The SubDense project

Collaborative dashboard to study periurban densification

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Context

- Suburban densification as a tool for more *sustainable cities* while avoiding many negative externalities linked to center densification (scarcity of space, price increase, housing shortage) [5]
- *Multiple rationalities / conceptions of space* for involved stakeholders (landowners, policy makers, inhabitants) coexist [4]
- Considerable *planning challenges* in associated incremental development, need for new policy insights and frameworks [3]

The SubDense project

The **SubDense** European project aims at better understanding **the polyrationalities of space, actors and policies on suburban densification**, by

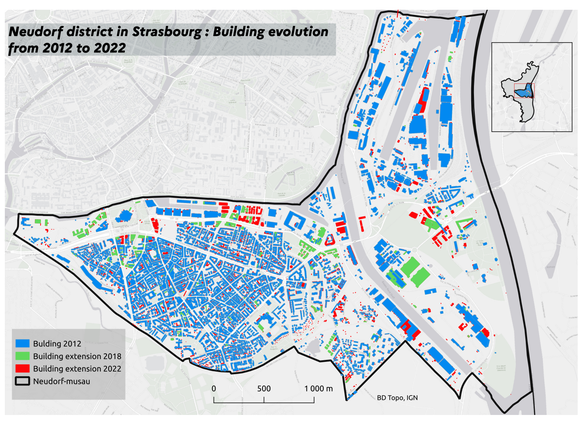
→ exploring how diverse strategies of land policy interact with landowners' and local stakeholders' interest and agency to shape suburban densification and their impact on suburbia across different planning systems (France, Germany, UK);

→ combining quantitative approaches (geodata analysis and geosimulation) with qualitative approaches (social and policy science and planning).

Work packages

- **WP1:** Which data, information infrastructures and approaches enable a comparative spatial analysis of suburban densification and allow for an integration of stakeholders' interests and agency?
  → **main LASTIG contribution:** data integration, collaboration in data analysis, geosimulation.
- **WP2:** How can stakeholders' interests and agency be explained in relation to land policies for suburban densification?
- **WP3:** How do land policies respond to the interests and agency of stakeholders in an effective and efficient way?

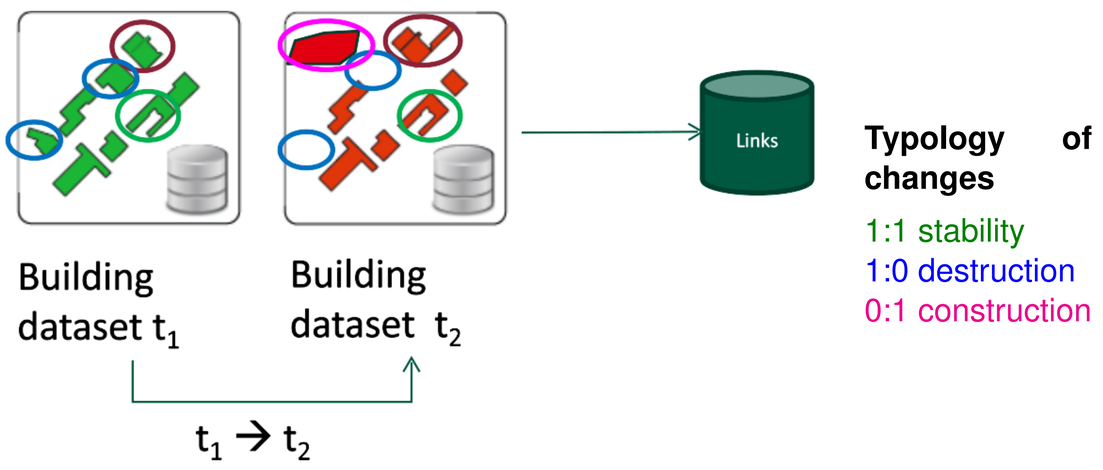
Data expertise and analysis



→ how to share analysis and methods for reproduction on other case studies (*Left figure*: example of change analysis)

→ how to integrate knowledge on data specification (*Right figure*: change in specifications of BDTopo 2020-2022) so that partners' analysis are not biased?

Matching algorithms for change detection

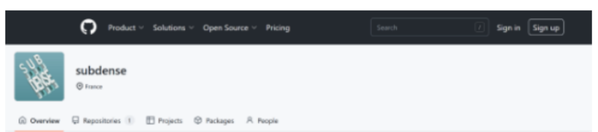


→ Benchmark of polygon matching algorithms [6], to provide tools for building change detection

Collaborative dashboard

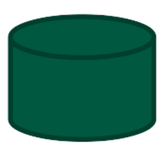
Clients (applications/plugins):
Enable users' and contributors' tasks

Examples:
- Visualisation / exploration of views
- Preparing a view
- Preparing change data using matching algorithms
- Launching a simulation with OpenMOLE
- Editing metadata



Git core repository for SUBDENSE:
- Views (Static map...)
- Styling rules
- Change data (references to)
- Source data (references to)
- Indicators
- Metadata on data, documentation of biases
- Libraries, script, detailed and replicable workflows
- Tutorials, animation

RDOM
Platform for the Data Management Plan maintained by the coordinator



→ A **collaborative dashboard** as a medium to **facilitate collaboration** between partners, **share methods, data and metadata** [2], and ensure reproducibility

→ The **git-based architecture** for the core dashboard ensures tractability, full history, reproducibility, flexibility, and collaboration through branching, shared remote repository (`https://github.com/subdense`).

→ Clients will implement interactions with the core and functionalities needed by partners for data analysis and integration (running change detection algorithms, adding data, exploring results and maps, ...).

→ An iterative process to produce **user stories**, finally leading to some specifications for the core architecture and functionalities of clients.

Future work

The second part of the project will also involve LASTIG for

- *heterogeneous data integration* [1], to couple densification analysis with socio-economic data;
- develop and explore *simulation models* for the impact of policies on densification processes, parametrise these models with the qualitative data obtained through interviews during the project.

Project details

- January 2023 – December 2025
- *Open Research Area for the Social Sciences* European grant: 1M€
- 4 partner institutions: TU Dortmund, IOER, University of Liverpool, IGN
- 8 permanent researchers, 5 short-term contracts working full time

References

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[2] Bénédicte Bucher, Esa Tiainen, Thomas Ellett von Brasch, Paul Janssen, Dimitris Kotzinos, Marjan Čeh, Martijn Rijsdijk, Erwin Folmer, Marie-Dominique Van Damme, and Mehdi Zhral. Conciliating perspectives from mapping agencies and web of data on successful european sdis: Toward a european geographic knowledge graph. *ISPRS international journal of geo-information*, 9(2):62, 2020.

[3] R Dunnning, Hannah Hickman, and Aidan While. Planning control and the politics of soft densification. *Town Planning Review*, 91(3):305–324, 2020.

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[5] Mathias Jehling, Martin Schorcht, and Thomas Hartmann. Densification in suburban germany: approaching policy and space through concepts of justice. *TPR: Town Planning Review*, 91(3), 2020.

[6] Ana-Maria Olteanu-Raimond, Sebastien Mustiere, and Anne Ruas. Knowledge formalization for vector data matching using belief theory. *Journal of Spatial Information Science*, (10):21–46, 2015.