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The evolution of the spatial data production model in Istat. New perspectives for the analysis of population socio-economic phenomena.

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Session 27 – Geostatistics II

The need for highly detailed spatial data

Users come mainly from research institutes, universities, the private sector and public administration.

Data are widely used for spatial studies, business objectives, planning and monitoring of policies.

The prevailing purpose is to conduct spatial analyses to evaluate (i.e.):

- socio-economic transformations;
- mobility in the territory;
- urban expansion and transformations;
- social segregation phenomena (e.g. in schools);
- housing needs;
- energy needs for the definition of energy strategies.

Types of data required

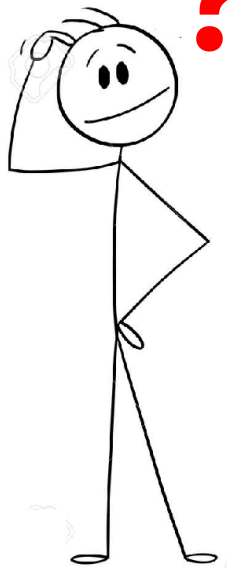
The main sub-municipal data required refer to:

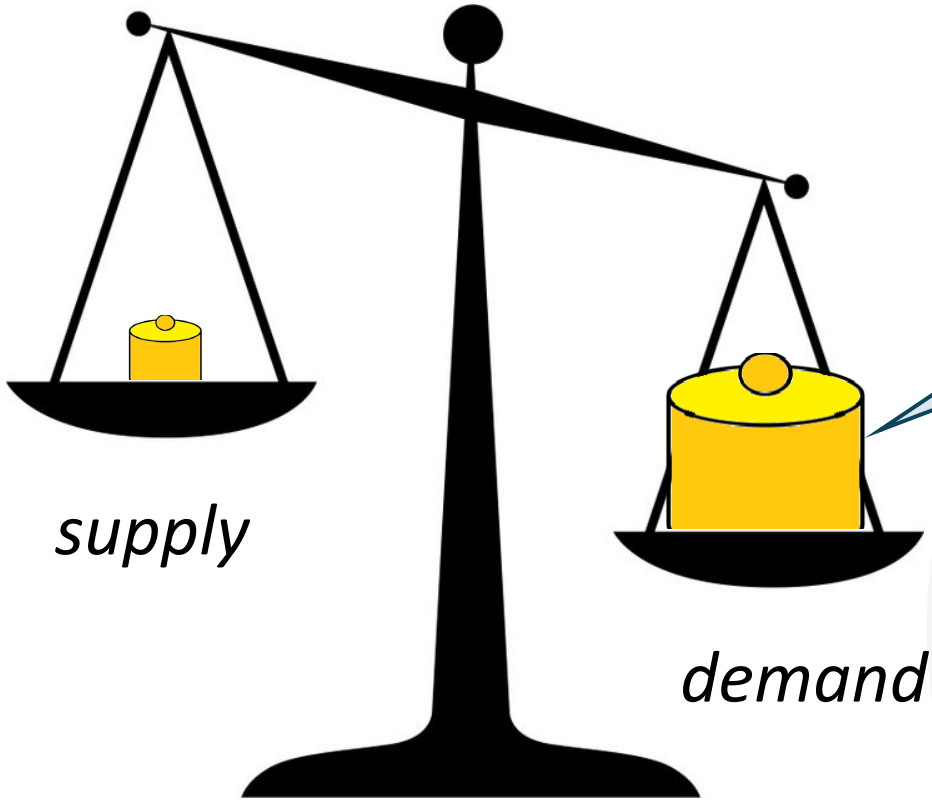
- ✓ *Structural characteristics of dwelling*
- ✓ *Characteristics of foreigners*
- ✓ *Employment characteristics*
- ✓ *Type of dwelling ownership*
- ✓ *Heating systems and fuel*
- ✓ *Current activity status of the population*
- ✓ *Type of household*
- ✓ *Educational attainment of the population*

Users who request such data often show advanced specialisation in data processing, applying it both in GIS and in an integrated manner with other data sources.

Need for higher data quality and detail

data with high spatial detail





There is a strong expectation for more accurate, timely, and detailed data.

How can official statistics balance the growing demand for spatial data?

The response of official statistics

In the past, the (traditional) ***Census of Population and Housing*** *was the only survey that provided data with a high classificatory and spatial detail.*

Administrative data sources

Statistical registers

Integration of sources

Big data

Record linkage techniques

Estimation models

Address normalisation processes

Geo-referencing of statistical units

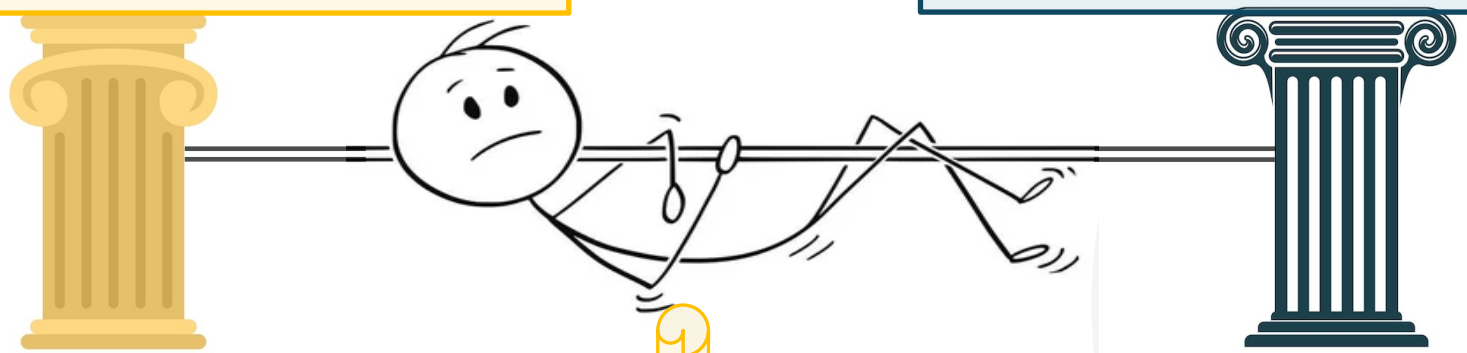
New **data sources** and **computer and methodological techniques** allow the development of new production processes and an increase in data supply.

The response of Istat: two pillars

The National Statistical Institute has undertaken a modernisation process that has led to a significant revision of the production processes of official statistics.

The Permanent Population and Housing Census (PPCH)

The Integrated statistical Registers System (IRS)

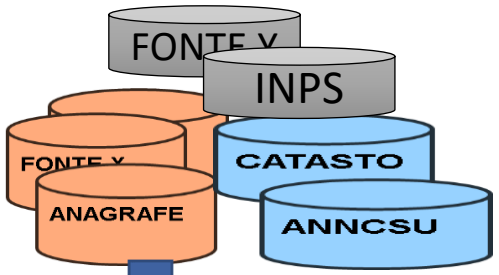


To collect census information each year and disseminate more accurate and timely data down to the municipal level.

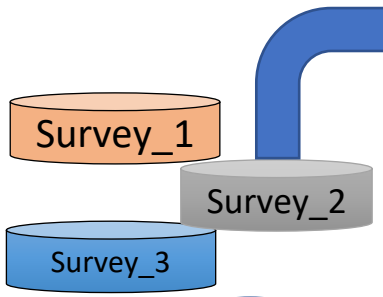
To enhance the information contained in administrative sources and produce official statistics in a structural manner.

The PPHC strategy in Italy

Combined Census - Strategy combining administrative and survey data



Continuous flow supplying the Integrated Registers System (IRS)



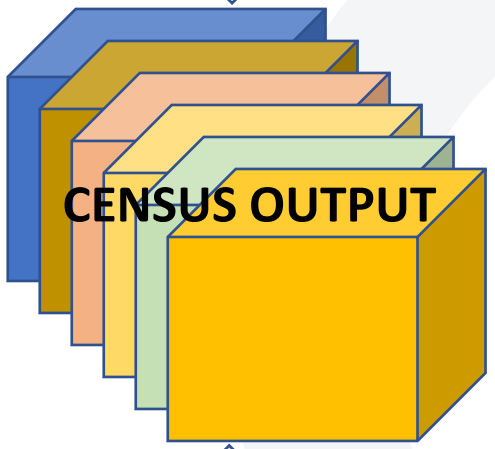
Labour Register

BRI - Base Register of Individuals

BRP - Base Register of Places

IRS

IT ARCHITECTURE



CENSUS OUTPUT

METHODOLOGICAL ARCHITECTURE

to assess the quality of Population Counting

Area Frame survey

SAMPLING SURVEYS

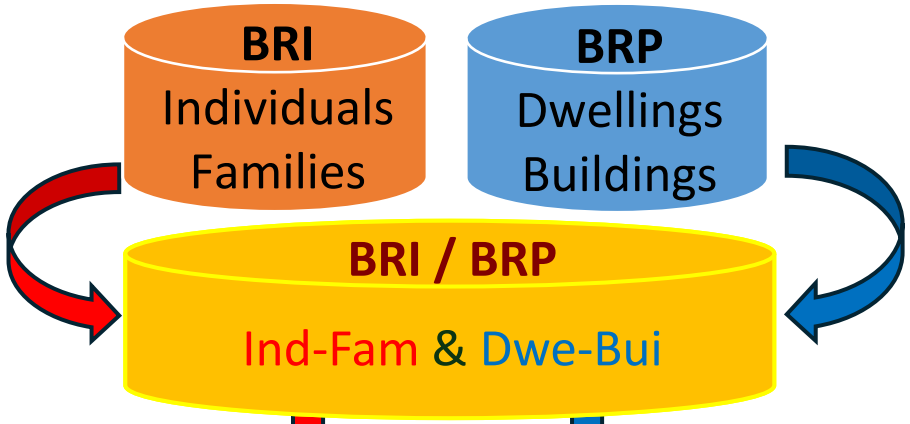
Master List Survey

to collect Census Data

2018, 2019, 2020, 2021, 2022, 2023, 2024, …

The sub-municipal data production model

Step 1 – **Linkage** Families-Dwellings



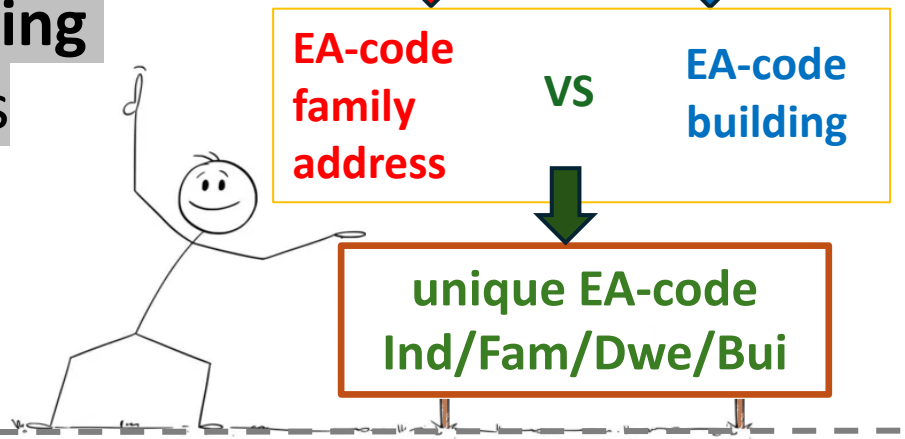
Linkage by groups and phases via:

1 – Addresses

2 – Property Register

3 – Tenancy Register

Step 2 – **Geo-coding** of statistical units



Outcomes of geo-coding comparison:

1 – same EA-code (assigned)

2 – only EA-code familiy address (assigned)

3 – only EA-code building (assigned)

4 – different EAcode (to be assigned)

5 – no EAcode (to be assigned)

Step 3 - Geo-coding of special populations

Persons in cohabitation, in equipped camps and the homeless are geo-referenced through address coordinates provided by the municipality in ad hoc surveys.

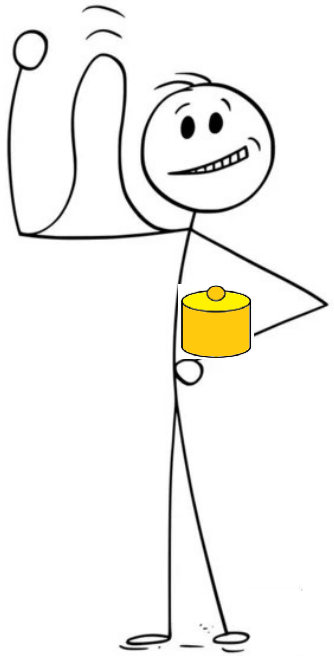
Main features of the production model

The new sub-municipal data production process is characterised by:

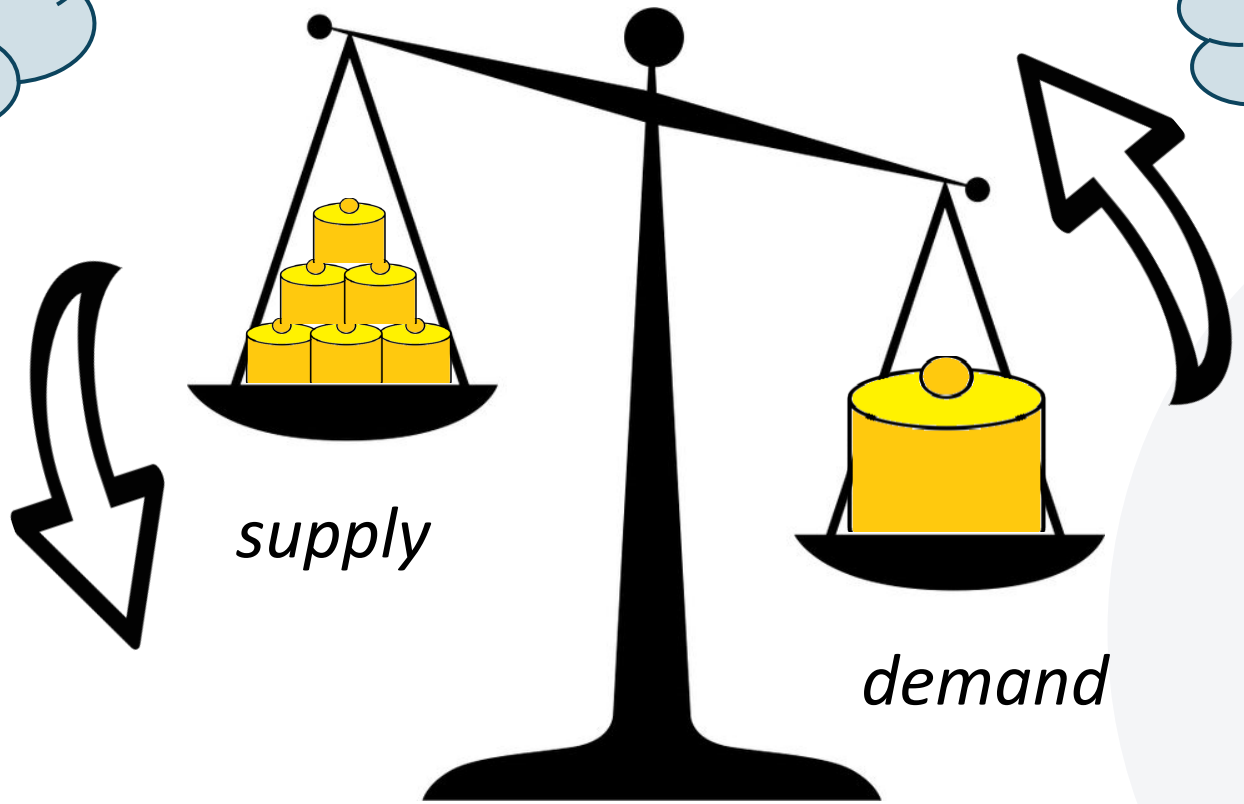
- ✓ *consistency in small domains between count data referring to populations, households, dwellings and buildings;*
- ✓ *integrated use of spatial data sources for geo-coding;*
- ✓ *use of administrative data referring to dwellings and buildings;*
- ✓ *strong focus on quality:*
  - *geographical accuracy;*
  - *data validation;*
- ✓ *possibility to repeat the process every year;*
- ✓ *evolving process due to the availability of new and updated data sources and methodological advances in linkage and geo-referencing techniques.*

Possibilities for increasing data supply

What is the work effort?



data with high spatial detail



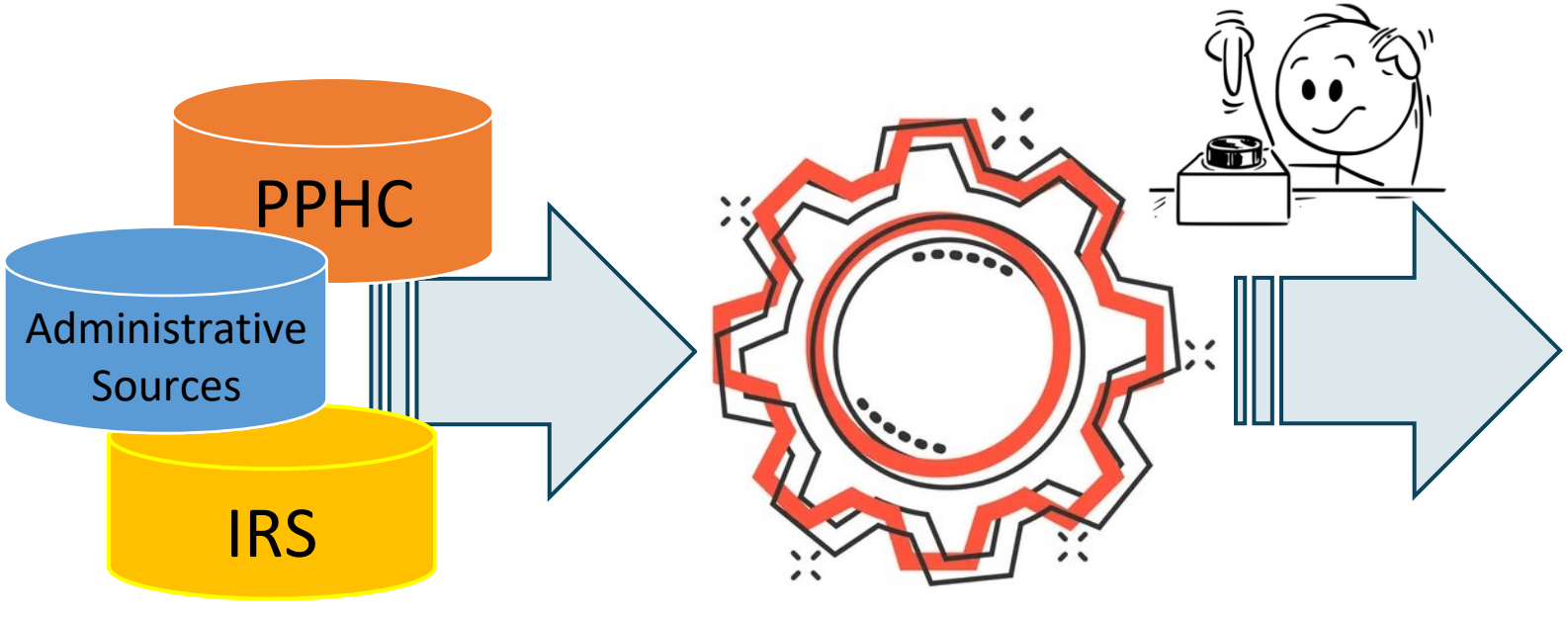
What is the timeline?

Is there sufficient attention to quality?

What are the expectations of success?

It is an evolving process and we are confident!

New opportunities for spatial analysis



Spatial data with more detailed information, available every year and of increasing quality

New spatial analysis possibilities for demographic, social and economic phenomena of individuals and households:

- *follow dynamics and make comparisons on spatial and temporal dimensions;*
- *identify the sub-municipal domains in which the phenomenon is most concentrated.*

A case study: family deprivation

Istat is conducting, with some municipalities, an experimental project to study family deprivation at the sub-municipal level. The activities concern:

- ✓ *providing a definition of "family deprivation";*
- ✓ *investigate the sources present in Istat (census; administrative data);*
- ✓ *provide measures of deprivation according to economic, employment, educational and housing aspects;*
- ✓ *calculate a composite index (**Index of Family Deprivation**) at the level of EA;*
- ✓ *conduct spatial analysis to identify critical areas of concentration of family deprivation within municipalities (contiguous EA clusters);*
- ✓ *represent the results through maps and indicators.*

The result of the project will be a **useful tool** for municipal administrators in planning and evaluating local policies.

The current system of dissemination

The current system of disseminating Census results follows three channels

1. Permanent Census Datawarehouse - *tradition* -

It maintains the approach used for the dissemination of the 2011 Census data.

2. Data Browser - *innovation* -

This channel is useful for browsing and visualising municipal Census data and makes it easy to navigate through the data and quickly select an area of interest.

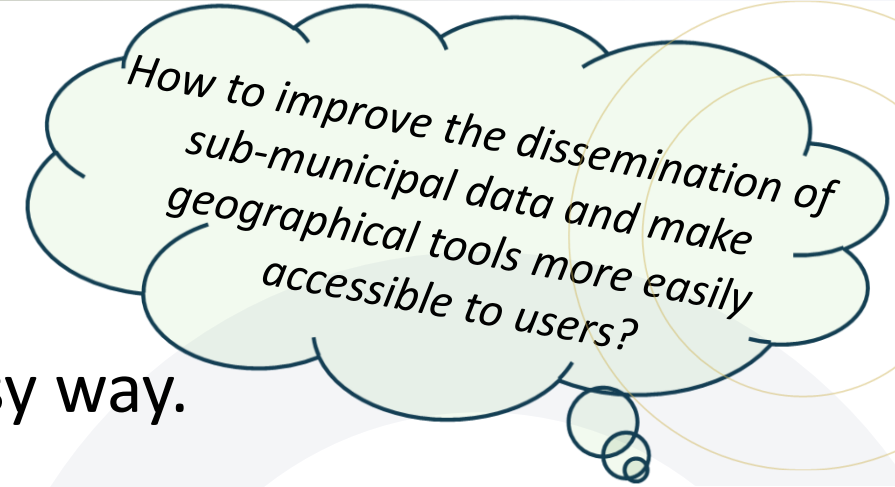
3. Tools for cartographic representations

- *BT.Carto - for consulting and exporting thematic maps;*
- *BT.Viewer – dedicated WebGIS application for visualising and consulting geographic data and census variables.*

Currently, such tools are mainly used by expert users.

New opportunities for dissemination

New forms and tools for the dissemination of sub-municipal data are being studied



1. show complex topics in a simple way;
2. illustrate territorial and local differences in an easy way.

The new tools will be GIS-based and will allow users to visualise and navigate geographical data in order to:

- *interrogate data*
- *create interactive maps*
- *find a location*
- *make selections on the map*
- *save the drawn area*
- *export the outline of the area to an image or spreadsheet (.csv).*

The aim is to facilitate, even for non-expert users, the navigation of interactive thematic maps at a minimum spatial level and to increase the informative richness of the sub-municipal data that will be made available.

Thanks for your attention

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