DESTATIS
Statistisches Bundesamt

INNOVATIVE DATA COLLECTION USING BIG DATA SOURCES FOR OFFICIAL STATISTICS

Natalie Rosenski, Maren Köhlmann (Destatis)

UNECE Workshop on Statistical Data Collection

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Content

Background

Improvement of timeliness, accuracy and relevance

Reduction of response burden

→ Use of new digital data for official statistics

→ Diverse data sources

- Mobile Network Data
- Remote Sensing Data
- Data from the Internet of Things (IoT)

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ESSnet Big Data II – WP L

12 partner from 11 countries: AT, BG, FI, FR, IT, NL, NO, PL, PT, UK& DE

Germany (Destatis) in lead for WP L “Preparing Smart Statistics”

Duration: November 2018 – October 2019

Goals:

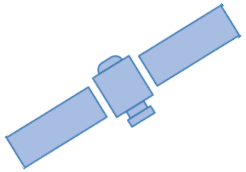
- Exploration of the IoT in order to produce trusted smart statistics
- Overview of relevant topics for official statistics
- Recommendations for possible follow-up studies

ESSnet Big Data II – WP L

4 Tasks

- Smart Farming
- Smart Cities
- Smart Devices
- Smart Traffic

DIGITALSTADT DARMSTADT



Remote Sensing Data

DLR

Federal Agency for Cartography and Geodesy

Smart Business Cycle Statistics

- Flash estimates of economic indicators

Makswell

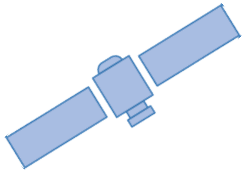
- MAKing Sustainable development and WELL-being frameworks work for policy analysis

Deep Solaris

- (Semi-)automatic analysis of satellite and aerial images for energy system transformation and sustainability indicators

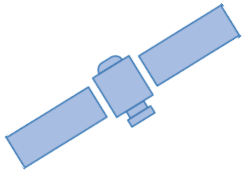
ESSnet Big Data II – WP H "Earth Observation"

- Linking remote sensing data to survey data



Remote Sensing Data - Challenges

- Frequency of images and weather-conditions
- Radar images vs. optical satellite images
- High resolution data only commercially available and costly
- Low coverage of high resolution images



Remote Sensing Data – Example: ESSnet Big Data II

ESSnet Big Data II - WP H “Earth observation”

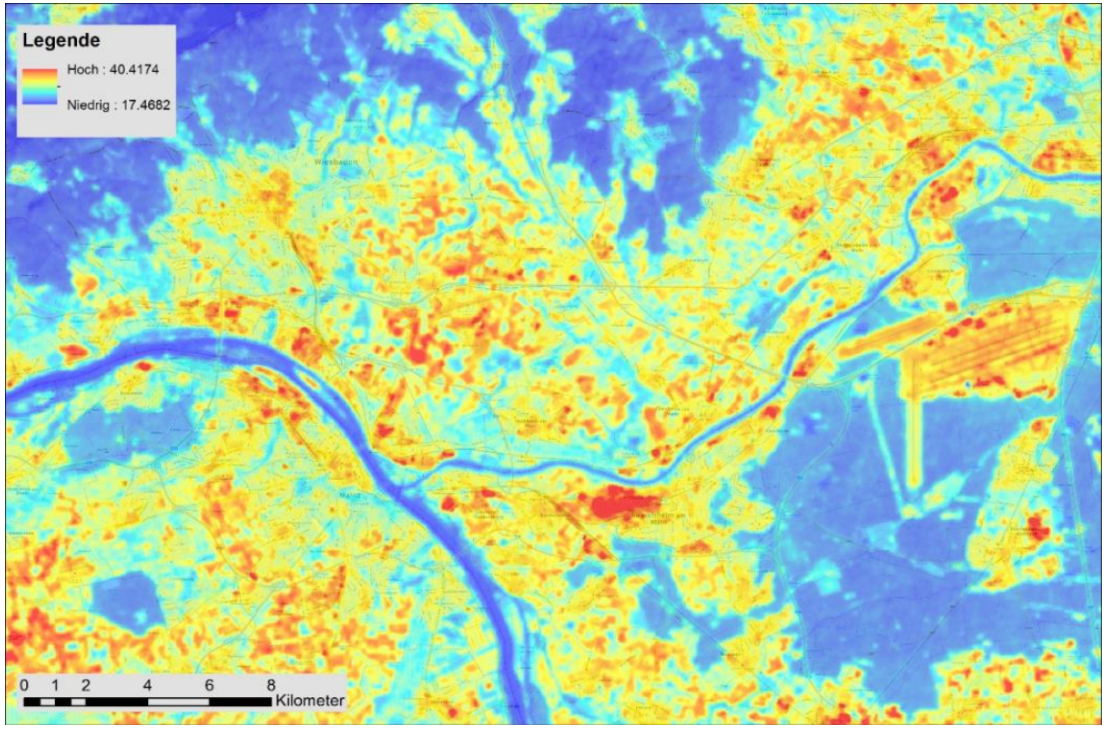
→ Analysis of quality of life indicators

- Indicators with spatial dimension
  - Urban heat islands, urban greens, noise pollution, air quality
- Linking neighbourhood characteristics derived from EO data to socio-demographic characteristics from the (micro) census
  - Inhabitants, age structure, civil status, income, education

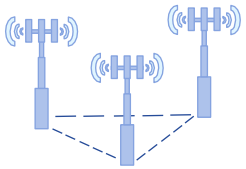
Remote Sensing Data – Example: ESSnet Big Data II

Surface temperature – heat islands

© Google Maps, Rhine-Main region



© Calculations by BKG using Landsat 8 data



Mobile Network Data

ESSnet Big Data II: WP I “Mobile Network Data”

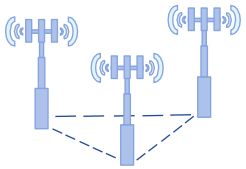
- Dynamic representation of the population via mobile network data

Comparison of static mobile network data with census data

- To represent day and resident population

Exploration of dynamic mobile network data for commuter statistics

- To illustrate commuter flows
- Compare data with census 2011 and existing commuter atlas

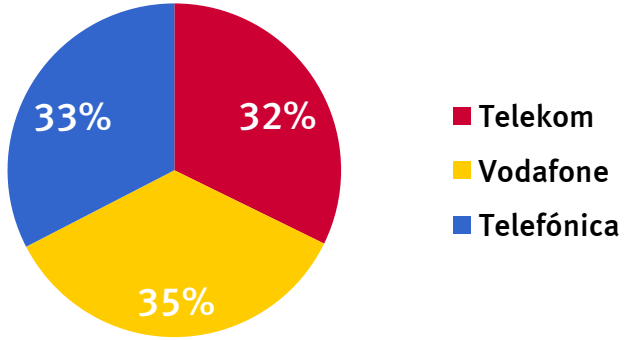


Mobile Network Data

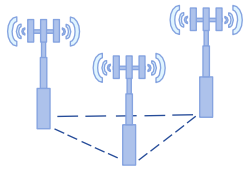
Anonymised and aggregated mobile network data

- Minimum activity per grid≥ 30 (lately ≥ 5)
- Test data of one German federal state for a statistical week
- Dwell time › 2 hours
- Specific geometry
- Demographic characteristics: age group, gender, mobile country code

Market share of mobile network operators (Germany, 2nd quarter 2019)

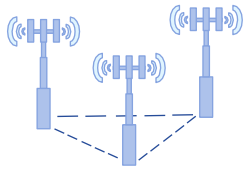


Data source: Federal Network Agency



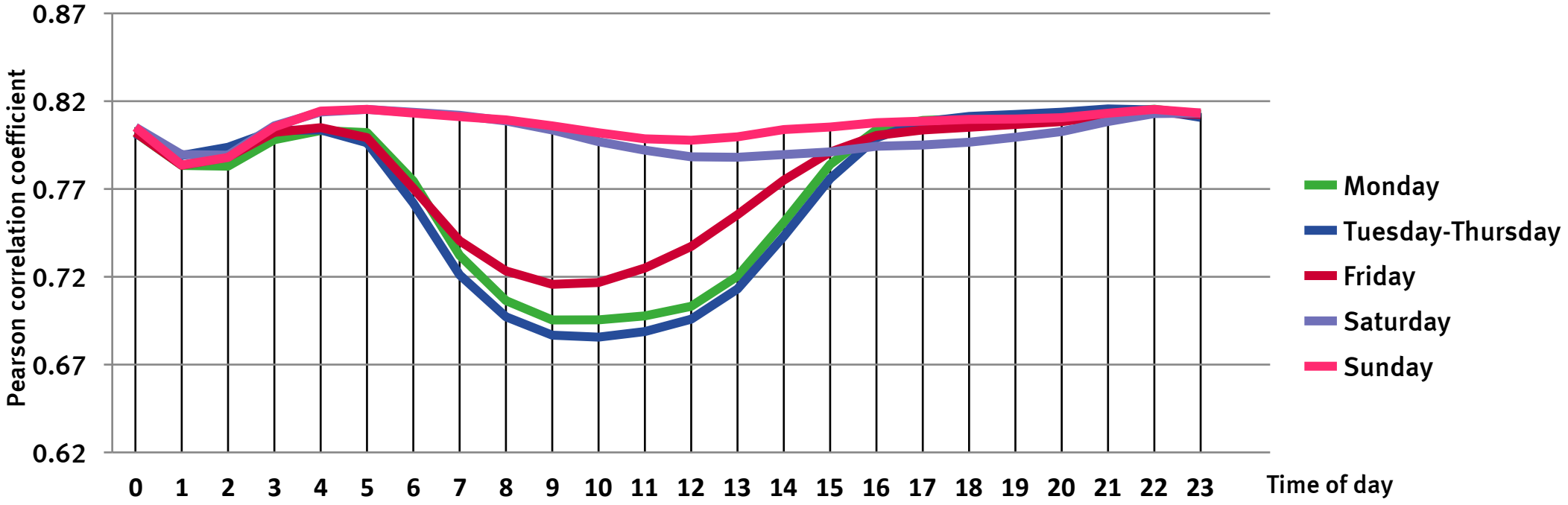
Mobile Network Data - Challenges

- No legally regulated permanent dataaccess
- No distinction between personal and device-related SIMcards
- Socio-demographic characteristics only for contractual customers
- Bias due to double counting of persons possessing several mobile phones and family tariffs
- Insufficient disclosure of the extrapolation methodology used by providers
- Available periods of mobile network data and census data do not always match well enough
- etc.



Mobile Network Data – Example

Illustration of the population via mobile network data



Graph: Pearson correlation coefficients for census values and mobile network data by statistical days and time periods

Outlook

- → Combination of survey, administrative and new digitaldata
- → Very promising to enrich the available official data
  - » Improve quality of data
    - » Accuracy: Provide more detailed data for policy decisions
    - » Timeliness: Improve punctuality of official statistics
    - » Relevance: Develop new research areas and questions
  - » Reduce response burden → reduction of costs ?

THANK YOU FOR YOUR ATTENTION!

Institute for Research and Development in Federal Statistics

newdigitaldata@destatis.de

Maren Köhlmann
+49 (0) 611 / 75 42 95
Maren.koehlmann@destatis.de

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