Third Statistics Conference "Measuring the Economy in the Digital Age"

Session I. Challenges of digitalization: How can we measure its impact in the economy?

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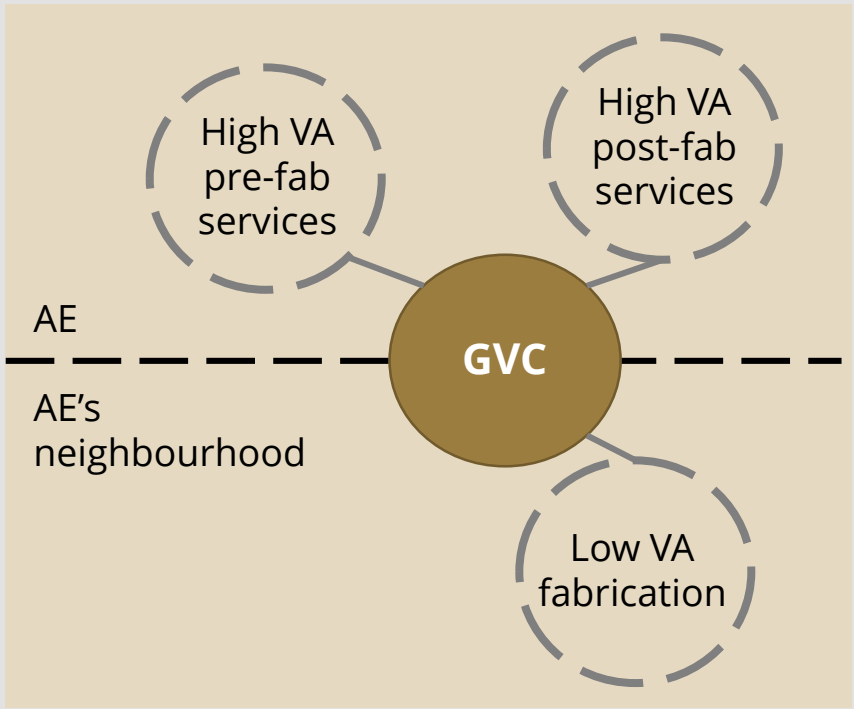
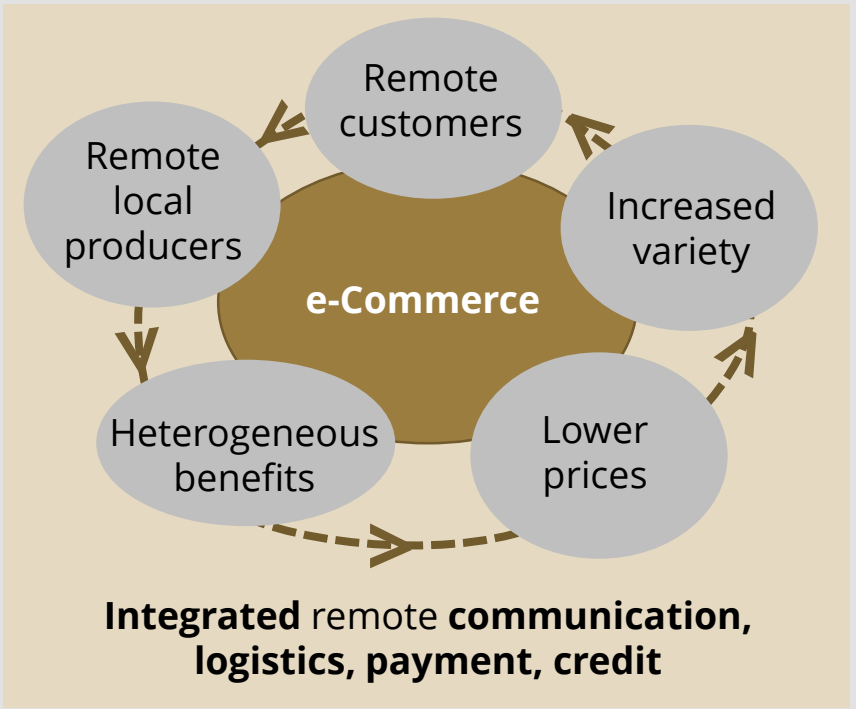
Digital economy: new wine into old wineskins?

Overview

Digitalisation promoted globalisation of production processes, **distribution** models **and financial services**





Integrated remote **communication, logistics, payment, credit**

- Large scale and network effects induce ***winner-takes-all*** paradigm
- Multinational **global value chains determine production and income** distribution
- **Impacts** from globalisation **become much less controllable** by national authorities
- National public policy needs **new tools**, increased **granularity** and enhanced **agility**
- A **new, institutionalised multilateralism** is needed

"People do not put new wine into old wineskins. Otherwise the skins burst, the wine spills out, and the skins are ruined. Rather, they pour new wine into fresh wineskins, and both are preserved."

Matthew 9:17, The New American Bible
United States Conference of Catholic Bishops

1. Digitalisation: characterisation and impact

What is digitalisation?

Digitalisation

… may be defined as "the way many domains of social life are restructured around digital communication and media infrastructures"
(Brennen and Kreiss, 2016)

… reduces the cost of moving ideas, contributing to the *2nd globalisation leap*

Constrained globalisation
Before 1820

- High **trade costs** (moving goods)
- High **communication costs** (moving ideas)
- High **face-to-face costs** (moving people)

Barriers to **moving goods, ideas and people**.

1st globalisation leap
1820-1990

- **Trade costs decrease**
- Production and consumption geographically unbundled – **globalised distribution**
- **Income concentration in producing countries –** *The Great Divergence*

2nd globalisation leap
1990 onwards

- **Communication costs decrease**
- Northern production stages unbundled towards South – **globalised production**
- **Income is redistributed** towards few emerging economies (neighbouring G7) – high face-to-face costs determine the selection – *The Great Convergence*

"[T]he amount of information transmitted by telecommunications during the whole of 1986 could be transmitted in just two-thousandths of a second in 1996."

Baldwin (2016)

Sources: Brennen, J. S. and Kreiss, D. (2016). Digitalization. In The International Encyclopedia of Communication Theory and Philosophy (eds K. B. Jensen, E. W. Rothenbuhler, J. D. Pooley and R. T. Craig); Baldwin (2016), *The Great Convergence – Information Technology and the New Globalization*, The Belknap Press of Harvard University Press

1. Digitalisation: characterisation and impact

What is digitalisation?

In the future...

- Virtual presence
- Telerobotics — Portuguese machinery producer CEI already does it!
- Computerised translation
- 3D printing

Reducing the cost of **moving people and spreading GVCs** geographically

Collapsing GVCs towards consumer's location

Constrained globalisation
Before 1820

1st globalisation leap
1820-1990

3rd globalisation leap
Future

- **Face-to-face costs decrease**
- **Labour services unbundled** from labourers

Sources: Baldwin (2016), *The Great Convergence – Information Technology and the New Globalization*, The Belknap Press of Harvard University Press

1. Digitalisation: characterisation and impact

Impact on production models

Across sectors

Amador and Cabral (2009) *Vertical specialization across the world: A relative measure,* The North American Journal of Economics and Finance

- **Free software, services and** online **platforms**
- **National specialisation in *production stages***, rather than *sectors*
- **Top G7 economies unbundled production towards neighbours** (high cost of moving people still limits geographical span[1]), but only in few specific sectors
- **Multinational firms build *global value chains* (GVCs)**, exploring nations' comparative advantages
- The very concept of *comparative advantage* is reassessed, given that **resources move with each globalisation leap, reinforcing or creating *comparative advantages*** – e.g. with the 1st leap, labour migrated to America, reinforcing the land advantage; with the 2nd leap, know-how was transferred to China, allowing for new sectors to rise
- **Each economy integrates a GVC, instead of exploring its own comparative advantage** – a given economy may now largely and permanently lose from trade
- In order to integrate a GVC, **a given country must provide fluid international supply-chain/offshoring flows** and coordination
- **Market segments** become increasingly **differentiated,** but **each segment** becomes **globally** increasingly **homogeneous**
- Innovation spread and **consumer attraction/repulsion became faster** and more impactful

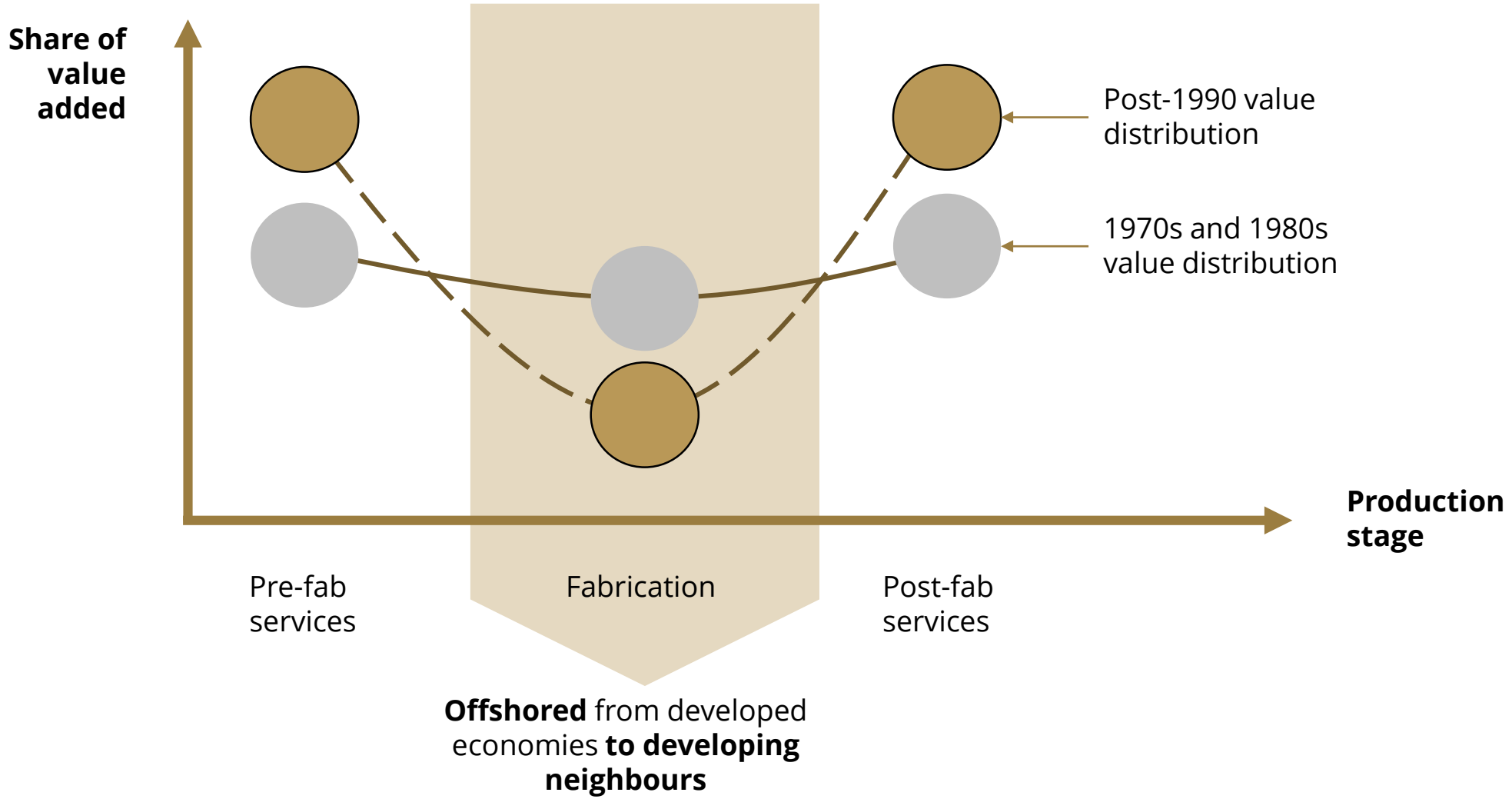
Financial sector

- **Financial sector increasingly interconnected with external suppliers and partners**, within complex networks (e.g. provision of account information and payments initiation services, cloud storage, etc.)
- Proliferation of **real-time, tailored product segmentation extracting consumer surplus**
- **AI-powered credit scoring** using big data may improve client risk assessment
- **Role of "small-scale, low-tech banks" to be determined** pending, among others, consumers' financial literacy and business models (e.g. will these banks be relegated to offering generic-brand products or serving small-client markets (in which proximity is key)?)
- **Role of distributed ledger technology** on payments and beyond?
- Development of **digital currencies** (central bank-based, stablecoins, etc.)

Notes: 1. India is a notable exception; the country specialised in services much less dependent on face-to-face interactions.

1. Digitalisation: characterisation and impact

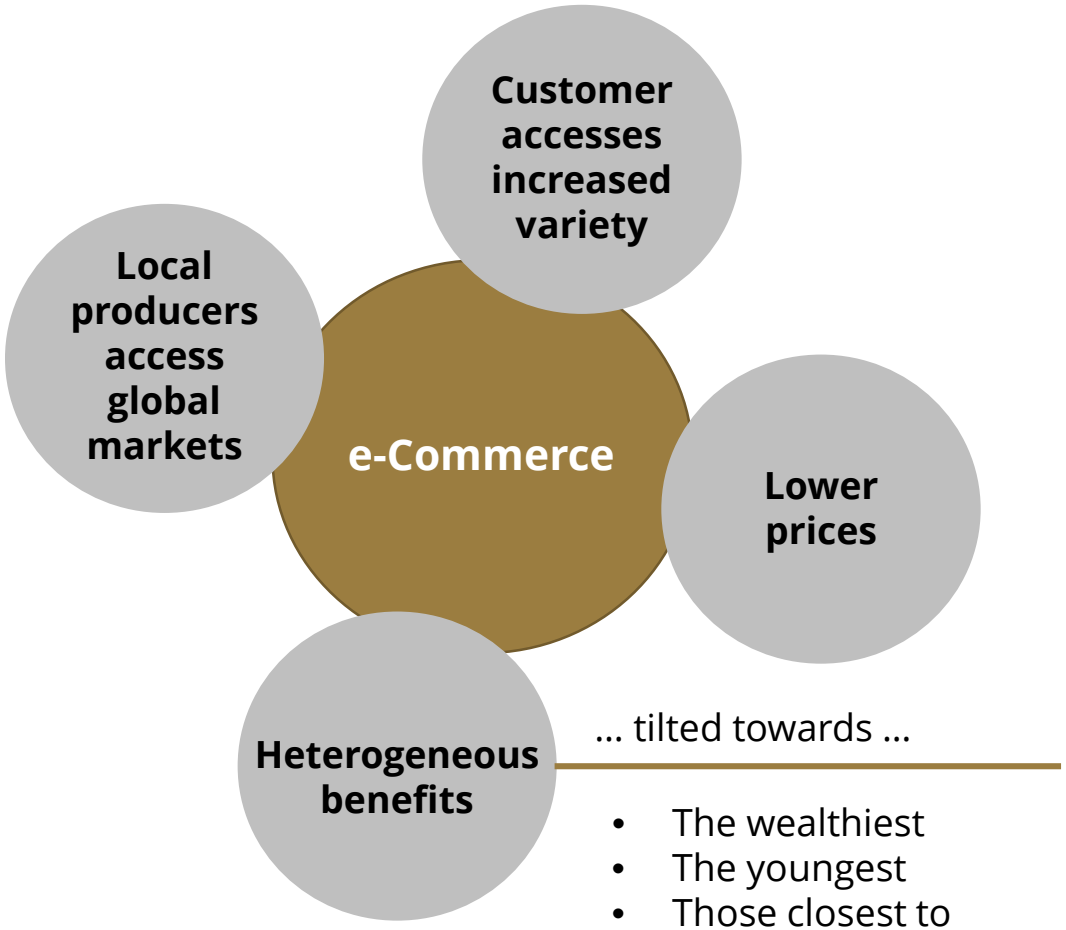
2nd globalisation leap shifted value along the production value chain ("smile curve")



Source: Inspired by figure 46 in Baldwin (2016), *The Great Convergence – Information Technology and the New Globalization*, The Belknap Press of Harvard University Press.

1. Digitalisation: characterisation and impact

Impact on distribution models



… tilted towards …

- The wealthiest
- The youngest
- Those closest to physical terminals
- Those most isolated

Novelties

Across sectors

- Online zero-price transactions, in which customer provides data; value is added despite lack of explicit price
- More efficient online transactions, integrating communication, logistics and payments
- Non-tradable services may become tradable, risking significant impact on employment (potential 3rd globalisation leap)

Financial

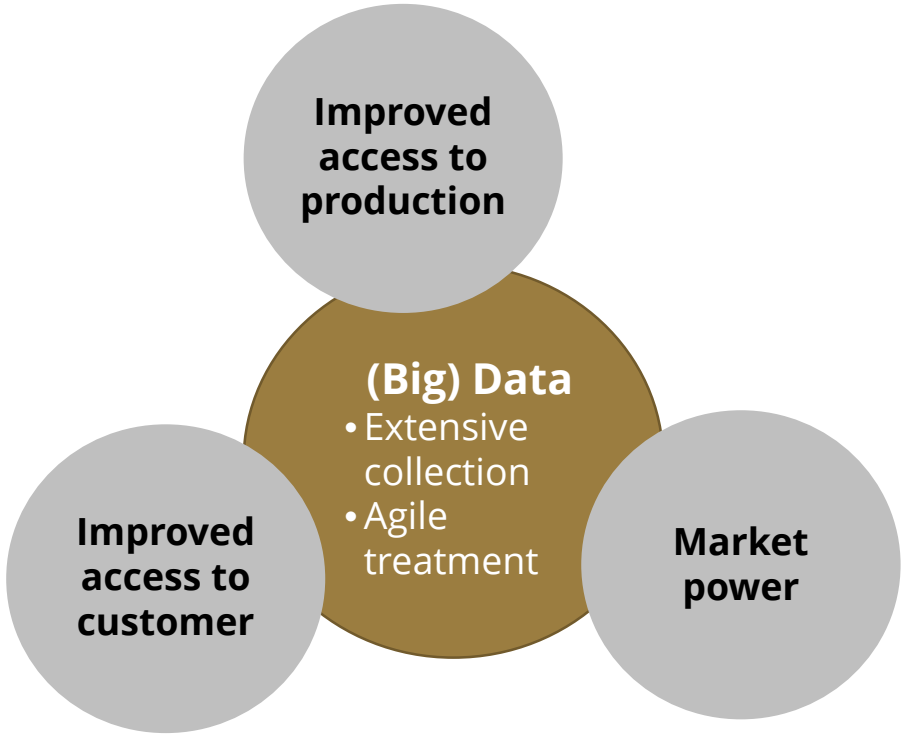
- Bank branches become less needed… or reinvented
- New ways to sell credit
- New payment channels
- Irrelevance of physical proximity and contact
- Enhanced financial inclusion

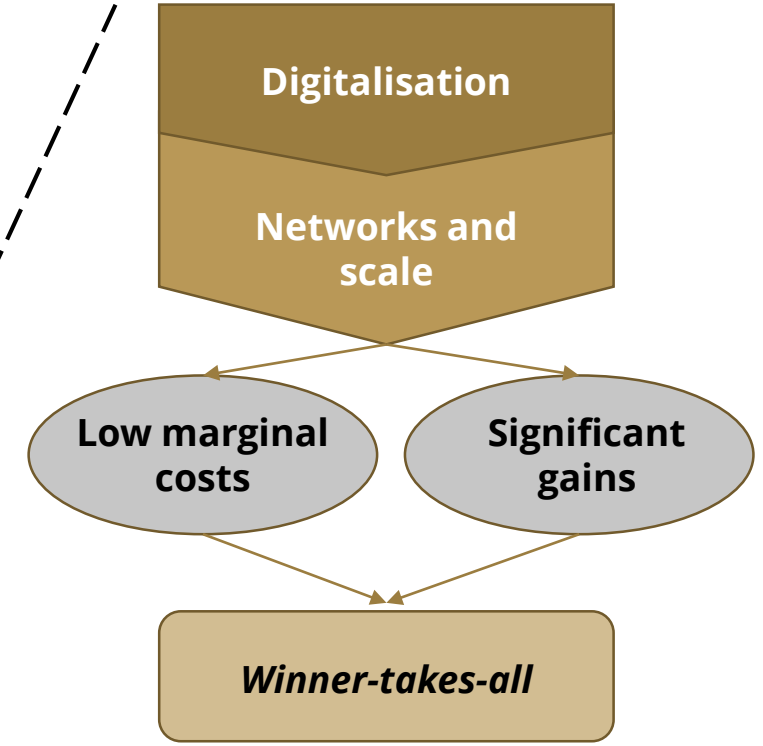
Potential hurdles

- Broadband coverage
- Physical local distribution in the “last mile”
- Remote payment systems
- Trust and habit in using online interfaces
- Cyber-risk and data protection

1. Digitalisation: characterisation and impact

Data collection and market power





Value of data depends on…

- … degree of use and integration in data collection platform
- … scale – key to granular segmentation, risk diversification and tech-costs dilution

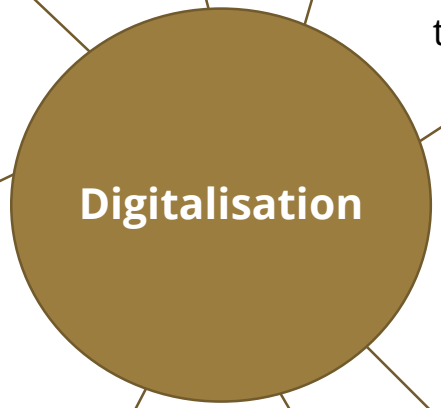
Large players hold competitive advantage

Flat competition > Pyramidal competition

- Openness and competition bring market power concentration (instead of dilution)
- Consumer surplus appropriation
- Customer manipulation

2. Regulation, supervision and public policy

Across sectors



Market power and income concentration increased as premium stages of value chain – innovation and design – are concentrated in fewer firms.

As communication costs decreased and production was unbundled geographically, **protectionism receded to capture jobs, resurging later on when inequality rose.**

GVCs became the new cells of comparative advantage, replacing national economies – **GVCs and supra-national regions become therefore critical to national income and employment** (instead of national exports/imports).

Income generation and distribution increasingly managed at supranational level, calling for **international coordination and multidisciplinary response by regulatory and supervisory authorities**.

Impact of globalisation may suddenly hit specific *jobs/stages,* inside any given production process, belonging to any given sector (e.g. emerging markets got low-value fabrication stages, instead of high-value pre-/post-fabrication services) – **public policy needs to enhance its granularity and agility**, targeting workers and not jobs.

The pace of change and the unpredictability around which jobs will be hit next increased greatly – **globalisation's impact became much less controllable** by any national authority (also because authorities don't control ICT barriers, unlike trade barriers)

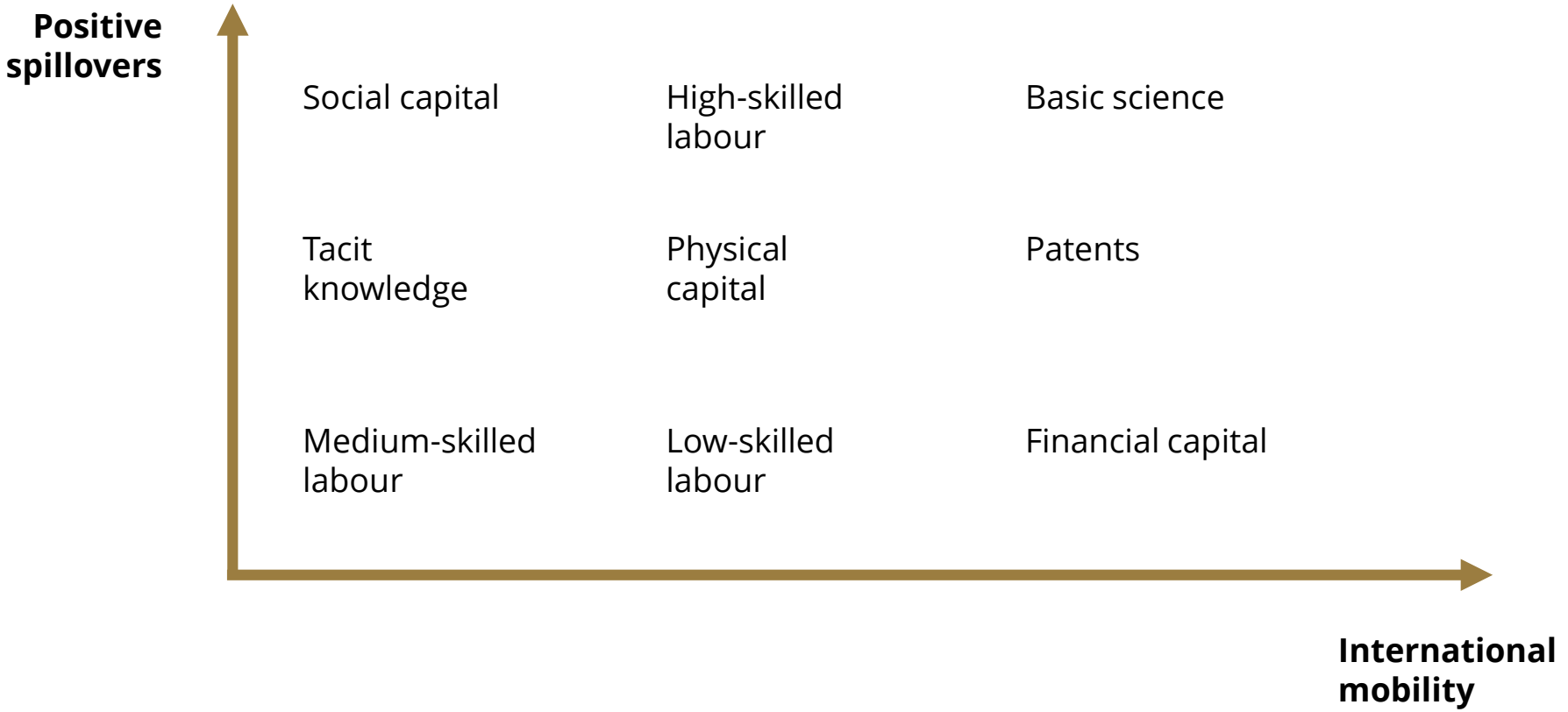
As firms offshore production stages, their **interests become misaligned** with those of their home countries.

Stickiness of productive factors **became crucial**.

International trade policy is much less about exchanging final goods and services and **much more about exchanging knowledge and other productive factors**.

2. Regulation, supervision and public policy

Cross-sector targets of public policy – stickiness and spillover potential



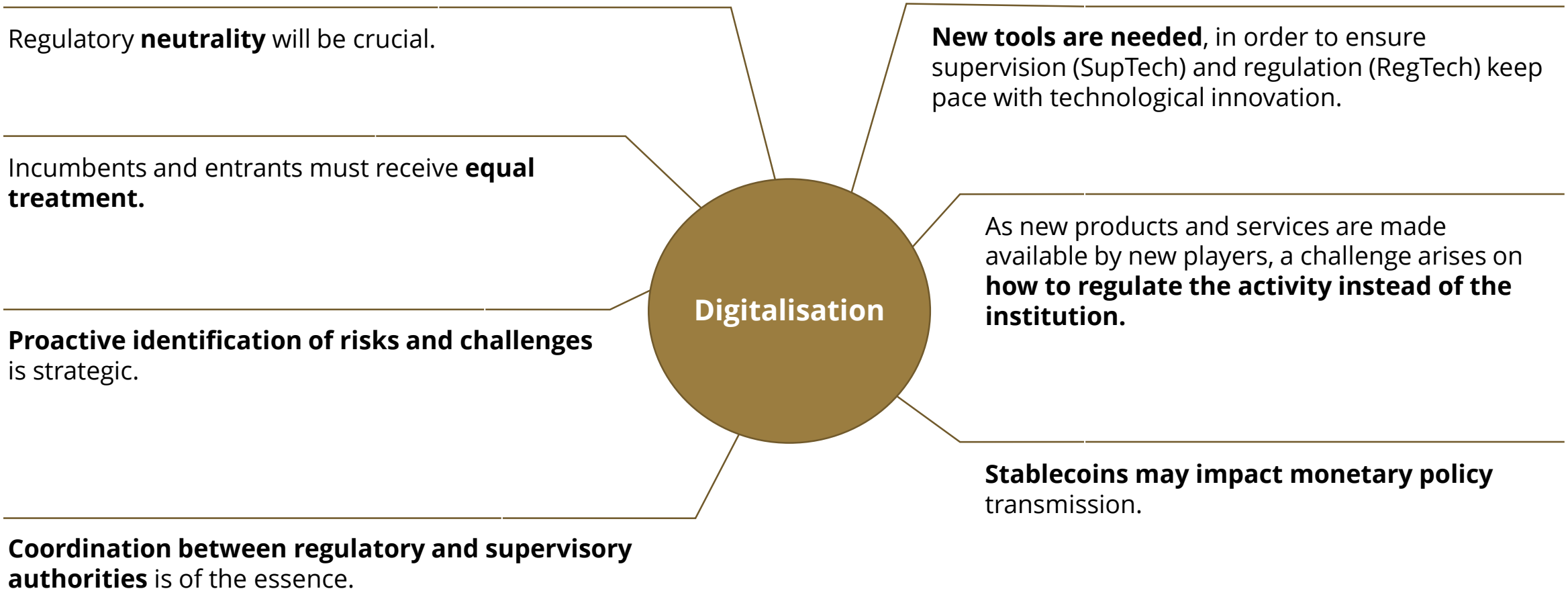
Sticky productive factors yield higher **local impact**; international mobile productive factors require **international policy coordination**.

Human capital is pivotal, given its agglomeration effects and flexibility.

Source: Figure 55 in Baldwin (2016), *The Great Convergence – Information Technology and the New Globalization*, The Belknap Press of Harvard University Press.

2. Regulation, supervision and public policy

Financial sector



3. How to measure the impact…

… on the economy?

Include in GDP?

- Measure **costs of producing software**
- Measure **impact of software** on subsequent packages
- Account for the **price of losing access** to free platforms and services
- Account for the ***willingness to pay*** **for online transactions**
- Measure **time saved by online transactions**, using hourly wage
- Monitor **GDP/manufacturing/value-added-exports shares** of G7 and emerging economies
- Monitor **intra-industry trade**, namely between G7 and their neighbouring emerging economies

Amador and Cabral (2009) *Vertical specialization across the world: A relative measure,* The North American Journal of Economics and Finance

- Should we **focus on the competition between *global value chains*** (the new unit of analysis to comparative advantages) instead of national exports/imports?
- Monitor **trade/investment barriers/agreements**
- Measure **inequality/poverty at several scales**: supra-national region-wise, country-wise, sub-national region-wise, citizen-wise at national level, citizen-wise at global level, GVC-wise, production-stage-wise
- Measure **innovation intensity and dispersion across the globe** (moving goods allowed regions to specialise in specific problems; moving ideas allowed distant people to think about the same problem; all this allowed heterogenous problem-solvers to communicate)
- Monitor **(inter)national population distribution** – the fall in trade and ICT costs led to **population *clustering*** (instead of *dispersion*), because (i) people still need to meet and (ii) face-to-face (time) costs are still binding

2nd leap brought a finer degree of resolution to globalisation's impact

- Monitor **value-added and job market in each stage within a given production process** – critical to understand income distribution amongst countries, inside a given GVC
- Measure and monitor **taxation of multinational firms**

… on the financial system?

- Monitor **cyber-risk**
- Monitor **systemic risk**, associated with increasingly interconnected external suppliers and partners spread across geographies
- Monitor the **responsiveness of market indices** and potential increase in volatility and procyclicality

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