Brainport Smart District
The dialog between public and data

Habidatum has been working together with UNStudio, Felixx, Metabolic, UNSense to create a new urban vision for the smartest district in the Netherlands. UNStudio masterplan, which assumes mixed-use strategy both at the level of buildings and at the level of territories, is supported with data analytics using the sources like online maps, mobile apps, social and mobile networks.

Habidatum uses this diverse people-generated data on mobility and business activity to assess (1) the existing conditions (e.g. in the case of greenfield development we look at the accessibility of the location and its neighboring areas), and (2) the plan for the future, simulating possible patterns of socio-economic activities that will be generated by the development suggested by the master plan.

We look at the area through the lens of its analogs and based on their functional profile, daily dynamics of people’s activity and transport parameters. Through the use of machine-learning-backed prediction based on the training sample of the real-world sites-analogs, we suggest possible options for the general future pattern of human and business activity at Brainport Smart District.

“The smartest neighbourhood in the world”

Brainport Smart District (BSD) – the future living envisioned by the UNStudio is currently being developed in Helmond’s Brandevoort District in the Netherlands.

Citing the architects, the area will be the ‘living lab’: a mixed residential neighborhood organised around a central park and surrounded by business spaces and natural reserves. The district aims to develop a new relationship between buildings and landscape, whereby both strengthen each other qualitatively, while the landscape is used as a productive environment for food, energy, water, waste processing and biodiversity.

Unlike most developments, Brainport Smart District is going to have a flexible grid-style masterplan – the area will be built according to residents’ needs, in response to their demand. The idea is to create a sustainable and unique living concept, one which embraces experimentation and ‘learning by doing’.

This living concept is planned to transform the area into a ‘hotspot for a connected and active mixed community, and a place of engagement that invites residents and neighbours to collaborate and co-create’.
The project includes a section called 100 Houses – another live experiment where UNSense will explore the ethics of data as currency. It will implement an urban data platform to investigate how data can be applied to improve people’s lives in cities. Seen as a direct response to the monopoly on data held by big technology companies, 100 Houses will offer its residents full control of their data.

In our turn, we also promote the idea of a distributed data universe when each person operates his own data and is collaborating with the neighborhood stakeholders under a unified and transparent set of terms. These terms include data aggregation, data transfer, counter warranties and obligations between each of the data owners, the data processor and the ultimate user. The basis for that can be Habidatum’s proprietary Chronotope Share system ensuring both the distributed data ownership and the aggregated data analytics for decision making.
Data analysis

BSD’s plan to host and attract an active mixed community and to support collaboration and dynamic SME development, is informed by data analysis by Habidatum. We explore and envision human and business activity patterns in, around and far away from BSD, which is explained in detail in the below sections.

Definitions:
Analog — area similar to BSD, selected by experts or automatically defined by its centrality level and size (area, population).
Function — business or social venue (“place”) with geolocation and category attributes, aggregated from online maps.
Functional profile — the structure of functions (density, diversity, combinations) in a given area.
Level of centrality — an index calculated considering area’s functional profile and patterns of activity using Habidatum in-house algorithm. Levels of centrality are given to all study areas and define the analogs selection.
Settlement structure / system — (sub)urban settlements arranged in a hierarchy by population, area and functional profile.
Temporal pattern of activity / time-profile — structure of activity concentrations by hours / days / weeks / months / seasons.

Analog study to define district’s functional profile

Even though the district’s masterplan is flexible, it assumes mixed-use development strategy at all levels – from building to the block to the whole site. Surrounded by areas used for agriculture and recreation, BSD also aims to satisfy its residents’ needs for varied functions and services. Habidatum explores the analog places that are supposed to have similar activity profiles, and distribution of commerce.

The analogs are studies both in the local context, country-wide and globally.

BSD in a local context

First, we look at several startup clusters in Eindhoven and Helmond both located in comfortable transport proximity to BSD: STRIJP-S, Eindhoven High Tech Campus, University of Technology and some others.

We estimate areas’ commercial density and diversity to understand the existing undersupply of functions.
Then based on aggregated smartphone applications data (GPS data that’s been derived from apps whose users are sharing anonymized background location data) we measure people’s activity in these clusters, analyzing the volume and dynamics of social activity in relation to the functional profile of the area.

For instance, the Eindhoven High Tech Campus with lower density and medium diversity of functions, in comparison to city average and other clusters, is only active during the working hours losing its visitors in the late (evening) and early (morning) hours (fig. 2-3).

**Fig. 2. High Tech Campus with surrounding green areas – 12:00 and 19:00.**

**Fig. 3. High Tech Campus, University of Technology and STRIJP-S activity.**

To extend the activity and make the area more attractive for the locals both in the peak and in the off-work hours, it is important to grow more diverse and vivid functions, and “tune” them according to the stakeholders’ needs and lifestyles.

The urban vision of BSD considers the lessons learnt from the local neighbors and focuses on mixed-use development with a large portion of functions being driven by the community and social innovations.
BSD in a broader context

To be able to support the community by functions that will create synergy and benefits, we inform the master plan on the possible functional framework of the area inspired by its analogs in a broader context: global (selected Silicon Valley campuses and the like) and national (similarly positioned towns in the Netherlands).

We selected the global startup hubs – Silicon Roundabout, Googleplex, 22@Barcelona – and studied their functional profile and social activity pattern. These hubs are dense and diverse, their centrality level is high, comparable with central business districts of the largest cities. All time-profiles show significant amount of activity during the evening in addition to the working hours. The local communities of the startup hubs claim for functional diversity and huge amount of commercial and social venues of all types.

Fig. 4. Examples of BSD analogs on regional and national level.

National and regional analogs are studied to understand whether such activity and centrality, similar to the global hubs, can be achieved in an area located like BSD. The selected national analogs have the level of centrality fitting in Eindhoven settlement system, and are comparable in terms of their population and area. Their analysis helps assess the most probable options for the development of the territory in the existing context:
I. The most probable way of the natural development of BSD area is a suburb type with a low-diversity functional profile. An additional demand for everyday commercial functions in the surrounding areas will not be too intense. The main volume of demand will be targeted towards the centre of Eindhoven, what is a coherent way to integrate a new area into the existing city structure.

II. The alternative development scenario is BSD development as an area with a higher centrality. In the future, this scenario can be exercised by localization of high-tech businesses at BSD, whose employees will create a demand for a more diverse functional environment.

Afterword

Learn more about the project at its website or in social media. There you will find detailed descriptions of the concept, articles and videos, or visit the UNStudio project's page.

Habidatum’s activity and functions analysis in sites-analogs is a part of methodology to determine district’s development pathway, which was quite experimental for both the project and ourselves. It is an offshoot from our standard Chronotope Planner pipeline – a solution for functions allocation at the block level. Stay tuned for details in a separate post!