

Expert Group Meeting on Exponential Technological Change, Automation, and Their Policy Implications for Sustainable Development

SESSION 5: INNOVATION AND TECHNOLOGICAL UNEMPLOYMENT

- **What are the mechanisms through which technological change impacts employment?**
- **To which extent has innovation caused technological unemployment?**
- **Will the future be different because of emerging automation technologies?**

Dr Gabriela Dutrénit

- **The innovation-employment nexus is determined by:**
 - **direct effects**
 - **compensation mechanism, through which employment adjusts after an innovation is introduced**
- **There are different economic perspectives –market & evolutionary:**
 - **Main disagreement: the possibility of a self-adjustment process that starts as soon as innovation is introduced (market)**

Different compensation mechanisms: alternative channels that trigger the transmission chain of the economic effect

- **Orthodox perspectives:**
 - New machines
 - Decrease in prices
 - Decrease in wages
 - New investment
- **Keynesian-Schumpeterian perspectives:**
 - Increase in incomes
 - New products

New products:

- **new branches and products →increase in consumption
→increase of demand→increase in employment**
- **But it depends on the level of analysis:**
 - **at the firm level: new products can cannibalize sales of old products; net effects on employment is ambiguous**
 - **at industry level: product innovators can face a demand increase (via market expansion) as the new product might satisfy previously unmet consumers' needs; positive effect on employment.**

General idea:

- **new products are labour-friendly**
- **new processes are labour-displacing**

The evidence

- **Main conclusion: there is no clear evidence that innovation generates unemployment**
- **Limited evidence that compare the different mechanisms of compensation**
- **More evidence focused on one mechanism: new products, using CIS**

At the firm level

- **Positive effect of product innovation on employment**
- **Rather inconclusive on the effect of process innovation (labour saving mechanism)**
- **Mostly for: high growth firms of high tech sectors, and in countries with a better innovation performance**
- **The effect is mediated by: technological capabilities, technological intensity and firm size**
- **But the results cannot be generalised at industry level**

At sectoral level

- **Differences between sectors matters**
- **Specific effects associated with sectoral specificities (e.g. technological, demand and labour market factors).**

Need to use different level of aggregation:

- **Firm level**
- **Industry level**

iWe know very little about this link in developing countries!



Recommendations on how to move forward

- **We cannot just translate the recommendations based on the evidence coming from developed economies to developing countries.**
- **Gather evidence will take time. Easier to build scenarios on the impact of adoption of modern automation technologies in developing countries based on their initial conditions**
 - **economic structure, specialization, level of formation of the workforce, institutional and regulatory frameworks, and international and local industries dynamics.**
 - **we could have a set of scenarios for different type of initial conditions, identifying emerging niches and job skills required for their development.**
- **Based on the scenarios, to define potential development strategies, the policy arenas that must be coordinated, and perhaps policy mixes.**

Aspects that would merit further discussions

- **Collect and analyse evidence on the link innovation-employment in developing countries, specifically on the direct and indirect effects; are they different?**
- **Type of innovations that will be potentially introduced.**
 - **These countries will be adopters of these technologies, so they will introduce process innovation (which generate productivity gains but is labour-displacing). The direct effect of the generators of product innovation (labour-friendly) will be missing.**
 - **Discrimination by type of product and process innovations in the specific industries.**
- **The role of international trade, export and integration into the GVC in the adoption process, according to the insertion of countries in links of the GVC.**
- **The complexity of measuring this link in developing countries where there is a high level of informality.**

Calvino, F. and Virgillito, M.E. (2016), The Innovation-Employment nexus: a critical survey of theory and empirics”, working paper, ISI-Growth.