Effect of ICT adoption on productivity

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Introduction

- ICT investments can provide changes in technical or organizational factors
- ICT role in the firm's innovative capacity
- Link between innovative activities and productivity
- CDM model

Research Question

- **How and to what extent do ICT investments and firm efforts impact their innovative capacity and productivity?**

State of Art

- The **role of ICT on the business model**, performance, innovation, and productivity has been widely recognized by several academics and researchers (Ahn, 2002; Álvarez, 2016; Pesole, 2015)
- **ICT** can be considered **a pivotal driver** of a **firm's innovative absorption capacity** (Najafi-Tavani et al., 2018)
- **CDM model** was developed in 1998 by Crépon, Duguet, and Mairesse (Crepon et al., 1998) and comprises three equations that **link R&D, innovation output, and productivity**

Research Methodology

- Based on an **adapted CDM methodology**
- Cross-section data from the **Innovation Survey 2021,** reference period of 2018-2020
- **Regression techniques:** Generalized Linear Modeling and Multiple Linear Regression
- Software **IBM SPSS** Statistics version 28

Results and Discussion

- The **product innovation output** that leads to **increased sales**, is the improved product that already exists in the firm's portfolio (**Turnimp20**), resulting in an average increase of **7.6 %**.
- The **most reported process innovation**, the new data process and communication systems (**Inpsict**), with a frequency of **52.4 %**.

ICT investments

- Have a not significant impact on product innovation models, except total R&D expenses on the product innovation new in relation to your competitor's offer (Turmar)
- For process innovation models, ICT investments found in some cases significant effects or at least positive coefficients or elasticities

$$\ln PI = -8.481 + 15.230\hat{T}_{urmar} + 10.858\hat{T}_{urin} + 11.311\hat{T}_{urung} + 0.862\hat{I}_{npsprd} - 0.798\hat{I}_{npsadmin} + 1.156\hat{I}_{npshrm}$$

This result is similar to **Polder et al. (2009)** and **Khalifa (2023)** findings, where ICT investments had a higher contribution on process innovation output

Conclusions

ICT investments found in some cases **significant impact** on **process innovation models**

The **model that best represents** the relation between **productivity intensity** and innovation outputs is

$$\ln PI = -8.481 + 15.230\hat{T}_{urmar} + 10.858\hat{T}_{urin} + 11.311\hat{T}_{urung} + 0.862\hat{I}_{npsprd} - 0.798\hat{I}_{npsadmin} + 1.156\hat{I}_{npshrm}$$

The **firm productivity** was greater **enhanced** by **product innovations** than by process innovations

Recommendations

- To **correct** the **endogeneity** and **simultaneity** issues
- To **study** the **complementarity effects** and to develop studies by economic sectors
- To look for **better or improved models**
- To **measure** the **individual ICT investment effect** on the CDM model