



# Innovation in Global Value Chains

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# Innovation in Global Value Chains (GVCs)

- Notwithstanding the recent halt to globalization, the growth of GVCs over the last 30 years have had remarkable effects on development allowing developing and emerging countries to increasingly participate in world trade;
- A still open question remains whether participation in GVCs provides firms/countries with opportunities to improve their innovative capabilities;
- Focus on the joint interaction between GVC participation and innovation capability building:
  - **Whether and under what circumstances does GVC involvement create opportunities** for learning and innovation?
  - How the interaction of **global value chains** and **innovation systems** influences the **trajectories** of learning and innovation in firms in different industries/countries?

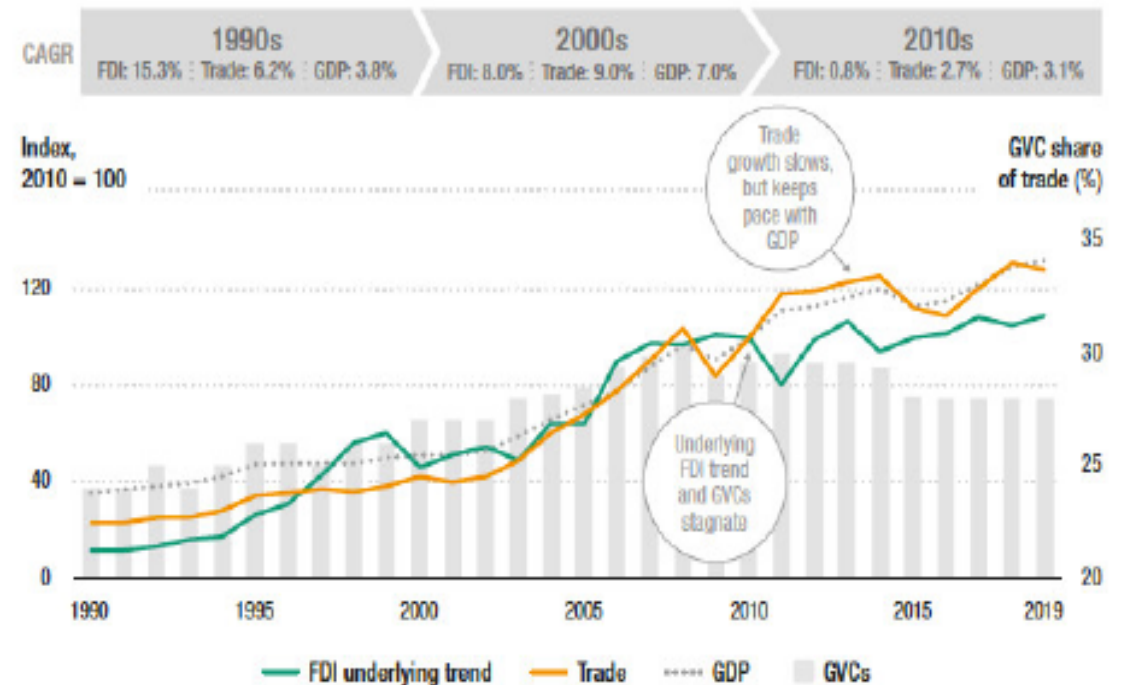
# Agenda

1. Introduce the concept of Global Value Chain;
2. Combine Global Value Chains and Innovation System (IS) approaches, proposing some possible trajectories of innovation;
3. Provide some empirical evidence about the ICTs industry;
4. Discuss current changes in GVCs and how they will impact on innovation opportunities.

# How important is GVC trade?

- GVC trade grew rapidly in the 1990s but stagnated after the 2008 financial crisis;
- The crisis caused by COVID-19 arrives on top of existing challenges to the system of international production arising from the new industrial revolution, growing economic nationalism and the sustainability transformation;
- The decade to 2030 is likely to prove a decade of transformation in GVCs.

Figure 1 The long-term trend of international production

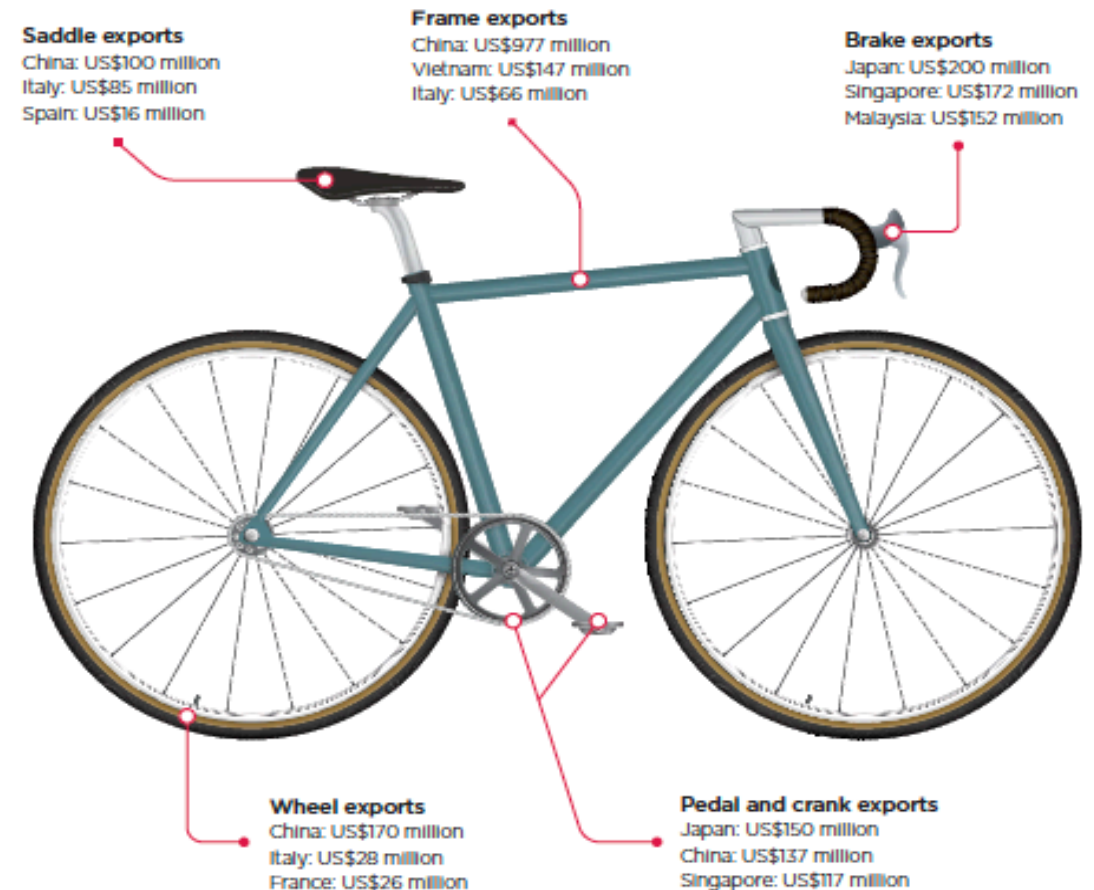


Note: Trade is global exports of goods and services. GVC share of trade is proxied by the share of foreign value added in exports, based on the UNCTAD-Eora GVC database (Casella et al., 2019). The underlying FDI trend is an UNCTAD indicator capturing the long-term dynamics of FDI by netting out fluctuations driven by one-off transactions and volatile financial flows. (FDI, trade and GDP indexed, 2010 = 100; GVCs per cent)

# Global Value Chains in a nutshell

- A global value chain is the series of stages in the production of a product or a service for sale to consumers.
- Each stage adds value and at least two stages are in different countries.
- By this definition, a country, sector, or firm participates in a GVC if it engages in (at least) one stage.

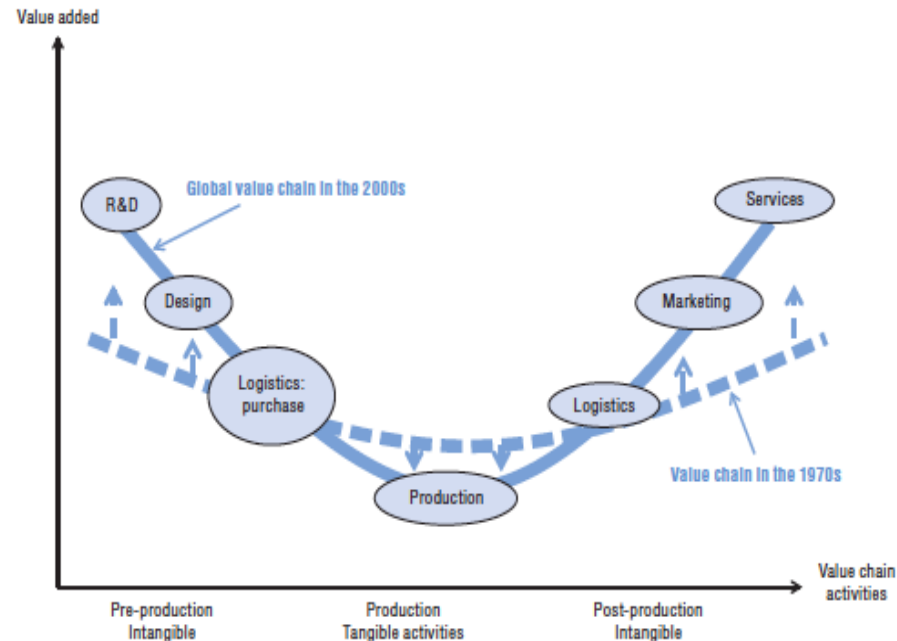
**Figure 1.1** Where do bicycles come from?



Source: WDR 2020 team, using data from UN Comtrade database. See appendix A for a description of the databases used in this Report.

# Where does value added lie in GVCs? The Smiling Curve

- Along the GVC there are activities that aggregate more value than others;



Source: Based on Shih (1992), Dedrick and Kraemer (1999), and Baldwin (2012).

- Developing countries enter the GVC in **assembly**, which represents only a very small part of value generation;
- Developed countries specialize in activities where most value creation is generally found:
  - **upstream activities** (design, product development, R&D and manufacturing of key parts and components)
  - **downstream activities** (marketing, branding and customer services).

# How do countries (and firms) move up in GVCs?

- Product upgrading: moving into more sophisticated products;
- Process upgrading: transforming inputs into outputs more efficiently by reorganizing the production system or introducing superior technology;
- Functional upgrading: acquiring new functions to increase value added of activities;
- Intersectoral (chain) upgrading: entry into new value chains, leveraging knowledge and skills acquired in another chain (i.e. from textile to high tech textile).



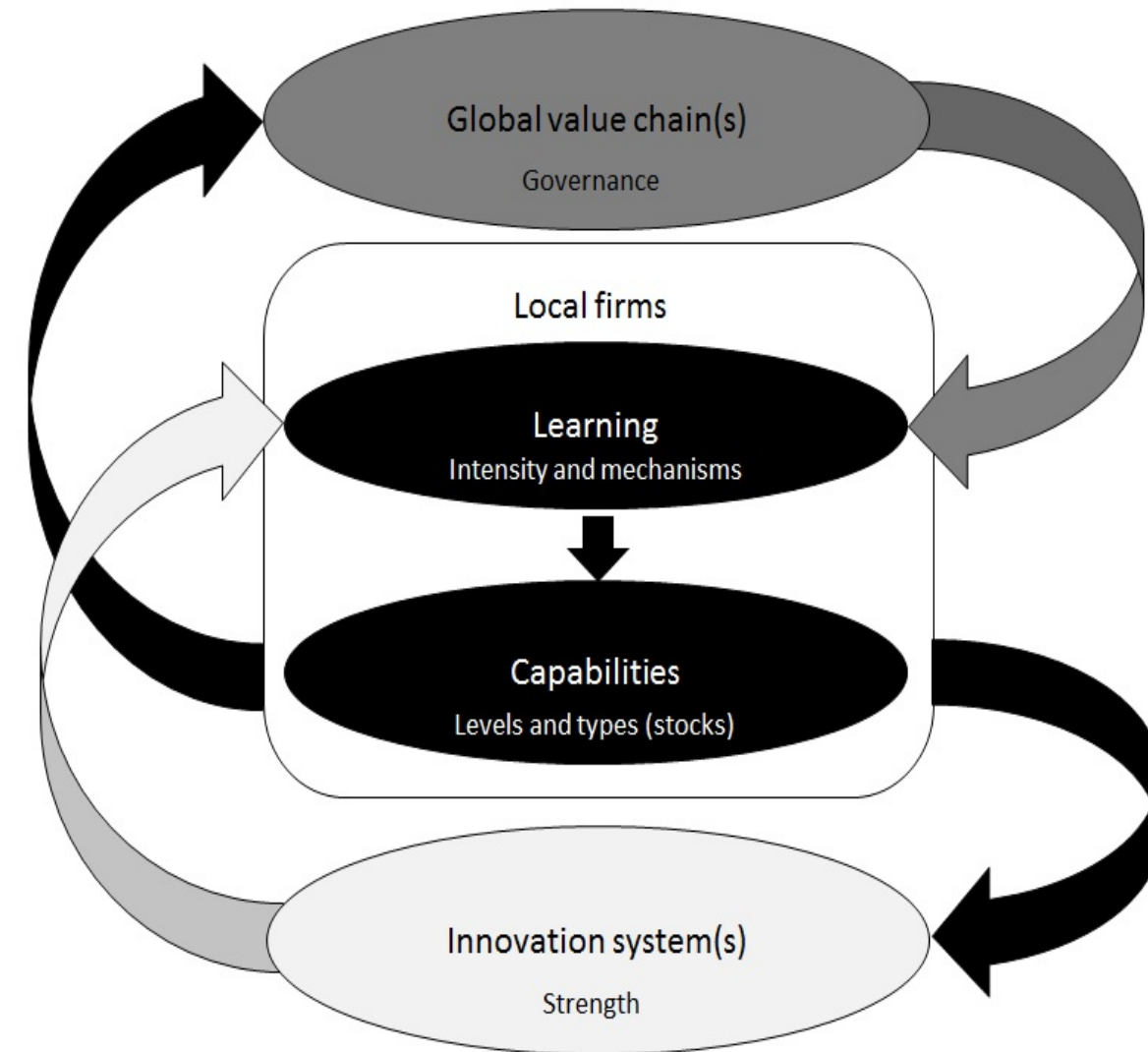
# Innovation in GVCs

- In the GVC literature, researchers have often treated innovation and upgrading as interchangeable concepts but have rarely directly investigated innovation;
- GVC governance patterns shape opportunities, direction and speed for building innovative capabilities (Pietrobelli and Rabellotti, 2011):
  - Learning can be facilitated by direct involvement of the value chain leaders or be the result of pressure to match international standards;
- Little attention to the micro-dynamics involved in the **innovation process**. How is **knowledge accessed**? How can firms in GVCs **learn and innovate**?

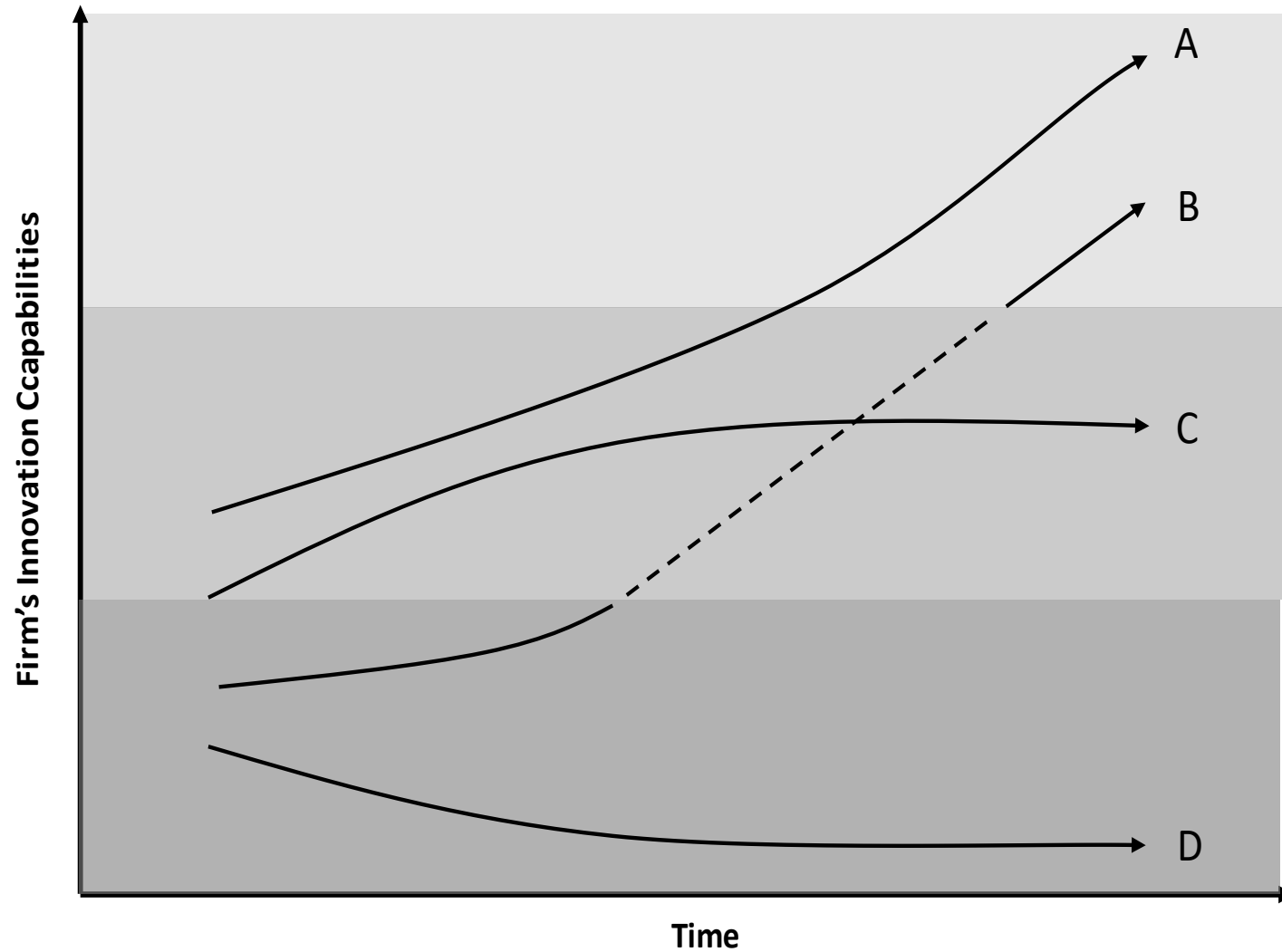


# Co-evolution of IS and GVC

- Both IS and GVC contribute to innovative capability building in firms.
- There are three building blocks: Firms, GVC and IS and two types of knowledge flows:
  - **Forward feeding flows' in grey:** both IS and GVC contribute to local firms' innovative capabilities;
  - **'Feedback flows' – in black:**
    - **GVCs:** Changes in firms' capabilities can influence GVC governance patterns;
    - **ISs:** Changing stocks of capabilities may have spillover effects and generate demand for different types of knowledge and resources in the IS.



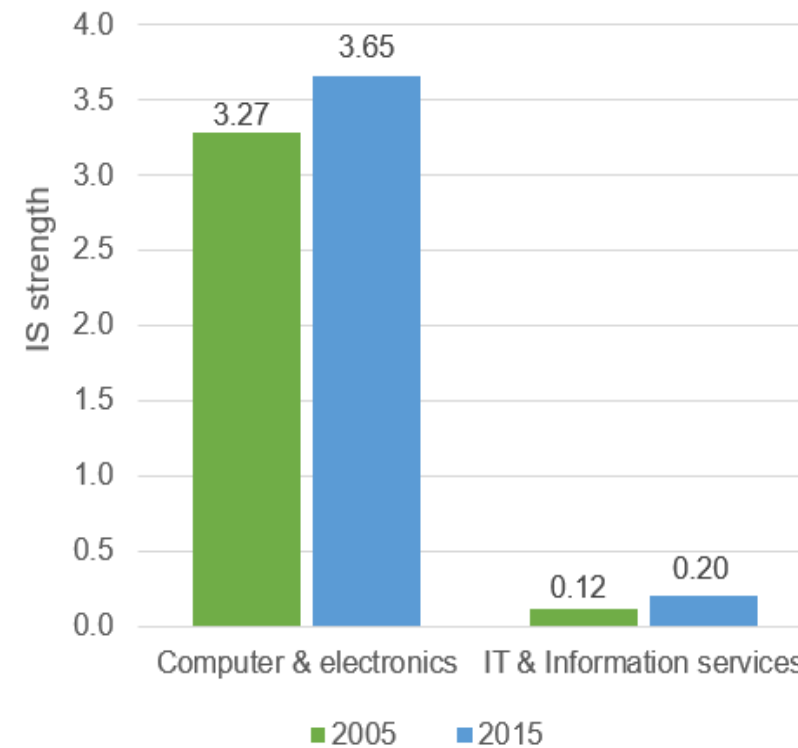
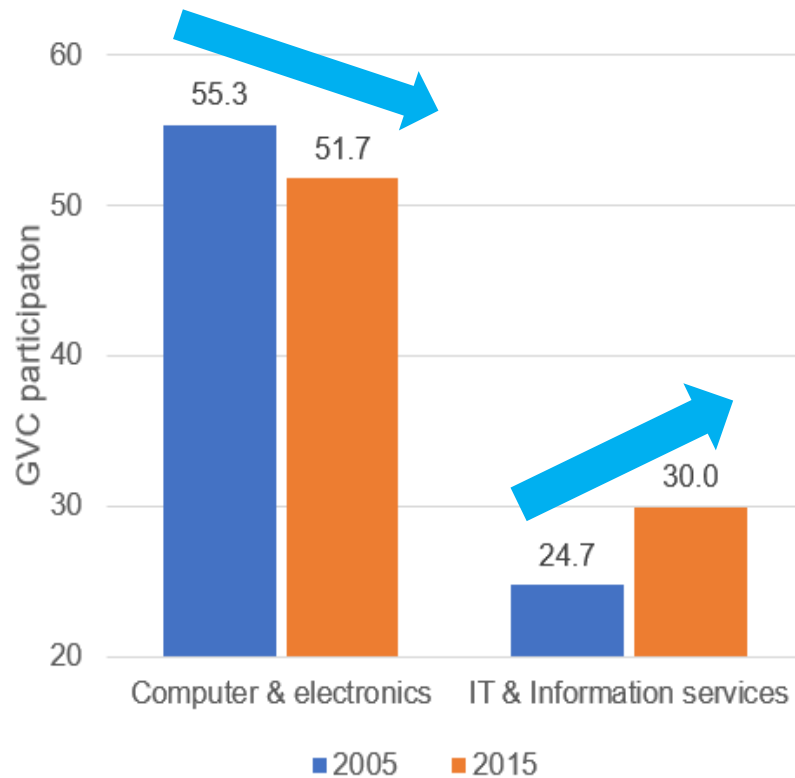
# Some illustrative trajectories of firms' innovative capabilities



# GVC & Innovation in the ICT industry

- We empirically test for the existence of such trajectories in 45 countries in the *Information and Communications Technology* (ICT) industry:
  - *Computer, electronic and optical products*
  - *Software services.*
- Two indicators:
  - **GVC participation:** value of production of intermediate products divided by total exports
  - **IS (relative strength):** UPTO patents per capita minus the sample mean

# GVC participation and IS strength of ICT sectors



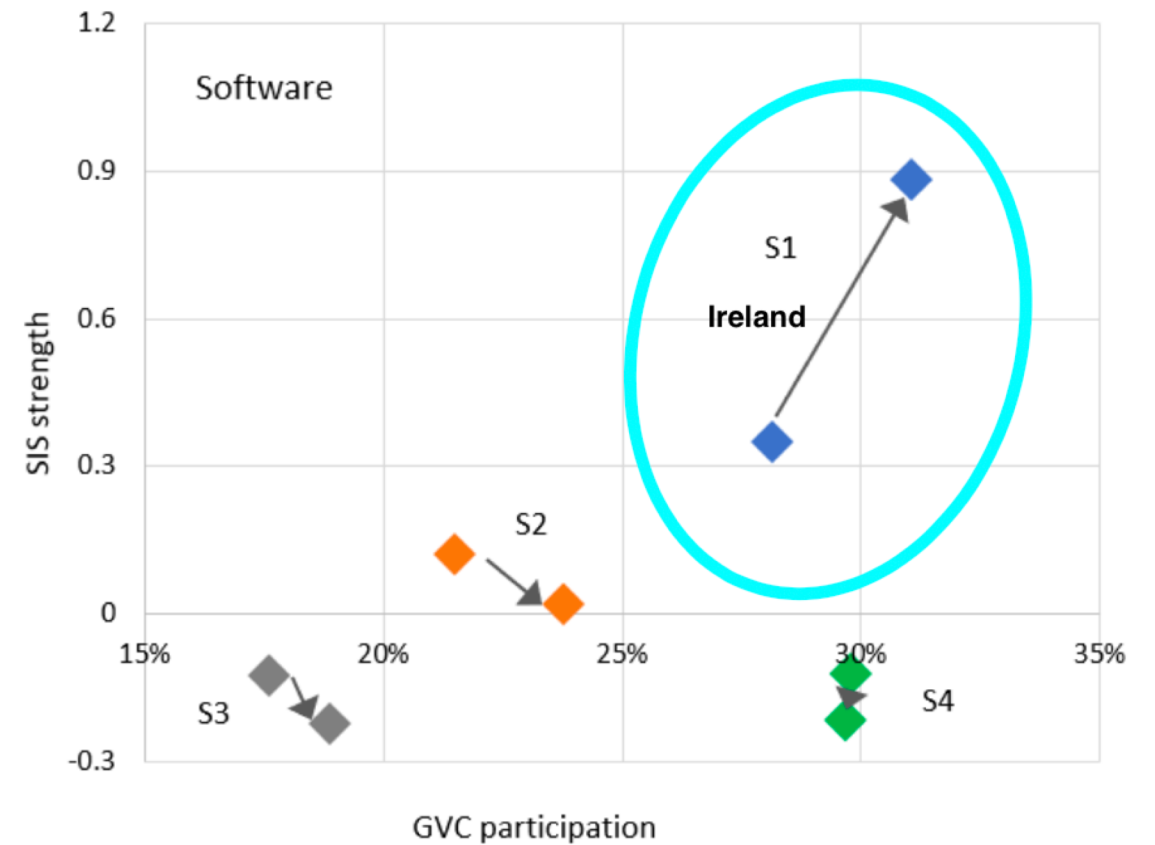
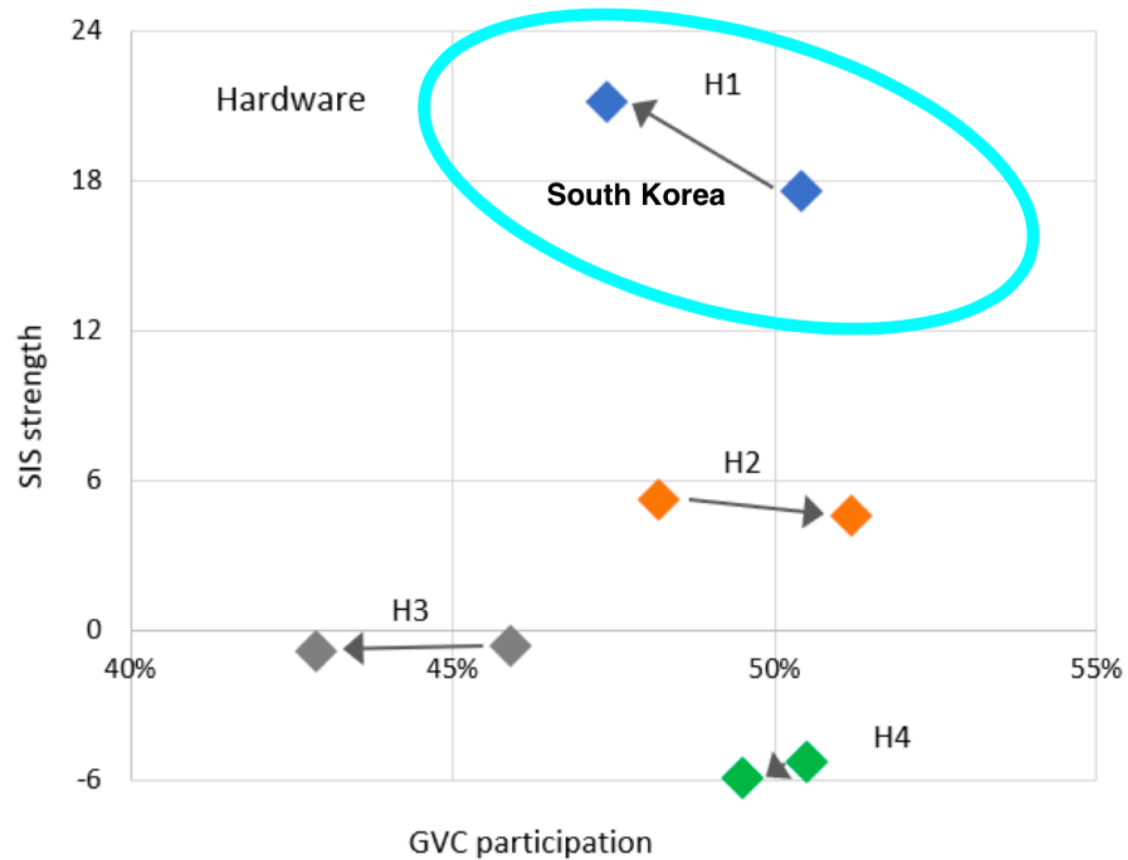
# Based on cluster analysis: 4+4 clusters & 4 trajectories

## Clusters and trajectories

	Strengthening relative innovative capacity	Weakening relative innovative capacity
<b>Deepening GVCs participation</b>	<b>T1</b> <b>Cluster S1: IRL, USA, ISR</b>	<b>T3</b> <b>Cluster H2: SGP, DEU, CHE</b> <b>Cluster S2: DEU, CHE, GBR</b> <b>Cluster S3: IND, ESP, FRA</b>
<b>Withdrawal from GVC participation (delinking)</b>	<b>T2</b> <b>Cluster H1: KOR, TWN, USA</b>	<b>T4</b> <b>Cluster H3: FRA, GBR, IRL</b> <b>Cluster H4: CHN, MEX, MYS</b> <b>Cluster S4: BEL, ITA, POL</b>

\*Top 3 countries in terms of global market share in 2015

# GVC-SIS trajectories (2005-2015): Hardware & Software



# Current technological trends shaping the future of GVCs

- **Automation**: incorporation of new disruptive technologies in the manufacturing process (i.e. robotics in scale operations and additive manufacturing in niche manufacturing) and in services:
  - ☞ Capital substitution of labor and change in the geography of chains;
  - ☞ Reshoring is highly heterogeneous across industries and activities;
  - ☞ Not just affecting manufacturing jobs but also service professional jobs (low and high tech jobs).
- **Digitilization (IoT, Big Data analytics, platforms) & Servicification**: increased role of services in manufacturing, new service activities (i.e. from automotive GVC to mobility GVC, including services such as car sharing or UBER)
  - ☞ Increased value of knowledge intensive services, which become a new GVC stage where ownership of data is key;
  - ☞ GVC highly polarized between high value added knowledge and data-intensive services, typically internalized by the lead MNE and many fragmented, offshored and outsourced low value added activities.
- These technological trends are impacting on the changes already undergoing in GVCs, which have been further accelerated by the pandemic crisis (e.g. chain rationalization, regionalization, GVC shortening).



Thank you

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