

# Socio-Spatial Analytics of Yerevan

SPINUNIT Lab Oy

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## Yerevan user view:

## Social media listening research

STRELKA KB

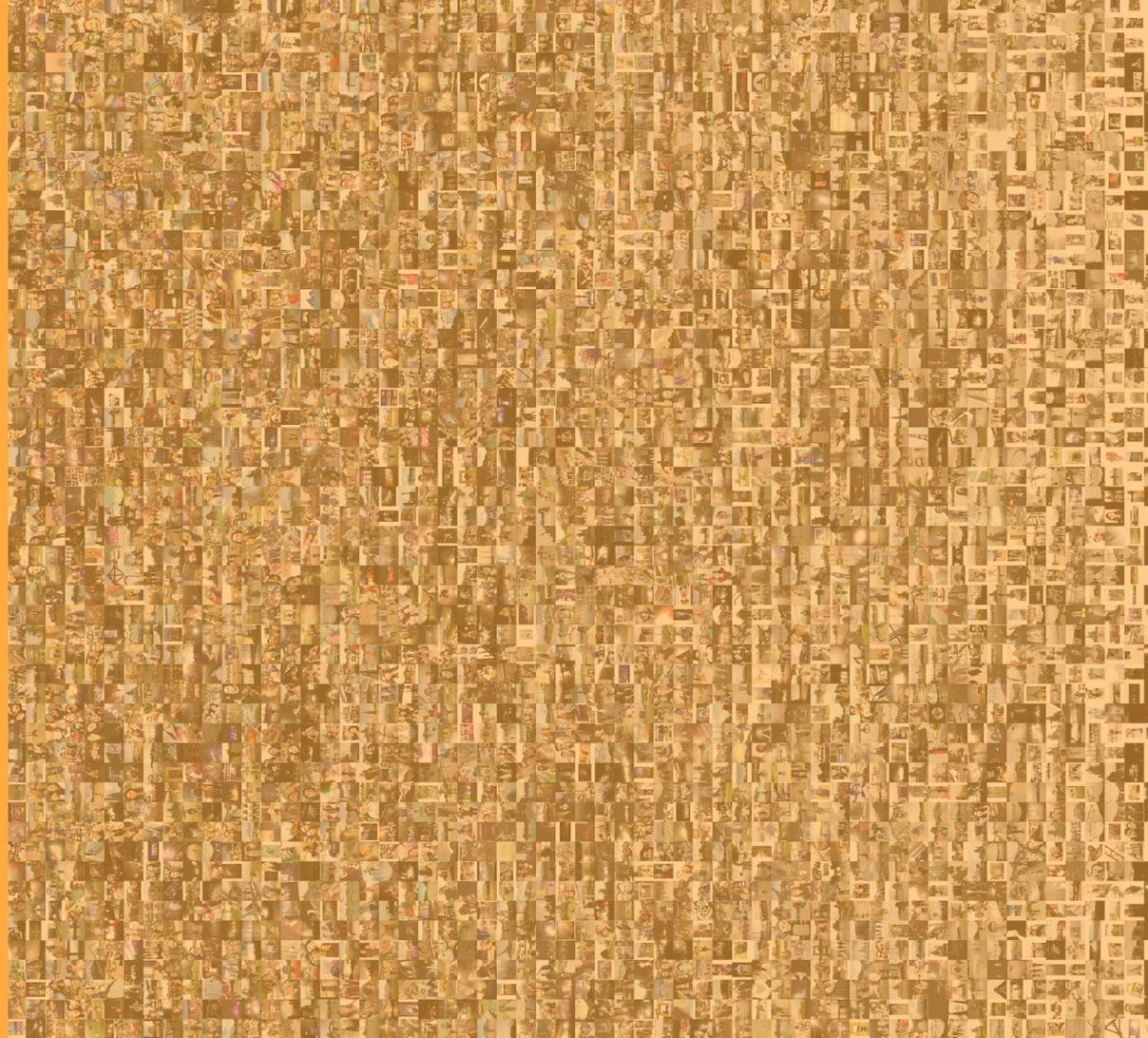


STRELKA KB 

# Socio-Spatial Analytics of Yerevan

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## USING DATA TO ANALYZE URBAN SPACE

Users' performativity in crowd-sourced locative platforms and especially location-based social networks centred on urban spaces is contingent on the places where the actions take place. The great potential of crowd-sourced data is being exploited to analyze a diverse range of topics related to the functional organization of the city (Arribas-Bel and Tranos, 2018), such as: the relationship between urban form and function (Crooks et al., 2015, 2016); the identification of POIs –points of interest– (Van Canneyt et al., 2012; Deng and Newsam, 2017; García-Palomares et al., 2015; Van Weerdenburg et al., 2019) and their accessibility in terms of density and diversity (Shen and Karimi, 2016); the characterization of Livelihoods according to the collective behaviors of residents (Cranshaw et al., 2012); and, the delimitation of functional areas to understand social and spatiotemporal aspects of the city (Chen et al., 2017; Rösler and Liebig, 2013).



## READING THE CITY THROUGH ACTIVITY

The link between the physical aspects of the urban form and the clustering of city functions contributes to create a specific type of urban life (Crooks et al., 2015; Kropf, 1996).

Urban activity together with other factors –i.e. social preferences and urban morphology– have a significant impact on the perceived character of neighborhoods (Cranshaw et al., 2012; Kropf, 1996). In fact, ‘the availability and easy access to the range of goods and services that provide for residents’ necessities and amenities give neighborhoods a sense of place and identity (Mehta and Mahato, 2018). Indeed, at a cognitive and perceptual levels, neighborhood units are largely defined by the association of spatial features to socio-economic and behavioral aspects (Kropf, 1996; Lynch, 1960).

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Structure, function and form are not sufficient for the generation of social relations; they can only favour it. In the context where social platform becomes ubiquitous, the socio-cultural expression and economic transactions are no longer space-bound. Instead they dramatically influence the determination of social needs, which can be influenced by global trends as well as by local phenomena.

In this context, the collection and study of activities that people engage with becomes fundamental to learn more about contemporary life in the city. In urban planning, there is a long-lasting tradition of functional zoning and, more generally, a consideration towards classifying urban structures and infrastructures according to functional typologies – which separate for example housing, leisure and work, as well as organisational typologies that distinguish public and private spaces and providers. If on the one hand the functional classification of amenities has its values in regards to planning and regional law, it does not consider the actual use that dwellers make of urban structures (Cerrone, López Baeza and Lehtovuori, 2020).

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**Dr. JESÚS  
LÓPEZ BAEZA**  
*Project lead*

Project Architect in SPIN Unit and Lead Scientist in CityScienceLab at the HafenCity Universität Hamburg, where he has led and participated in several international projects in Europe and Asia.

Part of his work encompasses social cohesion, activities and livability of urban spaces, and citizen preferences in urban public spaces, urban identity production, spatial perception, agent-based modeling, among other dynamics in the field of advanced socio-spatial analysis



**DAMIANO  
CERRONE**  
*Urban consultant*

Damiano Cerrone is Consultant at Demos Helsinki and co-founder of SPIN Unit, an international urban agency, combining art and science to find new approaches to urban planning and design.

He works on the development of new avenues of research inquiry around urbanity and digital societies to foster change in policy making and urban management. His personal research leverages digital footprints to study new solutions to retrofitting inner cities to contemporary life.



**Prof. Dr. PANU  
LEHTOVUORI**  
*Senior expert*

Panu Lehtovuori is the Professor of Planning Theory at the Tampere University, School of Architecture, and the head of Urban Planning Research Group. Before the current position, he was the Professor of Urban Studies at the Estonian Academy of Arts in Tallinn.

Lehtovuori's research interests focus on contemporary forms of public urban space, new urban design approaches and the resource-efficiency of built environment. Lehtovuori is partner of Livady Architects, one of Finland's leading experts in heritage evaluation and conservation, co-founder and LAB lead at SPIN Unit international urban agency.



**KRISTI  
GRİŠAKOV**  
*Expert*

Tallinna Tehnikaülikooli Arhitektuuri ja urbanistika akadeemia programijuhit ning TallTech Targa linna tippekuse teadur. Alates 2009 aastast teadur ja külalislektor Aalto Ülikoolis. Koostöös SPINUnitiga viinud läbi erinevaid uurimisprojekte liikuvuse, linna- ja regionaalplaneerimise ja sstenaariumplaneerimise valdkonnas.



**KRISTJAN  
MÄNNIGO**  
*Data analyst*

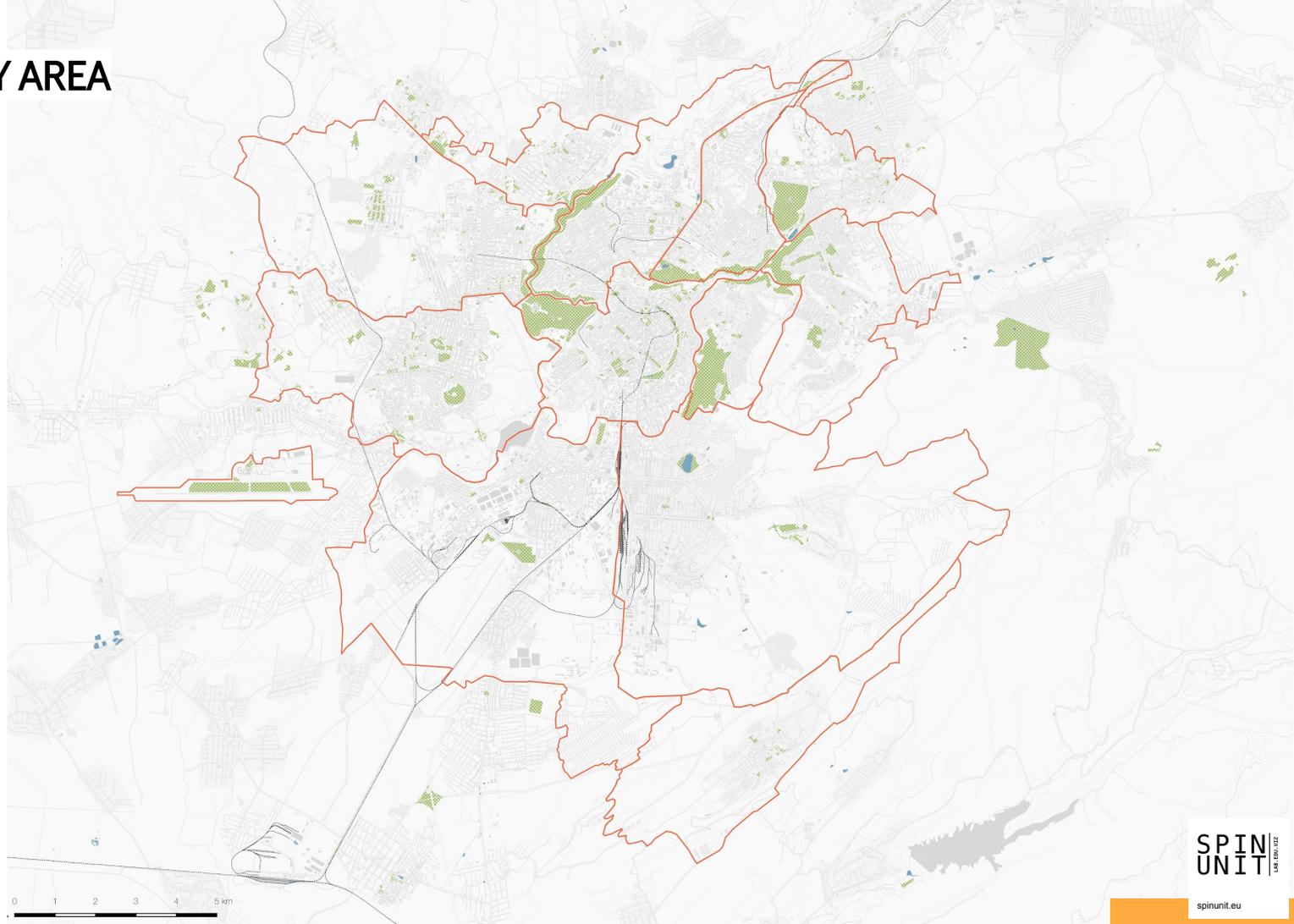
Kristjan Männigo is a member of the international urban research agency SPIN Unit, executive architect of Ars Projekt and an external lecturer at the Faculty of Architecture of the Estonian Academy of Arts.

Kristjan's main interests are city, architecture and construction data models and their practical applications in creating a better environment. In recent years, he has participated in several urban research projects as part of SPIN Unit and worked as an architect in the design of high-rise buildings.

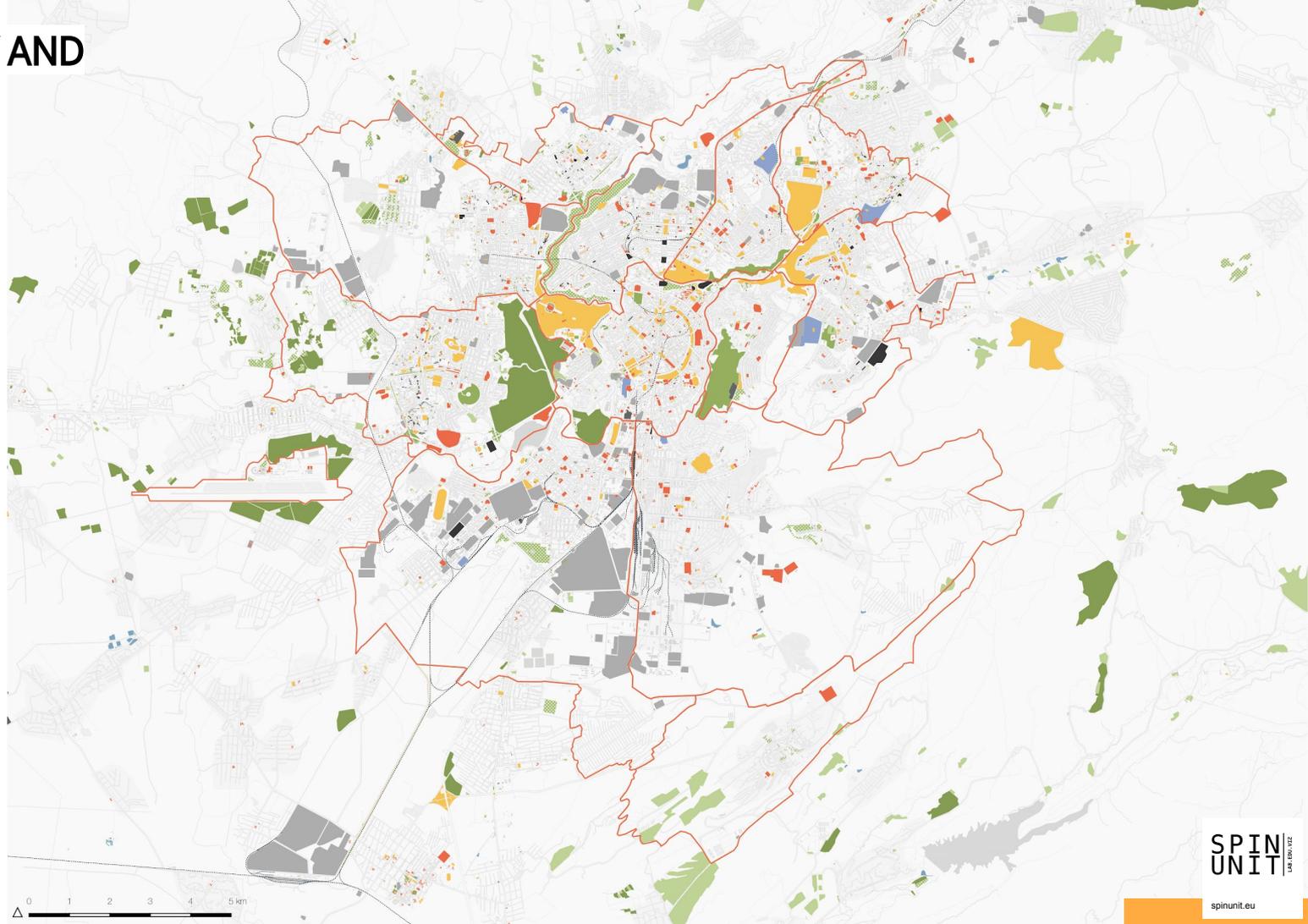
## CASE STUDY AREA

Yerevan is the capital and largest city of Armenia and one of the world's oldest continuously inhabited cities. Situated along the Hrazdan River, Yerevan is the administrative, cultural, and industrial center of the country. It has been the capital since 1918, the fourteenth in the history of Armenia.

Yerevan has 12 administrative districts covering an area of 223km<sup>2</sup>, a population over a million inhabitants and an average density of 4,824/km<sup>2</sup>.



# TERRITORY AND LAND USE



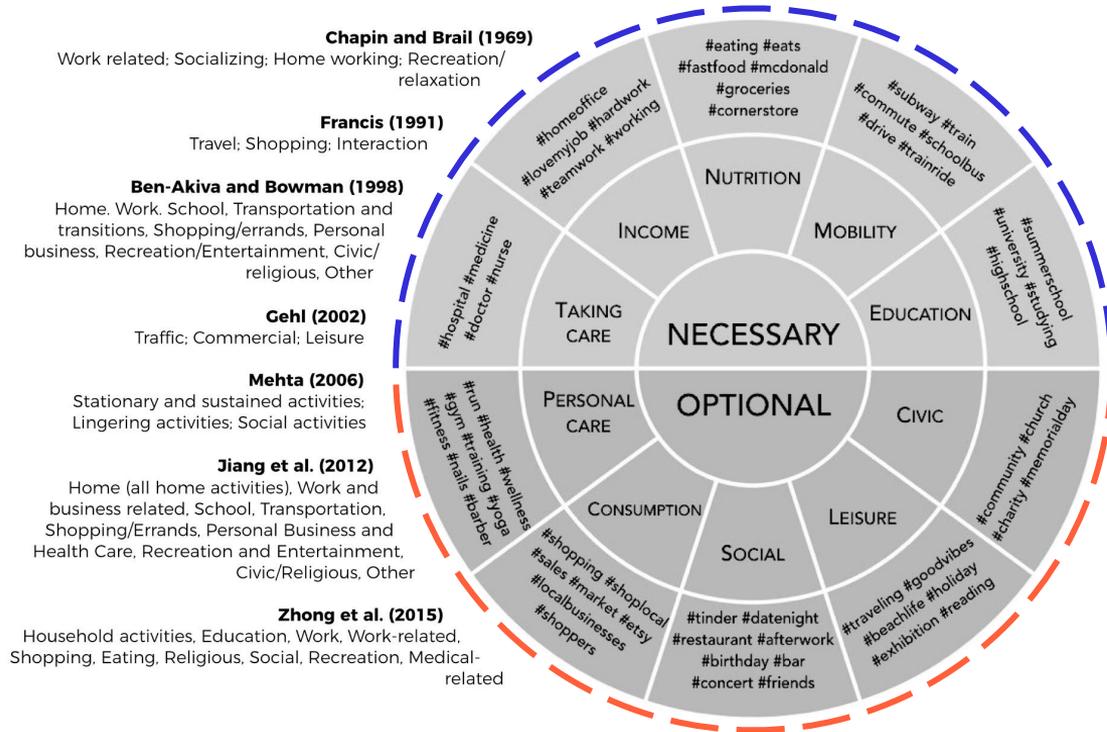
# CATEGORISING URBAN AMENITIES

The SPIN wheel shows a way to categorise the currently available rich data on urban amenities in ten broad types that are socially meaningful and understandable. The ten types - such as leisure or mobility - are further divided in **necessary and optional activities**, following Jan Gehl's classic formulation. Key idea is that good urban space needs to have a balanced mix of optional and necessary activities.

Optional activities  
Taking a walk by the river, jogging in the park, sun bathing, eating out



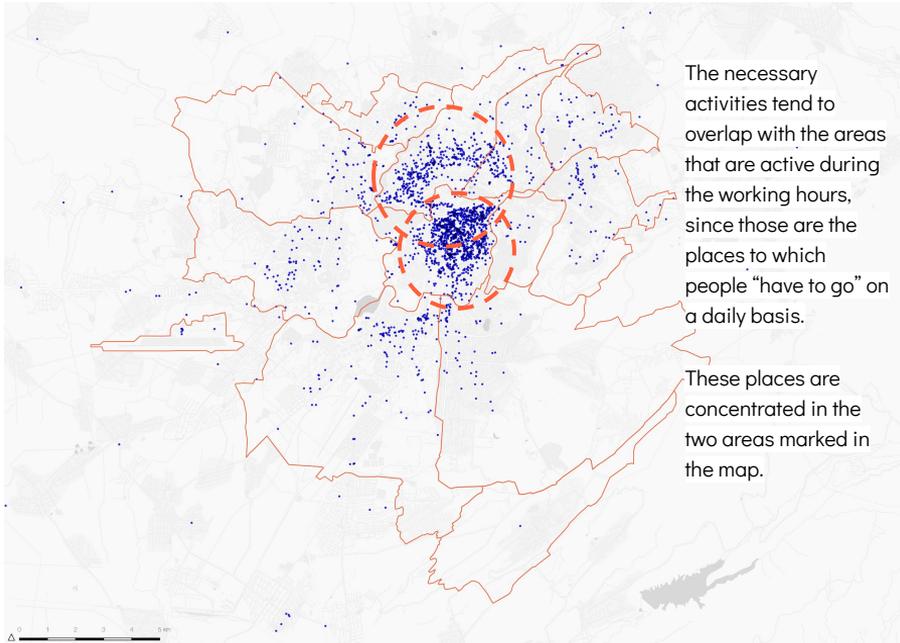
Necessary activities  
Going to work, to school, doing the groceries



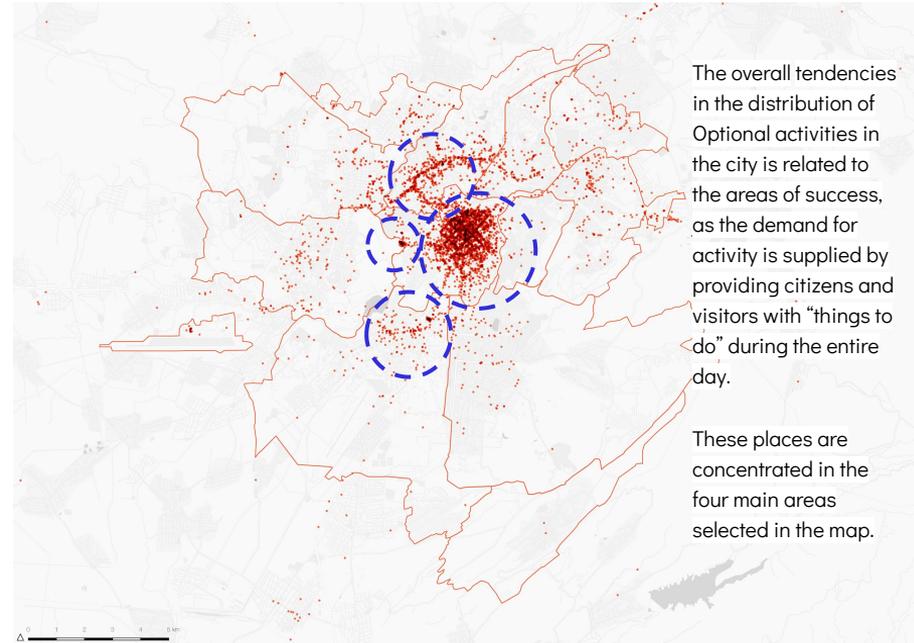
SPIN wheel  
Classification of urban activity types



# TERRITORY AND LAND USE



Necessary activities

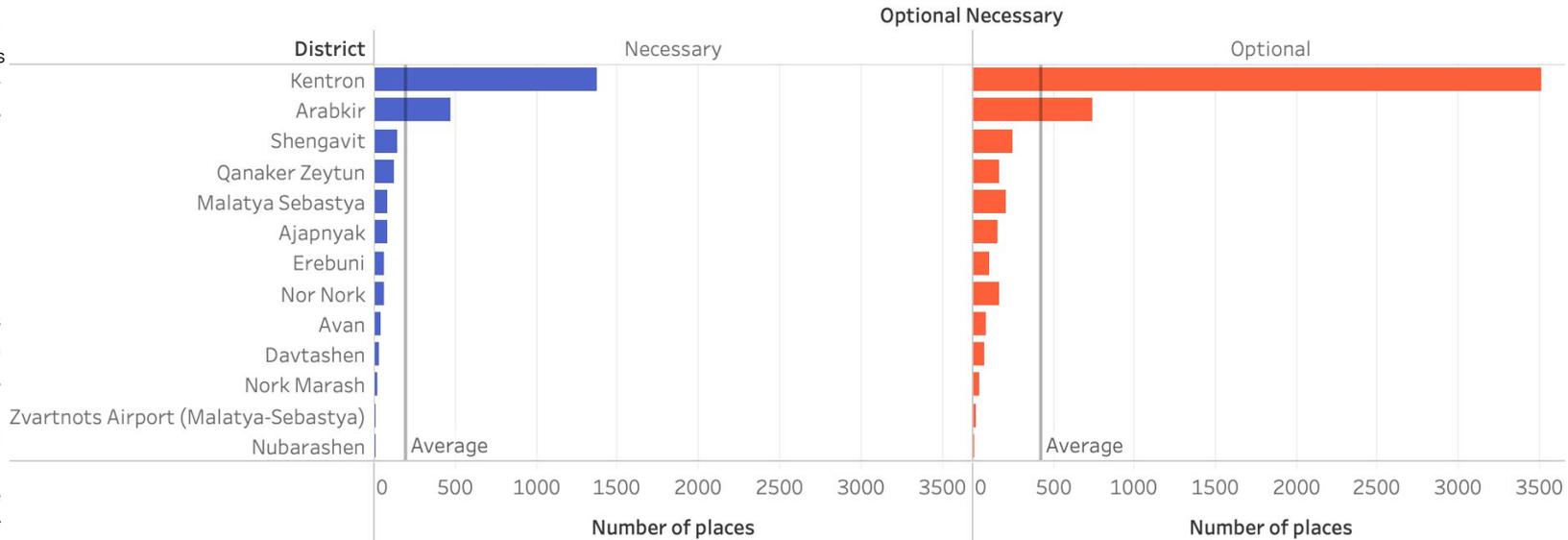


Optional activities

# TERRITORY AND LAND USE

As explained previously, the presence of Optional and/or Necessary places have different consequence for the liveliness of urban space. Here we represent the number of existing places of each of the two groups, for every district.

The central district stands out for a high concentration of both, however the proportion between Optional and Necessary shifts towards Optional in relation to the other districts, as it happens to Nor Nork and Malatya Sebastya in a lower degree



# CATEGORISING URBAN AMENITIES

## What activities are Optional?

Civic

Consumption

Social

Personal Care

Leisure

### SOCIAL

to be in companionship with other people or groups (i.e. bar, nightclub, café, dinner)

### CIVIC

activities relevant to the development of local communities (libraries, places of cult, community centers, youth clubs, no-profits, volunteering institutes.)

### CONSUMPTION

activities related to purchasing goods and services that are not of primary necessity (i.e. boutiques, exclusive food stores, retails etc)

### PERSONAL CARE

to maintain or improve the condition of comfort, wellbeing, fitness (i.e. sports, spa, Sport facilities, gyms, massage, fitness studios)

### 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)

## What activities are Necessary ?

Education

Workplaces / Income

Mobility

Healthcare

Nutrition

## MOBILITY

horizontal physical movement  
by a mean of transport, or  
service related to that (i.e.  
transportation nodes or  
stations, commuting, travelling)

## EDUCATION

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

## HEALTHCARE

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

## WORKPLACES / INCOME

to receive a payment for a good  
or service (i.e. office spaces, or  
any other working activity)

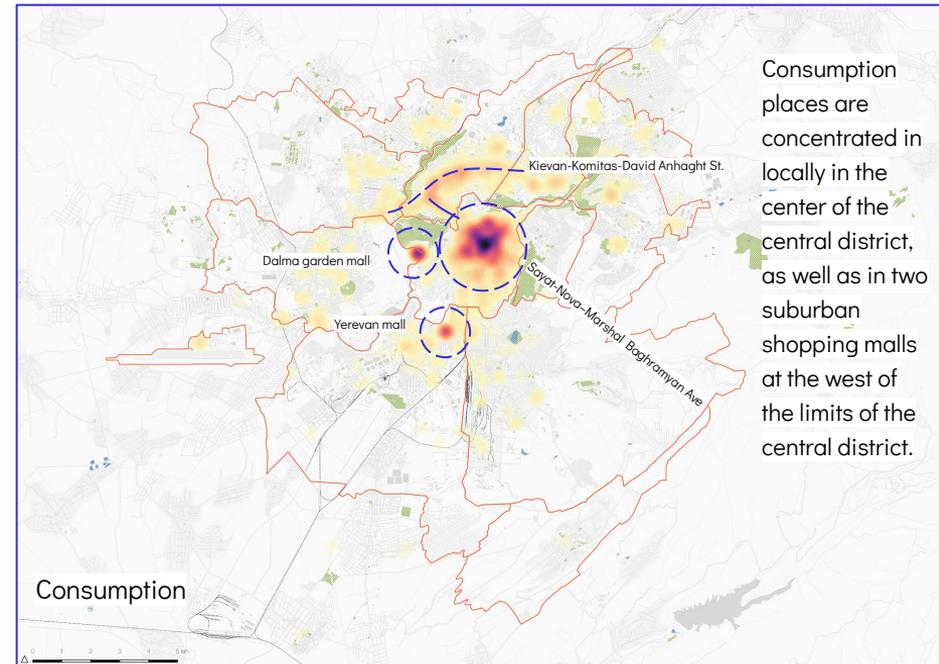
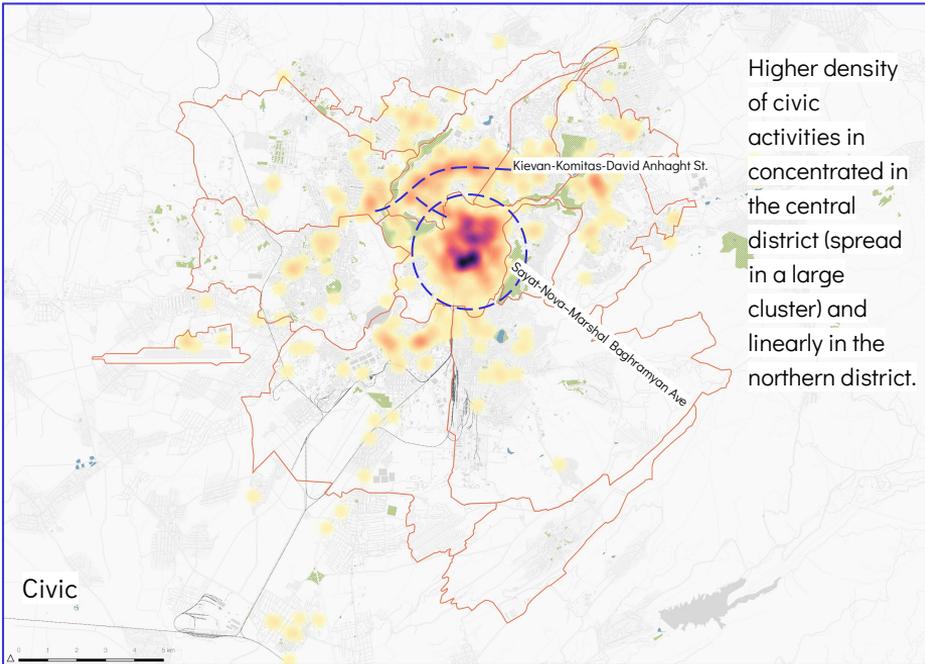
## NUTRITION

to consume food with no other  
purpose, related to food that is  
ready to be eaten (i.e.  
supermarket, fast food  
restaurant, mensa)

# TERRITORY AND LAND USE

This series of cartographies show the density of potential activities in the city.

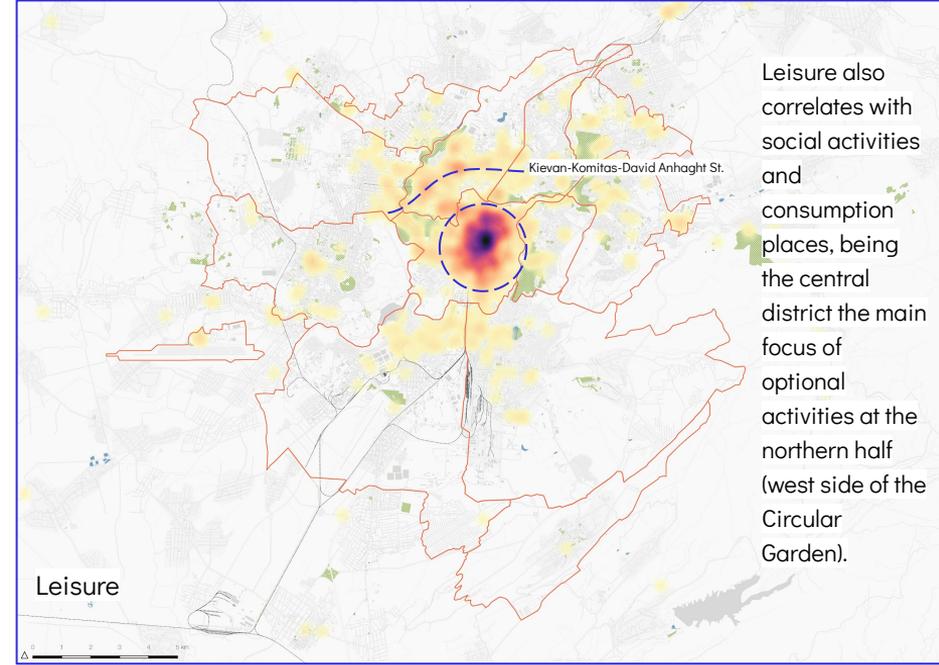
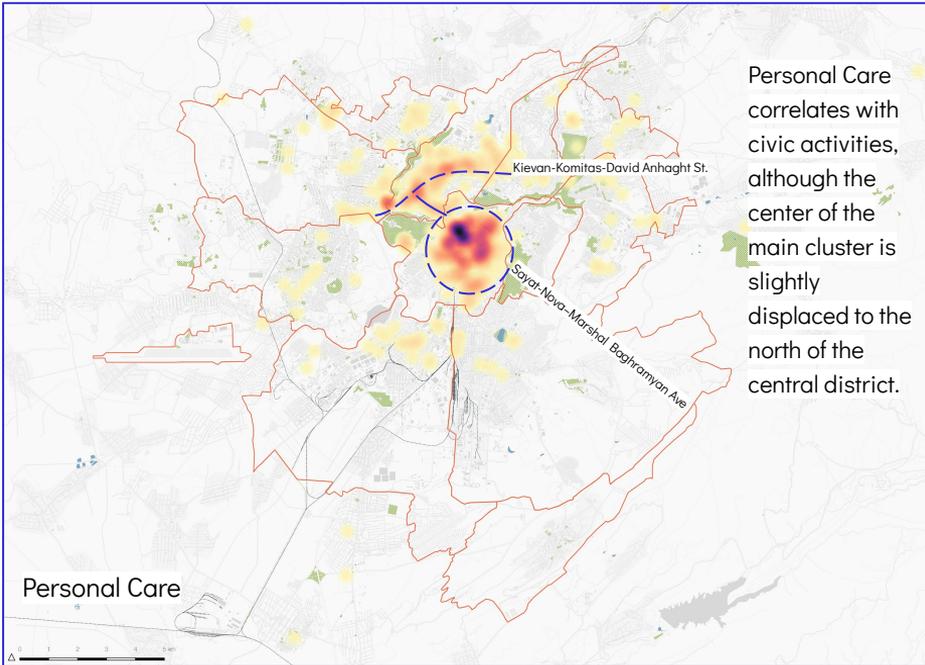
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# TERRITORY AND LAND USE

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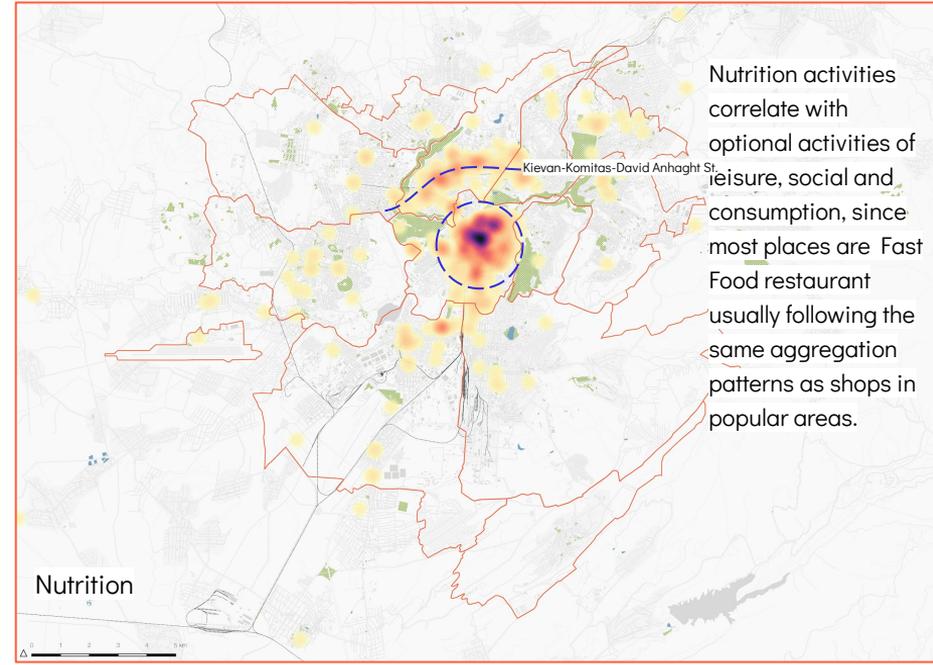
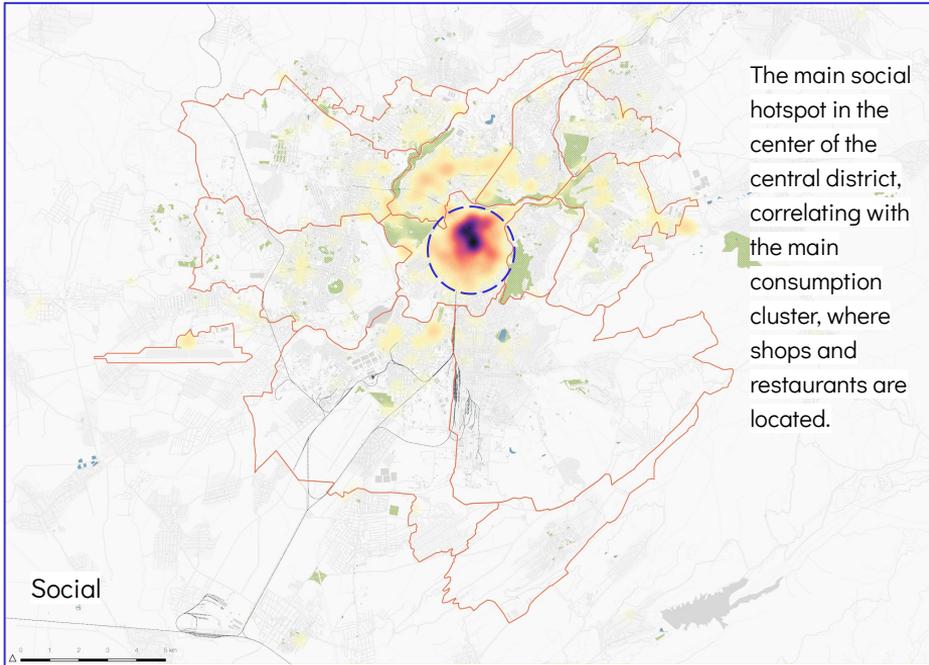
high  low



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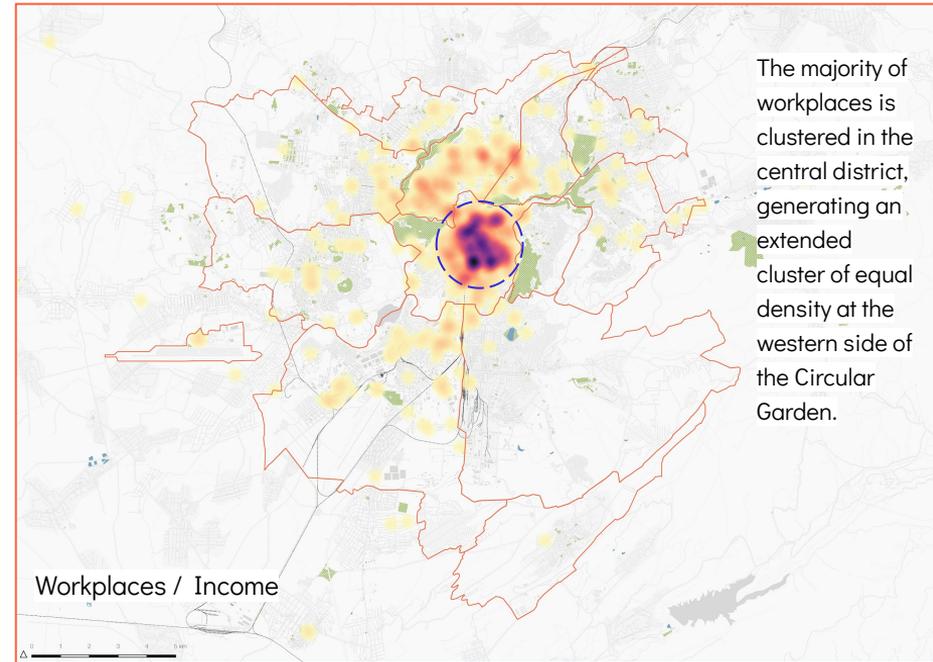
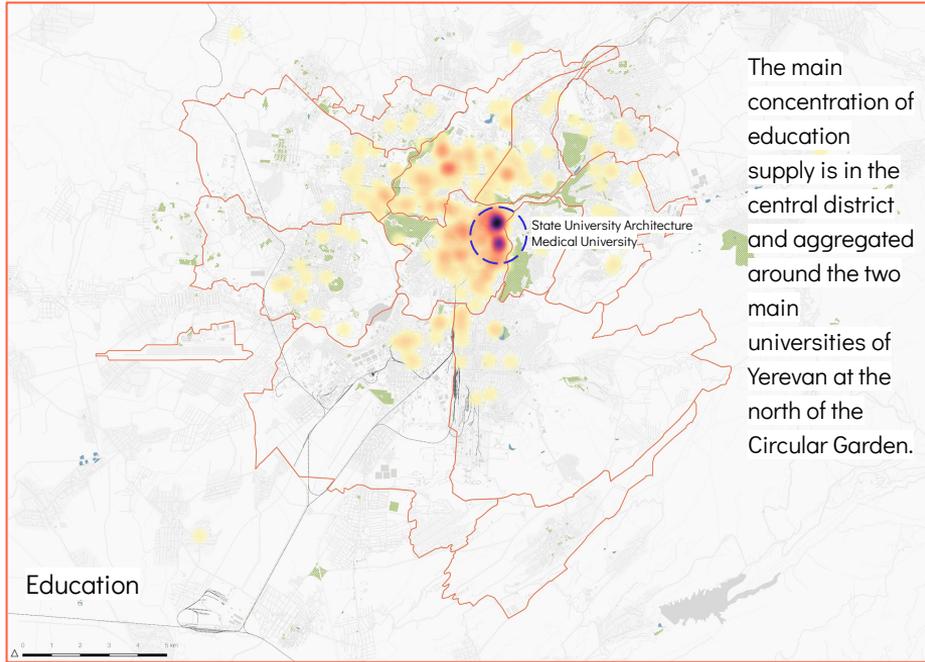
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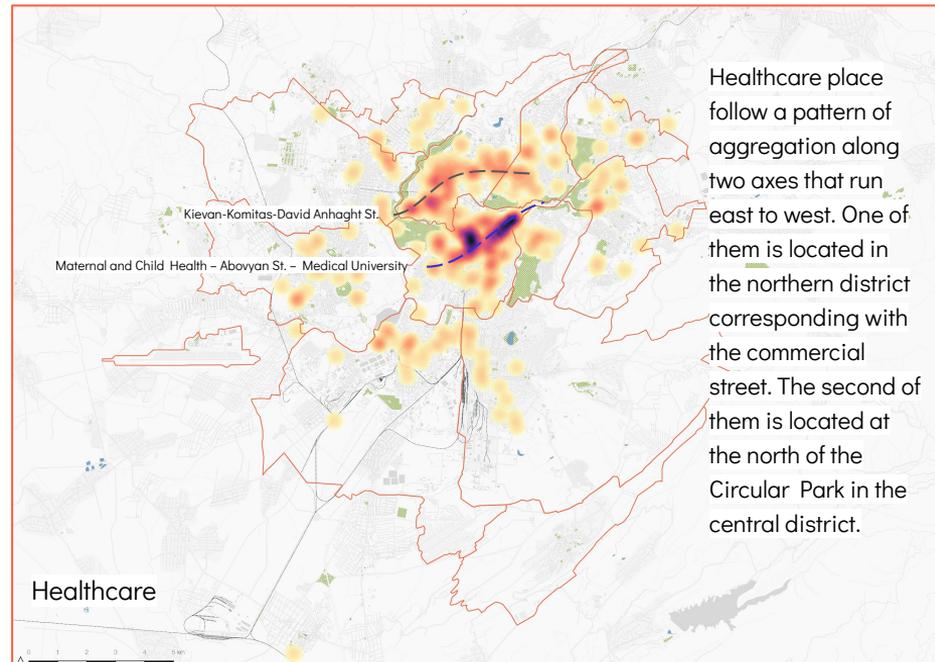
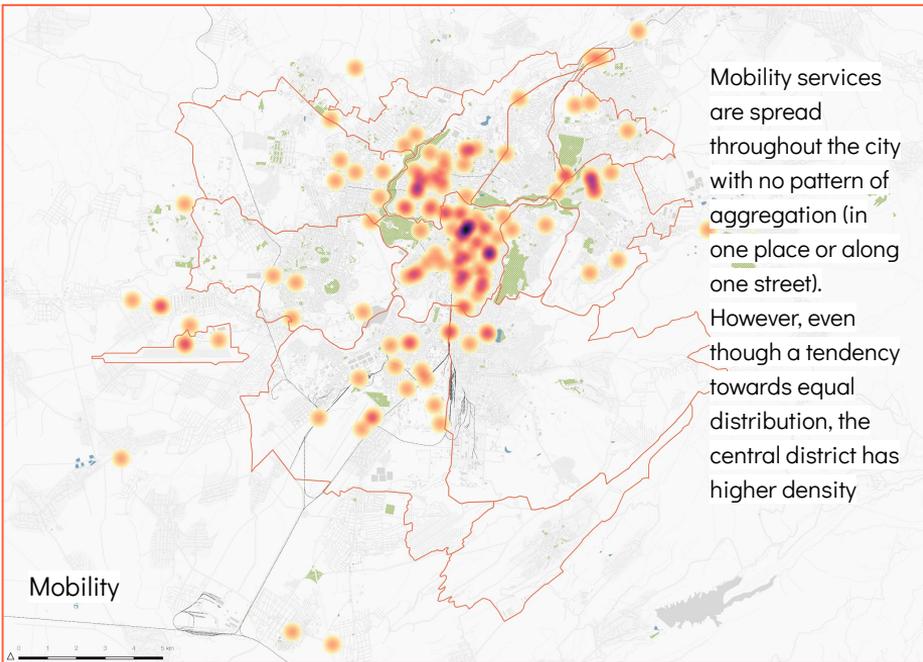
high  low



# TERRITORY AND LAND USE

This series of cartographies show the density of potential activities in the city.

high ■■■■■■■■■■ low



# TERRITORY AND LAND USE

## Optional activities

Civic

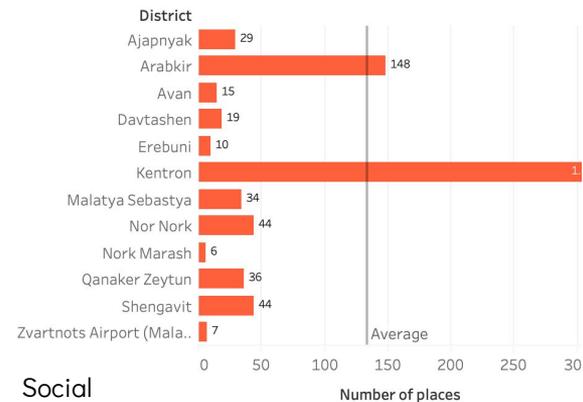
Consumption

Social

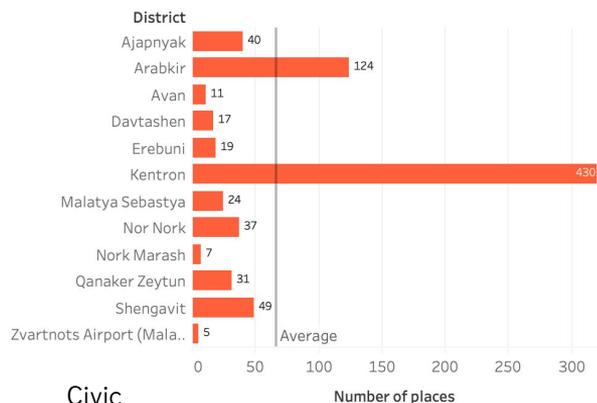
Personal Care

Leisure

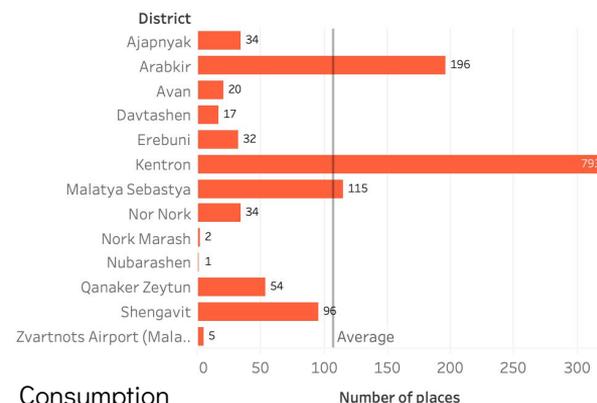
Quantity of places of each type, per neighborhood



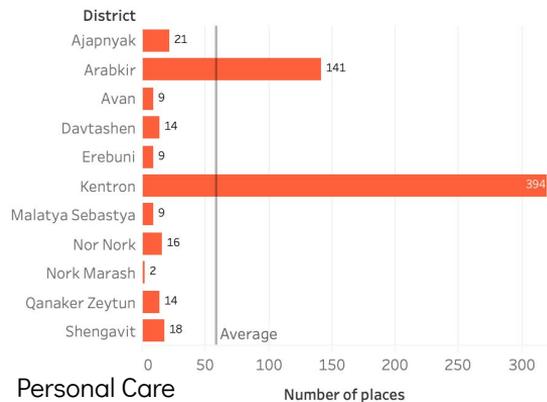
Social



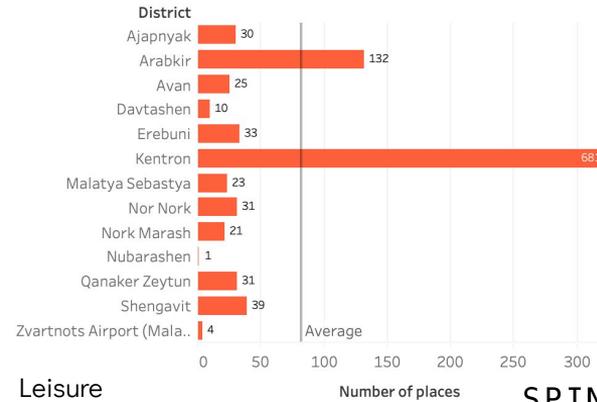
Civic



Consumption



Personal Care



Leisure

# TERRITORY AND LAND USE

## Necessary activities

Education

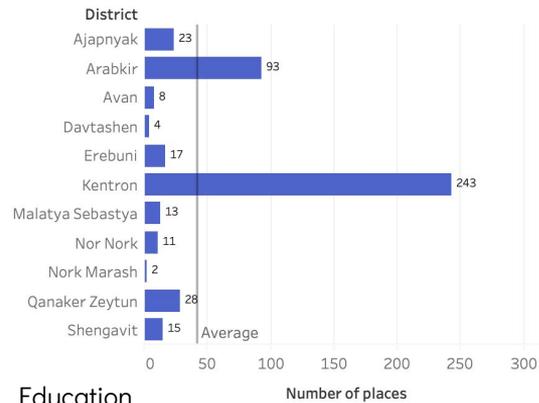
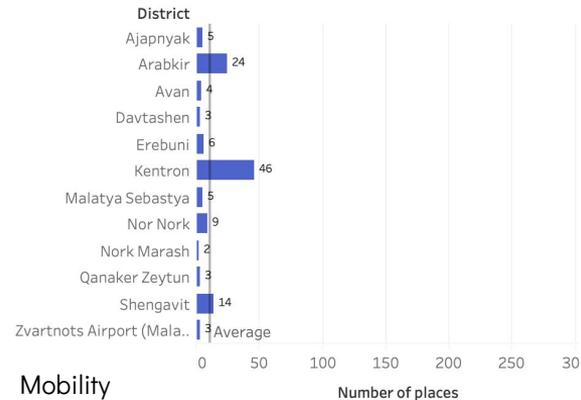
Workplaces / Income

Mobility

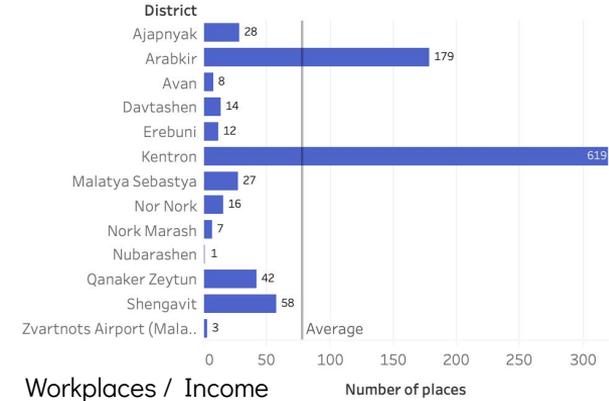
Healthcare

Nutrition

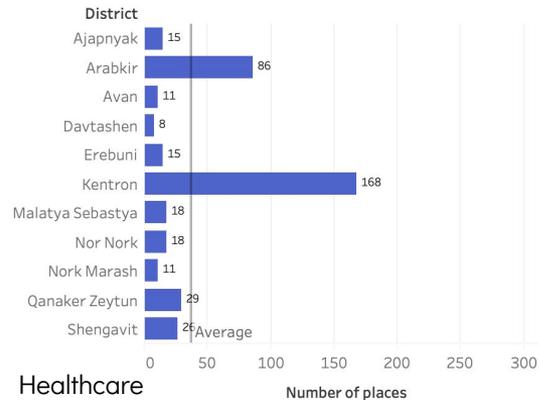
Quantity of places of each type, per neighborhood



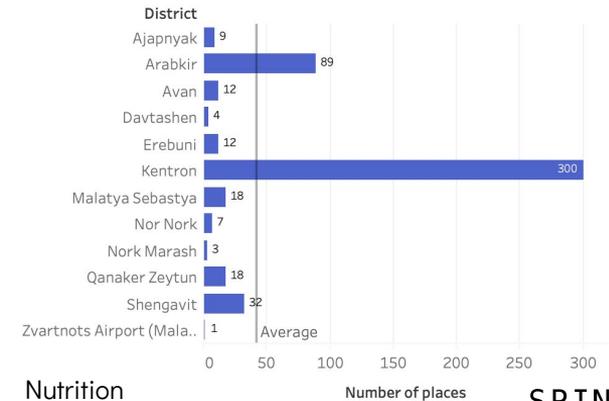
Education



Workplaces / Income

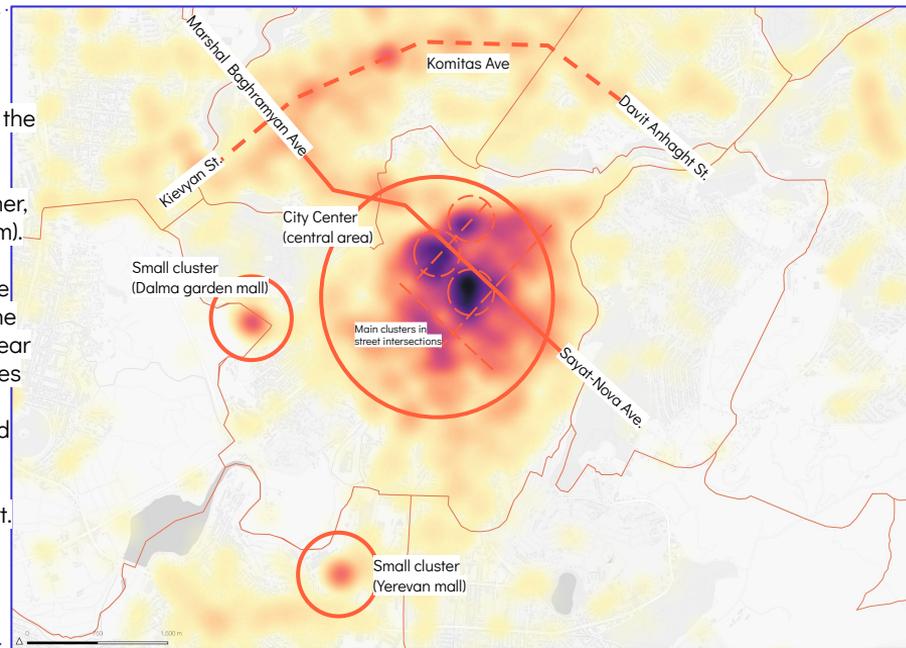
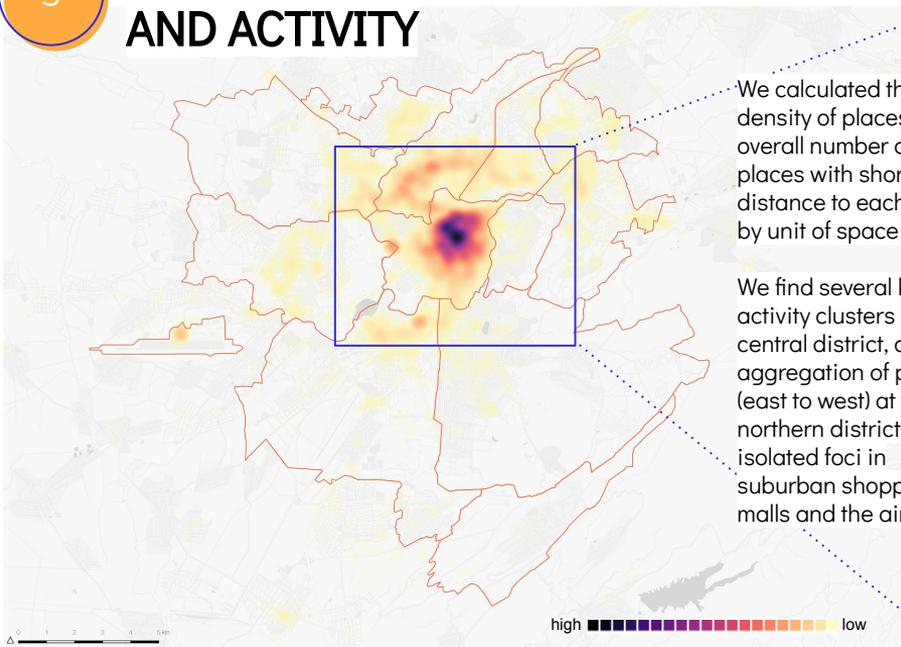


Healthcare

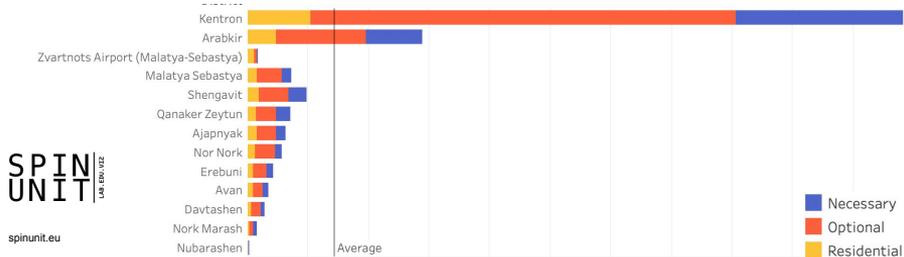


Nutrition

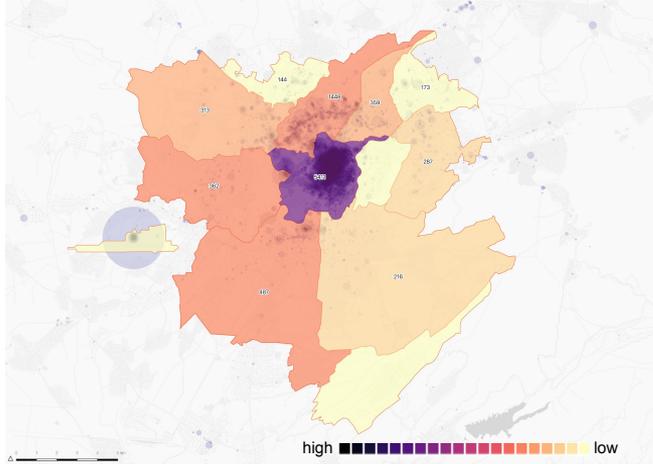
# POPULATION AND ACTIVITY



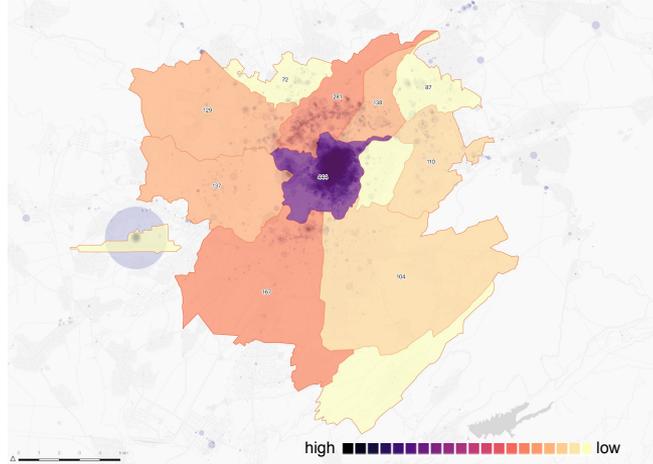
## Number of venues in each neighborhood



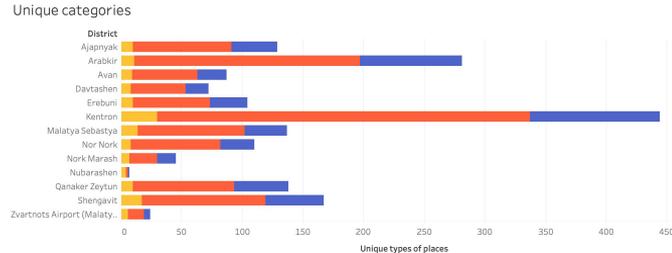
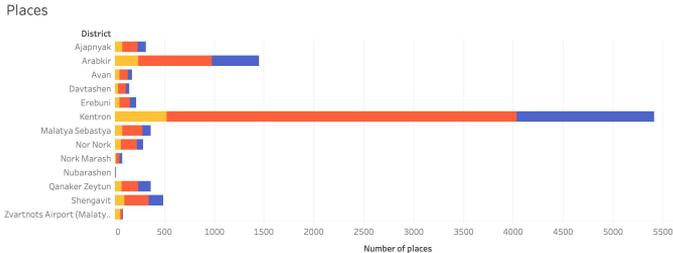
# POPULATION AND ACTIVITY



Aggregation - Number of places



Diversity - Number of unique place types



Complexity of urban space looks at the diversity of the mix of uses and services. Complexity defined as the set of relations between all elements that constitute the city, the complex self-regulating system that shows the ecosystemic nature of cities.

We define of urban complexity as a simultaneous measure of both the density and diversity of economic activities in a given urban space, which is directly related to the spatial experience and can be measured quantitatively through the application of the Shannon-Wiener diversity index.

Complexity not only qualifies a space as good because there's a high density of places, but also because those activities are diverse.

# POPULATION AND ACTIVITY

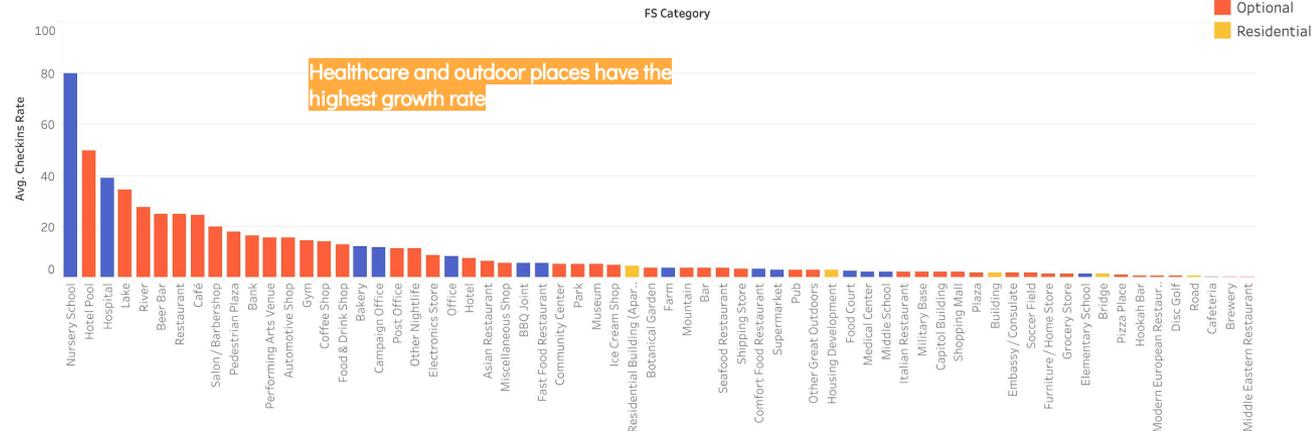
## Growth by period

Types of places increasing the number of visitors between March and October 2020

### Average rate% of growth per place

The columns measure the number of visitors gained in each type of amenity (Restaurant, Café, Park, Airport) in the period between March and October 2020, relative to the total number in October expressed in percentage %.

### Positive Growth



### Negative Growth



Types of places decreasing the number of visitors between March and October 2020

### Average rate% of shrinkage per place

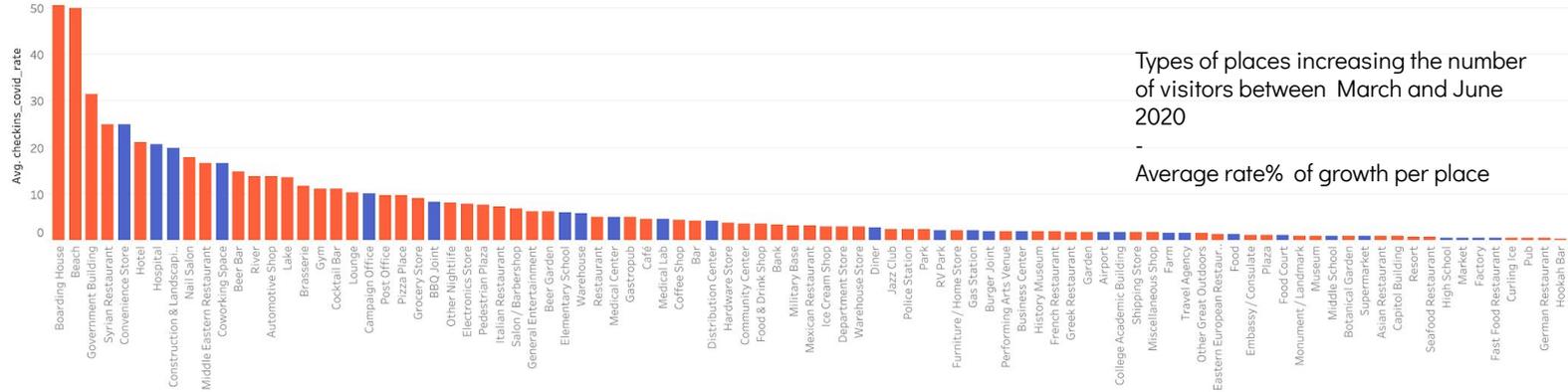
The columns measure the difference of visitors for in each type of amenity (Pub, Café, Gov. Building, Startup) in the period between March and October 2020, relative to the total number in March expressed in percentage %.

■ Necessary  
■ Optional  
■ Residential

# POPULATION AND ACTIVITY

## Growth by period

### Positive Growth (COVID)

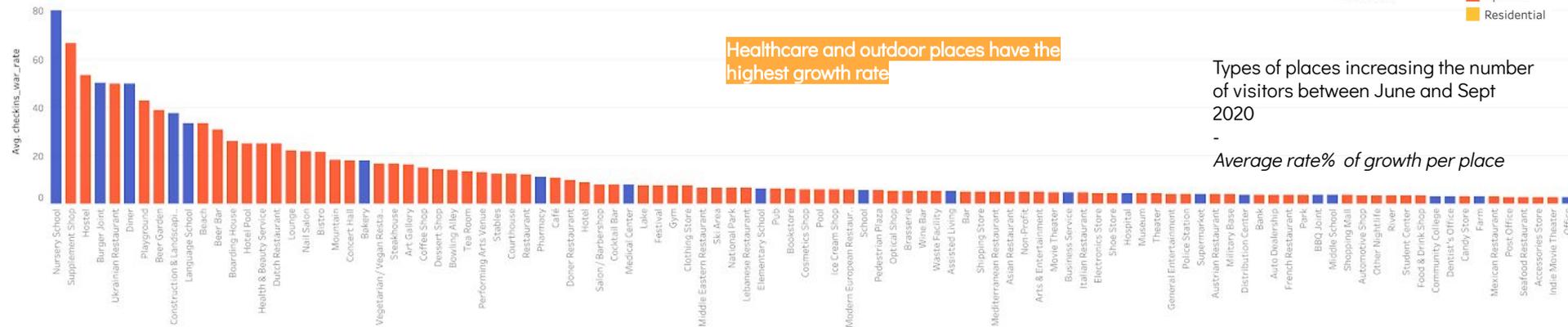


### Negative Growth (COVID)

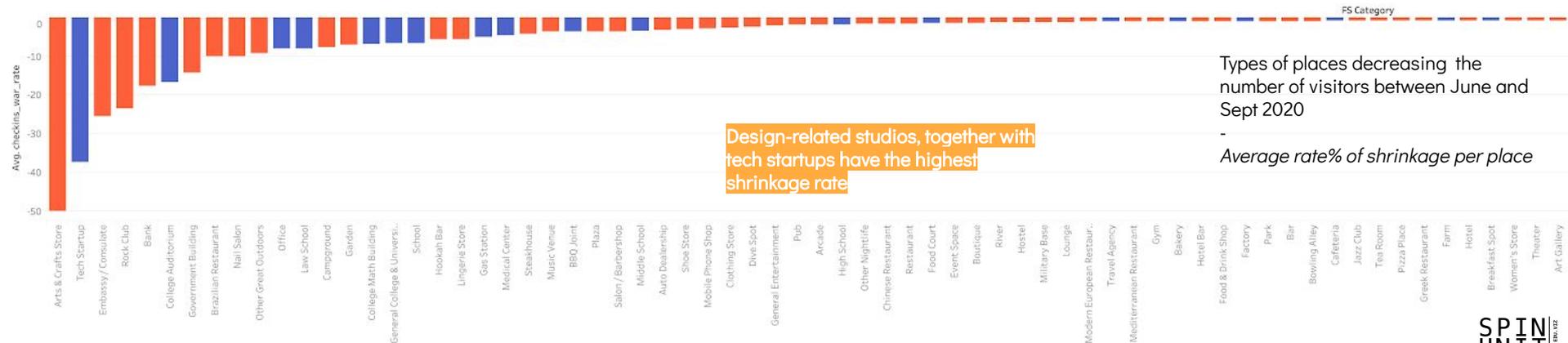


# POPULATION AND ACTIVITY

Growth by period



Negative Growth (War)



# LANDMARKS AND HOTSPOTS

Number of visits per category in each neighborhood  
Logarithmic scale (top) and Absolute value (bottom)

Visits to places



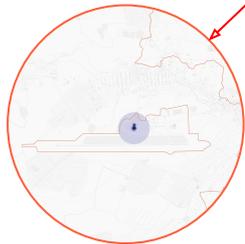
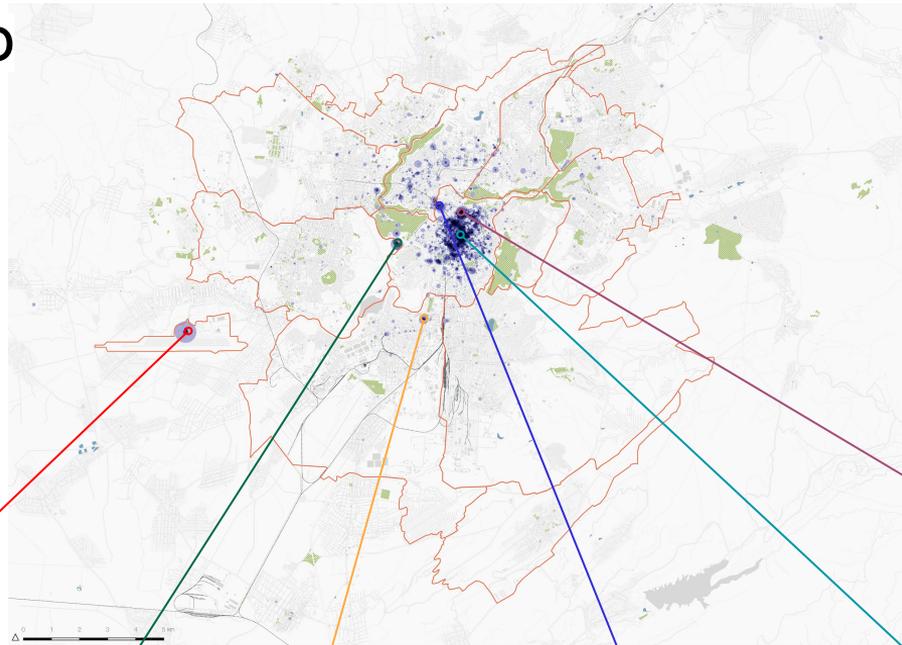
We calculated the popularity places by the overall number of times that they have been visited through time.

Each bar represents the aggregation of visits to each place pertaining to a category, grouped by the district in which each place is located

# LANDMARKS AND HOTSPOTS

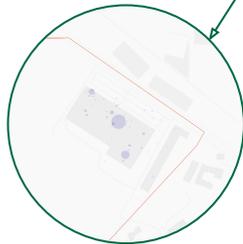
We define landmarks as places meeting two circumstances:

- (1) Being relevant for the urban fabric in a city-wide scale, meaning that those places are popular in absolute numbers.
- (2) Outstanding condition from the surrounding context, meaning that places have high popularity relative to the places around it.



## Zvartnots International Airport (EVN)

Including all duty free shops, business lounges and restaurants, it's the most visited place in the city



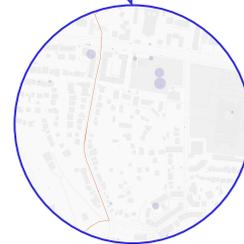
## Dalma Garden Mall

Including Dalma Cinema and Food Court are the main attraction outside the central district



## Yerevan Mall

Including KinoPark and big-box stores such as Carrefour are the second main hotspot outside the central district.



## Lovers Park

Together with several cafés and social and recreation facilities.



## Northern Avenue

Concentrates the main social hotspot in the city center hosting restaurants, shopping and leisure for locals and tourists.



## Cascade Monument

One of the main tourist attractions, together with international restaurants and cafés.

# LANDMARKS AND HOTSPOTS

We calculated the popularity places by the overall number of times that they have been visited through time.

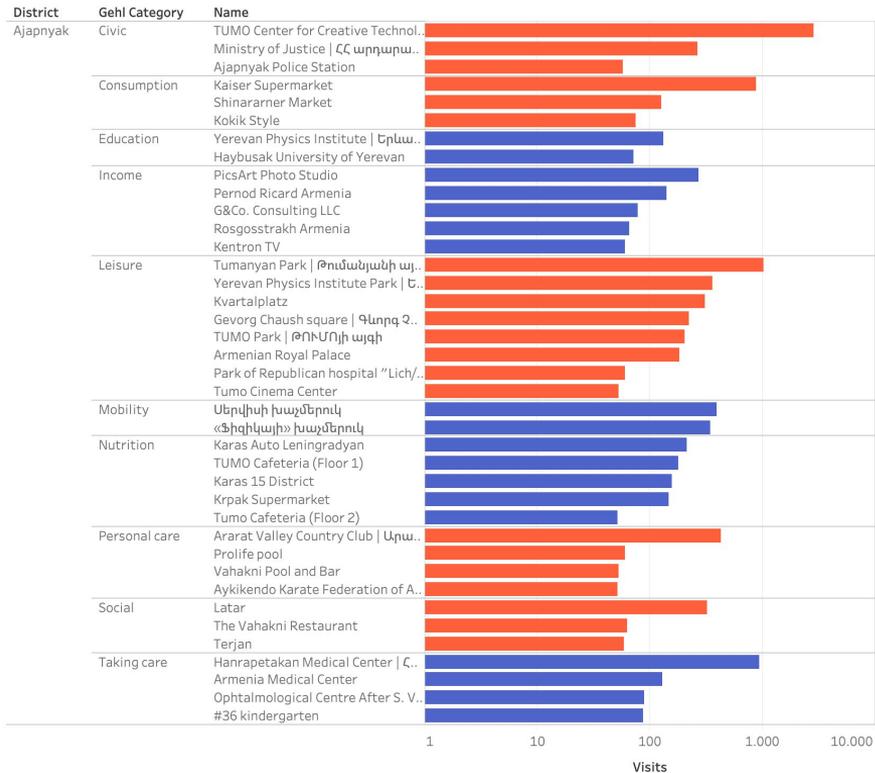




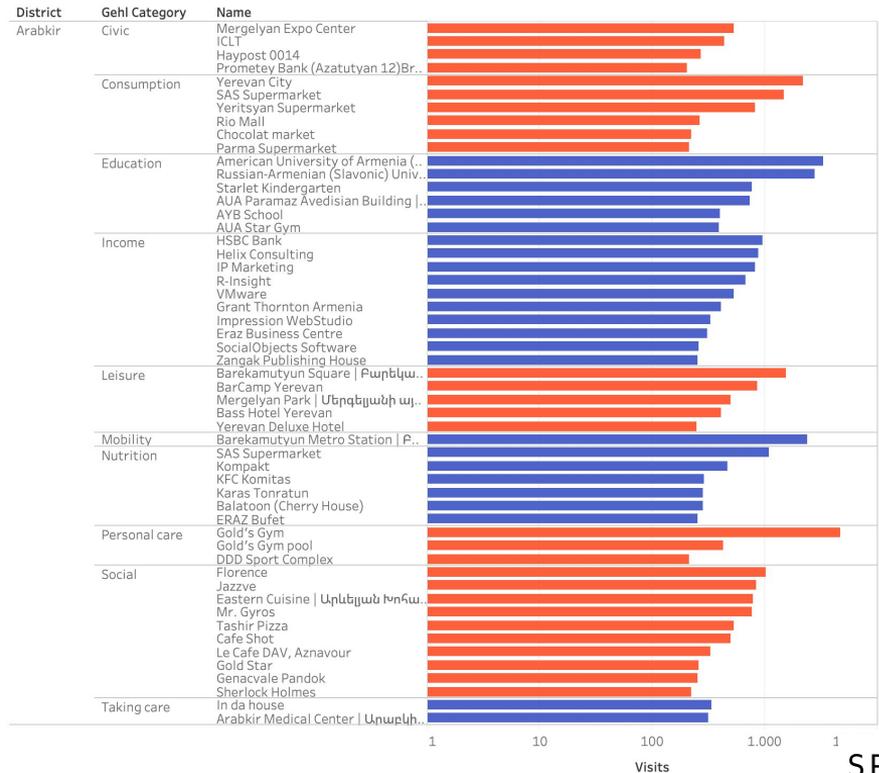
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

## Ajapnayak



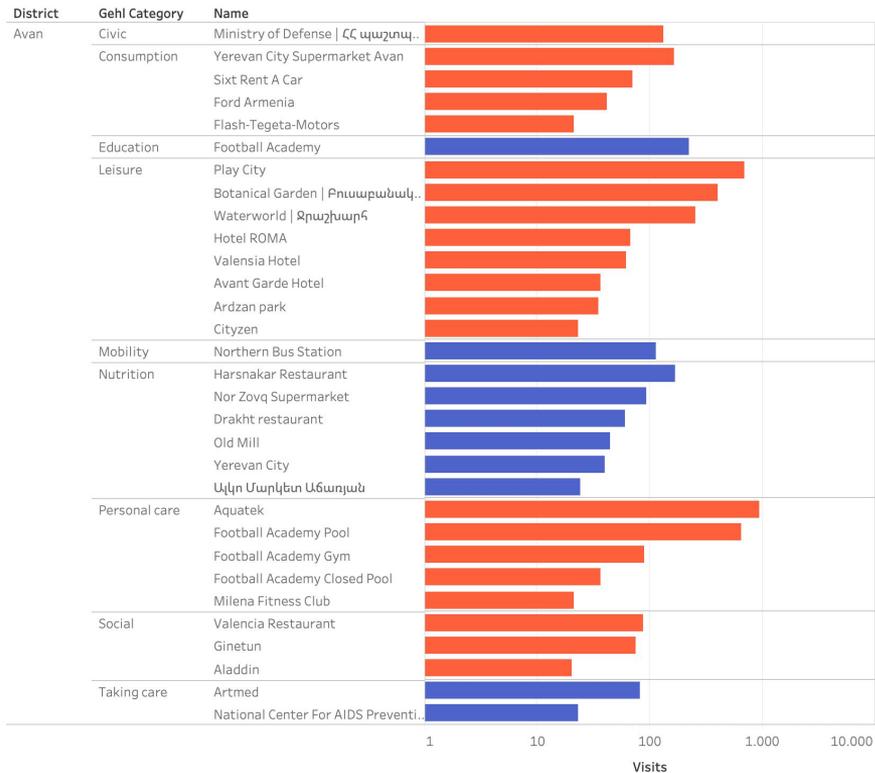
## Arabkir



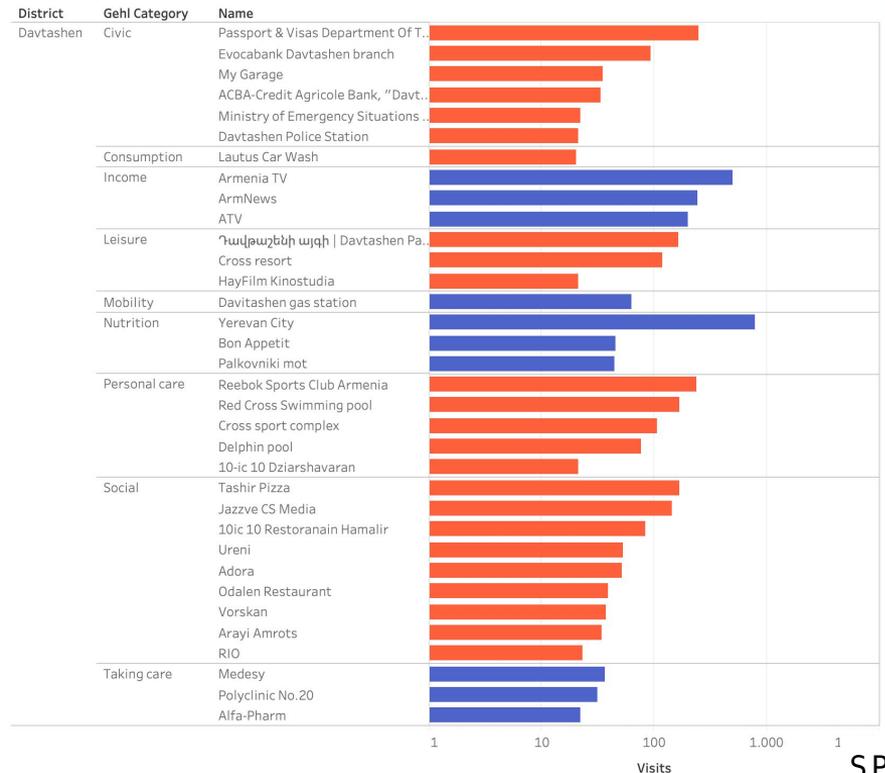
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

## Avan



## Davtashen

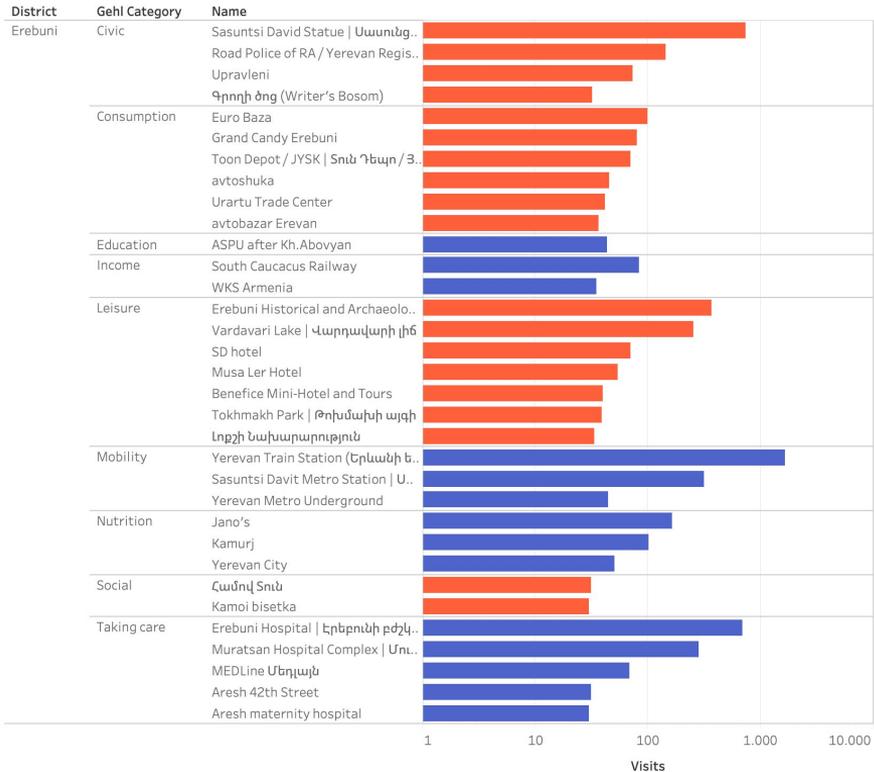




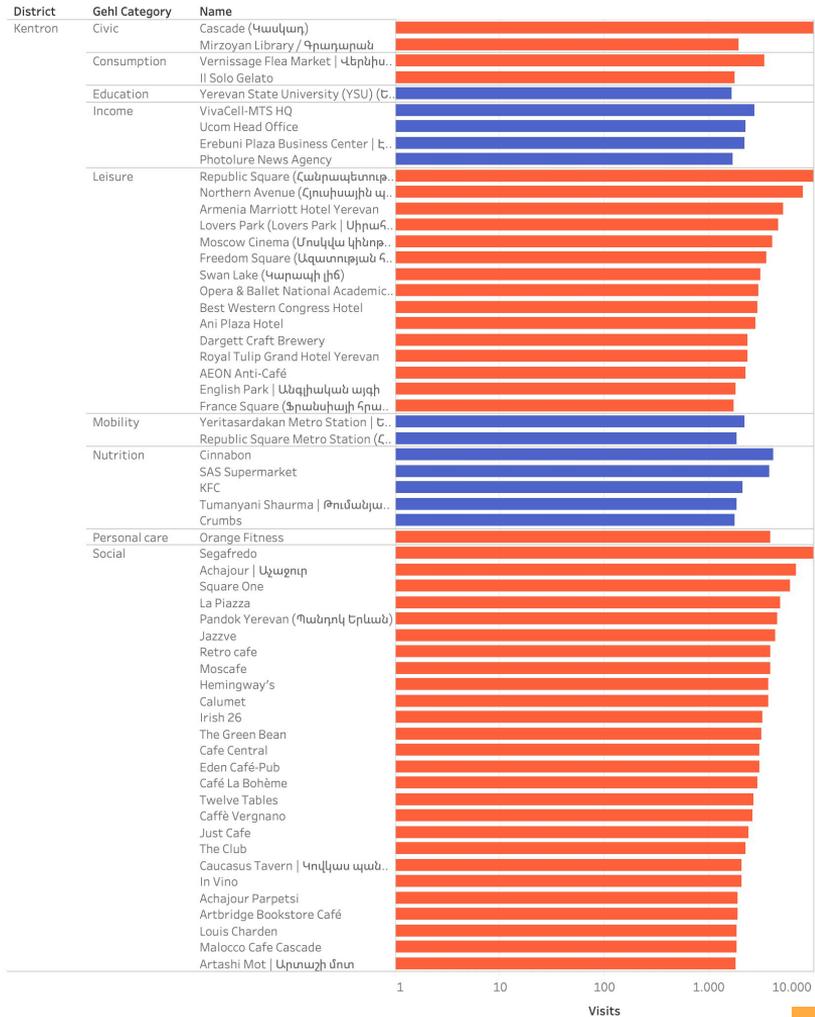
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

## Erebuni



## Kentron

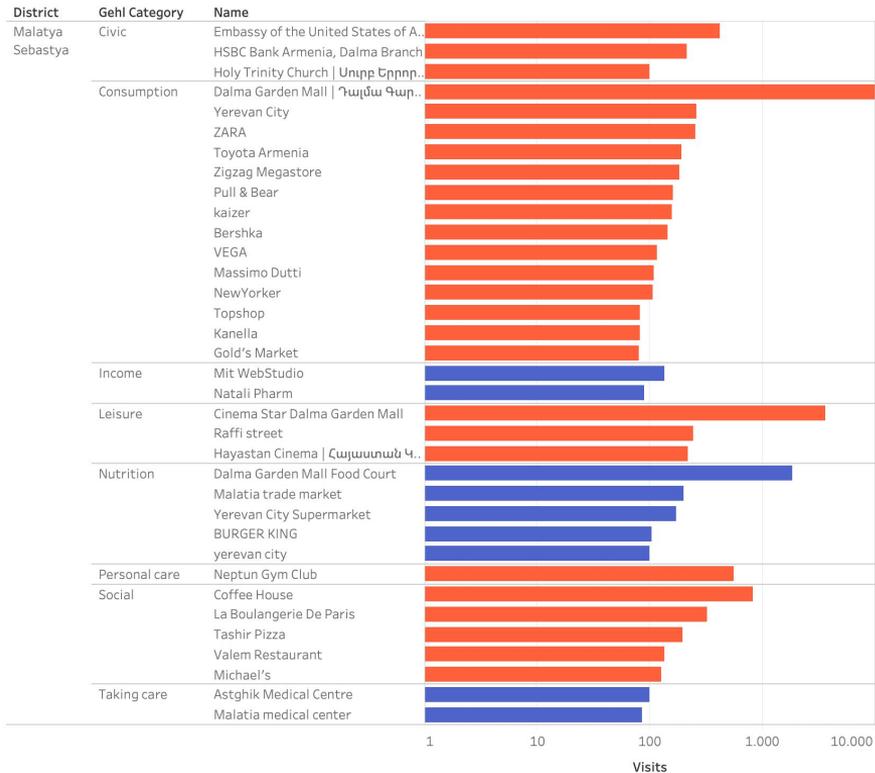




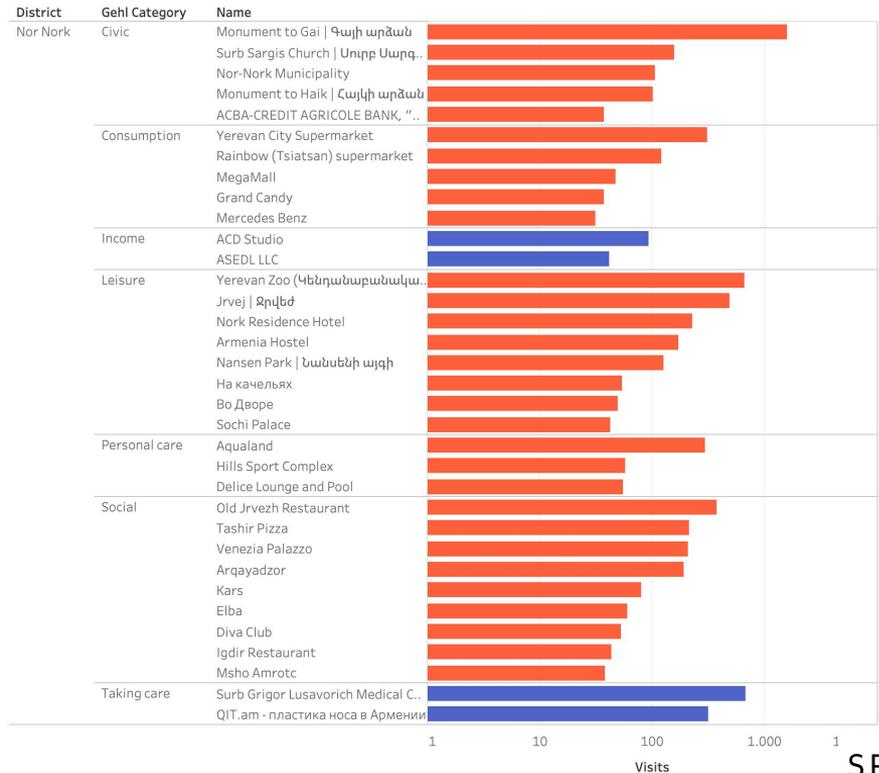
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

## Malatya Sebastya



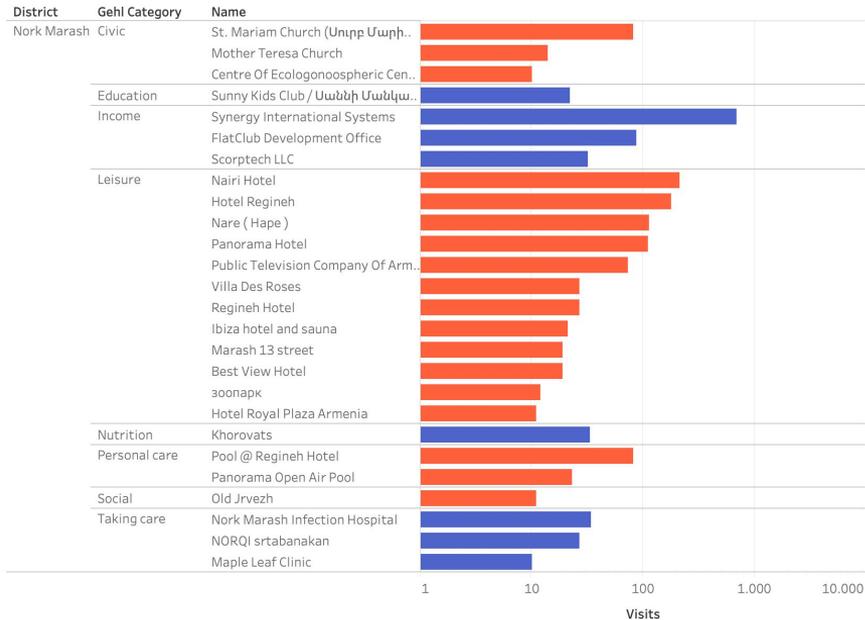
## Nor Nork



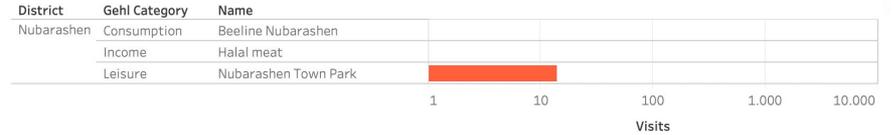
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

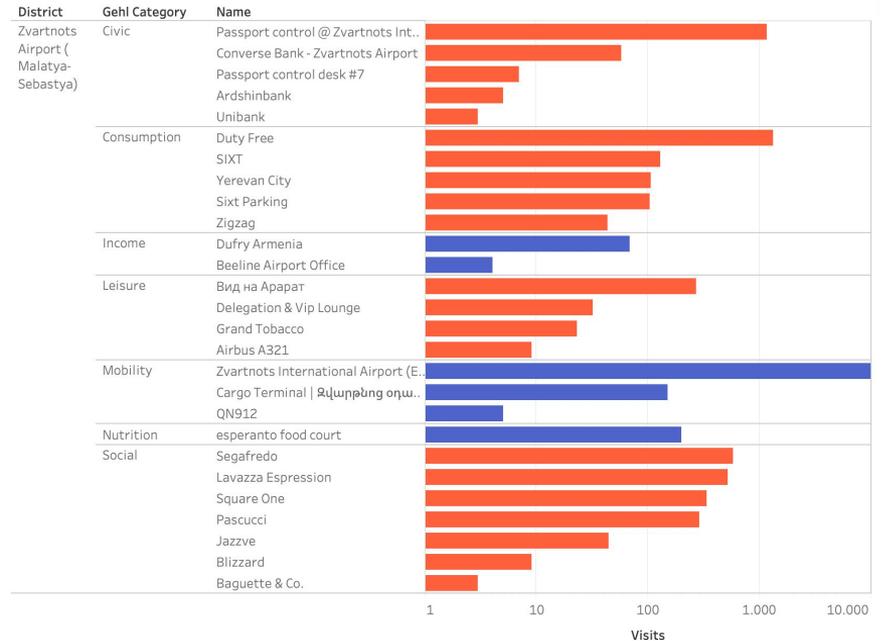
## Nork Marash



## Nubarashen



## Zvartnots Airport

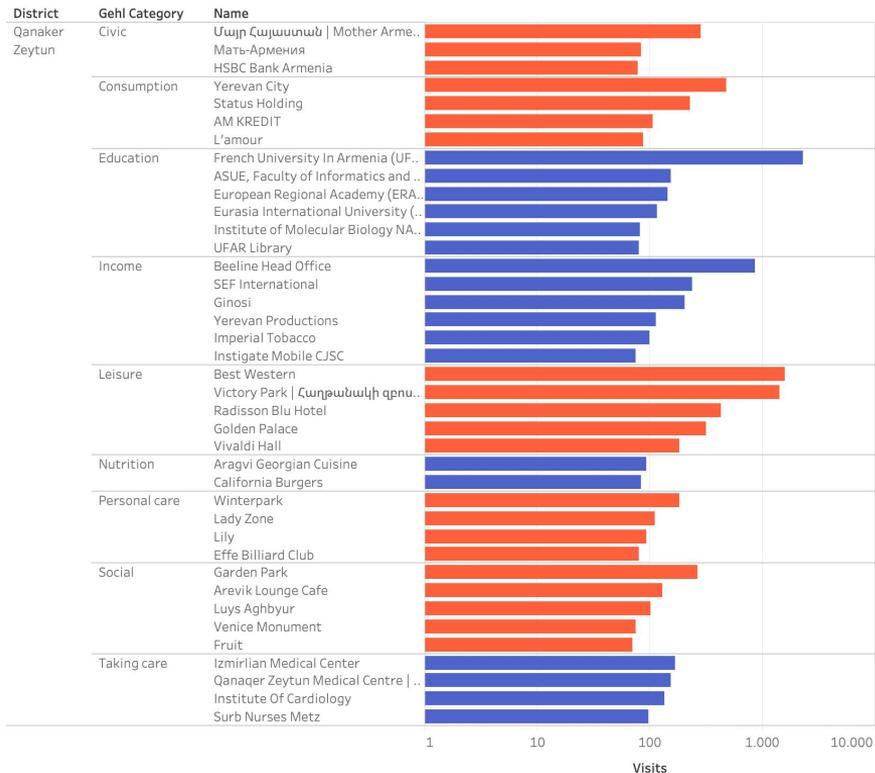




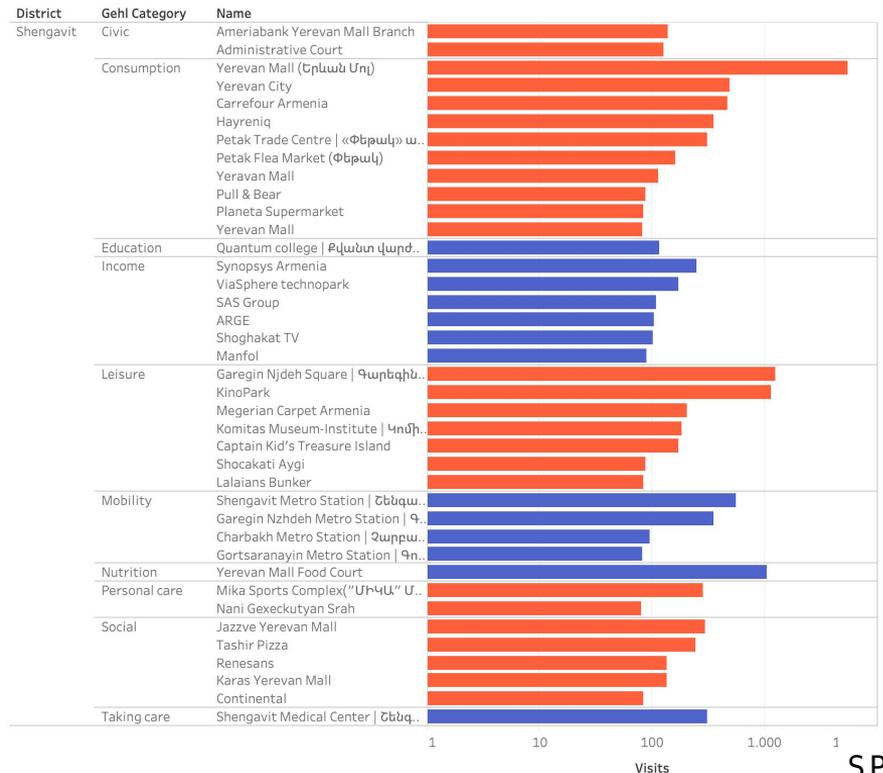
# LANDMARKS AND HOTSPOTS

Most relevant places in the district

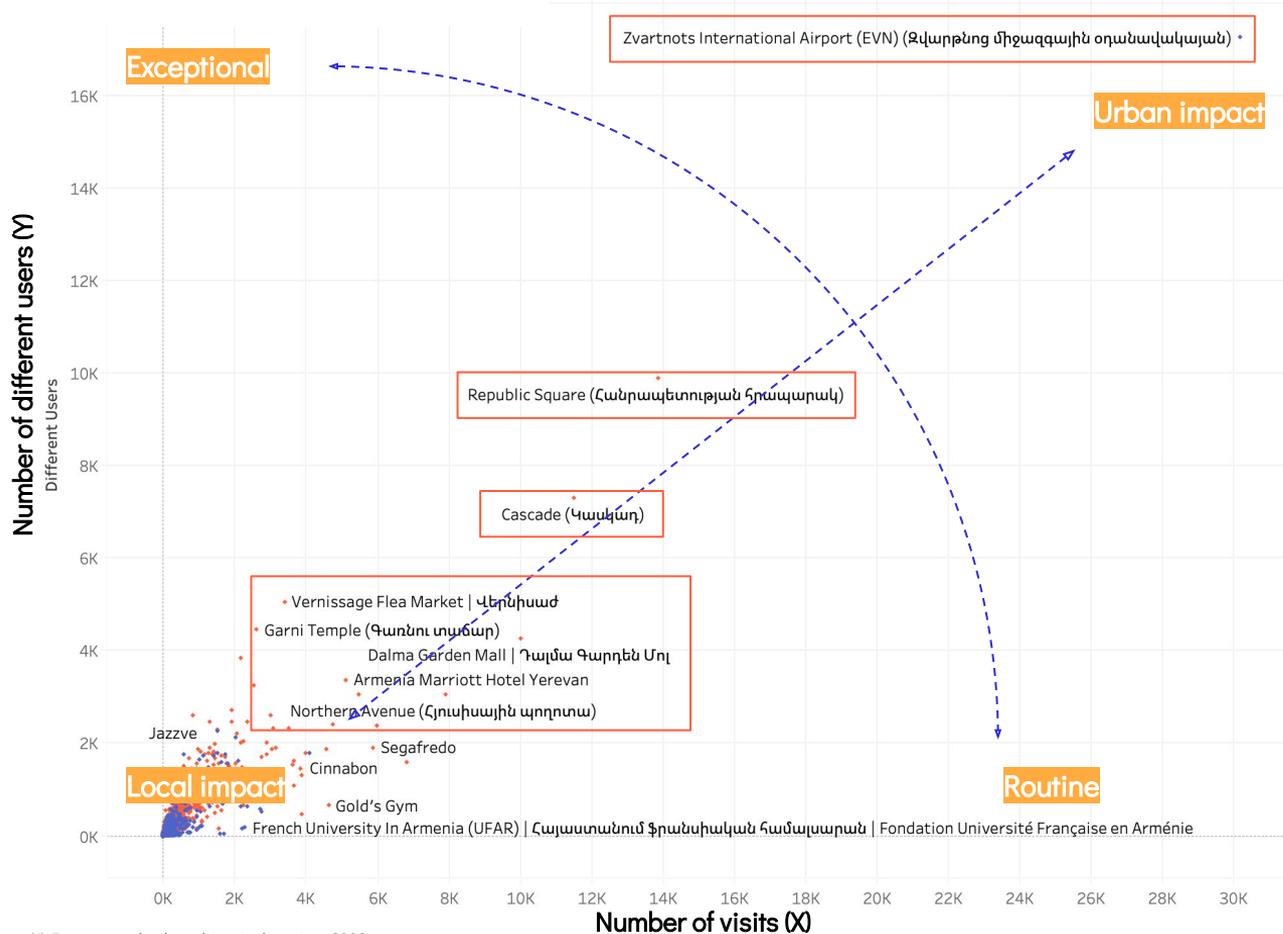
## Qanaker Zeytun



## Shengavit



# LANDMARKS AND HOTSPOTS



**Assiduity:** Number of different users (Y), Number of visits (X) calculates how many times, on average, the same people visit the same places.

High number of users and low number of visits in a place represents a reduced number of people visiting the place on a regular repeated basis, therefore it would indicate that the place is close to routinary activities.

On the contrary, a higher number of different users and would mean that the place is not only visited always by the same group of people, but by a wider variety of visitors pointing towards leisure activities and exceptional (not everyday).

Overall, the impact of a place for the surrounding urban fabric usually correlates to the intensity of both indicators as portrayed in the graph, the distance to the origin (0, 0)

# LANDMARKS AND HOTSPOTS



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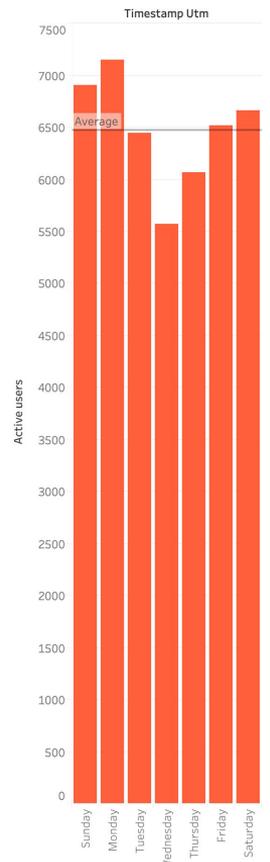
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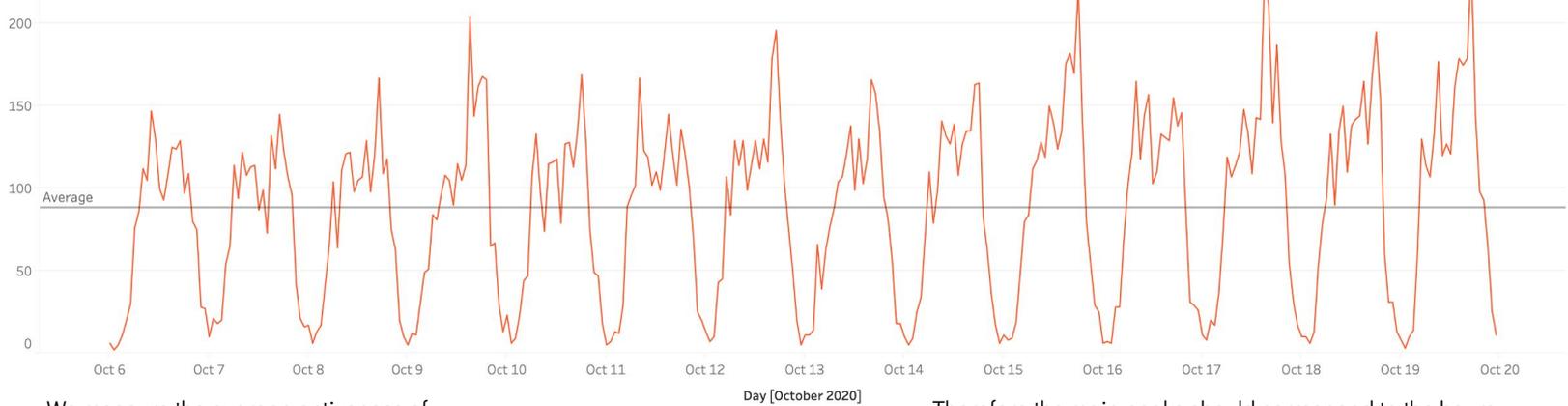


The analysis was conducted within the period of the conflict between Armenia and Azerbaijan and could differ from everyday activity.

## Day of the week



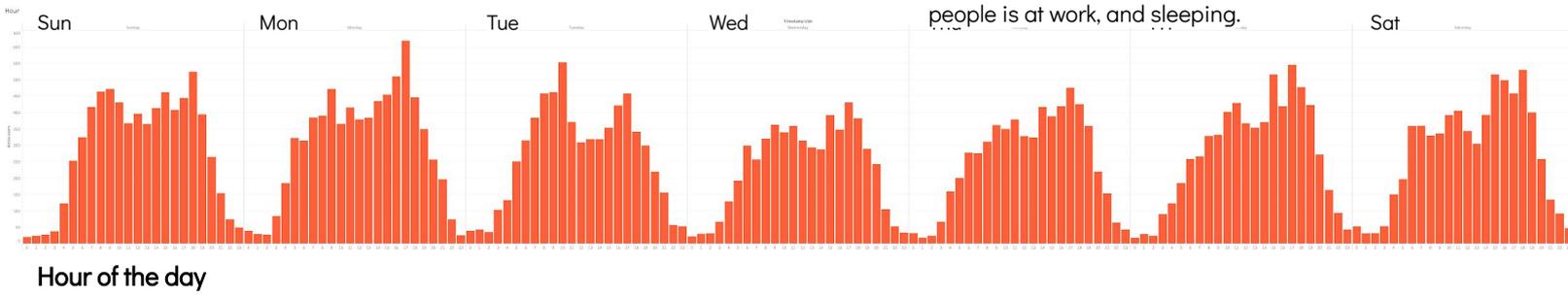
## October



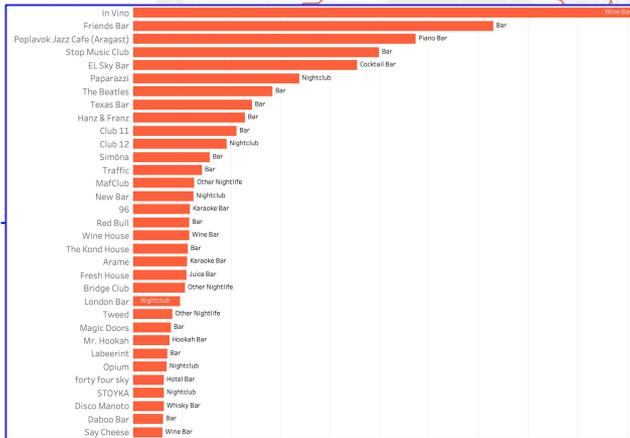
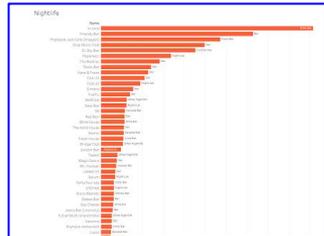
We measure the average activeness of the city by time, by observing the times in which they are active in social media (i.e. instagram) assuming that they use it in their free time.

Therefore the main peaks should correspond to the hours where they (1) take breaks from work (2) have lunch (3) perform leisure.

The main valleys should correspond to the times where most people is at work, and sleeping.



## NIGHT ACTIVITY

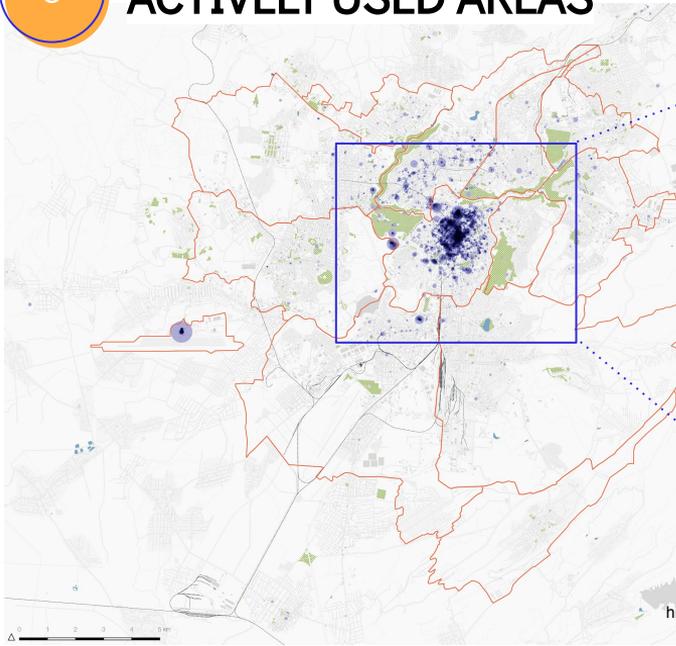


Popularity of nightlife amenities high ●●●● low

We calculated the popularity of nightlife amenities by the overall number of times that they have been visited through time.

We find three main clusters of nightlife in the central district, which is the most active area.

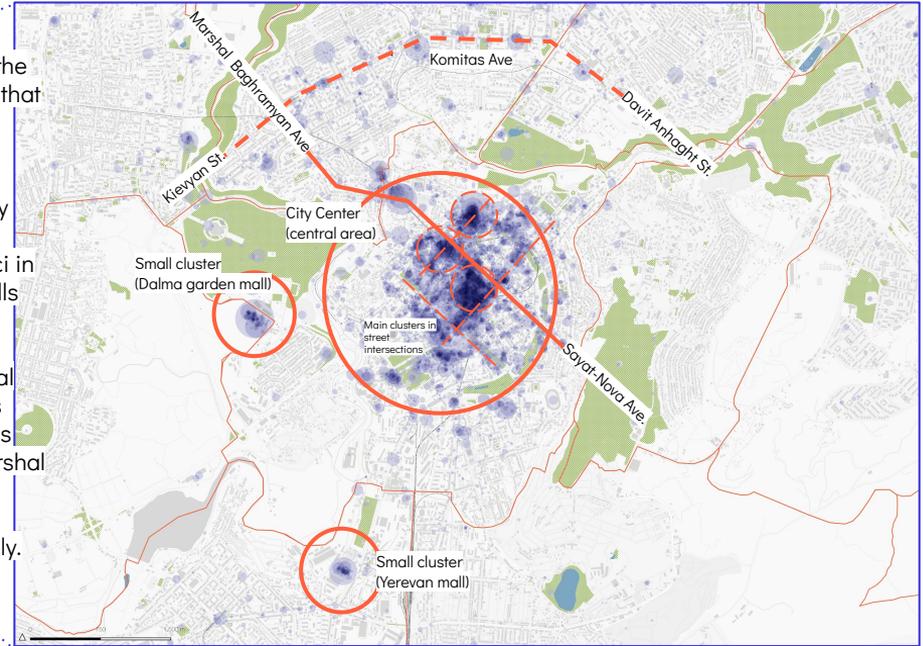
# ACTIVELY USED AREAS



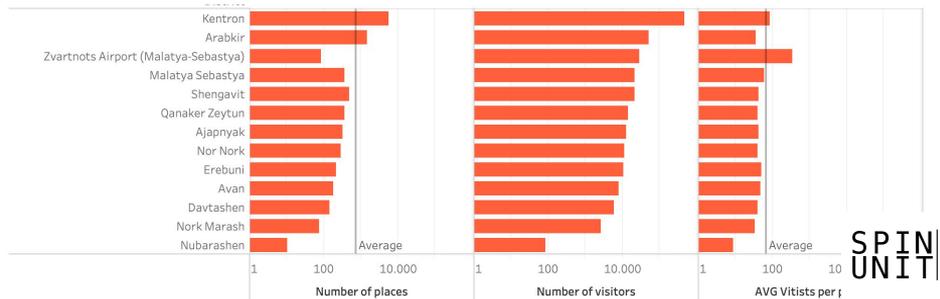
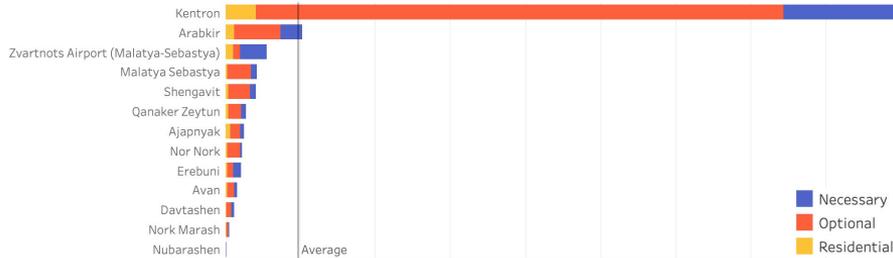
We calculated the popularity of places by the overall number of times that they have been visited through time.

We find the main activity clusters in the central district, and isolated foci in suburban shopping malls and the airport.

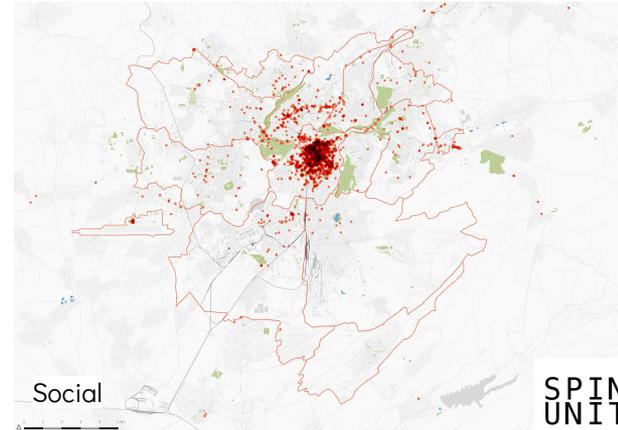
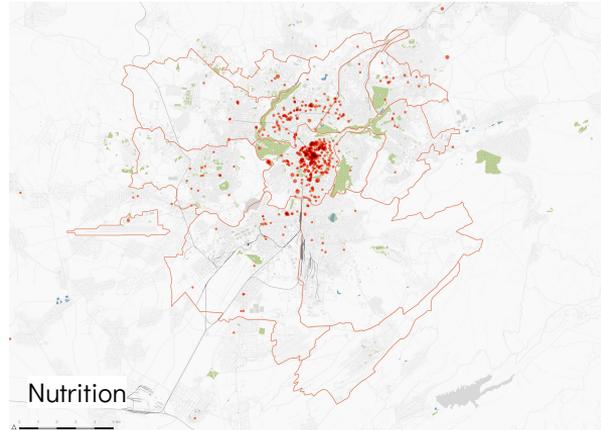
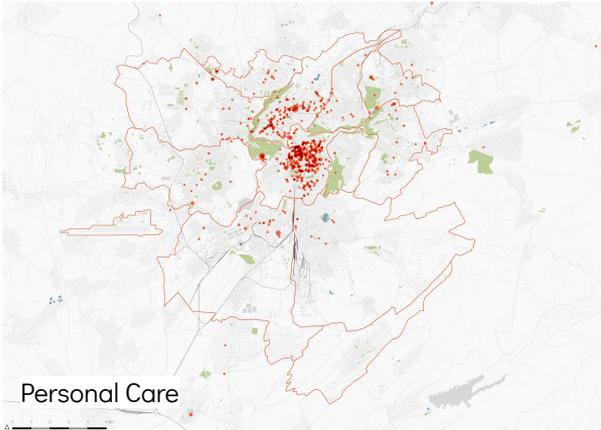
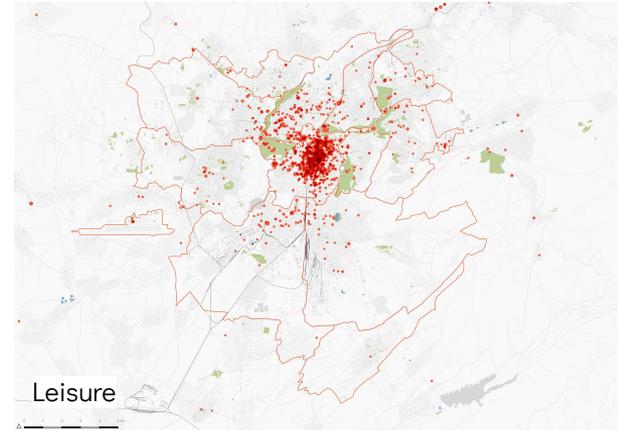
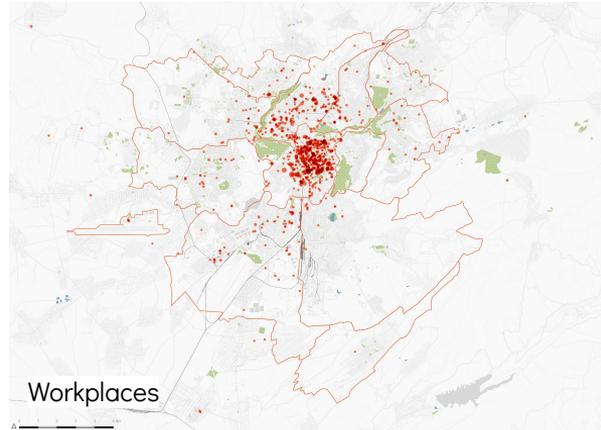
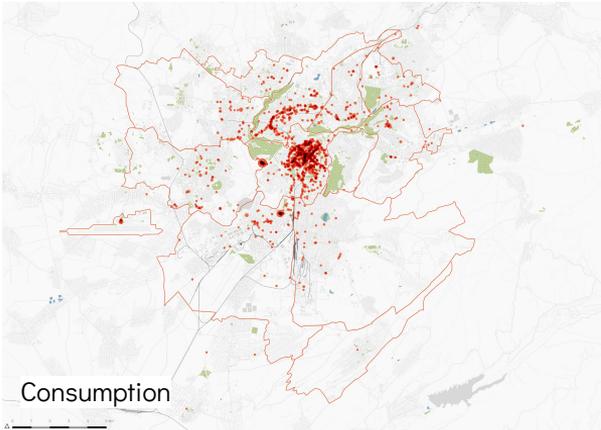
The activity of the central and northern districts is structured along the axis "Sayat-Nova Ave. – Marshal Baghramyan Ave", and "Kievan-Komitas-David Anhaght St.", respectively.



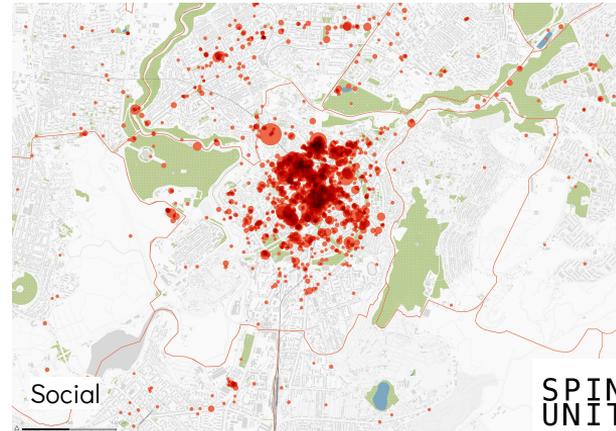
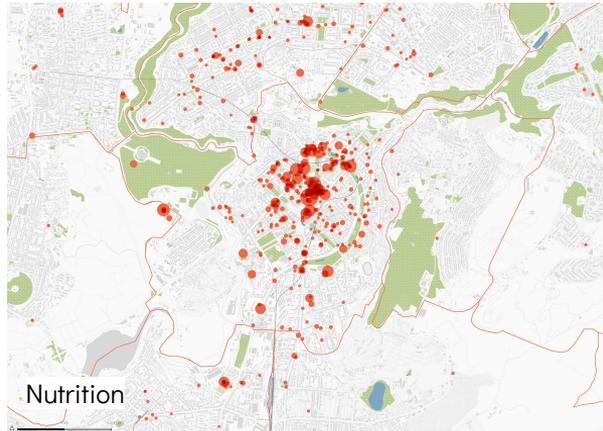
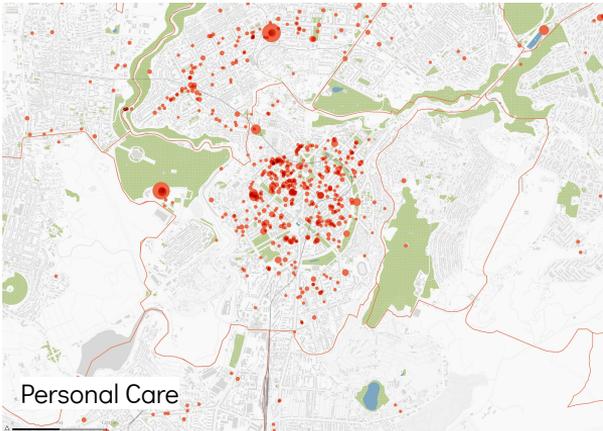
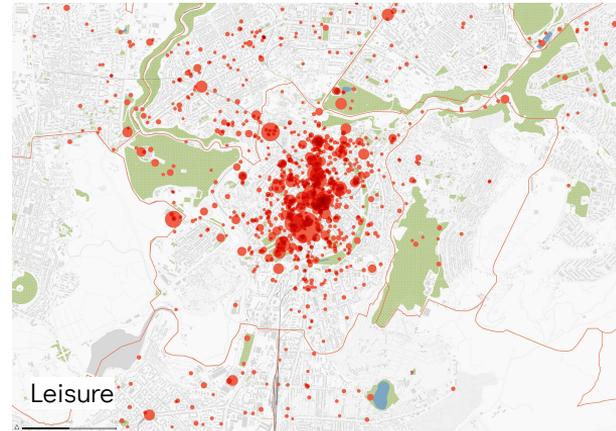
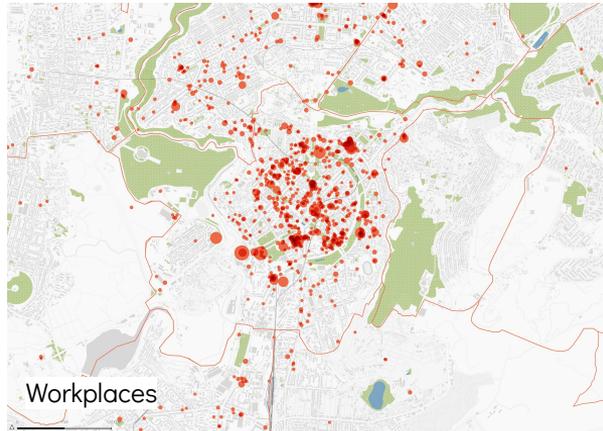
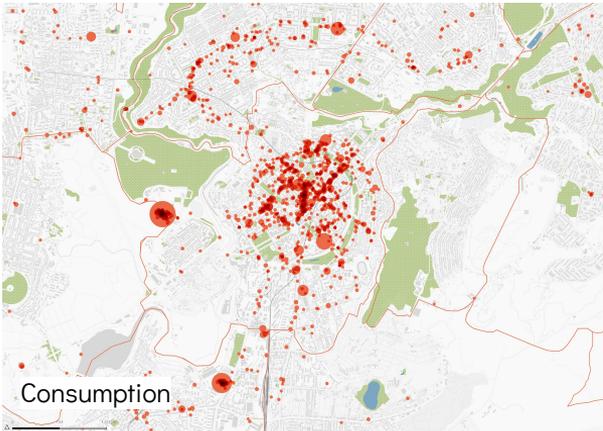
## Number of different visitors visiting each place



# ACTIVELY USED AREAS

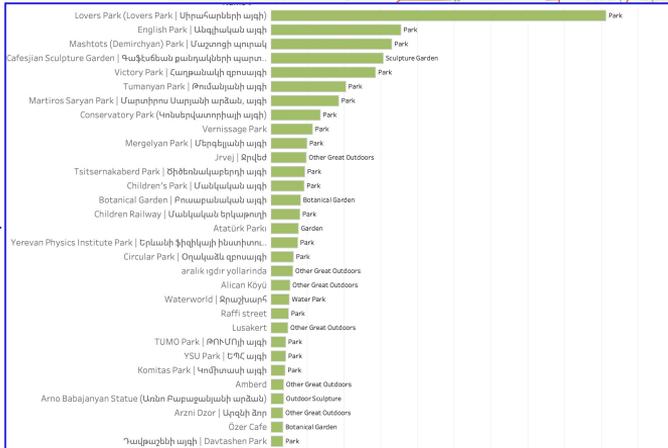
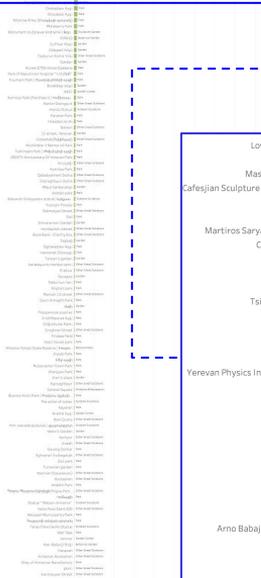
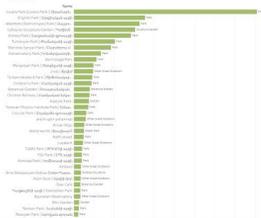


# ACTIVELY USED AREAS



# OUTDOORS AND GREENERY

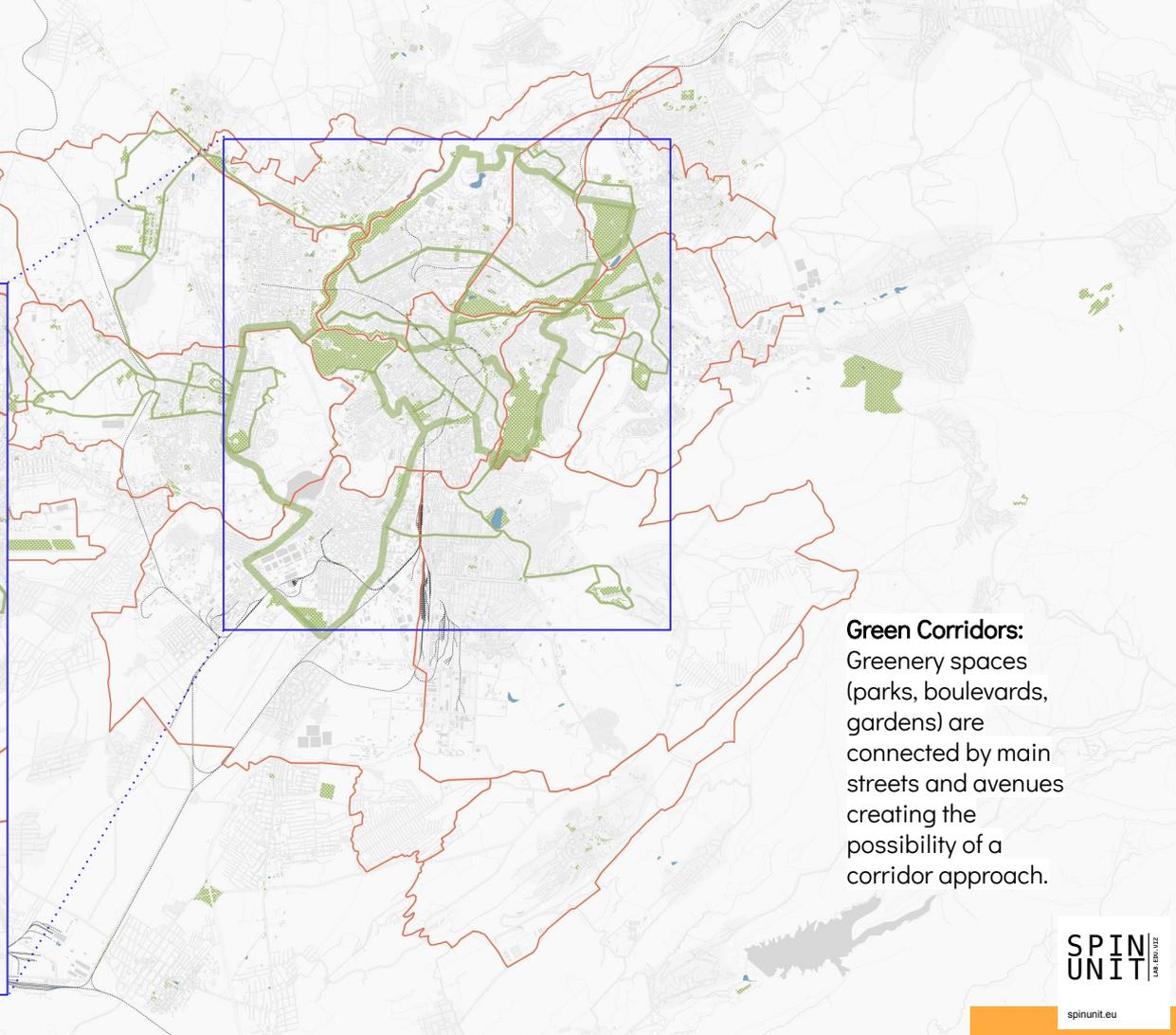
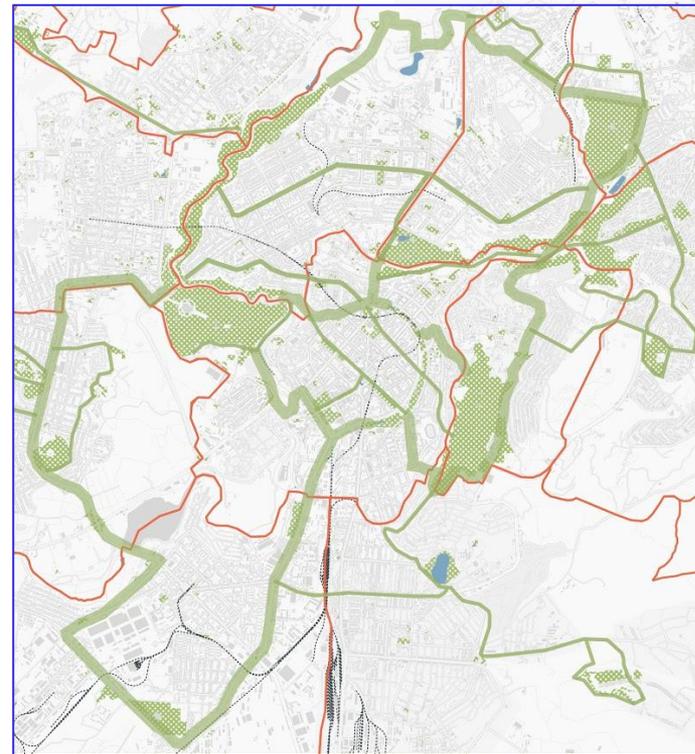
Greenery



Relevance of green and PS

high ● ● ● low

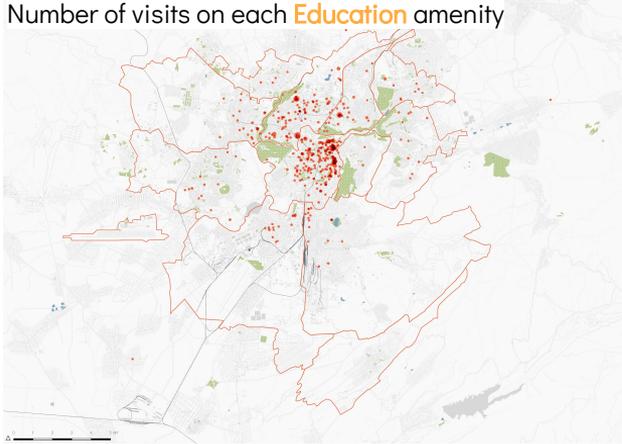
The most popular Green spaces have smaller size. It's not the size that drives the popularity of parks but their location, accessibility, their surroundings, and their aesthetic features.



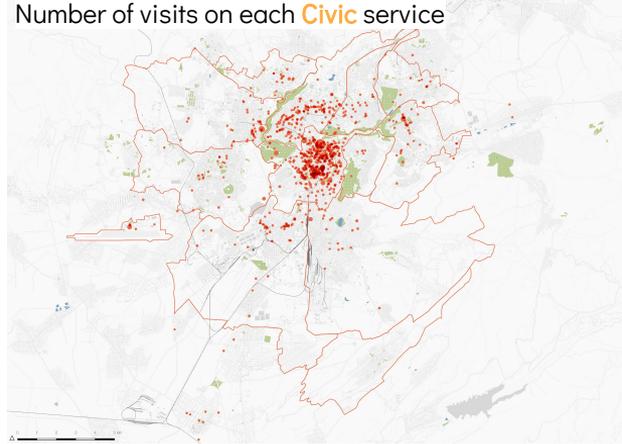
**Green Corridors:**  
Greenery spaces  
(parks, boulevards,  
gardens) are  
connected by main  
streets and avenues  
creating the  
possibility of a  
corridor approach.

# SOCIAL FACILITIES

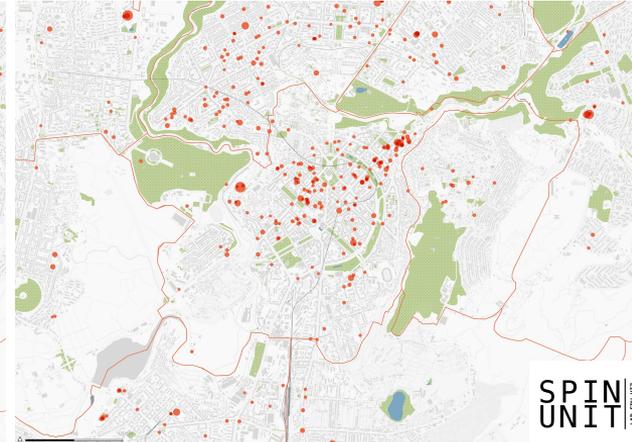
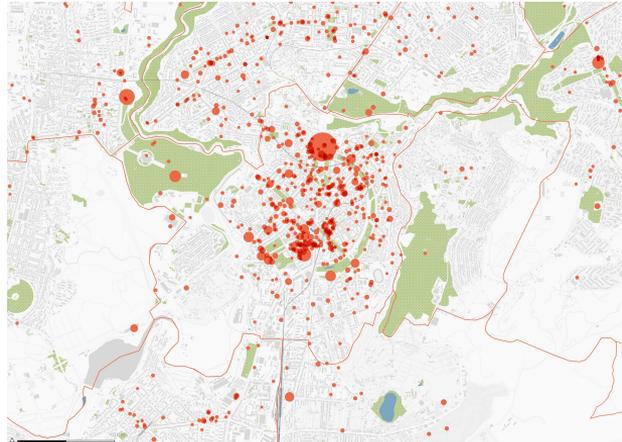
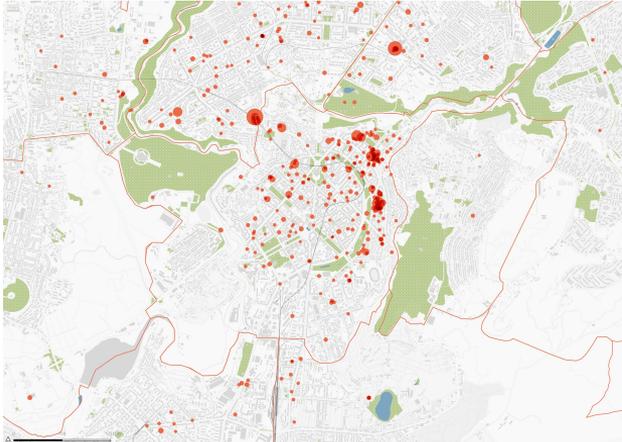
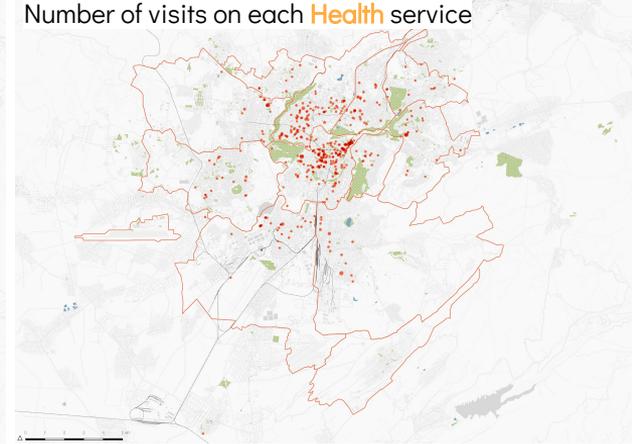
Number of visits on each **Education** amenity



Number of visits on each **Civic** service



Number of visits on each **Health** service



# SOCIAL FACILITIES

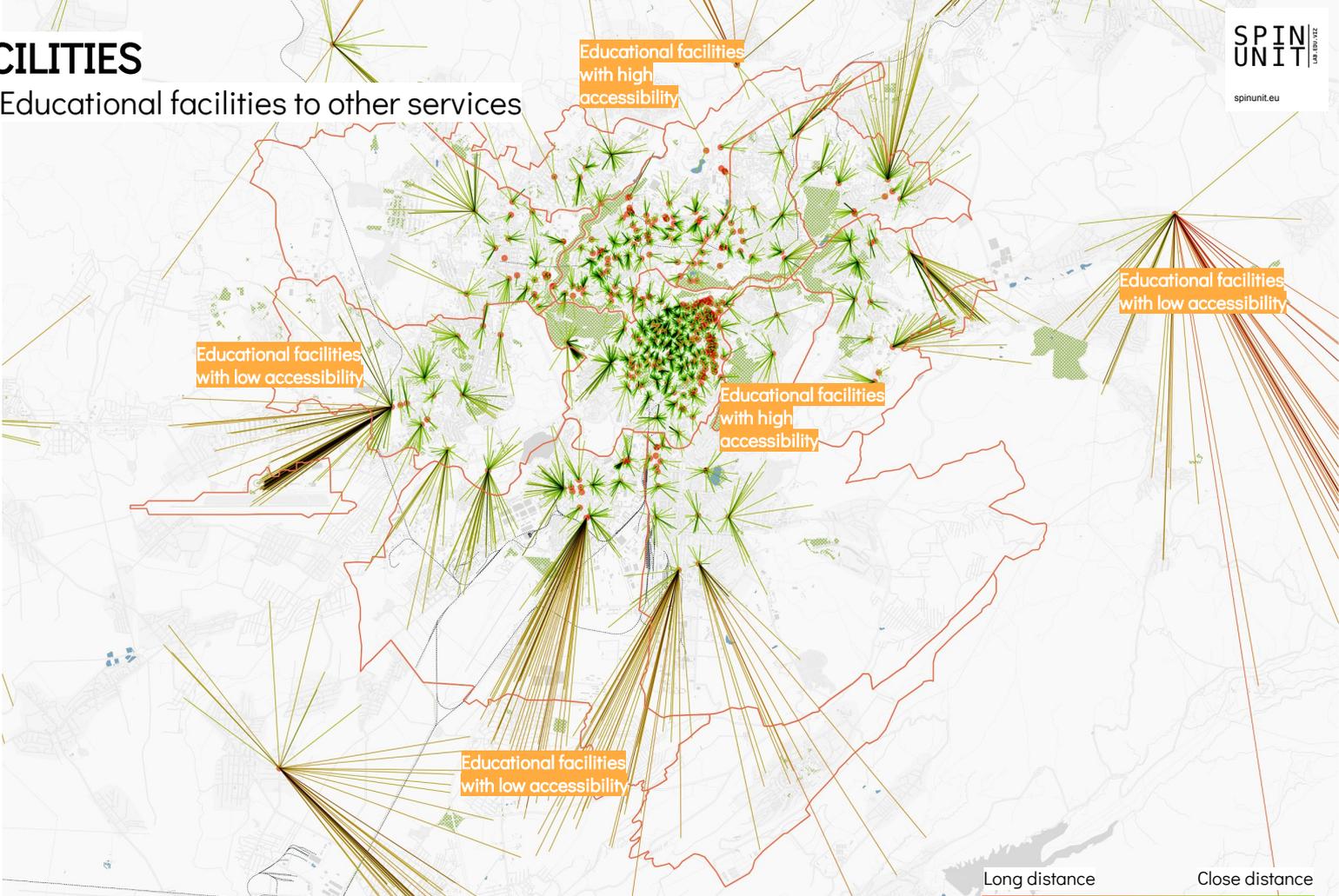
## Distance from Educational facilities to other services

### Distance to educational facilities:

We infer that accessibility and distance are related. The closer a service is to a place, the more accessible.

In this sense, calculating the distance from all services to the educational facilities we can observe which areas of the city have higher or lower accessibility to education, and observe if educational facilities services are equally distributed for all areas.

We can observe a high density of educational services in the central district, all of them with high accessibility. The northern districts also have a high density and accessibility to educational facilities. The access to education is reduced in peripheral areas near the external borders of the city, probably due to lower residential density.



Distance from buildings of Educational facilities to other buildings containing services

# SOCIAL FACILITIES

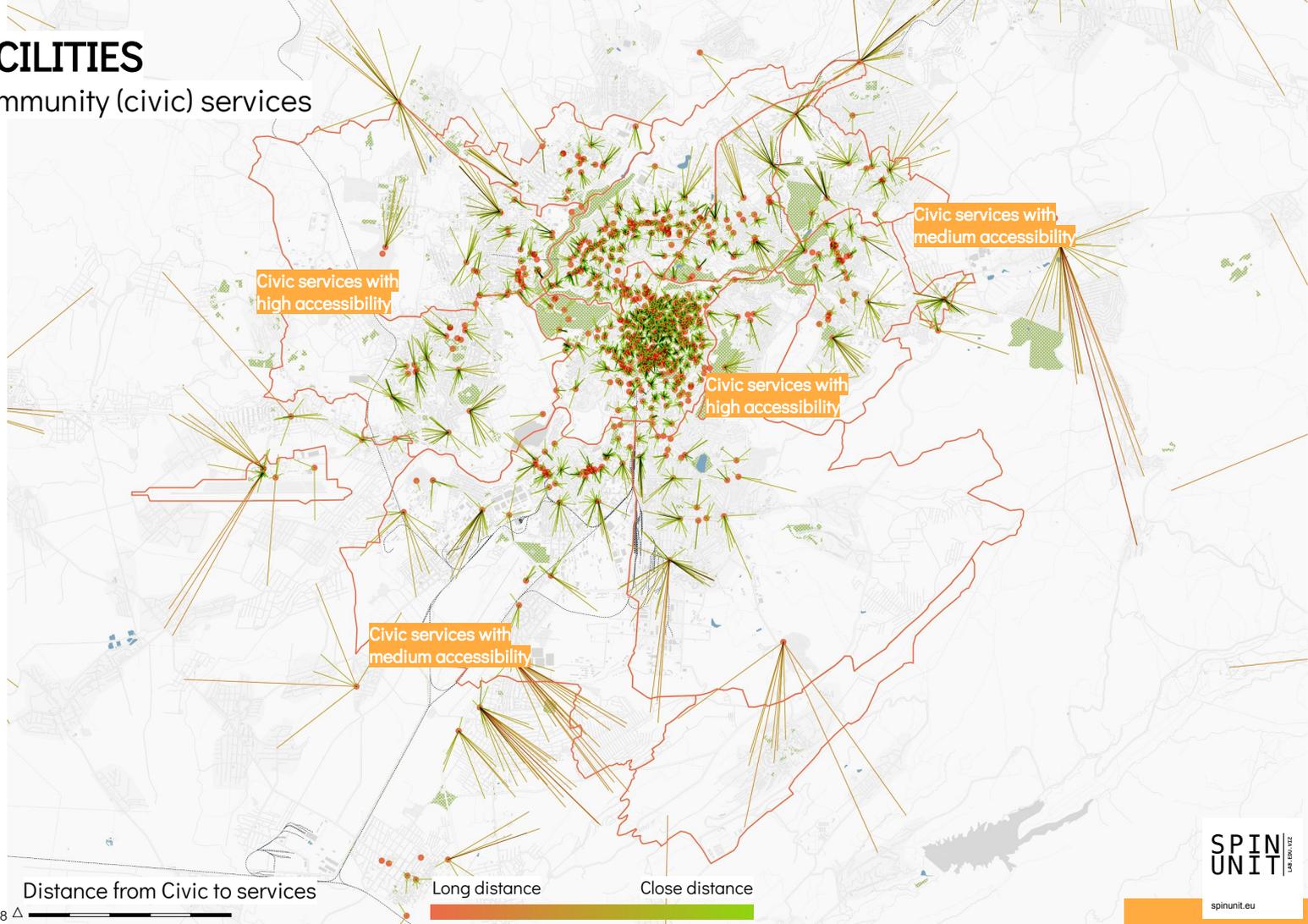
## Distance to community (civic) services

### Distance to community services:

We infer that accessibility and distance are related. The closer a service is to a place, the more accessible.

In this sense, calculating the distance from all services to the community services we can observe which areas of the city have higher or lower accessibility to civic activities, and observe if community services are equally distributed for all areas.

We can observe a high density of community services in the central district, all of them with high accessibility. The northern districts also have a high density and accessibility to community services. The access to civic activities is reduced in peripheral areas near the external borders of the city, probably due to lower residential density.



Distance from Civic to services

Long distance

Close distance

# SOCIAL FACILITIES

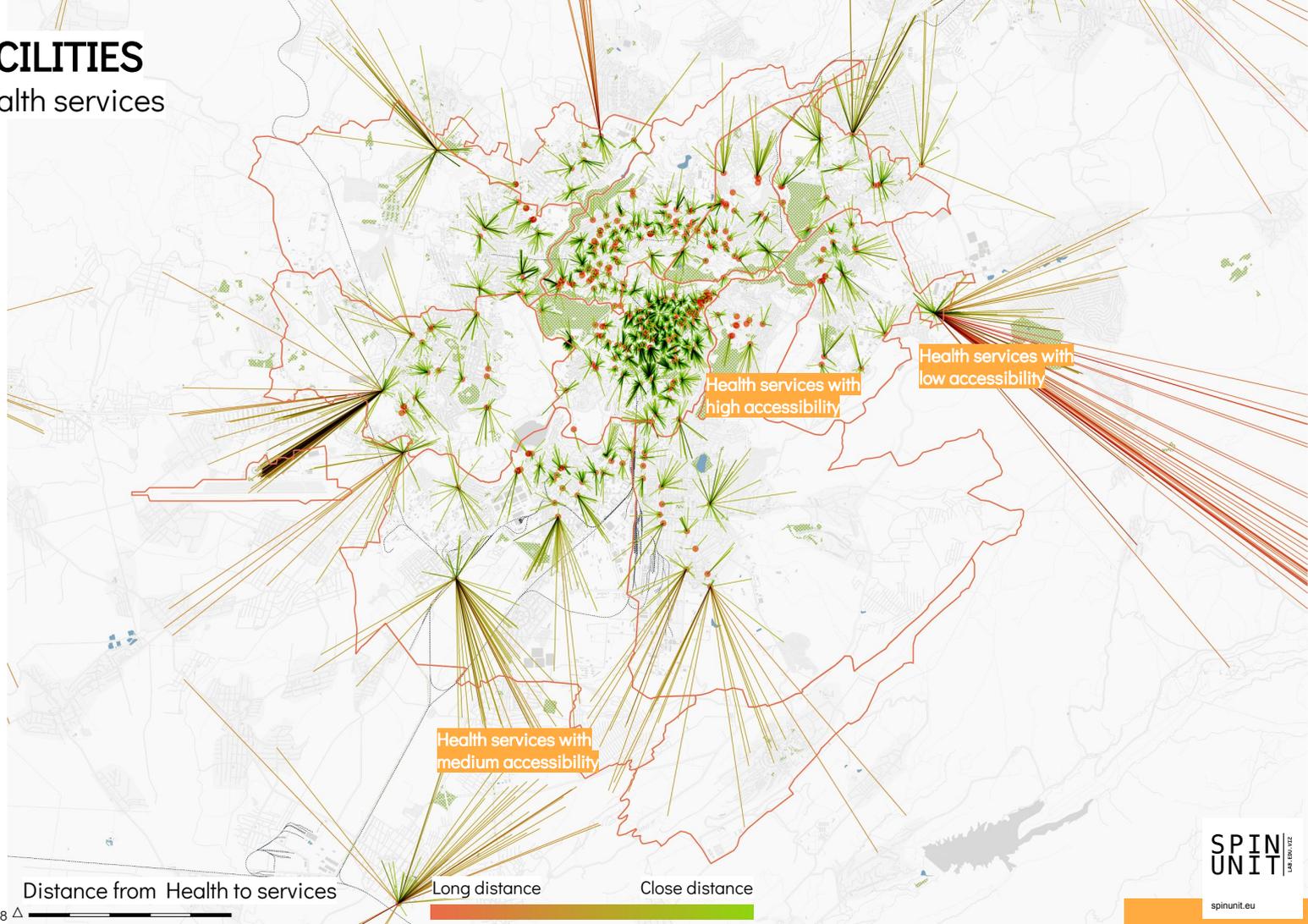
## Distance to health services

### Distance to healthcare:

We infer that accessibility and distance are related. The closer a service is to a place, the more accessible.

In this sense, calculating the distance from all services to the healthcare centers we can observe which areas of the city have higher or lower accessibility to healthcare, and observe if health services are equally distributed for all areas.

We can observe a high density of health services in the central district, all of them with high accessibility. The northern districts also have a high density and accessibility to health services. The access to healthcare is reduced in peripheral areas near the external borders of the city, probably due to lower residential density.



Distance from Health to services

Long distance

Close distance

# TRANSPORT AND ACCESSIBILITY

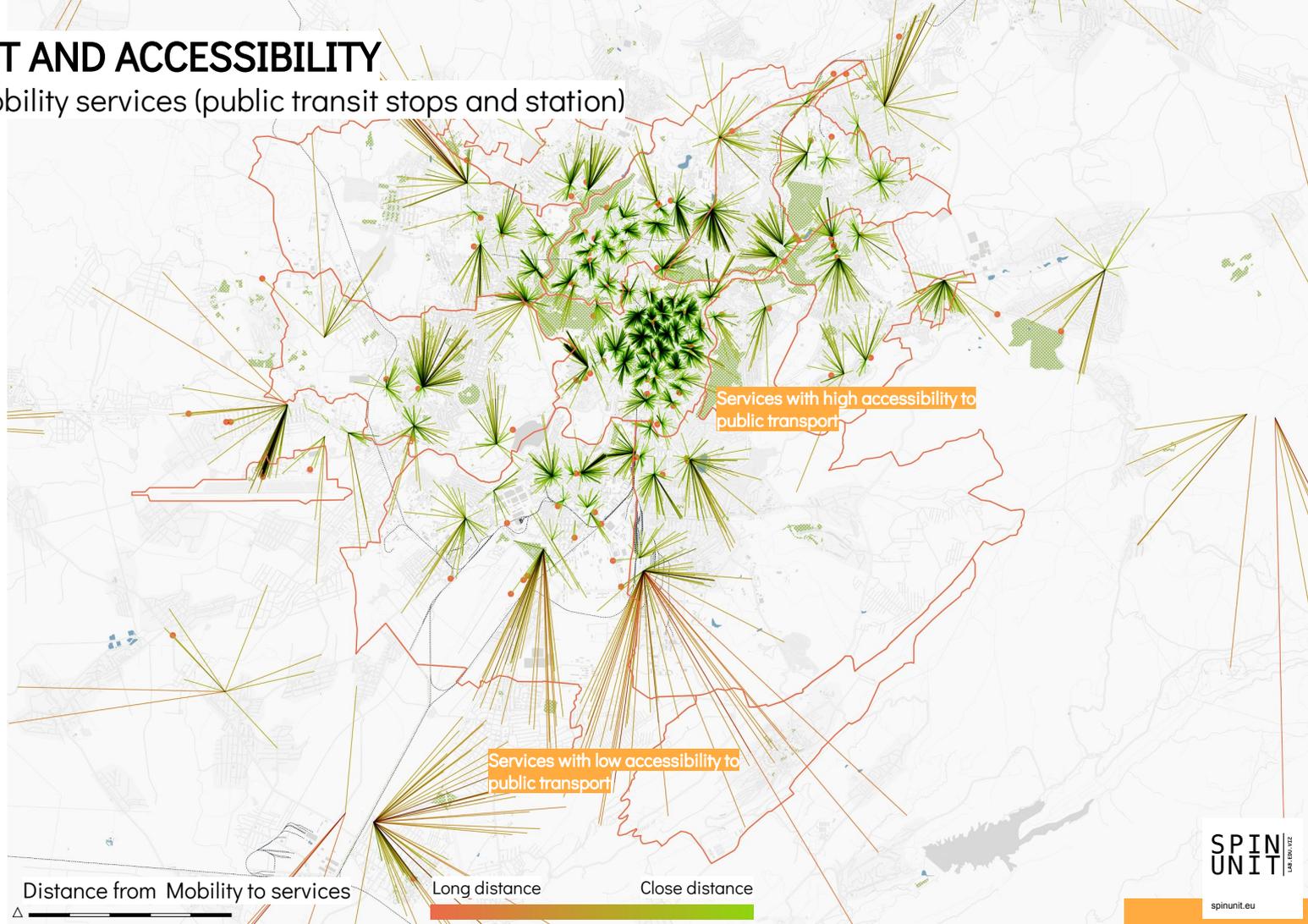
## Distance to mobility services (public transit stops and station)

### Distance to services:

We infer that accessibility and distance are related. The closer a service is to a place, the more accessible.

In this sense, calculating the distance from all services to the mobility nodes (public transport stops) we can observe which areas of the city have higher or lower accessibility to mobility nodes from the rest of services.

We can observe the central district being highly accessible, and the most peripheral areas with low accessibility to public transport. However, we will see in Section 12 that these areas will have a high accessibility in terms of connectivity through the street network, meaning that the need for transportation is supplied by private mobility.



Distance from Mobility to services

Long distance

Close distance



# ACCESSIBILITY

The centrality of streets, based on Space Syntax analysis of the street network, calculates the likelihood of a street segment to host pedestrian movement.

Central streets are better connected to more places in the city. The index of centrality indicates how well connected a street is, considering all other streets in the city.

high  low

Centrality of streets Sources (1) Space Syntax result from OSM street network

 **Accessible areas:**  
Areas with high accessibility are located closer to main access roads and highways, and the city center. Accessibility is computed as in how easy is to reach all other places in the city from them. They tend to be the origin and destination of most trips of daily basis, generally (1) commuting from home to work, (2) logistic transport, (3) daily recreational and leisure activities.

 **Accessible intersections:**  
Intersections with high accessibility are located in the crossing of two or more main roads (highways). From those intersections, the majority of places in the city can be reached. In those intersections traffic tends to be higher. Due to high traffic and large infrastructural requirements, they tend to be isolated.



### Main Streets

The higher distribution of activities concentrates in the central district Kentrom, the most popular and dense. Followed by Arabkir and the south west part of Qanaqer-Zeytun, which host one of the mayor axes out of Kentrom, providing with continuity east to west via the concatenation of Kievan Street, Komitas Avenue, and David Anghagt Street. These three streets are outlined as an arch parallel to the boundaries of the central district. Marshal Baghramyan Ave connects this area with the center, via the intersection at Barekmautyn, one of the busiest public transport stations.

### Central Area

The central district concentrates the higher density and diversity of activities and activity types, and they're structured in small and subsequent type clusters, which follow a distribution long Sayat-Nova Ave, and it's intersections with Nalbandyan Street and Mesrop Mashtots Avenue. These intersections not only frame centers of activity and popularity but also concentrate the higher number of people. The last of streets mentioned, Mesrop Mashtots Avenue, is also the most central and accessible street, with potential to host high traffic levels especially at the north and south ends.

### Isolated Small Clusters

Three isolated centers of activity stand out regarding number of visits and activity levels: The International Airport, Yerevan Mall, and Dalma Garden Mall. The International airport, even though the diversity of activities is related to fast-food and transport, concentrates the highest number of visitors in the city. Yerevan and Dalma Garden malls enclose both high diversity (shopping, leisure, food) and density of people visiting them.

### Green areas

The main factor that seems to influence the popularity and social success of parks and green spaces is their proximity to popular places. Most frequented gardens and parks are those situated in the central district near the main structural axes or at their intersections. The size of parks does not influence this process, as larger parks such as the botanical garden, or the riverfront of Hrazdan River, concentrate considerably less visits than smaller central gardens such as Freedom Square or the Lovers' Park. Due to the proximity to main streets, there is a great potential to connect these parks in a "green corridor" strategy.

## USING FOURSQUARE DATA

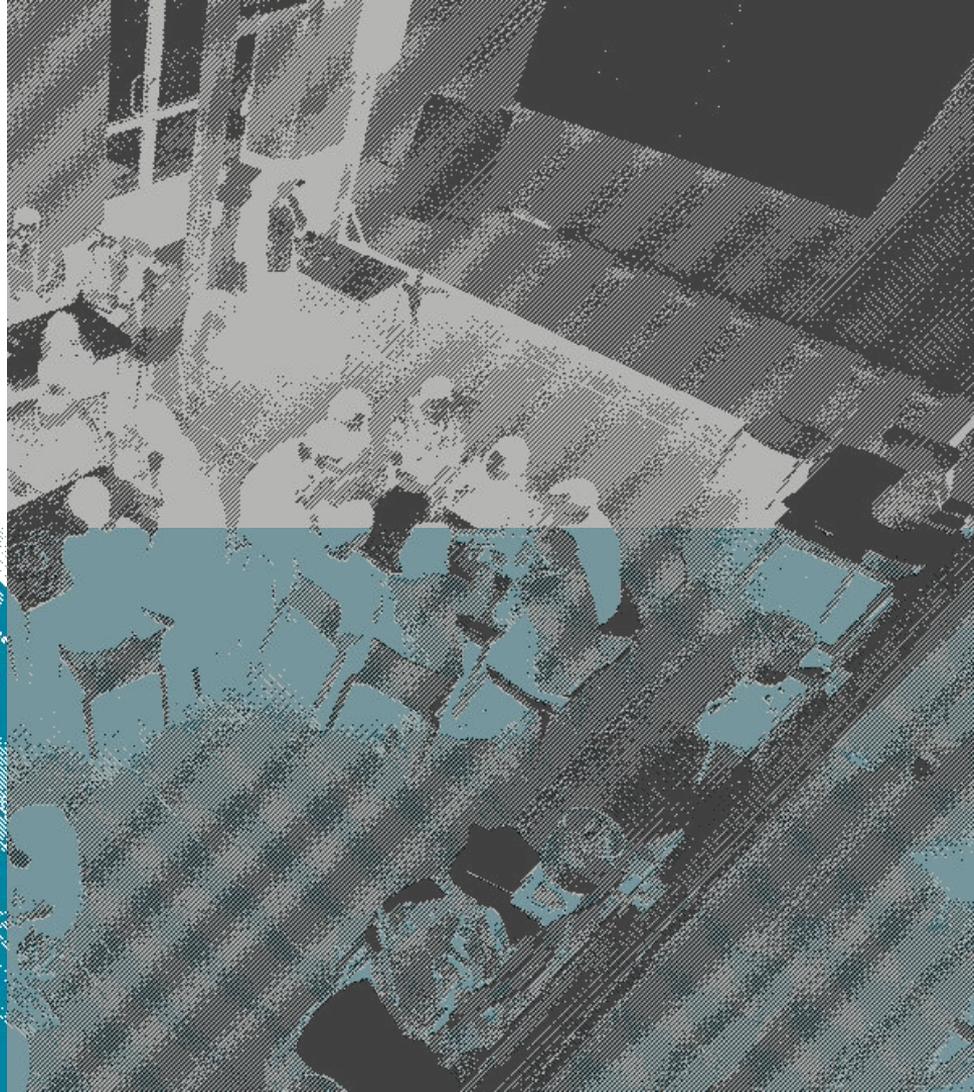
Mapping activities begins with retrieving the Foursquare dataset of all urban amenities and categorising them to the nature of the activity that can be performed in them. Traditionally, Jan Gehl deployed a reliable classification system to study public space and the links between design and public life. Even though Gehl's focus is in small public spaces such as streets, squares and parks, his approach can be used to survey urban space in general thanks to its elemental yet powerful categorization. The applicability of a classification to all kinds of activity within the city should be regardless of space characteristics – including also those performed in indoor or private spaces. Operationalising and scaling up this approach would potentially allow estimating and study activity patterns for one or many cities while keeping the resolution of the analysis at a human scale. The core benefit of this approach including crowd-sourced data is the possibility to chart tangible environment with the elements that are intangible but valuable for the social and economic success of one neighbourhood and its streets and squares (Cerrone, López Baeza & Lehtovuori, 2020).

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**STRELKA KB** 

**YEREVAN: USER VIEW**  
**SOCIAL MEDIA**  
**LISTENING RESEARCH**



# ABOUT KB STRELKA: PROJECT TEAM

KB Strelka is a leading strategic consultant that brings city administrations, the business world and local residents together to come up with effective solutions for urban development.



IANA KOZAK

PROJECT MANAGER  
KB STRELKA

**Masterplanning, integrated development strategies and models, guidelines development**

Iana is an architect, urban planner and the Project Team Manager at KB STRELKA. She developed guidelines and strategies for urban planning, open spaces and landscape design for various climate zones from hot arid to polar climate.



DARIA RADCHENKO

DIGITAL ANTHROPOLOGIST  
KB STRELKA

**Anthropological research design, conducting, and management (including Social Media Listening, Social Media research, field research)**

Darya Radchenko is leading Digital anthropological studies at KB STRELKA. She is also working in the Laboratory of Theoretical Folklore Studies at the Presidential Academy of National Economy and Public Administration (RANEPA). Among her responsibilities: developing and introducing innovative research methods and strategies.



VADIM EGOROV

DATA ANALYST  
KB STRELKA

**Information systems architect, technologist, chief developer of machine learning-based products**

Vadim Egorov is a part of Urbantech Team involved in projects such as the “What the City Wants” crowdsourcing platform, chatbots for conducting surveys and collecting ideas. Vadim also took part in the development of the methodology for the Quality Index of the Urban Stream for 1117 cities in Russia.

# SOCIAL MEDIA: VALUE AND LIMITATIONS OF DATA

— Natural discussion: Social media present unstimulated user texts, which have not been produced to answer a researcher's question. In social media, the live process of discussion on object under research can be encountered.

— Current data: It is worth to investigate social media to determine what social media users discuss today while speaking of cities. As it is a flexible process, the key topics and objects in the focus of public interest may have been different a few years ago and might change again.

— Influence on opinions: Peer-to-peer communication in social media influences public attitude towards the object (as confirmed by representative surveys and mathematical modelling, see e.g. Wang et al 2012\*).

— Big data: Social media provide hundreds of thousands of texts produced by as many social media users.

— Limited representation: The data is limited socially. It reflects the attitudes of people who have access to technologies (about 75% population of Russia, 72% of Armenia\*\*), and who are inclined to produce content.

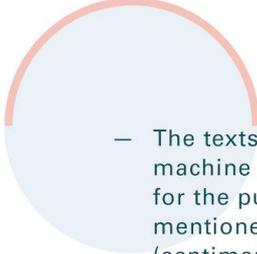
\*Wang, Xia & Yu, Chunling & Wei, Jack. (2012). Social Media Peer Communication and Impacts on Purchase Intentions: A Consumer Socialization Framework. Journal of Interactive Marketing. 26. 198-208. 10.1016/j.intmar.2011.11.004.

\*\* For Russia Source: TNS Web Index  
For Armenia Source: Asia Internet Stats by Country and 2020 Population Statistics

# METHODOLOGY AND DATA

- 
- The research is based on non-stimulated user texts in social media, mentioning Yerevan, its districts and territories, and produced during 12 months in the period of Oct 2019-Sept 2020.

- 
- The texts were approached via Brand Analytics (social media analysis service).

- 
- The texts have been analyzed by machine learning algorithms (NLP) for the purpose of grasping the key mentioned objects, the contexts (sentiments) in which they were mentioned, and lack/abundance of particular urban features and objects defined.

- 
- Russian language and Armenian language social media texts have been analysed.

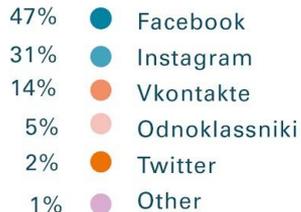
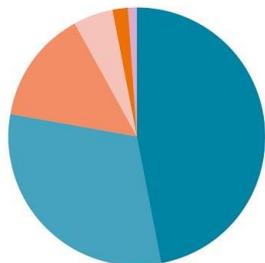
- 
- Only texts produced by Armenia-based users were selected.

- 
- Advertisements have been excluded.

# TEXT CORPORA AND SOCIAL MEDIA ENVIRONMENT

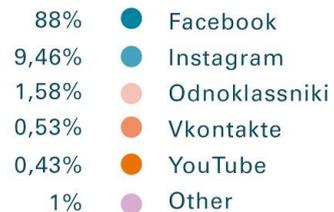
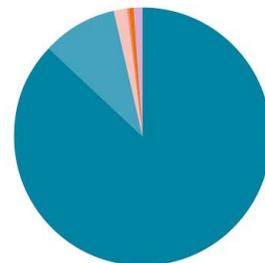
## RUSSIAN

- 138 321 texts
- Accounts both for Russian-speaking Yerevan insider view on Yerevan and “media image” of Yerevan produced specifically for and by tourists and expatriates
- Top social media to discuss Yerevan urban life in Russian are: Facebook, Instagram, Vkontakte
- Authors’ texts are distributed almost evenly between age groups (54% aged 18-44, 21% aged 25-34) slightly more often females (55% women, 45% men)
- 75% of authors posted texts in private accounts, 25% — in official media and business accounts



## ARMENIAN

- 349 290 texts
- Includes mostly the posts made by inhabitants of Yerevan (insider view)
- Facebook is by far the major social media platform for Armenian-speaking users discussing Yerevan problems
- It is also the most COVID-affected media: while Instagram dynamics remains stable throughout the year, Facebook posts quantity is declining dramatically
- Authors of texts are on average younger than in Russian corpus (83% aged 18-44; 37% aged 25-34.) Women also dominate in this corpus (60% females, 40% males.)



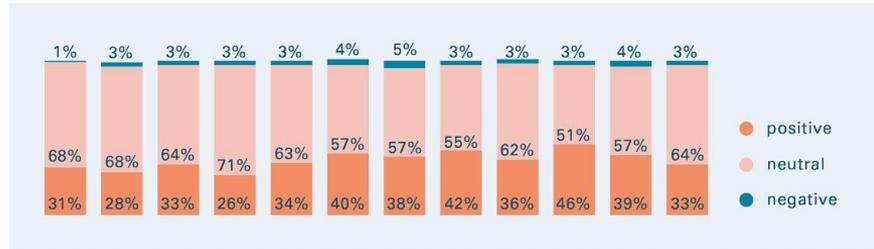
YEREVAN LIFE AND PROBLEMS TEND TO BE DISCUSSED MOSTLY ON FACEBOOK WITH CORE GROUP OF AUTHORS BEING WOMEN AGED BETWEEN 25-44 Y.O.

# COVID-19 IMPACT ON SOCIAL MEDIA DISCUSSIONS

## 1. DYNAMICS OF SOCIAL MEDIA TEXT QUANTITY (% TO YEAR TOTAL) COMPARED TO CONFIRMED COVID-19 CASES\*



## 2. DYNAMICS OF SOCIAL MEDIA EMOTIONS



Discussion of urban life of Yerevan flourished in the winter period around the Christmas holidays and after. However, COVID-19 anxiety in media (first based on situation abroad, later on confirmed cases in Armenia) to a large extent supplanted the discussions of urban agenda from social media.

As can be seen from the graph 1, since the number of confirmed cases increased and the lockdown was introduced on March 23, the number of urban life texts slid downwards.

Despite lockdown being partially lifted on May 4, only a slight reversion of this trend is observed. The growth of the number of confirmed COVID cases leads to a gradual decline of social media discussions due to limited experience of the city use during the pandemic.

However, the interest in urban phenomena and city itself has in total increased. As the graph 2 shows, before COVID, the lion's share of texts tended to be emotionally neutral (information, advertisement, etc). COVID led to a decrease of urban-related topics and increased share of texts with positive emotional attitude towards the city. No significant negativity and fear of being together in the city with other people have been observed. In general, COVID affected mostly business activity (less advertisements and commercially targeted content) in social media.

\* Source: World Health Organization, URL: <https://covid19.who.int/region/euro/country/arm>

# KEY TOPICS

	TOTAL, % OF ALL MENTIONS	OF THEM, POSITIVE	OF THEM, NEGATIVE
activities	27%	44%	7%
facilities	15%	33%	5%
landmarks	33%	22%	8%
territory	12%	22%	13%
transport	13%	10%	14%

In the Russian corpus, oriented mainly towards outsiders' interests, the most popular topics are targeted on tourists – attractions and possible city activities targeted on tourists. These texts tend to deliver a positive view on the attractions.

Condition of public spaces and qualities of particular territories are discussed less frequently overall, but those texts contain far more criticism.

This is even more visible in the transport discussion. Nevertheless, this is not necessarily a symptom of critical problems. Generally, people tend to write about transport after a negative experience, and in 2019-2020 the negativity was supported by problems of canceled flights due to COVID. Most texts about transport remained purely informational (neutrally colored).



# TOPICALITY RATING

SHARE OF TEXTS INDICATING TOPIC IN TOTAL TEXT  
COUNT

Leisure activities	18,14%
Public and personal transport	7,89%
Streets and squares	7,31%
Education	7,23%
Heritage	6,99%
Services	6,81%
Housing	6,67%
Healthcare	6,11%
Parks and greenery	5,21%
Religious establishments	4,87%
Road network	3,51%
Sport	2,91%
Outdoor lighting	1,39%
Social problems	1,38%
Garbage	1,13%
By-house areas	0,55%
Communal services	0,37%
Parking	0,22%
Bikes	0,15%
Toilets	0,08%

— Most popular topics are connected with leisure activities (18,14%), heritage (6,99%), shopping and services (6,81%). They are commonly supported by information on transport and addresses (“how to get there” guide)

— On the contrary, everyday life problems like parking, garbage, communal services and social problems are discussed far less frequently (less than 2% in total)

— Partially this corresponds with general social media norms (on Facebook and particularly Instagram), people tend to represent themselves by associating their lives with positive events and environment rather than encounters with everyday problems (see e.g. [Miller et al 2016]\*)

— However, this situation also reflects the most important questions of urban life and in particular of living in the capital city, which assumes access to a variety services. Yerevan inhabitants expect the city to provide them with leisure, sport, shopping facilities, education and healthcare

— Everyday aspects of life (communal services, maintenance of public spaces) are often taken for granted and discussed only in case something extraordinarily negative happens

\*Miller, Daniel, Elisabetta Costa, Nell Haynes, Tom McDonald, Razvan Nicolescu, Jolynna Sinanan, Juliano Spyer, Shriram Venkatraman, and Xinyuan Wang. How the World Changed Social Media. London: UCL Press, 2016.

# TRANSPORTATION

# ROAD NETWORK

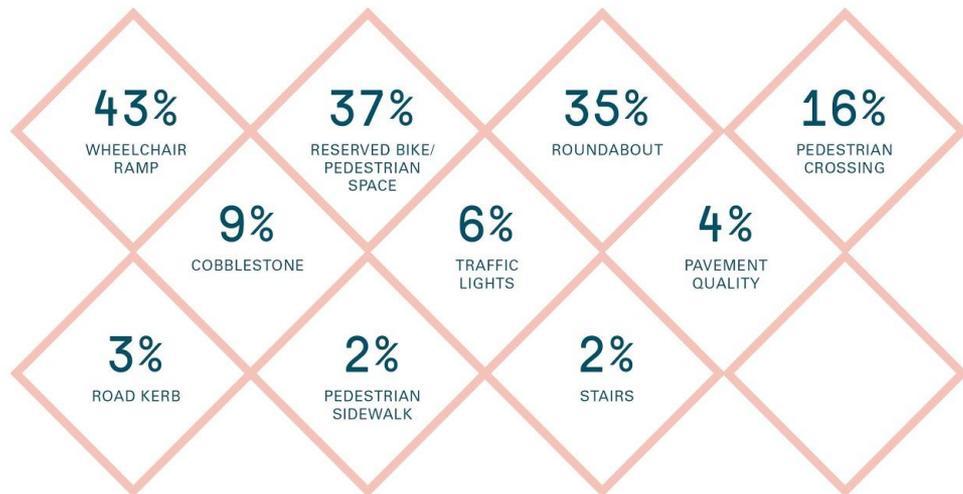
“It is really dangerous to ride a bike on the roads of Yerevan, and very inconvenient on sidewalks too. And just forget about the bike lanes in the city centre.”

MALE, FACEBOOK, 19/08/2020

“Len-jan, how can you feel safe in a city where many drivers are just killers or suiciders? I cannot ask kids to go and buy bread, we live on Gaidar street, old street in Yerevan, and we have no sidewalk at all! But what we do have is cars driving at mad speed and cars parked on both sides of a narrow 3 meter road.”

FEMALE, FACEBOOK, 28/02/20

## TOP-10 PROBLEMS:



## AVERAGE SHARE OF CRITICAL TEXTS

2%

The major critical problems regarding the system and quality of road networks are connected with accessibility (ramps, stairs), comfort for pedestrians (sidewalks, crossings), regulation of traffic (lights, roundabouts). While quality of the sidewalks is a key factor of walking comfort, people rarely discuss trackway surface (e.g., holes on the road).

Another significant issue for social media users is the problem of “road heritage” — the quality of cobblestone pavements in Yerevan. Generally, the heritage is rarely criticized (only exclusion being cemeteries).

In general, the issues in this sphere are connected with safety and comfort for pedestrians. Possibilities and services for biking also lack in the city, particularly in the centre, since there is a request to use bicycles both as a means of everyday transport and leisure.

# PUBLIC TRANSPORT

Just one question – when normal buses will appear in Yerevan streets? Are we bound to get bounced in those old and miserable minibuses for ages?

FEMALE, FACEBOOK, 10/06/20

Yerevan needs new underground lines. There are none in the largest city districts...

MALE, VKONTAKTE, 17/04/2020

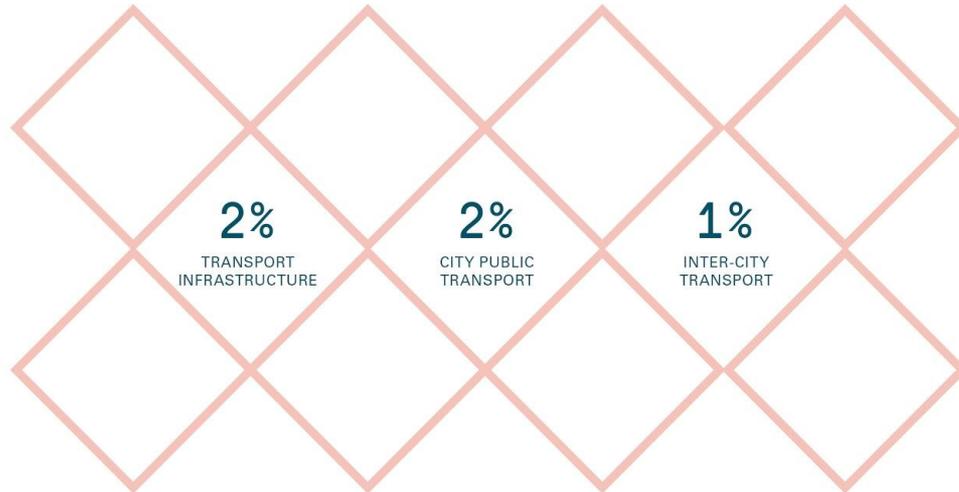
Yerevan minibuses violate all laws of physics :)

MALE, FACEBOOK, 16/01/2020

AVERAGE SHARE  
OF CRITICAL TEXTS

1%

## TOP-10 PROBLEMS:



In Yerevan, the problems of public transport lie within the state and quality of transport infrastructure (railway stations, intercity bus stations, etc.) and city public vehicles. The situation deteriorated during COVID-19 restrictions when closure of public transport ruined everyday logistics of Yerevan inhabitants.

People name mini-buses, trolleybuses, and taxi services as problematic areas.

The only exclusion of generally positively perceived inter-city transport is regional trains as the top problem in this sphere.

# PARKING

“ There are shops, especially in the centre of Yerevan, where you just cannot park a car, so you park with emergency lights, on the second line, and try not to be a bother for others.”

MALE, FACEBOOK, 30/12/2019

“ I was looking for a parking slot for half an hour, turned somewhere on Isaakyan because of a jam, drove to Cascade, whole street is packed with some bastards from the villages!”

FEMALE, FACEBOOK, 4/11/2019

AVERAGE SHARE  
OF CRITICAL TEXTS

10%

## TOP-10 PROBLEMS:



People tend to be very critical about parking in Yerevan: parking lots and garages seem to be one of the most significant lacks in the city (notably, in Russian texts, the criticism is even more visible than in Armenian).

The current critical choice of people is a parking lot rather than a garage.

However, people are critical about the excessive number of non-legal parking spaces that force them to park elsewhere.

# PUBLIC SERVICES

# CULTURAL CONSUMPTION

“Yerevan city stimulates walking – it is very comfortable, everything in the centre, there are a lot of festivals in summer.”

FEMALE, FACEBOOK, 21/05/2020

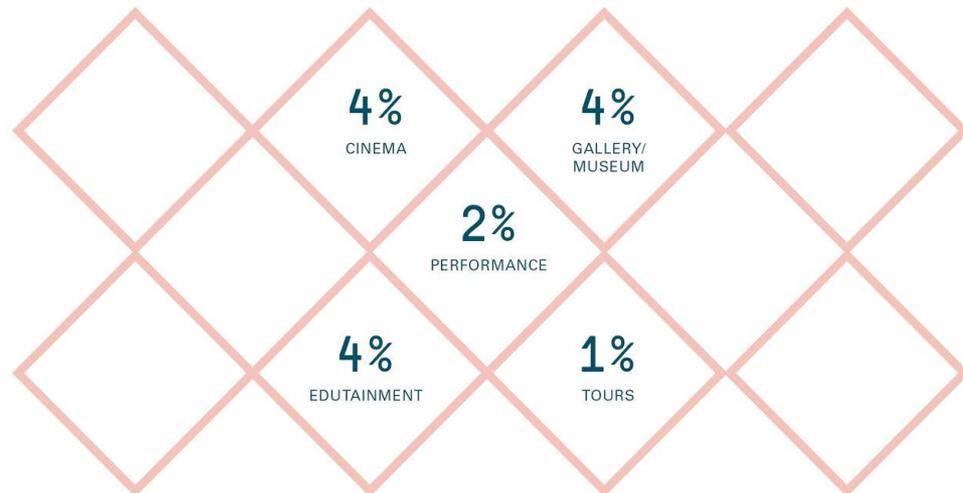
“For the third year we have been fighting over the creation of the Alexander Tamanyan Museum, but we are told that there is no building. Or they don't say anything. There is no building for Tamanyan in Yerevan !!!”

FEMALE, FACEBOOK, 27/3/2020

AVERAGE SHARE  
OF CRITICAL TEXTS

3%

## TOP-10 PROBLEMS:



Generally, the users feel that Yerevan is abundant with cultural consumption options, especially performative arts and music — from opera to jazz.

However, they feel at least lack of cinemas, galleries, and museums.

Options for edutainment are also sought for – in particular, those for children and young people (kids educational clubs, quests, etc.)

Senior users of social media tend to be nostalgic about closed cultural establishments and “commercialization” of Yerevan.

# SPORT

There are only two stadiums in Yerevan – Republican and Razzan.

MALE, VK, 8/9/20

There's an abandoned stadium right in the centre of Yerevan. Cannot imagine this in any European capital.

MALE, INSTAGRAM, 8/1/20

AVERAGE SHARE  
OF CRITICAL TEXTS

13%

## TOP-10 PROBLEMS:



Sport seems to be one of the significant requests for people in Yerevan. While fitness, combat sports, and athletics are apparently developed and raise few issues, most sports requiring specific facilities are underrepresented and mildly accessible.

These include command games (football, volleyball, etc.), pair games (tennis), swimming facilities, and places for skateboarders and rollers.

# SERVICES

It's such a pity they prohibited Christmas market. It was one of the attractions of Yerevan's New Year

FEMALE, FACEBOOK, 6/12/19

## TOP-10 PROBLEMS:



AVERAGE SHARE  
OF CRITICAL TEXTS

1%

Though widely discussed (and highly important for the city), the topics of eating out, shopping, and personal care services rarely raise any issues.

Yet, some people suggest that more open-air markets or better service at the existing markets would benefit Yerevan.

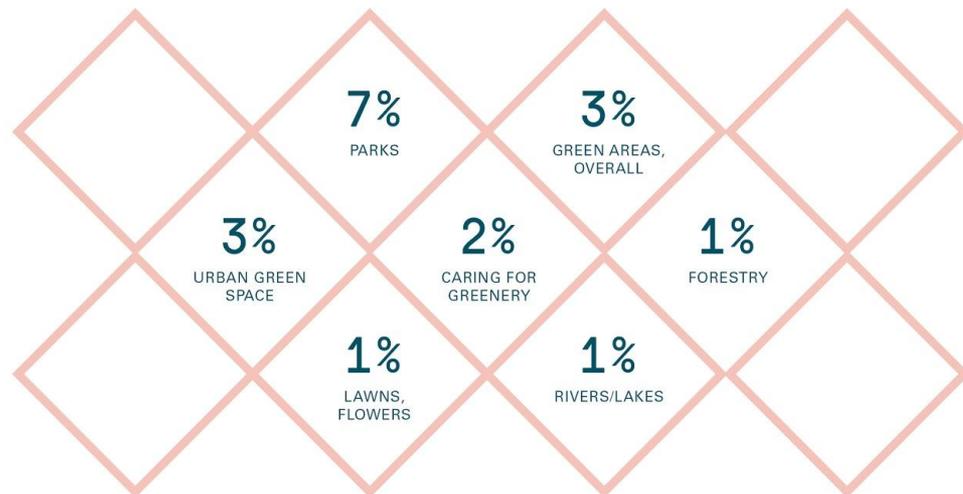
# PUBLIC SPACES

# PARKS AND GREENERY

Concrete is producing more heat, especially when there are no trees or bushes for shade. I did not walk in the new park “2800 years of Yerevan” because of that. It is all concrete and nowhere to hide from the sun, and we’ve got 4 months of heat in summer.

FEMALE, VK, 18/08/20

## TOP-10 PROBLEMS:



AVERAGE SHARE  
OF CRITICAL TEXTS

4%

Even though the city is quite green, the citizens feel lack of contact with nature (for details, see section “Public Spaces Usage”).

Social media users suggest that more greenery is needed in Yerevan in order to avoid summer heat. The key demand is the green space for socializing and leisure, complete with cafes, but allowing to avoid urban noise, heat and stress. New parks which do not correspond with these needs are criticized.

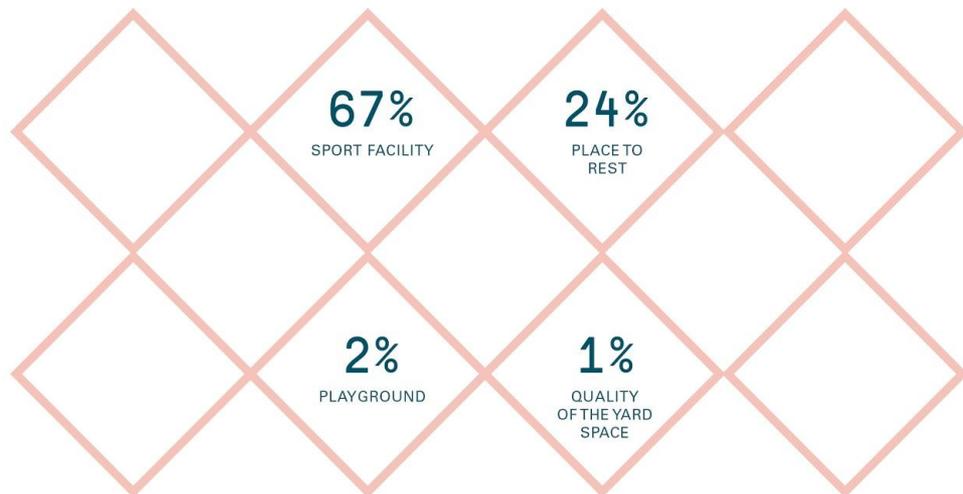
Mostly social media users argue for more parks and yards. According to them, it is highly important for the local parks to be maintained on the periphery of the city where the living quarters are located.

# YARDS

"We live in the area of dust and noise. On Amiryan street 18 it is awful, everywhere expensive cars are parked, we breathe exhaust fumes. The parking is very noisy and nobody cares."

FEMALE, FACEBOOK, 20/08/20

## TOP-10 PROBLEMS:



AVERAGE SHARE  
OF CRITICAL TEXTS

1%

Yards of the old town are considered valuable heritage and people often discuss the possibility to save them from major changes and retain local atmosphere and identity.

Territories near the multi-apartment buildings are rarely discussed in connection with living in Yerevan or a particular district – these topics are mainly local. Due to COVID-19 restrictions, yards gained even more popularity (people reported up to 200-300 people walking in the yard simultaneously).

People mention two key lacks in their yards – sport facilities (workouts, football grounds for teenagers) and places for rest. Various groups of users often compete for such spaces because of the lack of sitting areas for socializing and playing games for kids, teenagers, senior citizens.

Moreover, the parking issue and garbage are significant problems of local yards.

# URBAN PROBLEMS

“How long will the underground passage on Mashtoz avenue, between Yerevan City and Mosque, be such a scrap heap, and even worse, no lights at all! My husband almost broke his leg today!”

FEMALE, FACEBOOK, 15/05/2020

## OUTDOOR LIGHTING

AVERAGE SHARE  
OF CRITICAL TEXTS

4%

The negative texts emphasize a particular (though not extreme) lack of illumination in some areas of the city (users don't specify particular places), which leads to a reduction of pedestrian safety\*. In particular, under-lit underground passageways are considered a major problem.

Architectural highlighting of the heritage and tourist sights is also often sought for.

\* IESNA Security Lighting Committee. Guideline for Security Lighting for People, Property, and Public Spaces, 2003

“Unfortunately, I cannot boast that Yerevan has many public toilets.”

FEMALE, INSTAGRAM, 19/11/19

## PUBLIC TOILETS

AVERAGE SHARE  
OF CRITICAL TEXTS

4%

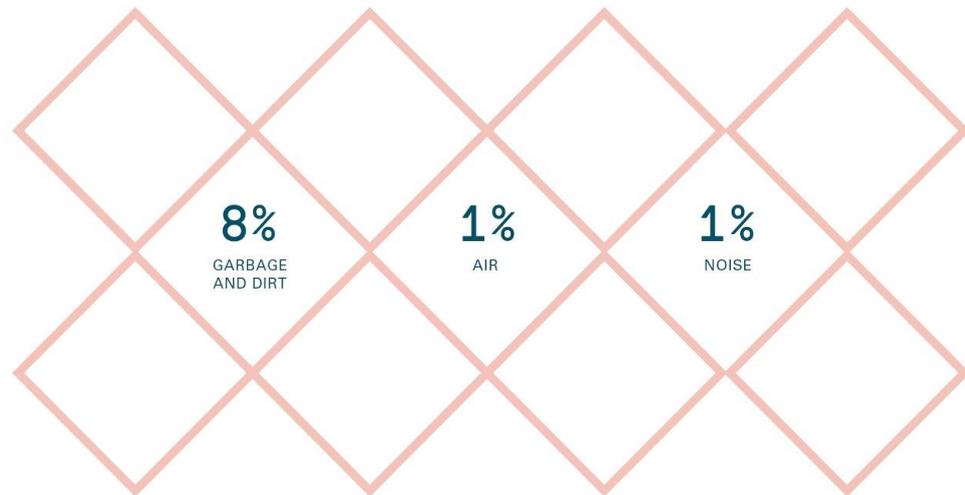
This accounts for two major topics. First is the lack of public toilets. Second is the inappropriate usage of urban spaces for these purposes.

# POLLUTION IN THE CITY

“Some people just don’t know how Yerevan used to look before. The place occupied by the market in Malatia used to be a park with greenery and a lawn, and now all garbage flows down the street towards Bangladesh” (male, Vkontakte, 24/05/2020)

MALE, FACEBOOK, 19/08/2020

## TOP-10 PROBLEMS:



AVERAGE SHARE  
OF CRITICAL TEXTS

5%

The most discussed pollution problem is also the most visible: garbage in the city, dirt, and lack of effort to clean and maintain it.

However, air and noise pollution are also discussed, though on a much lesser scale.

# SUMMARY

— Though Yerevan is generally referred to as a beautiful city with an abundance of possibilities for culture and leisure (27% of all texts), shopping and beauty (15% of all texts), landmarks (33% of all texts), there are still a range of problems connected to transport, greenery to be solved.

— Walking seems to become essential part of life in the city. Pedestrian safety and comfort is an important issue. People also request to develop green areas (especially “cultured” parks) and get disappointed when notice garbage on the street. However, overall ecological issues are not on the top of the discussion.

— Since many Yerevan inhabitants are car owners, the problem of traffic jams and parking lots is critical. In social media, public transportation is discussed less intensively than private transport, however, there is huge criticism at certain means of transport, in particular, mini-buses.

— Access to sports is a significant problem. While fitness and combat, which are demanded by many and often do not require huge spaces, are presented well, inhabitants lack accessible outdoor sports facilities and swimming pools.

— General problems of urban public spaces (air pollution, garbage, illumination, toilets) are of medium importance for social media users. These problems are more tolerated in local yards than in parks and urban spaces: lack of maintenance of the latter arouses huge criticism, while badly kept yards stimulate only few posts on social media.

# PUBLIC SPACES USAGE

# PUBLIC SPACES DURING CRISIS

— parks — other public spaces



“ We live in the area of dust and noise. On Amiryan street 18 it is awful, everywhere expensive cars are parked, we breathe exhaust fumes. The parking is very noisy and nobody cares.

FEMALE, FACEBOOK, 20/08/20

Before COVID: parks experience a seasonal decline of interest, other public spaces become essential for the Christmas and New Year celebrations.

During COVID: in the course of the pandemic, public spaces lose the users' attention, but parks become more important for people than the other types of urban locations.

After COVID + second wave: interest continues to decline (partially due to the beginning of complications in the borderline with Azerbaijan).

# KEY PARKS IN DYNAMICS

Quarantine does not mean you can't go out! There are a lot of spaces without crowds where you can breathe fresh air – upper part of Cascade for example.

FEMALE, INSTAGRAM, 20/03/20

I went to TUMO park for a walk and there are crowds, nobody wears masks, they lie on the grass in groups of 10-20 people, no masks.

MALE, VKONTAKTE, 28/05/2020



In social media, Yerevan users tend to specify by name only the most prominent parks with a high quantity of attractions.

The interest in these parks varies over the last 12 months. The most frequently mentioned "Northern Avenue" showed a seasonal decline in Feb-Apr 2020, but then the interest started to grow despite COVID.

Northern Avenue and Opera house are the two territories which managed to regain the pre-COVID level of interest in summer, and TUMO even to surpass it.

Cascade is the most stable park which managed to stay on social media despite seasonal and epidemic challenges.

In general, the most popular public parks with flower beds, open lawns, sitting places and/or cafes turned out to stay more in demand during COVID-19 than deserted forested areas. The need to socialize and being on an urban stage grounded in local culture proved to be greater than the fear of the virus.

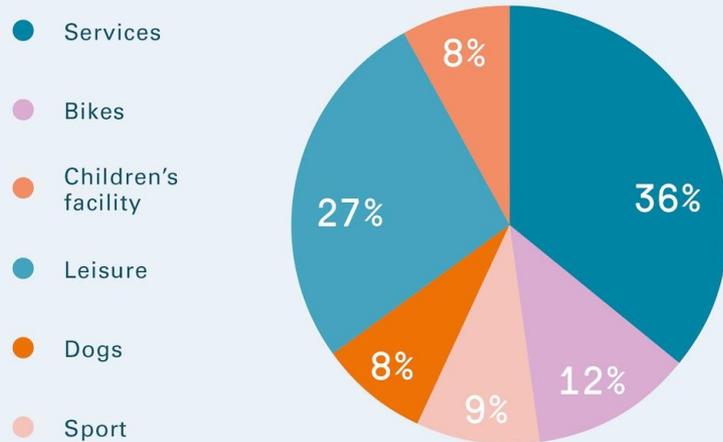
# ACTIVITIES IN PUBLIC SPACES

“ My biggest pain in course of commercialization of Yerevan is the ruined park opposite the House of Chamber Music. Who was the idiot who thought that it's good idea to transform a pool into a café? Return the park... make a gift to the city, to children and their grandmothers...”

FEMALE, FACEBOOK, 3/5/2020

“ Parks are my love. I never want to leave them. A lot of people but no haste, crowds and lack of space. Everywhere people are picnicking, partying in gazebos, various swings, neatly cut lawns, sea of flowers and their scent, sunbeams through the leaves, cicadae and birds singing.”

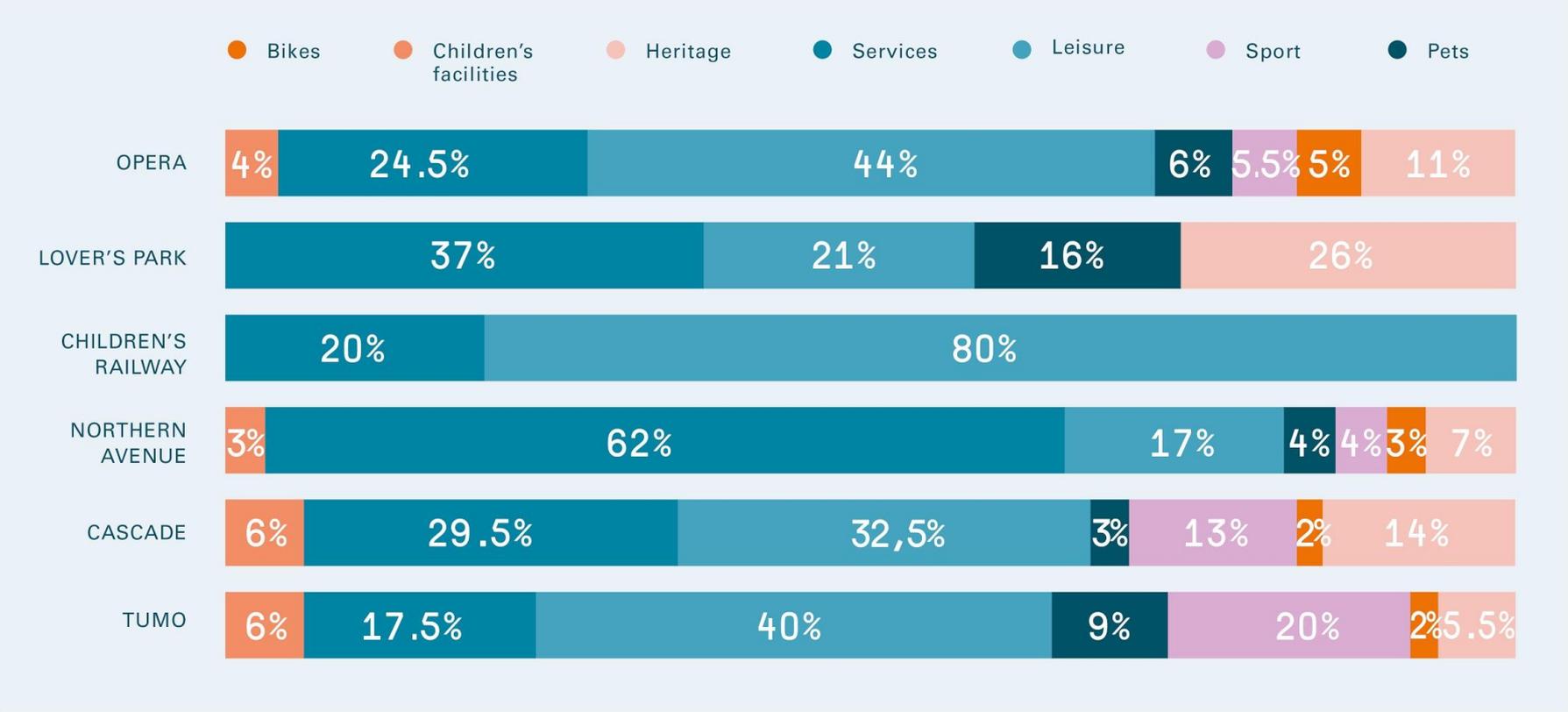
FEMALE, INSTAGRAM, 12/07/20



The most important activities performed in public spaces and reflected on social media are leisure (walking, picnicking, socializing, dog walking, visiting festivals and outdoor performances) (27% of all texts), and services (eating out, window-shopping, visiting shops, and services located in major public spaces) (36% of all texts). Though cafes are in demand, their

excess is also criticized if it ruins the principal function of public space – relaxed walk. Active leisure like sports (9% of all texts), biking (8% of all texts), visiting children's playgrounds (8% of all texts) are much less frequently represented on social media.

# ACTIVITIES IN KEY PARKS



services

leisure



TUMO



sports

services

leisure



CASCADE

services

leisure



NORTHERN  
AVENUE

CHILDREN'S  
RAILWAY

services

leisure



LOVERS'  
PARK



dog walking

landscape  
and statues

services

leisure



OPERA

Most popular public spaces in Yerevan are considered as places for leisure, socializing events, eating out, and less frequently, enjoying heritage. Dog walking is an important activity for some parks (e.g. there is a dog ground in TUMO).

Except for TUMO, there is no park associated with physical activity in social media.

# PROBLEMS IN KEY PARKS



The key problem of the most frequently mentioned parks is accessibility, which includes getting there (transport issue) and accessibility inside them (stairs, convenient walking routes, etc.).

The second issue is outdoor lighting. This problem highly matters in all parks apart from Cascade, which is a mixture of a park and urban public space.

Garbage is one of the key problems in key public spaces.

Notable, toilets and parking are not considered an issue in popular parks.

# SUMMARY

- In general, the interest in public spaces has significantly declined (56%) in 2020, firstly due to low season activity, then to COVID, and to the conflict on the borderline with Azerbaijan.

- However, the parks are generally surviving the crises better than other types of public spaces. The most popular and/or integrated into the city's urban fabric even managed to stay on top of social media despite all challenges.

- Open-air active leisure is much less prevalent in Yerevan. Sports are associated first and foremost with fitness and combat sports. Biking or outdoor games are characterized by users as lacking.

- This is partially due to the motivations of visitors of the parks. Many of them perceive parks as the places to relax in the natural environment rather than the parts of the city ("cultural parks"). Hence, the availability of attractions, services, and events is important, as well as possibilities to shop or to eat near the park.

# RECOMMENDATIONS



## PRESERVATION OF CATERING FUNCTIONS IN PARKS AND PUBLIC SPACES

Despite the negative attitude towards the dominance of cafes in parks, users request sidewalk cafes or fairs. It is recommended to move away from capital buildings and change the format to a temporary, more flexible one. Also, the development of pop-up markets and festivals will preserve parks' value and saturate the event.



## CREATION OF LAWNS FOR RECREATION AND PICNICS

Green lawns provide a whole range of diverse opportunities: picnics, recreation, and mass events. Such solutions allow users to be together to distinguish themselves from the environment and simultaneously keep a safe distance "without masks".



## CREATION OF PEDESTRIAN PROMENADES/BOULEVARDS

The creation of more urbanized public spaces allows, on the one hand, to ensure the survival of commerce on the ground floors, and on the other hand, to maintain a sense of community among users.



## CREATION OF AREAS FOR WALKING DOGS

Such sites form local communities of dog owners and create permanent scenarios in parks, thereby providing social control and increasing safety.



## ACTIVE LANDSCAPING AND INCREASING MICROCLIMATIC COMFORT

Users have an active demand for spaces away from the noise with shading and softening thermal comfort in summer. It can be satisfied by planting full-fledged trees instead of ornamental shrubs.