Sequencing Public Interventions to Support Private Sector-led Innovation Infrastructure

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1. Motivation -- from three perspectives
2. Case: polices for techno-entrepreneurship in Israel (three-phase model)
4. So what? Framework programs
5. Conclusions
1. Motivation

Another paper on high-tech in Israel at a conference on inclusive growth? A unique case to offer insights on

Three broader perspectives:

- **New open economy industrial policy**: how to make choices without ‘picking winners’

- **Creation of institutional infrastructure for technological entrepreneurship**: overriding concern in middle-income countries

- **Endogenous innovation policy**: from the list of constraints to the process to alleviate them
1.1 Open Economy Industrial Policy: Making Choices without Picking Winners

- Out of 1000 ideas, an angel or early stage VC finance 1-5 of them. Out of 10 being financed, 1 is successful (‘home run’),
- “Doomed to choose”: one must **make** a choice (backing all projects is impossible), yet picking winners is also impossible. Winners are not picked, they are generated through incubation process.
- New open industrial policy as management of **incubation cycle**: a process with cut-off points and performance benchmarks
Articulating Winners: The Incubation Cycle

Product Development Stage
- Market consolidation
- Market expansion
- Market penetration
- Product enhancement
- Sales & distribution
- Product development
- Marketing & research
- Prototyping
- Market definition
- Innovation & R&D

Risk Of Failure

Public Sector Involvement
Commercial Value

Sources of Funding

IPO/MBO / Trade Sale

VC/ Expansion

Early stage

Seed

Angels /3F’s

R&D

Tier 0

Tier 1

Tier 2

Tier 3

Tier 4

Tier 5

Business Development Tiers -- Bridge Institutions

Tiers 0/1 - Pre-incubation
- Direction
- Collaboration
- Guidance
- Resources etc
- Pre-Seed funding

Tier 2 - Incubation
- Mentoring
- Seed funding
- Contacts
- Consulting
- Clients

Tier 3 - Post-incubation
- Funding
- Structuring
- Relationships etc

Tiers 4/5 - Commercial
- Maturity
1.2 Supporting the Incubation Cycle: Institutional Infrastructure for Techno-entrepreneurship:

Deal generation and early stage support:

- Informal networks of angel investors (aka as FFFs – friend, family and fools – 3Fs)
- Links with foreign VC, particularly through diaspora networks (India, Argentina, Russia, Armenia, Belarus)
- Private early stage venture capital
- Idiosyncratic VC-like private-public organizations: e.g. Foundation Chile
- ‘The Boulevard of Broken Dreams’ – public and public-sector led VC organizations,
Seed and early stage VC: public good quality

- Commercial returns of seed funds are close to zero. Seed and early stage funds reap returns through later stage funds. This is why there family of funds (focusing on all tiers of the Incubation ). Because of the public quality of early stage, in catching up context, they are invariably subsidized.

- The key question is how?
India’s Venture Capital: Skewed toward later stage funds

- **Seed**
  - SIDBI, APIDC, GVFL
  - Seed Fund, Nadathur, TePP, Band of Angels

- **Early**
  - Silicon Valley Funds and Strategies
    - Sequoia, Softbank, Bessemer, DFJ, Battery, Intel, Norwest, NEA, KPCB; TDB

- **Growth**
  - Domestic strategics
    - Reliance, BCCL

- **Late**
  - International PE funds
    - Warburg Pincus, Temasek, IFC, StanChart, Actis, General Atlantic, Citigroup, Newbridge, Henderson, New Vernon, Blackstone, 3i, Carlyle, KKR, Oak Hill
  - Domestic PE funds
    - ICICI, IL&FS, IDFC, ChrysCapital, Kotak, UTI, Barings, GW Cap.

- **PIPE/Buyout**
  - Hedge funds
  - average fund size: $100 million and up
  - average fund size: $400 million and up

*Sources: Venture Intelligence; World Bank.

Note: Those companies not listed here are known exclusively by their acronyms. APIDC = Andhra Pradesh Industrial Development Corporation; BCCL = Bennett Coleman & Co.; DFJ = Draper Fisher Jurvetson; GVFL = Gujarat Venture Finance Ltd; IFC = International Finance Corporation; IL&FS = Infrastructure Leasing & Financial Services; KKR = Kohlberg Kravis Roberts & Co.; KPCB = Kleiner, Perkins, Caulfield, and Byers; NEA = New Enterprise Associates; PIF = private investment in public equity; SIDBI = Small Industries Development Bank of India; TDB = Technology Development Board; TePP = Techno-entrepreneurs Promotion Program; UTI = UTI Ventures.*
1.3 From ‘what’ to ‘how’: Endogenous Innovation Policy

Policy Makers in Middle Income Economies:

- **‘We have seen it all’**: the client is not only aware, but personally visited best practice examples (Israel, Finland, Chile, Singapore, Ireland, S. Korea etc.)
- **‘We have done it all’**: diverse attempts to adopt and adapt the best practice
- **‘We are already doing it’**: in response to recommendations of a typical innovation report of international organizations/consultants
Endogenous Innovation Policy Process

Focused interaction with stakeholders, trial and error experimentation and ‘policy’ learning by doing

- Analyzing the links among policies through time
- Anticipatory thinking + attempts at visualizing actual and future business/system of innovation trajectories
- A readiness to adapt/replace policies
- Our focus; institutional infrastructure for techno-entrepreneurship
- We start by considering a Three Phase Model based on the Israeli experience of innovation, high tech and innovation policy during the 1969-2000 period
Endogenous Innovation Policy Process: Turning Constraints into Variables

- Incubating the Incubation Cycle
- From deal flow problem – to generation of deals
- Increase in the diversity, size and numbers of start-ups and spin-offs
- Emergence of families of VC funds – including early stage
- Emergence of specialized and globally connected professional services firms
2. Three Phase Evolutionary Model

- **Critical mass problem** (strategic complementarily): private sector innovation infrastructure emerges in response to demand from firms. If demand is insufficient, it may never take-off. Yet without it, innovation entrepreneurship faces additional constraints.

- **Two sides** of the same collaborative process:
  - Real sector side: innovative firms and VC-ready
  - Innovation infrastructure side

**Three-phase** evolutionary model to describe this process.
2. Three Phase Innovation Policy Model-Israel

**Phase 1 -- Background Conditions Phase:**

1969-84

- A strong Science/Technology infrastructure.
- Market Failure in generating BERD
- Creation of OCS, agency in charge of promoting BERD in companies
- Implementation of Grants to R&D Program
Phase 2 -- Pre-emergence (1985-1992)

- New global opportunities (software industry, comm. market); Economic liberalization in Israel
- Growth in BERD and beginning of High Tech industry (some IPOs in Nasdaq of established co’s)
- New start-ups, foundation of some companies that would become relatively large (e.g. Comverse)
- Business Experiments with SU & VC
- 300 SU by 1992/3 some w/ IPO in Nasdaq

- Triggered by a VC-Targeted Program: Yozma
- An endogenous, largely market driven process
- 2500 SUs, 80 VCs, 13 B$ Exports, Capital inflows >20$, presence of MNEs, invest. Banks, foreign VC
- Favorable Global (NASDAQ, fall of USSR) and internal conditions (immigration, Oslo Peace Agr)
- Moderate impact on aggregate growth;
- Growth in BERD (lower G’t supp), rise in GERD/GDP
3. ‘So what?’: Inclusive Growth Issues

Innovation for Inclusive Growth:

- Increasing the innovative content of existing firms (including low-tech): productivity enhancement
- Incubating technology start-ups: transition to knowledge economy
- Attracting and rooting FDI by linkages to existing firms: linkage promotion
- Internationalizing firms: to accelerate growth from within by market expansion (not limited to high-tech)
3. ‘So what?’: Inclusive Growth Issues in Israel

- Innovation Strategy (1969--) formally Neutral but highly biased in favor of product innovations leading to exports & based on R&D (and against non-R&D functions e.g. design and engineering)
- Biased against process innovation
- No significant, specific program supporting Mid/Low Tech (till 2005)
Strong overall bias against Mid/Low tech

- High Tech benefits did not spill over to the rest of the economy
- Narrow base for growth
- Productivity growth of many non-high tech sectors was low or even negative;
- Worsening of distribution of Income, enhanced Center-Periphery differences
Main Lesson: an extreme High Tech oriented Innovation Strategy is problematic

Problem goes beyond ‘enhancing spillovers from high tech to mid & low tech’

The strategy & other policies should consider both comparative advantages (high tech in Israel) AND inclusive growth object
4. ‘So What?’ Framework Programs

Many economies (Argentina, Russia, India etc) are at phase 2. They have innovation clusters but fragmented institutional infrastructure.

Framework programs bring together pieces of institutional infrastructure on the basis of programs already in operation (examples in Israel: Yozma, Magnet). They are **humble and ambitious** at the same time:

- Dramatic change is at stake but the programs themselves are very specific.
- Since the programs are initiated on the **organizational periphery**, they are either not taken seriously by vested interests or allow to establish an alliance with vested interests.
Framework program beyond high-tech:

- Problem: multinationals which do little local sourcing
- Supplier development implies assembling of a packages of services which relies on many service providers
- The program taps into a variety of SME programs and transforms them, rather than duplicating existing programs – leverages heterogeneity of service providers
- Only a segment of multinationals participates. Out of 900 MNCs, approximately 200 proved to be effective participants in the program
- Outcome: 83 supply companies participated in the program dramatically outperformed their peer with similar characteristics
5. Conclusions

- Creation of institutional infrastructure for techno-entrepreneurship (including early stage VC): a multi-stage collaborative process
- Example: three-stage policy model in Israel
- Inclusive growth implications: limited growth effect. A need for new open economy industrial policy?
- For middle-income economies at stage 2: focus on the framework programs