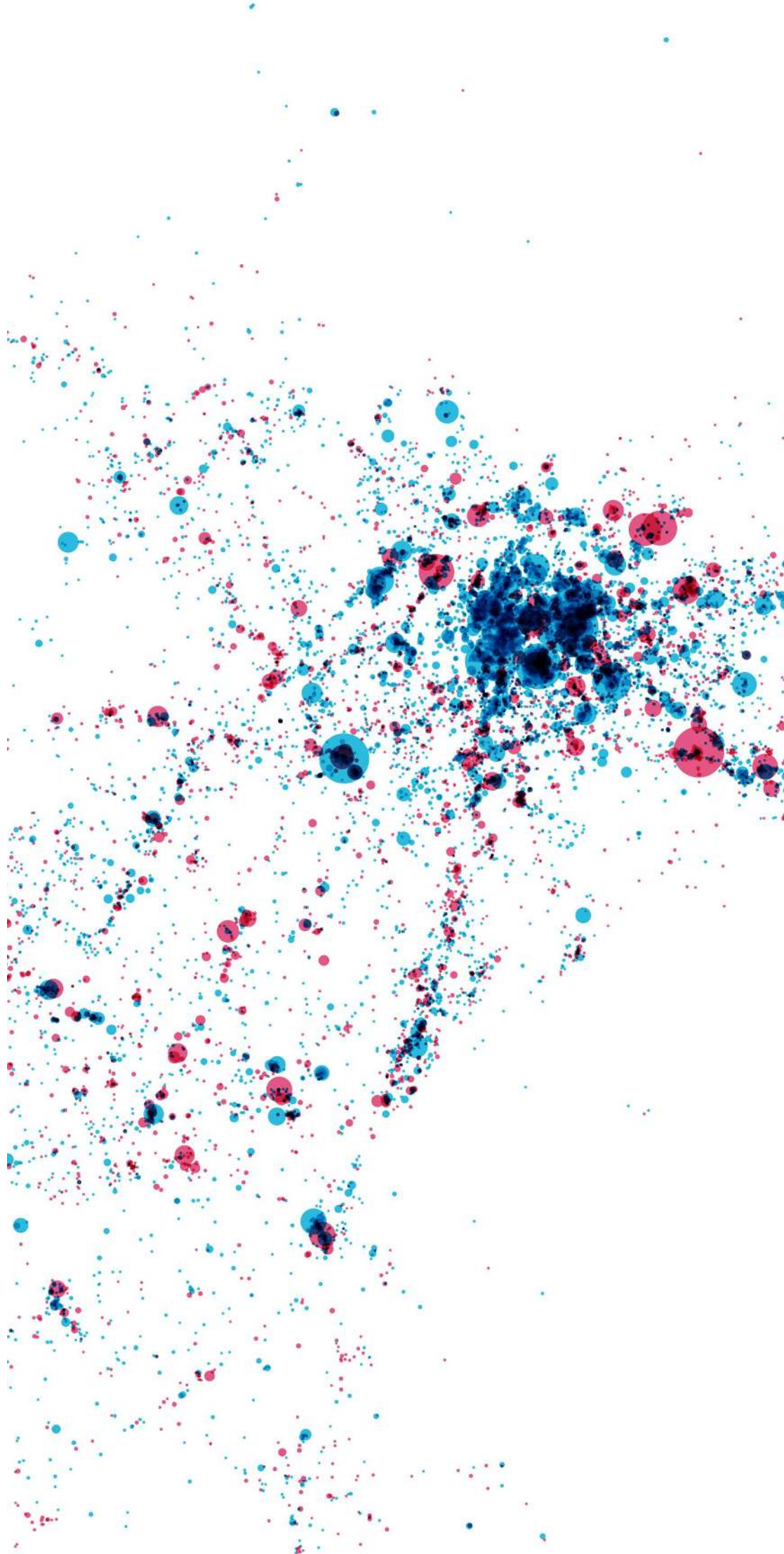


EXECUTIVE REPORT 25



A NEW CITY CENTER

Current opportunities

Good urban life is one of the main targets of urban planning and policy making today. As key characteristics of liveable, socially balanced and attractive cities, vibrant and active places have become valuable social assets. They are no less than a key resource for urban development, directing, and sometimes initiating, both the location and type of new investments.

An urban plan is what activates the potentials of urban places and participated investments when it is capable to address to contemporary challenges and urban trends.

Physical and digital

For already a decade, digital connectivity is challenging the supremacy of physical space in explaining how people use and experience the city. Entirely new patterns of local, urban, and regional phenomena are emerging within the urban fabric. These phenomena often remain undiscovered and unmapped by local authorities. Successful and attractive urban spaces are no longer only those designed according to well-established guidelines of land-use planning, but also ones which derive from human activities and self-organised processes. Information based on designated land-uses of physical characteristics of urban space are no longer able to capture all the key development opportunities as visibility and attraction are to great extent also digital. New centralities in digital space are claimed through presence in social-media platforms and advertising and not necessarily only the physically central places fulfil this criteria any more. Furthermore, pedestrian traffic not necessarily correlates with commerce any more, since commercial activities may take place online without a particular physical location in the city.

Future urban and district plans have to be designed considering that places can be reached not only by physical means and that there are numerous alternatives to public transport. At the same time new economies and delivery services are becoming major users of publicly-funded public infrastructures and urban logistic networks, meaning that current traffic models and plans should be rethought in regards to those new-economy generated movement - which follows dynamics that are related to social-media theories more than location theories.

We are going to provide a study that will highlight the potential for success of new activity patterns in Tallinn, and develop strategies to capitalise on existing connections to enhance performance.

Cities are becoming more complex and their development harder to predict and inform. Both urban development processes and our approaches to understanding it are rapidly changing. Asking new questions about the city is, thus, very time-

ly. The basic interest of the metaINN study is to explore what can we know about city becoming big users of publicly-funded infrastructures and urban logistic networks, meaning that current traffic models should be rethought. Future urban process might follow more the dynamics of social-media than that of location and access.

Acknowledgements

The project has been executed by SPIN Unit, in close collaboration with City of Tallinn. We extend our sincere thanks to Jaak-Adam Looever and his team for support and good ideas during the project. A larger workshop was organised in February 14, 2019 to support the definition of key performance indicators (KPI) that involved actors from City's transport sector and the regional Sustainable Urban Mobility process. We wish to thank everybody involved.

In SPIN Unit, the work has included Damiano Cerrone, Jesús López Baeza, Jacob Dibble, Kristi Grišakov, German Mitish, Panu Lehtovuori and Daniel Giovannini. In the past six years our team has developed new academic theories and consulting services to understand new urban phenomena and to help planners and public administrations find potentials for positive socio-economic development. We have presented new urban design and policy guidelines for place making in European and Russian cities. We wish that metaINN becomes well-used in the upcoming city centre planning.

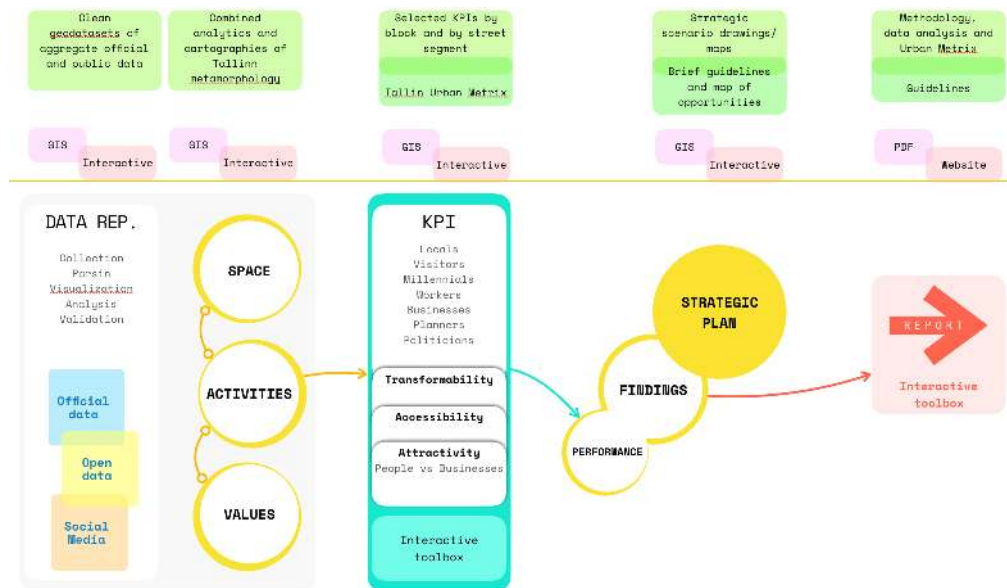
In the past 6 years our team have developed new academic theories and consulting services to understand this new urban phenomenon to help planners and public administrations finding potentials for socio-economic development. We have also presented new design and policy guidelines for place making in European and Russian cities.

We foresee a direct continuation of this work as metaINN II, in collaboration with the Estonian Academy of Arts / Renee Puusepp. This work will allow us to extend the analysis fully to the scale of whole city and to an extent city-region. By June 2019 this additional work should be available, providing new analysis and regional contextualisation that further benefit planning effort for active and liveable city centre.

METAMORPHOLOGY

Our aim is to harness insights in different kinds of potentials - and different approaches or tools needed - in various locations.

In this project we will analyse all the three components of metaMorphology but with an emphasis on urban activity patterns and socio-cultural trends through the use of digital traces obtained from open-data repositories, social media data, and behavioural data gathered on site.



This cross-platform study of spaces, activities, and values allows us to profile the public domain and shopping-life according to how people interact with the mall, its public spaces, and its amenities. We combine the study of the morphology and design goals of Tallinn city centre with our knowledge of the architecture design and our urban sciences experience, developed studying over 150 cities and 30 sites worldwide. We have explored contemporary urban trends to define design guidelines for cities better suited to the urban life and activity patterns of contemporary city dweller.

Our methods and techniques, which will be tailored to the specific needs of Tallinn city centre's management, will provide a user-friendly and highly visual summary of trends revealed by large-scale multivariate data sets as provide with a novel understanding of activity patterns. It allows us to define data-driven guidelines to boost to the social and economic life of the mall in the current and future scenario.

With our results it will be possible for planners to develop guidelines that aim at revitalising urbanisation processes for existing public realms and new emerging centralities by defining scenarios for targeted interventions inside and outside the central core, to leverage the existing potential of Tallinn's amenities and the City's place-making policy priorities.

AIMS OF THE PROJECT IN NUTSHELL

- To explore a tool that allows planners to find potentials for urban development in Tallinn's city centre and support the dialogue with city-makers, investors, and other stakeholders.
- To support a new type of integrated planning process where the intimate knowledge of the urban form can feed the development of new ideas, responding to the rapidly changing de-

mographic and economic trends.

- To produce a series of interactive maps that provide the planners and other actors with an understanding of how different types of urban areas produce gather activities and add social and economic value.
- To give policy advice, benchmarks and a performance evaluation framework for the City of Tallinn's inner city planning and urban management.

In a nutshell

What do we want to do?

We want to produce a compilation of analysis and cartographies that allows planners to find potentials for urban development in Tallinn's city centre and support the dialogue with city-makers, investors, and actors.

Why do we want to do this?

We want to support a new type of integrated planning process where the intimate knowledge of the urban form can support the development of new ideas for the city, that respond to the rapidly changing demographic and economic trends of contemporary urban life.

What is the result?

The provision of a series of interactive maps that present the planners and city actors with an understanding of how different types of blocks and streets can produce activities and values.

How do we want to do it?

We want to establish a set of measurable criteria upon which we can evaluate the relationship between street and block types with activities and the values the generate.

Who are we doing this for?

We are making this tool for the planners of Tallinn, who recognise the changing nature of contemporary urban lifestyles,

and who are establishing the framework for a new future city that will only generate value when prepared to meet for the new needs and demands of entrepreneurs, businesses, and citizens.Space x| Activities | Values

INTERPRETATIVE FRAMEWORK

Urban morphology – street pattern, blocks, plots and buildings – describes physical aspects that contribute to create a specific type of urban life. However, the factors that influence the dynamic texture and character of urban environments are complex and varied – i.e. cultural perceptions, local economy, municipal borders, etc. This study of the meta-Morphology of Tallinn (metaLINN) goes beyond urban morphology: it measures urban accessibility (Space), the variety of urban amenities and services (Activities) and their popularity and demand (Values).

This approach allows practitioners to find new urban development potentials in the city, gaining information about the activities the city could offer, neighbourhoods that work better than others, and the connections of the spatial, social and economic dimensions at various scales from one street to the whole city region. This approach seeks to fuel new conversations on the meaning of urbanity in contemporary cities, increasing awareness of what kinds of roles the tangible and invisible elements might play for future developments.

Our methods and techniques, which are tailored to the specific needs of Tallinn city centre's management, will provide a user-friendly and highly visual summary of trends revealed by large-scale multi-variate data sets as provide with a novel understanding of activity patterns. It allows us to define data-driven guidelines to boost to the social and economic life of the mall in the current and future scenario.

Our results define guidelines that aim at revitalising urbanisation processes for existing public realms and new emerging centralities by defining scenarios for targeted interventions inside and outside the central core, to leverage the existing potential of Tallinn's amenities and the City's place-making policy priorities.

SPIN Unit's approach involves an analysis of urban activity patterns and socio-cultural trends through the use of digital traces obtained from open-data repositories, social media data, combined with a novel approach to physical space called 'morphometrix'. This cross-platform study of spaces, activities, and values allows us to give deep insight in the potential's of Tallinn city centre.

Vibrant and active urban locations are valuable social and economic assets. To shape urban planning and policymaking in service of these locations, a representation of the key characteristics of such spaces should be defined. A meta-morphological representation may include the aforementioned Spaces, Activities, and

Values. Not only does this description provides advanced, comprehensive, and truly representative insight in how the city works, it is also highly unique and provides a description of Tallinn that outperforms traditional approaches.

SPACE

Measuring spatial design and the configurational properties to reveal the accessibility and centrality of urban space. We recognise that spatial configuration still affects use and creates potentials for economic developments, but it's role is changing due to digital services and new socio-cultural trends.

ACTIVITIES

Measuring the intensity and the complexity of human activity patterns through the supply of retails, services and amenities. We have developed a unique method to classify activities using traditional and social media data to help s to understand what people actually do, instead of focussing on formal functions of spaces and buildings.

VALUES

Measuring socio-cultural and economic values. Real-estate and Airbnb data is mapped to find price patterns in the current housing stock. Foursquare (and through it, many other popular services) and Instagram data is used for charting venue's popularity and ranking the attractiveness of urban spaces. We also use the data regarding the use and activeness of those venues as a proxy to measure their socio-cultural values.

BASE DATA

The first step of the project was to gather all dataset available and combine all the information according the unit of analysis

This is the list of the GIS data we have in metaLINN project. For the GIS layers, everything shpopulationould be in CRS: EPSG 3301(L-EST97).

- Tallinn's base map data (TAR)
- Cadastral boundaries for Harjumaa
- Administrative boundaries
- Observations of Foursquare venues of Tallinn between 13.10.2017 and 16.12.2018
- Demographic data
 - Tallinn Population in 01.01.2008
 - Tallinn Population in 01.01.2013
 - Tallinn Population in 01.01.2018
 - Tallinn Population in 01.06.2018
 - Grid 50x50 - that is used as basis for population data
 - City Center Population in 01.01.2008
 - City Center Population in 01.01.2013
 - City Center Population in 01.01.2018
 - City Center Population in 01.06.2018
- Positium data from 2014
- Observations of Airbnb venues
- Parking data sourced from metaPARK project
- Public transport data
- Public transport validation data
- Bicycle strategy layers
- Population and Housing Census 2011
 - Eluruumi asustatus
 - Haridustase
 - Eluruumi hoone tüüp
 - Rahvaarv 2011
 - Eluruumi pindala ja tubade arv
- Block parcels
- Estonian Building sRegistry Info (EHR)
 - Geometries
 - Processed metadata
- Observation of publicly available Instagram images 2015-2018

CONCERNS AND RECOMMENDATIONS

Building registry

There are major inconsistencies between TAR data layers and the Ehitis Register. Nor TAR or the Ehitis Register offer a comprehensively representations of all the data layers. Only through a combination of the two it would be possible to have a well represented datasets of topologies in Tallinn.

In the buildings' layer we have also observed inconsistencies with the geometrical representation of the buildings, slightly influencing our morphological measures of the city. Some buildings are better represented in one layer than in the other but the quality is not consistent in each data source. Meaning that some buildings are better represented in TAR while others are better represented in Ehitis Register.

We advise to unify the two registry and use remote sensing survey to determine which buildings are better represented in each layer before merging the datasets.



DATA DELIVERABLES

GIS Data

All the spatial data is going to be stored, processed and released in GIS format (geoPackage, geoJSON or Shapefile). Quantitative data will be delivered in textual and graphical format in the final report. If other typology of information will be produced, SPIN Unit is going to process and release that data in the most compatible file format.

Interactive maps

A series of interactive maps were designed and released as decision support system for the Tallinn Urban Planning Department and run common workshops and meetings.

BRIEF ON CORE DATA AND METRICS

All elements analysed of Space

Streets
Normalised Angular Choice
Architectural Historic Variation
Built Front Facade Area [Set]
Built Front Ratio
Distance Between Buildings [Set]
Frontage Continuity
Frontage Occupation
Gross Transferable Area
Historic Composition
Length
Mean Building Age
Minimum Building Age
Normalised Angular Integration
Parcel Composition
Parcel Extension [Set]
Parcels per meter
Park Ratio
Percentage of the street edge built-up at 5m
Projected Density (by meter)
Projected Density (Gross)
Unbuilt Area
Unbuilt Ratio
Walled Ratio
Weighted Height [Set]
Weighted Height to Width Ratio
Width

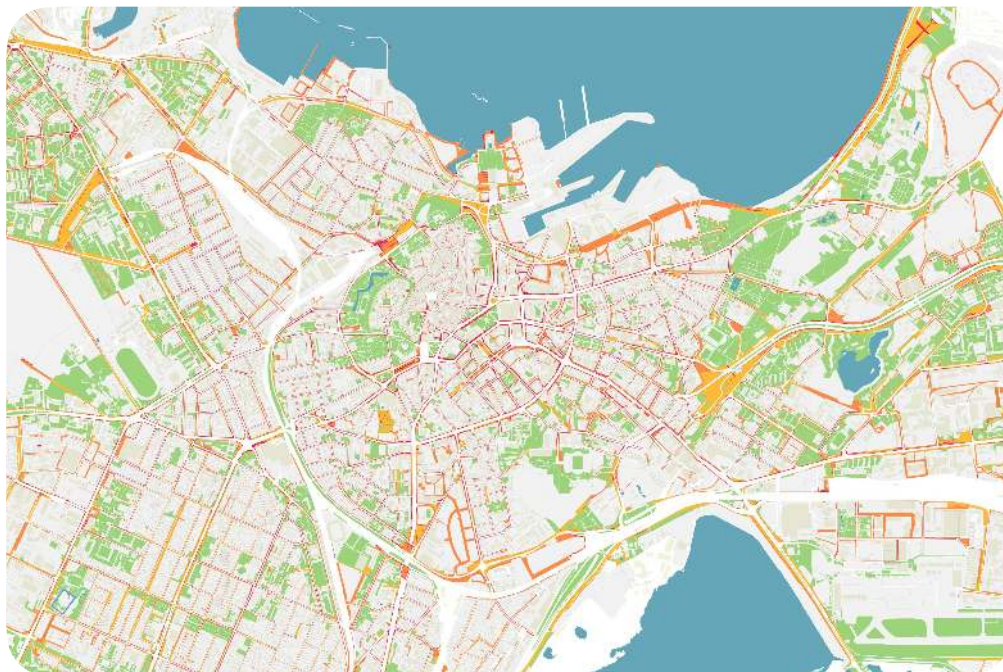
Blocks
Area
Average Building Setback
Average Weighted Height
Built Front Ratio
Built Front Ratio
Commons Ratio
Commons Ratio
Compactness Index
Covered Area Ratio
Covered Area Ratio (CAR)
Floor Area Ratio
Floor Area Ratio (FAR)
Frontage Occupation 0
Frontage Occupation 10
Frontage Occupation 5
Frontage Setback [Set]
Gross Density (total floor Area)
Industrial and Warehouse Building Area
Internal Parcel Ratio
Internal Parcels Covered Area Ratio [Set]
Internal Parcels Floor Area Ratio [Set]
Internal Transport Area
Interstitial Green Area
Interstitial Green Ratio
Interstitial Green Ratio
Parcel Extension
Parcels CAR Average
Parcels CAR StDev
Parcels Covered Area Ratio [Set]
Parcels FAR Average
Parcels FAR StDev
Parcels Floor Area Ratio [Set]
Parks Area
Parks Concentration
Parks Concentration
Rectangularity Index
Rectangularity Index
Regular Parcel Ratio
Regular Parcels Covered Area Ratio [Set]
Regular Parcels Floor Area Ratio [Set]
Sidewalks aratio - against block perimeter
Transport Ratio
Unbuilt Parcels Area
Unbuilt Parcels Ratio
Unbuilt Ratio
Unused Rooms Ratio
Vacant Rooms Ratio
Walled Ratio
Weighted Height [Set]

Analysis

Total Land Value
Average Land Value
Average Age
Travel Time -- Walk
Travel Time -- Bike
Travel Time -- Public Transport
Travel Time -- Private Car
Block Area
Distance to Public Transport
AirBnB Price per Bedroom
AirBnB Number of Listings
Education Activities Visits
Optional Activities Visits
Necessary Activities Visits
Education Activities Venues
Optional Activities Venues
Necessary Activities Venues
Diversity -- Visits
Diversity -- Venues
Chains -- Optional Venues
Chains -- Necessary Venues
Chains -- Optional Visits
Chains -- Necessary Visits
Chains -- Percent of all Visits
Chains -- Percent of all Venues
Total Unique Building Uses
Visittallinn Accommodation
Visittallinn Cafes
Visittallinn Conference Hotels
Visittallinn Conference Venues
Visittallinn Nightlife
Visittallinn Pubs and Bars
Visittallinn Restaurants
Visittallinn Sightseeing
Visittallinn Vinotheques
Total Visittallinn Venues
Visittallinn Tourist Venues -- Percent of Total
Population
Population Density
Education Level
Total Density
Spatial Centrality -- Citywide
Spatial Centrality -- Walkable
Spatial Centrality -- District
Total Hotels
Population -- 0 to 6
Population -- 7 to 17
Population -- 18 to 27
Population -- 28 to 37
Population -- 38 to 47
Population -- 48 to 57
Population -- 58 to 67
Population -- 68+
Millennial Hangouts -- Venues
Millennial Hangouts -- Visits
Private-Public Ratio
Distance to City Centre
Total Office Spaces
Distance to Bike Lanes
Venues Around Work -- Optional
Venues Around Work -- Necessary

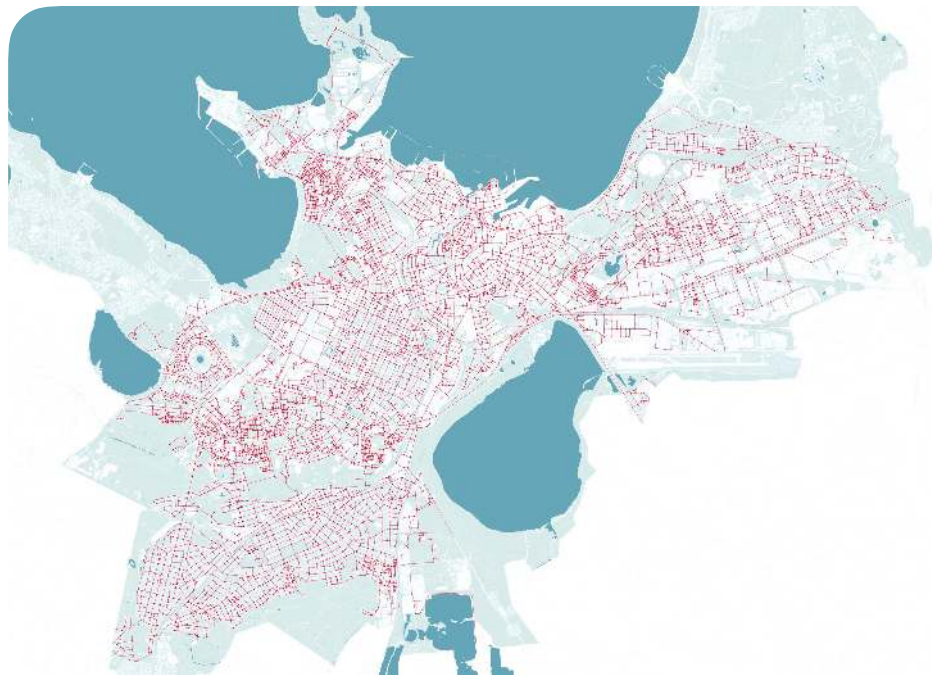
ELEMENTS OF CITY FORM

Representation of all the morphological elements of the city decomposed to calculate the morphometric



REPRESENTATION OF THE ANALYTICAL COM-
POENTS OF THE MORPHOMETRIX

*Hand draw segment lines representing
public space between buildings*

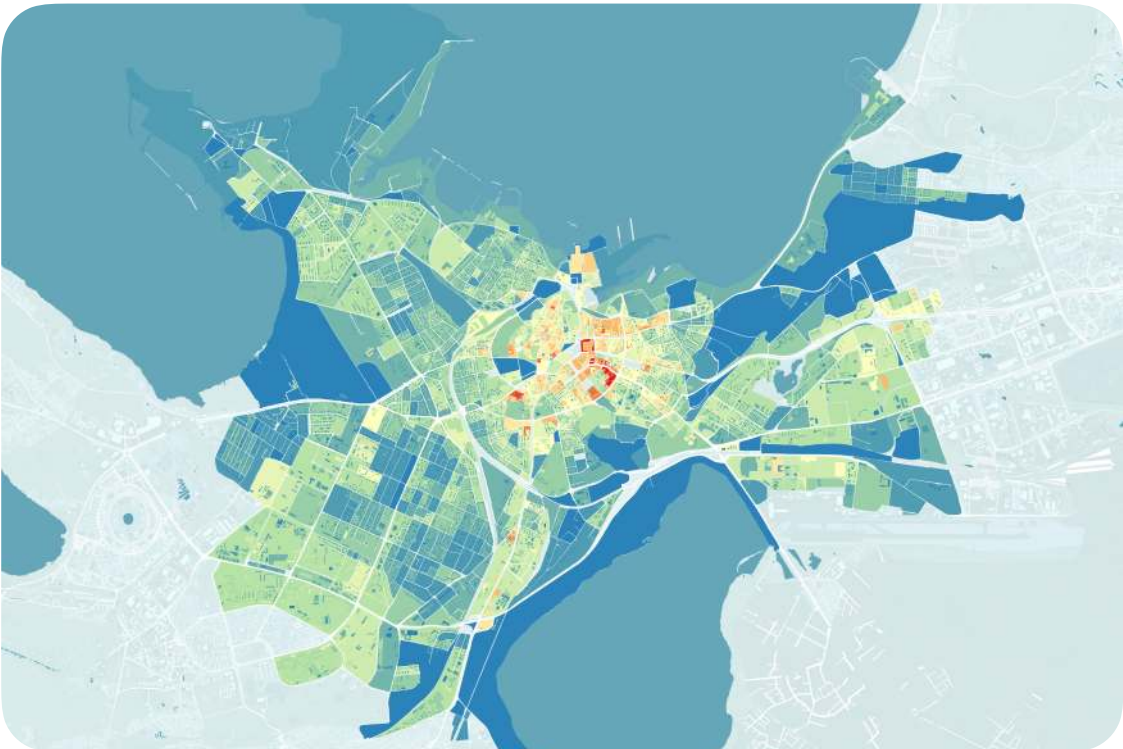
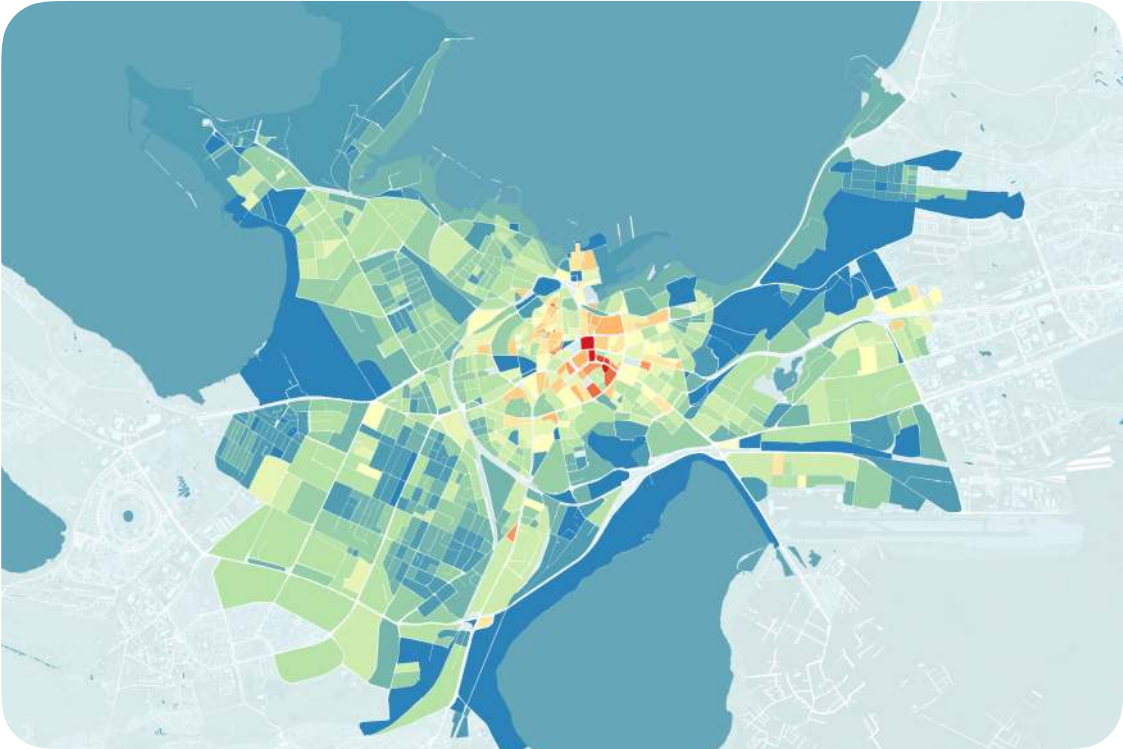


*Mapping the interface to analyse the
space between buildings*



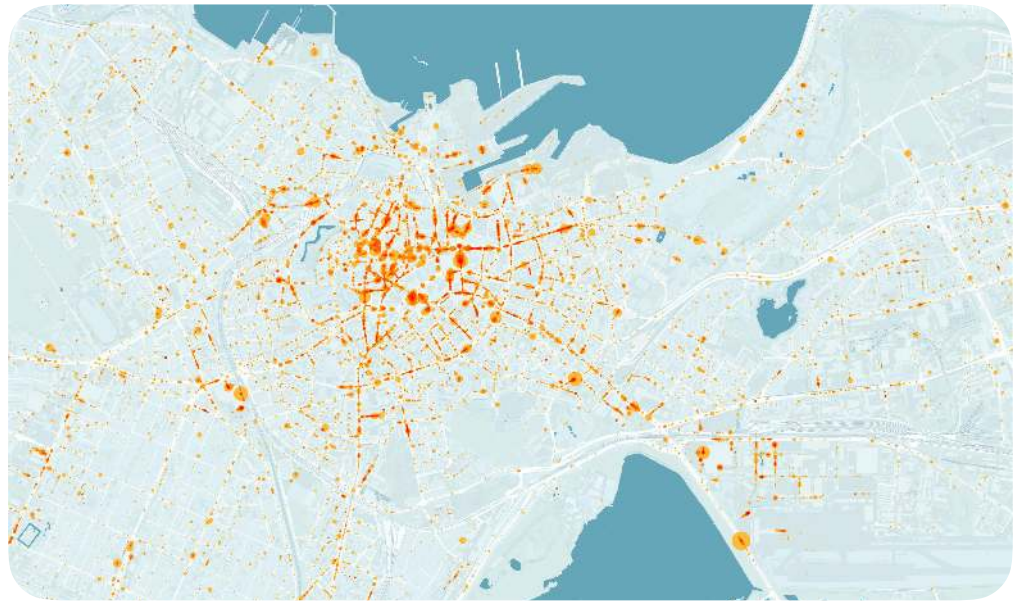
Calculated street width

BUILDING DENSITY (FAR)



ACTIVITIES

*Intensity of provided activities by
urban amenities*

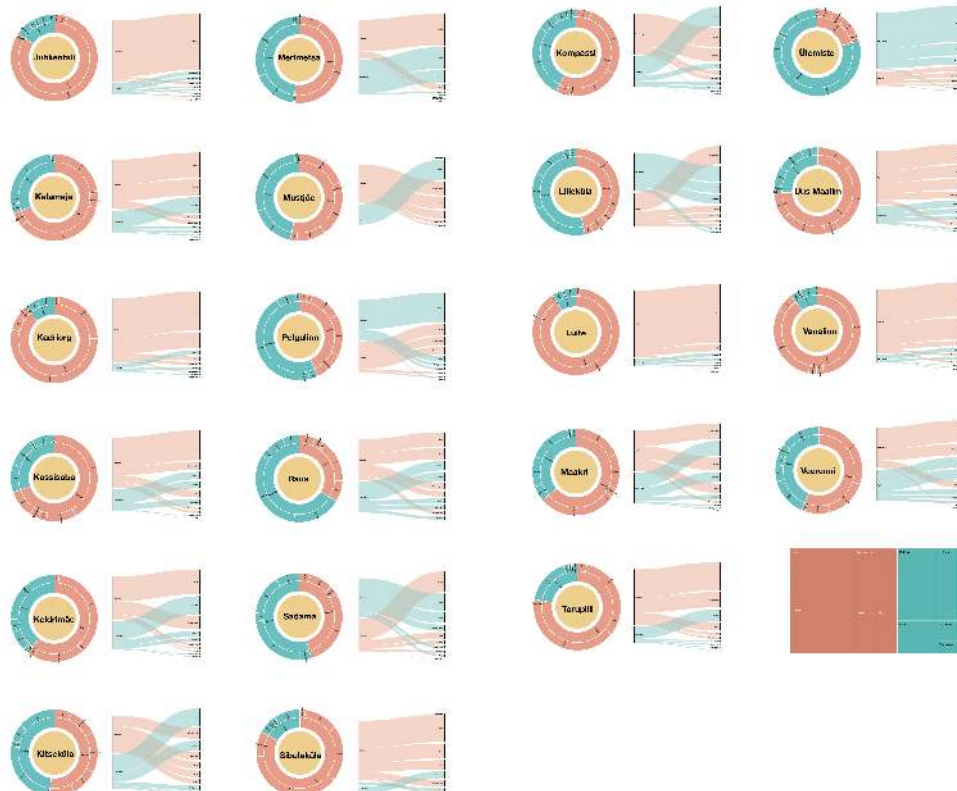


INTENSITY OF USE OF SPACE ON SOCIAL MEDIA PLATFORM

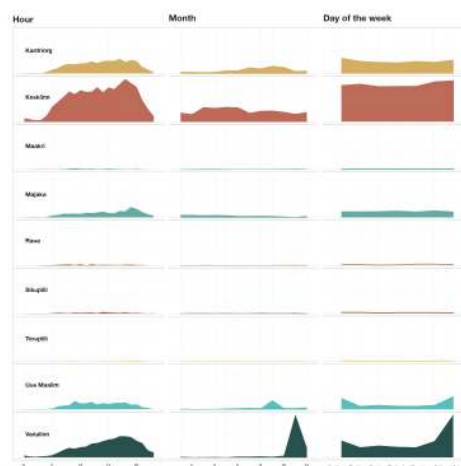
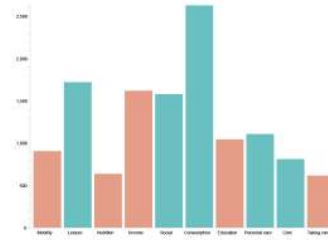
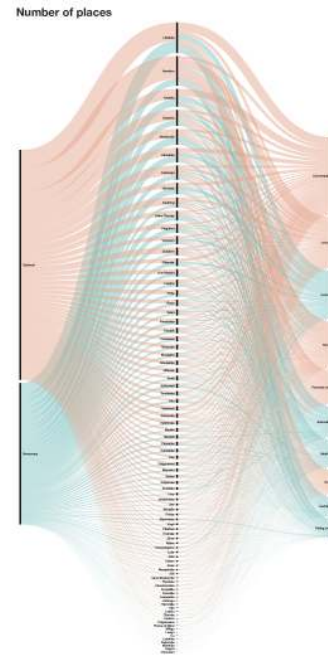


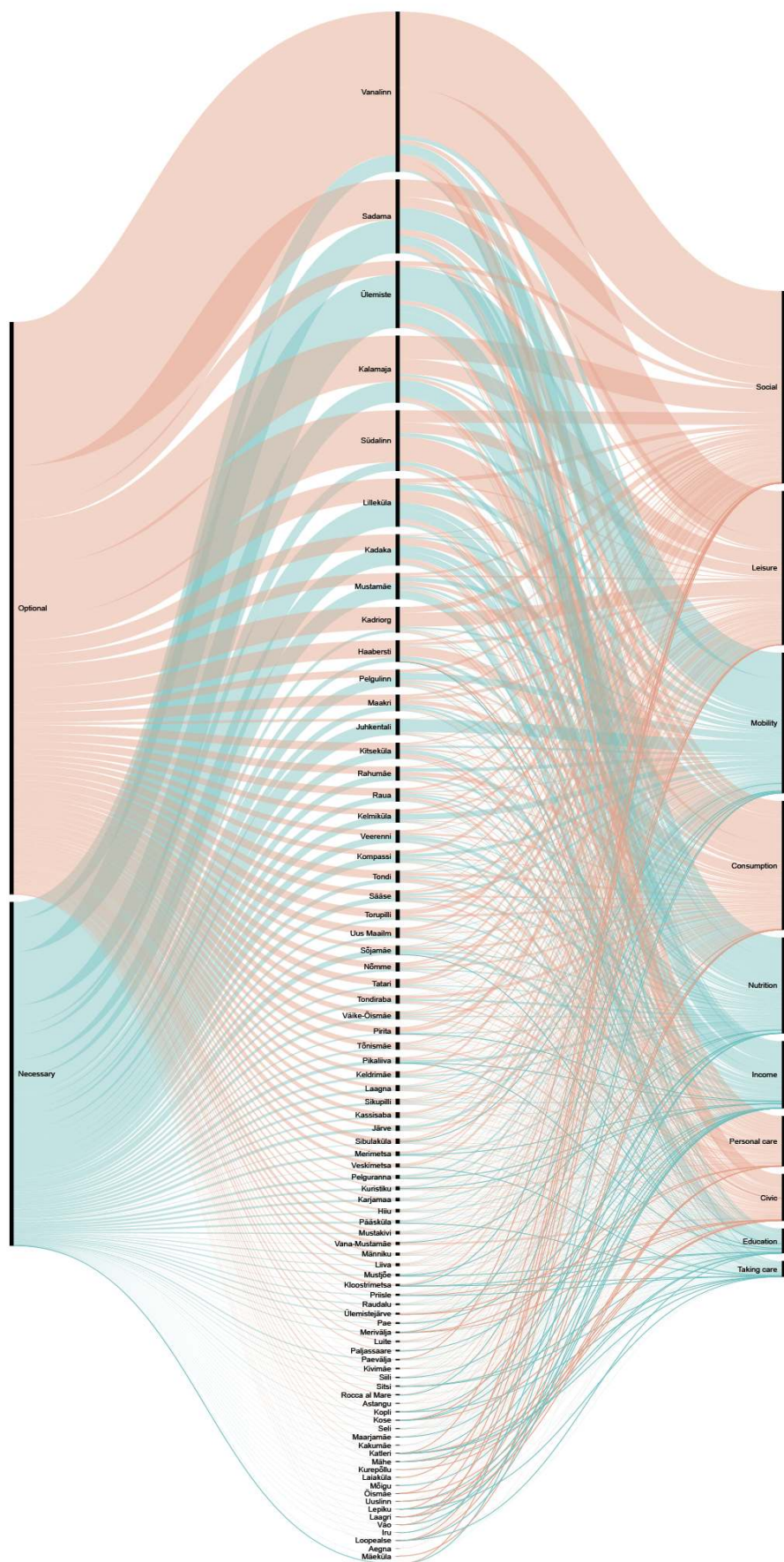
INTENSITY OF USE OF SPACE BY LOCATION IN SOCIAL MEDIA

Chorio-In differential



PROVISION OF URBAN AMENITIES

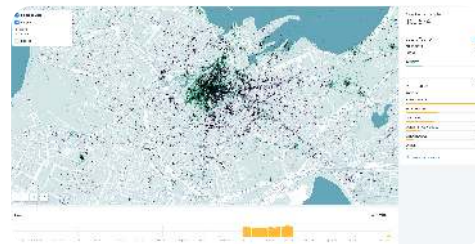




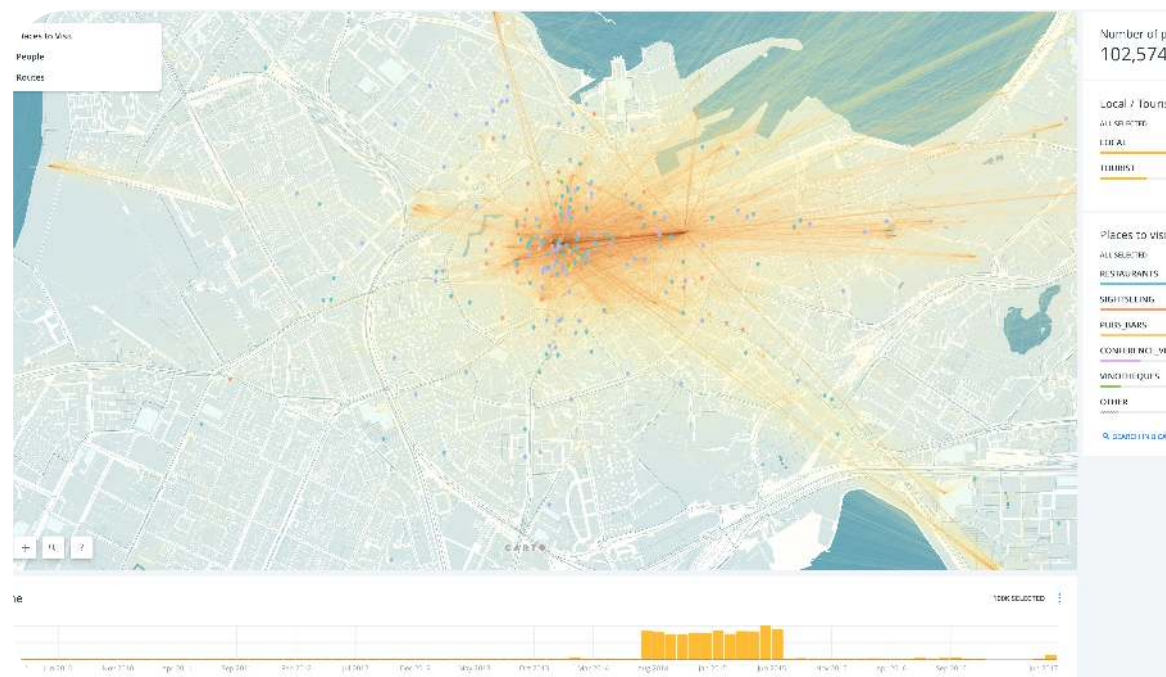
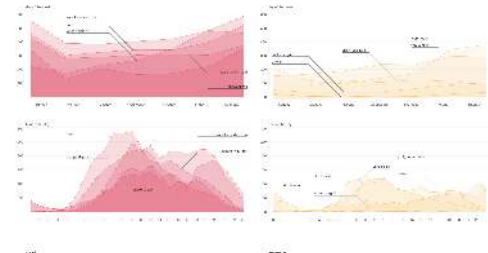
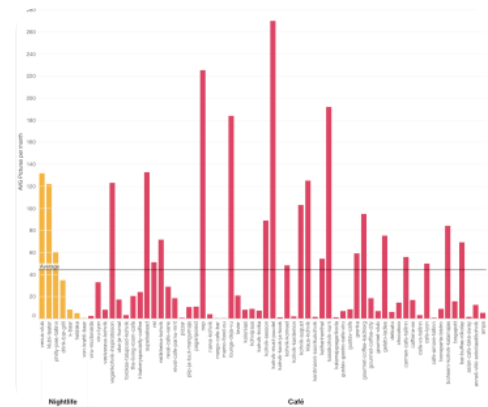
VALUES

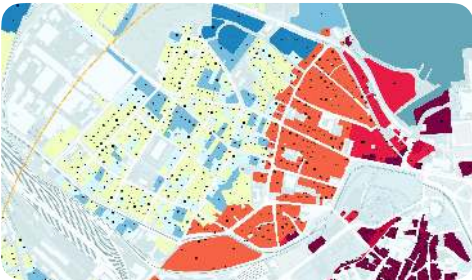
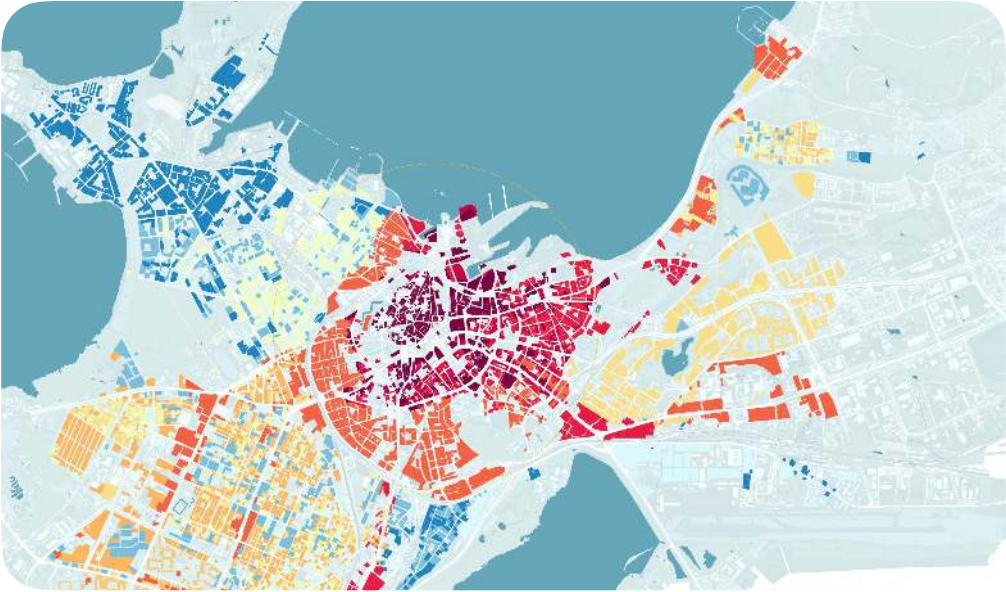
VISIT TALLINN

The following outputs represent an in-depth analysis of the use and activity of all venues promoted by Visit Tallinn. This research is a proxy to learn activity patterns related to tourism and leisure.



Intensity of use of Cafés and venues for Nightlife

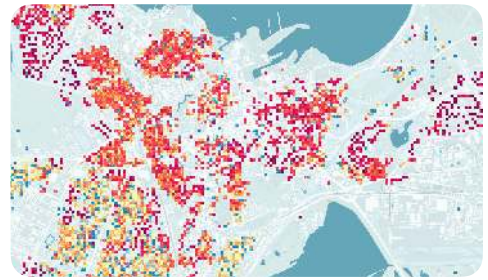




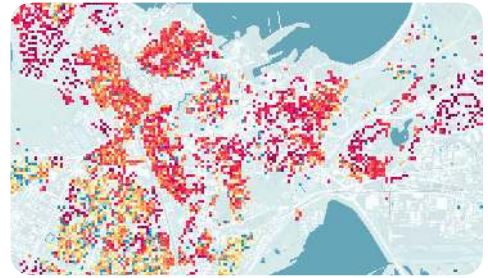
INFORMAL REAL-ESTATE AND ACCOMMODATION MARKET VALUES



*Offer of informal accommodation
listings*



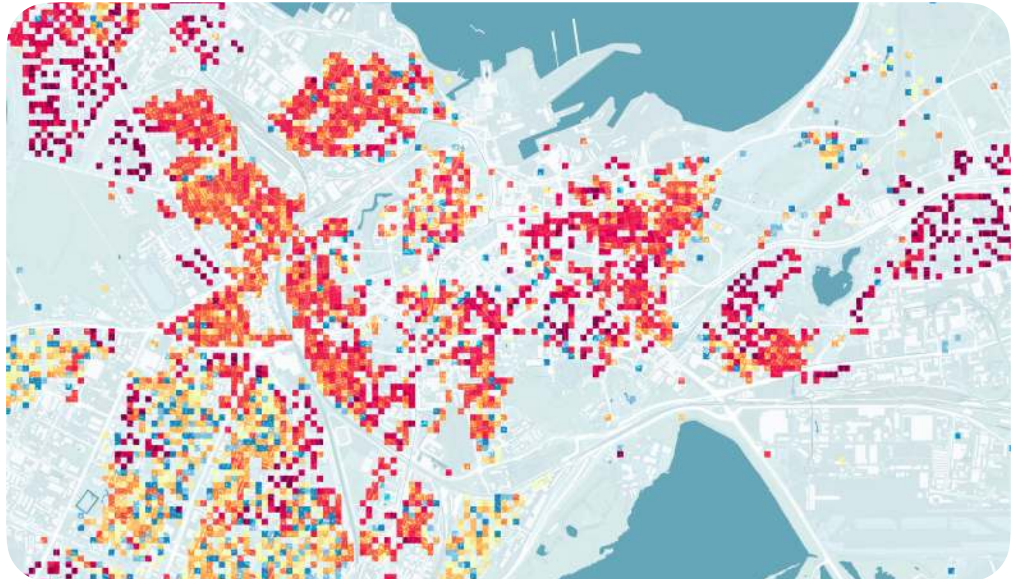
Population density 2018



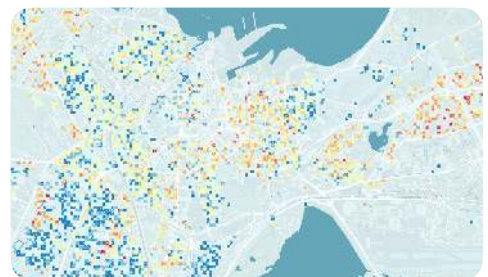
*Population density 2018 of young
people 18-27 years old*

DEMOGRAPHIC POTENTIAL

Population density 2008



Population density 2013



METHODOLOGY

Challenge

Our research aims to develop methods to study urban life in cities from which we have little data, in a situation where the sheer number of neighbourhoods involved and the brief length of this study makes traditional surveys and statistical tools inappropriate. Our challenge is to develop a set of relevant metrics to quantify the qualities of space in order to find new potentials. Currently, social media data offers new conceptual and analytic paths (Wueric-a2012t, Nummi 2017, Cranshaw 2012, Dunkel 2015 especially if combined with other sources of understanding, including local knowledge (Helliwell 2003, Silver 2011, Hu 2015, Rogerson 1999). Societally, thus, key issues involve increasing awareness about neighbourhoods, foregrounding their hidden life and urban potentials, directing planning decisions and arguing for local mobilization and resource-pooling. In what follows, we show how a certain combination of classic urban design principles for better city life by Jan Gehl (Gehl 2011, Gehl 2013) and Jane Jacobs (Jacobs 2016), operationalized through a multi-dimensional analysis of building uses and social media data surveys, can achieve the challenging task.

Solution

We found the optimal solution in Jan Gehl's approach to study public space. Gehl's research is based on understanding the primary quality of small urban places and feeding this information into his architecture practice to improve urban design (Gehl 2011). Gehl is standing with one foot into the academic discourse and the other into his practice, which find his methods always easy to implement in real case scenario. In his practice, he was capable to bring together into one single conceptual model both the physical and intangible qualities of public space. The fact that Gehl's method is designed to perform actual surveys of public space, all the metrics are engineered to be measured by human senses, mostly the eyes of the surveyor. Thanks to the availability of the national registry of building uses together with high diffusion of mobile phone and social medias, we found possible to think of social media users as proxy-surveyors of public space.

In *Life Between Buildings*, originally published in Danish in 1971, Jan Gehl introduced an approach for practitioners to study public life from the dwellers' perspective by surveying and mapping what type of activities people perform in public and semi-public space. His approach is not only analytical but provides guidelines for architectural and urban design in favour of increasing the variety of activities and typology of users. Through his practice, he proved the efficacy of his method and it is our intention to provide a framework to overcome some its spatial and temporal limitations. The novelty of Gehl's method was the inclusion of the human dimension in the classification of small urban spaces.

Instead of mapping buildings, streets and park according to their designated function, he observed and mapped what activities that are taking place on those topologies.

Gehl's aim was to re-value the social significance of urban spaces and improve their design in the context of modernistic post-war planning. In his view planning ideology had led to a situation where "streets and squares disappeared from the new building projects and the new cities" (Gehl, 1987, p. 45). Gehl notes that the social consequences of modernist planning were not discussed, because "it was not recognised that buildings also had great influence on outdoor activities and consequently on a number of social possibilities." (Gehl, 1987, p. 46)

QUESTIONS FOR CITY SPACE

In "How to study public life" Jan Gehl introduces "The list of questions that can be asked about the interaction between life and form is essentially endless" (Gehl 2013). Although those questions are originally designed for field surveys, we operationalized Gehl's method to transform observations into quantifiable metrics in Tallinn. Only from the human perspective it is possible to learn about the degrees to which people can experience the city and interact with each other and with all the different architectural types present in the city. But how can we survey a large amount of cities? And for those cities how can we observe and record activity patterns? The very simple questions that we are going to operationalise in our study are:

How many

people are present of passing by every street, square or park of one city?

Who

are the people crowding or strolling by all those places?

Where

those people prefer to spend their time

What

people do in each corner of the city

How long

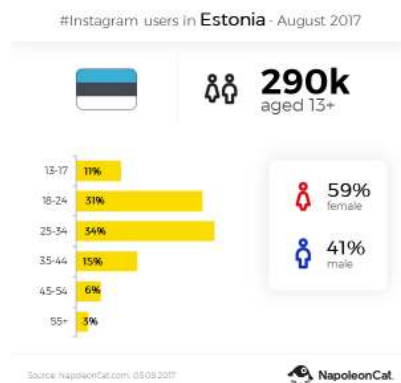
people stay in public space

Traditionally those questions can be answered through classic surveys and experts' observations on site but hardly they can be implemented to survey large as the urban space of Tallinn, through difference seasons and 3 months period, from start to end, of this study. The method we developed aims to opera-

tionalise Gehl's methodology into a quantifiable set of metrics using a combination of statistical data and social media surveys - analysing the popularity of venues and publicly shared images taken by dwellers, becoming direct surveyors of space and activities through their personal perspectives.

The analytic framework is set by the questions of this study and the representative sample of population is bound to Instagram users and more in general social media users as their permanence is aggregated to measure the popularity of local venues,

Estonia has a large poll of Instagram users compared to population and it is well representative of Millennials and a good share of adults over 35 years old.



According to the statistical yearbook of Tallinn of 2019, the use of internet on mobile devices away from home and work in Tallinn is at high figure of 241 000 people.

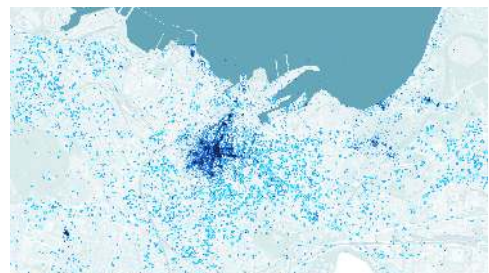
Tallinn	2018	Kasutajate arv [1000] - Number of users [1,000]	
	Kokku - All individuals		241,5
	Mehed - Males		115,7
	Naised - Females		125,8
	15-24aastased - Persons aged 15-24		37,8
	25-34aastased - Persons aged 25-34		89,7
	35-44aastased - Persons aged 35-44		59,5
	45-54aastased - Persons aged 45-54		28,8
	55-64aastased - Persons aged 55-64		26,3
	65-74aastased - Persons aged 65-74		9,6

In the same yearbook we recognise the high use of internet on mobile phones among all users groups.

Osatähtsus vastavas interneti kasutajate rühmas (%) - Percentage among the group of the Internet users	
Kokku - All individuals	83,1
Mehed - Males	86,0
Naised - Females	80,6
15-24aastased - Persons aged 15-24	100,0
25-34aastased - Persons aged 25-34	95,5
35-44aastased - Persons aged 35-44	94,3
45-54aastased - Persons aged 45-54	85,2
55-64aastased - Persons aged 55-64	58,4
65-74aastased - Persons aged 65-74	36,5

HOW MANY

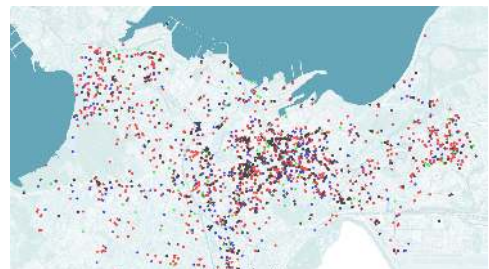
With the first metric How many Jan Gehl proposes to observe the number of people walking by one street or stay in one square. This models the permanence of people in space and it originally has been designed as a method to assess users' preferences in public spaces and urban cores. We operationalise this metric by calculating the density of publicly shared Instagram images. Density with respect to urban space as proxy to measure the presence and preference of dwellers through the city neighbourhood by neighbourhood.



WHO

The question WHO is presented by Gehl to map dwellers' demographics in public space and learn which are more successful at hosting a higher mix of people thought gender, age and social groups. Through observations on site, researchers can study users' location choice by mapping which spaces they occupy. We operationalized Gehl's method using the categorization of prevalent gender and age of people present in public shared geolocated pictures.

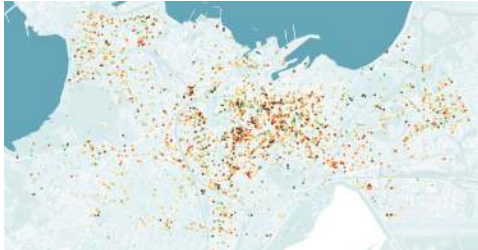
Successful cities are the ones that are capable to bring together dwellers and visitors of all social and cultural background, therefore this metric is aiming to measure the demographic blend in public space to find segregation or integration phenomena.



WHERE

With the question Where Gehl is observing dwellers' activity-location choice in public space to maps where people move or stay in individual spaces. We operationalise the question by categorising publicly shared Instagram images to ex-

plore only the static component of this question. To learn in what type of urban environment dwellers prefer to carry out their activities, we are going to classify pictures whether they are taken Indoor or Outdoor and when Indoor, whether those pictures are taken in semi-private spaces such as restaurants, clubs and services or not.



WHAT

Interesting for the present research on categorising activities in contemporary cities is the way how Gehl and his contemporaries understood the linkages between space and its use, on one hand, and between the different uses, on the other hand. Gehl's basic assumption is that the necessary activities are rather insensitive to the quality of physical environment, while the optional activities are greatly influenced -in line with other commentators such as Jacobs (1961), Whyte (1980) and Sennett (2000). Combining Gehl's with later categorisations (Axhausen et al., 2000; Ben-akiva and Bowman, 1998; Jiang et al., 2012; Zhong et al., 2015) and empirical observations from data retrieved from social media in a series of previously made study on 100 cities in Russia, we developed a categorisation that aims to include all activities capable of being performed in the city with the purpose of recognising specific spatial patterns.

Optional activities

Optional activities all the one that are usually undertaken during free time, for pleasure, self-initiative or whom. Included in these, social activities are the ones that individuals perform in groups.

Civic

to pertain to citizenship (i.e. rallies, parades, public events and commemorations, volunteering, going to church, all activities that are part of the civic life of one community)

Leisure

to recreate by making use of the freedom from demands of work or duty (i.e. picnic, playing, reading, exhibition, sunbathing, walking the dog)

Social

to be in companionship with others (i.e. bar, nightclub, café, home party, dinner)

Consumption

to make use of a good or service (i.e. stores, boutiques, retail, supermarket)

Personal care

to maintain or improve the condition of comfort, wellbeing, fitness (i.e. sports, spa, nail care, make up)

Necessary activities

Necessary activities are all the ones that are vital for dwellers in their sociocultural context (Going to work, going to school, buy the groceries):

Taking care

to maintain or improve the condition of health (i.e. hospital, doctor, dentist, health centre)

Income

any activity that does not offer any other service to dwellers unless work or to receive a payment for a good or service (i.e. office spaces, or any other working activity)

Nutrition

to consume food with no other purpose (i.e. food that is ready to be eaten)

Mobility

horizontal physical displacement by a mean of transport (i.e. transportation nodes or stations, commuting, travelling)

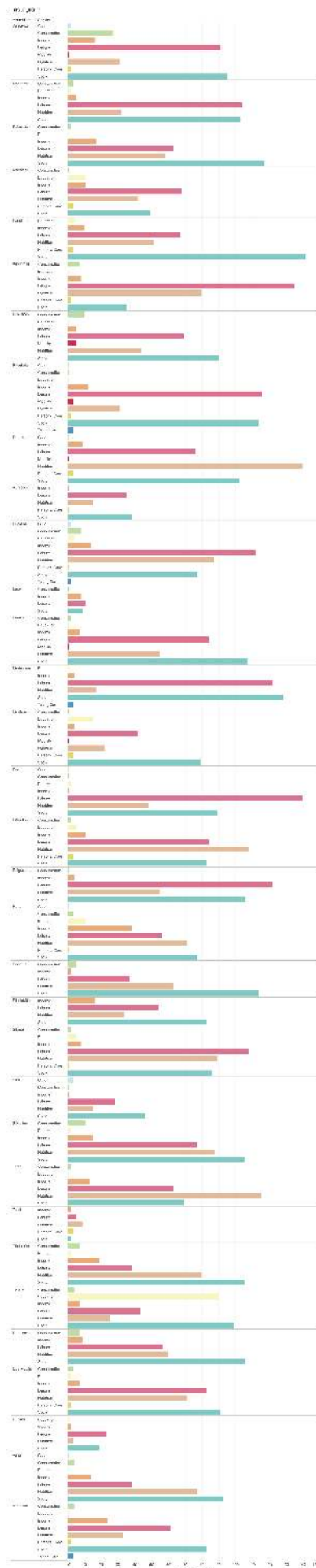
Education

to learn by being taught (i.e. schools, kindergarten, university, people studying)

With the SPIN activity wheel we present all the possible categories of activity patterns.



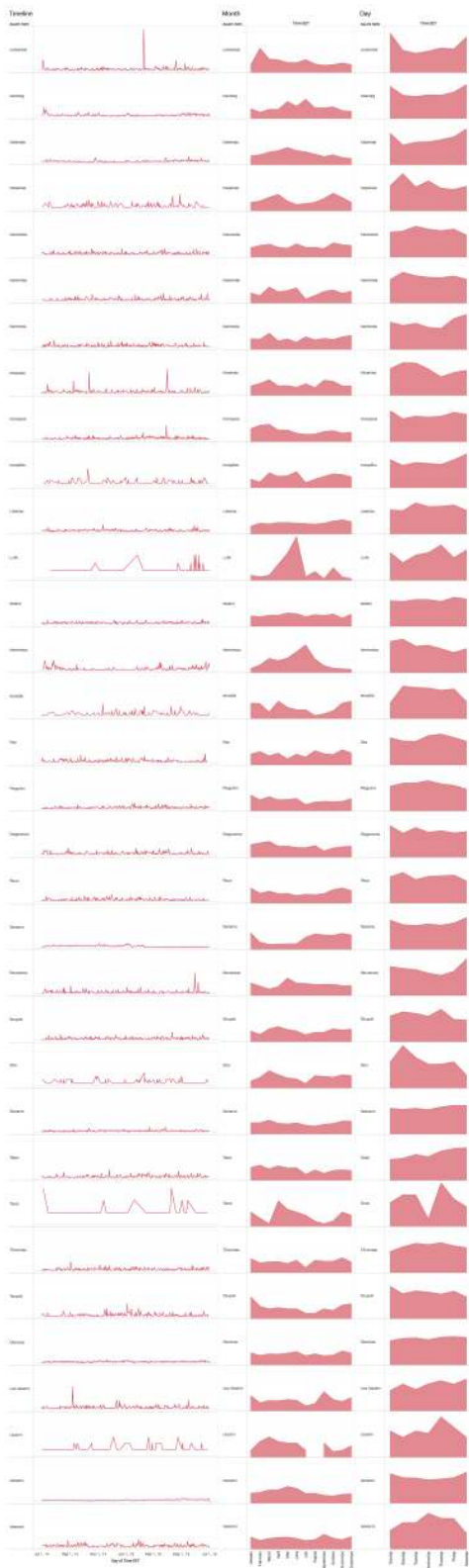
What are the activities people engage with in public spaces? Gehl's question is aiming to map activity patterns to learn what are the requirements for urban design to host them adequately. We use social media surveys as proxy to quantify this question by analyzing the variety of activity available in the city and the ones valued by people. This is one of the main proxies to assess the perceived quality of life as the mixing of uses and activities is the hallmark of good city life together with their spatial distribution and accessibility (Salingaros 2005, Salingaros 1998 theory).



HOW LONG

Permanence is a clear indicator of preference. The period of time spent in a certain place is a measurable parameter that describes the bonds and interactions between people and the space they inhabit. Gehl analyses permanence in a dynamic and a static form. The first one is about measuring the lapse of time required to walk through a given place and the second is the measurement of the duration of time one spend in a given place. They can be used together although they can be used to study public space in different ways. The first metric describes how the environmental factor and preferences may affect human behaviour by slowing or accelerating their movements and the latter describes the duration of human activities.

With social media data we can focus on the second metric described by Gehl as the duration or permanence of human activities. To do so we use made a survey of publicly shared Instagram images to characterise indoor and outdoor spaces based on how long they are used through the day, days of the weeks and seasons of the year. A series of graphs and maps were designed to map the use of space according to days of the weeks and seasons. Those were used to perform a visual inquiry of the neighbourhoods in Tallinn.



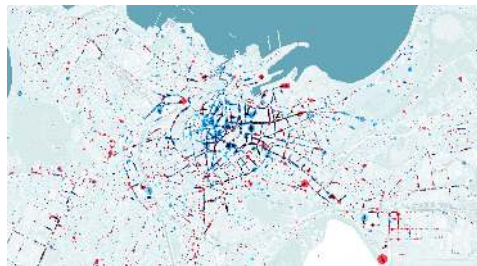
Activities offered by venues

The geographic distribution of amenities is topical to the definition of spatio-temporal patterns of urban and rural settlements. Numerous studies have revealed the spatial relations that govern the location choice of these establishments although it is primal to map and understand these relations in their socio-cultural context. In particular we are going to focus on clustering and dispersal phenomena to learn how the spatial relations between socio-economic establishments are typical to the urban and regional contexts of one city.

To learn about people's preferences and popularity of urban activities we made a Social media survey using Foursquare, a social media platform that allows users to add "Venues" worth visiting and expressing preferences. The app also allows "check-ins" for users who intend to state their presence in a specific venue. Originally Foursquare was designed to be used as a game, where users with most check-ins in one venue could earn badges and popularity. Today is more of an organised database of venues in the city.

In the past years, venues were mostly trendy places such as bars, restaurants and clubs, but only recently Foursquare's coverage became broader and more detailed. Today the list of venues is no longer limited to few urban amenities but to the overall set of locations, places and spaces present in one city - including open areas, infrastructures and buildings hosting real estate or small businesses.

These venues were classified according to the activities they are capable to host and foster as explain before in the SPIN's Wheel.

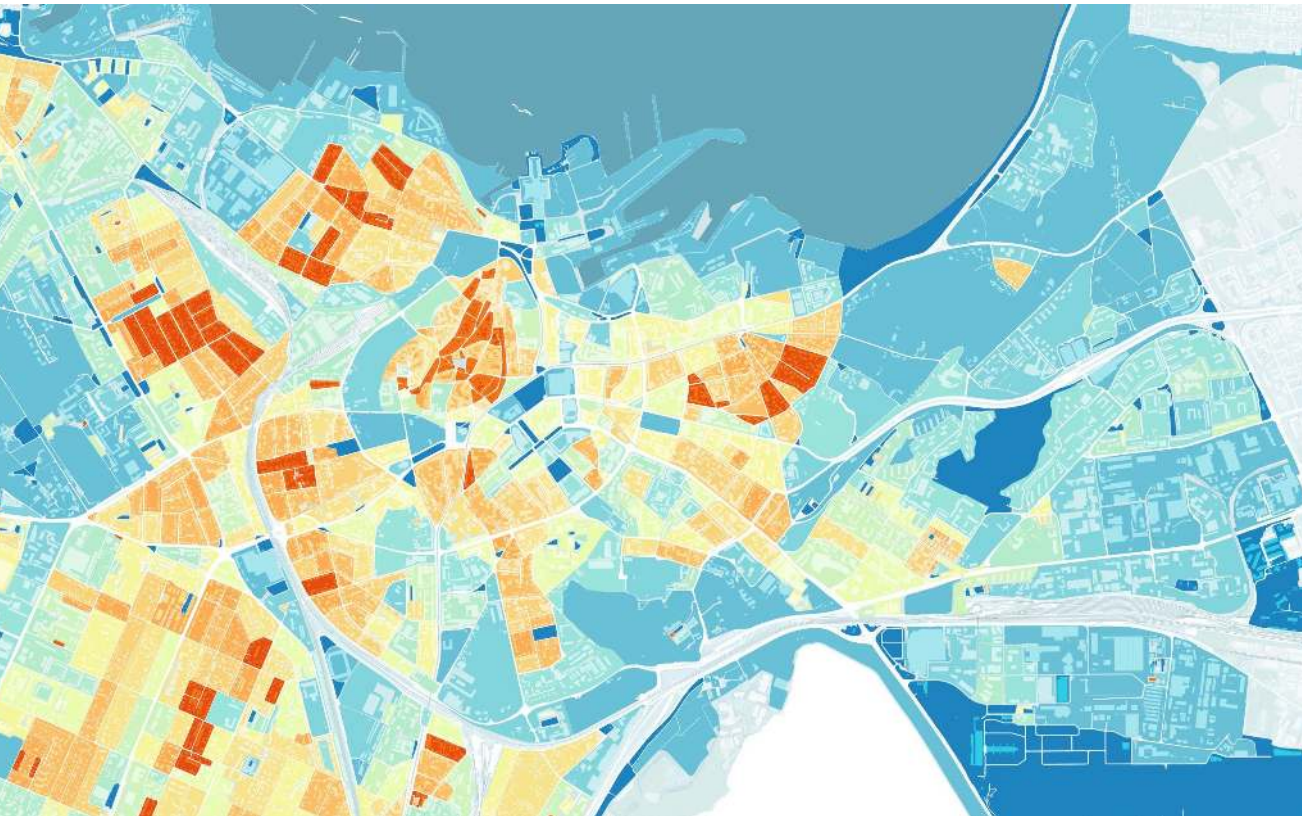


JANE JACOB'S CONDITIONS FOR LIVEABLE CITIES

THE NEED FOR MIXED PRIMARY USES

The district, and indeed as many of its internal parts as possible, must serve more than one primary function; preferably more than two. These must ensure the presence of people who go outdoors on different schedules and are in the place for different purposes, but who are able to use many facilities in common. On successful cities streets, people must appear at different times. This is time considered on a small scale, hour by hour through the day. I have already explained this necessity in social terms while discussing street safety and also neighbourhood parks.

We used the Estonian Building Registry to calculate the mixity of buildings' uses to find what are the block in Tallinn with high or slow diversity of uses.

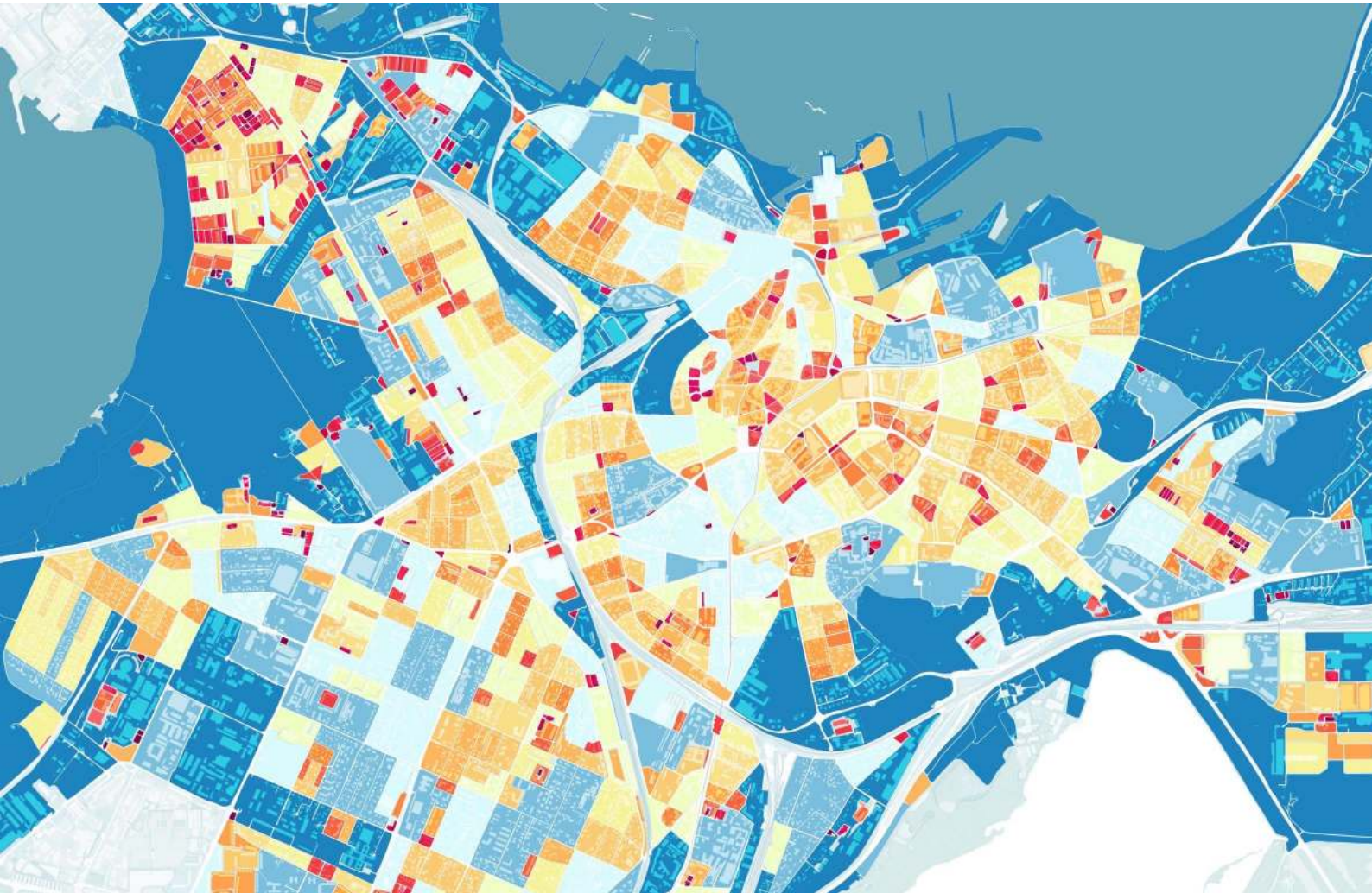


THE NEED FOR SMALL BLOCKS

Most blocks must be short; that is, streets and opportunities to turn corners must be frequent. The advantages of short blocks are simple.

Small blocks are believed to support stationary activities and provide opportunities for short-term and low-intensity contacts, easing interactions with other people in a relaxed and relatively undemanding way. Jacobs criticized super-blocks and rectangular blocks, which constrain urban mobility with high travel distances and limited opportunities of cross-use.

So we analysed the blocks to find which are small and compact.



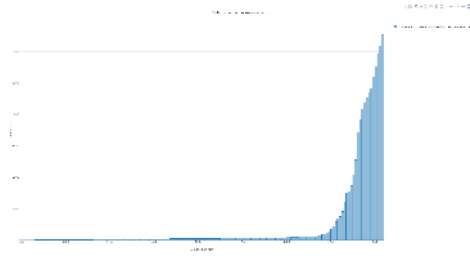
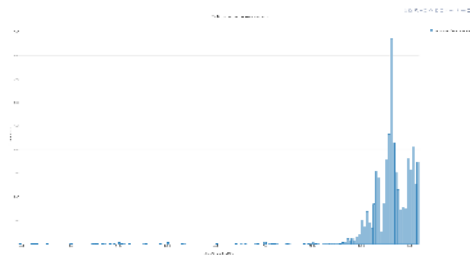
AGED BUILDINGS

The district must mingle buildings that vary in age and condition, including a good proportion of old ones. Cities need old buildings so badly it is probably impossible for vigorous streets and districts to grow without them. Old buildings are not museum-piece old buildings, not old buildings in an excellent and expensive state of rehabilitation.

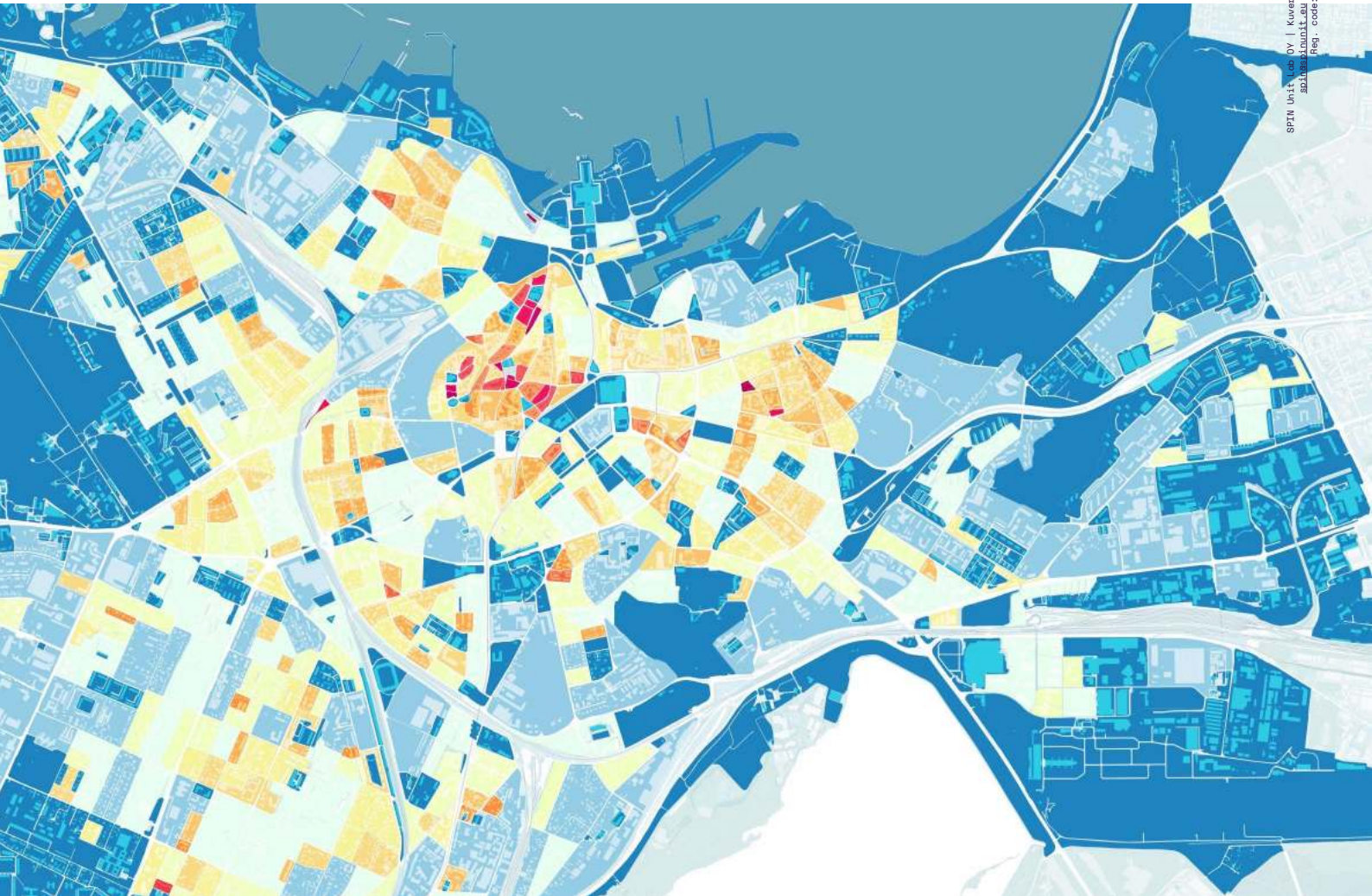
Jacobs stressed the importance of having old buildings in a district. If a district has only new buildings, then it would have only enterprises that can support the high costs of new constructions. If it has old buildings too, instead, it would be able to incubate new small enterprises that cannot afford high rents, and that will benefit the local economy in the long run: "If the incubation is successful enough, the yield of the building can, and often does, rise".

We used the Estonian Building Registry to measure the mixity of building ages.

This map is crucial to understand the potential for urban development. The higher is the mixity the more potentials there are for the life in the city and the capability to incubate new activities while maintaining the costs.



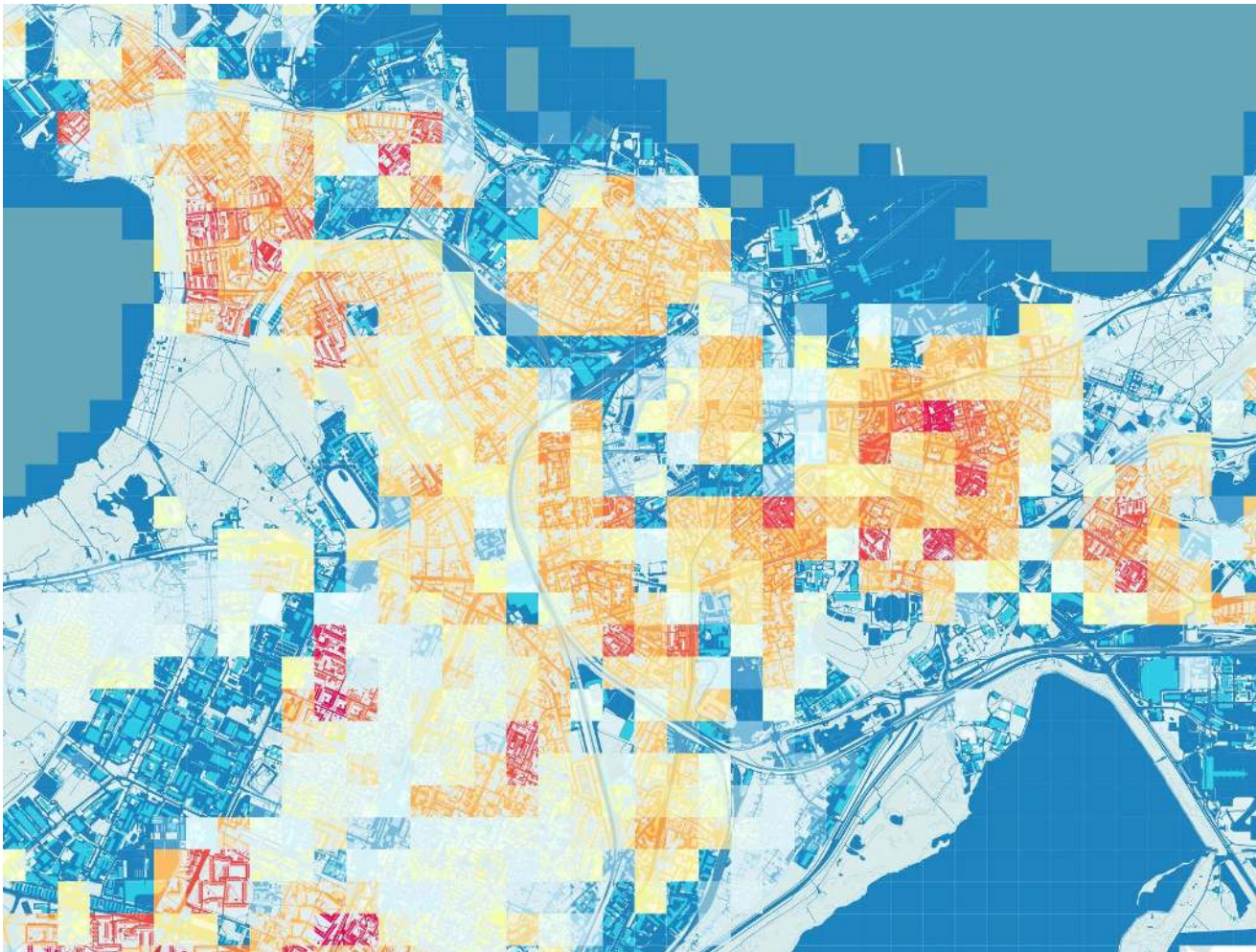
Time span	
< 1500	Buildings from medieval times to year 1500
1500 - 1699	Buildings from 16th and 17th century
1700 - 1799	Buildings from 18th century
1800 - 1899	Buildings from 19th century
1900 - 1943	Buildings from 20th century before Russian occupation
1944 - 1979	Buildings from 20th century Soviet era before 1980 olympics
1980 - 1990	Buildings from 20th century Soviet era after 1980 olympics
1991 - 1999	Buildings from early years of independence restoration
2000 - 2009	Buildings from 21st century first decade
2010 - 2019	Buildings from 21st century second decade



THE NEED FOR CONCENTRATION

The district must have a sufficiently dense concentration of people, for whatever purpose they may be there. This includes people there because of residence.

We used the Tallinn demographic data using population density as proxy for concentration.



THE NEED FOR SIDEWALKS

Jacobs also stressed the need for sidewalks and in the following map we visualised all pedestrian zones according to TAR but in RED colour we extract all those area that are potential sidewalk and therefore foster pedestrian movement around the neighbourhoods.



BILL HILLIER AND THE POTENTIAL ACCESSIBILITY

With regards to colloquial use of the word centrality, anyone in Tallinn may say the city centre is either the Old Town or the Downtown or the combination of both but is it really so? Are these the only centres of the city or there are multiple ones? If the aim is to create new centralities on the waterfront, it is first needed to learn how Tallinn is spatially constructed today in order to draw necessary data which can be used as criteria for comparison.

The use of the word "centre" in urban context is addressing either to its topological or functional centrality, meaning that certain areas can be considered central due to the clustering of city activities or because of their geographical centrality (Hillier 1991). By following this definition, it would be not so complicated to define the exact boundary of the city centre in Tallinn using georeferenced data of different sorts, like demography, land use, passive mobile position data, retails and services location and more on. The phenomenon of clustering activities of different kinds, is not to be considered the element that gave birth to the city centre but rather it is produced thank to the spatial characteristic of a certain geographic area (Porta et al. 1999).

Centrality can be very subjective also depending on the mobility kind: for car drivers, a place can be central if provides accessibility for their cars which depends on the availability of parking places. An efficient way to evaluate the spatial distribution of centrality is the Multiple Centrality Assessment (later MCA) a method that "investigates how centrality flows through edges over nodes" or "how each street is structurally central in a city according to several different notions of centrality" (Porta, Crucitti and Latora 2008). Some parameters used in MCA are: Closeness, Betweenness, Straightness and Information centrality. Since the authors of MCA have defined mathematical algorithms to compute these centrality indexes, it is possible to realise a quantitative study of centrality, using one of the four notions is important to measure on a graph made up of edges representing streets and nodes which in turn represent street junctions or crossings.

As this project is aiming not to describe only the current situation which is already observable in the every day like - but to find where are the potentials for urban development, we analysed the city using the Space Syntax approach.

Space Syntax is an application of network centrality analysis developed in academia and growing in use in professional practice. The process applies principles of mathematical graph theory to understand the structural arrangements of networks occurring in the urban form, namely the street network, although it can be modified for public transport networks, cy-

cling networks, pedestrian networks and lines of sight, and even extended to understand non-physical aspects of the city.

While there are countless measurements looking at a multitude of various facets of the urban street network, we focus on the two most fundamental measurements called Choice and Integration. An in-depth discussion of the computations used for these measurements is not necessary to understand the value of these metrics, nor to gain straightforward and tangible information from the analysis.

Segment map

The segment map is constructed from lines that go from one crossing to another without a topological interruption. An alternative method takes the road centre-lines from a pre-drawn transport network and simplifies and cleans it up to reduce over-articulated curves and to remove extraneous road traffic features. For this project we are going to manually draw the segment map as lines from one crossing to another as we want to analyse them as the topological representation of the space between building - that is, public space.

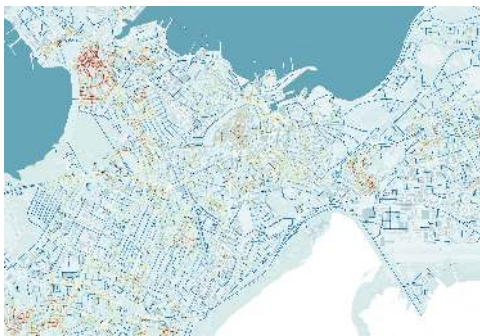
This segment map is our unit of measure because it is used as proxy for the space between buildings. Each segment is drawn to coincide with the space between buildings from one crossing to another. Therefore our analysis is measuring distances between potential public spaces or potentials spaces of movement.

With a segment analysis we are going to measure topological accessibility, meaning the relative nearness from one space to all others.

In other words, with the Space Syntax approach is possible to study the potential centrality of central spaces in Tallinn. It can be used as guidance for urban development and it is a representative measure to estimate potentials pedestrian movement in connection to the location and popularity of venues in Tallinn.

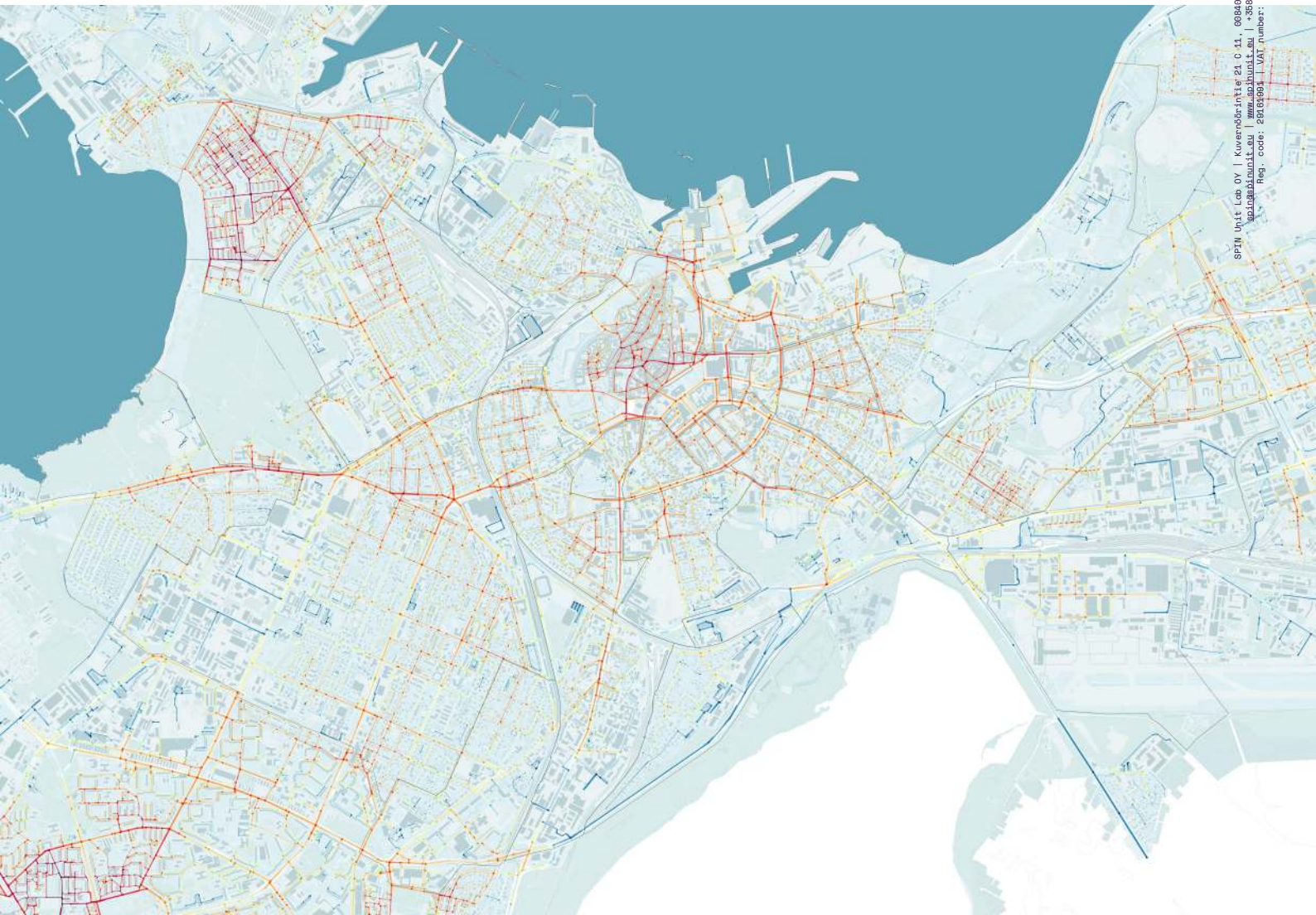
Choice

Choice is a measure of mathematical 'betweenness'. It measures the degree to which a street forms part of the shortest path between all other pairs of origin and destination movement in a specified radius from the identified street, or across the entire city. If a street is on many shortest paths between various destinations, it has the highest potential to support 'through' movement. Studies have demonstrated that streets with high Choice values and 'through' movement potential naturally attract shops and other forms of day-to-day commercial activities.



Integration

Integration is a measure of mathematical 'closeness'. It measures the degree to which a street is close to the other streets in a specified radius or across the entire city. A street with high integration values can easily be reached from other streets. This minimised network distance corresponds with the potential for 'to' movement and highly integrated streets have been demonstrated across cities to form the central component of neighbourhoods, district, and city-wide commercial centres.



TALLINN'S PATTERNS OF LANGUAGE

Christopher Alexander's *A Pattern Language* (1977) describes the patterns of space and life across scales from towns to neighbourhoods and buildings. For metaLINN study, we use his notions to add the dimension of experiential quality to the analysis. For this purpose, we made a selection of the themes or patterns he discusses, that is beneficial for understanding Tallinn inner city and its potentials

87 INDIVIDUALLY OWNED SHOPS

Communities can only get this personal quality back if they prohibit all forms of franchise and chain stores, place limits on the actual size of stores in a community, and prohibit absentee owners from owning shops. In short, they must do what they can to keep the wealth generated by the local community in the hands of that community.

Do what you can to encourage the development of individually owned shops. Approve applications for business licenses only if the business is owned by those people who actually work and manage the store. Approve new commercial building permits only if the proposed structure includes many very very small rental spaces.

Retail Local VS. Chains



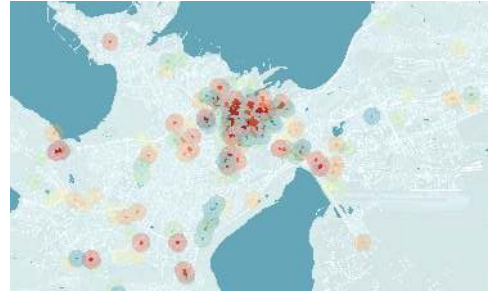
124 ACTIVITY POCKETS

Qualitative map of activity pockets in Tallinn - micro clusters 50m

People gravitate naturally toward the edge of public spaces where activities take place. They do not linger out in the open, or at least not for too long unless there an attractive landscape, good weather or someone to enjoy that with. It is therefore clear that open urban spaces should be surrounded by pockets of activity: shops, stands, benches, displays, rails, courts, gardens, news racks. The process of permanence is a gradual one; it happens; people do not make up their minds to stay; they stay or go, according to a process of gradual involvement and good public space and the presence of services and retails play a major role.

This means that the various clusters of activity should all be next to paths and entrances so that people pass right by them as they pass through. The goal-oriented activity of coming and going then

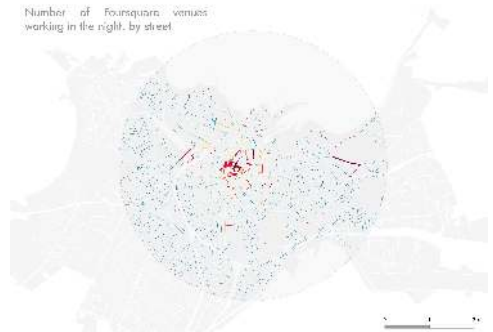
has a chance to turn gradually into something more relaxed.



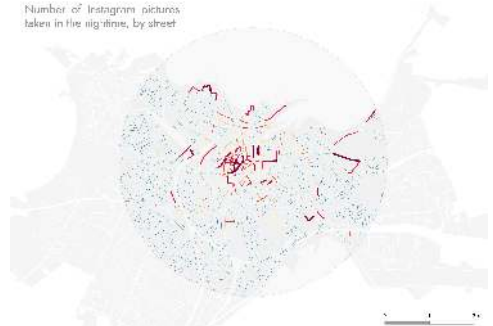
33 NIGHTLIFE

Knit together shops, amusements, and services which are open at night, along with hotels, bars, and all-night diners to form centres of night life.

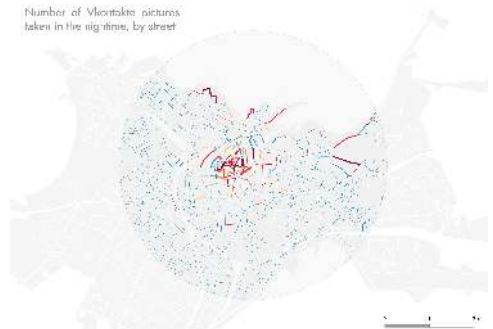
Number of Foursquare venues working in the night, by street



Number of Instagram pictures taken in the nighttime, by street



Number of Viator pictures taken in the nighttime, by street



31 PROMENADE

Each subculture needs a center for its public life: a place where you can go to see people, and to be seen. It seems that people, of all cultures, may have a general need for the kind of human mixing which the promenade makes possible; but that if it is too far, the effort to get

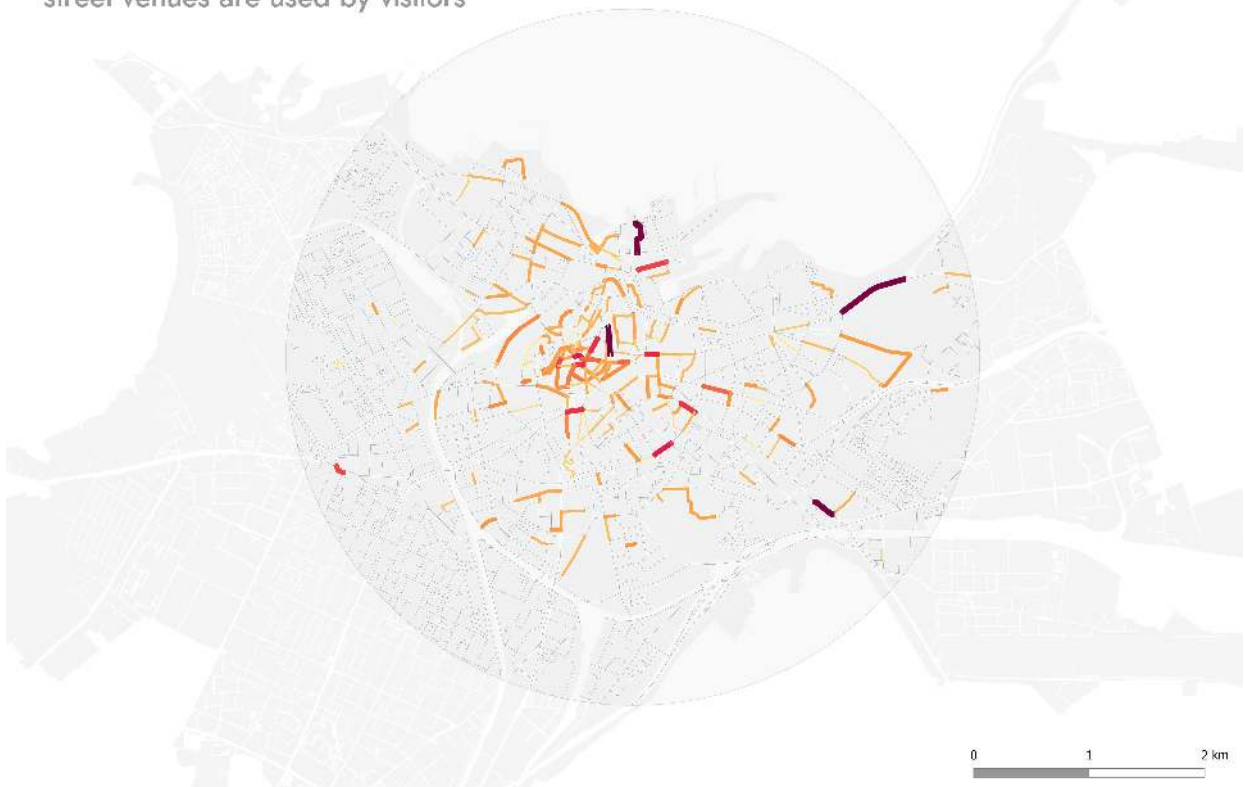
there simply outweighs the importance of the need. In short, to make sure that all the people in a city can satisfy this need, there must be promenades at frequent intervals.

Any street has the potential to attract pedestrians if there are retails suitable to both the everyday life activities, leisure and shopping.

Any street can be a promenade regardless if it is purposely designed to be one. Therefore we analysed the average time spent by visitors in one place, also called Permanence. Both urban and natural areas are present due to the popularity of park, beaches, monuments and other open-air attractions.

The analysis is represented on the closest street to the venue with the purpose to analyse what are the spaces that could be easily attract more users.

Liveliness: Average time per week when street venues are used by visitors



KEY PERFORMANCE INDICATORS

The KPIs are delivered in the form of an interactive map usable by city planners to reveal different results according to their criteria or according to the different user groups they may interact with.

To planners, designers, investors, and everyday citizens in Tallinn, the way the city works is of utmost importance. However this concept of working, or functioning well is often understood but over-generalised. Conversations gravitate towards discussing how a particular intervention or action plan might improve how the city works. In more detailed planning endeavours, this discussion will begin to understand the nuances of the city performance for the various user groups of the city. Defining these groups is a challenge in itself, as is determining how the city performs and benchmarking this determination through the derivation of Key Performance Indicators (KPIs) or other metrics of quantifying this performance.

Why is it necessary to benchmark or measure the performance of the city? On one hand, when major urban interventions like new developments or masterplans occur, the results might not be seen for 30 years, but there will nonetheless be gradual changes in the urban form and corresponding changes in activity patterns, land-use patterns, mobility, neighbourhood identity, values, and a litany of other changes in response to these interventions. The city must be prepared to not only monitor these changes, but know how to respond to them appropriately over the course of the urban interventions -- not only after 30 years when the results can be studied again. Furthermore, when there are small-scale interventions in the city and even non-physical interventions like action plans, legislation changes, etc., these will still make an impact on the city and how the city functions. In these cases it is even more difficult to gauge the effect on urban life, but equally as imperative to respond appropriately over the course of the intervention.

Generally when the 'performance' or 'quality' of a city is discussed, whether explicitly or implicitly the discussion gravitates towards three components of urban life: space, activities, and values. In fact, these are the three principal elements of an understanding of how the city performs:

What does the city look like and how does this design influence people, for the better or the worse? SPACE

Does the area have the necessary services to be functional, liveable, provide a suitable environment for working, raising a family, or other urban issues? ACTIVITIES

Does the city attract people and generate value over time? Is it a lively and active place that naturally draws people there or is it uninviting, isolated, or unsafe? VALUES

These three components of urban life are intertwined -- beautiful spaces naturally

attract activities and in turn generate values, whereas places with few activities are undervalued and might not see necessary changes in their spaces. The interrelation of these three elements forms the foundation of the metamorphology methodology, and supports the design of the KPI measurement criteria.

It is possible, yet impractical and inaccurate to try to discuss how Tallinn performs as a whole -- this conversation would be too broad and would contribute little to monitoring the effects of urban interventions, physical or non-physical, at any scale and over any time period. Instead, the categories of evaluating the urban performance can be subclassified into two principal groups and 8 (10?) subgroups.

The PERSONAL Scale

The personal scale refers to how Tallinn works for the individual. It answers the question of, "how does the city work for me, as a unique person?". This category of KPIs entails metrics to evaluate the performance of city for:

Locals | the regular citizens of Tallinn

Tourists | visitors to the city

Workers | people who work in Tallinn

Millennials | the 25 - 35 year olds, the next generation of homeowners, community members, and business leaders

Indeed, this list is not exhaustive -- there are more PERSONAL groups that could be considered when evaluating the performance of Tallinn, and of course there are many further subgroups such as families, children, different types of workers, etc. However if the KPIs become too specific, they may also lose meaning, as the city cannot be custom-designed and custom-tailored to the needs of every individual. Instead, the PERSONAL scale subgroups correspond to larger, yet distinct groups of users who could feel the impact of urban interventions on a PERSONAL level.

The COLLECTIVE Scale

The collective scale refers to how Tallinn works altogether as a city, effectively answering the question, "how does Tallinn perform for itself?". These KPIs reflect the performance level of the city as it relates to:

Transformability | the capacity for changes

Business | businesses and investors

Spatial Quality | pure morphological structural quality

Residential Districts

Mixed-Use Districts

Commercial Districts

Generation of Value | ability to prosper, increase property values, and attract money

DEVELOPMENT OF THE KPIs

Each of the 8 KPIs is formed by a combination of metrics relating to the three metamorphological categories of space,

activities, and values. The measurements individually cannot be used to evaluate the performance of the city in relation to the specific KPI category, but combinations of these variables, with different values, define 'optimal', 'performing', 'underperforming', and 'unstable' performance levels, representing 'ideal', 'good', 'lacking', and 'poor' levels of performance. As a banal example, MILLENNIALS might be interested in having a good variety of cafes and in proximity to public transport. These correspond with two baseline measurements: XX.Optional Activity Concentration and XX.Proximity to Public Transport. When these measurements are high, or in an upper percentile, the area may be deemed 'optimal' or 'performing' for MILLENNIALS.

The unit is small enough to reflect small-scale changes in the urban form and activity patterns, yet large enough to capture variety of activities and morphological patterns.



At what scale are these KPIs implemented?

At the city or district, or even neighborhood scales, there may be too much variation within the urban form for these metrics to be meaningful. In fact, if there is a concentration of activities and venues on one end of the neighborhood and the other end is totally devoid of activities, these differences must be accounted for and would otherwise be lost in applying the KPIs at the scale of the neighbourhood or larger. Conversely, if applied at a scale too small, such as the scale of the individual building or land parcel, there would not be enough information to apply these KPIs. A single building can only form a limited part of the performance of the city, can only host so many activities, etc.

Therefore, and in accordance with contemporary urban literature, the block has been chosen as an appropriate scale to the KPIs. The block:

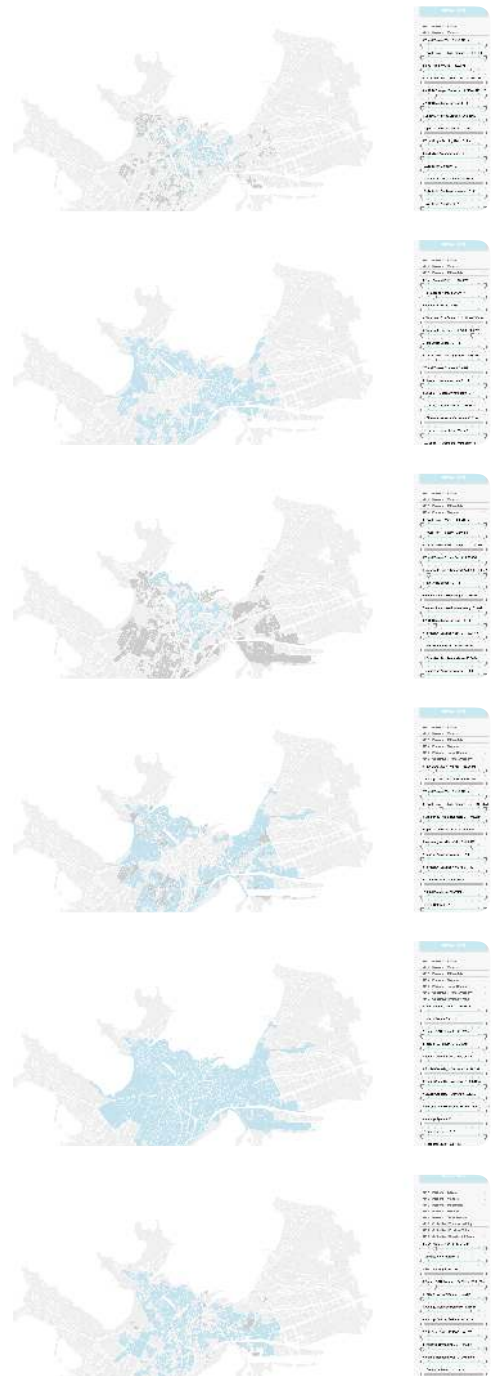
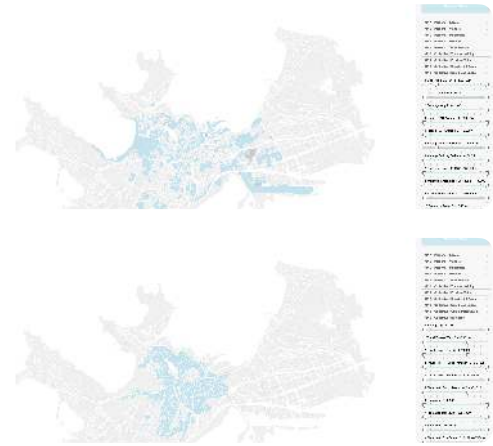
Is a universally understood and definable constituent urban element (Dibble, 2017; Dibble, 2018). Blocks can be compared to other cities to evaluate KPIs against other worldwide cities

The KPI methodology can easily be expanded into the entirety of the city of Tallinn

The definition of the blocks is totally consistent with the city of Tallinn's definition of land parcels and streets

KEY PERFORMANCE INDICATORS

The metrics that were used to form the foundation for the KPIs were measured to be as comprehensively as possible, and to capture as much information as possible regarding activities, the values they produce, and all morphological characteristics of the city. In the workshop between the design team and the city, the combination of variables elected for the 8 KPIs were presented and discussed, and efforts to refine the variables ranges to establish the four criteria of optimal, performing, underperforming, and poor were refined.



TRANSFORMABILITY

Transformability measures all the unbuilt land, from low to high, bases on the land use definition from TAR.

LOW

Low transformability applies to all the unbuilt spaces that are not easy to transform because the land has an active use.

Those areas be transformed but the current use would require major efforts to be changed.

MID

Middle transformability applies to all the unbuilt spaces that are predominantly used for localised movement.

Those areas can be easily transformed likely their use can't be changed. Those area are directly related to public space, pedestrian and bicycle movement and the access to buildings. Therefore those are the crucial spaces for city planners to redesign to clearly improve the quality of life in the city.

HIGH

High transformability applies to all the unbuilt spaces that have no use related to public space or the collectivity.

Those areas can be transformed very easily - but almost entirely by private owner - to improve the quality of the living environment.

Transformability 1

In this map they are visible all the transformable land



Transformability 2

In this cartography they are visible all the transformable land that is no laying on areas that are currently used as loans or loans with car parking.



APPLICATION

The procedure those cartographies, we start from a layer comprehending all the land in Tallinn. From this initial polygon we subtract (clip) all the land uses according to our definition of Transformability.

List of uses considered to lower the transformability of land surfaces

- Surface under existing buildings

From the ETAK building layer

12419 - 12430 - 12431 - 12744 - 30037

- Water bodies

21	Mere osa - Kõrvaldised alad
22	Suuremõõduga - Mõeldavalt suurem osa, mis on veevõrgu (või kanalite) võrgu osaks ja millel on järele
23	Veevõrgu - Looduslikult veevõrgu osaks, mis on veevõrgu (või kanalite) võrgu osaks ja millel on järele

- Street sidewalks, bicycle lanes, pedestrian paths and car access paths with no hard surface

LIIK 250 - 320 - 410 - 420 - 100 - 110 - 120 - 121 - 122 - 123 - 130 - 131 - 132 - 133 - 210 - 211 - 212 - 213 - 214 - 215 - 216 - 217 - 220 - 221 - 222 - 230 - 240

KATE A - B - Mk - Pk

- Surface under railways

LIIK 1208

- Surface under kids playgrounds

LIIK 1203

- Surface of stadiums and other playgrounds

LIIK 330

- Cemeteries, airport, ports and sports complex areas

- Surface of underground parking
garages and other underground facil-
ities

A detailed, colorful map of a city, likely Copenhagen, showing a dense urban grid, green spaces, and a large body of water (the harbor) to the right. The map is overlaid with a circular grid pattern, suggesting a planning or zoning context.

BRIEF RECOMMENDATIONS

Future urban and district plans must to be designed considering that places can be reached not only by physical means and that have numerous alternatives by public transport. At the same time, new economies and delivery services are becoming major users of publicly-funded public infrastructures and urban logistic networks, meaning that current traffic models and plans should be rethought in regards to those new-economy generated movement - which follows dynamics that are related to social-media theories more than location theories.

Currently, the redevelopment, rebranding and reimagination of city centres is an issue in many cities comparable to Tallinn. Reasons for this are, broadly, two-fold. Firstly, the regional deconcentration of populations and urban functions continues, putting pressures to city centres' attractiveness and regional status. This quite old process is taking new shapes due to digitalisation and ICT, which radically restructure both retail and office work, thus further changing the relative position of traditional city centres where these functions tend to concentrate. Secondly, there is renewed interest in city centres both as locations for housing and dense mixed-used developments and as unique tourist destinations in the international market of experiences. Drivers of this interest are, especially, demands for urban sustainability and international real-estate investment.

Shifting center of gravity

For long time, Tallinn's city centre has been developing towards South and South-West from Vanalinn and Südalinn. The directions of Liivalaia and Pärnu road, reaching towards Nõmme, have been the most important emerging business locations. This pattern has historic roots in the early 20th century decisions to erase Southern city wall and try a dense 'metropolitan' development around Vabaduse väljak in the inter-war period. The pattern gets strong support from the accessibility and centrality of Tallinn's street network, which indeed foregrounds Liivalaia and Pärnu road, but also parts of Kristiine to the West and Narva road to the East. The weight of airport and better rail access have recently added another growth direction towards Ülemiste and the Southern ringroad crossing.

Regionally, the Southern ringroad (Tammisaare - Järvevana - National highway 1 to Narva) should be seen as a mobility backbone and provider of smart mobility solutions that support also the city centre. Main crossings of radial and centripetal routes in Haabersti, Järve and Ülemiste should be seen as 'Opportunity Locations' for new mixed development. The Southern ringroad zone will likely benefit in case the Helsinki-Tallinn tunnel becomes reality, with possible station in Ülemiste / Airport.

This image from "Activities" series shows very well the dynamic. Further development of Ülemiste and Sikupilli seem obvi-

ous opportunities. It would also make sense to develop the underused industrial areas around Järvevana tee and rail line. Productive green, sustainable neighbourhoods and ecological leisure might fit that area. Combining air, rail and bus terminals in Ülemiste might free land in Juhkentali and Keldrimäe for urban purposes

In the long run, quite big part of new developments might find locations in the Southern part of the City along the ringroad. This would free the seaside for parks, leisure and relatively low-density developments with emphasis in public space, open and accessible seaside, smart green solutions and very high environmental quality. Seaside, Pirita river, Ülemiste lake and main parks of the city should be connected with good biking infra, linked to the Opportunity Locations where possible. From Ülemiste shores through Sikupilli's Pae park, Kumu and Kadrioru park it is possible to develop a new regional urban park system that links key ecological sites to the green seaside towards Pirita and Põhja-Tallinn, providing added value to residents and tourists.

Tallinn

The heavy development of Tallinn's harbour and areas close to it, such as Rotermanni, are changing the historic development pattern and opening another direction for the growth of the city centre. This new city area should be developed as mixed and human-scaled urban area, emphasizing high-quality public space, walkable connections and spatial integration of key sites, such as Linna-hall, Kultuurikatel and Lennusadam in the North and Kadrioru park and Russalka monument in the East. The role of Tallinn University should be recognized as a driver. This new city area does not need big high-roads, like the earlier Põhjavälj plan, but rather a well-connected network of urban streets. Densities can be quite high, but abundant green space provision and public sea access are paramount. Narva road could be pedestrianized after new streets on the seaside zone are ready.

In the West, we recognize excellent potential in developing the area around Kristiine keskus. We strongly recommend to better connect Sõle, the main boulevard of Pelgulinna, and Sõpruse Puiestee, leading to Mustamäe. If well-designed, landscaped and supported by a new tramline, this long urban connection would create an excellent urban growth pole around Kristiine keskus, Lilleküla train station and Hippodrom. This development would also naturally solve the relative segregation of Northern Tallinn and open the development opportunity of areas such as Pelguranna and Sitsi, which are spatially very good but socially lag behind Tallinn average.

Telliskivi and rapid change of Kalamaja further show the potential on the Northern side of city centre. Piecemeal and organic development is here a good way forward. If the large railway area becomes a planning question in the future, good mix of green spaces and medium-den-

sity mixed urban blocks is a probable solution.

On streets

From our preliminary analysis it is very clear that Tallinn has strong potentials to produce a very sustainable and innovative urban and transportation plan. This is due to the morphological homogeneity of its central area. The milieus have strong common character and their street patterns are well connected and structured within each districts. The critical infrastructures are the streets that do not belong to the same logic of street patterns of the mileus. Currently those outliers streets (such as Narva, Ahtri, Soo, Liivalaja, Sole, Pärnu and others listed in the map of the street outliers) act as an element of separation and they are focused on car traffic. Our analysis shows that those are actually the street that literally bring the city of Tallinn together but they also slice the mileau into parts. Changing the view over the function of those streets and including high quality standard for different transportation mode with the inclusion of new mixed activities along those streets, will be the key factor to rebind the city together into one connected and usable city fabric. Those streets are the essential focus for the development of the city and only with new design interventions aimed to produce a city that is attractive to the contemporary citizen, it will be possible to re-establish the connections inside the milieus and from one district to another. There seem to be no particular issues with the macro design of the infrastructures in Tallinn, the key change for those streets is about the activities and the values that are currently missing from the track.

In fact those preliminary analysis show how popular activities then retails have the tendency to cluster around "nodes" rather than stretch along one of those streets.

Also the Airbnb market shows how the milieus are favorable among traveller and how the main street are actually the least popular venues for Airbnb. This is also due to the phenomenon of rent gap, but once again the outliers streets act as separation lines between different popular zone instead of being the actual center of activity.

Public and green space

In any new development, great care should be taken to ensure green space provision. Tallinn city centre is suffering from a relative lack of high-quality parks, waterfront and recreational facilities. Bigger developments should be required to support the City in such provision through incentives. Streets should be always designed as human-centred public and green corridors, not only routes for autos and trucks. The existing parks should be protected, improved and modestly enlarged when possible.

The urban core

The junction between Narva road, Pärnu road, Merepuistee and Old Town is today and in the future the nodal core of Tallinn's city centre. As was hinted above, this area should be oriented towards pedestrian and public uses, with limited car access. Trams should run through it in the future, though. Imagined as 21st century digital public space, this core area would radiate energy to the rest of the inner city.

Mobility

In inner city, the amount of cars has stayed the same during 2000s, despite radical growth in both number of cars and mileage regionally. This tells that the city centre mobility policies have had some success, and should be continued. In every new project, thus, the order of priority should be 1) pedestrians, 2) biking, 3) trams, 4) other forms of public transit & shared e-cars, 5) city logistics, 6) cars. Naturally, access of invalids and elderly need to be considered, as well a small provision for short-term visitors. The whole inner city should gradually become less car-oriented, greener and human-friendly.

Regionally, the Southern ringroad (Tammisaare - Järvevana - National highway 1 to Narva) should be seen as a mobility backbone and provider of smart mobility solutions that support also the city centre. Main crossings of radial and centripetal routes in Haabersti, Järve and Ülemiste should be seen as 'opportunity locations' for new mixed development and multi-modal mobility centres, where big part of commuting and leisure travelers would shift from cars to trams and other, maybe personal or shared, public / automated vehicles, e-bikes and the like. Major part of traffic from Viimsi to city centre should be redirected by opening new route from Viimsi straight to national highway 1 in Nehatu, East of Pirita River. This area is a possible long-term future development area in case the Helsinki-Tallinn tunnel becomes reality.

Kesklinn

In 2000s, Kesklinn has experienced a rapid population growth, about 30% increase since 2000. Current population is nearly 60 000 inhabitants. It is clearly the fastest growing city district (linnaosa) of Tallinn, differing markedly from the neighbouring Kristiine, Põhja-Tallinn and Lasnamäe that all had very modest growth in the same period.

Interestingly, in the inner city the amount of cars has stayed the same during 2000s, despite the mentioned population growth not to mention the radical growth in both number of cars and mileage regionally. It seems that Kesklinn is already harbouring a 'new urban' lifestyle with less focus on owning a car and probably more interest in urban services. From this we conclude that Tallinn's inner city should gradually become less car-oriented, greener and human-friendly.

In any new development, thus, great care should be taken to ensure green space provision. Tallinn city centre is suffer-

ing from a relative lack of high-quality parks, waterfront and recreational facilities. Bigger developments should be required to support the City in such provision through incentives. Streets should be always designed as human-centred public and green corridors, not only routes for autos and trucks. The existing parks should be protected, improved and modestly enlarged when possible.

Conclusion

The metaLINN study has pointed spatial potentials for future transformations towards sustainable, innovative and human-centred city. Clearly, Tallinn has a lot to do to achieve high scores in all or most of the KPI's. On the other hand, development is rapid and goes in good direction. The strategic plan for inner city is timely. We wish that SPIN Unit work has added value to it.

What next

The SPIN Unit work provides KPI's that should be monitored annually. This monitoring should be used effectively to direct future policies and plans. SPIN Unit team is ready to take part in this work in the coming years to ensure better performance of the city in system level, more attractive and liveable spaces for citizens and visitors and inviting business environment for investors.

District level recommendations

In the following pages we will present a brief selection of general recommendations for the core districts of this study. In a second moment in May, we will compile district specific details recommendation based on the "Interpretation Matrix" that will be developed in cooperation with the Estonian Academy of Arts and a new series of workshops and meetings that we are going to be running in Tallinn with Planners, interest Groups and Real Estate agencies.

VANALINN

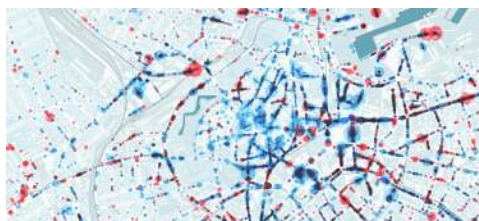


Space

Spatially, the protected Vanalinn cannot change much. Public space, especially bastion belt but also many squares and streets, would benefit from careful and creative urban design interventions that would improve accessibility and provide opportunities for a variety of temporary uses. The temporary theatre in Skåne bastion some years ago is a good example. The few unbuilt lots and some still undeveloped yards should be reserved for something else than touristic bars. Probably most important would be to seriously rethink and redesign the public space and mobility solutions at the edges of Old Town. While the harbour-side and the link to railway station are badly sub-standard, improvements are welcome in all sides.

Activities

Based on social media data (nr of check-ins), Vanalinn is still today the unquestioned centre of activities in Tallinn. Especially important are the optional social activities – bars and restaurants – while the necessary ones, such as income and nutrition, are nearly invisible. Surprisingly, consumption is not too important in Vanalinn, either. Shortly, Vanalinn has a lot going on but the activity profile is not mixed. The historic transitory zone around on Aia and Uus streets has potential for careful reprogramming and densification for housing, shops, sports and urban green. Case by case, individual projects for example near railway station and on Toompea hill might add variety to Vanalinn's too touristic profile.



Values

The unique heritage is the core value of Old Town. Any future project should use that as a key driver.

SÜDALINN



Space

The neighbourhood has two important urban parks, Tammsaare park and Teatri väljak. Our main recommendation is to make sure the green character of the blocks between Estonia puistee and Pärnu maantee is strengthened. Estonia puistee should be changed to a real boulevard with trees and urban green. Pärnu maantee should be pedestrianized, with only trams running. Street spaces should be used to achieve a continuous, amiable green zone that complements the bastion belt in other parts of the Old Town edge.



Activities

Südalinn is the shopping hub of Tallinn, with consumption and nutrition as the dominant activities based on social media data. This is complemented with important cultural and leisure functions. With future of shopping being unclear due to Internet shopping, the large shopping malls should be developed towards more mixed cultural, leisure, civic and activist spaces, supporting the active use of parks and other public space.

Values

Viru väljak between Narva road, Pärnu road, Merepuistee and Old Town is today and in the future the nodal core of Tallinn's city centre. This identity-rich node should be oriented towards pedestrian and public uses, with limited car access. Trams should run through it in the future, though. Imagined as 21st century digital public space or the new green heart of Tallinn, this core area would radiate energy to the rest of the inner city.

SADAMA



Space

The heavy development of Tallinn's harbour and areas close to it, such as Rotermanni, have opened a new direction for the growth of the city centre. This new city area should be developed as mixed and human-scaled urban area, emphasizing high-quality public space, walkable connections and spatial integration of key sites, such as Linnahall, Kulturikatel and Lennusadam in the North, Kadrioru park and Russalka monument in the East and main railway station in the West. This new city area does not need big high-roads, like the earlier Põhjaväili plan, but rather a well-connected network of urban streets. Densities can be quite high, but abundant green space provision, public sea access and careful preservation of views to Old Town are paramount.



Activities

After Vanalinn, Sadama is already now the second of Tallinn's neighbourhoods as shown by social media data, with a nicely mixed and rich activity profile. The role of Tallinn University should be recognized as a driver. Narva road could be pedestrianized after new streets on the seaside zone are ready and turned to a boulevard for outdoor cafes and restaurants, urban gardens and the like at the junction between Sadama and other city centre neighbourhoods.

Values

Social, food and leisure characterize the Instagram profile of Sadama today which is of high relevance as it is one of the most valuable place in real-estate as too.



MAAKRI



Space

Tallinn's current high-rise construction and emerging skyscrapers (+120m) are in this area. Both Maakri and Sibulaküla still have underused lots and parking areas that could be used for high-rises. In city's skyline more highrise here, extending South on Liivalaia and relatively invisible from sea and regarding main UNESCO-protected views to Old Town, would be positive or at best neutral. Key is to ensure that the street level is active and human-friendly. The boring housing tower in Maakri-Lennuki crossing is a negative example. High-rises should be set back from street lines and streets should be either 4-6 stories traditional urban facades or – in some special cases – green front parks.

The very high complexity of building age makes Maarki the potentially most relevant relevant area in Tallinn for new small scale intervention and optimization of public space with high quality design and semi-closed spaces to shield from weather to gather people from the nearby office spaces.



Activities

The area has mixed character with emphasis on income (offices).

Values

Here key is to attract FDI and maximise land and real-estate value. City should find a way to tax part of the added value away for public benefit.

KALAMAJA & KELMIKÜLA



Space

Protection and care regarding the wooden built environment. Small, organic changes and additions.

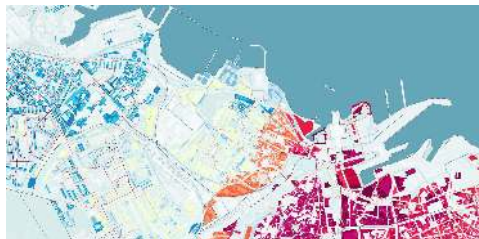
Green and public seaside.

Activities

Telliskivi cultural quarter and rapid change of Kalamaja, including Kultuurikatel, Maritime museum and new EKA premises, show the potential on the Northern side of city centre. Piecemeal and organic development is here a good way forward. If the large railway area becomes a planning question in the future, good mix of green spaces and medium-density mixed urban blocks is a probable solution.

Values

Support of unique inner-city wooden area with social and cultural vibe. Historic streets are boosting real estate values and they are capable to generate cultural attachment that not even the newest renovation project of Soo was capable to achieve.



LILLEKÜLA, PELGULINN & SITSI



Space

We recognize excellent potential in developing the area around Kristiine keskus. We strongly recommend to better connect Sõle, the main boulevard of Pelguranna, and Sõpruse Puiestee, leading to Mustamäe.

Activities

If well-designed, landscaped and supported by a new tram-line, this long urban connection would create an excellent urban growth node around Kristiine keskus, Lilleküla train station and Hippodrom, providing for full range of activities.

Values

This development would naturally solve the relative segregation of Northern Tallinn and open the development opportunity of areas such as Pelguranna and Sitsi, which are spatially very good but socially lag behind Tallinn average. Furthermore, the great Pelguranna beach would become better connected to the city centre spatial logic and service provision.



SIKUPIILLI



Space

The artificial Pae lake should be developed as an urban park and leisure destination, with well-organised links to Kumu and Kadrioru park.

Activities

Urban park, leisure, water, art (see above) are relatively attractive and be boosted through improved accessibility



and better public transport connection.



Values

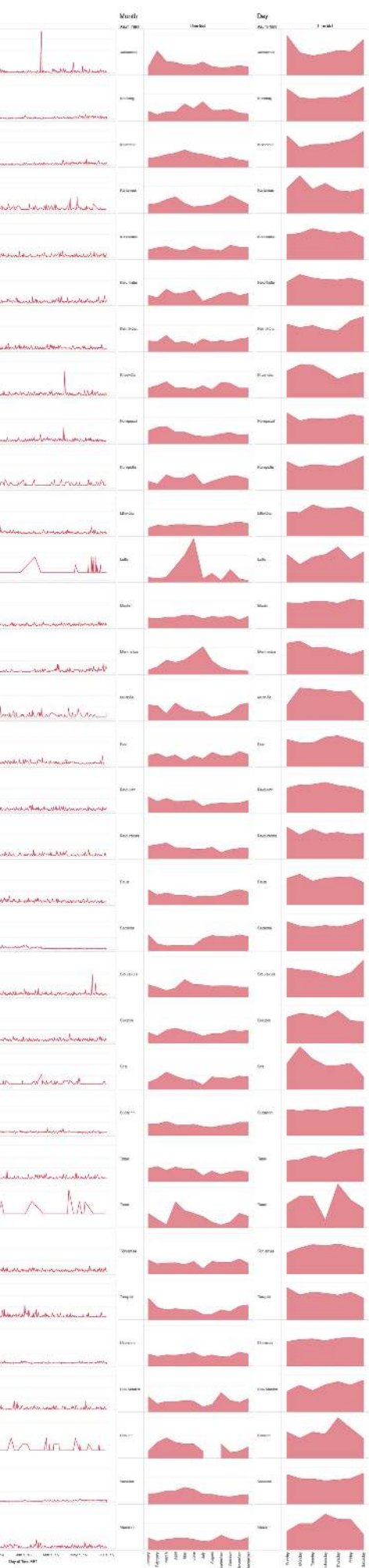
Green, bike & eco connection, productive landscape.



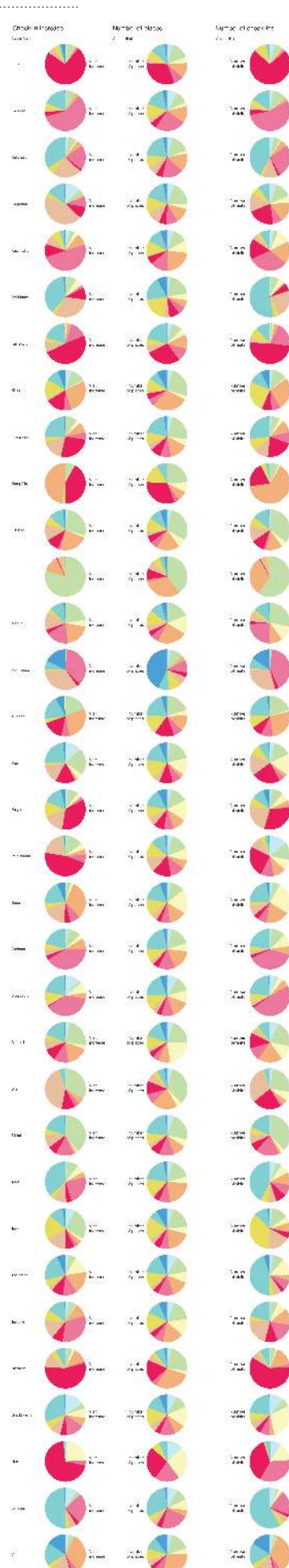
All the activity patterns mapped and extrapolated using Social Media surveys, were made available on the district bases via a folder with shared with the Tallinn Planning Department at the moment of release of this document.

[illegible]

	District																							
	Jhansi	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj	Kannauj
Value	0.125	0.128	0.118	0.135	0.123	0.112	0.124	0.119	0.126	0.121	0.127	0.122	0.129	0.124	0.131	0.125	0.132	0.127	0.134	0.128	0.135	0.129	0.136	0.131



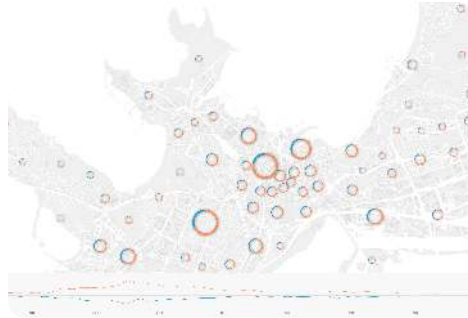




DEVELOPMENT, USE AND DELIVERY OF KEY INTERACTIVE MAPS + WORKSHOPS

We delivered a set of interactive maps to run internal workshops with the Planning dept. Those maps are becoming the living toolbox for future data analysis and allowed city planners to analyse data and interact with the information provided to support the decision making process.

ACTIVITY MAPS



ACTIVITY MAPS V2



TEAM

Damiano Cerrone



Panu Lehtovuori



Jacob Leonard Dibble



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Jesus Lopez Baeza



German Mitish



DATA MANAGEMENT

All the spatial data is going to be stored, processed and released in GIS format (geoPackage, geoJSON or Shapefile). Quantitative data will be delivered in textual and graphical format in the final report. If other typology of information will be produced, SPIN Unit is going to process and release that data in the most compatible file format.

ETHICAL STATEMENT

Only information of public domain will be harvested from open data sources and their collection, manipulation and storage will be in full compliance of the GDPR requirements on data protection, retention and erasures, breaches, international data transfer and third-party disclosure and subject access request. To ensure the highest ethical standards of academic research, all data used in our practice will only be gathered under the strict scope of our project. No personal data is collected nor datasets will be aggregated to profile internet users according to their socio-economic status or more generally to allow their identification by any class or rank. Our internal policy will also prevent the use of data without the written consent of the PI. Any step regarding data analysis will be supervised by the PI and all the data analysis process will be documented.

Our team has a long experience handling sensitive and personal data. In several occasions we were granted the access and use of national government data, mobile positioning data and received clearance for handling personal data from the Estonian Police and Border Guard Board.