non-competitive products.
- One becomes competitor through growth and then acquisition of a U.S. company (likely to start competing for MNE’s customers).
- MNE opens its own offshore office with status of supplier uncertain (acquisition?)

In MNE case, firm “experiments” in offshore market through contract engineering company,

- Then later acquires the TechEntre’s engineering team in MNE’s offshore site.

Cases from Lynn/Salzman.
Cases: China (TechEntre birth and trajectories)

- TechFaith – Motorola
- Ultrapower Software – HP, IBM, others
- Smartdot – IBM
- Sina – Stone Group, Dell
- Lenovo – HP, AST
- Guangdong Galanz – Whirlpool

Cases from our colleagues and from literature
Cases: China (MNE support of TechEntre)

- PC Products: Global producer of software for computer systems -
  - Local TechEntre ambitions
- PowerStar: US based producer of heavy electrical equipment -
  - help local TechEntre deal with MNEs
- Energy Systems: Power systems division of diversified U.S. MNE active in wide range of industries -
  - help local TechEntres meet global technical standards

Cases from Lynn/Salzman, Names are disguised
Cases: Mexico (Problems and alternatives to TechEntre)

- **J LH Numeric Control**
  - Est. 2000: process automation
  - Former employee of emergent Tier 1 supplier
  - Several MNE clients

  *But: difficulties getting capital, employees. Slow to realize potential.*

- **SLR**
  - 1920 Suspension repair slop
  - 1938 OEM for Ford
  - 1984 Design/sales/customer service office in Michigan
  - 1997 Strategic alliance with Brembo
  - ISO-9001 and QS-9000 certifications
  - Customer awards from Ford, Nissan, Toyota

*Functional equivalent to TechEntre – pros and cons*

Cases from colleagues and from our interviews
Case: Slovenia
Automotive Cluster (building local infrastructures for TechEntre)

- Sudden immersion in global economy
  - Break up of Yugoslavia – loss of protected market
  - New opportunities in EU
- Building globally competitive infrastructure
- Creation of entrepreneurially friendly technology cluster
  - Small and large businesses
  - Universities, research institutes
- Bottom-up Approach (led by firm, supported by government)

Case: from colleagues in Slovenia
Implications

- Not just hard tech
- Suppliers uses linkages as well as technology to become competitors
- New patterns of migration
- Linkages of firms with their offshore sites are complements for firms, uncertain impact for nations

- Technological entrepreneurship tends to take on a life of its own
  - Corporate strategists need to take this into account
  - EE Policymakers need facilitate, not direct
  - Strong pull of globalization