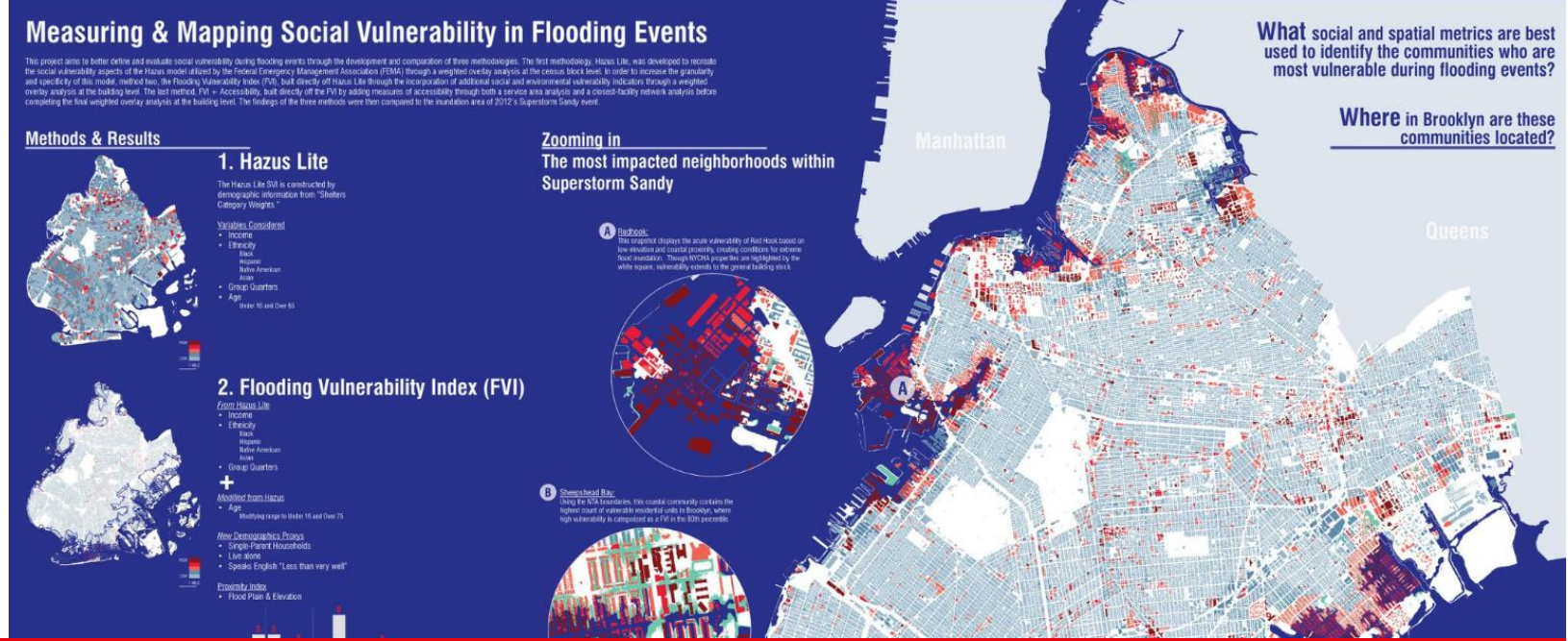


How to make (an engaging) poster?

- Laboratory on Human-Environment Relations in Urban Systems

Ankita Singhvi
Glòria Serra Coch

May 7 2025

WHAT?

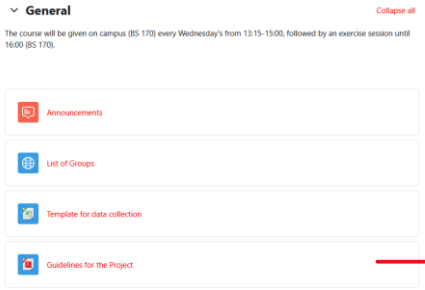
Some practical items:

- deadlines
- content
- evaluation

Deadlines

- **22.05.2025:** Submit poster to Moodle by **9:00am**
- **28.05.2025:** Presentations, whole group must be present
- **28.05.2025:** Do the critical evaluation individually of another poster
- **30.05.2025:** Submit critical evaluation

Guidelines updated!



Guidelines for group project

Updated 07-05-2025

- The goal of the group project is to mobilize the concepts and tools presented during the lectures, and in the suggested reading.
- As a general rule, each group will be made of 4 students.
- Each group is expected to: (i) evaluate and compare the sustainability of 4 cities; and (ii) report the results of their assessment in the form of an oral presentation with an A0 poster.
- At the end of the project, students will be able to independently carry out a comparative sustainability assessment of cities and develop critical reflections on the theory and methodology introduced in the lectures.

Submission timeline

Step 1: Group formation

Form groups of four students and submit the group list on Moodle. Together, select four cities that share a common characteristic to ensure meaningful comparisons. For example, this could be a thematic focus on:

- Geographical factors (e.g., Swiss cities, Mediterranean cities)
- Economic factors (e.g., developing cities, post-industrial hubs, tourism-dependent cities, recession-hit cities)
- Social factors (e.g., cities with declining populations, commuter towns)

Step 2: Outline

Each group must submit a 2-page outline (excluding the bibliography) for review by supervisors. The outline should include:

Content

1. Motivation of the study and RQ

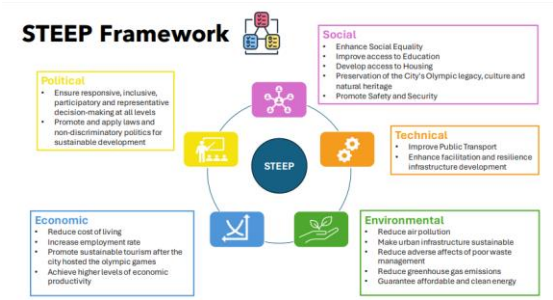
WHO guideline: PM 2.5 < 5 µg/m³

Milan: 28.6 µg/m³
Cairo: 47.4 µg/m³
Lima: 25.6 µg/m³
New Delhi: 89.1 µg/m³

Which of London, Rio de Janeiro, Beijing, Sydney linked by their Summer Olympic experience is the most sustainable?

Content

1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework



	Social/cultural	Environmental	Economical	Political
Food supply	Access to food, diversity of the needs, sufficient production	Impact of the agriculture, the transportation and the distribution	Cost of production, infrastructure costs	Support to the agriculture
Inequalities	Different backgrounds		Distribution of the money	Regulations to support minorities
Security	Feel safe in the city, amount of crimes	Natural disaster	Infrastructure and security personnel costs	Measures put in place, surveillance, police
Energy demand	Access to electricity	Electricity production from fossil energies	Electric infrastructures (bring electricity to the households)	Energy plan (renewable)
High Waste production	Waste in the streets, different habits	Recycling or burning	Cost of waste collection	Waste management
Education	Amount, geographic distribution and quality of schools		Cost of education	Increase of education quality, financial help
Traffic/mobility	Access to mobility, public transportation	Car Pollution, amount of cars	Cost of public transportation infrastructure	Lack of public transport, cyclic area
Health infrastructure	Access to hospitals		Hospital fees for poor people	Health insurance
Housing	Access to a living place, suburb	Material usage	High accommodation cost	Regulations for housing distribution
Water supply system and wastewater	Usage of tap water	Wastewater, pollution of the rivers/lakes	Cost of infrastructure	Wastewater management
Pollution	Smog, air breathability	Industry/agriculture/ traffic/ pollution	Costs for implementing solutions to reduce CO2 emissions	Regulations to reduce pollution problems

Figure 5.2: Framework

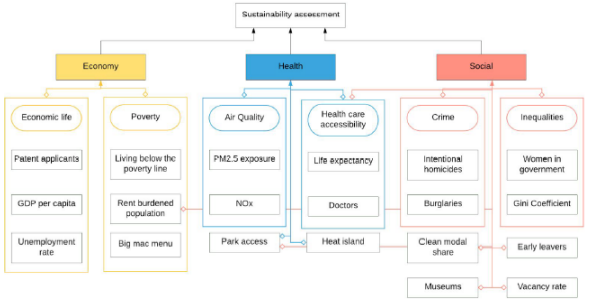
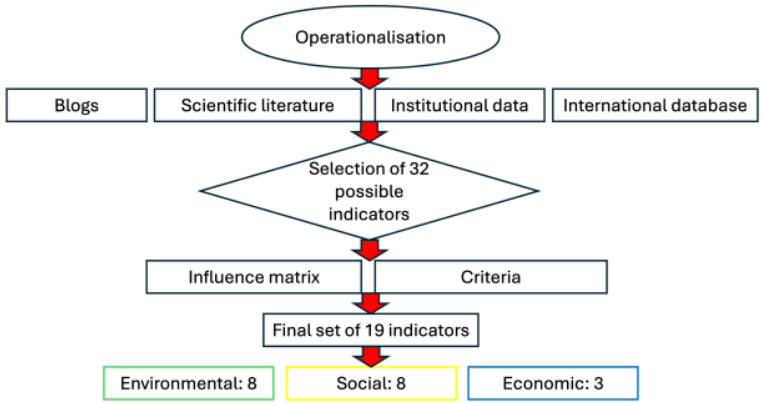
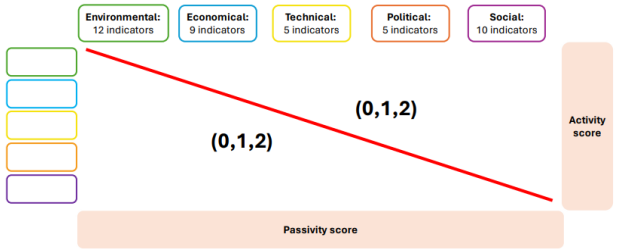


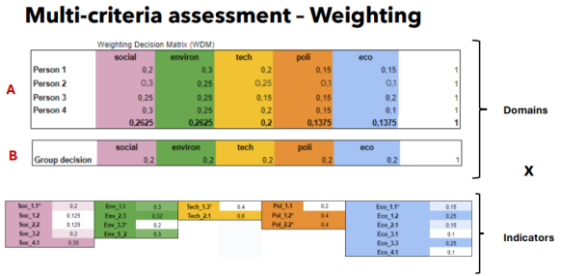
Figure 2: Conceptual Framework

Content

1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework
3. Methods and materials







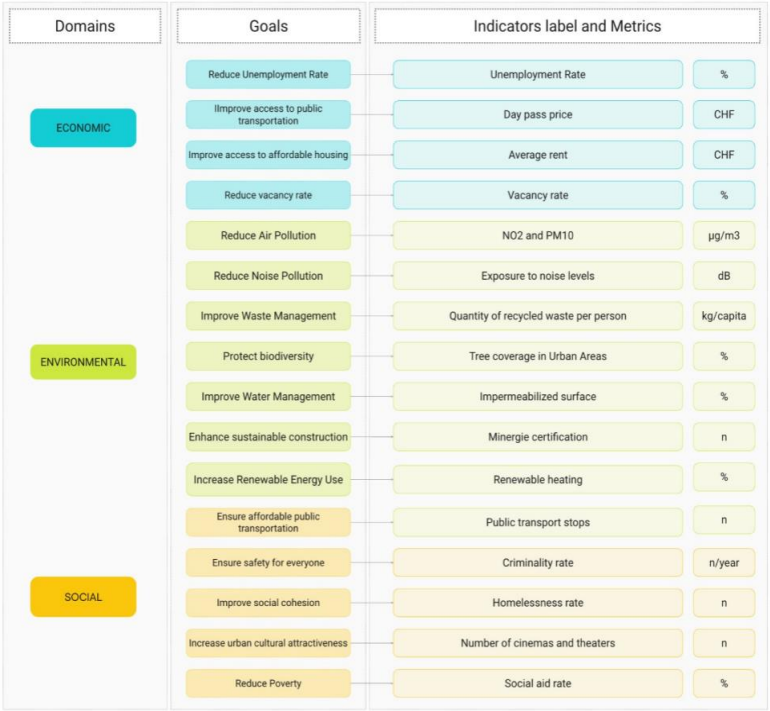
Content

1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework
3. Methods and materials
4. Results

Content

1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework
3. Methods and materials
4. Results
    a. Final indicators

Content - Final indicators



Code	Indicator Definition	Objective	Source	Years taken into account
Env 1.1	Annual mean level of fine particulate matter (PM2.5 or PM10)	↓	IQAir [13]	2023
Env 2.3	Percent of population that lives within 1km of a city-managed green space	↑	Landscape and Urban Planning[14]	2022
Env 3.3*	Amount of foodwaste	↓	UNEP [15]	2023 (London), 2022 (Rio), 2021 (Sydney), 2021 (Beijing)
Env 5.2	Renewable energy share in the total final energy consumption	↑	Worldbank [16]	2023
Eco 1.1*	Share of population that cannot afford a healthy diet	↓	OurWorldInData [17]	2021
Eco 1.2	Proportion of citizens' income that is attributed to necessities (housing, food, electricity, transport, etc.)	↓	OECD [18]	2020
Eco 2.1	Proportion of youth (aged 15-24 years) not in education, employment or training	↑	Statista [19], ILOSTAT (for Beijing) [20]	2022
Eco 3.1	Tourism direct GDP as a proportion of total GDP for 5 years directly after hosting the games	↑	SDG data (London)[21], GlobalEconomy (Rio, Sydney) [22], Environmental Science and Pollution Research (Beijing)[23]	2012-2017 (London), 2016-2020 (Rio), 2000-2005 (Sydney), 2008-2013 (Beijing)
Eco 3.3	Percentage difference of the unemployment rate during and 5 years after a city hosted the Olympic Games	↓	WorldBank [24]	2012-2017 (London), 2016-2020 (Rio), 2000-2005 (Sydney), 2008-2013 (Beijing)
Eco 4.1	GDP per capita	↑	WorldBank [25]	2022
Tech 1.3*	Number of buses by 1000 inhabitants	↑	OECD [26], China-Institute-org [27]	2021
Tech 2.1	Percent of repurposed facilities since used in the Olympics	↑	The Olympics studies centre [28]	2022
Pol 1.1	Average approval rate of local government	↑	OECD [29], Statista (Beijing) [30]	2019-2022 (London), 2019-2022 (Rio), 2019-2022 (Sydney), 2022 (Beijing)
Pol 1.2*	Country's score on global peace index	↓	Vision of Humanity [31]	2022
Pol 2.2*	Gender index	↓	OECD [32]	2019
Soc 1.1*	Income inequality measured by the Gini coefficient	↓	OECD (London, Sydney)[33], Statista (Rio) [34], Statista (Beijing) [35]	2022 (London), 2020 (Rio), 2022 (Sydney), 2022 (Beijing)
Soc 1.2	Proportion of people earning less than 50% of the median income	↓	OECD [36]	2021 (London), 2022 (Rio), 2018 (Sydney), 2020 (Beijng)
Soc 2.2	Percentage of residents aged 25-34 years with a higher education degree	↑	OECD [37], OECD (Beijing)[38]	2022
Soc 3.2	Percentage of population without a permanent residence (living in slums, informal settlements, inadequate housing)	↓	WorldPopulationReview [39]	2024
Soc 4.1	Citizen satisfaction with the hosting of the Olympic Games	↑	London School of Economics and Political Science (London)[40], The Guardian (Rio)[41], Elsevier Science (Sydney)[42], Pew Research Center (Beijing)[43]	2016 (London), 2016 (Rio), 2000 (Sydney), 2008 (Beijing)

Content

1. Motivation of the study and RQ
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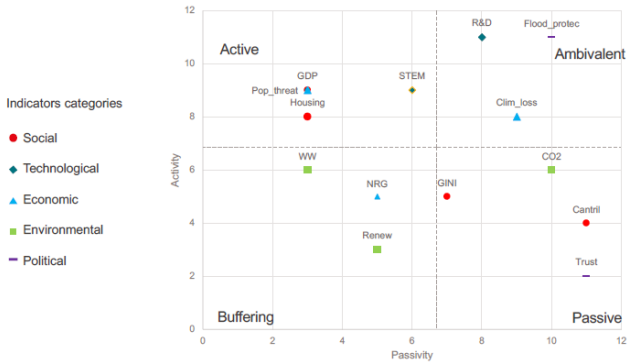
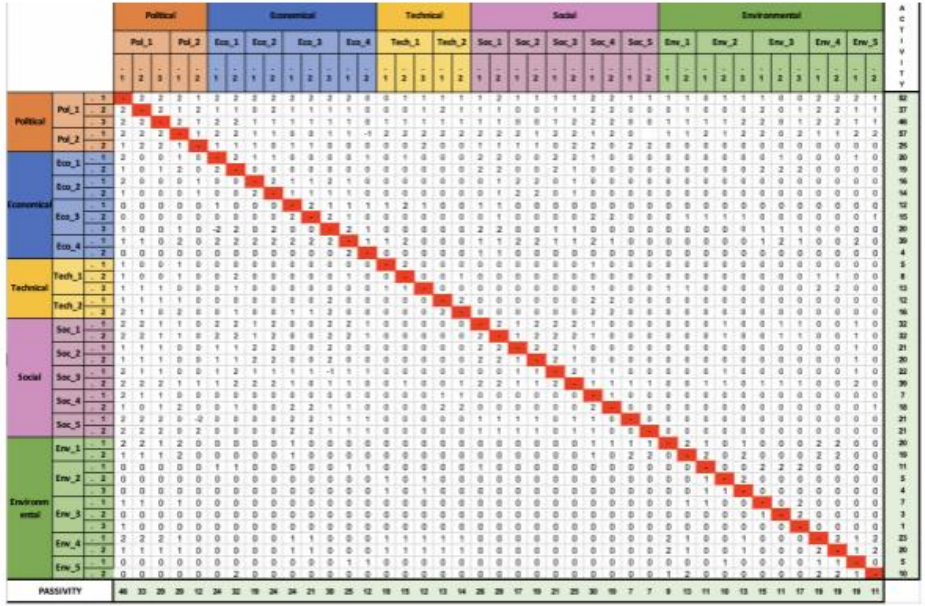
    a. Final indicators
    b. (Influence matrix and) activity-passivity plot

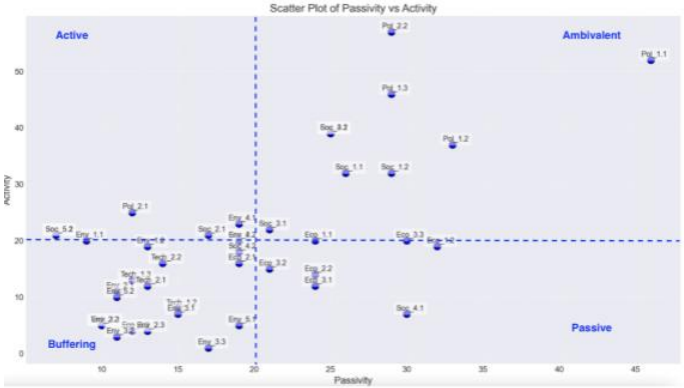
Content - Influence matrix and activity-passivity plot

Domain	Indicator	Label		EN_1	EN_2	EN_3	EN_4	EN_5	EN_6	EN_7	EN_8	S_1	S_2	S_3	S_4	S_5	E_1	E_2	E_3	E_4	Activity
				ENV.								SOC.					ECON.				
Environmental	Exposure to noise levels	EN_1	ENV.		0	2	2	0	0	0	0	1	1	-1	0	0	0	0	0	-1	8
	Quantity of recycled waste per person	EN_2		0		-1	-1	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	NO2	EN_3		2	-1		2	2	-2	0	0	0	0	-1	0	0	0	0	0	0	10
	PM10	EN_4		2	-1	2		2	-2	0	0	0	0	-1	0	0	0	0	0	0	10
	Renewable heating	EN_5		0	2	-2	-2		0	0	2	0	0	0	0	0	1	0	0	0	9
	Tree coverage in Urban Areas	EN_6		0	0	-2	-2	0		2	0	0	0	0	0	0	0	0	0	0	6
	Impermeabilized surface	EN_7		0	0	0	0	1	-2		1	0	0	0	0	0	0	0	0	0	4
	Minergie certification	EN_8		0	0	-2	-2	2	1	-2		0	0	0	0	0	1	0	0	0	10
Social	Homelessness rate	S_1	SOC.	1	0	0	0	0	0	0	0		2	0	1	0	2	1	2	0	9
	Criminality rate	S_2		1	0	0	0	0	0	0	0	1		0	1	0	2	0	2	0	7
	Access to mobility	S_3		-1	0	-1	-1	0	0	0	0	0	0		1	0	0	0	0	0	4
	Social aid rate	S_4		0	0	0	0	1	0	0	2	-2	2	2		0	2	0	2	2	15
	Number of cinemas and theaters	S_5		1	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
Economic	Average rent	E_1	ECON.	0	0	0	0	1	0	0	0	2	0	0	0	0		0	0	1	4
	Vacancy rate	E_2		-1	0	0	0	0	0	0	0	-1	-2	0	-1	0	2		2	0	9
	Unemployment Rate	E_3		0	-1	0	0	0	0	0	0	2	-2	-1	2	0	1	0		0	9
	Day pass price	E_4		1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0		3
			Passivity	10	5	13	13	11	7	4	5	9	9	6	6	0	11	1	8	4	



Content - Influence matrix and activity-passivity plot





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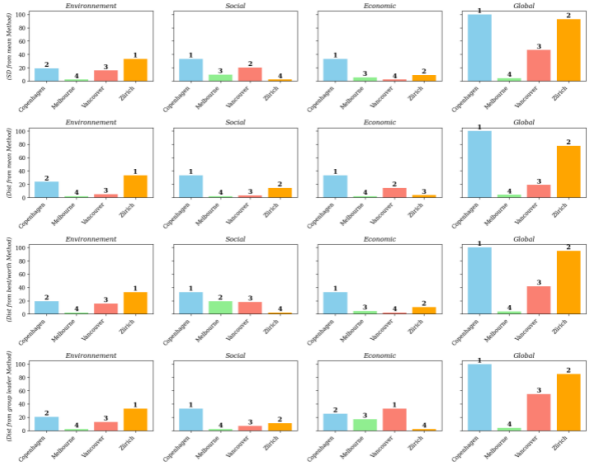
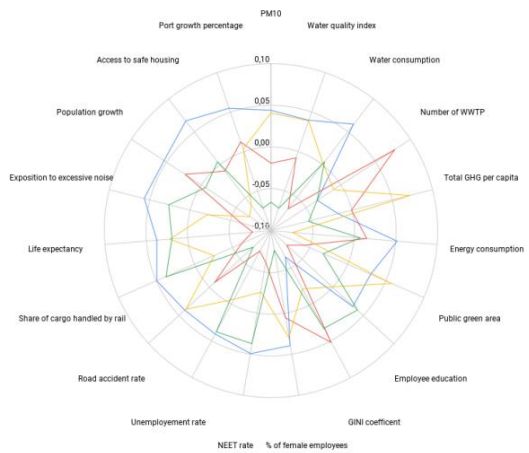
Content - MCDA





Standard Deviation from the Mean

City	Basel	Geneva	Lausanne	Zürich	Best Options
Environmental	0.207	-0.335	0.016	0.112	Basel
Social	-0.337	-0.015	0.749	-0.398	Lausanne
Economic	-0.546	0.015	-0.693	1.223	Zürich
Sum	**-0.675**	**-0.335**	**0.073**	**0.938**	**Zürich**

Distance from the Best and Worst Performers

City	Basel	Geneva	Lausanne	Zürich	Best Options
Environmental	476.2	294.3	421.9	453.9	Basel
Social	123.6	201.0	377.4	110.7	Lausanne
Economic	49.0	164.8	22.7	380.7	Zürich
Sum	**648.8**	**660.1**	**822.0**	**945.4**	**Zürich - Lausanne**

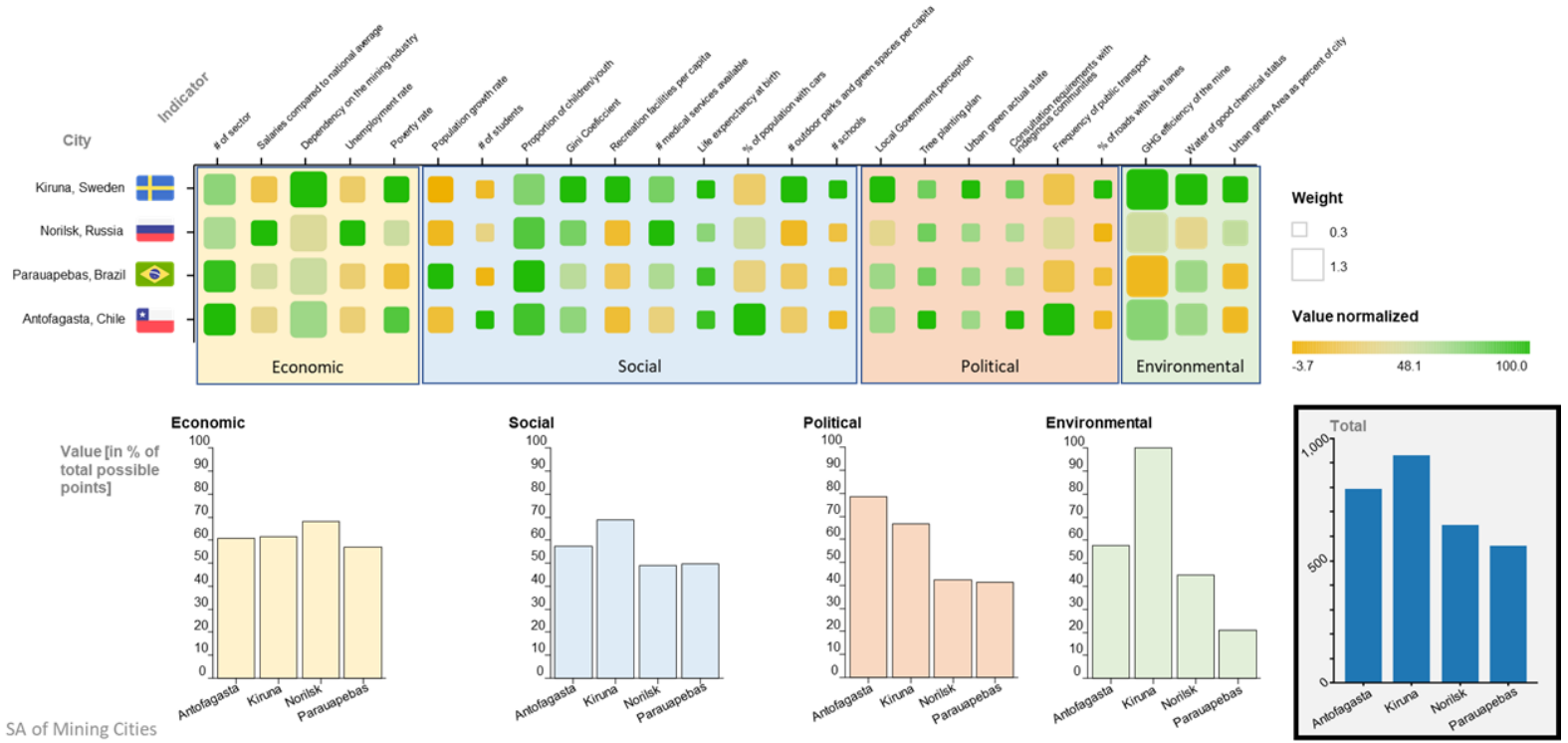
Distance from the Mean

City	Basel	Geneva	Lausanne	Zürich	Best Options
Environmental	108.7	80.7	101.7	109.0	Zürich - Basel
Social	81.3	110.8	118.9	89.0	Lausanne
Economic	87.0	103.3	81.0	128.6	Zürich
Sum	**277.1**	**294.8**	**301.6**	**326.5**	**Zürich**

Distance from the Group Leader

City	Basel	Geneva	Lausanne	Zürich	Best Options
Environmental	580.2	464.8	563.0	547.4	Basel
Social	297.1	372.7	417.2	309.4	Lausanne
Economic	245.0	299.5	235.3	379.2	Zürich
Sum	**1122.3**	**1137.0**	**1215.4**	**1236.0**	**Zürich - Lausanne**

Content - MCDA



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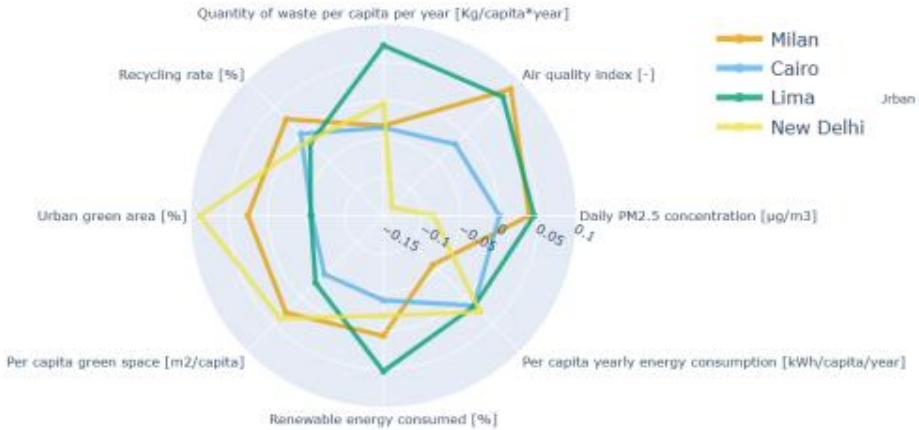
    c. MCDA
5. Recommendations: Policies targeted to specific stakeholders to enhance sustainability

Content - Recommendations

Milan

- Waste production
- Energy consumption
- Public transport split

Environment

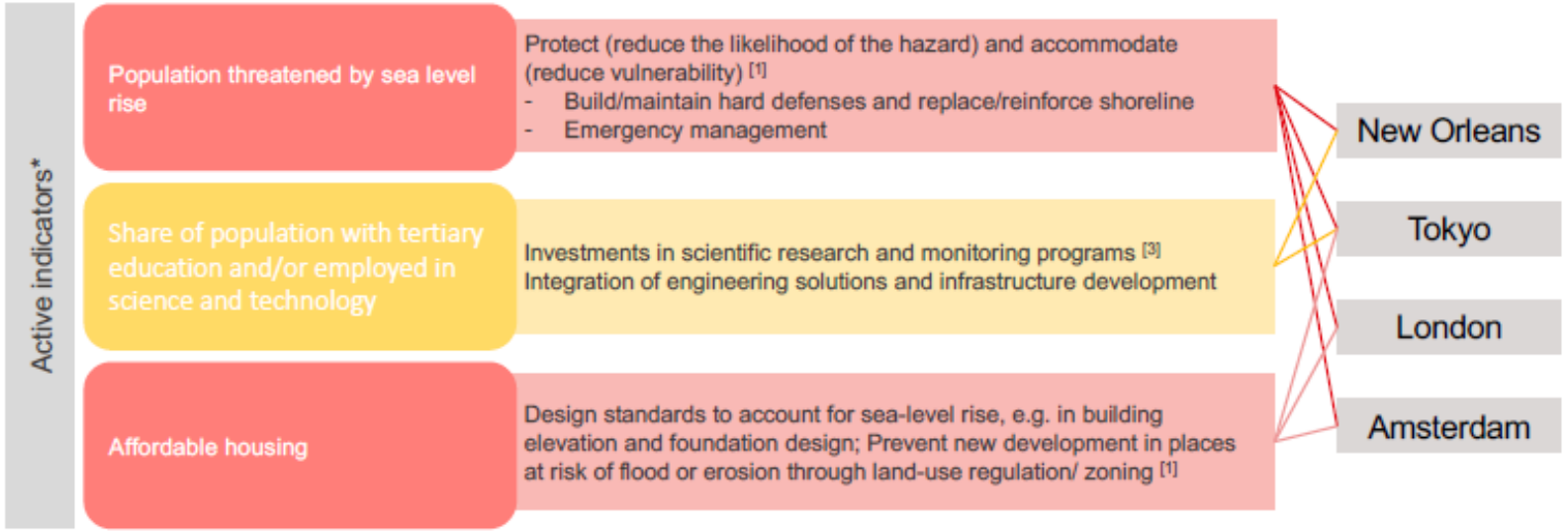


Social

Cairo

- Bike roads
- Green areas
- Number of hospital beds

Content - Recommendations



Content

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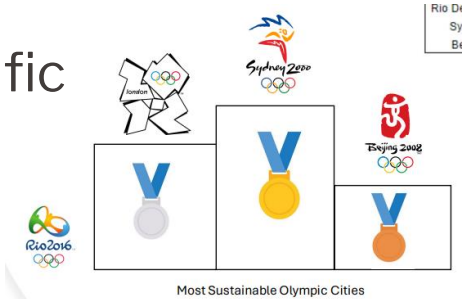
5. Recommendations: Policies targeted to specific stakeholders to enhance sustainability
6. Conclusions



Evaluation

- Exam - 60% of final grade
- Poster content - 20%
- Oral presentation - 10%
- Critical evaluation - 10%

WHY?

Why a poster?

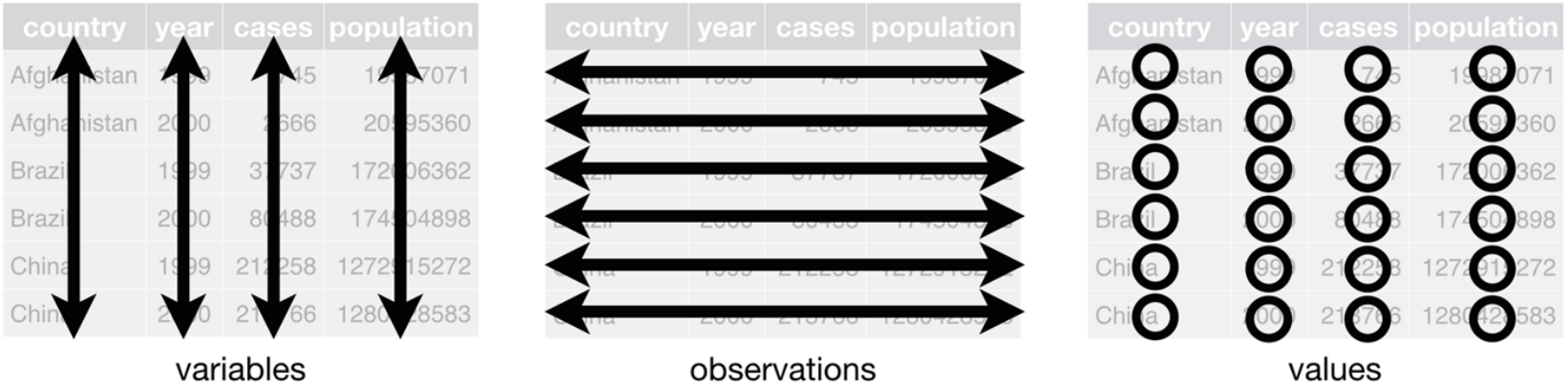
The place of posters in scientific communication

- Posters are a staple of scientific communication
- Their useful characteristics are:
  - Succinct (one page)
  - Presents curated, key pieces of information
  - Understandable even without researcher to guide viewer through the content
  - Physical artefact (“in the real world”) allows a conversational starting point

HOW?

First things first,
working with your data

Tidy Data



1. Each variable must have its own column.
2. Each observation must have its own row.
3. Each value must have its own cell.

Tidy Data

One reason data might not be tidy is because sometimes data entry doesn't make it easy.

country	year	cases
Afghanistan	1999	745
Afghanistan	2000	2666
Brazil	1999	37737
Brazil	2000	80488
China	1999	212258
China	2000	213766

country	1999	2000
Afghanistan	745	2666
Brazil	37737	80488
China	212258	213766

table4

country	year	key	value
Afghanistan	1999	cases	745
Afghanistan	1999	population	19987071
Afghanistan	2000	cases	2666
Afghanistan	2000	population	20595360
Brazil	1999	cases	37737
Brazil	1999	population	172006362
Brazil	2000	cases	80488
Brazil	2000	population	174504898
China	1999	cases	212258
China	1999	population	1272915272
China	2000	cases	213766
China	2000	population	1280428583

table2

country	year	cases	population
Afghanistan	1999	745	19987071
Afghanistan	2000	2666	20595360
Brazil	1999	37737	172006362
Brazil	2000	80488	174504898
China	1999	212258	1272915272
China	2000	213766	1280428583

Data Format

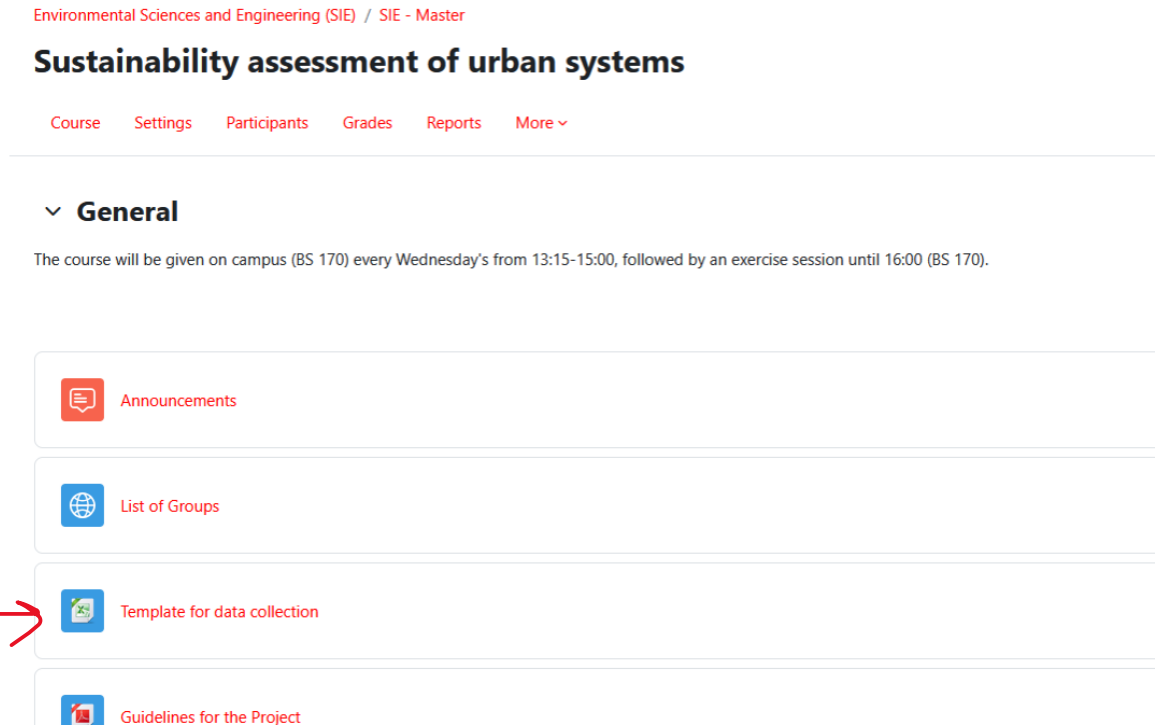
Domain	Goal	Indicator	Definition	units	value	aggregation	level	datatype	dataCategory	city	country	year	datasource	datasourceLink
Environemnt	Access to Clean Air for Everyone	Air quality index	A composite score of pm 2.5 and NO2	index	9	score	city	int	quantitative	Lausanne	Switzerland	2021	iqair	https://www.iqair.com/air-quality-map
Environemnt	Access to Clean Air for Everyone	Air quality index	A composite score of pm 2.5 and NO3	index	61	score	city	int	quantitative	Paris	France	2021	iqair	https://www.iqair.com/air-quality-map
Environemnt	Access to Clean Air for Everyone	Air quality index	A composite score of pm 2.5 and NO4	index	20	score	city	int	quantitative	Boston	United States	2021	iqair	https://www.iqair.com/air-quality-map
Environemnt	Access to Clean Air for Everyone	Air quality index	A composite score of pm 2.5 and NO5	index	17	score	city	int	quantitative	Cambridge	United Kingdom	2021	iqair	https://www.iqair.com/air-quality-map
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotones of Co2 emissions released	Kilotones of Co2 equivalent	500	sum	city	int	quantitative	Lausanne	Switzerland	2016	CDP	https://data.cdp.net/Emissions/2016-Citywide-Emissions-Map/iqbu-zjaj
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotones of Co2 emissions released	Kilotones of Co2 equivalent	5196	sum	city	int	quantitative	Paris	France	2016	CDP	https://data.cdp.net/Emissions/2016-Citywide-Emissions-Map/iqbu-zjaj
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotones of Co2 emissions released	Kilotones of Co2 equivalent	6066	sum	city	int	quantitative	Boston	United States	2016	CDP	https://data.cdp.net/Emissions/2016-Citywide-Emissions-Map/iqbu-zjaj
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotones of Co2 emissions released	Kilotones of Co2 equivalent	6	sum	city	int	quantitative	Cambridge	United Kingdom	2020	Cambridge City Council	https://www.cambridge.gov.uk/media/10022/greenhouse-gas-report-2020-21.pdf

Column Dictionary

domain	The domain that indicator corresponds to
goal	the goal that you have set for sustainability
indicator	name of the indicator
definition	a description of how the indicator has been measured
value	value of the indicator
units	unit of the value
aggregation	the aggregation of the metric, i.e. sum, score, index, median, mean, etc…
level	the administrative boundary level of the data, i.e. city, region, country
datatype	the data type of the value for databases, i.e. int, float, character, boolean
data category	the category of data i.e. quantitative or qualitative, could be broken down(nominal, ordinal, etc.)
city	the city where value is for
country	the country where city is located
year	the year the value was measured
datasource	the data source provider
datasource link	the html or location of pdf for the data source

Template on Moodle

Download here and fill in with your data, it should be an appendix to your final report submission!



Qualitative vs. Quantitative

Subjective vs. Objective

Qualitative vs. Quantitative

Data that describes qualities or characteristics
i.e.: land use data

Data that can either be counted or compared on a numeric scale
i.e. population density

Subjective vs. Objective

anecdotal information that comes from opinions, perceptions or experiences.
i.e.: neighborhood satisfaction

actual information gathered through observation or measurement that is true regardless of the feelings or opinions of the person presenting or receiving the information.
i.e. green cover

HOW?

How to design a poster?

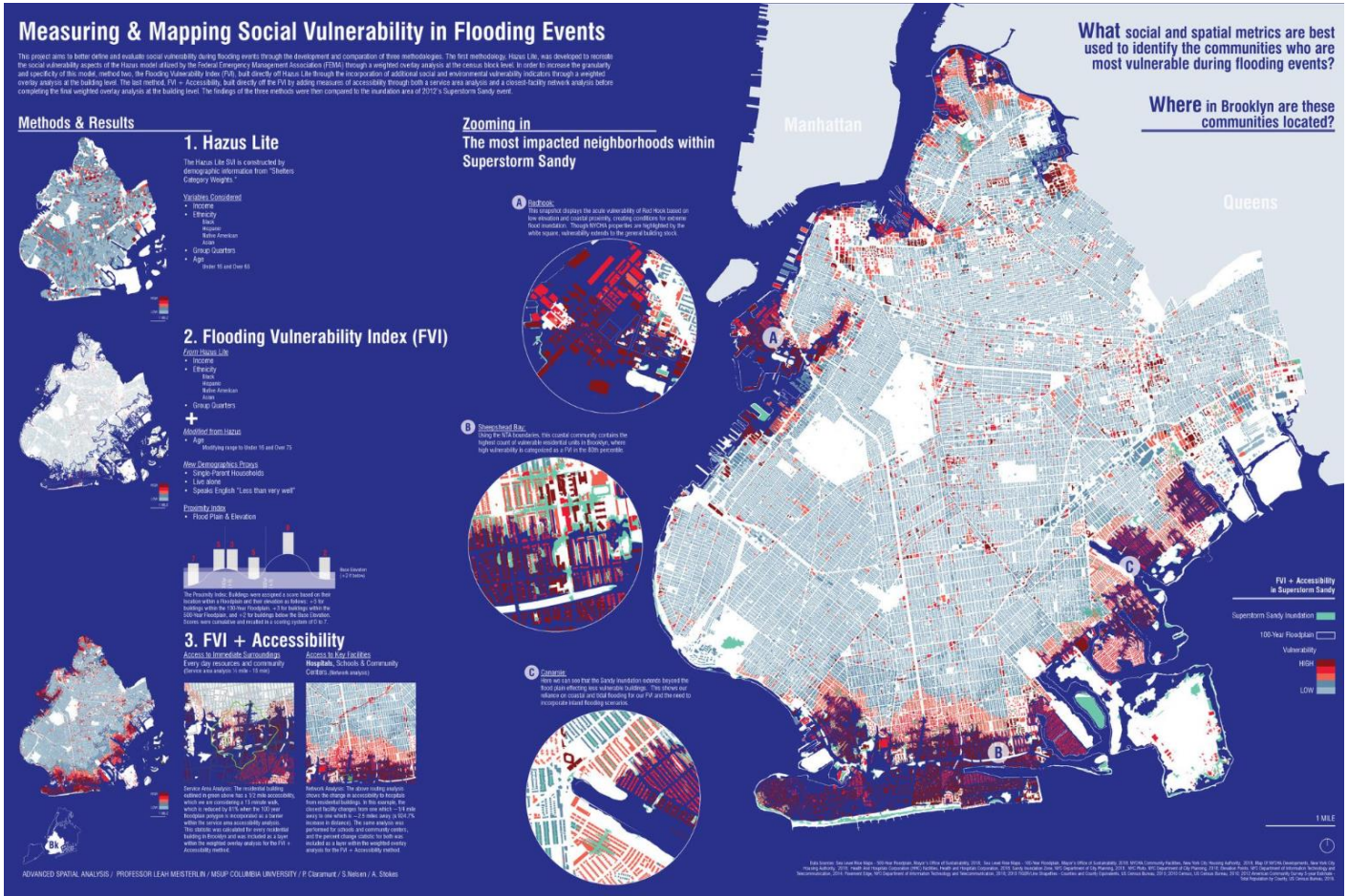
How to effectively use visualisations to communicate

Poster

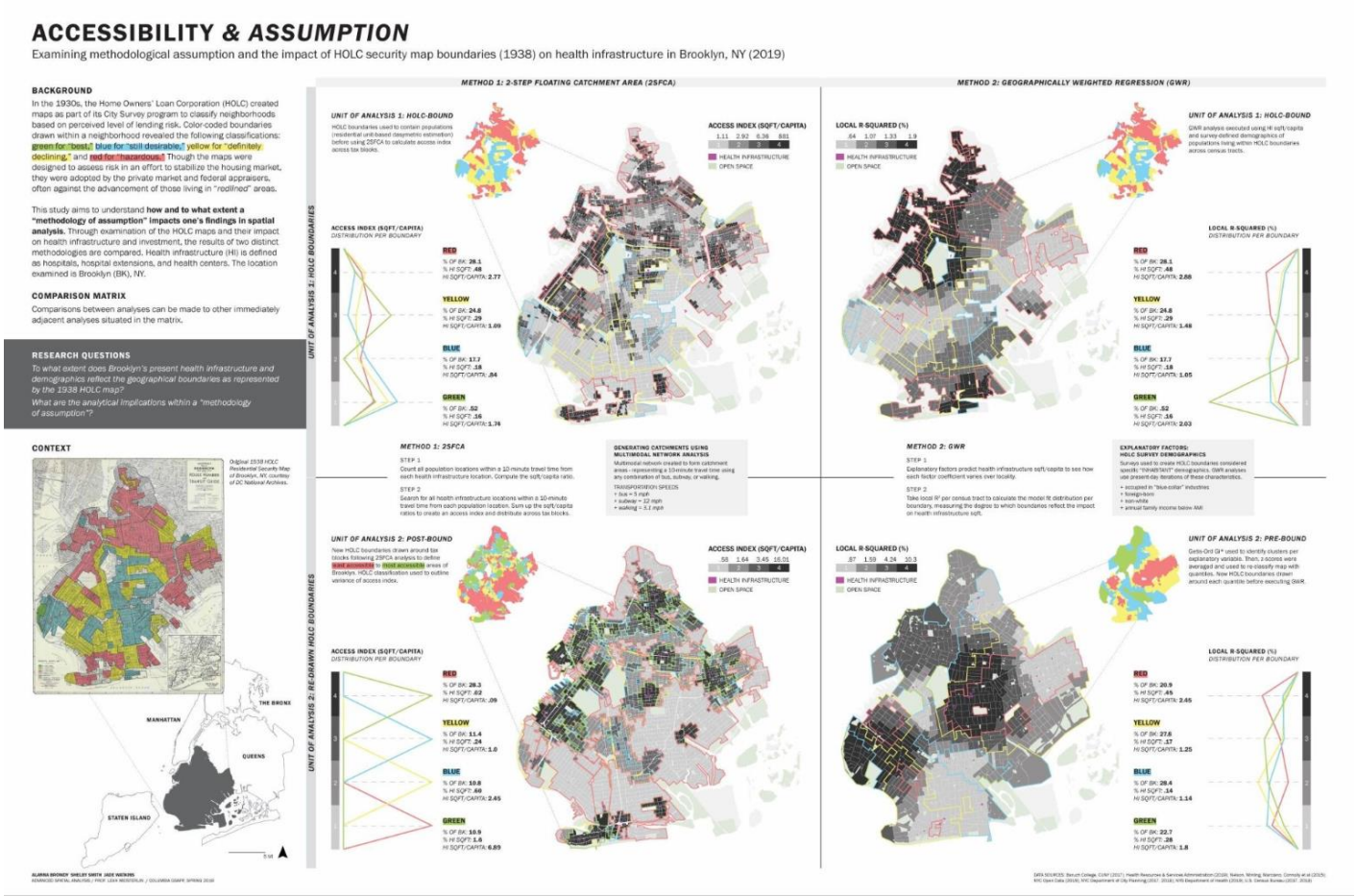
Check-list:

- Hierarchy
- Consistency
- Coherence
- Legibility

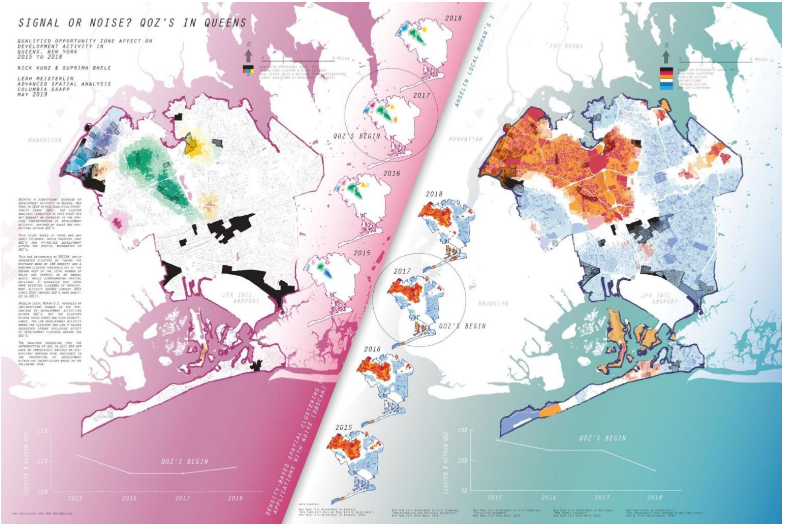
Coherence

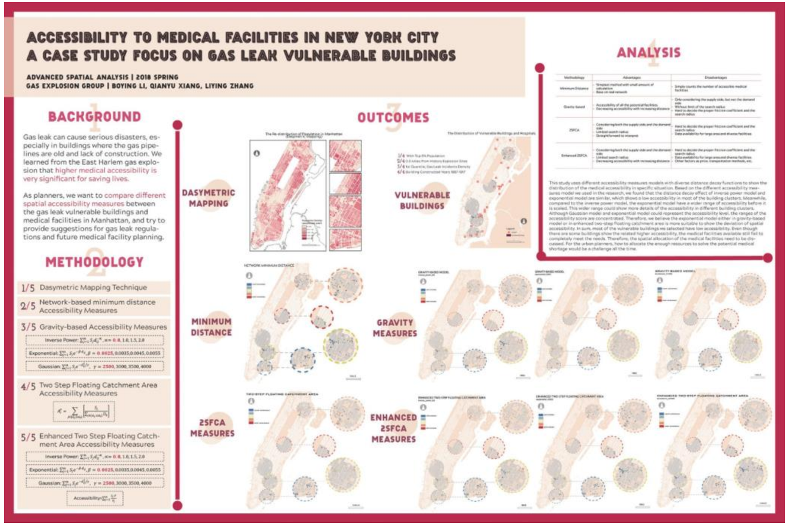

Measuring & Mapping Social Vulnerability in Flooding Events
This project aims to better define and evaluate social vulnerability during flooding events through the development and comparation of three methodologies. The first methodology, Hazus Lite, was developed to recreate the social vulnerability aspects of the Hazus model utilized by the Federal Emergency Management Association (FEMA) through a weighted overlay analysis at the census block level. In order to increase the granularity and specificity of this model, method two, the Flooding Vulnerability Index (FVI), built directly off Hazus Lite through the incorporation of additional social and environmental vulnerability indicators through a weighted overlay analysis at the building level. The last method, FVI + Accessibility, built directly off the FVI by adding measures of accessibility through both a service area analysis and a closest-facility network analysis before completing the final weighted overlay analysis at the building level. The findings of the three methods were then compared to the inundation area of 2012's Superstorm Sandy event.
Methods & Results
1. Hazus Lite
The Hazus Lite GUI is constructed by demographic information from "Shelters Category Weights."
Variables Considered
Income
Ethnicity
Black
Hispanic
Native American
Asian
Group Quarters
Age
Under 16 and Over 65
2. Flooding Vulnerability Index (FVI)
From Hazus Lite
Income
Ethnicity
Black
Hispanic
Native American
Asian
Group Quarters
+
Modified from Hazus
Age
Modifying range to Under 16 and Over 75
New Demographics Proxys
Single-Parent Households
Live alone
Speaks English "Less than very well"
Proximity Index
Flood Plain & Elevation
Base Elevation (+2'0"below)
The Proximity Index: Buildings were assigned a score based on their location within a floodplain and their elevation as follows: +3 for buildings within the 100-Year Floodplain, +3 for buildings within the 500-Year Floodplain, and +2 for buildings below the Base Elevation. Scores were cumulative and resulted in a scoring system of 0 to 7.
3. FVI + Accessibility
Access to Immediate Surroundings
Every day resources and community
(Service area analysis ¼ mile - 15 min)
Access to Key Facilities
Hospitals, Schools & Community Centers (Network analysis)
Service Area Analysis: The residential building outlined in green above has a 1/2 mile accessibility, which we are considering a 15 minute walk, which is reduced by 81% when the 100 year floodplain polygon is incorporated as a barrier within the service area accessibility analysis. This statistic was calculated for every residential building in Brooklyn and was included as a layer within the weighted overlay analysis for the FVI + Accessibility method.
Network Analysis: The above routing analysis shows the change in accessibility to hospitals from residential buildings. In this example, the closest facility changes from one which ~ 1.6 mile away to one which is ~ 2.5 miles away (a 924.7% increase in distance). The same analysis was performed for schools and community centers, and the percent change statistic for both was included as a layer within the weighted overlay analysis for the FVI + Accessibility method
ADVANCED SPATIAL ANALYSIS / PROFESSOR LEAH MEISTERLIN / MSUP COLUMBIA UNIVERSITY / P. Claramunt / S.Nelson / A. Stokes
Zooming in
The most impacted neighborhoods within Superstorm Sandy
A Redhook:
This snapshot displays the acute vulnerability of Red Hook based on low elevation and coastal proximity, creating conditions for extreme flood inundation. Though NYCHA properties are highlighted by the white square, vulnerability extends to the general building stock.
B Sheepshead Bay:
Using the NTA boundaries, this coastal community contains the highest count of vulnerable residential units in Brooklyn, where high vulnerability is categorized as a FVI in the 80th percentile.
C Canarsie:
Here we can see that the Sandy inundation extends beyond the flood plain effecting less vulnerable buildings. This shows our reliance on coastal and tidal flooding for our FVI and the need to incorporate Inland flooding scenarios.
What social and spatial metrics are best used to identify the communities who are most vulnerable during flooding events?
Where in Brooklyn are these communities located?
Manhattan
Queens
FVI + Accessibility in Superstorm Sandy
Superstorm Sandy Inundation
100-Year Floodplain
Vulnerability
HIGH
LOW
1 MILE

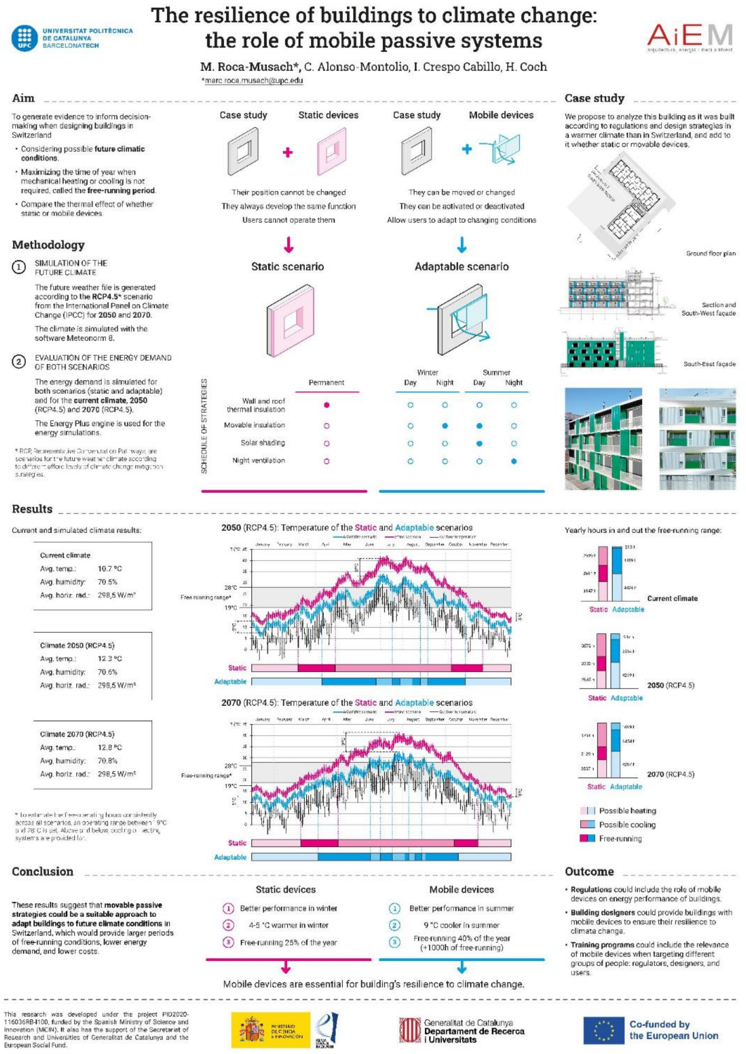
Coherence


ACCESSIBILITY & ASSUMPTION
Examining methodological assumption and the impact of HOLC security map boundaries (1938) on health infrastructure in Brooklyn, NY (2019)
BACKGROUND
In the 1930s, the Home Owners' Loan Corporation (HOLC) created maps as part of its City Survey program to classify neighborhoods based on perceived level of lending risk. Color-coded boundaries drawn within a neighborhood revealed the following classifications: green for "best," blue for "still desirable," yellow for "definitely declining," and red for "hazardous." Though the maps were designed to assess risk in an effort to stabilize the housing market, they were adopted by the private market and federal appraisers, often against the advancement of those living in "redlined" areas.
This study aims to understand how and to what extent a "methodology of assumption" impacts one's findings in spatial analysis. Through examination of the HOLC maps and their impact on health infrastructure and investment, the results of two distinct methodologies are compared. Health infrastructure (HI) is defined as hospitals, hospital extensions, and health centers. The location examined is Brooklyn (BK), NY.
COMPARISON MATRIX
Comparisons between analyses can be made to other immediately adjacent analyses situated in the matrix.
RESEARCH QUESTIONS
To what extent does Brooklyn's present health infrastructure and demographics reflect the geographical boundaries as represented by the 1938 HOLC map?
What are the analytical implications within a "methodology of assumption"?
CONTEXT
Original 1938 HOLC Residential Security Map of Brooklyn, NY, courtesy of DC National Archives.
MANHATTAN
THE BRONX
QUEENS
STATEN ISLAND
METHOD 1: 2-STEP FLOATING CATCHMENT AREA (2SFCA)
METHOD 2: GEOGRAPHICALLY WEIGHTED REGRESSION (GWR)
UNIT OF ANALYSIS 1: HOLC-BOUND
UNIT OF ANALYSIS 2: RE-DRAWN HOLC BOUNDARIES
UNIT OF ANALYSIS 2: POST-BOUND
UNIT OF ANALYSIS 2: PRE-BOUND
ACCESS INDEX (SQFT/CAPITA)
HEALTH INFRASTRUCTURE
OPEN SPACE
LOCAL R-SQUARED (%)
ACCESS INDEX (SQFT/CAPITA) DISTRIBUTION PER BOUNDARY
LOCAL R-SQUARED (%) DISTRIBUTION PER BOUNDARY
RED
YELLOW
BLUE
GREEN
METHOD 1: 2SFCA
METHOD 2: GWR
GENERATING CATCHMENTS USING MULTIMODAL NETWORK ANALYSIS
EXPLANATORY FACTORS: HOLC SURVEY DEMOGRAPHICS

EPFL







■ Laboratory on Human-Environment Relations in Urban Systems

Hierarchy

Measuring Human Impact of Wildfires in Los Angeles County

Catastrophic wildfires are occurring in greater frequency in Southern California due to several culminating factors including climate change, land development in the wildland-urban interface, a history of fire suppression, and natural wind patterns.

Although the California Department of Forestry and Fire Protection (CAL FIRE) produces "fire risk" maps for every county in the state, the risk levels represent "burnability" based on slope and vegetation. Wildfires are natural phenomena that have had profound evolutionary impacts on the earth's fauna and flora. However, since human settlements have encroached into flammable forested regions, wildfires now cause tremendous damage to buildings and infrastructure and occasionally result in human death.

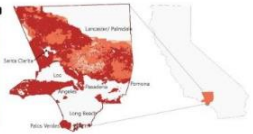
Our project analyzes the impact that wildfires have on humans in three distinct ways. We believe that CAL FIRE's current wildfire risk map is too narrow-minded, and must integrate the degree to which wildfires disrupt settlements and inhabitants.

Research Questions

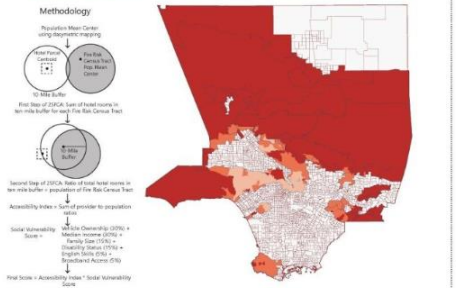
Where, and by **what** magnitude, are humans impacted by wildfires in Los Angeles County?

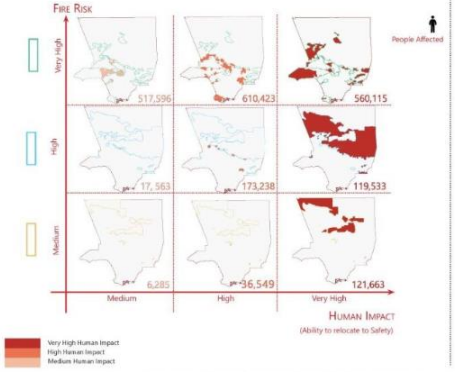
How does this "**human impact index**" relate to CAL FIRE's current wildfire risk map?

CAL FIRE's Current Wildfire Risk Map

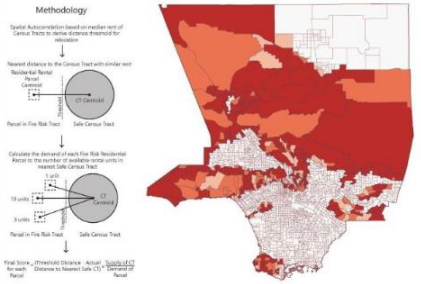


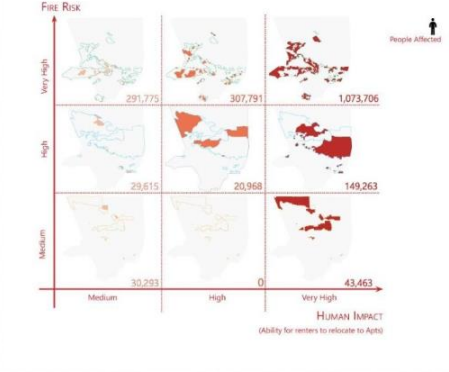
I. Ability for Residents in Fire Zones to Relocate to Safety



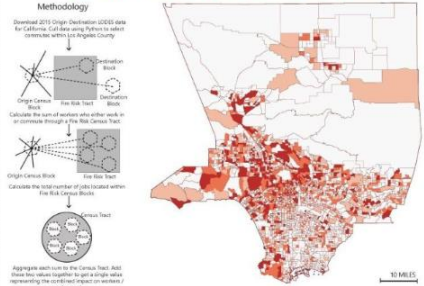


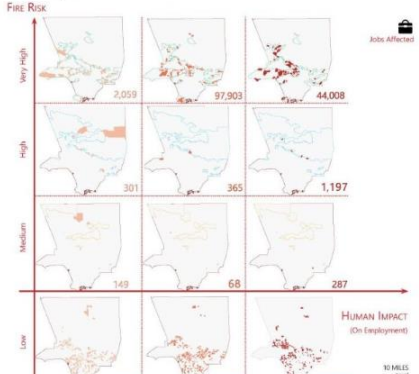
II. Ability for Renters to Relocate Apts. after Wildfire Event





III. Countywide Impact of Wildfires on Employment

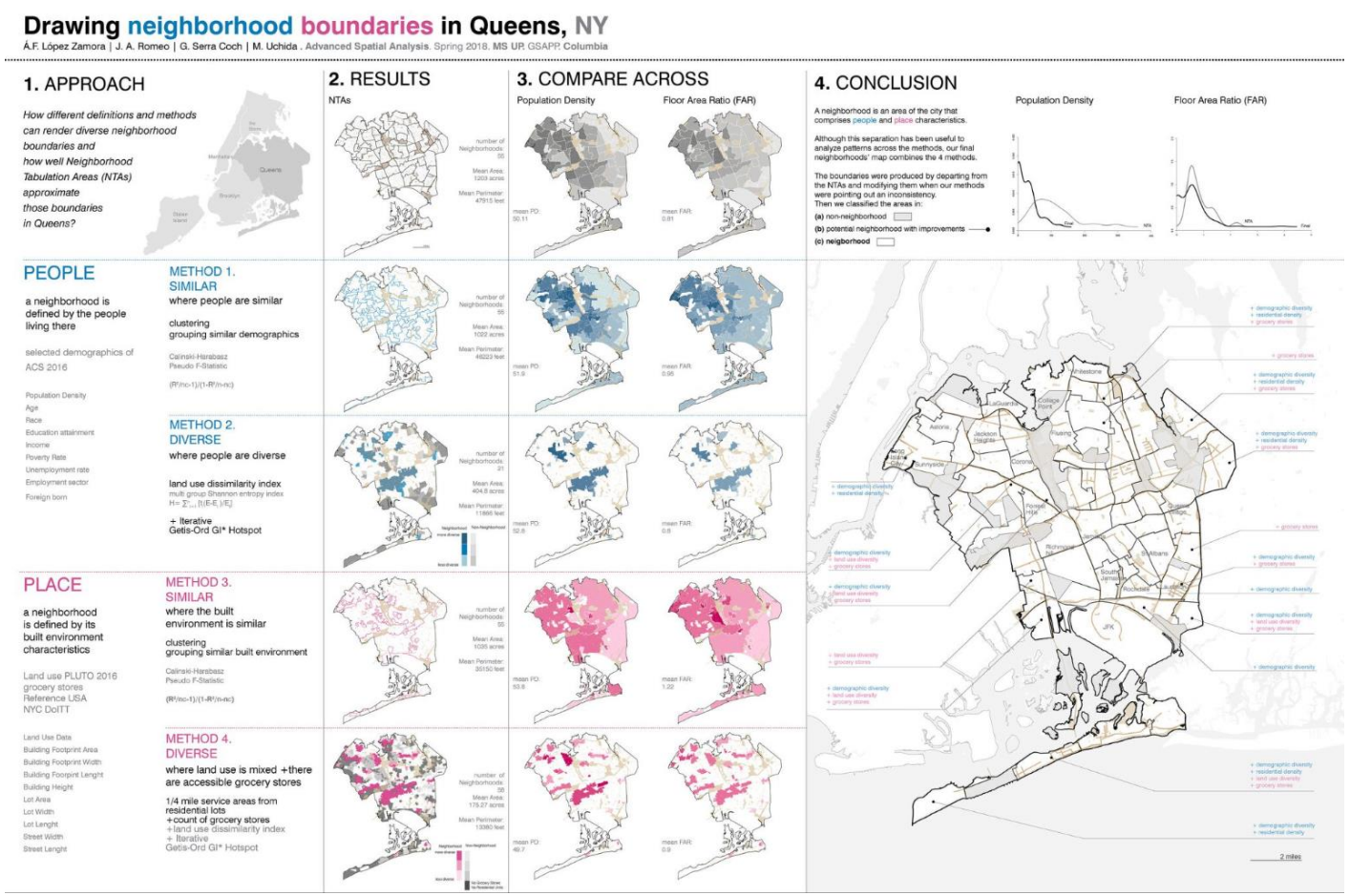




Very High Human Impact
High Human Impact
Medium Human Impact

ADVANCED SPATIAL ANALYSIS | PROFESSOR LEAH MEISTERLIN | SRUJANA BHOOPANAM | SHUYANG HUANG | TIMOTHY O'GRADY

Hierarchy


Drawing neighborhood boundaries in Queens, NY
Á.F. López Zamora | J. A. Romeo | G. Serra Coch | M. Uchida . Advanced Spatial Analysis. Spring 2018. MS UP. GSAPP. Columbia
1. APPROACH
How different definitions and methods can render diverse neighborhood boundaries and how well Neighborhood Tabulation Areas (NTAs) approximate those boundaries in Queens?
2. RESULTS
NTAs
3. COMPARE ACROSS
Population Density
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A neighborhood is an area of the city that comprises people and place characteristics.
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METHOD 1. SIMILAR
where people are similar
clustering
grouping similar demographics
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METHOD 2. DIVERSE
where people are diverse
land use dissimilarity index
multi group Shannon entropy index
+ Iterative
Getis-Ord Gi* Hotspot
PLACE
a neighborhood is defined by its built environment characteristics
Land use PLUTO 2016
grocery stores
Reference USA
NYC DoITT
Land Use Data
Building Footprint Area
Building Footprint Width
Building Footprint Lenght
Building Height
Lot Area
Lot Width
Lot Lenght
Street Width
Street Lenght
METHOD 3. SIMILAR
where the built environment is similar
clustering
grouping similar built environment
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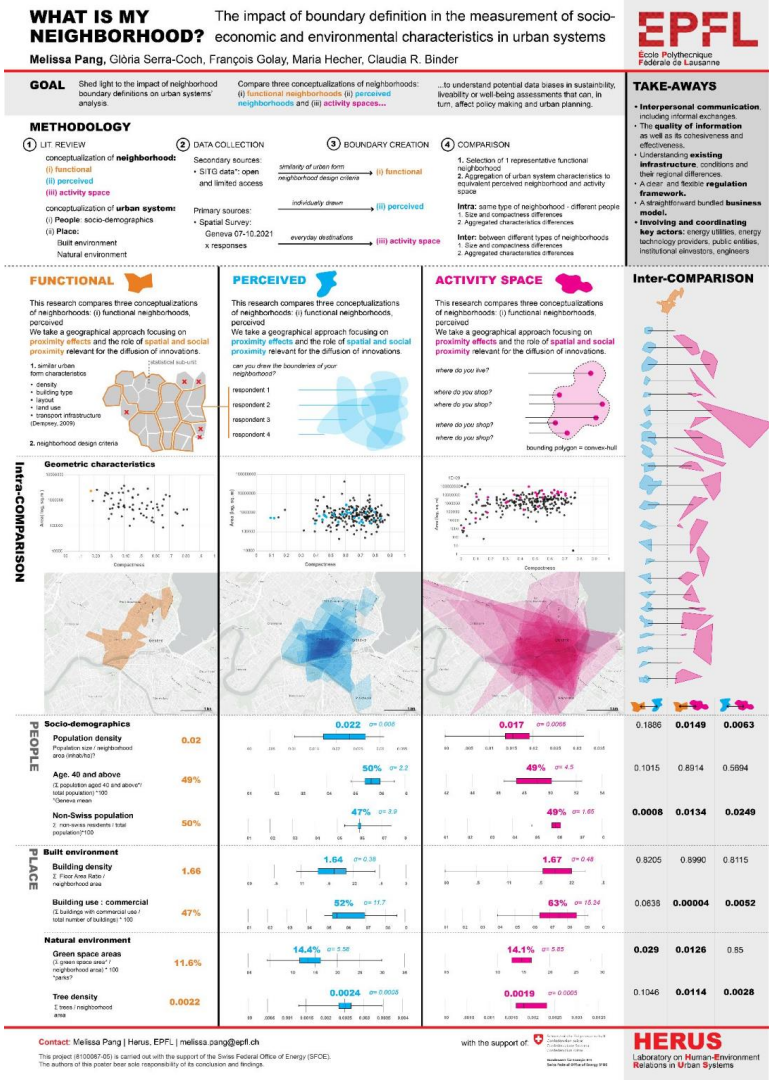
METHOD 4. DIVERSE
where land use is mixed +there are accessible grocery stores
1/4 mile service areas from residential lots
+count of grocery stores
+land use dissimilarity index
+ Iterative
Getis-Ord Gi* Hotspot
2 miles

Consistency



Legibility

Provision of housing services within planetary limits: A methodological framework for the urban circular economy

Ankita Singhvi, Aristide Athanassiadis, Claudia R. Binder

Relevance

- Decent housing is a core sustainable development goal and a fundamental human right. It is currently not met for a quarter of the global population
- Construction sector is the world's largest consumer of raw materials, and 40% of global CO_2 emissions are attributed to housing and construction
- The challenge of providing decarbonised, decent housing differs per urbanisation context

Circular city ≠ Circular economy

- Circular economy proposes strategies to reduce resource use, reuse buildings, and recycle construction and demolition waste
- However, meeting housing needs within climate targets requires attention to more than material and energy stocks and flows
- A circular city must consider trade-offs in the configuration of stocks and flows in providing urban services

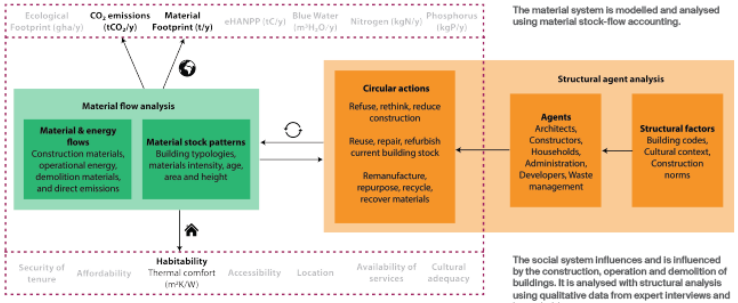
Theoretical basis: Stock-flow-service nexus

Resource flows combined with material stocks provide the urban services necessary for societal well-being (Haberl et al., 2017).

Social structures, actors and their actions restrict or enable strategies for managing material stocks and flows (Binder, 2007).

Methodological framework: Housing services in the urban circular economy

Planetary boundaries (O'Neill et al, 2018) are defined in relation to climate targets, monitored using biophysical indicators (i.e. carbon and material footprint) based on life cycle inventory data.



The material system is modelled and analysed using material stock-flow accounting.

The social system influences and is influenced by the construction, operation and demolition of buildings. It is analysed with structural analysis using qualitative data from expert interviews and household surveys.

Housing services are defined in relation to decent housing targets (OHCHR, 2014), monitored using cadastral, administrative and survey data.

Next steps

- I will operationalise the framework for provision of decent housing services within climate targets for Geneva, Switzerland
- Housing services are defined as thermal habitability and planetary limits defined by climate targets (GHG emissions)
- System dynamics (right) allows the integration of housing stock-flow analysis, GHG emissions, and the circular actions that restrict or enable the meeting of targets
- Key contribution: Recentering urban circular economy around the objective of providing necessary urban services

Ankita Singhvi | HERUS, EPFL | ankita.singhvi@epfl.ch
École Polytechnique Fédérale de Lausanne

Laboratory on Human-Environment Relations in Urban Systems

Laboratory on Human-Environment Relations in Urban Systems

Poster

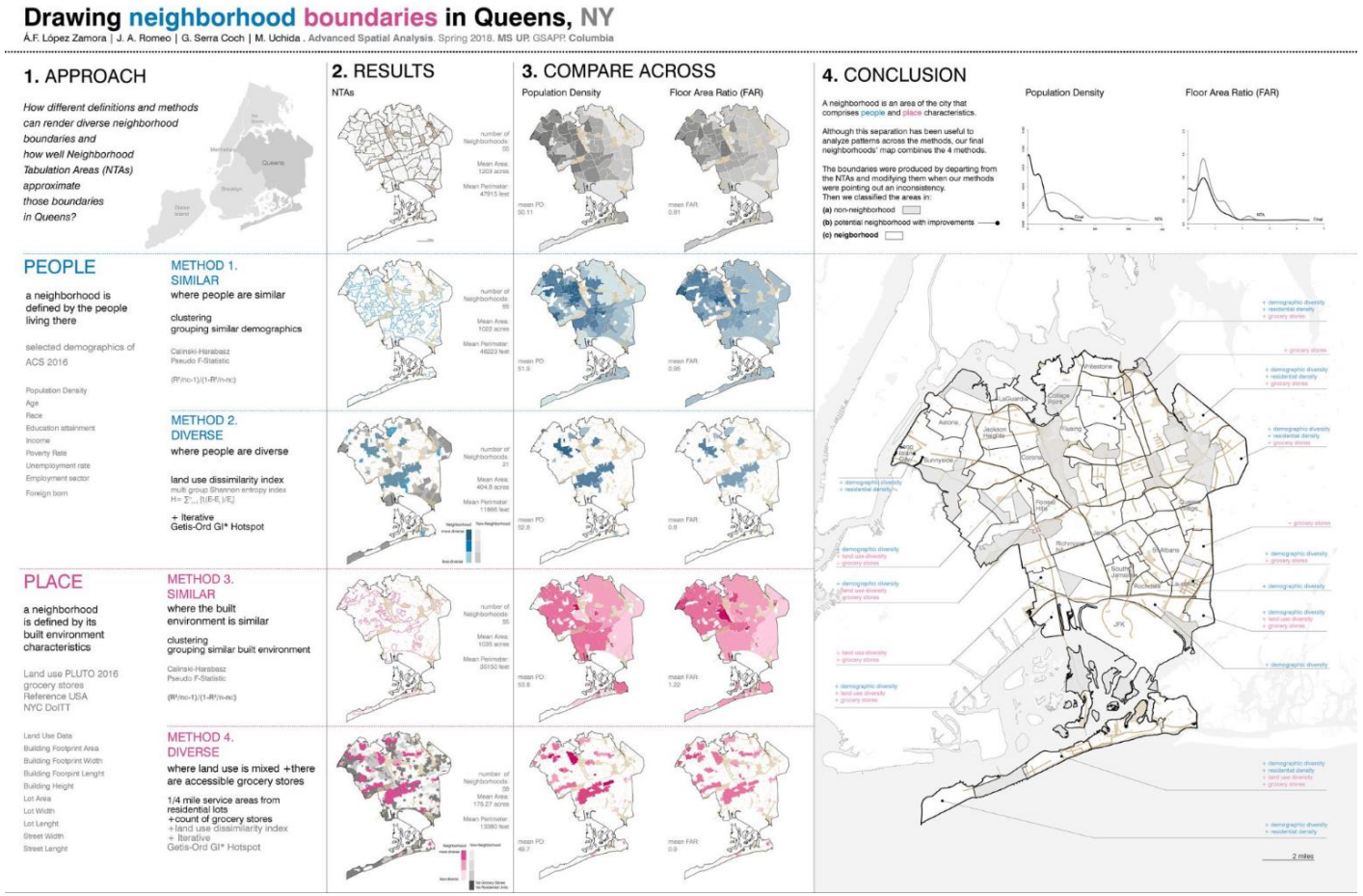
Do’s and dont’s

- Tell a story / narrative
- Minimum ink rule
- Keep text to a minimum
- Minimise mixing fonts
- Break text into readable blocks
- No bento boxes
- No huge title boxes
- Align!
- Diagrams are your friends
- Images can also be your friend
- Direct your audience

“Less is more”

It is a visual mean of communication

Tell a story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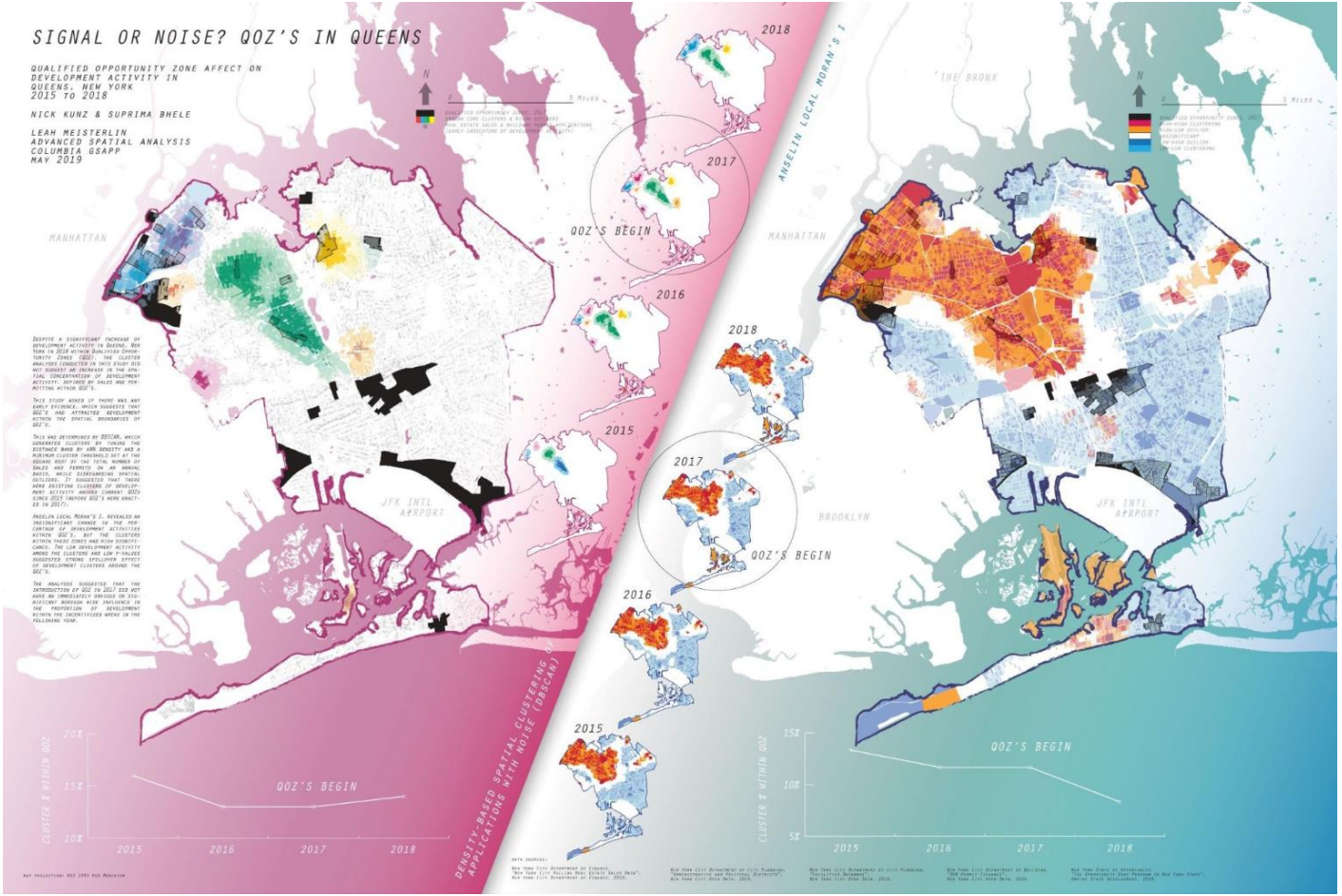
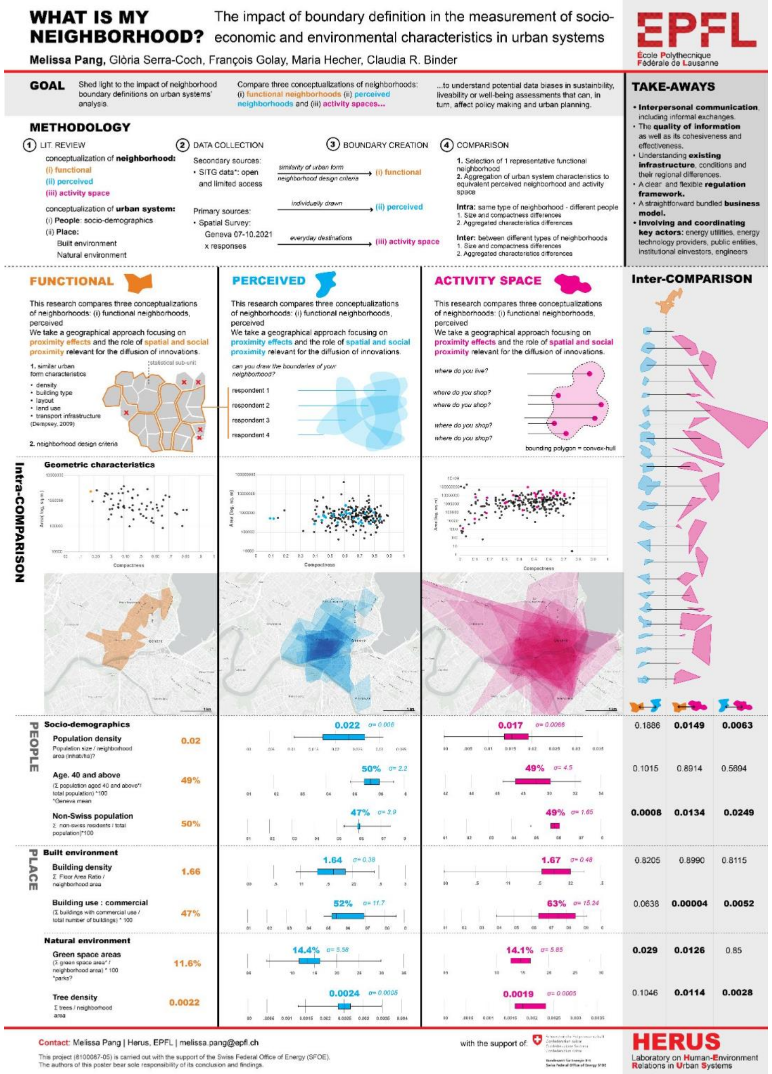
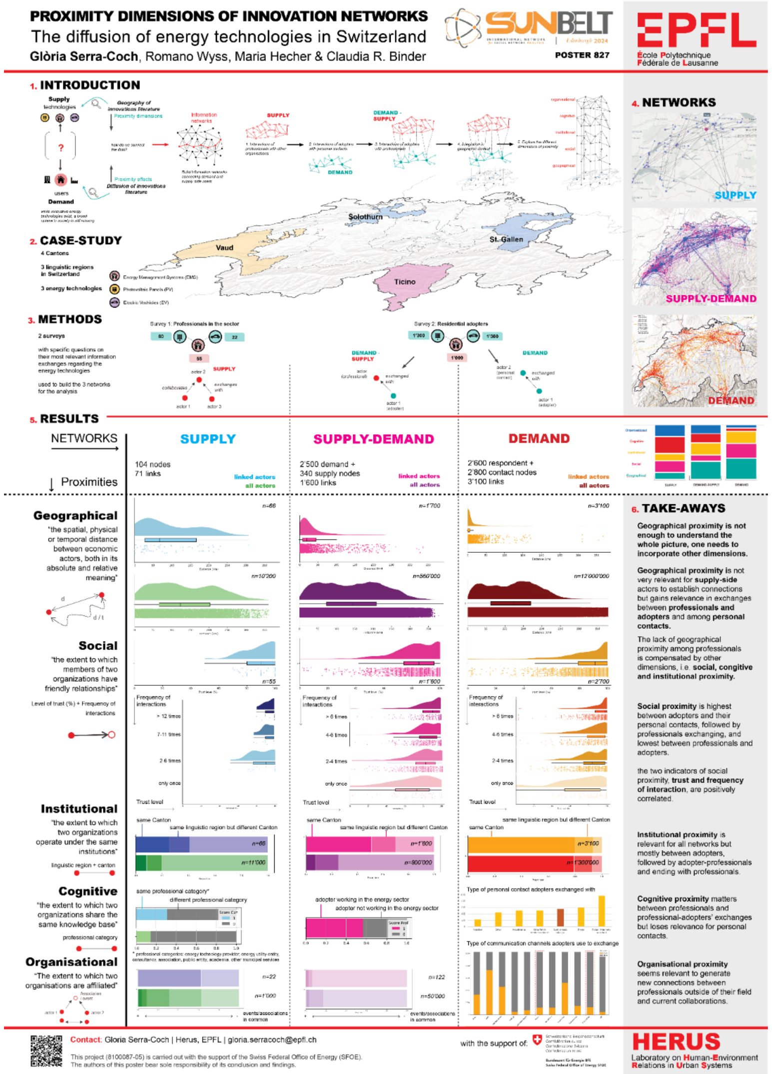

SIGNAL OR NOISE? QOZ'S IN QUEENS
QUALIFIED OPPORTUNITY ZONE AFFECT ON DEVELOPMENT ACTIVITY IN QUEENS, NEW YORK 2015 TO 2018
NICK KUNZ & SUPRIMA BHELE
LEAH MEISTERLIN
ADVANCED SPATIAL ANALYSIS
COLUMBIA GSAPP
MAY 2019
MANHATTAN
JFK INTL AIRPORT
QOZ'S BEGIN
2018
2017
2016
2015
ANSELIN LOCAL MORAN'S I
DENSITY-BASED SPATIAL CLUSTERING OF APPLICATIONS WITH NOISE (DBSCAN)
THE BRONX
BROOKLYN
CLUSTER # WITHIN QOZ





Laboratory on Human-Environment Relations in Urban Systems

Less is more

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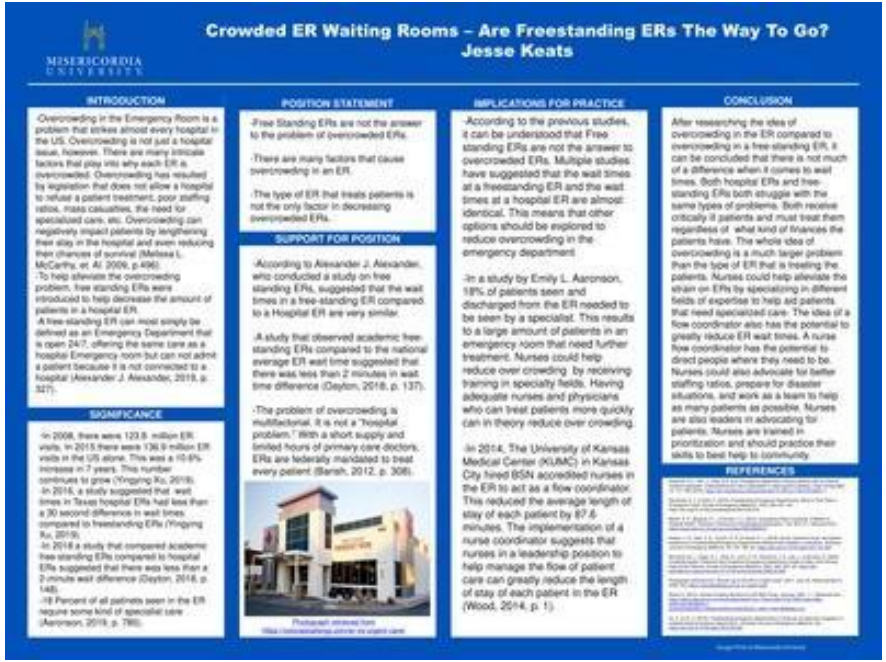

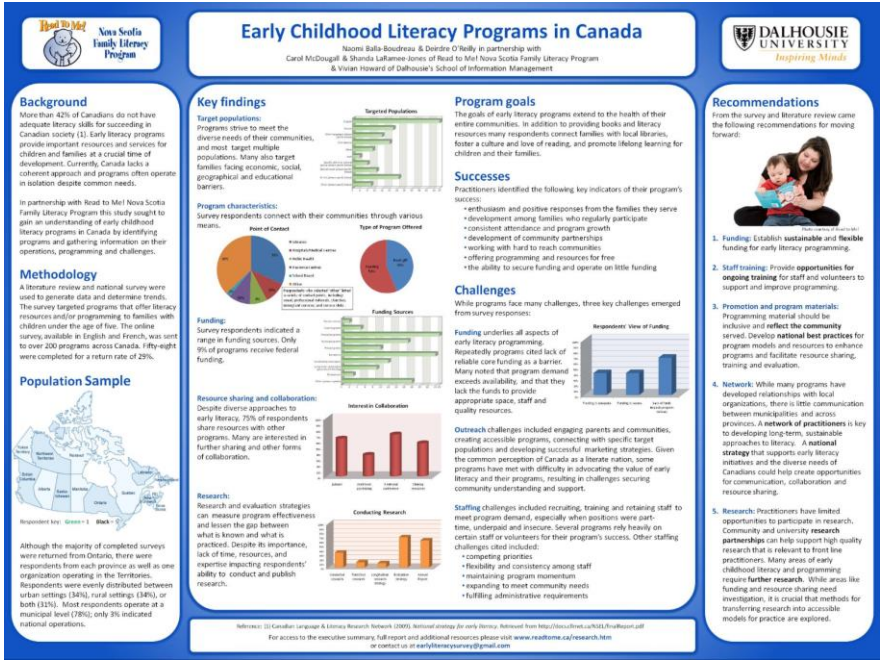

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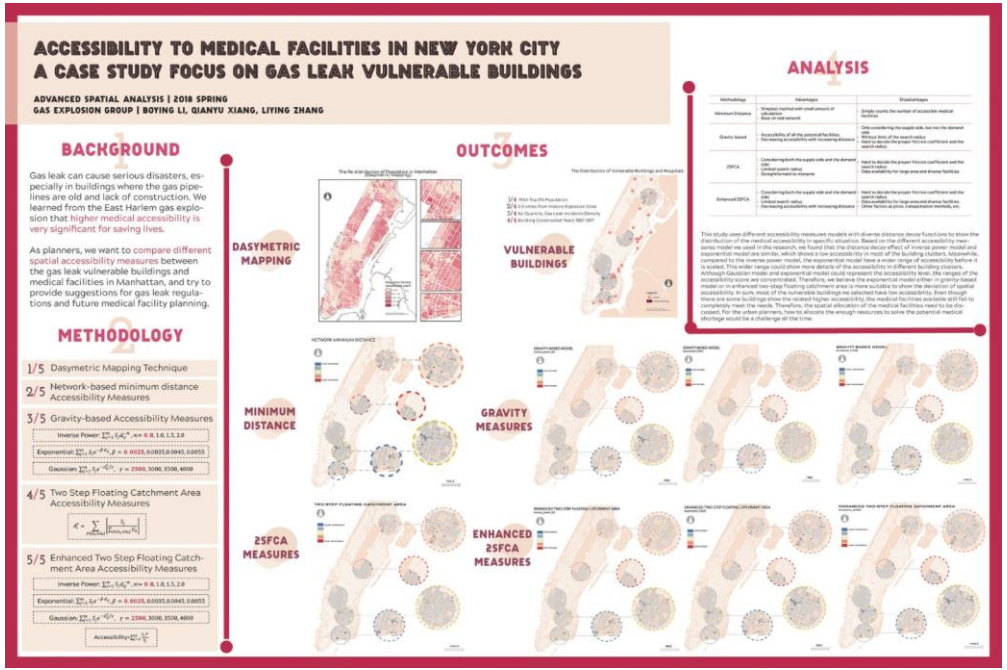

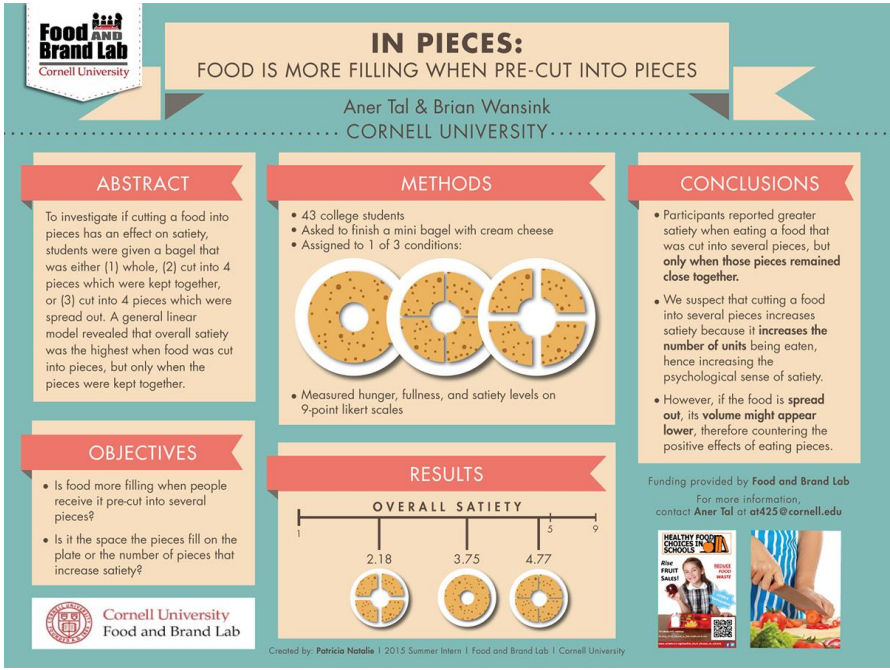

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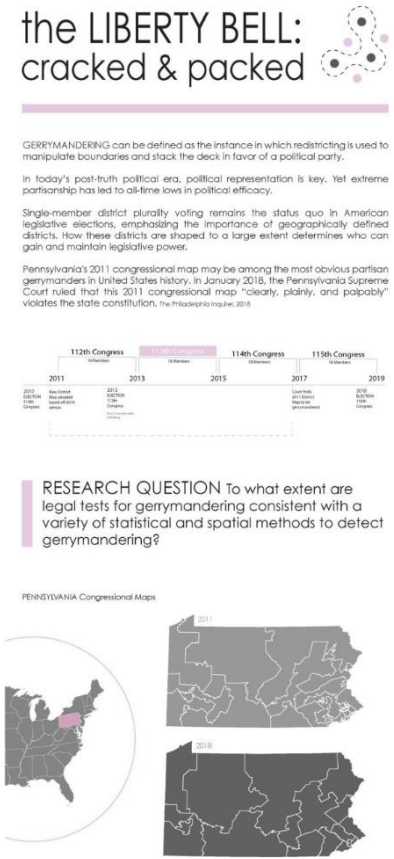
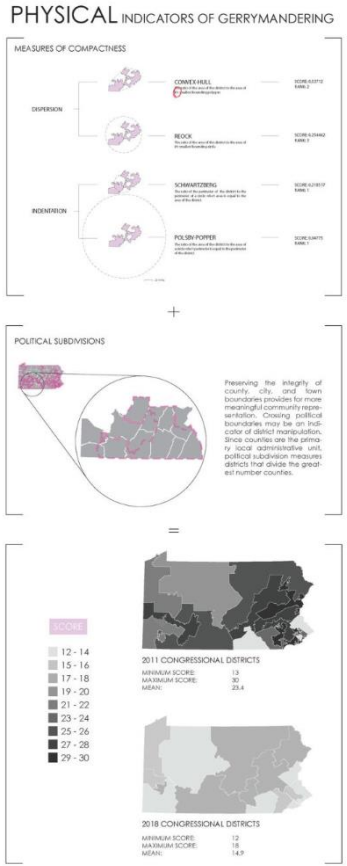
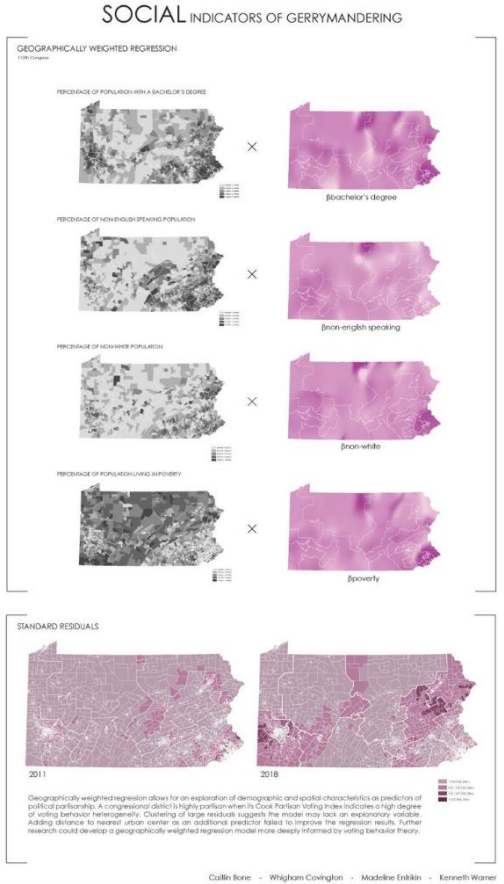






Less is more

ETHICS AND/OF UNCERTAINTY: SPECULATIVE URBANISM AND THE RISE OF SYNTHETIC PEOPLE

Dare Brawley, Gayatri Kawlra, Francis Yu

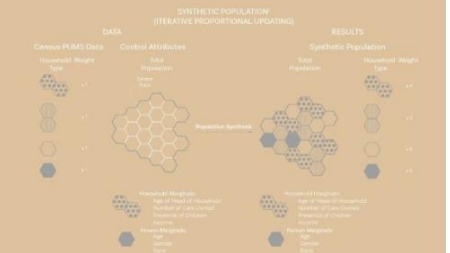
Abstract:
This research takes up synthetic populations to discuss the ethics of uncertainty in data-driven urban processes. Urban-tech tells us that better data is a replacement for more robust democracy; that urban issues are solved through more computation, not more deliberation; and that data can increasingly substitute for political representation. In the face of these ever louder claims for calculable urban futures we examine the logics underlying synthetic populations—a fictitious but statistically representative urban populace. This paper uses GIS-based methods to investigate whether synthetic populations evenly represent the cities and citizens they claim to describe. It asks whether mathematical sophistication here obscures an underlying uncertainty, and, in turn, speculates on the stakes of this uncertainty for the creation of a just city.

Synthetic populations' describe a fictitious but statistically representative urban populace. Materially, it is a dataset comprised of individual-level statistics calculated from aggregate data.

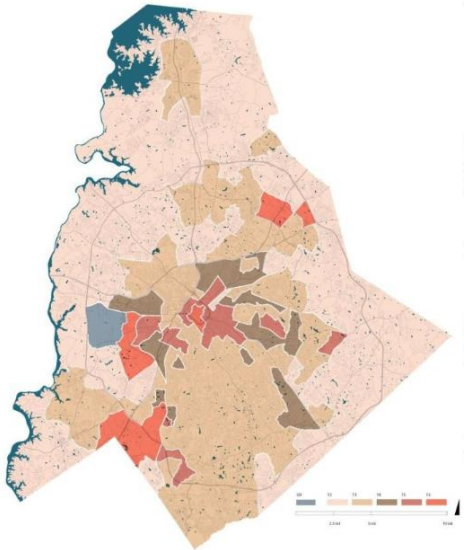
Q: *To what extent can we rely on behavioral models produced by synthetic populations for planning and policy-making? What kinds of urban areas are such models best at synthesizing? (I.e. is the goodness of fit of such models evenly spatially distributed, and if not which places are best approximated?)*

We use two methods to evaluate the goodness of fit and spatial variation.

1. We define zones according to the model of the New Urbanist transect. For each transect zone and for the city as a whole we assess whether each synthetic population model performs better in certain types of places over others using Total Absolute Error and Classification Error..
2. We perform geographically weighted regressions to assess the relationship between percent error and population density, built density, land area, and transect zones to see how synthetic populations differ from ACS aggregates in representing demographic and spatial characteristics.



CASE STUDY CITY:
CHARLOTTE, NORTH CAROLINA



Synthetic Population Error
$\delta = T - E$
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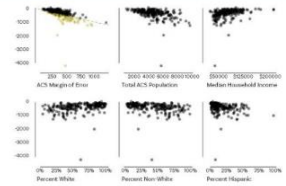

Total Absolute Error by Zone
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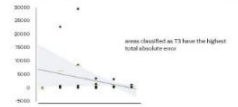
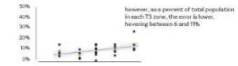
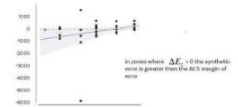


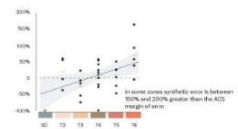
Percentage Error by Zone
$CE_i = \frac{TAE_i}{N_i}$

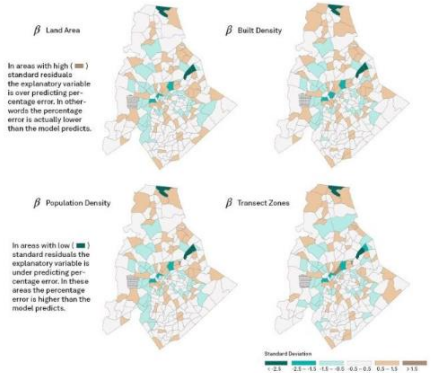


Difference Between Total Absolute Error and ACS Margin of Error
$\Delta E_i = TMoE_i - TAE_i$
where $TMoE_i = \sum_{i=1}^{n} MoE_i$



Percent Difference
$\%\Delta E_i = \frac{\Delta E_i}{TMoE_i}$





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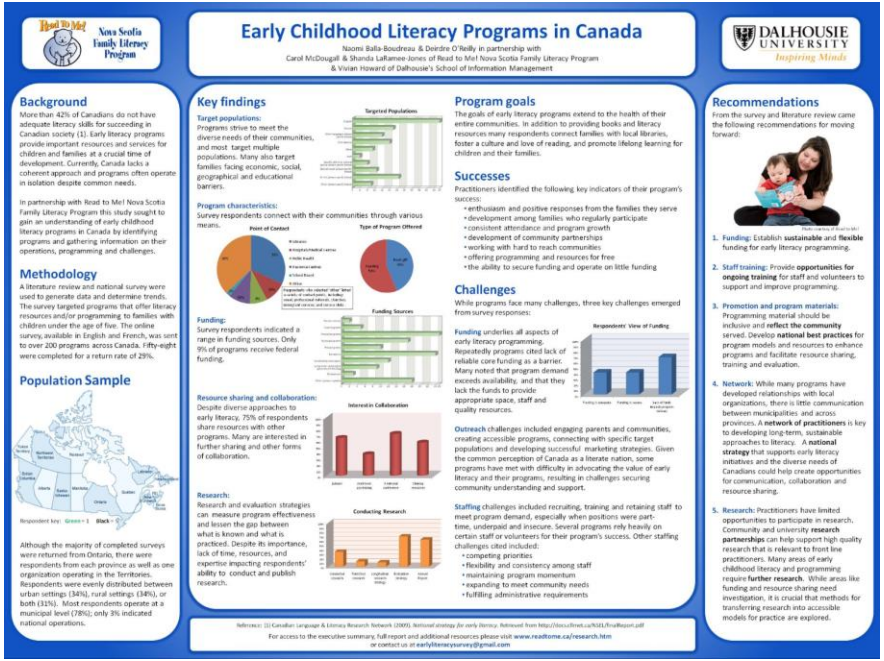
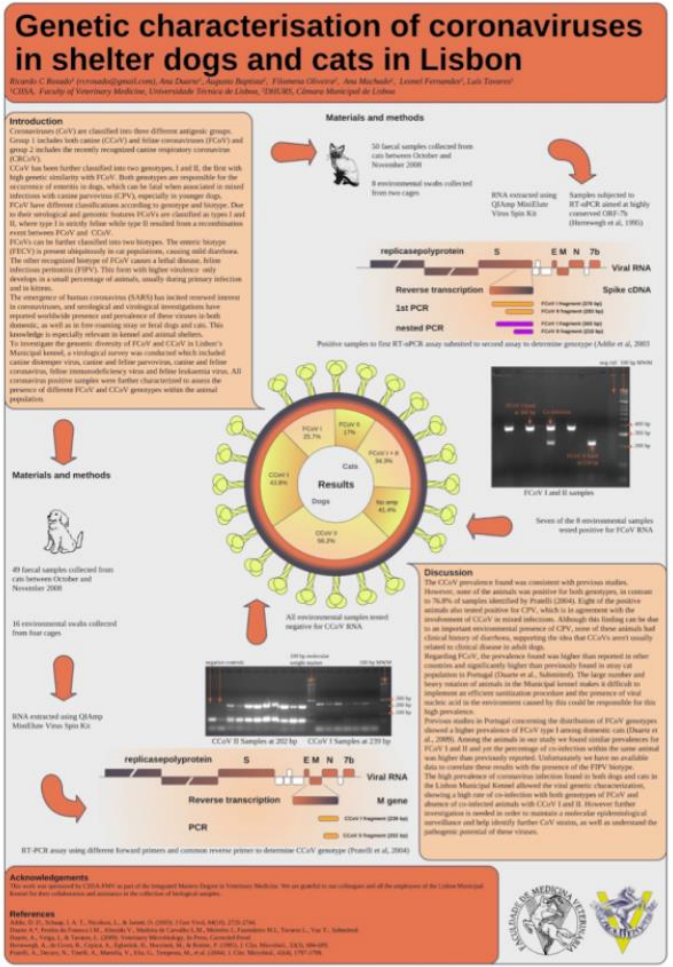
Population Density	-572.148	0.145	0.064	0.966
Built Density	-569.299	0.106	0.043	1.010
Land Area	-565.968	0.131	0.044	0.982
T-zone	-578.004	0.129	0.075	0.984

Do not overstate

- No bento boxes
- No huge title boxes





Source: Ricardo Rosado; Copyright License

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ETHICS AND/OF UNCERTAINTY: SPECULATIVE URBANISM AND THE RISE OF SYNTHETIC PEOPLE

Dare Brawley, Gayatri Kawlra, Francis Yu

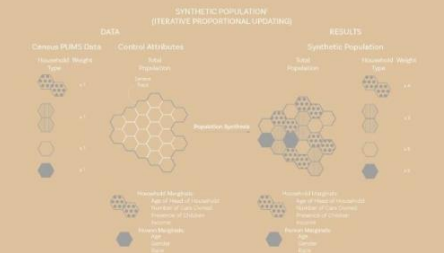
Abstract:
This research takes up synthetic populations to discuss the ethics of uncertainty in data-driven urban processes. Urban-tech tells us that better data is a replacement for more robust democracy; that urban issues are solved through more computation, not more deliberation; and that data can increasingly substitute for political representation. In the face of these ever louder claims for calculable urban futures we examine the logics underlying synthetic populations—a fictitious but statistically representative urban populace. This paper uses GIS-based methods to investigate whether synthetic populations evenly represent the cities and citizens they claim to describe. It asks whether mathematical sophistication here obscures an underlying uncertainty, and, in turn, speculates on the stakes of this uncertainty for the creation of a just city.

Synthetic populations' describe a fictitious but statistically representative urban populace. Materially, it is a dataset comprised of individual-level statistics calculated from aggregate data.

Q: *To what extent can we rely on behavioral models produced by synthetic populations for planning and policy-making? What kinds of urban areas are evenly spatially distributed, and if not which places are best approximated?)*

We use two methods to evaluate the goodness of fit and spatial variation.

1. We define zones according to the model of the New Urbanist transect. For each transect zone and for the city as a whole we assess whether each synthetic population model performs better in certain types of places over others using Total Absolute Error and Classification Error..
2. We perform geographically weighted regressions to assess the relationship between percent error and population density, built density, land area, and transect zones to see how synthetic populations differ from ACS aggregates in representing demographic and spatial characteristics.



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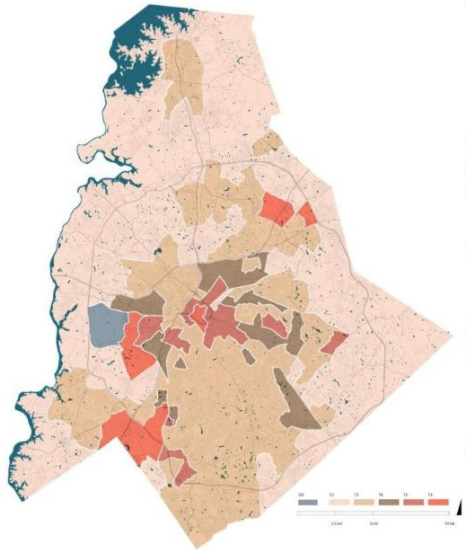

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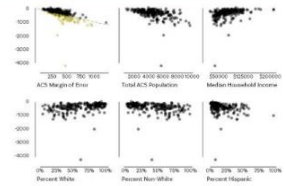

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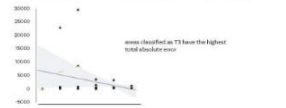

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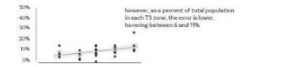

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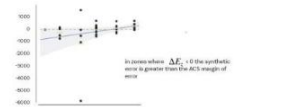

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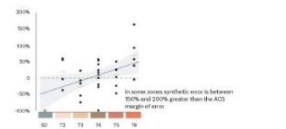

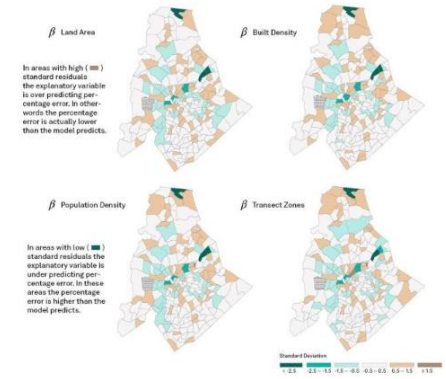

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Break text into readable blocks

the LIBERTY BELL: cracked & packed

GERRYMANDERING can be defined as the instance in which redistricting is used to manipulate boundaries and stack the deck in favor of a political party.

In today's post-truth political era, political representation is key. Yet extreme partisanship has led to all-time lows in political efficacy.

Single-member district plurality voting remains the status quo in American legislative elections, emphasizing the importance of geographically defined districts. How these districts are shaped to a large extent determines who can gain and maintain legislative power.

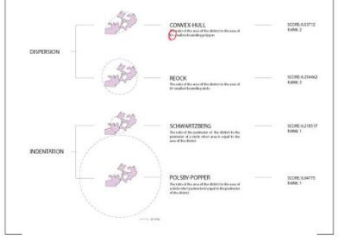
Pennsylvania's 2011 congressional map may be among the most obvious partisan gerrymanders in United States history. In January 2018, the Pennsylvania Supreme Court ruled that this 2011 congressional map "clearly, plainly, and palpably" violates the state constitution. The Philadelphia Inquirer, 2018

RESEARCH QUESTION To what extent are legal tests for gerrymandering consistent with a variety of statistical and spatial methods to detect gerrymandering?

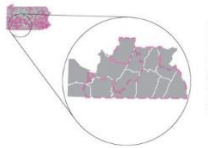
PENNSYLVANIA Congressional Maps

PHYSICAL INDICATORS OF GERRYMANDERING

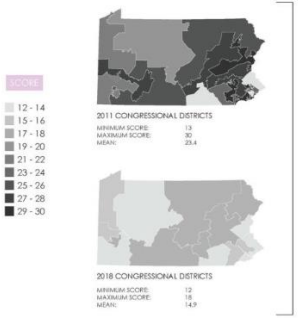
MEASURES OF COMPACTNESS



POLITICAL SUBDIVISIONS

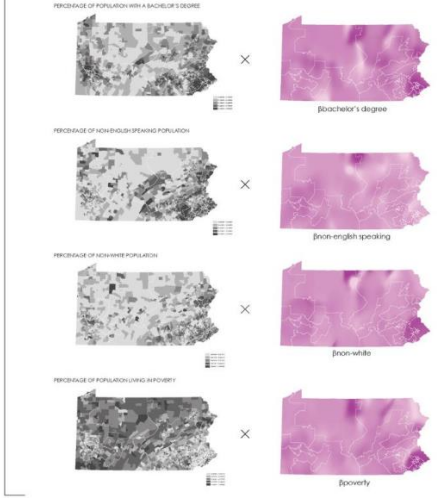


Preserving the integrity of county, city, and town boundaries provides for more meaningful community representation. Crossing political boundaries may be an indicator of district manipulation. Since counties are the primary local administrative unit, political subdivision measures districts that divide the greatest number counties.



SOCIAL INDICATORS OF GERRYMANDERING

GEOGRAPHICALLY WEIGHTED REGRESSION



STANDARD RESIDUALS

Geographically weighted regression allows for an exploration of demographic and spatial characteristics as predictors of political partisanship. A congressional district's highly partisan when its Cook Partisan Voting Index indicates a high degree of voting behavior heterogeneity. Clustering of large residuals suggests the model may lack an explanatory variable. Adding distance to nearest urban center as an additional predictor failed to improve the regression results. Further research could develop a geographically weighted regression model more deeply informed by voting behavior theory.

Caitlin Bone - Whigham Covington - Madeline Enhlkin - Kenneth Warner

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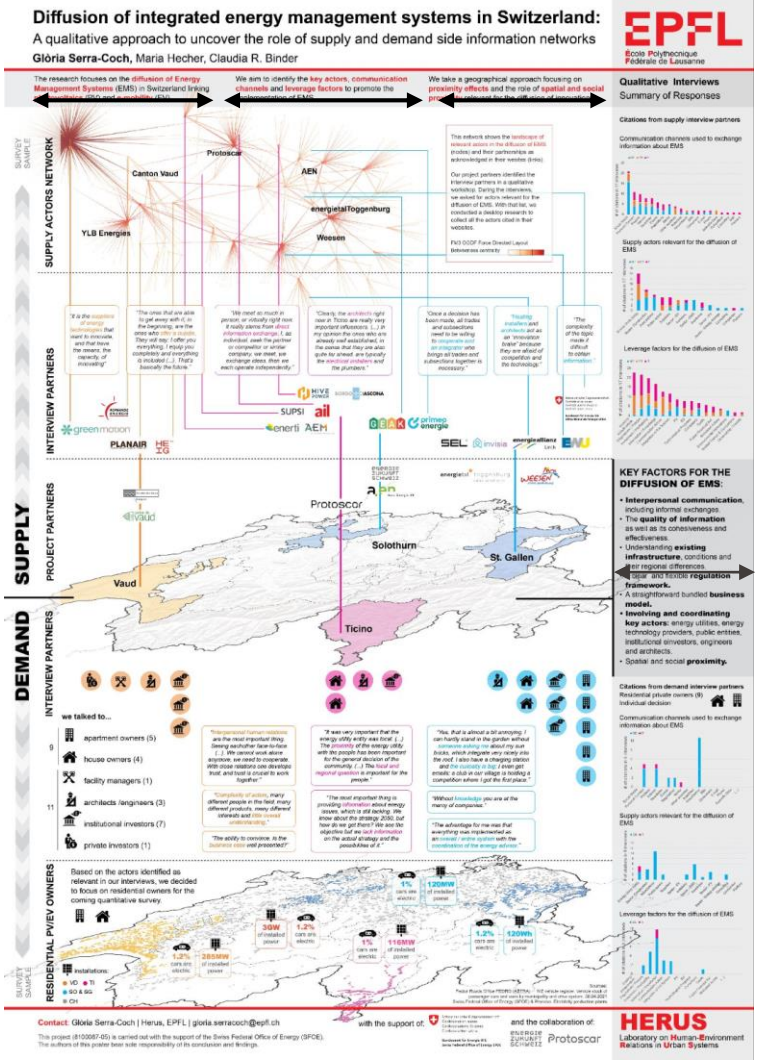


Align!

Align!

Align!

Drawing neighborhood boundaries in Queens, NY

Á.F. López Zamora | J. A. Romeo | G. Serra Coch | M. Uchida . Advanced Spatial Analysis. Spring 2018. MS UP. GSAPP. Columbia

1. APPROACH

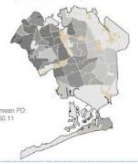
How different definitions and methods can render diverse neighborhood boundaries and how well Neighborhood Tabulation Areas (NTAs) approximate those boundaries in Queens?

2. RESULTS

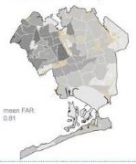
NTAs

3. COMPARE ACROSS

Population Density



Floor Area Ratio (FAR)



4. CONCLUSION

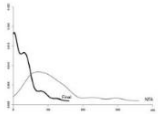
A neighborhood is an area of the city that comprises people and place characteristics.

Although this separation has been useful to analyze patterns across the methods, our final neighborhoods' map combines the 4 methods.

The boundaries were produced by departing from the NTAs and modifying them when our methods were pointing out an inconsistency.
Then we classified the areas in:

(a) non-neighborhood
(b) potential neighborhood with improvements
(c) neigborhood

Population Density



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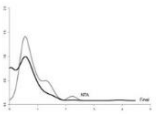


PEOPLE

a neighborhood is defined by the people living there

selected demographics of ACS 2016

Population Density
Age
Race
Education attainment
Income
Poverty Rate
Unemployment rate
Employment sector
Foreign born

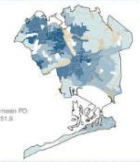
METHOD 1. SIMILAR

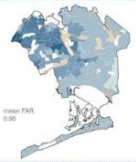
where people are similar

clustering
grouping similar demographics

Calinski-Harabasz
Pseudo F-Statistic

$(R^2/nc-1)/(1-R^2/n-nc)$



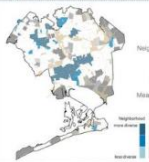


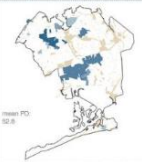
METHOD 2. DIVERSE

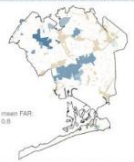
where people are diverse

land use dissimilarity index
multi group Shannon entropy index
$H = \sum_{i} h[E_i / E]$

+ Iterative
Getis-Ord Gi* Hotspot







PLACE

a neighborhood is defined by its built environment characteristics

Land use PLUTO 2016
grocery stores
Reference USA
NYC DoITT

Land Use Data
Building Footprint Area
Building Footprint Width
Building Footprint Lenght
Building Height
Lot Area
Lot Width
Lot Lenght
Street Width
Street Lenght

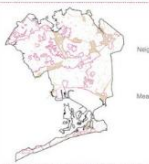
METHOD 3. SIMILAR

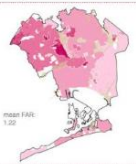
where the built environment is similar

clustering
grouping similar built environment

Calinski-Harabasz
Pseudo F-Statistic

$(R^2/nc-1)/(1-R^2/n-nc)$

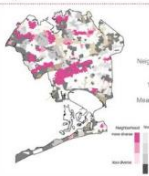


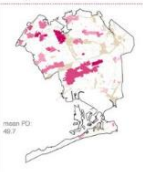


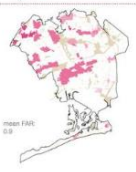
METHOD 4. DIVERSE

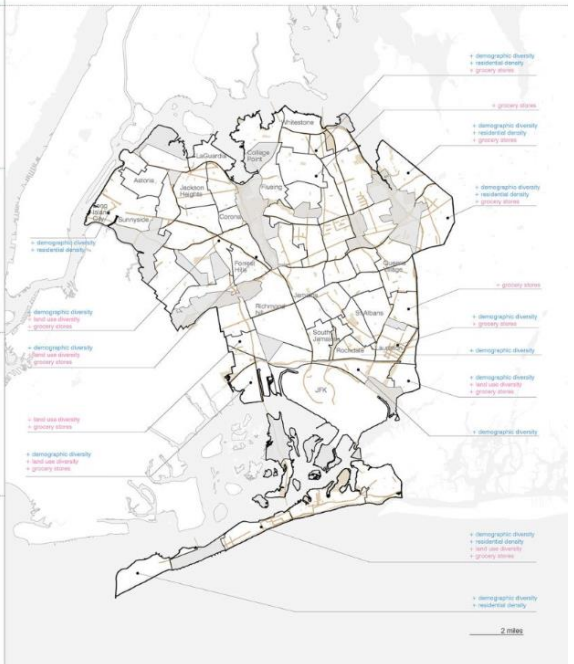
where land use is mixed +there are accessible grocery stores

1/4 mile service areas from residential lots
+count of grocery stores
+land use dissimilarity index
+ Iterative
Getis-Ord Gi* Hotspot









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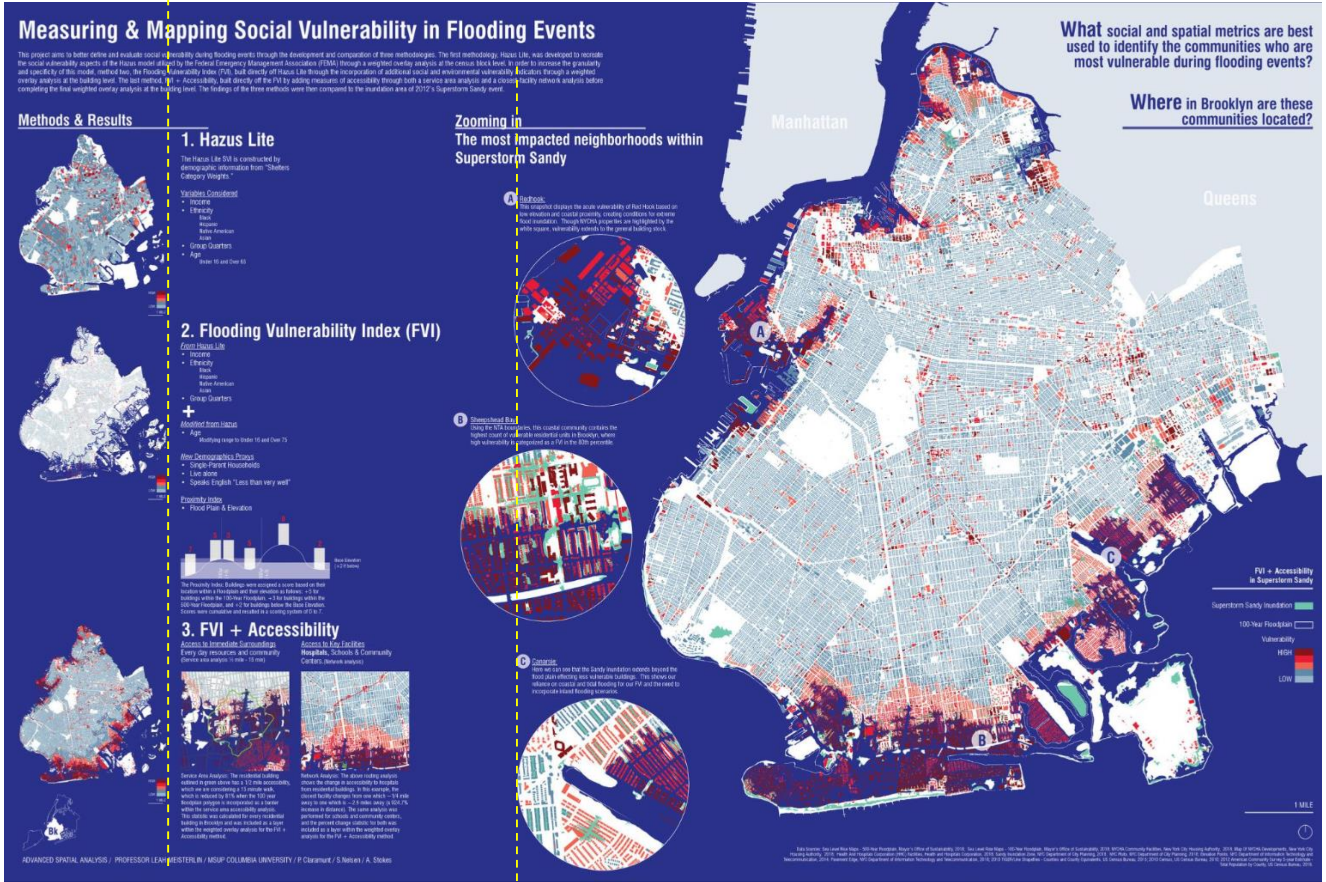
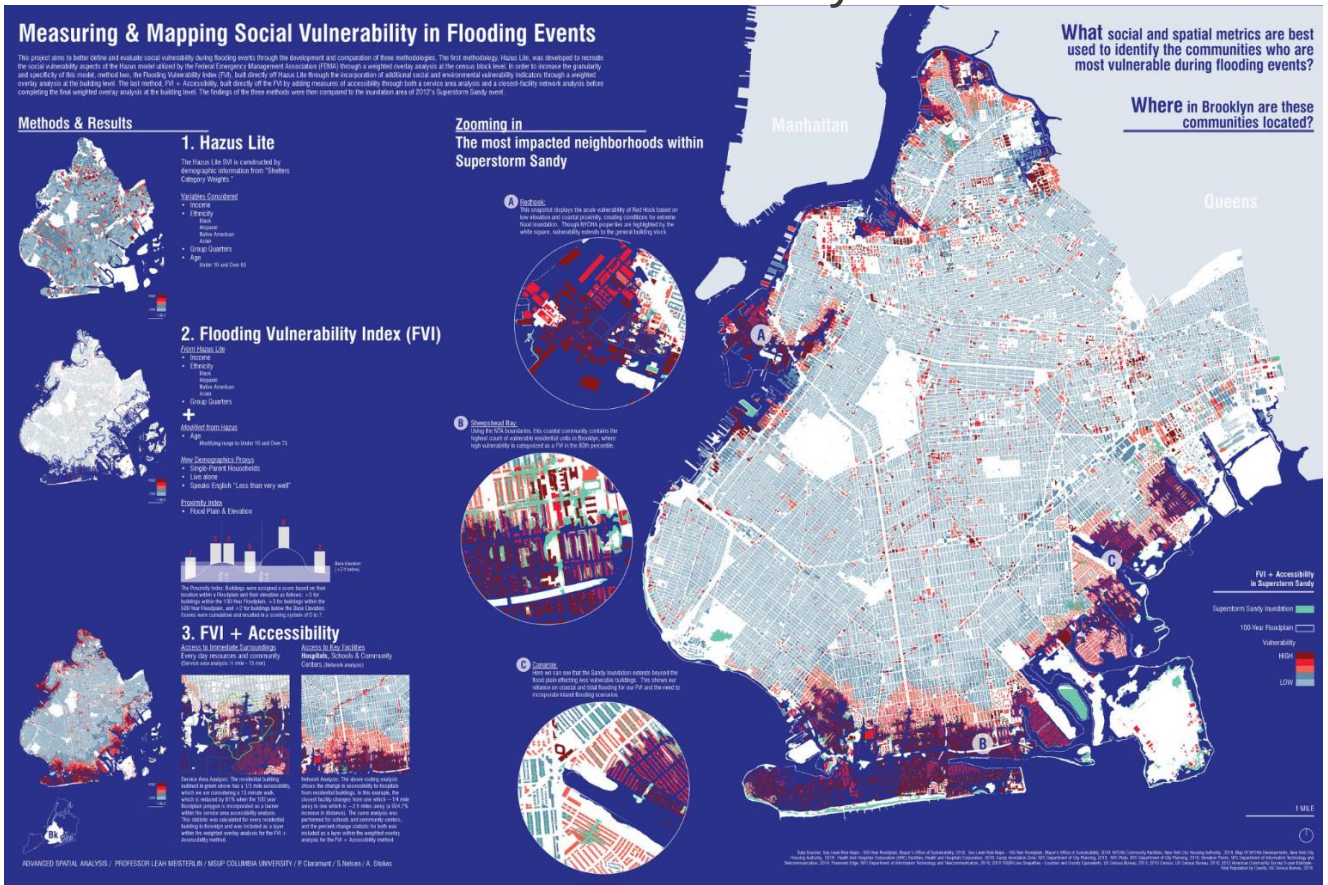


Laboratory on Human-Environment Relations in Urban Systems

This is visual

- Diagrams are your friends
- Images can also be your friend
- Direct your audience



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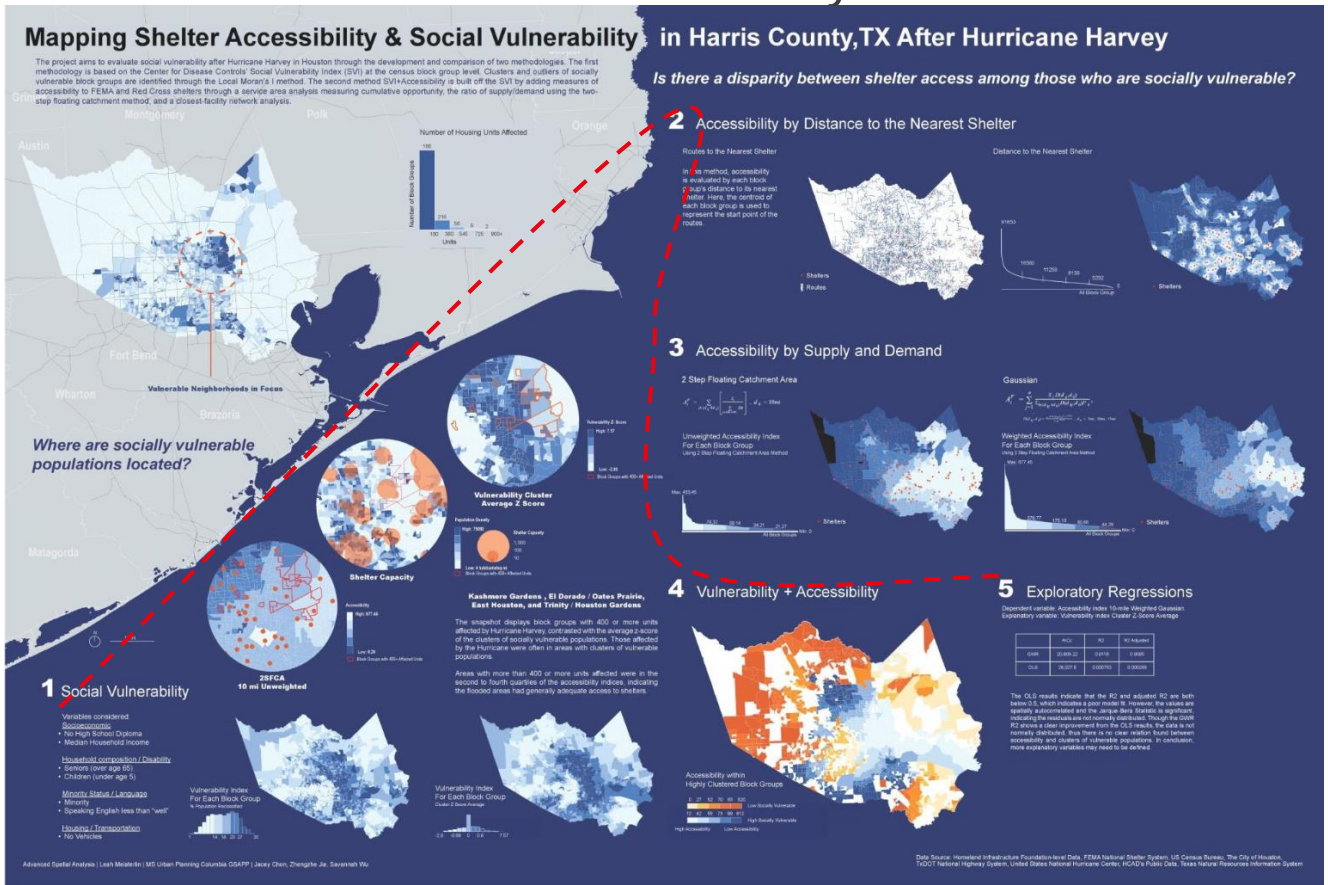
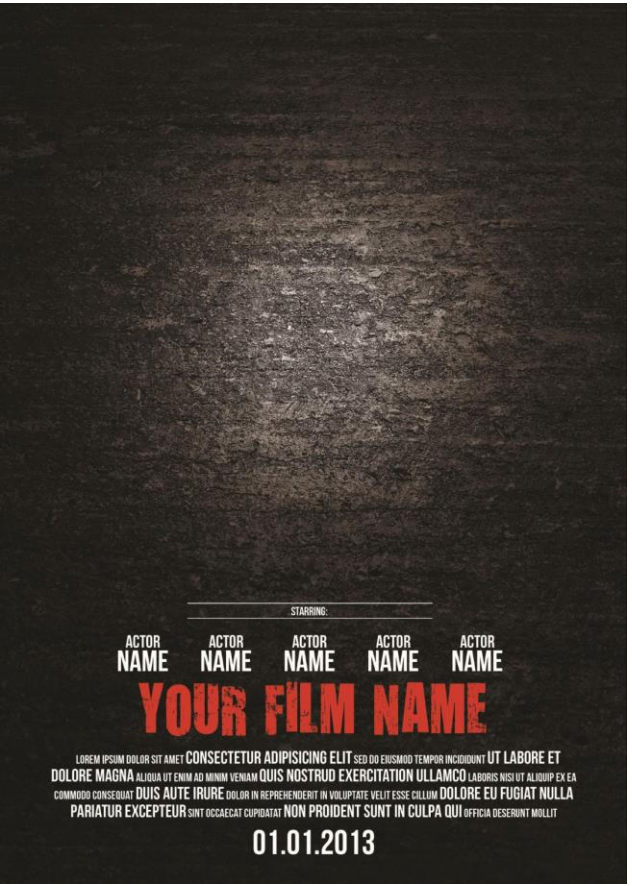


Poster

Composition rules

- Weight to the bottom
- Western reading: top to bottom, left to right
- Colors have (and should have) meaning
- Golden ratio
- Proportions ½, ⅓… *“a quien modula dios le ayuda”*
- Matrix vs. Follie systems

Weight to the bottom



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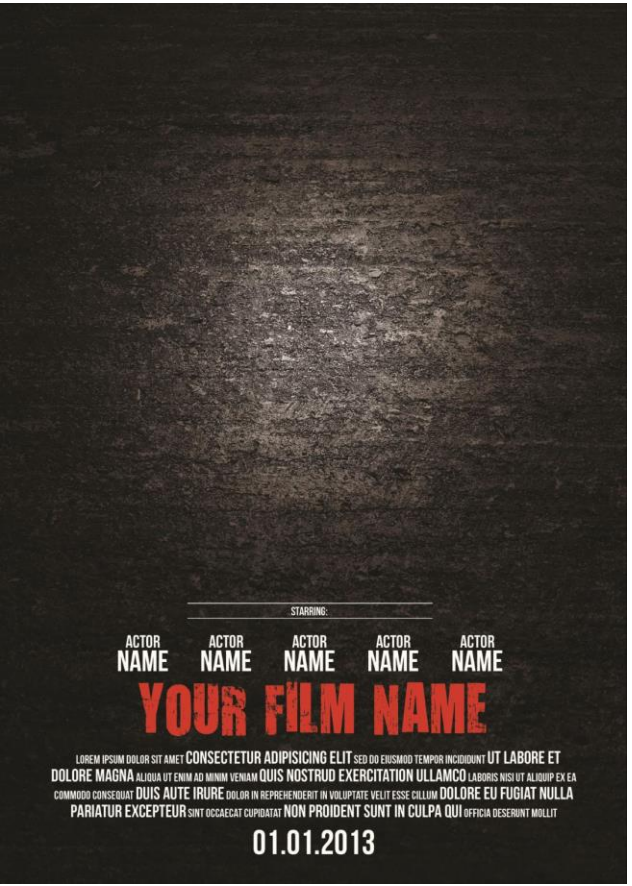

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Dare Brawley, Gayatri Kawira, Francis Yu

Abstract:
This research takes up synthetic populations to discuss the ethics of uncertainty in data-driven urban processes. Urban-tech tells us that better data is a replacement for more robust democracy; that urban issues are solved through more computation, not more deliberation; and that data can increasingly substitute for political representation. In the face of these ever louder claims for calculable urban futures we examine the logics underlying synthetic populations—a fictitious but statistically representative urban populace. This paper uses GIS-based methods to investigate whether synthetic populations evenly represent the cities and citizens they claim to describe. It asks whether mathematical sophistication here obscures an underlying uncertainty, and, in turn, speculates on the stakes of this uncertainty for the creation of a just city.

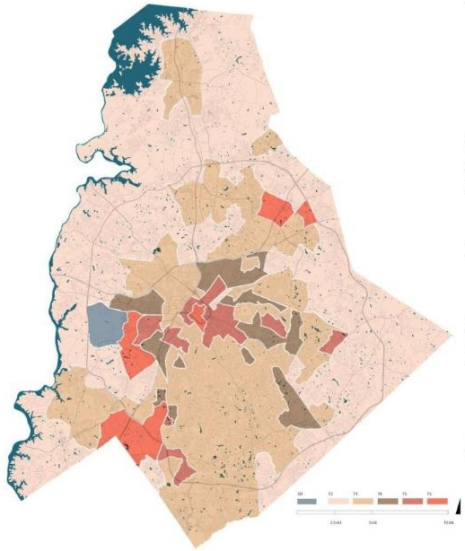
Synthetic populations[1] describe a fictitious but statistically representative urban populace. Materially, it is a dataset comprised of individual-level statistics calculated from aggregate data.

Q: *To what extent can we rely on behavioral models produced by synthetic populations for planning and policy-making? What kinds of urban areas are such models best at synthesizing? (I.e. is the goodness of fit of such models evenly spatially distributed, and if not which places are best approximated?)*

We use two methods to evaluate the goodness of fit and spatial variation.

1. We define zones according to the model of the New Urbanist transect. For each transect zone and for the city as a whole we assess whether each synthetic population model performs better in certain types of places over others using Total Absolute Error and Classification Error.
2. We perform geographically weighted regressions to assess the relationship between percent error and population density, built density, land area, and transect zones to see how synthetic populations differ from ACS aggregates in representing demographic and spatial characteristics.

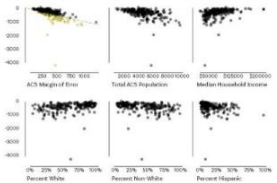
CASE STUDY CITY:
CHARLOTTE, NORTH CAROLINA



Synthetic Population Error

$\delta = T - E$

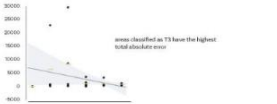
where, T is the synthetic population estimate and E is the ACS population estimate



Total Absolute Error by Zone

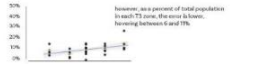
$TAE_i = \sum_{i=1}^{n} |T_i - E_i|$

where, T_i is the synthetic population estimate and E_i is the ACS population estimate



Percentage Error by Zone

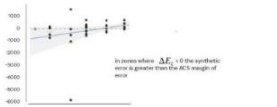
$CE_i = \frac{TAE_i}{N_i}$



Difference Between Total Absolute Error and ACS Margin of Error

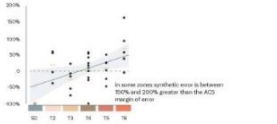
$\Delta E_i = TMoE_i - TAE_i$

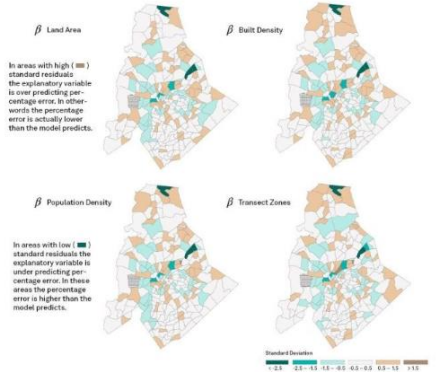
where $TMoE_i = \sum_{i=1}^{n} MoE_i$



Percent Difference

$\%\Delta E_i = \frac{\Delta E_i}{TMoE_i}$



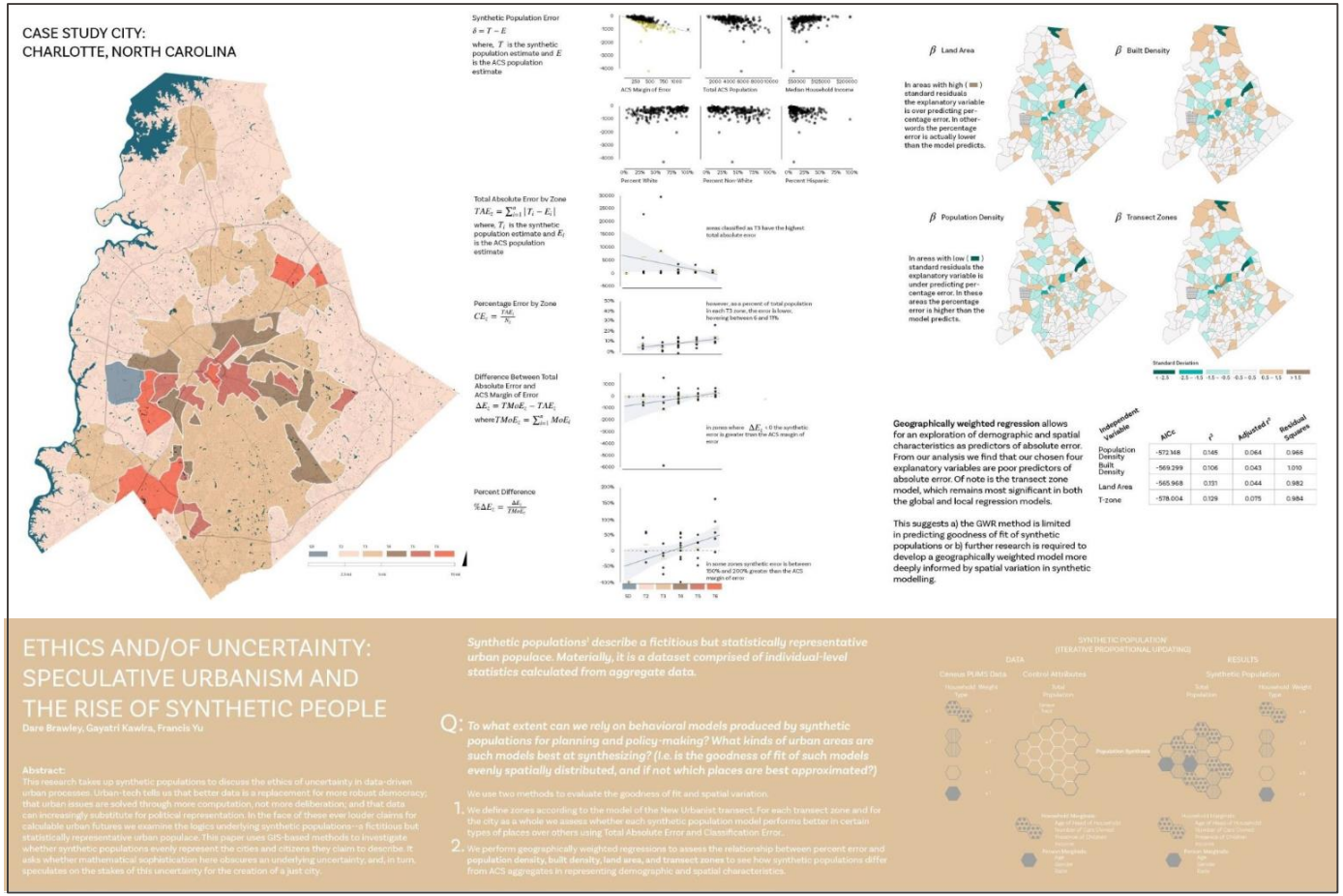


Geographically weighted regression allows for an exploration of demographic and spatial characteristics as predictors of absolute error. From our analysis we find that our chosen four explanatory variables are poor predictors of absolute error. Of note is the transect zone model, which remains most significant in both the global and local regression models.

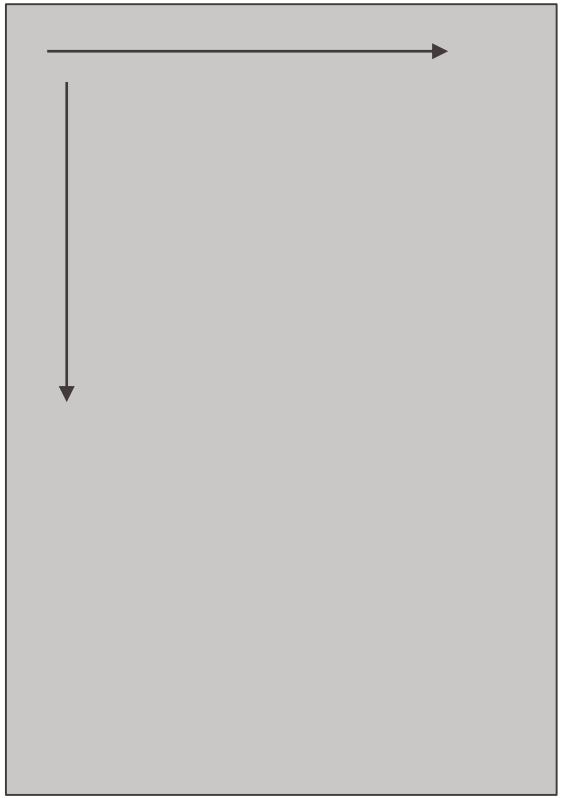
This suggests a) the GWR method is limited in predicting goodness of fit of synthetic populations or b) further research is required to develop a geographically weighted model more deeply informed by spatial variation in synthetic modelling.

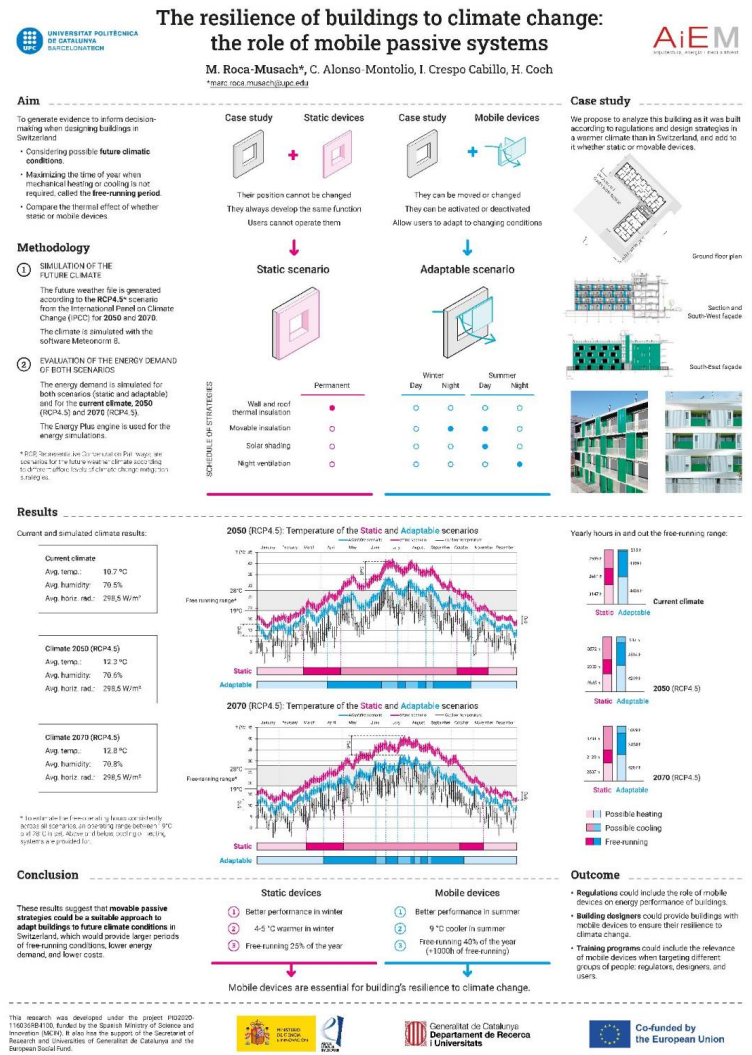
Independent Variable	AICc	r^2	Adjusted r^2	Residual Squares
Population Density	-572.148	0.145	0.064	0.966
Built Density	-569.299	0.106	0.043	1.010
Land Area	-565.968	0.131	0.044	0.982
T-zone	-578.004	0.129	0.075	0.984

Weight to the bottom



Western reading





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Colors have meaning

https://www.webfx.com/blog/web-design/psychology-of-color-infographic/
https://etoninstitute.com/blog/infographic-colors-around-the-world/
https://www.color-meanings.com/color-symbolism-chart/
https://praxent.com/blog/color-psychology-brands-infographic

https://venngage.com/blog/infographic-design-the-dos-and-donts-of-color-selection/
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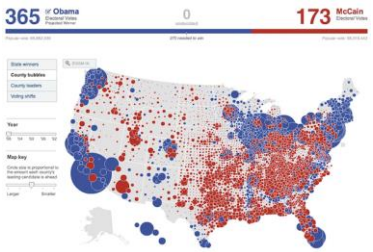
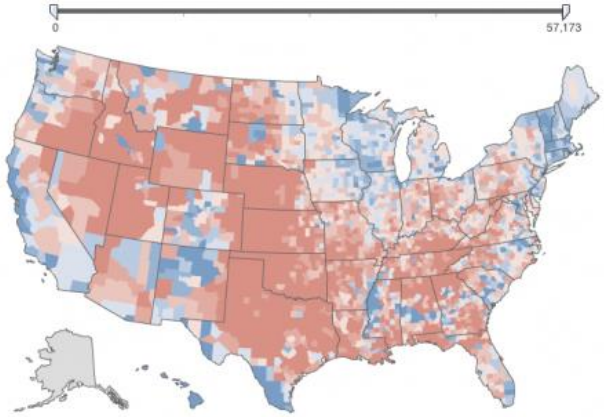
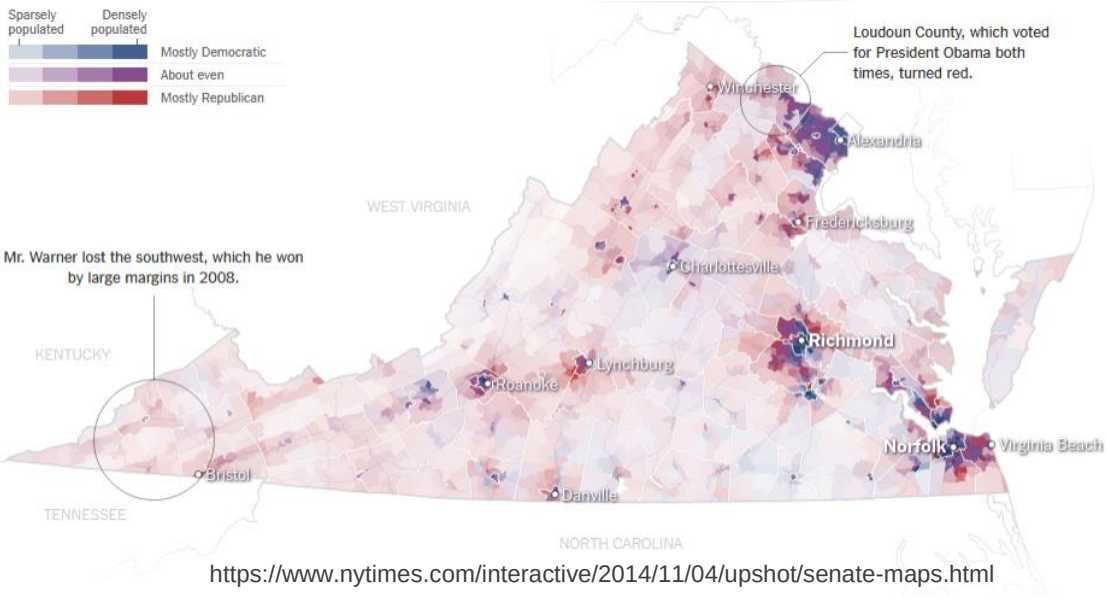
Colors have meaning

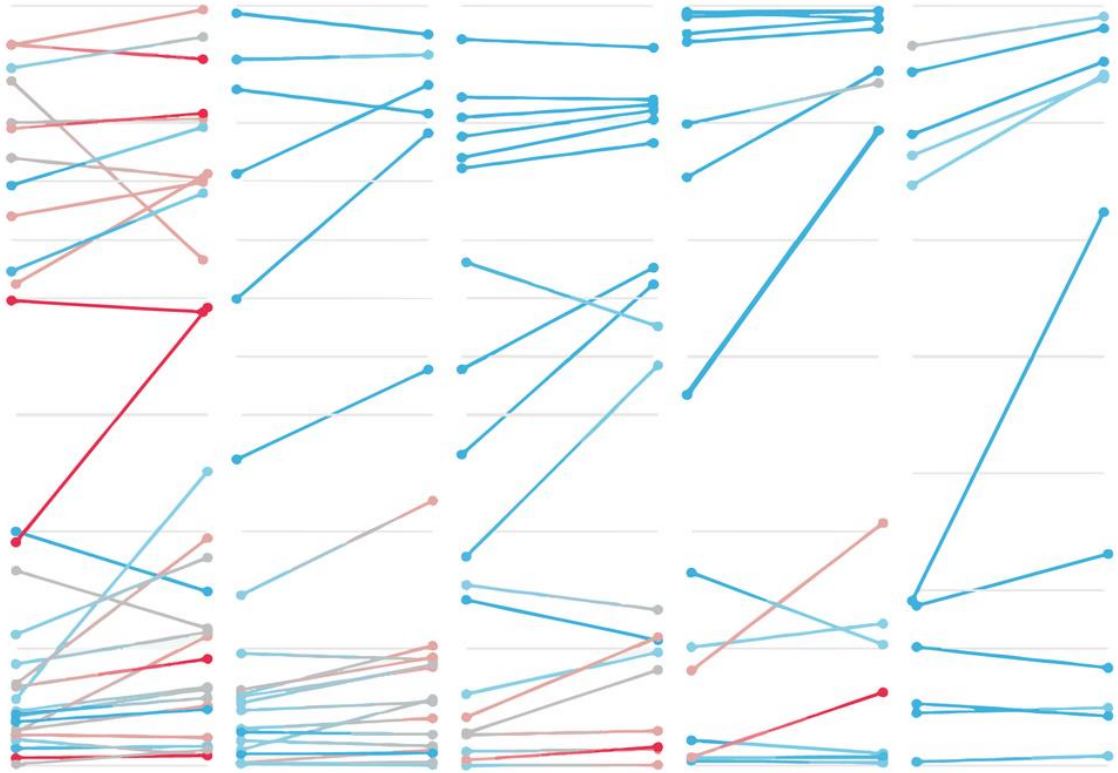






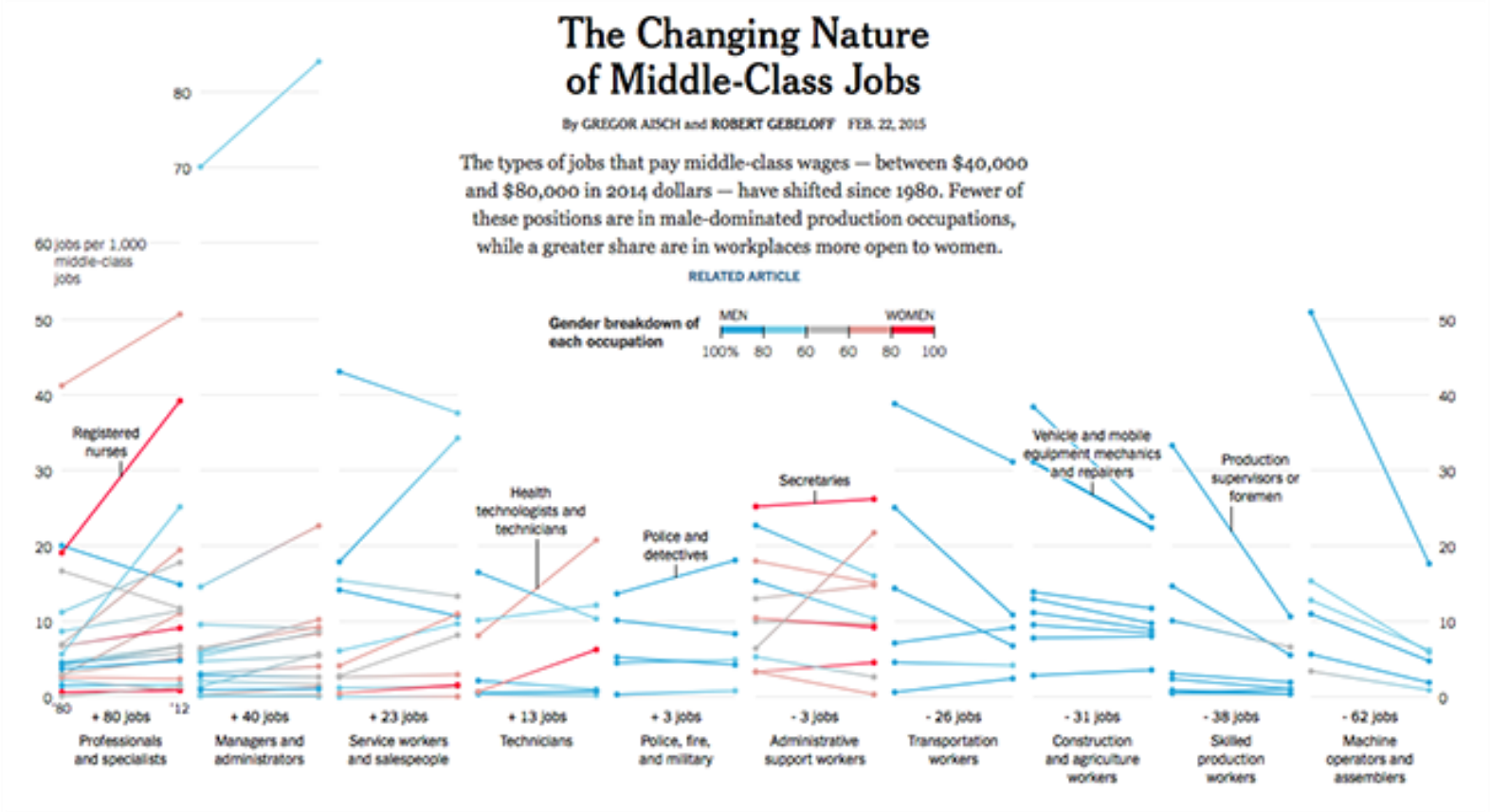
https://www.nytimes.com/interactive/2014/11/04/upshot/senate-maps.html

Colors have meaning



https://www.nytimes.com/interactive/2015/02/23/business/economy/the-changing-nature-of-middle-class-jobs.html

Colors have meaning



https://www.nytimes.com/interactive/2015/02/23/business/economy/the-changing-nature-of-middle-class-jobs.html

Colours In Culture

A Western / American
B Japanese
C Hindu
D Native American
E Chinese
F Asian
G Eastern European
H Arab
I African
J South American

1 Anger
2 Art / Creativity
3 Authority
4 Bad Luck
5 Balance
6 Beauty
7 Calm
8 Celebration
9 Children
10 Cold
11 Compassion
12 Courage
13 Cowardice
14 Cruelty
15 Danger
16 Death
17 Decadence
18 Deceit

19 Desire
20 Earthy
21 Energy
22 Erotic
23 Eternity
24 Evil
25 Excitement
26 Family
27 Femininity
28 Fertility
29 Flamboyance
30 Freedom
31 Friendly
32 Fun
33 God
34 Gods
35 Good Luck
36 Gratitude

37 Growth
38 Happiness
39 Healing
40 Healthy
41 Heat
42 Heaven
43 Holiness
44 Illness
45 Insight
46 Intelligence
47 Intuition
48 Religion
49 Jealousy
50 Joy
51 Learning
52 Life
53 Love
54 Loyalty

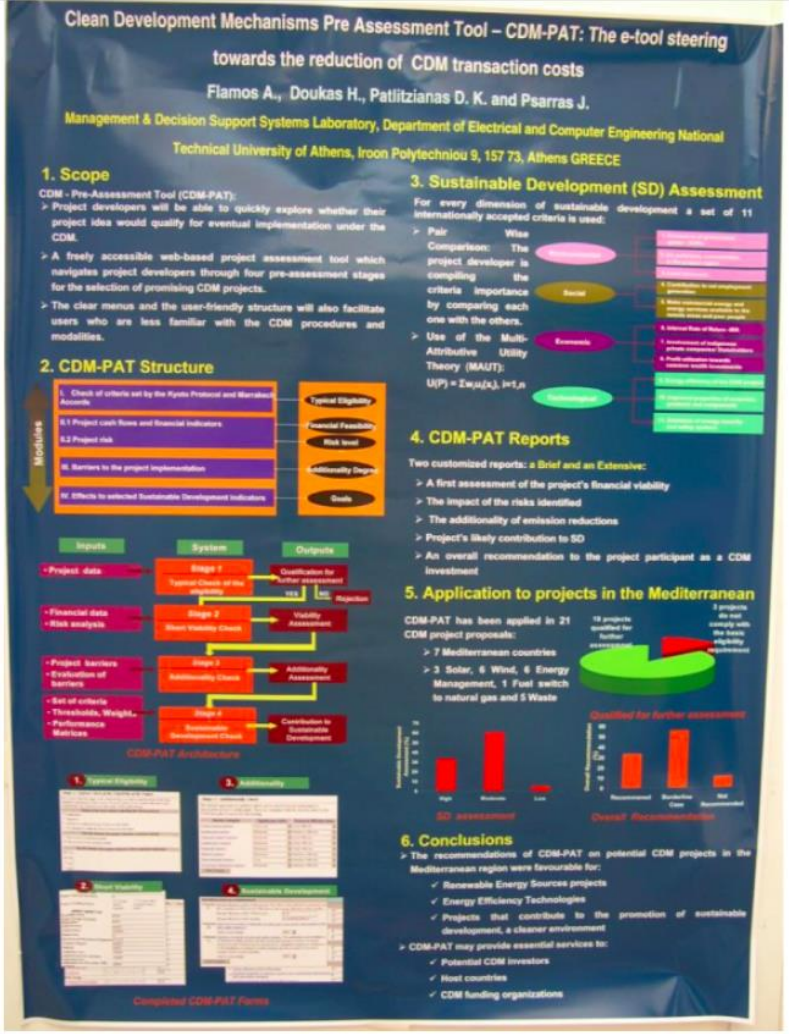
55 Luxury
56 Marriage
57 Modesty
58 Money
59 Mourning
60 Mystery
61 Nature
62 Passion
63 Peace
64 Penance
65 Power
66 Personal power
67 Purity
68 Radicalism
69 Rational
70 Reliable
71 Repels Evil
72 Respect

73 Royalty
74 Self-cultivation
75 Strength
76 Style
77 Success
78 Trouble
79 Truce
80 Trust
81 Unhappiness
82 Virtue
83 Warmth
84 Wisdom

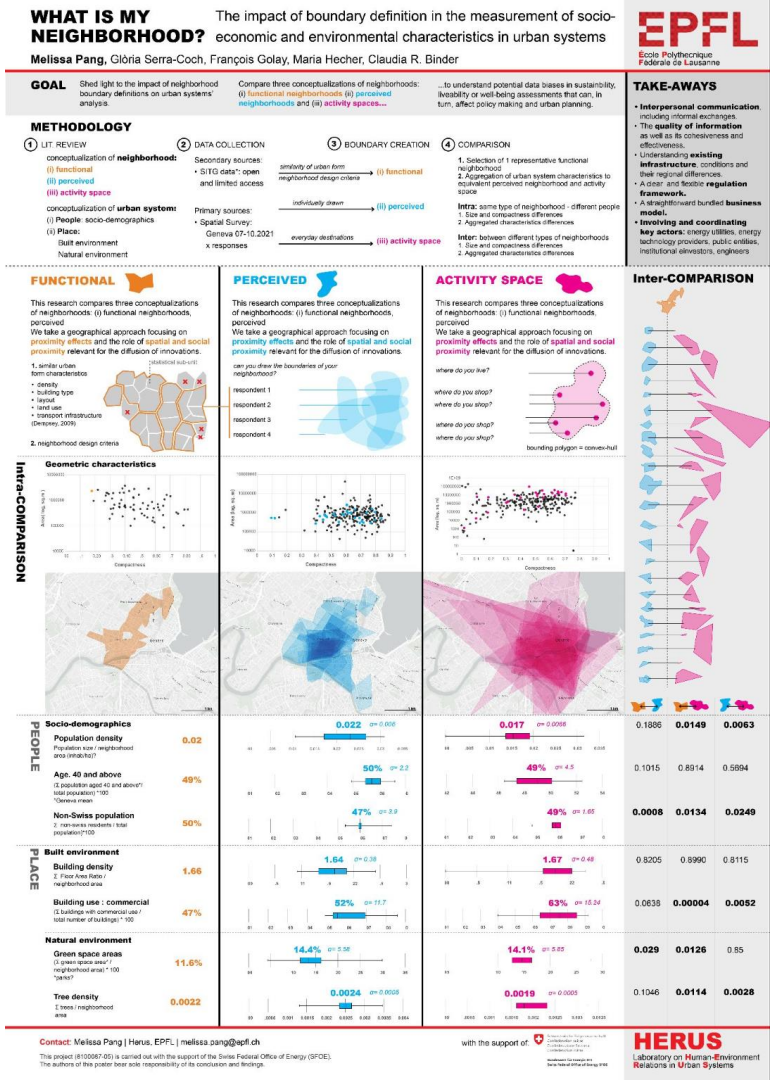
Yellow
Gold
Grey
Silver

David McCandless & AlwaysWithHonor.com // v1.0 // Apr 09 // InformationIsBeautiful.net

source: Pantone, ColorMatters & web sources



Source: Diomidus Spinellis; Copyright Licens



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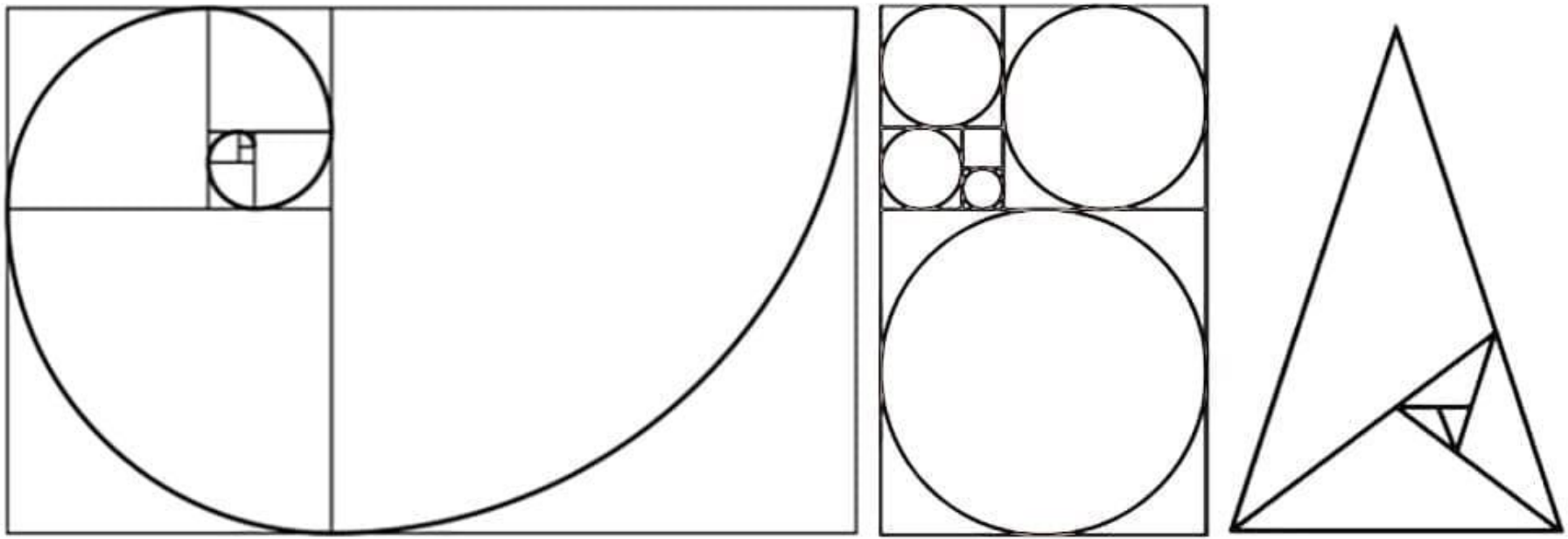
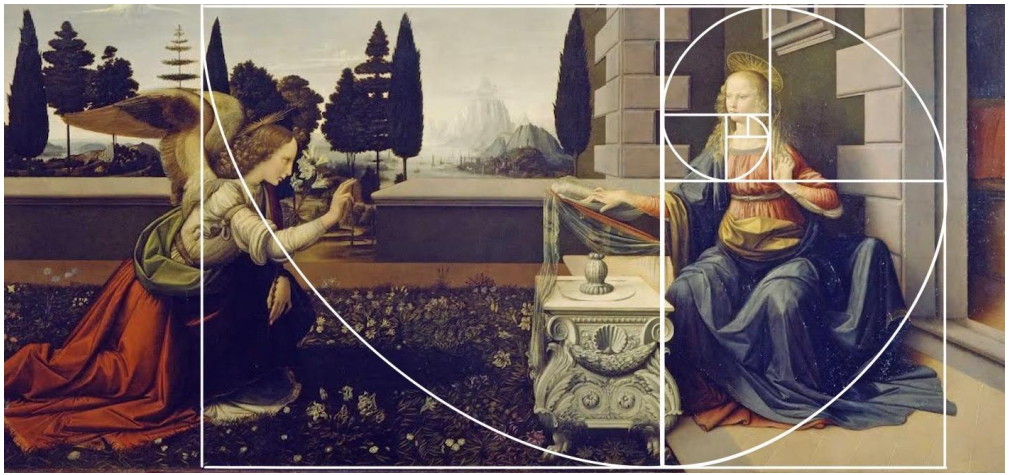
Golden ratio

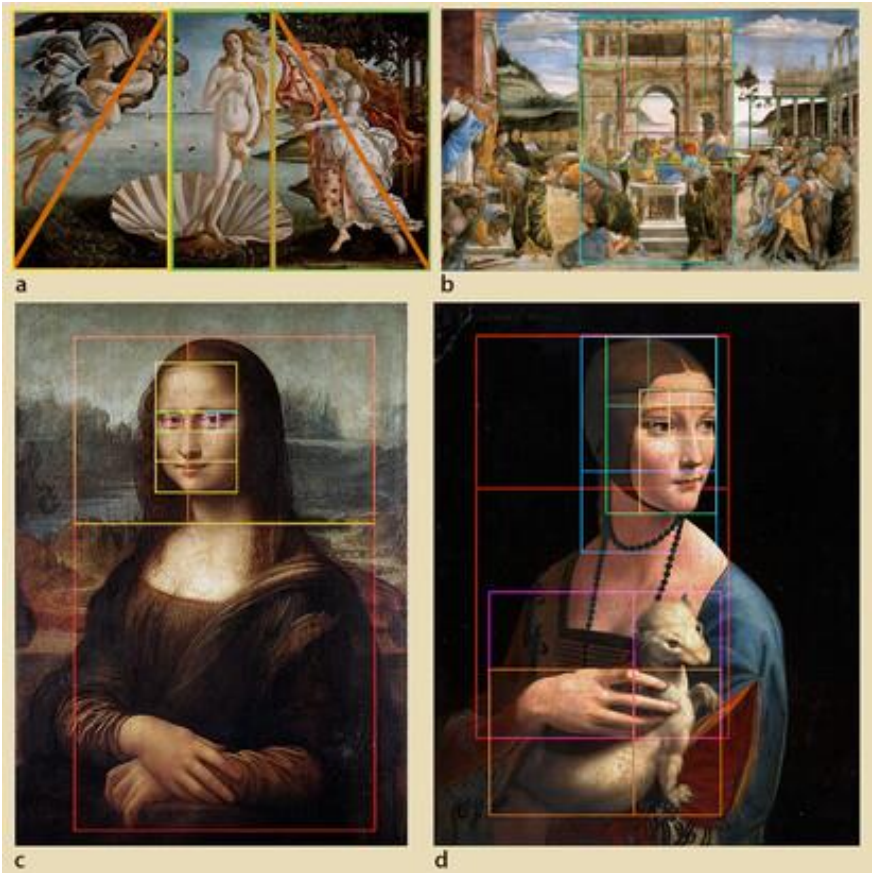


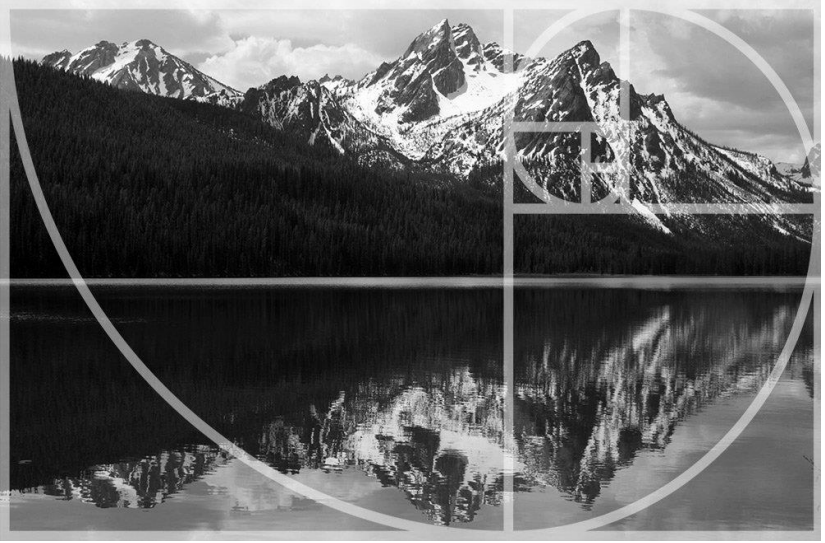
Golden ratio

https://youtu.be/kkGeOWYOFoA

Golden ratio

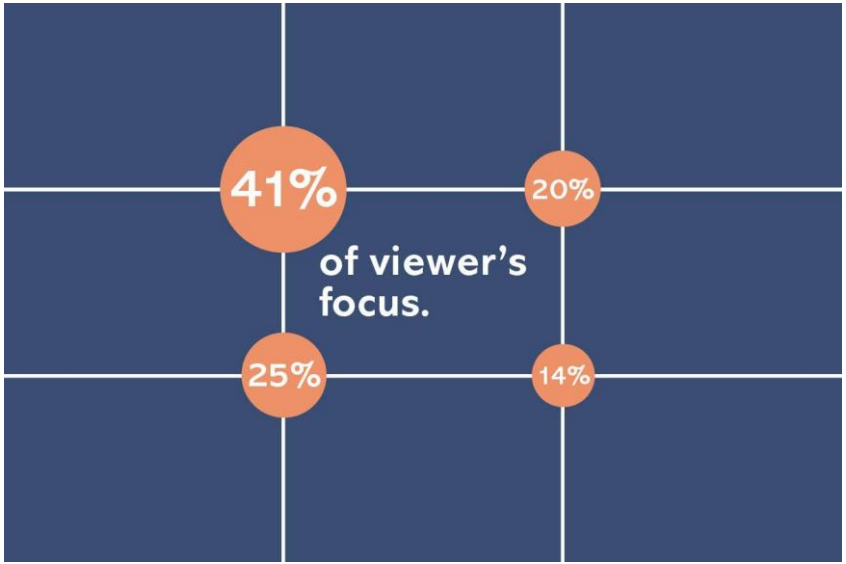




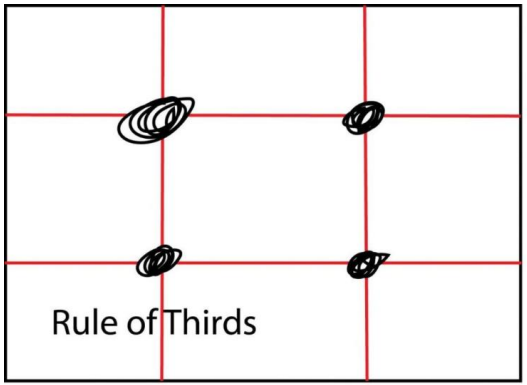


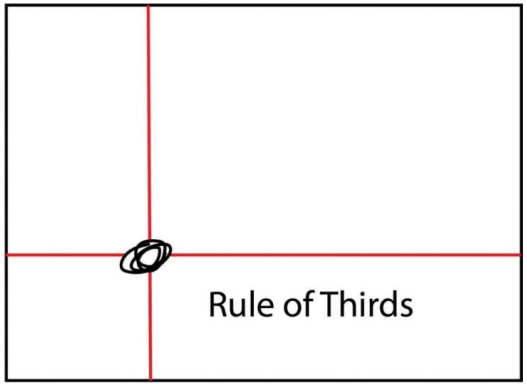
https://photographyhero.com/golden-ratio-photography/

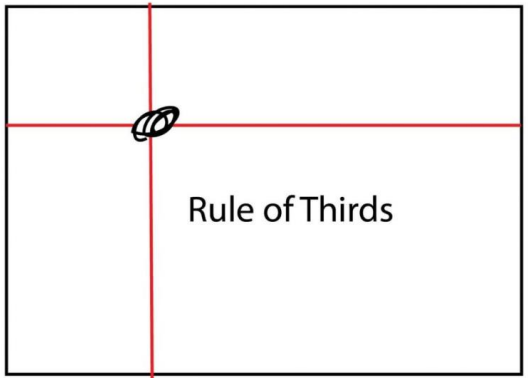
Rule of two thirds

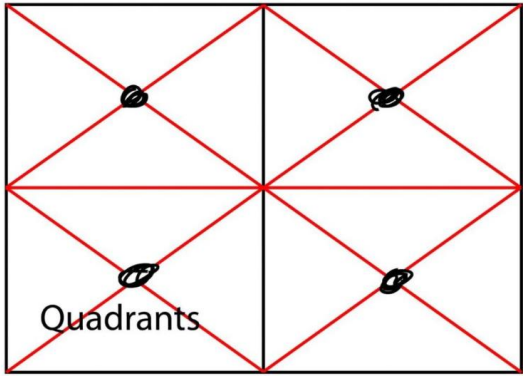


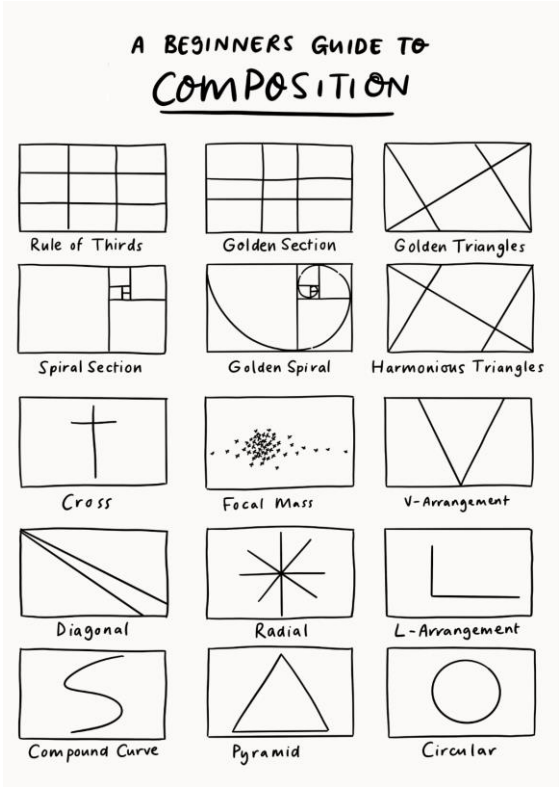
Rule of thirds



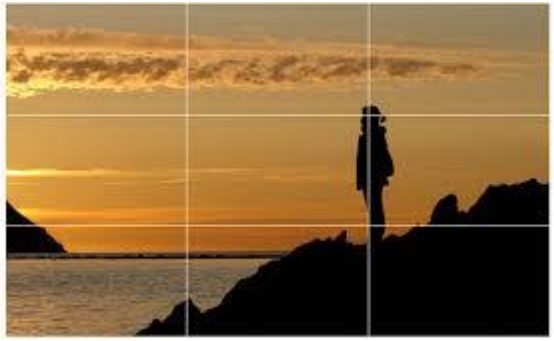




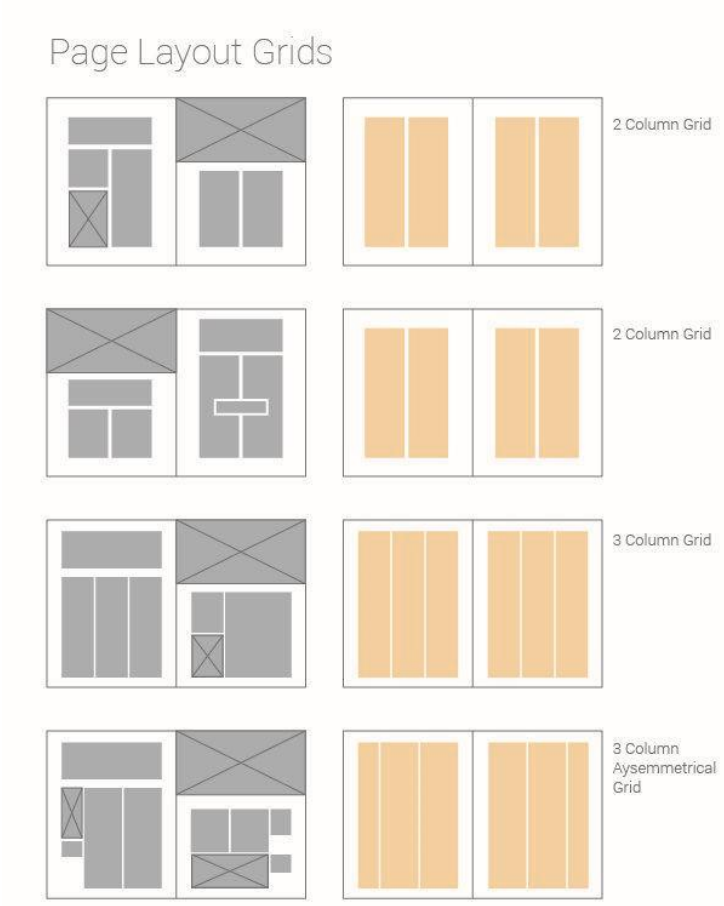


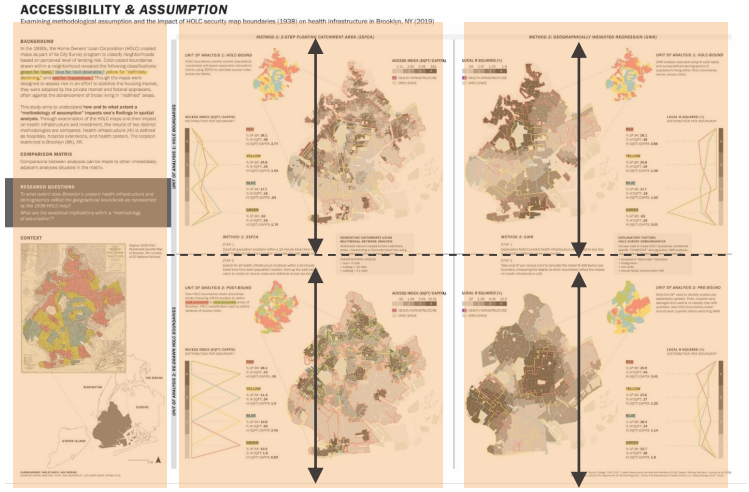


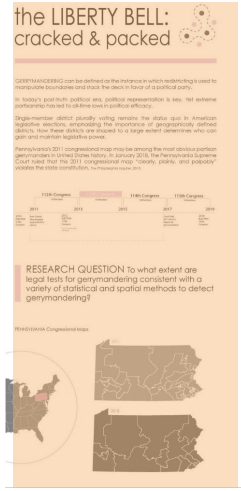

gina yeo

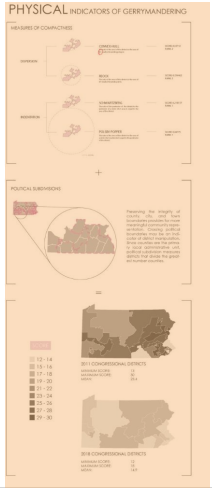


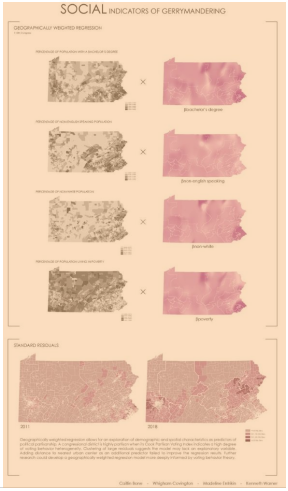
Other ratios



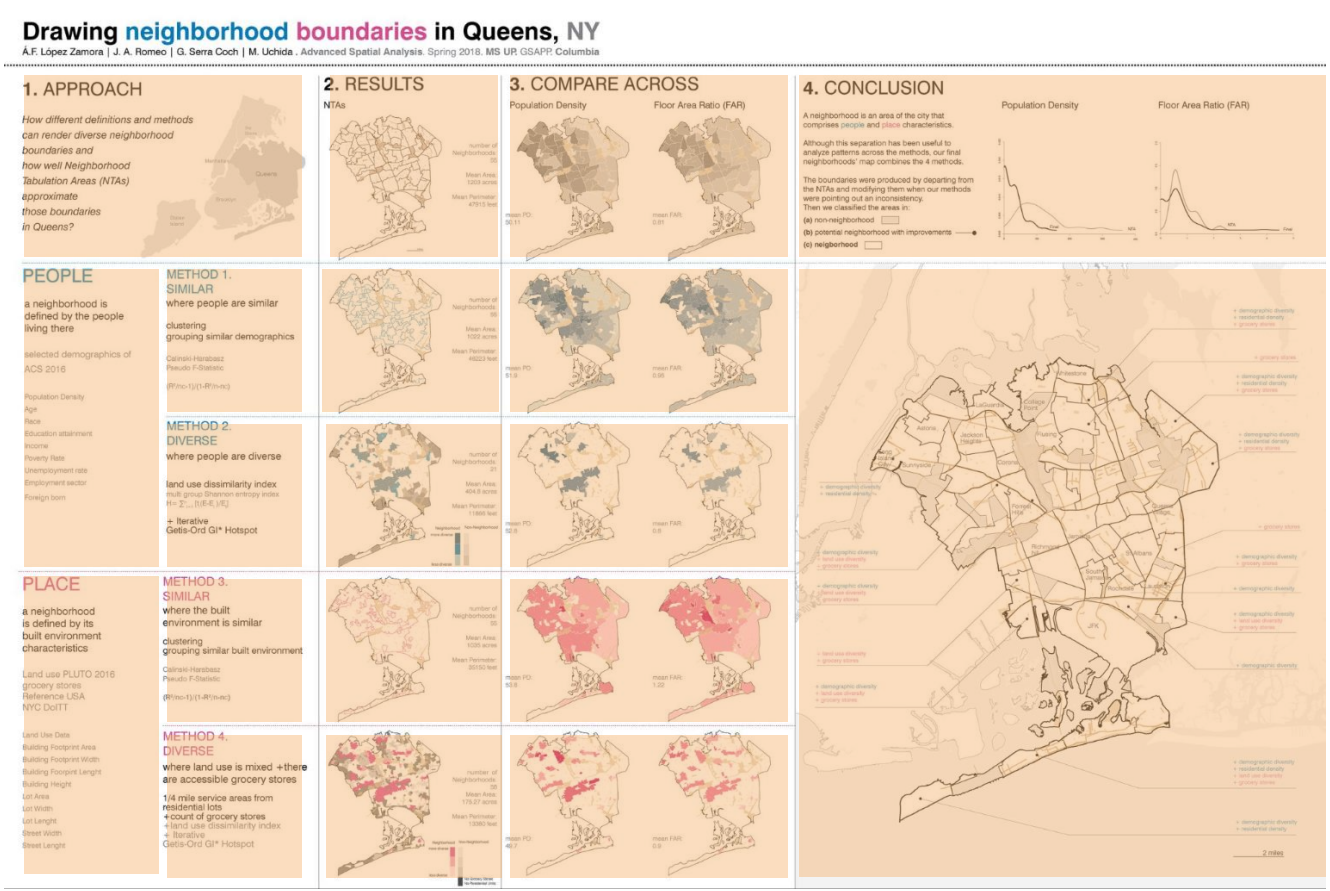




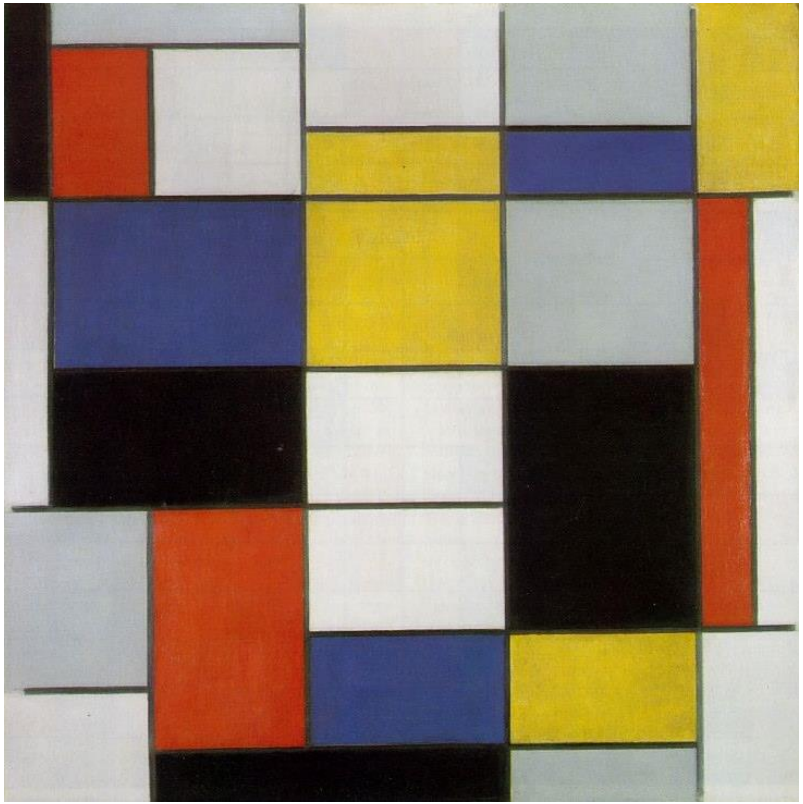


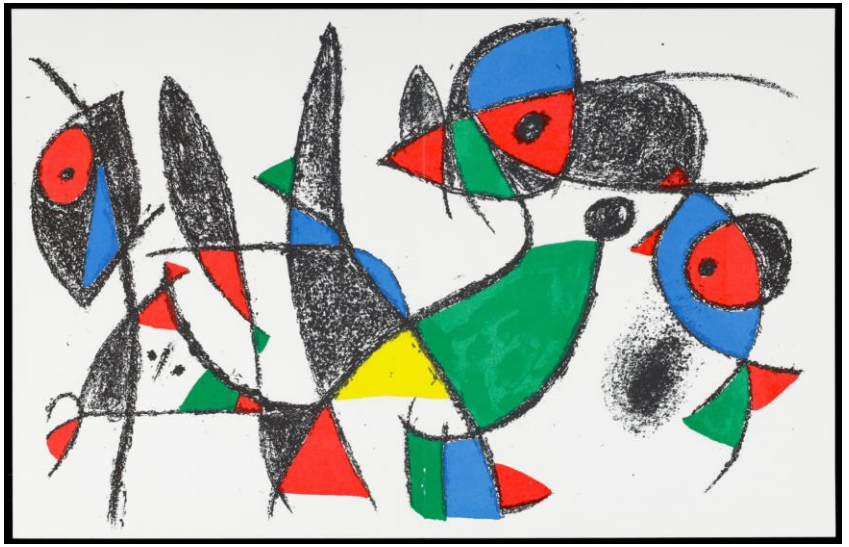


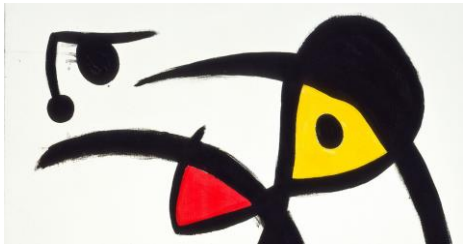
“A quien modula Dios le ayuda”



Matrix vs. Folie







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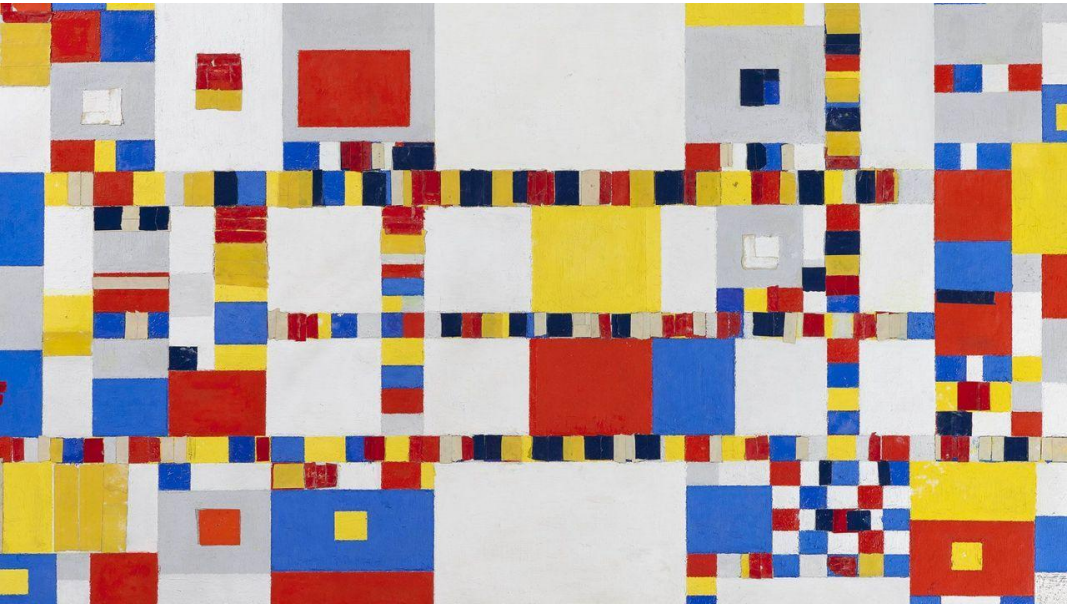

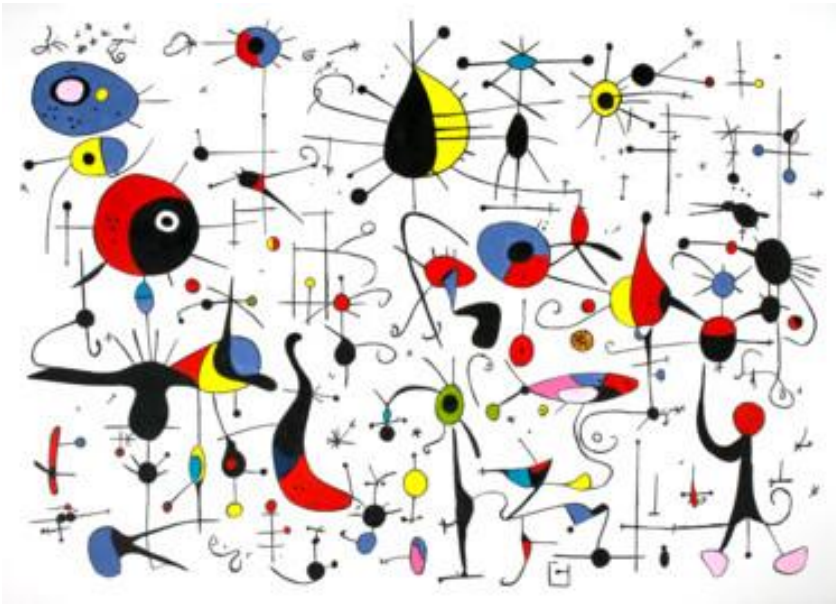

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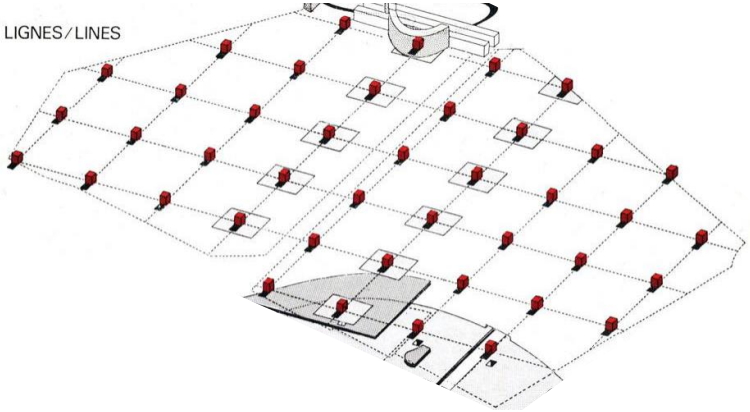
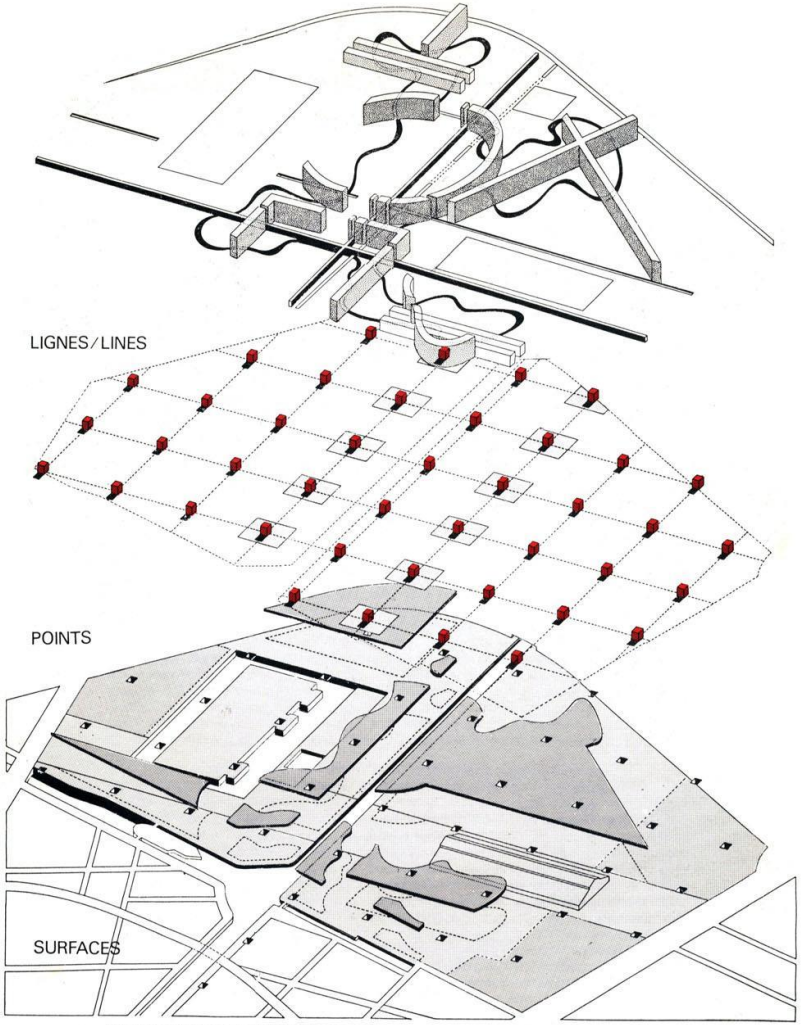
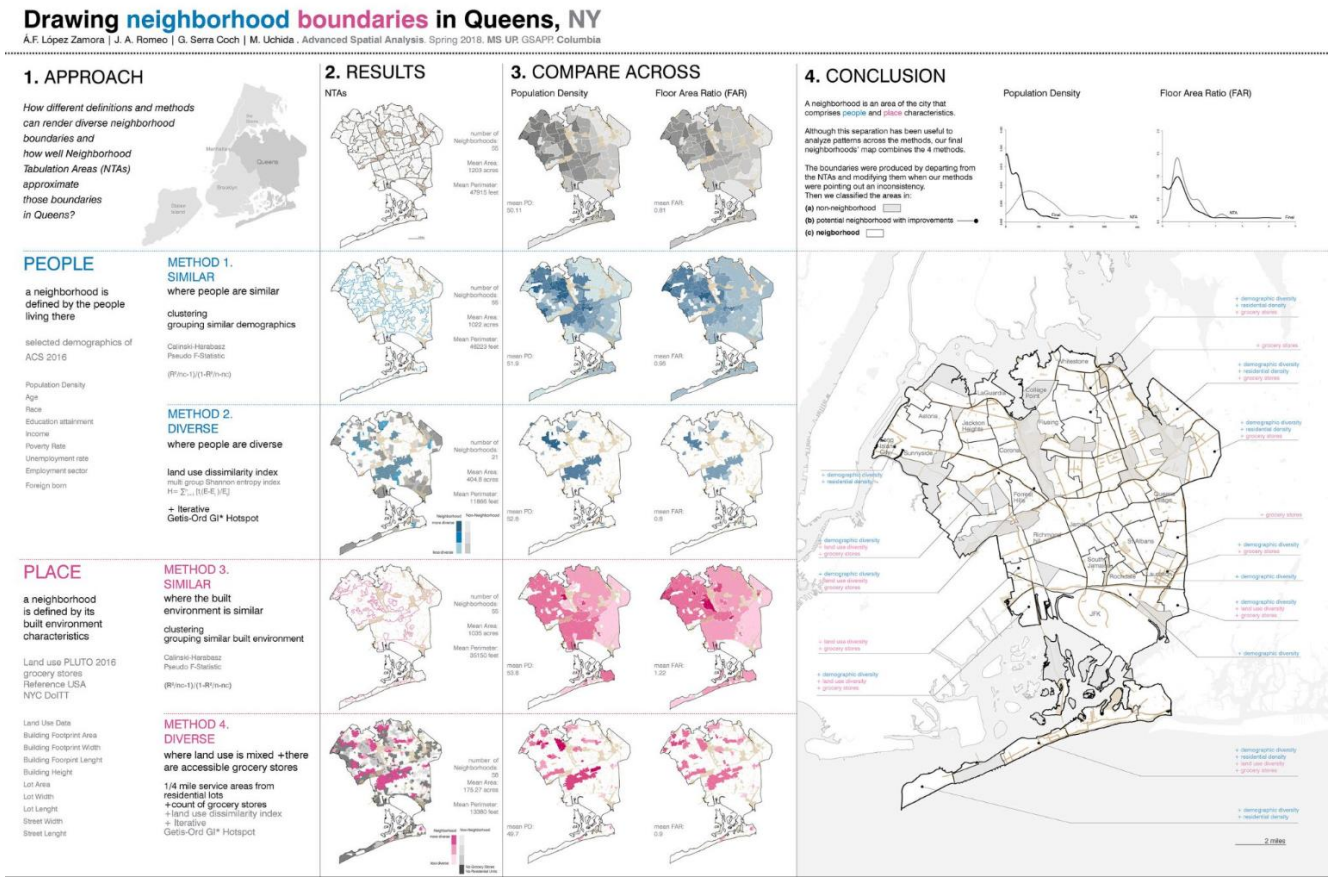




THE SUPERIMPOSITION OF THE THREE SYSTEMS (POINTS, LINES, SURFACES) CREATES THE PARK AS IT GENERATES A SERIES OF CALCULATED TENSIONS WHICH REINFORCE THE DYNAMISM OF THE PLACE. EACH OF THE THREE SYSTEMS DISPLAYS ITS OWN LOGIC AND INDEPENDENCE

Matrix vs. Folie



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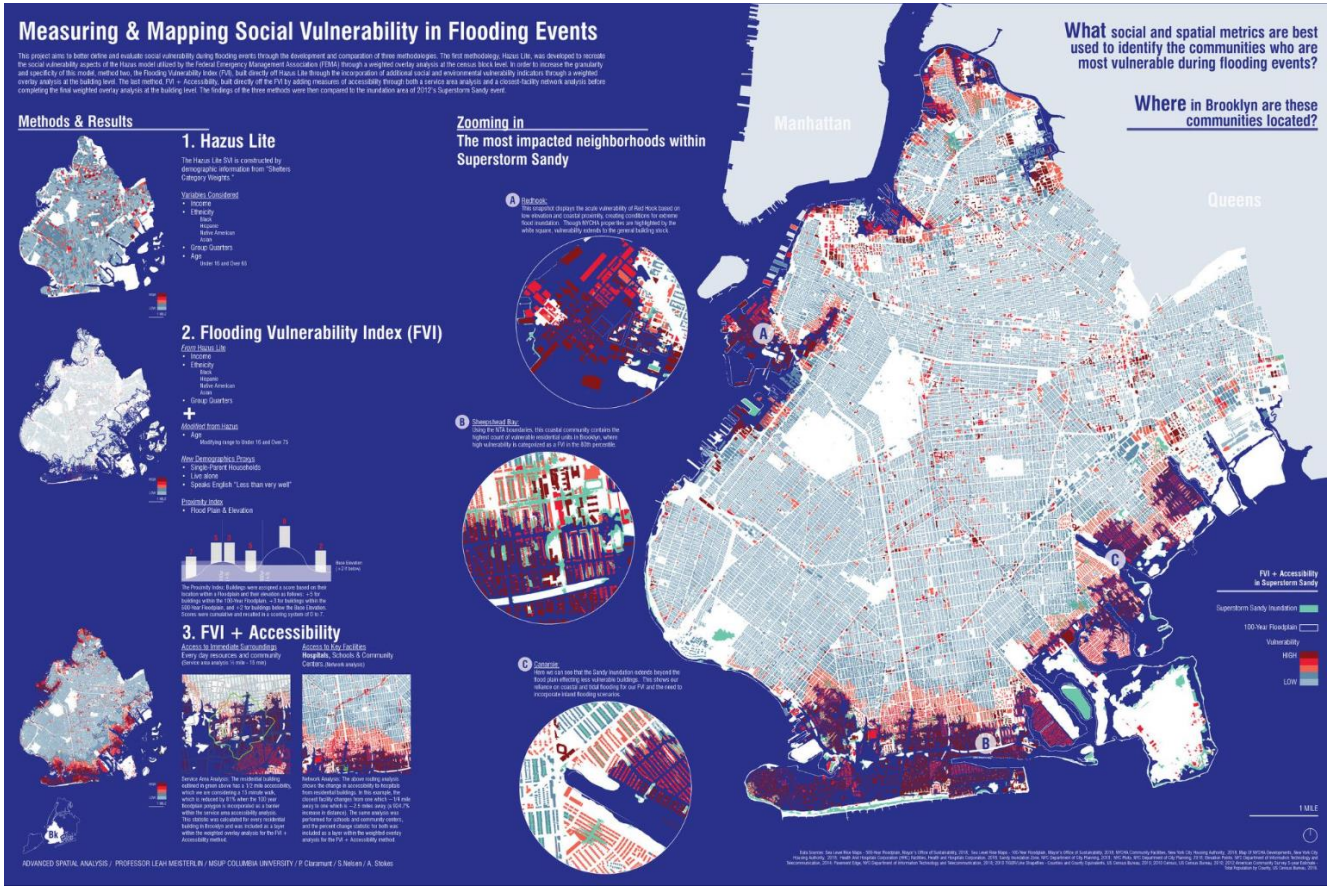
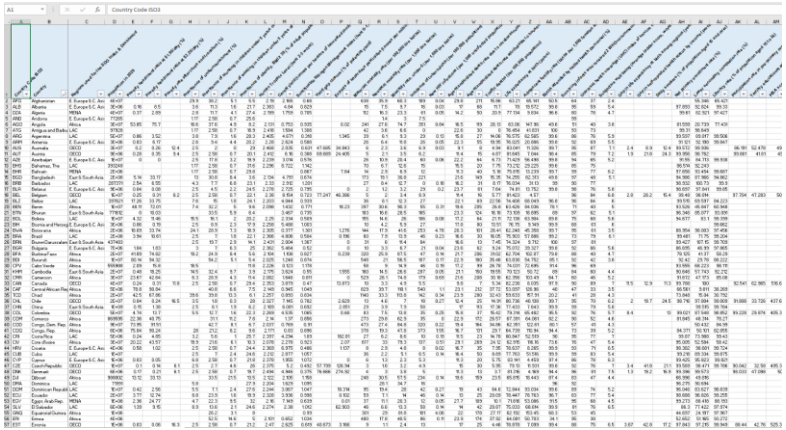


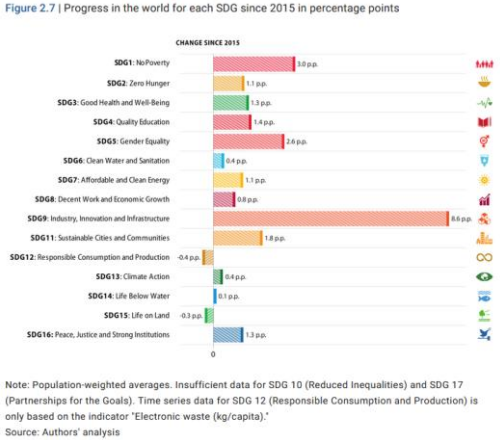
Infographics

In your poster you will have:

- Materials and method
- Doman-goal conceptual framework
- Activity-passivity plot
- Multicriteria assessment
- Results of your sustainability assessment

How will you present these elements?





Data visualization makes information accessible

https://dashboards.sdgindex.org/chapters

For each figure, think about:

- Purpose (**the why**)
- Content (**the what**)
- Structure (**the how**)
- Formatting (**everything else**)

Source: http://complexdiagrams.com/

Example: Hybrid conceptual framework

- Purpose (the why) □ Present definition of sustainability relevant to this assessment
- Content (the what) □ Show the relationship between the chosen goals and domains
- Structure (the how) □ ?
- Formatting (everything else) □ Contrasting colours, easy to understand labels, legible font size etc.

Examples

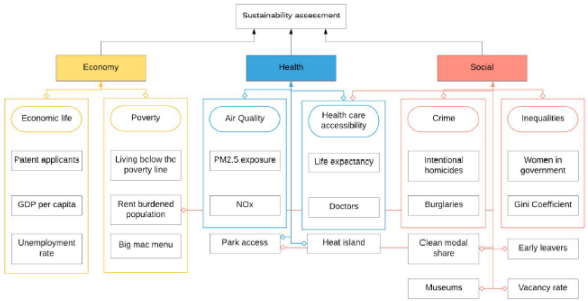


Figure 2: Conceptual Framework

	Social/cultural	Environmental	Economical	Political
Food supply	Access to food, diversity of the needs, sufficient production	Impact of the agriculture, the transportation and the distribution	Cost of production, infrastructure costs	Support to the agriculture
Inequalities	Different backgrounds		Distribution of the money	Regulations to support minorities
Security	Feel safe in the city, amount of crimes	Natural disaster	Infrastructure and security personnel costs	Measures put in place, surveillance, police
Energy demand	Access to electricity	Electricity production from fossil energies	Electric infrastructures (bring electricity to the households)	Energy plan (renewable)
High Waste production	Waste in the streets, different habits	Recycling or burning	Cost of waste collection	Waste management
Education	Amount, geographic distribution and quality of schools		Cost of education	Increase of education quality, financial help
Traffic/mobility	Access to mobility, public transportation	Car Pollution, amount of cars	Cost of public transportation infrastructure	Lack of public transport, cyclic area
Health infrastructure	Access to hospitals		Hospital fees for poor people	Health insurance
Housing	Access to a living place, suburb	Material usage	High accommodation cost	Regulations for housing distribution
Water supply system and wastewater	Usage of tap water	Wastewater, pollution of the rivers/lakes	Cost of infrastructure	Wastewater management
Pollution	Smog, air breathability	Industry/agriculture/ traffic/ pollution	Costs for implementing solutions to reduce CO2 emissions	Regulations to reduce pollution problems

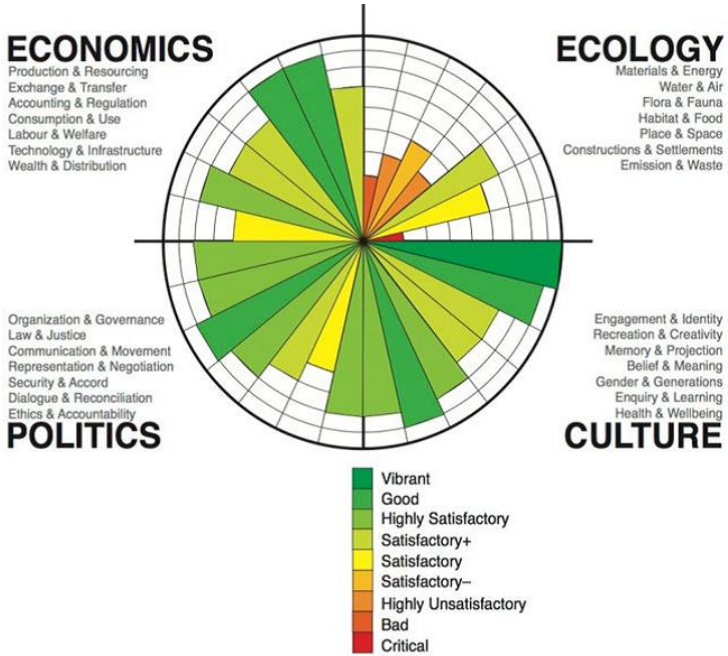
Figure 5.2: Framework

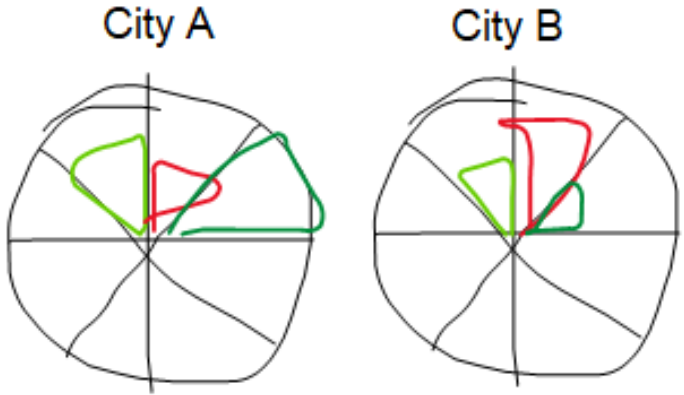
Figure 2: Scheme - Sustainability Conceptual Framework

Example: Result of your SA

- Purpose (the why) □ Illustrating which of the selected cities (A, B, C and D) is the most sustainable
- Content (the what) □ Comparison of the sustainability score of four cities (per domain? per goal? per indicator? per city?)
- Structure (the how) □ ?
- Formatting (everything else) □ ?

Examples

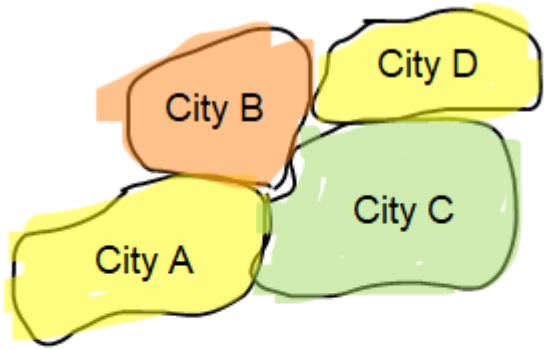




Domains?
Goals?

https://www.academia.edu/9294719

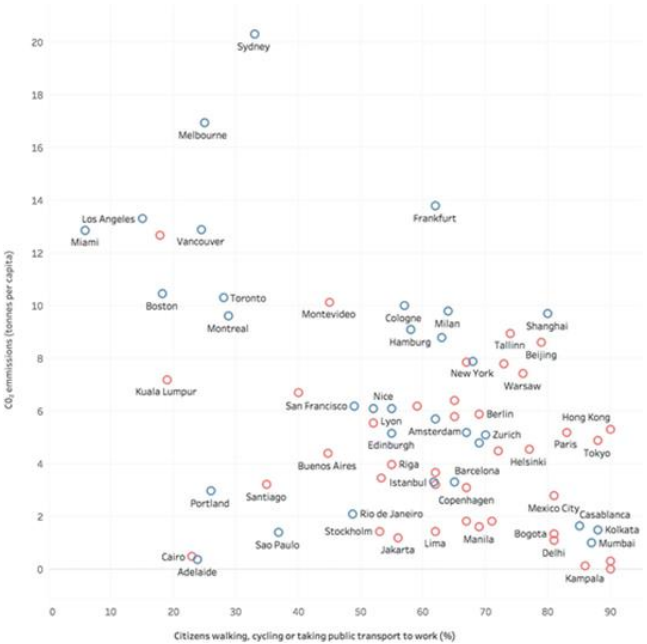
Examples

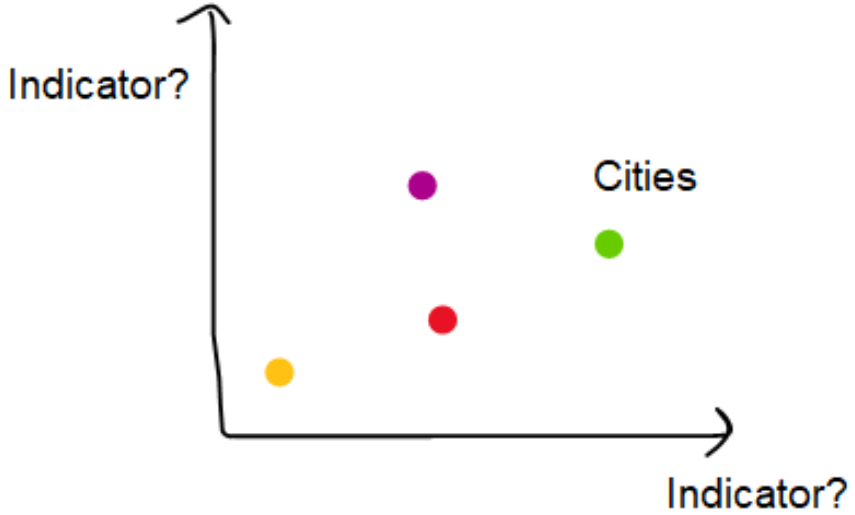


Total sustainability score?
Domains?
Goals?
Indicators?

https://www.academia.edu/9294719

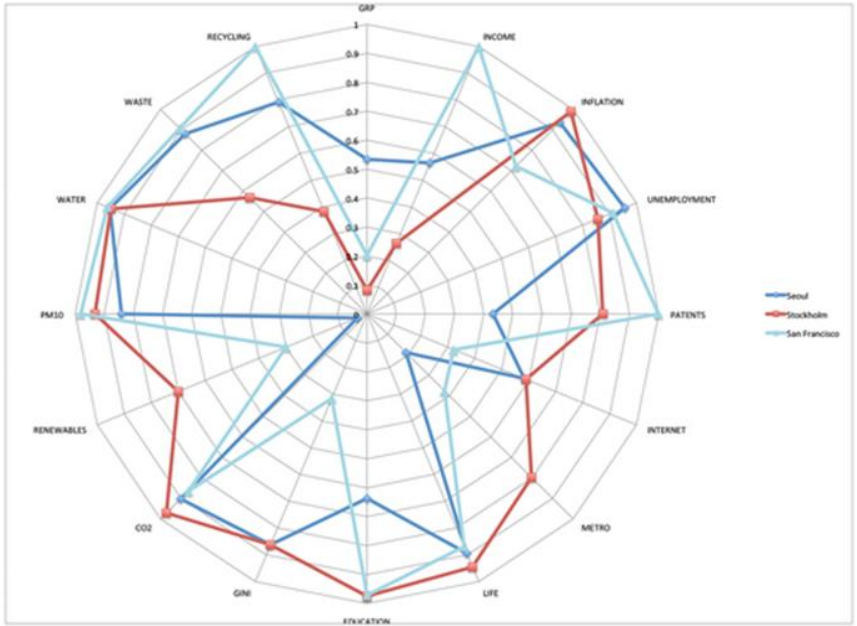
Examples

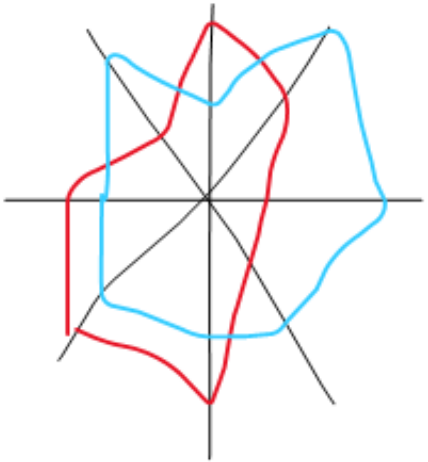




https://onlinelibrary.wiley.com/doi/10.1002/sd.1887

Examples



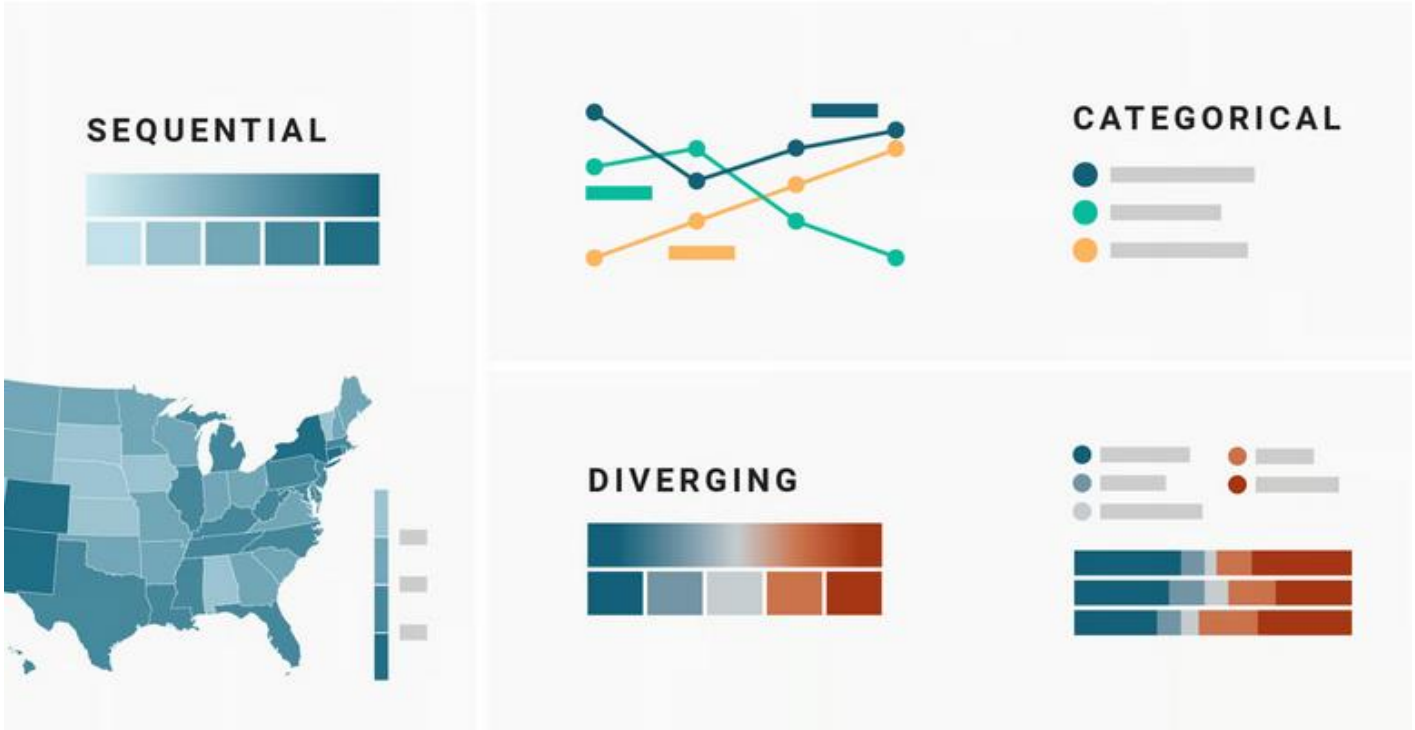


Domains?
Goals?
Sensitivity analyses?

https://onlinelibrary.wiley.com/doi/10.1002/sd.1887

How to choose your colors?

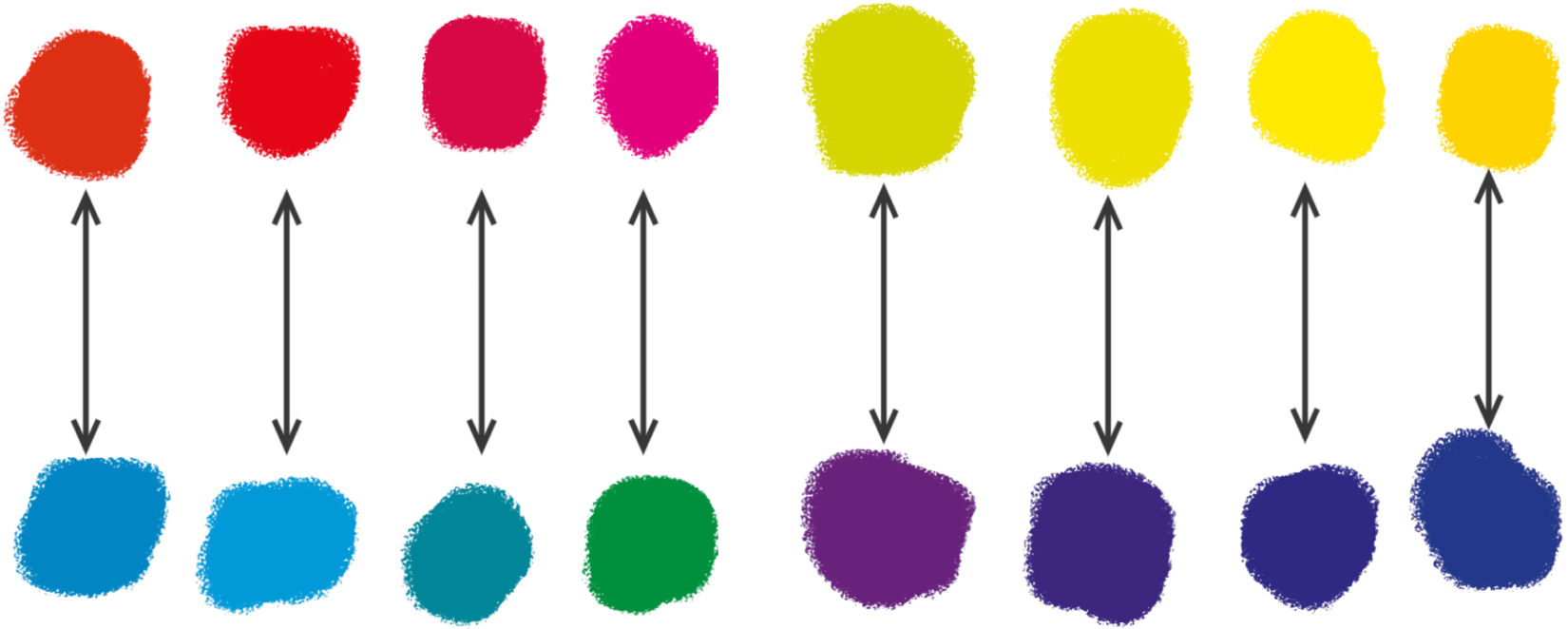
color schemes



https://www.datawrapper.de/blog/which-color-scale-to-use-in-data-vis
https://www.datawrapper.de/blog/quantitative-vs-qualitative-color-scales

How to choose your colors?

Complementary colors



https://finearttutorials.com/guide/complementary-colours/

Remember:

- First decide the storyline of your report
- Then decide which paragraphs need a figure to strengthen the point
- Each figure should tell one story
- Use clear language, avoid acronyms
- Remove visual clutter
- Title, caption, labels the axis and units in every diagram

https://www.eea.europa.eu/data-and-maps/daviz/learn-more/chart-dos-and-donts

Resources / tools

- **Excel**: https://policyviz.com/wp-content/uploads/woocommerce_uploads/2017/07/A-Guide-to-Advanced-Data-Visualization-in-Excel-2016-Final.pdf
- **Python libraries**: Matplotlib, Seaborn, Plotly
- **R packages**: ggplot
- **Online**:
  - https://rawgraphs.io/
  - https://www.storytellingwithdata.com/chart-guide
  - https://material.io/design/communication/data-visualization.html
  - https://datavizcatalogue.com/
  - https://datavizproject.com/
  - https://www.informationisbeautifulawards.com/news/118-the-nyt-s-best-data-visualizations-of-the-yea

Next week (14.05.2024)

Sustainability assessment in practise:

- **Engage with stakeholders who utilize SA related tools!**
- **Understand their role in the political agenda!**
- **Share their experiences regarding their potential impact!**

(Participation in this session is important, as it will also contribute to the exam)

The lecture will be structured as an interactive session in two steps to facilitate exchanges:

- Step 1: A 10-minute presentation by the guest speaker.
- Step 2: A question-and-answer session for discussion.

Please add your questions to Menti (1-3 per group): https://www.menti.com/al9iqgh5wios

Our invited guests:

- **Albert Mérino-Saum** is a jurist and economist, and a former EPFL researcher, specialized in ecological economics and sustainability. He currently serves as a scientific advisor at the Directorate of Sustainability and Climate for the Canton of Geneva.
- **Alexandre Bosshard** is a board member of the Department for Industrial Services and Technical Office of the City of Pully. As the coordinator of this department, he has led several smart city projects focusing on big data, mobility, e-government, and open source, in collaboration with industry partners such as Swisscom, academia including EPFL, international organizations like ITU, and other cities. He is also responsible for implementing the United for Smart and Sustainable Cities (U4SSC) initiative developed by ITU and UNECE in the City of Pully.
- **Denis Bochatay** is an environmental engineer from EPFL who currently works as a Project Manager in the Climate Unit for the City of Lausanne. He has extensive experience in assisting businesses and public entities in measuring and understanding their environmental footprint.

Please add your questions to Menti (1-3 per group):
https://www.menti.com/al9iqgh5wios
Before 14.05.2025

Take ten minutes now:

- Brainstorm three questions pertinent to your project for which the policymakers next week can give you advice.
- Submit them here: https://www.menti.com/al9iqgh5wios

- **Rest of the session**: work further on your project