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Polish experiences and possibilities in realisation of the URBAN AUDIT programme

Source of the photo: www.info.kalisz.pl
Realisation of the URBAN AUDIT programme in Poland

Poland participates in the project since 1st half of 2003.

Works connected with the URBAN AUDIT are conducted by:

- Central Statistical Office
- Urban Statistics Centre of the Stat. Office in Poznań

Scientific support (e.g. Regional Statistics Centre in Poznań).
Main fields of research activities and problem areas

- Original delimitation of spatial units – necessity of looking for effective solutions
- Variables – methodological discrepancies in terms of their definitions
- Problems occurring during data collection – towards estimation and new surveys
Delimitation of spatial units – cities

In the URBAN AUDIT II 23 towns have participated

Used criteria of choice:

- Capitals of voivodship (NUTS 2 region) – 18 cities
- 5 small towns (from 50 – 100 thous. inhabitants)
- Having the powiat status (NUTS 4 region)
- Even geographical and demographical distribution

In the URBAN AUDIT III next 5 medium cities were added to the list.
Delimitation of spatial units
– Large Urban Zones

Definition of LUZ is based on the borders of gminas (NUTS 5 regions)

Main difficulties concerning determination of LUZ in Poland:
- Non-adequacy of criteria used in 70s and 80s
- Lack of explicit definition of urban agglomeration
- Lack of preferred data concerning journeys to work
- Level of available data aggregation – NUTS units
Delimitation of spatial units – original definition of the LUZ

Cities with number of inhabitants up to 100 thous.

Central city

The border of the first ring of NUTS 5 surrounding the city and also the border of LUZ
Cities with number of population from 100 thous. to 250 thous.

- The border of first ring of NUTS 5 surrounding the city
- Area of NUTS 5 including LUZ
- Central city
- The border of LUZ

Delimitation of spatial units – original definition of the LUZ
Delimitation of spatial units – original definition of the LUZ

Cities with number of population above 250 thous.

- The LUZ border
- The border of first ring NUTS 5 surrounding the city
- The border of second ring NUTS 5 surrounding the city
- NUTS 5 units, which are the component of NUTS 4
- NUTS 5 units, which are the component of NUTS 4
Definition of LUZ
– new experiments in URBAN AUDIT III

- Kalisz – one of new URBAN AUDIT cities

- Neighbourhood of three powiats (NUTS 4 regions):
  - Kaliski
  - Ostrowski
  - Pleszewski
Definition of LUZ for Kalisz
– new experiments in URBAN AUDIT III

New source of data for estimation of an index of journeys to work – the Polish tax register POLTAX
Grouping of statistical areas according to the value of the Florence’s concentration index:

Let \( n \) be a number of statistical areas within a given city. Then

\[
LC_i = \frac{x_i}{y_i - x_i} \cdot \frac{(y_i - x_i)}{x(y - x)}
\]

for \( i = 1, 2, \ldots, n \), where the used symbols denote:

- \( x_i \) – number of households for which the main sources of maintenance were retirement pay, pension for invalids, unemployment and social benefits in the \( i \)–th statistical area;
- \( y_i \) – total number of households in the \( i \)–th statistical area;
- \( x \) – total number of households for which the main sources of maintenance were retirement pay, pension for invalids, unemployment and social benefits in the city. That is,
  \[
x = \sum_{i=1}^{n} x_i;
\]
- \( y \) – total number of households in the city:
  \[
y = \sum_{i=1}^{n} y_i.
\]
Delimitation of Sub–city districts

Criteria of grouping of statistical areas:

- Similar values of the Florence’s coefficient
- Geographical neighbourhood of areas
- Requirements of the EUROSTAT
- Number of population – for controlling the SCD size
Variables – most important methodological problems

Dwellings and apartments – difficulty concerning a distinction between „dwelling” and „apartment”. The latter notion practically doesn’t exist in the Polish methodology.

„Employees” and „employed persons” – in the EUROSTAT methodology these notions are rather not distinguished, whereas in Poland they are different, i.e. „employees” perform work providing them earnings or income and the term „employed persons” includes only persons performing work on the basis of a legal contract.
Variables – most important methodological problems

Doctors of „first contact” – a specific system of health service in Poland generates some problems. For example, this notion should not include hospitals doctors, but they can work simultaneously in health care institutions as family doctors or specialists on the basis of a contract with the National Health Fund or not.

Persons directly employed by the municipal authority – lack of precise definition. There are enterprises only overseen by local self-government, schools administrated by it, offices.
Problems occurring during data collection for the URBAN AUDIT II

Estimation of median and quintiles of incomes in households in Central City and LUZ based on the data from the tax register POLTAX and the National Population and Housing Census 2002:

\[ m = \frac{b \times x}{a \times y} \]

\[ q_i = \frac{\tilde{q}_i \times x}{a \times y} \]

- \( m \) – median,
- \( q_i \) – \( i \)-th quintile, \( i = 1, 2, 3, 4 \),
- \( a \) – average income per taxpayer (tax register)
- \( b \) – median of incomes (tax register)
- \( x \) – total incomes of taxpayers,
- \( y \) – total number of households
- \( \tilde{q}_i \) – \( i \)-th quintile, \( i = 1, 2, 3, 4 \) of taxpayers income
Problems occurring during data collection for the URBAN AUDIT II

Estimation of median of household income for SCD – data for 5 income groups of households

\[ m = \frac{b \times \sum_{j=1}^{5} (y_j \times \bar{x}_j)}{a \times y} \]

- \( m \) – median,
- \( a \) – average income per taxpayer for a city,
- \( b \) – median of incomes for a city
- \( \bar{x}_j \) – average income of the \( j \)-th group for a given SCD
- \( y_j \) – total number of households in the \( j \)-th group for a given SCD
Problems occurring during data collection for the URBAN AUDIT II

- Total number of households with less than half of the national average income – also estimated on the basis of the POLTAX and Census data with a subestimation of a number of households with incomes excluded from taxation.

- Examples of problems requiring new surveys:
  - Percentage of journeys to work by bicycle/foot
  - Peoples commuting out of the city
  - Average time of journey to work
  - Number of households with a PC
Original analytical methods possible to apply in an analysis of the URBAN AUDIT results

Resulting analyses of diversification of spatial units on the account of a given socio-economic phenomenon investigated in the URBAN AUDIT programme can be made using the Polish taxonomical methods.

A basis of this approach is a set of features having a form of indexes. It is verified by elimination of those features having too small variation and next too much correlated with others (e.g. by analysis of diagonal elements of reversed correlation matrix).
Original analytical methods possible to apply in an analysis of the URBAN AUDIT results

The remained diagnostic features are divide into:

- **Stimulants** (higher values give better situation)
- **Destimulants** (higher values give worse situation)
- **Nominants** (having an optimal level of value)

Destimulants and nominants are transferred into stimulants. Next all these features are normalised, for example by formulas:

\[
    z_{ij} := \frac{x_{ij} - \bar{x}_j}{s_j} \quad \text{or} \quad z_{ij} := \frac{x_{ij} - \theta_j}{(1.4826 \cdot \text{mad}_j)}
\]

$s_j$ – standard deviation of the $j$–th feature, $\theta_j$ – $j$–th coordinates of the Weber median, $\text{mad}_j$ – median absolute deviation (median of absolute deviation from coordinates of the Weber median); for $i$–th object.
Original analytical methods possible to apply in an analysis of the URBAN AUDIT results

- Construction of a pattern of development (an artificial „ideal” object), e.g. \( \varphi_j = \max_{i=1,2,\ldots,n} z_{ij} \), \( j = 1,2,\ldots,m \).

- Determination of a measure of development.
  \[
  \mu_i = 1 - \left( d_i \big/ \left( \bar{d} + 2s_d \right) \right), \quad \text{where} \quad d_i = \sum_{j=1}^{m} \left| z_{ij} - \varphi_j \right|
  \]
  \( j = 1,2,\ldots,m, \quad i = 1,2,\ldots,n \).

- Grouping of objects according to similarity of development expressed by the measure (e.g. by method of three averages or three medians).
Thank you
for listening!