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CONSISTENCY AND INDICATORS INTEGRATING SBS, ICT AND INNOVATION DATA

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Users'needs

What drives productivity in developed and developing countries?

Industry
Size
Location
ICT
Innovation

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Data constraints

- Enterprise size, industry and location matter for productivity and this can be assessed with SBS data.
- The key role of innovation and ICT for productivity is well known but only indirectly assessed (data modelling)
- The EU Business statistics regulation framework includes SBS, innovation and ICT as relevant but independent domains
- Most countries carry out SBS, innovation and ICT as sample surveys so census like data integration with the Business Register is not an option

ISTAT framework for the production of official statistics

- Enterprise
- Local Unit
- Enterprise Group
- ENT

Micro-level census like data integrating multiple data sources (direct resporting, administrative data, etc)

- Enterprise (Frame SBS)
- Local Unit (Territorial Frame SBS)

Micro-level census like data integrating census like multiple data sources (direct resporting, administrative data, etc) with estimates for missing variables

- Enterprise (Frame SBS)
- ENT

Micro data from integrated census and sample surveys

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The methodological approach adopted by ISTAT to develop new indicators

- **Objective:** Producing standard economic indicators (value added, productivity) that integrate standard domains with new domains (businesses classified by innovation (CIS) and ICT profiles).
- **Approach chosen:** Integration of the information gathered by the sampling CIS/ICT with the exhaustive (FRAME SBS) source through methods that guarantee results of high quality in terms of comparability and consistency according to Istat methodological standards.
- **Results obtained:** Indicators providing a better description of the relations among the economic performances of enterprises and their innovation and ICT features and, at the same time, ensuring consistency between the estimates calculated by the Frame and by the sample survey.

MICRO INTEGRATION PROCEDURE

ICT SURVEY

UNIT	SIZE	INDUSTRY	LOCATION	ICT variables	ICT weights (BR)
un_1					weight_1
un_2					weight_2
…					…
…					…
un_n					weight_n

ICT SURVEY+FRAME

UNIT	SIZE	INDUSTRY	ICT profiles	Turn	Value Added	Gross Operating Margin	weights (Frame)
un_1							new_1
un_2							new_2
…							…
un_n-x							new_n-x

CIS SURVEY

UNIT	SIZE	INDUSTRY	LOCATION	CIS variables	CIS weights (BR)
un_1					weight_1
un_2					weight_2
…					…
…					…
un_m					weight_m

CIS SURVEY+FRAME

UNIT	SIZE	INDUSTRY	Innovation profiles	Turn	Value Added	Gross Operating Margin	weights (Frame)
un_1							new_1
un_2							new_2
…							…
un_m-y							new_m-y

Istat

The methodological approach adopted by ISTAT to develop new indicators

The calibration estimates methodology was applied as the most suitable for data integration of the FRAME SBS with the ICT/CIS surveys exploiting the interaction between an exhaustive register and the sample data in order to produce economic indicators.

Calibration estimates methodology adjust weights to converge to FRAME SBS. The aim of the work is not to replicate published estimates. It exploits the information derived from combining the two sources in substantial or complete consistency with both.

With regards to the model used for the calibration of the weights in the ICT/CIS surveys (totals for the variables Number of enterprises and Number of employees by NACE and geographical level), the use of FRAME SBS was crucial to consider within the known totals those related to Value Added, Turnover and Gross Operating Margin.

Some examples of new information from new indicators

Community Innovation Survey Indicators

Innovation may or may not be combined with R&D. The main challenge to be dealt with the CIS is to capture the non R&D-driven forms of innovation and any sort of innovation that traditional R&D indicators are not able to grasp and measure.

INNOVATION PROFILES:

- **Innovators.** All enterprises that introduced a product or process innovation in 2018-2020 (definition based on an Eu harmonized questionnaire).
- **R&D Performers.** Enterprises that introduced a product or process innovation by doing intramural R&D activities.

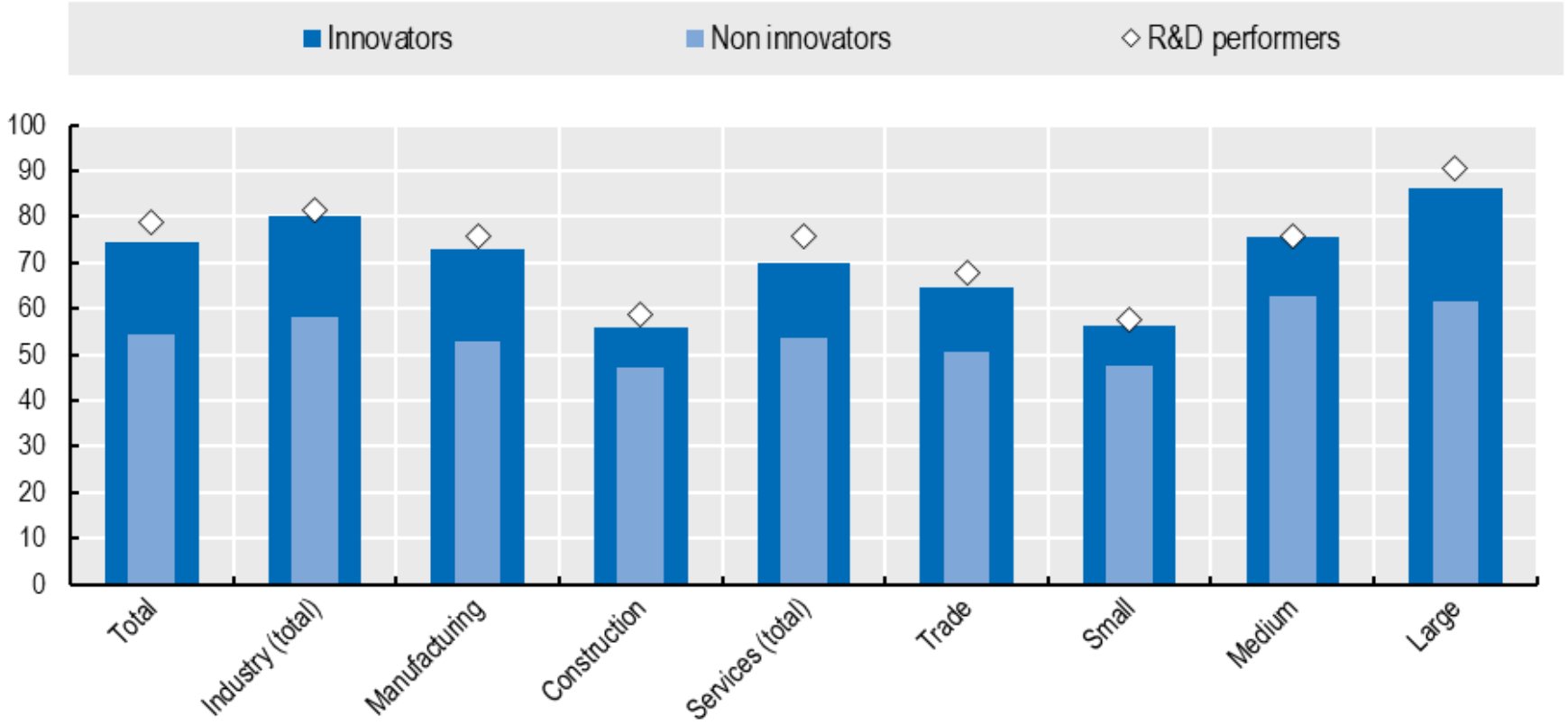
ICT usage and e-commerce Survey Indicator

INTENSITY LEVELS OF DIGITAL USE (EIUSE): enterprises with at least 10 persons employed classified by penetration of Internet usage among persons employed

Lev 1 (low). Enterprises without PC and Internet + those using PCs and less than 25% persons employed are connected to the Internet;
Lev 2. Enterprises with % of persons employed using Internet between 25% and less than 50% of the total;
Lev 3. Enterprises with % of persons employed using Internet between 50% and less than 75% of the total;
Lev 4 (high). Enterprises with at least 75% of persons employed using the Internet.

Some examples of new information from new indicators

Productivity of Italian enterprises by economic activity, size class and type of enterprise. Year 2020 *(value added per persons employed, thousands of euros)*



- ✓ Further insights to innovation-productivity nexus. Strong evidence of productivity gains running from innovation.
- ✓ Besides, importance of R&D in spurring productivity is confirmed: R&D performers have a stronger association with productivity improvements than those innovating without R&D (especially in services and large enterprises).

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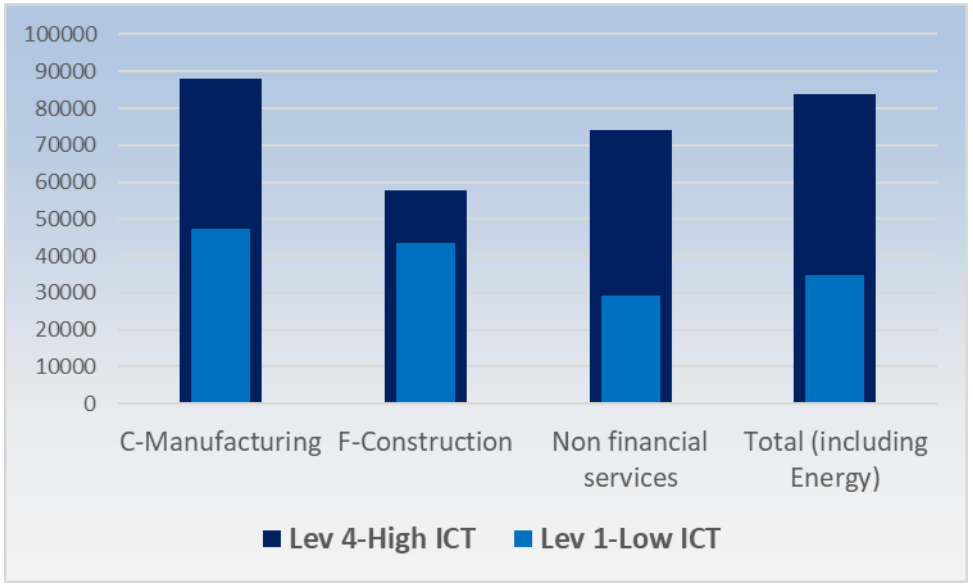
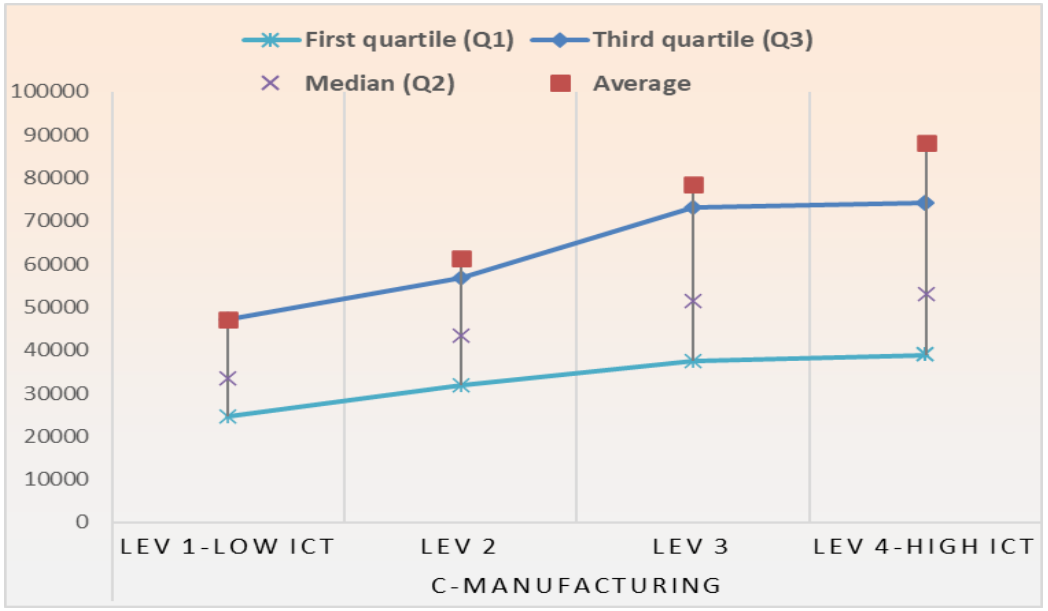
Some examples of new information from new indicators

Productivity of Italian enterprises by low and high intensity levels of digital use (eiuse).
Year 2021 *(value added per persons employed)*



Quantiles of productivity of Italian manufacturing enterprises by intensity levels of digital use (eiuse).
Year 2021 *(value added per persons employed)*



- ✓ There is a positive correlation between the adoption of technologies and the labor productivity.
- ✓ In particular in manufacturing, the interquartile range shows that as the use of digital technologies becomes more widespread, it not only adds productivity value relative to lower levels but also widens the productivity gap between businesses.

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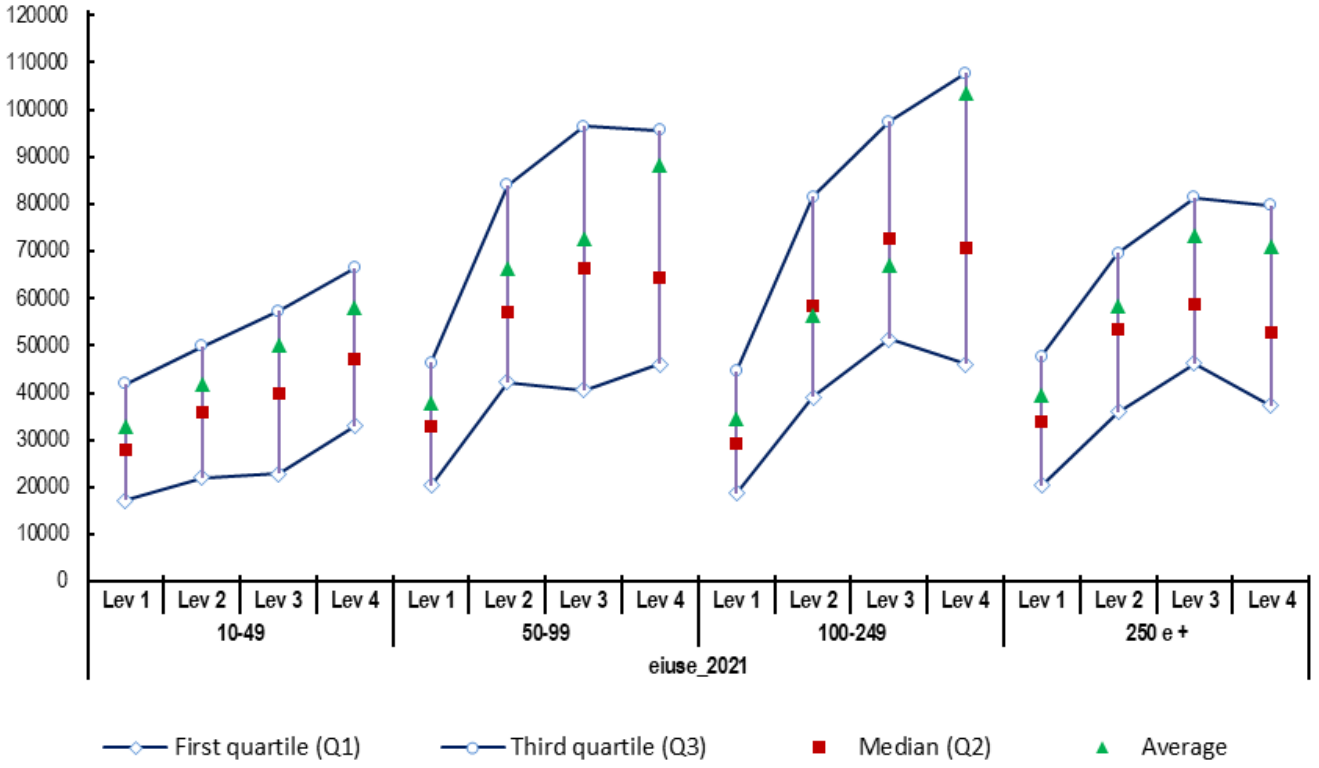
Some examples of new information from integrated indicators

Quartiles of productivity of Italian enterprises by size and intensity levels of digital use (eiuse).
Year 2021 *(value added per persons employed)*



- ✓ The positive correlation between the adoption of technologies (eiuse) and the labor productivity is evident also in terms of size classes and is very similar in time.
- ✓ The interquartile range highlights a greater dispersion around the average of the indicators and therefore a greater differentiation between those who get the most benefits and those who fall behind.

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Key advantages in developing indicators integrating SBS, ICT and innovation data

Increasing relevance of **official statistics** to **assess the drivers of productivity**:

New data:

- Data linking productivity with innovation and ICT profiles
- Data on productivity (jointly) broken down by enterprise size, industry, innovation or ICT profiles.

Better use of «old» data:

- Data on productivity by innovation profiles incorporate an «enterprise size» bias: are innovative enterprises more productive than not innovative ones or just bigger?

Thank you

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