Innovation in Global IT Value Chains and the Impact of the Digital Transformation: Implications for ASEAN & India

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## Outline

- •The importance of global value chains;
- Is participation in GVC driving to innovation? An empirical study on the IT value chain;
- •How GVC are changing with the digital transformation?
- •Implications for ASEAN & India (and Korea).

- GVCs (i.e. firms specializing in specific tasks with the production process distributed across different countries) have characterized the evolution of the global economy during the last three decades.
- GVC trade:
  - Growing until the global financial crisis in 2008;
  - Then stable;
  - Recently impacted by protectionism and COVID-19.
- One third of world trade is related to GVCs with important transformations in progress.

#### 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)

## Innovation & GVCs

- Integration in GVCs offers remarkable opportunities for international tasks specialization and for accessing key knowledge and technology, particularly in emerging countries.
- •Yet, it is unclear whether and under which circumstances countries and firms involved in GVCs are able to acquire and improve their innovative capacities.

## Deepening or delinking? Innovative capacity and global value chain participation in the IT industry

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- •Empirical study on the building up of innovative capacities in the Information Technology (IT Hardware & Software) GVC;
- 45 countries, including India, Korea, Malaysia, Philippines, Singapore & Thailand.

Hardware & Software IT industries are highly innovative and deeply influenced by GVC trade

- About 40% of R&D investments by the top R&D investing companies globally are performed in the IT industry;
- In 2005, GVC trade in the hardware sector was particularly high, while that in software was rather low.
- Since then, the two sectors have been moving in opposite directions.

Figure 1. GVC trade: total and in IT industries



Note: Share of trade in intermediaries over total trade. Source: Authors' elaboration from TIVA-OECD data.

# Four trajectories combining GVC participation with innovative capacity

#### Table 1. Typology of possible trajectories

	Strengthening relative innovative capacity	Weakening relative innovative capacity
Deepening GVCs participation	Trajectory 1	Trajectory 3
	Deepening and strengthening	Deepening and weakening
Withdrawal from GVC participation	Trajectory 2	Trajectory 4
(delinking)	Delinking and strengthening	Delinking and weakening

Source: Authors' elaboration.

 With cluster analysis we identify the trajectory followed by the countries in our sample.

#### Table 4. Hardware clusters

Cluster	Countries	$GVC \parallel change (\%)$	$IC \parallel change (\%)$	Trajectory
Cluster H1	FIN, ISR, JPN, KOR, TWN,	0.504    -6.0%	$17.60 \parallel +20.0\%$	T2: Delinking and strengthening
Cluster H2	CAN, CHE, DEU, NLD, SGP, SWE	$0.482 \parallel +6.2\%$	5.20    -12.3%	T3: Deepening and weakening
Cluster H3	AUS, AUT, BEL, DNK, FRA, GBR, IRL, NOR	0.459    -6.5%	$-0.64 \parallel -32.8\%$	T4: Delinking and weakening
Cluster H4	ARG, BGR, BRA, CHL, CHN, CZE, ESP, GRC, HKG, HUN, IND, ITA, MEX, MYS, NZL,	0.505    -2.0%	-5-27    -12.1%	T4: Delinking and weakening
	PHL, POL, PRT, ROU, RUS, SAU, SVK, THA, TUR, ZAF			

Source: Authors' elaboration.

#### Table 5. Software clusters

Cluster	Countries	$GVC \parallel change (\%)$	IC    change (%)	Trajectory
Cluster S1	CAN, FIN, IRL, ISR, KOR, SGP, USA	$0.281 \parallel +10.3\%$	0.352    +66.0%	T1: Deepening and strengthening
Cluster S2	AUS, CHE, DEU, GBR, JPN, NLD, NZL, SWE, TWN	0.215    +10.7%	0.121    -85.1%	T3: Deepening and weakening
Cluster S3	ARG, BRA, CHL, ESP, FRA, IND, MEX, NOR, RUS, TUR	0.176    +7.4%	$-0.126 \parallel -78.6\%$	T3: Deepening and weakening
Cluster S4	AUT, BEL, BGR, CHN, CZE, DNK, GRC, HKG, HUN, ITA, MYS, PHL, POL, PRT, ROU, SAU, SVK, THA, ZAF	0.298    -0.3%	-0.121    -78.5%	T4: Delinking and weakening

- Hardware: an increased innovative capacity is associated with a decreased GVC participation (T2 Delinking and Strengthening: Korea):
  - explained by the ability to codify knowledge and separate production from innovation in this sector;
  - Suppliers may move deeper into GVCs without improving their innovative capacity (i.e. Vietnam).
- Software: the strengthening of innovative capacity is associated with increased participation in GVCs ((T1 – Deepening and Strengthening: Korea and Singapore):
  - explained by the continued dependence on user-producer interaction for innovation in the software and IT-enabled services sector.
- Synergies between hardware and software: some countries (i.e. Korea) appear among the most dynamic in both sectors:
  - Dynamism in hardware is fostered by dynamism in software, and vice versa.

## Digital transformation & GVCs (1)

 <u>Automation</u>: 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).

## Digital transformation & GVCs (2)

- Servicification (IoT, Big Data analytics, platforms): increased role of services in manufacturing & development of 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 <u>ownership of data</u> is key;
  - ☞ GVC highly polarized between high value added knowledge and data-intensive services, typically internalized by the lead MNEs, and many fragmented, offshored and outsourced low value added activities.

## Implications for ASEAN, India and Korea

- Korea and the most advanced ASEAN countries face a two-fold challenge in GVCs:
  - From lower cost countries which are rapidly increasing their technological capability and may put at risk their manufacturing strong base;
  - From advanced countries, which have been faster in taking advantage of Industry 4.0, increased automation and servicification.
- Korea and ASEAN have tremendous opportunities to turn their manufacturing strength in technological leadership but the window of opportunity is short and competitors are moving rapidly.
- India is well positioned to capture the IT services opportunity given its high share of relevant talent but it still struggles in moving from delivering standard services to more cutting-edge innovation and increased R&D;
- Investments in digital skills, capabilities and infrastructure are key to avoid increasing inequalities within and between countries.

