Innovation and Inclusive Growth in Emerging Economies

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Outline

- Innovation and Inclusive Growth in the context of Emerging Economies
- Innovation Challenge I: Capability Development of Local Firms
- Innovation Challenge II: Innovating for Lower Pyramid markets
- Synergy between the two
- Concluding Remarks

Innovation & Inclusive Growth in the Context of Emerging Economies

- Structural problem: Significant population in low-productivity sectors (rural agriculture and urban informal sectors) and have unmet social needs
- Many SMEs competing on low resource-cost and lack scale to invest in innovation capability
- Innovation Challenge I: Developing capability of local firms to catch Up (or at least avoid falling behind) technologically in Global Competition
- Innovation Challenge II: Addressing social needs of “lower pyramid” population & speeding Structural Transformation

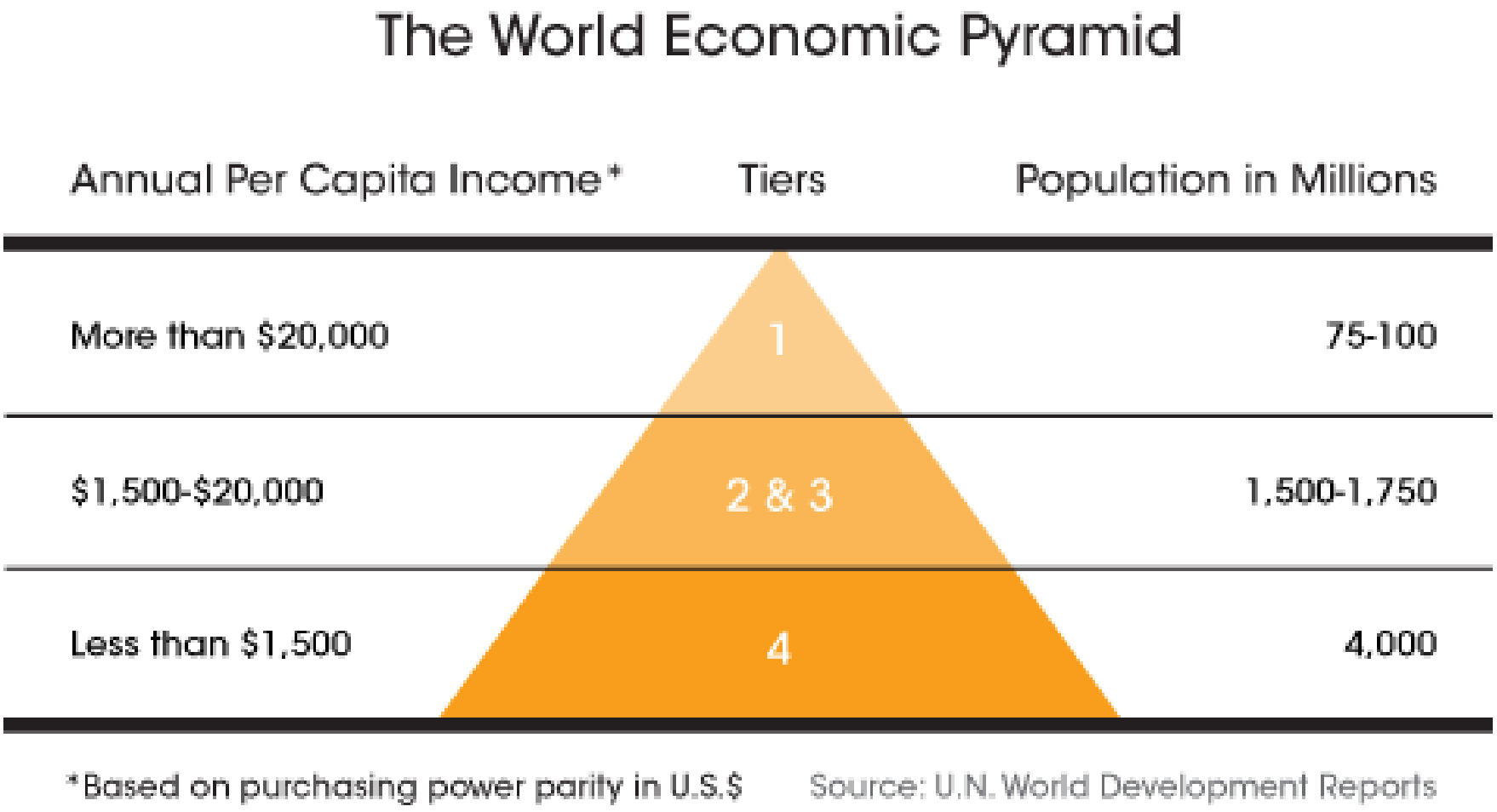
The Latecomer Catching Up Challenge ?

- The “easy” phase of “growth by accumulation” is over; the next phase of “growth by assimilation & innovation” is harder
  - Competitive advantage is shifting from low resource cost to technological capability
  - But technological frontiers are advancing rapidly, and most developing countries are already “late” in entering the technology capability development race; “Adding-Up” problem & “Middle-Income” trap
- However, opportunities do exist to exploit various latecomer advantages, including knowledge spillovers & new disruptive technologies

The Lower Pyramid Challenge ?

- The Challenge of a relatively large Lower Pyramid (Bottom of the Pyramid (BOP)+ Lower Middle Pyramid (LMP))
  - Under-served Social Needs
  - Low Affordability/Market Demand for Many Existing Goods & Services
- But also New Market-Fit Innovation Opportunity
  - Potential to Apply New Technologies
  - Under-Exploited Markets that can be unleashed through Technological and Business Model Innovations offering better Market-Fit
  - Local Firms & Entrepreneurs May Have Competitive Advantage due to their local knowledge & connections

The Lower Pyramid



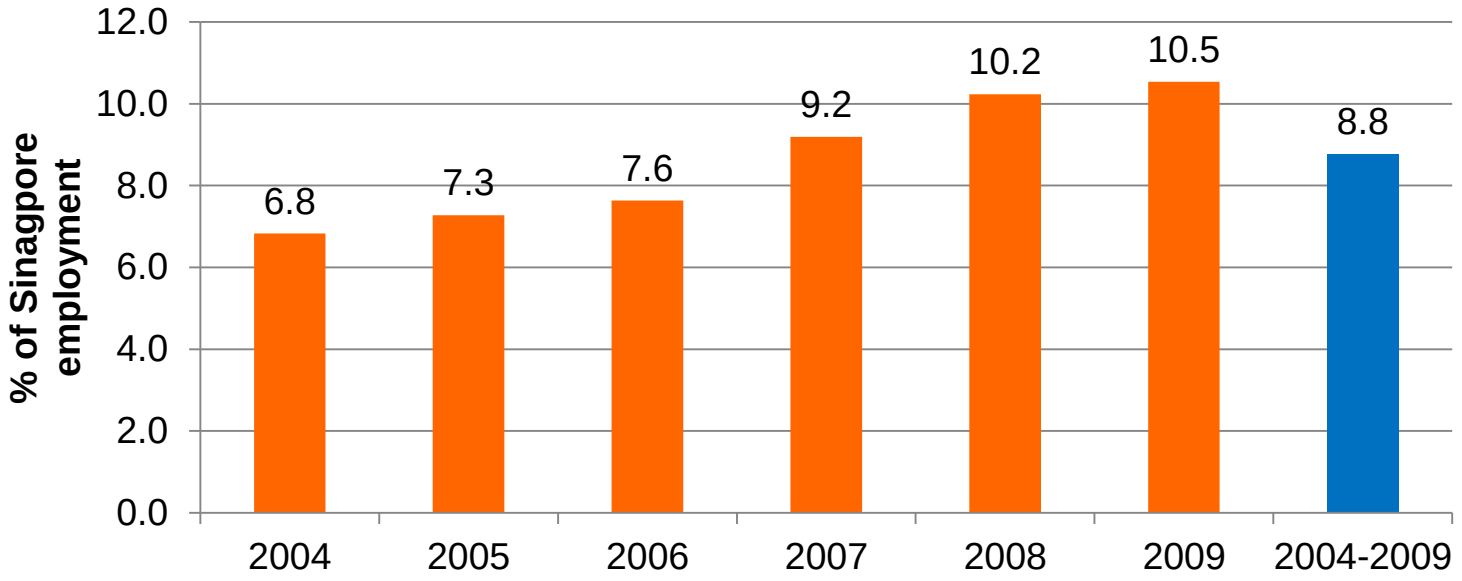
Capability Development of Local Firms I: Raising Innovation Capability of Existing SMEs

- Technology Assimilation/R&D Consortia
  - Pooling of Resources among SMEs
  - Coordination through a Public Research Institute
  - Phased Diffusion Strategy
  - Taiwan ITRI as the best example
- "Creative Imitation" Ecosystem built around Open Technology Platform & Modular Production Cluster
  - Integrated cluster of assemblers, component suppliers and designers/product innovators
  - Competing on speed to market and variety built around open technology platform
  - The "Shanzhai" system in Shenzhen as the leading example

Local Capability Development II: Spawning New Innovative Firms

- Building Technology Entrepreneurship Ecosystem
  - Technology Start-Up Incubation Programs
  - Development of Entrepreneurial Financing System (Angel Investment Community & Venture Capital Industry)
  - "Entrepreneurial" University Model to inculcate entrepreneurial mindset, foster technology spin-offs and inclination to start or work in young firms
  - Attracting overseas diasporas & openness to foreign entrepreneurs
  - Israel, Singapore, Chile?

Start-up* Share of Singapore Employment (2004 - 2009)



	2004	2005	2006	2007	2008	2009	*2004-2009*
No. of employees in start-ups	152,805	164,886	191,256	241,874	292,324	306,242	*1,349,387*
Total no. of employees in Singapore	2,238,100	2,266,700	2,505,800	2,631,900	2,858,100	2,905,900	*15,406,500*

* Young firms less than 5 years old

Source: Wong Poh Kam et. al. (2011), *Study on High Tech Start-Ups in Singapore*, Research Report commissioned by NRF

Moving Beyond Catching Up: Innovating for Lower Pyramid

- Limitations of the Latecomer "catch-up" strategy
  - Implicit linear view of a *"path-following"* mode of learning that consider *"path Breaking"* Innovation as only possible after one has gotten close to the leaders
  - *Strategic Framing Bias* that focuses on competing with the incumbent leaders in advanced markets or fitting into their global production system as producers and component suppliers; both reinforce the early-mover advantages of the incumbent leaders
- Need to complement with a strategy to exploit Knowledge Spillovers from Advanced Economies to target *New* Market Opportunities in the Lower Pyramid of Emerging Markets

A Broader Conceptual Framing of Latecomer Innovation Capability Development

- Types of Technological Capability
- Path-Following vs. Path-Breaking Mode of Learning
- Technology as a Vector of Performance Attributes and their Market-Fit
- Technological vs. Business Model Innovation

TECHNOLOGICAL CAPABILITY

- **Types** of Technological Capability
  - Ability to **Use**
  - Ability to **Imitate (Replicate)**
  - Ability to **Innovate**
- **Level vs. Vector of Capability**
  - Every technology has multiple performance attributes
  - Strategic Choice of which performance attributes to prioritize depends on the target market of application

Path-Following vs. Path-Breaking Learning

	Path Following	Path Breaking
Learning to Innovate	Incremental; Continuous; Sustaining; Exploitative	Radical; Discontinuous; Disruptive; Explorative
Learning to Replicate	Duplicative Imitation	Creative Imitation
Learning to Use	Imitative Use	Creative Use

Source: Wong, P.K. (Forthcoming)

Path Following vs. Path Breaking

	Path-Following	Path-Breaking
Technologically Close to Leader	"Overtaking"; Frontier Leapfrogging	Radical Innovation; Frontier Leapfrogging
Technologically Far Behind Leader	"Catching-Up" Learning; Stage-skipping Leapfrogging	**Disruptive Innovation or New Market Niche Creation**

Source: Wong, P.K. (Forthcoming)

Technology Attributes and Market Fit

- Every Technology is a vector of performance attributes; technological improvement/innovation is not movement on a line but in a multi-dimensional space
- Different market applications impose different mix of performance attributes of a technology; different target market strategies will thus require different technological learning and innovation trajectories
- In addition to targeting a different bundle of performance attributes, innovation for new market applications often involves adopting a different business model ("business model" innovation)

Performance Attributes: Ultra-Sound Scanner

	Conventional Scanner	Portable Scanner
Image Resolution	High	Lower but acceptable
Range of Problems Diagnosed	Comprehensive	Limited
Portability	No	High
Operating Skills Requirements	High	Low
Cost	High	Low

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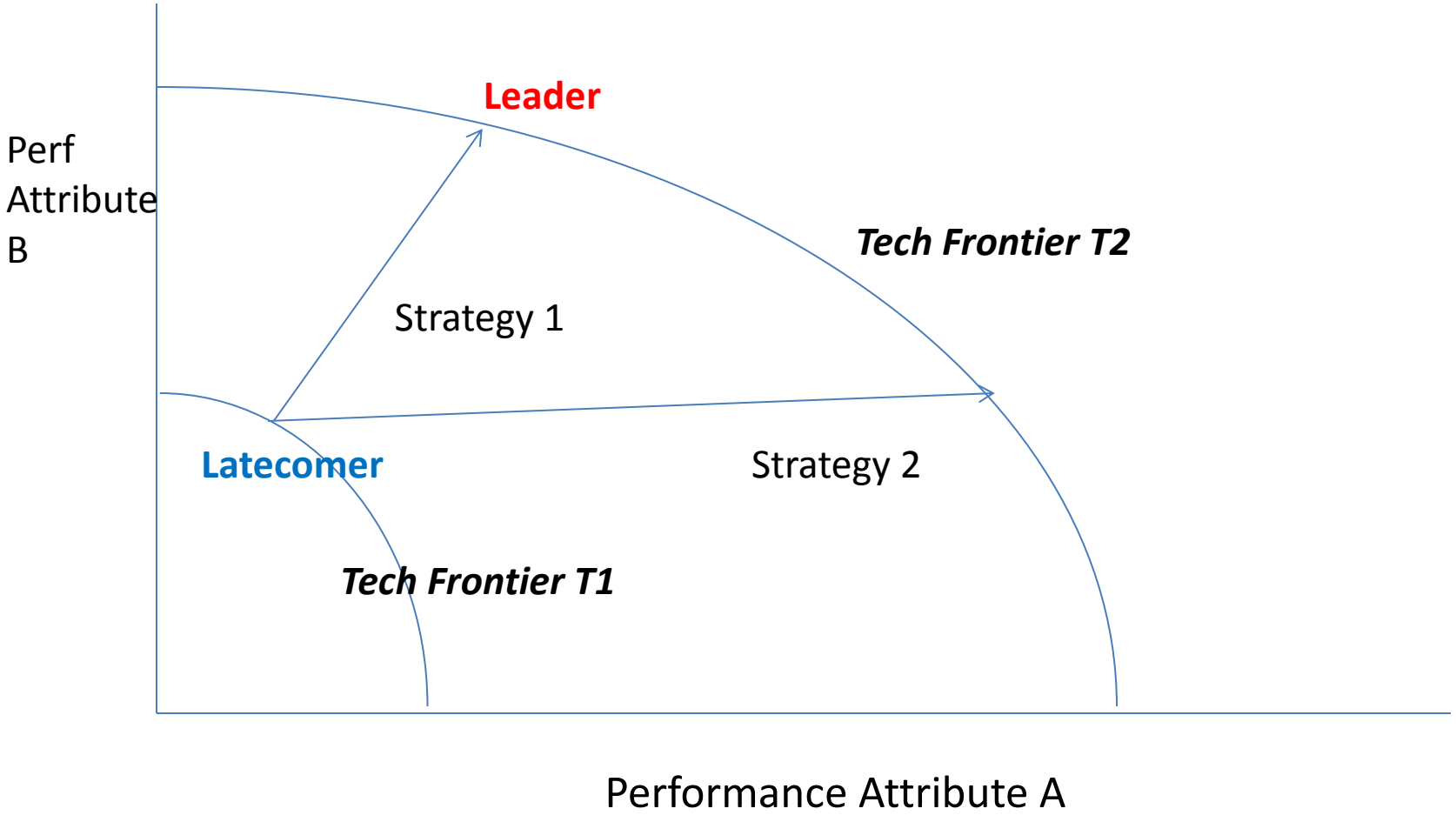
Technological Learning Strategy



How Market-Fit Drives Innovation Trajectories

	Innovation Focus
Low Income/ Affordability Level	Cost reduction; “Frugal Innovation” for BOP; Small Packaging; Business Model Innovation
Space Constraints	Miniaturization
Remote Location	Portable solution
Lack of IP Protection	Rapid incremental innovation & product proliferation; new delivery mechanism
Poor physical infrastructure	“Juggad” Innovation; mobile solutions

Path Breaking: Technology vs. Market-Fit

	Existing Market/ Application	New Market/ Application
New Technology	**Disruptive Innovation**	**Architectural Innovation**
Existing Technology	Path-Following Innovation	**Creative Use**

Source: Wong, P.K. (Forthcoming)

Some Examples of Emerging Market Innovations

- Mohd Yunus' Grameen Bank micro-finance innovation ("bank for the poor")
- Mobile App Innovations for BOP markets (e.g. MPESA in Kenya, SMS payment in Philippines)
- How China became the world's leader in Electric Bicycle ("E-Bike") Industry
- How Singapore became the world's leader in off-shore oil rig building
- How Taiwanese MTK became the leading platform for "Shanzhai" phones in China

Innovating for Lower Pyramid

- Exploit new technologies, especially ICT, to solve social problems largely ignored by leading firms from advanced countries
- Develop new innovation capabilities by focusing on developing technological attributes that have better market fit with the lower pyramid's demand characteristics
  - Frugal Innovation for BOP; "Jugaad" Innovation
  - New Business Model
- "Reverse Innovation" and "Horizontal Innovation" growth opportunities
- Re-Prioritize Public R&D to focus on Lower Pyramid
- Promotion of Social Entrepreneurship & New Impact Investing Model to complement traditional public subsidies & philanthropy/ODA models

Mobile Innovation for Lower Pyramid

- The emerging Open Technology Platform for Mobile Solutions
  - "dumb" sensors
  - "smart" mobile computing/display device
  - wireless data connectivity
  - "cloud storage" & big data analytics
- Disrupts conventional integrated systems
  - Significantly reduced design, development, manufacturing & maintenance cost by using standard modular components and interfaces
  - Greater market-fit to Lower Pyramid environment (low affordability, need for portability, poor maintenance infrastructure, etc)
- Lowers entry barriers for new firms and SMEs

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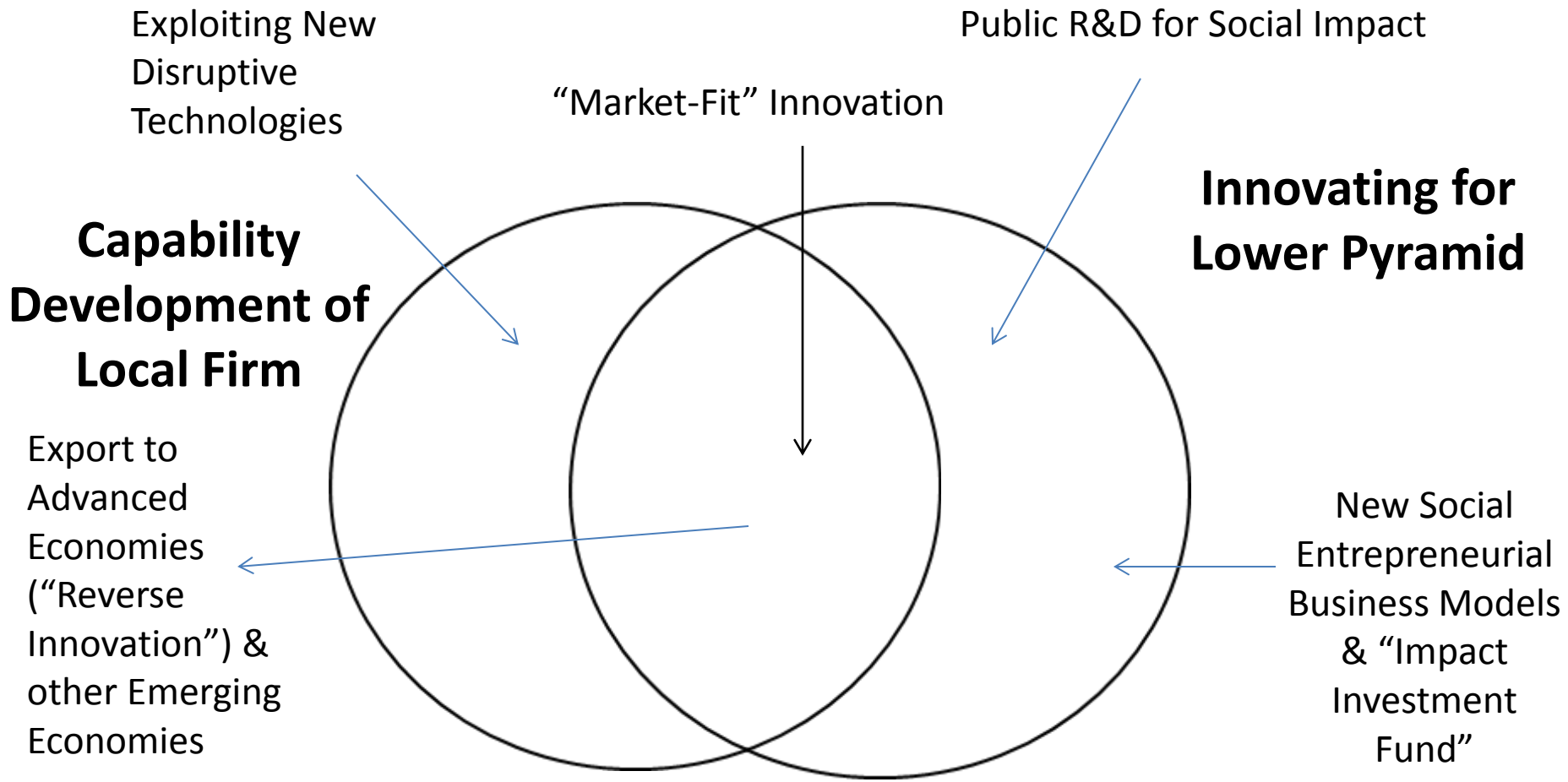
Synergy between Innovating for Lower Pyramid and Capability Development of Local Firms



Concluding Observations

- Emerging economies need to pursue both path-following technological learning as well as path-breaking capability development (creative use and creative imitation), even when they are far behind the technological frontiers
- Innovating for Lower Pyramid market opportunities in the emerging markets themselves contributes not only to bring inclusive development to low-income population, but also contributes to the capability development of local firms

Thank You !