ISUF2021 GLASGOW

XXVIII International Seminar on Urban Form

URBAN FORM AND THE SUSTAINABLE AND PROSPEROUS CITIES

29th June - 3rd July 2021 - Glasgow

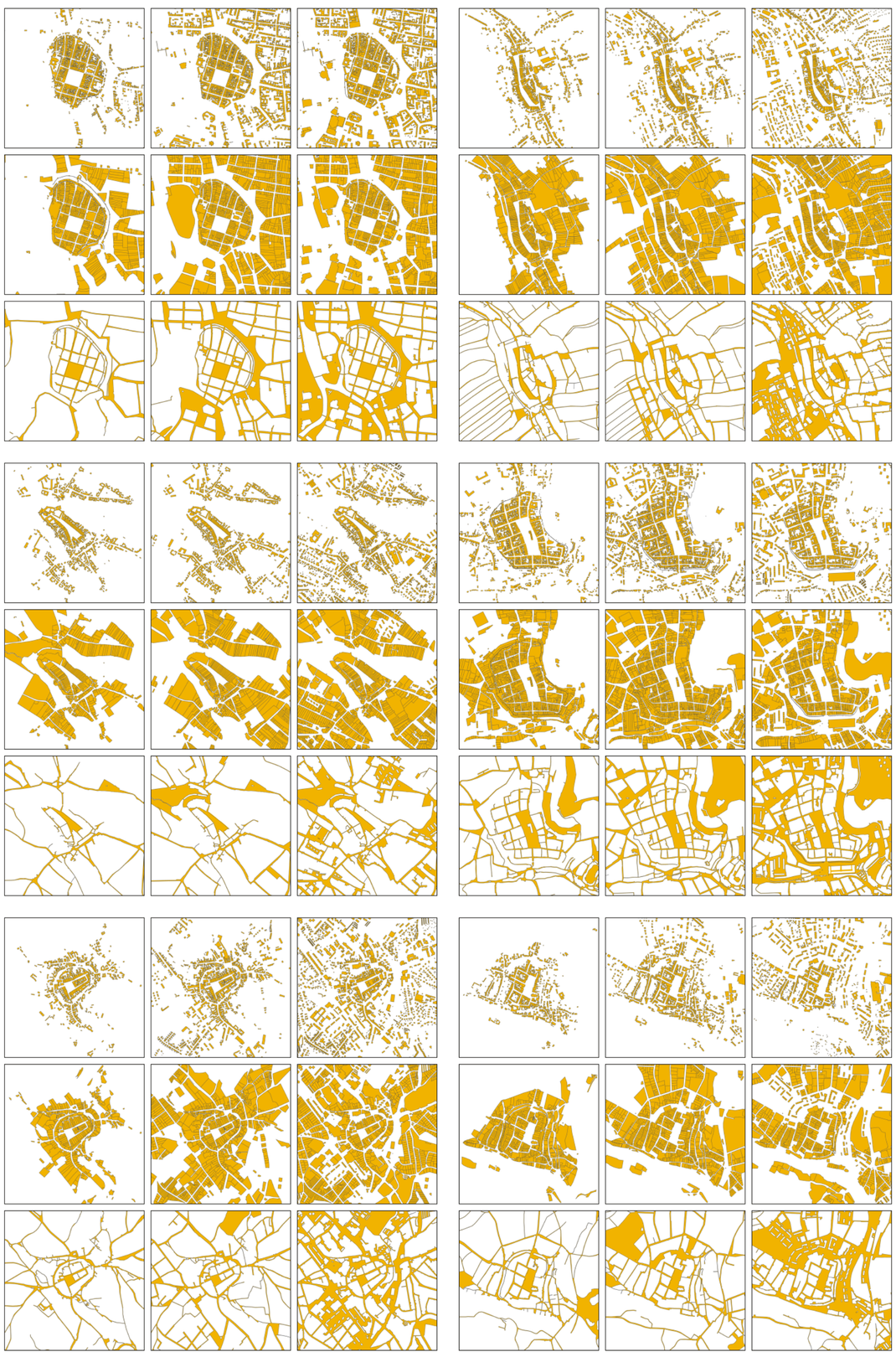


figure ↑ 1 | 2 / 3 | 4 / 5 | 6

figure ↓ 8 | 9 | 10 / 11 | 12 | 13

# Heritage and morphology: street as an object


figure 7
The group of studied towns belongs to a total of 295 Czech urban listed areas

*Morphological characterisation of urban tissue has been utilised in relation to conservation of urban heritage for decades. Hierarchical approach based on a town plan analysis, however, not always corresponds to the urban tissue as perceived by pedestrians. To complete the characterisation, it might be useful to complement a traditional urban block analysis by considering a street as a built-up space of its kind.*

## Introduction

The cornerstone of any urban fabric analysis lies in the complementary relation of the built-up and the void. In this research the built-up is represented by plots and buildings, the void by the open public space and its pivotal component—the street space. Through a quantitative analysis at the fine grain scale this research focusses on the street–building interface and its evolution in time. It is studied on six towns of medieval origin which were subjected to a historic-geographical analysis during preceding research on Czech urban heritage (see fig. 1–7).
Its goal is to identify different types of urban fabric through the streetscape perceptive analysis and to specify threshold values of their distinctive characters or, to be precise, the methods of their identification.

## Background

The complementarity of the void and the built-up represents the intrinsic paradox of perception in urbanism. Whilst the void tends to be associated with the pedestrian experience of townscape, the town-plan analysis is more engaged with the built-up. In quantitative analyses streets are usually considered as the limits for spatial partitioning, rather than as the core of a fragment of the urban fabric—such perspective is also adopted by the study which directly inspired this research (Dibble, 2019). Nonetheless, the constant rise of interest in bridging the gap between streetscape and the town-plan perspective is apparent even when focussing strictly on the morphometric analyses (Araldi & Fusco, 2019). What makes this study less common is its particular interest in the application of morphometrics to different time frames of streetscape characterisation.

## Methodology and Results

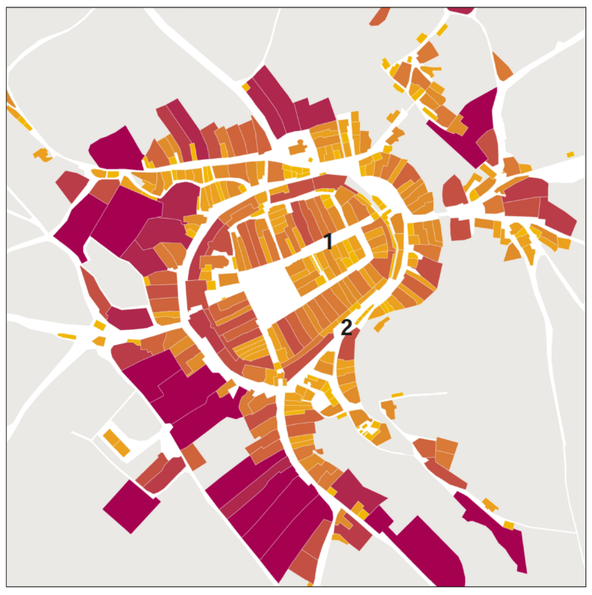
The two-step analysis consists of the structural town plan preparation and its geoprocessing. The town plan follows standard historic-geographical approach resulting in a set of nine maps of three time-frames and three levels of resolution per town, prepared during a preceding project (Jehlík, 2020). Selected structural layers: buildings, plots, public and street space (open and covered), entrances and frontages are then processed in GIS (Python script & ArcMap, courtesy of Jiří Čtyroký, IPR Praha). Their geometrical and qualitative attributes are aggregated to the street segments and statistically evaluated. Among the most closely observed values are those representing the scale and grain of the environment: ratio, mean and median (MED) and those representing the degree of homogeneity: interquartile range (IQR) and standard deviation (σ). For a sample of results see table 1 exhibiting an observation of arterial and pericentric streets in the centre of Pelhřimov (fig. 8–13), the particularly interesting figures are coloured.

fig. 1–6. First step of the analysis: town plan representation of buildings, plots and street spaces in the time frames of 1830's, 1940's and 2020 covering the town kernel and its surroundings of: České Budějovice (1), Litomyšl (2), Telč (3), Jihlava (4), Pelhřimov (5) and Kadaň (6).

fig. 8–13. Second step of the analysis: geoprocessing represented at the centre of Pelhřimov in three time-frames. Figures 8–9 shows the change of plot structure—the colour scheme representing plot area whilst the public space is white. Figures 10–13 show the change of typical length (mean) of plot fronts projected to the street segments—the lighter the colour is the finer is their grain.

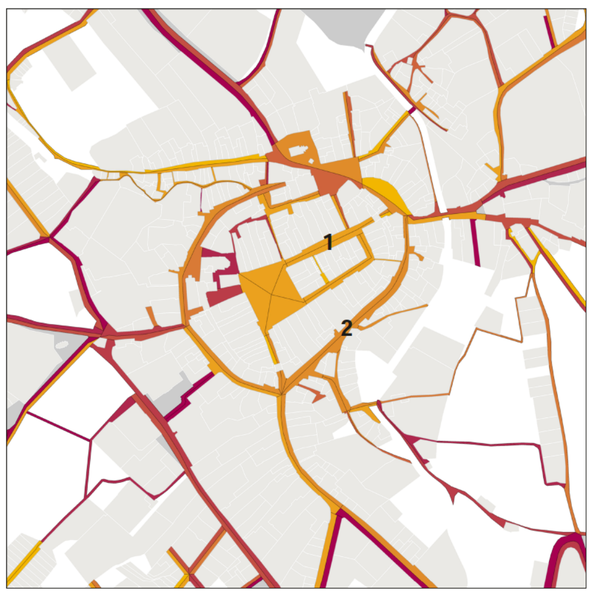
↓ table 1

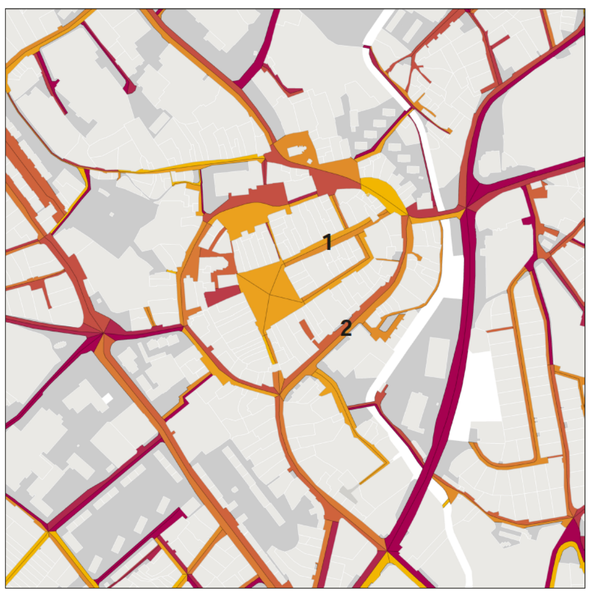
| Observations | 1839 | | 1949 | | 2020 | | |
|---|---|---|---|---|---|---|---|
| STREET SEGMENT (Left or Right) | L | R | L | R | L | R | EXAMPLE |
| Plot front length (MED) | 12 | 12 | 13 | 12 | 13 | 13 | 1 |
| | 28 | 16 | 18 | 15 | 28 | 23 | 2 |
| Plot front length (σ) | 4 | 8 | 4 | 7 | 4 | 11 | 1 |
| | 30 | 11 | 10 | 8 | 9 | 28 | 2 |
| Building front height (MED) | 7 | 8 | 7 | 8 | 7 | 9 | 1 |
| | 5 | 4 | 9 | 7 | 9 | 8 | 2 |
| Building front height (IQR) | 2 | 1 | 1,8 | 2 | 2,8 | 3,3 | 1 |
| | 2 | 2 | 3 | 5 | 5 | 2 | 2 |
| Street built front ratio (%) | 96 | 100 | 100 | 100 | 100 | 100 | 1 |
| | 23 | 72 | 36 | 70 | 44 | 36 | 2 |
| Density of etrances (/100 m) | — | — | 14,3 | 9,5 | 14,3 | 7,9 | 1 |
| | — | — | 6,7 | 7,2 | 6,2 | 4,1 | 2 |










## Conclusions

Considering the ongoing project outputs, the direction towards the main goal—the identification of threshold values—is correct. Moreover, the decision to split the street space into a parallel segment promises a means to consider the degree of street constitutedness. However, two major methodological challenges remain: the delimitation of street segments within the continuous public space and the role of proximity and orientation of the built features towards the analysed street segment—both of the tasks are particularly complex in the interlocking grid of modernist housing. In the author's opinion the answer to them lies in tools derived from traditional conceptualisation of the street as an interior (Sitte, 1899), therefore in a process of conscious evaluation and decision rather than geoprocessing automation.

## References

Dibble, J., Prelorendjos, A., Romice, O., Zanella, M., Strano, E., Pagel, M. and Porta, S. et al. (2019) 'On the origin of spaces: Morphometric foundations of urban form evolution', *Environment and Planning B: Urban Analytics and City Science* 46.4, 707-730.

Araldi, A. and Fusco, G. (2019) 'From the street to the metropolitan region: Pedestrian perspective in urban fabric analysis', *Environment and Planning B: Urban Analytics and City Science* 46.7, 1243-1263.

Jehlík, J., Drdácký, T, Plos, J., Loits, A., Zdráhalová, J., Rýpar, V., Buryška, P., Sedlák, J., Cikán, J., Kohout, M. (2020) *Skrytý řád a vnitřní podstata jedinečnosti historických měst ČR*, ČVUT, Prague.

Ing. arch. Vít Rýpar, Department of Urban Design, Faculty of Architecture, Czech Technical University in Prague, Czechia