Reflecting on the ‘Economics of Technological Leapfrogging’ by Keun Lee

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Campinas conference on technology upgrading July 3-4, 2019

Economics of leapfrogging

- A newly emerging topic (if not sub-discipline) within development economics – Lee K. as one of its co-founders
- Contribution: conceptual clarifications, taxonomies and predictions based on synthesis of rich and growing empirical evidence
- Paradox of catch-up: overtaking cannot be achieved by imitating
- The chapter is excellent summary of the state of the art of the area drawing on a rich array of insights, issues and references

What is actually leapfrogging?

- Negative definition: Lpfg is anything that it is not ‘path following’
- Positive definition: leapfrogging as the *final stage of catching-up* (post-catch-up?) after the detour stage of building technological capabilities (macro)
- Leapfrog older vintages of technology (micro view) vs leapfrog to catch up with advanced countries in new markets (macro view)

The extent of (macro) leapfrogging?

- Lpfg should be about technology generation capability, not about production capability and technology use
- If so, it is confined on a small number of potential ‘leapfroggers’
- Leapfrogging is upgrading but not every upgrading is lpfg but only the one that puts country/sector on technology frontier
- The majority of the EME are still in ‘J.Y. Lin world’ ie. building production capabilities and have’ islands’ of technology generation capabilities

Towards more rigorous understanding of the notion of lpfg I

- Is every stage skipping (SS) and path creation (PC) case also lpfg case?
- Is every detour planned or unplanned lpfg?
- Criteria for defining lpfg are not spelt out
- The key criteria: whether SS or PC or/and detour leads to technology generation capabilities (vs technology use and application)
- Examples: Chinese thermal solar? eFishing in Indonesia? Biofuel in Brazil? M-Kopa Solar in Africa? M-Pesa in Kenya?

Towards more rigorous understanding of the notion of lpfg II

- Are ‘lpfg cases’ easily imitable and easily transferable?
- If yes, they are technological lpfgs but not necessary economic lpfgs
- Example: Estonian ICT applications are easily imitable and transferable and they represent technological applications to local context but without organizational capabilities which would convert them into export, technology based income or employment ie into non-imitable and non-transferable capabilities

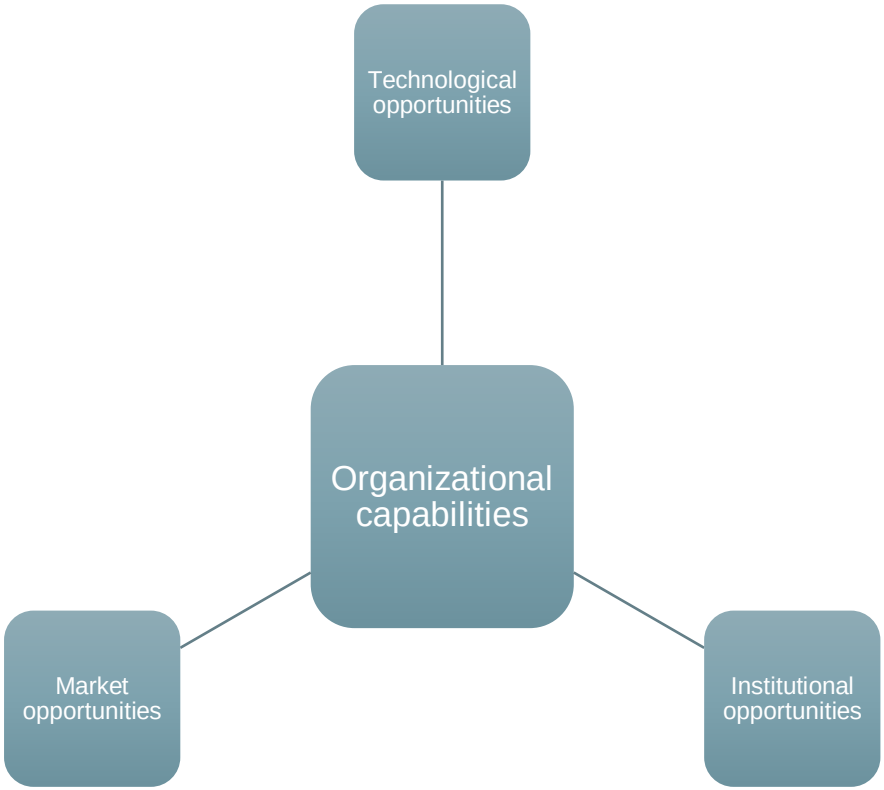
Is every case of Stage skipping and path creation in 4IR also leapfrogging?

- 4IR ‘window of opportunity’ is about *transformative* opportunities, not confined on individual lpfg cases without macroeconomic (inter-sectoral) relevance
- Is lpfg leading to transformation of ‘industrial' fabric of economy? Or remains isolated to one sector? (ICT in India? Ireland? Ukraine?)

General domains of 4.0 technologies	Technology sector	Carrier sectors		Induced sectors	
		Industry	Services	Modernised	Emerging
Actors	Core technology inventors Bridging technology inventors Application inventors	Industrial firms (primary ICT and industry 4.0 users)	Online digital platforms (newcomers)	Industry and services users and adaptors of digital solutions	New entrepreneurs responding to new demands

Preconditions for leapfrogging: interaction of organizational capabilities and three types of opportunities

(present in K.Lee analysis but not spelt out)



Preconditions or why lpfg is so rare?

- Threshold level of organizational capabilities required for leapfrogging: from OEM to ODM and to OBM
- Corporate governance and broader institutional dimension of lpfg > social conditions of innovative enterprises
- Institutional preconditions (opportunities): vested interests coincide with catching up modernization project
- Internal precondition: complementarity btwn public and private interests
- External precondition: asymmetric regulation !!
- Techn Opport and Mkt Opport spelt out in the analysis

India: is software export leapfrogging and detour opportunity for catchup?

- Low barriers for entry into ICT … so not lpfg
- The key to lpfg is the existence of barriers to entry
- Key challenge: moving to manufacturing will face barriers to entry
- What are organizational capabilities for lpfg into manufacturing and are there Mkt/ Techn/ Inst Opport?

Is lpfg possible in the cases with ‘FDI based manufacturing’ and with ‘weak manufacturing base’?

- Will MNCs on their own enhance technology generation skills and organizational capabilities?
- Probably not… if so policy approach should be quite different compared to countries with developed indogenous manufacturing base
- Underlying issue that has been hidden under the carpet: Who controls modernization process?
- Hyper integration models (CEE) vs domestic led modernization models and their tradeoffs

In summary

- Seminal contribution which opens new avenues for research and generation of policy ideas about growth in globalized economy from the perspective of emerging economies
- My comments hopefully give some ideas in which direction this research can be further advanced