



Innovation in Global Value Chains in Developing Countries

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Singapore - GPN@NUS

November 22 2018

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Collection: Innovation systems in the era of global value chains

EJDR is pleased to showcase the recent Special Issue on 'Innovation systems in the era of global value chains'. Volume 30, Issue 3, July 2018

Guest Editors: Padmashree Gehl Sampath, Rasmus Lema and Roberta Rabellotti.

Innovation Trajectories in Developing Countries: Co-evolution of Global Value Chains and Innovation Systems

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Innovation Trajectories in Developing Countries: Co-evolution of Global Value Chains and Innovation Systems

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Working Paper Series

#2018-038

Innovation in Global Value Chains

Rasmus Lema, Carlo Pietrobelli and Roberta Rabellotti

Sustainable Industrial Development in developing countries

- Innovation is a **fundamental prerequisite** for sustainable economic growth and development;
- Developing countries are faced with significant **challenges in building and deepening their innovative capabilities**, in forming appropriate skills and in strengthening the related supporting institutions;
- **Globalisation** has important implications on how developing countries build their innovative capabilities.

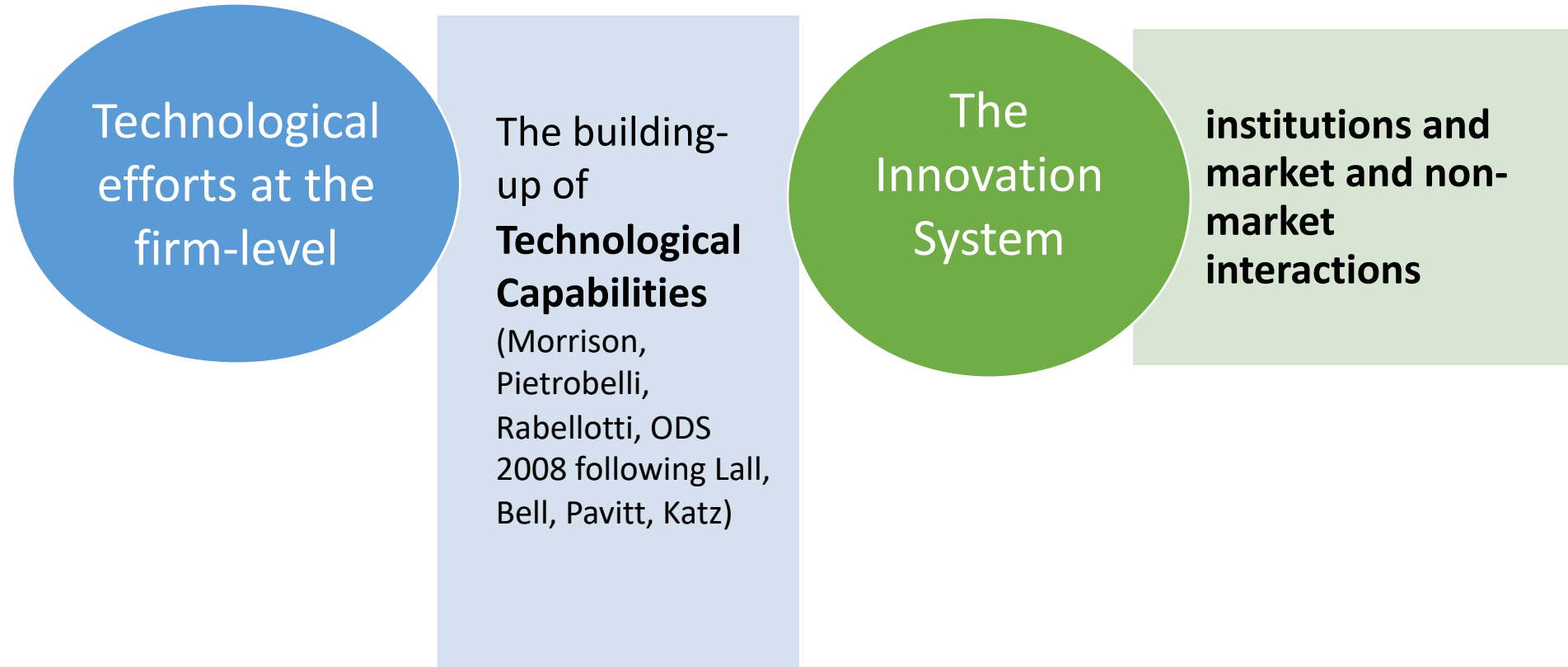
Key Question

- **Whether and under what circumstances globalisation creates new opportunities** for learning and innovation in developing countries? Or conversely, may it be a **hindrance** for building up innovative capabilities?
 - We investigate how combining **global value chain** and **innovation system** approaches can help to understand possible **trajectories** of learning and innovation in firms in developing countries.

The GVC approach and innovation

- Upgrading and innovation often used as interchangeable concepts;
 - In fact, innovation is rarely investigated (De Marchi, Giuliani & Rabelotti, EJDR 2018);
- Opportunities, direction and speed for building domestic production and innovative capabilities are shaped by governance patterns in GVCs;
 - Learning can be facilitated by direct involvement of the value chain leaders or be the result of pressure to match international standards (Pietrobelli & Rabelotti, WD 2011);
- Limitations:
 - No investigation on **micro knowledge mechanisms** at firm level: how do firms in GVCs learn and innovate? how is knowledge accessed by domestic enterprises?
 - Limited attention on institutional frameworks which contribute to shape innovative capabilities of firms involved in GVC.

Innovation in GVC does also depend on

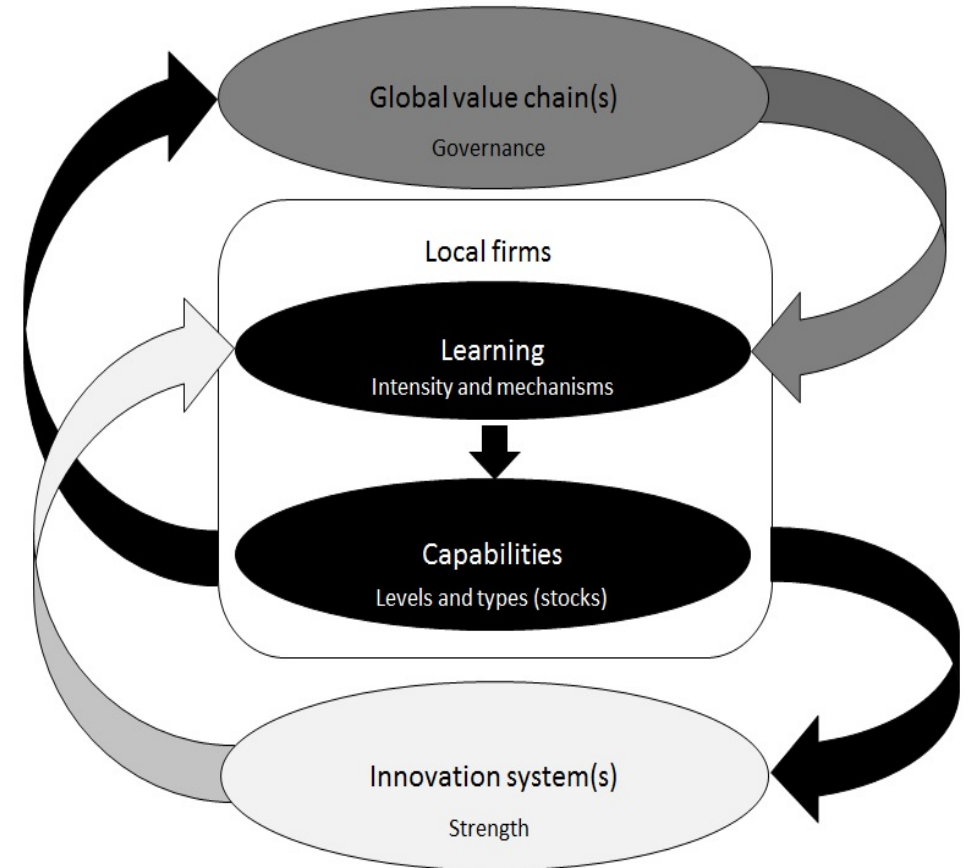


Innovation systems

- **Focus on** how interactions among enterprises, institutions, research bodies and policy makers contribute to learning and innovation within firms;
 - Innovative capacity at the firm level also depends on the density and quality of the relationships among enterprises and the different actors in the IS;
- Limitations:
 - No understanding of systems building and dynamism (changes over time);
 - Limited attention to external linkages in the generation and diffusion of knowledge and innovation.

Co-evolution of IS and GVC

- Both IS and GVC contribute to *firm's* learning processes and innovation capability building and change because of changes in firms' capabilities ;
- Forward-feeding linkages (dark and light grey arrows);
- Feedback linkages (black arrows):
 - **GVCs**: changes in firms' capabilities influence whether and how firms can engage in different markets, functions and governance patterns;
 - **Iss**: changes in firms' capabilities generate demand for different types of knowledge, resources, services (i.e. international certifications)
 - **Iss**: there are also spillover effects (i.e. demonstration effects, labour rotation).



Some illustrative trajectories of firms' innovative capabilities

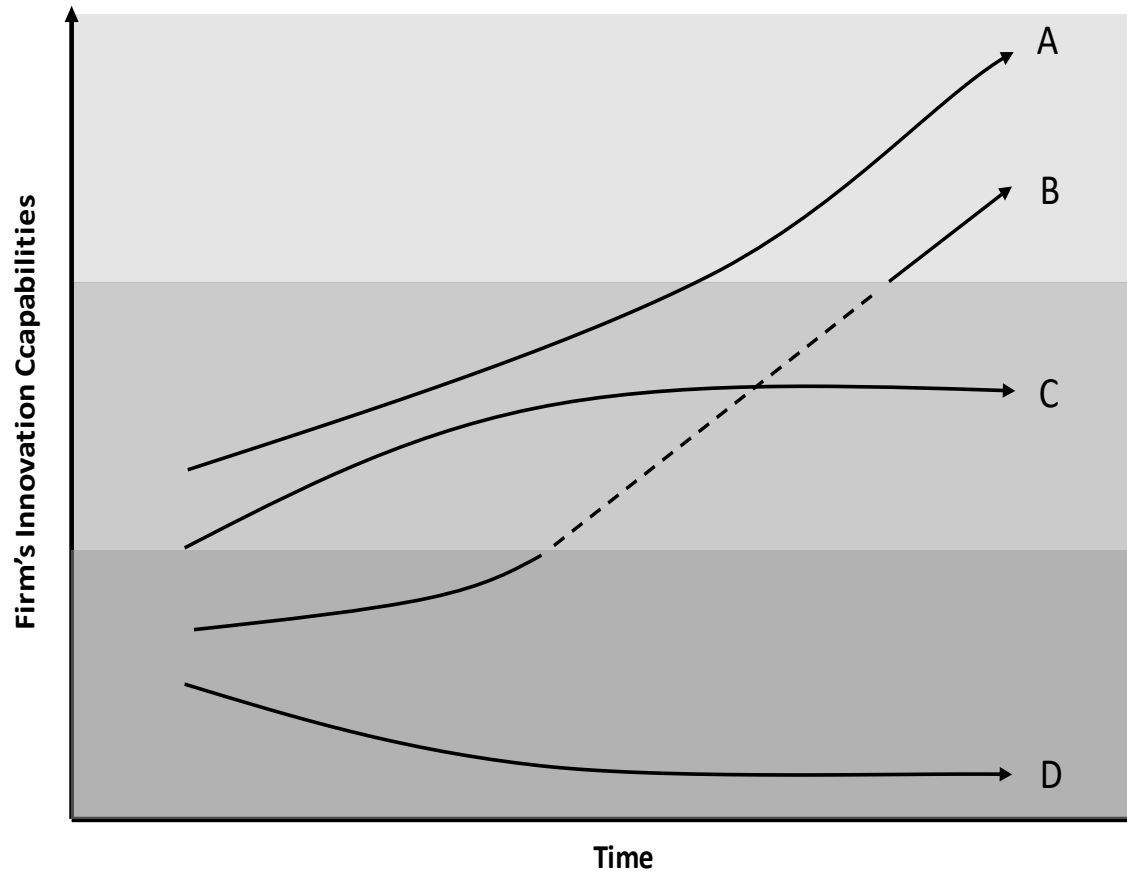
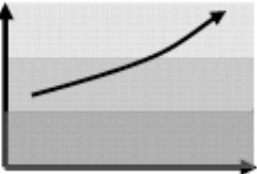
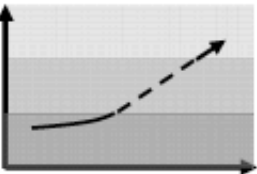
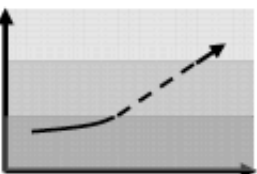
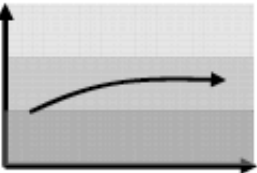
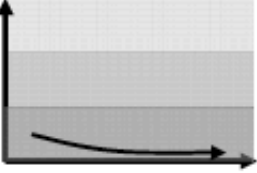


Table 1: Illustrative trajectories of innovation capabilities

	Trajectory	Firms' capabilities	ISs	GVCs	GVC-IS co-evolution
<p>Gradually increasing trajectory (A) <i>Chile:</i> salmon <i>China and India:</i> electronics, cars, space technologies <i>China:</i> mobile phones and electric two-wheelers</p>		Firms' capabilities gradually and cumulatively strengthen.	IS strengthens sufficiently due to GVC involvement.	Value chains play a learning-intensive role.	GVC and IS exhibit complementarity and positive interactions.
<p>Leap-wise increasing trajectory (B1) <i>Brazil:</i> footwear <i>India:</i> pharmaceuticals <i>Korea:</i> toys, musical instruments, and helmets</p>		Firms' capabilities strengthen in successive jumps; firms oscillate between GVC and IS as alternate sources of knowledge and capability building.	Initially weak IS eventually develops to support value-chain development.	GVCs provide initial learning opportunities; local firms exit the chain; and the value chains move from local to global.	IS and GVC have sequential one-way relationships (each playing the stronger role in turn).
<p>(B2) <i>India:</i> software <i>East Asia:</i> apparel</p>		Firms' capabilities increase but are biased towards export-demand preferences until IS grows.	Absent or weak IS fails to support enterprise capabilities.	GVCs provide sustained learning opportunities that eventually feed back into IS development.	A one-way relationship is followed by a two-way interaction.
<p>Stagnating trajectory (C) <i>Bangladesh:</i> aquaculture <i>Kenya, Lesotho and Swaziland:</i> textiles</p>		Firms' capabilities remain unchanged (stagnant) or develop only marginally.	IS becomes fragmented and thus cannot support value-chain development, leading to limited absorptive capacity.	Value-chain participation remains stagnant, leading to limited learning in key tasks.	Initial efforts at mutual support are followed by disjunction or ineffective interaction.
<p>Declining trajectory (D) <i>Gabon:</i> timber <i>Thailand:</i> cassava</p>		Firms shift to lower-value-added stages or exit from the value chain.	Absent or very weak IS fails to support value-chain development.	Lead firms with strong bargaining power play a negative role.	GVC and IS have disjointed and/or negative interactions.

Source: Adapted from Lema et al. (2018)

The leap-wise trajectory

(Lee, Szapiro and Mao, EJDR 2018)

- Firm capabilities strengthened in jumps; GVC & IS as alternate sources of knowledge and capabilities, IN-OUT-IN strategy:
 - IN: in the **preliminary development** stage GVC participation is necessary to acquire foreign knowledge and production skills;
 - OUT: in the **intermediate stage** separation and independence from existing foreign-dominated GVCs is required for functional upgrading. This requires building capabilities in design, R&D, marketing, and a strong IS;
 - IN: in the **maturity stage** the latecomer firms build and lead their own GVC.

Case illustrations of the leap-wise trajectory

South Korea: From OEM to ODM to OBM (*Aurora World, Shimro Musical Instruments, HJC Helmets, Hyundai Motors*)

- Clear strategic and risky decision is required, e.g. Hyundai's choice to break up with Ford, and then with Mitsubishi, after they refused to transfer knowledge about engine technologies.

Brazil: *Footwear in Rio Grande do Sul cluster*

- From 1970s to mid-80s growth through GVC integration, then decline in mid-2000s, when China enters the market;
- Some firms remain in the US GVC with low price products, passive learning, low interactions with other actors and only product upgrading;
- Other firms (i.e. *Arezzo, Alpargatas, Grendene*) target domestic (and then regional) high-end markets, develop local learning mechanisms, R&D, train professional designers and create their own GVCs.

Other illustrative trajectories

- *Gradually increasing trajectory*: GVC and IS exhibit positive complementarities like in the case of the **salmon industry in Chile**, where involvement in the GVC created a demand for technicians with knowledge in biochemistry and engineering, which was successfully addressed by the local IS;
- *Declining trajectory*: when the IS is too weak to maintain previously attained competitiveness in GVCs when changes in GVCs and global demand arise. This is the case of **Gabon timber industry** when the market shifted from exporting processed logs to the EU (which has strict environmental standards) to shipping of unprocessed logs (with a focus on quantity rather than quality) to China.

Final takeaways

- GVCs and IS **co-evolution** has implication on the speed and direction of innovative capability accumulation at firm level;
- More empirical research is needed to collect micro-level evidence for enriching the list of trajectories in different sectors, countries at different levels of development, local contexts;
- **GVC policies** are quite popular and they should aim at:
 - **attracting** GVCs (FDI and trade policies);
 - **capturing value** within GVCs with measures aimed at **strengthening and deepening IS** (i.e. matching-grant programs to support collaborative innovation involving firms and universities; training programs to create skills needed for integration of local firms in GVCs; technology services in the areas of standards, metrology, testing, and certification).

Thank you

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