

Measuring & Mapping Social Vulnerability in Flooding Events

This project aims to better define and evaluate social vulnerability during flooding events through the development and comparison 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 the social vulnerability index, the Flooding Vulnerability Index (FVI) was developed through a weighted overlay analysis at the building level. The third methodology, FVI + Accessibility, builds upon the FVI by adding an analysis of accessibility within 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 events.

Methods & Results

1. Hazus Lite

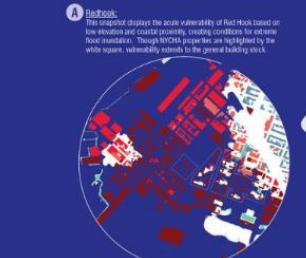


2. Flooding Vulnerability Index (FVI)

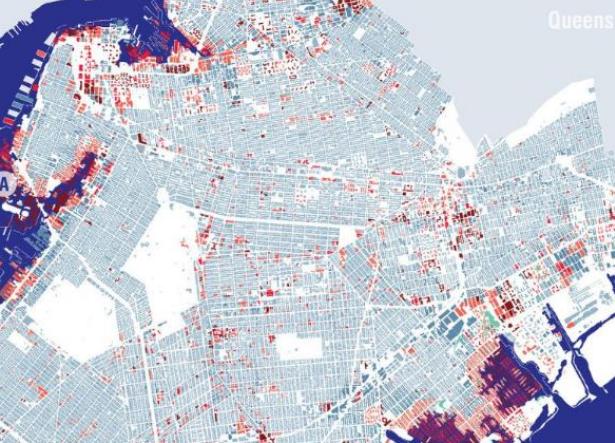


Zooming in

The most impacted neighborhoods within Superstorm Sandy



Manhattan

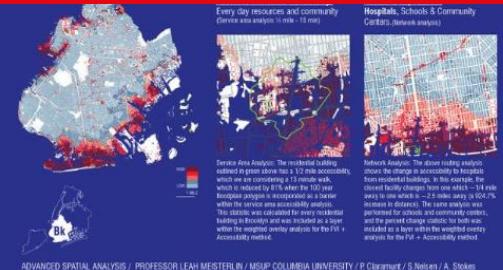


Queens

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?

How to make (an engaging) poster?



Ankita Singhvi
Glòria Serra Coch

WHAT?

Some practical items:

- deadlines
- content
- evaluation

- **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!

General

Announcements

List of Groups

Template for data collection

Guidelines for the Project



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:

1. Motivation of the study and RQ



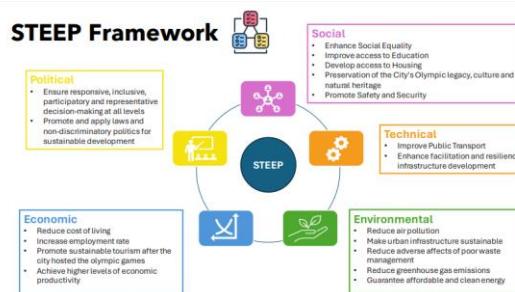
WHO guideline: $PM 2.5 < 5 \mu\text{g}/\text{m}^3$

Milan: $28.6 \mu\text{g}/\text{m}^3$
Cairo: $47.4 \mu\text{g}/\text{m}^3$
Lima: $25.6 \mu\text{g}/\text{m}^3$
New Delhi: $89.1 \mu\text{g}/\text{m}^3$



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

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, its 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	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	Incorrect 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

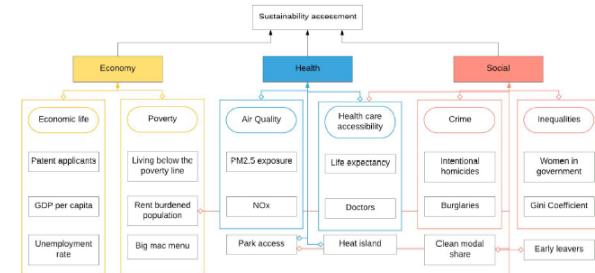
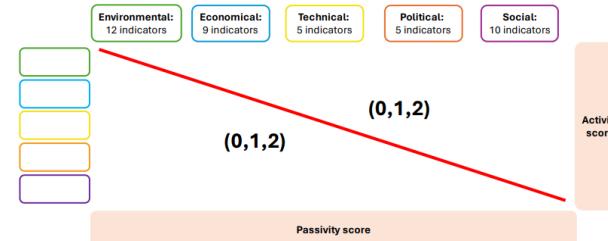
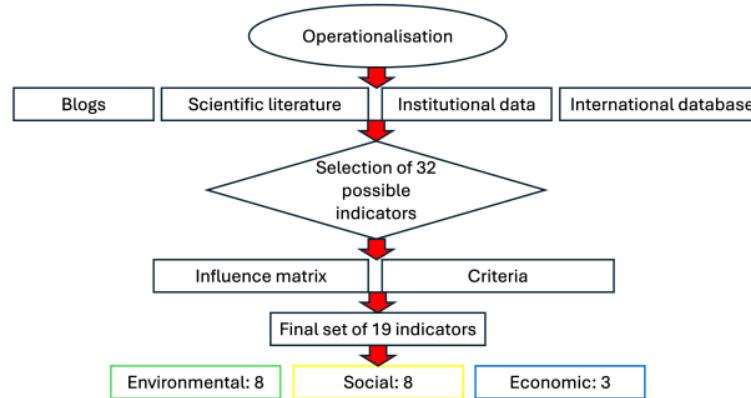


Figure 2: Conceptual Framework

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



Multi-criteria assessment - Weighting

Two tables illustrating the weighting of indicators across different domains.

Weighting Decision Matrix (WDM)

	social	environ	tech	poli	eco	
Person 1	0.2	0.3	0.2	0.15	0.15	1
Person 2	0.3	0.25	0.25	0.1	0.1	1
Person 3	0.25	0.25	0.19	0.16	0.2	1
Person 4	0.3	0.25	0.2	0.15	0.1	1
	0.2625	0.2625	0.2	0.1375	0.1375	

A

Group decision

	social	environ	tech	poli	eco	
Group decision	0.2	0.2	0.2	0.2	0.2	1

Domains

Indicators

B

Group decision

	social	environ	tech	poli	eco	
Group decision	0.2	0.2	0.2	0.2	0.2	1

Indicators

Below the tables are two small tables showing indicator weights:

Env. 1,1*	Env. 2,1	Env. 2,3	Env. 3,1	Env. 3,2	Env. 3,3	Env. 4,1	
0.2	0.3	0.3	0.4	0.4	0.4	0.15	
Env. 1,2	0.125	Env. 2,2	0.3	Env. 3,2	0.2	Env. 4,2	0.25
Env. 1,3	0.125	Env. 2,3	0.3	Env. 3,3	0.2	Env. 4,3	0.15
Env. 1,4	0.125	Env. 2,4	0.3	Env. 3,4	0.2	Env. 4,4	0.15

Env. 1,1*	Env. 2,1	Env. 2,3	Env. 3,1	Env. 3,2	Env. 3,3	Env. 4,1	
0.2	0.3	0.3	0.4	0.4	0.4	0.15	
Env. 1,2	0.125	Env. 2,2	0.3	Env. 3,2	0.2	Env. 4,2	0.25
Env. 1,3	0.125	Env. 2,3	0.3	Env. 3,3	0.2	Env. 4,3	0.15
Env. 1,4	0.125	Env. 2,4	0.3	Env. 3,4	0.2	Env. 4,4	0.15

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

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

Domains	Goals	Indicators label and Metrics	
ECONOMIC	Reduce Unemployment Rate	Unemployment Rate	%
	Improve access to public transportation	Day pass price	CHF
	Improve access to affordable housing	Average rent	CHF
	Reduce vacancy rate	Vacancy rate	%
	Reduce Air Pollution	NO2 and PM10	µg/m3
	Reduce Noise Pollution	Exposure to noise levels	dB
	Improve Waste Management	Quantity of recycled waste per person	kg/capita
	Protect biodiversity	Tree coverage in Urban Areas	%
	Improve Water Management	Impermeabilized surface	%
	Enhance sustainable construction	Minergie certification	n
ENVIRONMENTAL	Increase Renewable Energy Use	Renewable heating	%
	Ensure affordable public transportation	Public transport stops	n
	Ensure safety for everyone	Criminality rate	n/year
	Improve social cohesion	Homelessness rate	n
	Increase urban cultural attractiveness	Number of cinemas and theaters	n
	Reduce Poverty	Social aid rate	%

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 [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 (Beijing)
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)

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
 - b. (Influence matrix and) activity-passivity plot

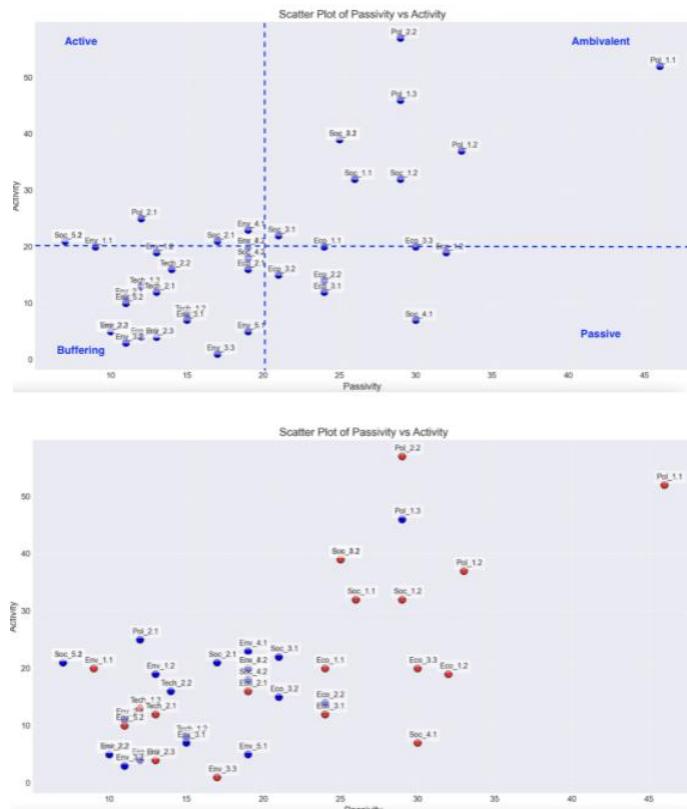
Content - Influence matrix and activity-passivity plot

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



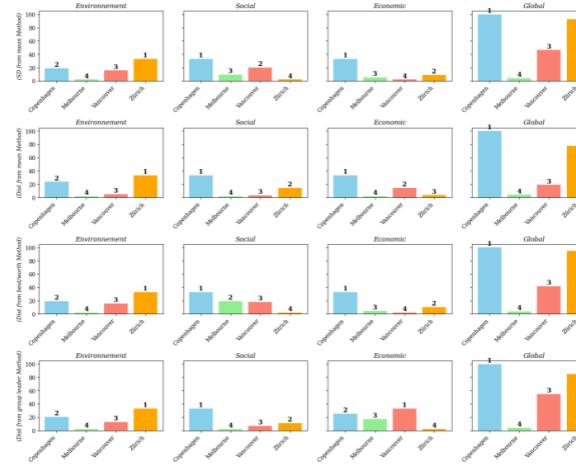
Content - Influence matrix and activity-passivity plot

		Political		Economic				Technical		Social					Environmental						
				Pol_1	Pol_2	Eco_1	Eco_2	Eco_3	Eco_4	Tech_1	Tech_2	Soc_1	Soc_2	Soc_3	Soc_4	Soc_5	Ene_1	Ene_2	Ene_3	Ene_4	Ene_5
Political	Pol_1	5	2	2	2	2	2	2	2	2	2	1	2	1	2	1	1	1	1	1	1
	Pol_2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Economical	Eco_1	1	2	3	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eco_2	2	0	1	2	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Economical	Eco_3	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0
	Eco_4	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Technical	Tech_1	-1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tech_2	2	1	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Technical	Tech_3	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tech_4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Social	Soc_1	1	2	3	1	0	2	1	2	3	2	1	2	3	2	1	0	0	0	0	0
	Soc_2	1	1	1	0	1	2	3	0	2	1	0	0	0	0	0	0	0	0	0	0
Social	Soc_3	-2	1	1	0	1	2	3	0	1	0	0	0	0	0	0	0	0	0	0	0
	Soc_4	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Social	Soc_5	-1	2	3	0	2	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0
	Soc_6	2	2	2	0	2	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0
Environmental	Ene_1	1	2	1	2	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0
	Ene_2	-2	1	1	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Environmental	Ene_3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ene_4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Environmental	Ene_5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ene_6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PASSIVITY		46	33	39	39	10	34	32	19	24	36	21	38	35	12	18	19	12	13	11	11

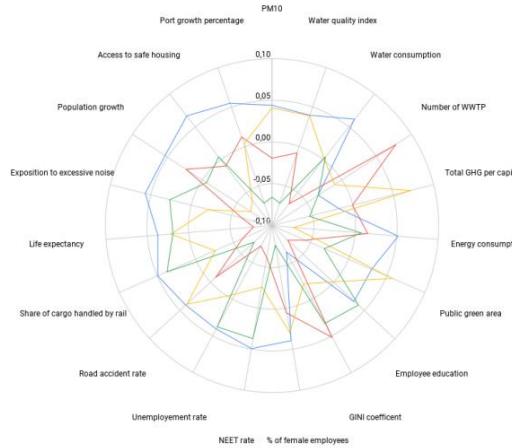


1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework
3. Methods and materials
4. Results
 - a. Final indicators
 - b. (Influence matrix and) activity-passivity plot
 - c. MCDA

Content - MCDA



Hamburg
Durban
Santos
Guangzhou



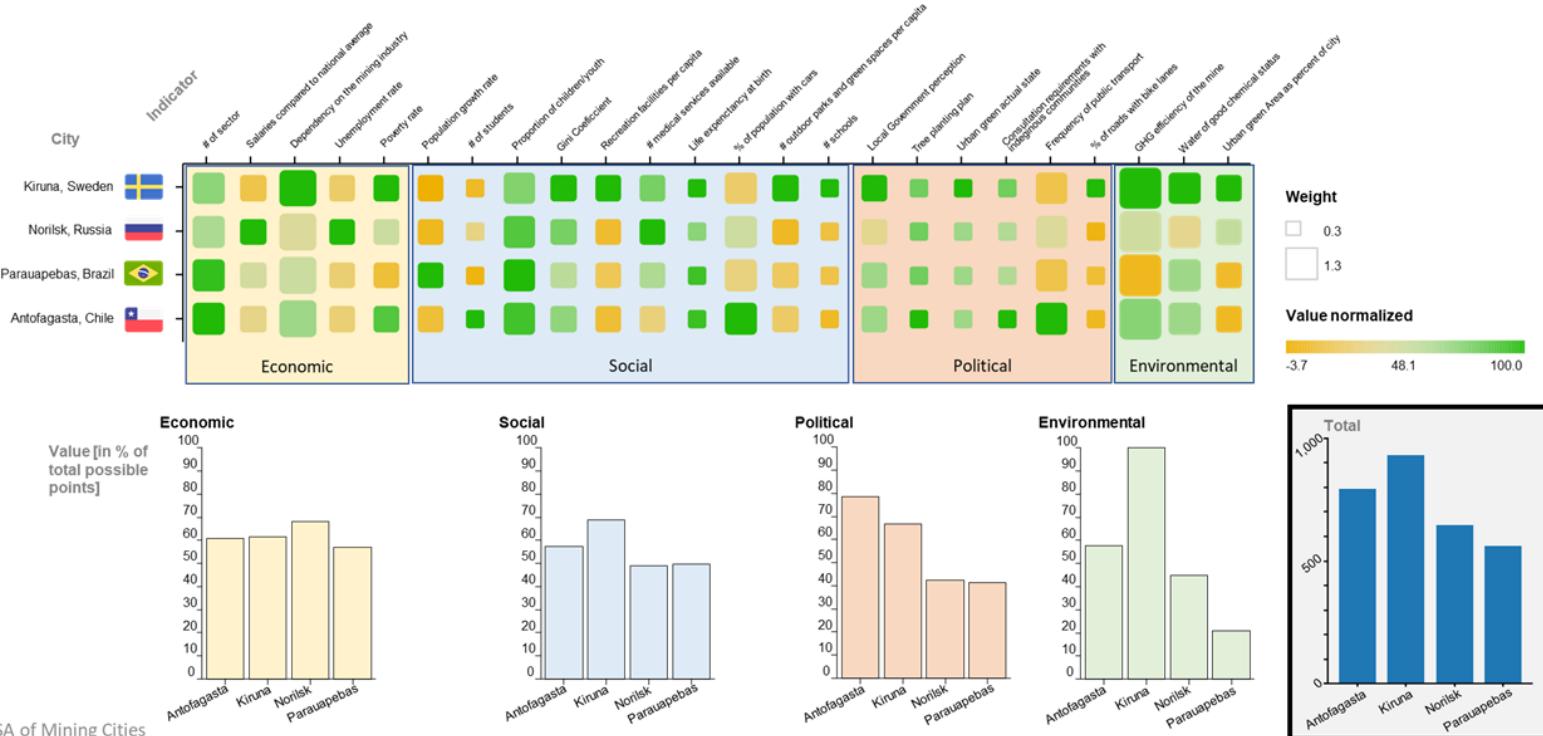
Standard Deviation from the Mean					
City	Basel	Geneva	Lausanne	Zürich	Best Options
Environmental	0.207	-0.335	0.016	0.112	Basel
Social	-0.337	-0.015	0.749	-0.398	Lausanne
Economic	-0.546	0.015	-0.693	1.223	Zürich
Sum	-0.675	-0.335	0.073	0.938	Zürich

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



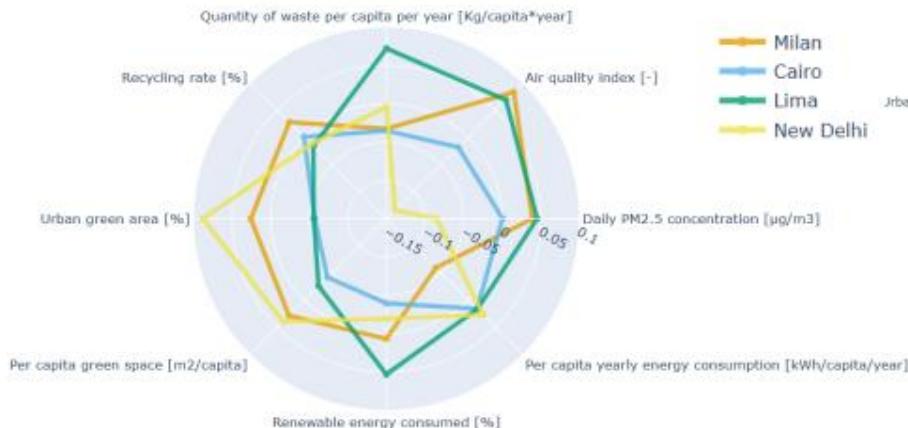
1. Motivation of the study and RQ
2. Definition of sustainability specific to your cities + graphic representation of your conceptual framework
3. Methods and materials
4. Results
 - a. Final indicators
 - b. (Influence matrix and) activity-passivity plot
 - c. MCDA
5. Recommendations: Policies targeted to specific stakeholders to enhance sustainability

Content - Recommendations

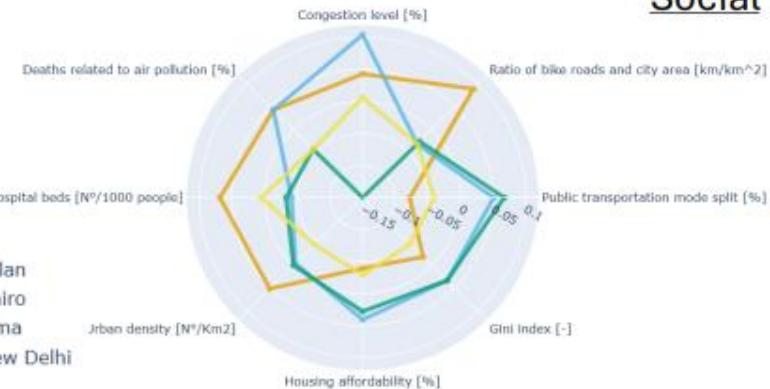
Milan

- Waste production
- Energy consumption
- Public transport split

Environment



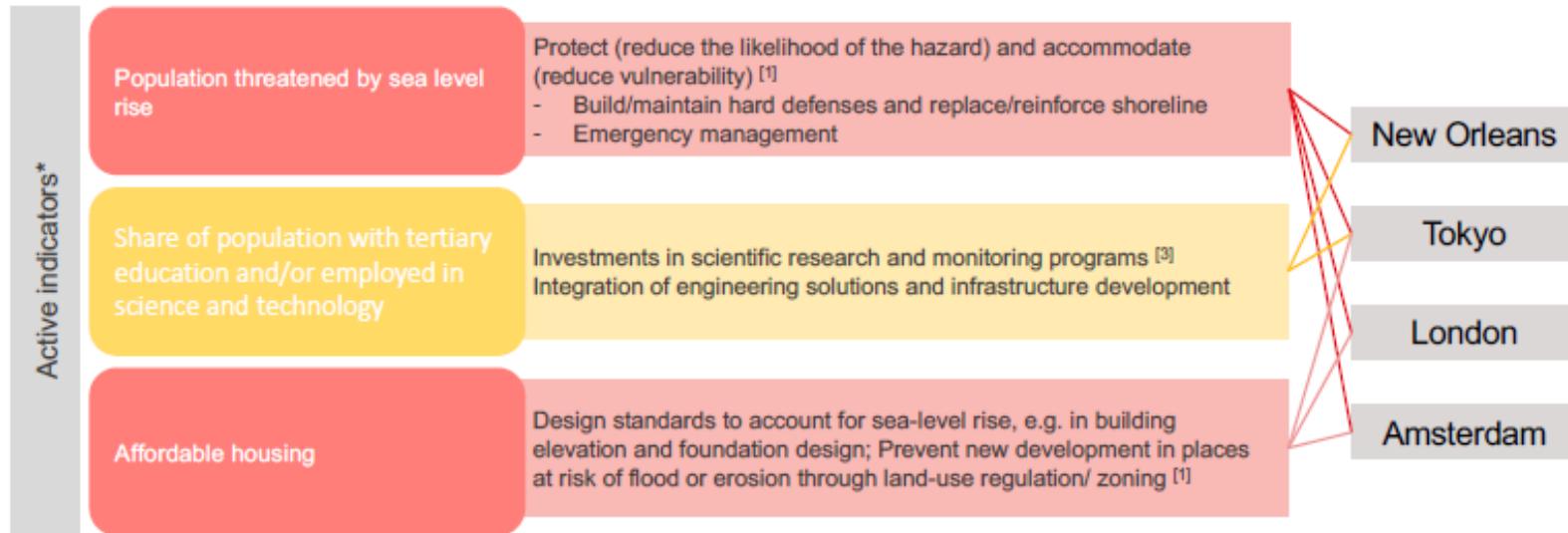
Social



Cairo

- Bike roads
- Green areas
- Number of hospital beds

Content - Recommendations



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
 - b. (Influence matrix and) activity-passivity plot
 - c. MCDA
5. Recommendations: Policies targeted to specific stakeholders to enhance sustainability
6. Conclusions



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

WHY?

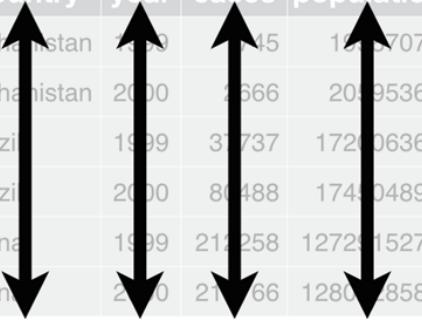
Why a poster?

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



country	year	cases	population
Afghanistan	1990	745	1637071
Afghanistan	2000	2666	20595360
Brazil	1999	31737	172006362
Brazil	2000	80488	174604898
China	1999	212258	1272915272
China	2000	213766	1280425583

variables



country	year	cases	population
Afghanistan	1990	745	1637071
Afghanistan	2000	2666	20595360
Brazil	1999	31737	172006362
Brazil	2000	80488	174604898
China	1999	212258	1272915272
China	2000	213766	1280425583

observations



country	year	cases	population
Afghanistan	1990	745	1637071
Afghanistan	2000	2666	20595360
Brazil	1999	31737	172006362
Brazil	2000	80488	174604898
China	1999	212258	1272915272
China	2000	213766	1280425583

values

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

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

table4

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

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

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 kilotonnes 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/lqbu-zjai
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotonnes 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/lqbu-zjai
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotonnes 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/lqbu-zjai
Environemnt	Access to Clean Air for Everyone	total greenhouse gas emissions	Total amount of kilotonnes of Co2 emissions released	Kilotones of Co2 equivalent	6	sum	city	int	quantitative	Cambridge	United Kingdom	2020	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

Environmental Sciences and Engineering (SIE) / SIE - Master

Sustainability assessment of urban systems

Course Settings Participants Grades Reports More ▾

▼ General

The course will be given on campus (BS 170) every Wednesday's from 13:15-15:00, followed by an exercise session until 16:00 (BS 170).

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



- [!\[\]\(f6cd74eecbcd5acede9fc60710d79464_img.jpg\) Announcements](#)
- [!\[\]\(e1689182d31a588762dff3e6611247eb_img.jpg\) List of Groups](#)
- [!\[\]\(0656420c98f821ef0fd0801943fb630f_img.jpg\) Template for data collection](#)
- [!\[\]\(dedd2b2e8452ea6e6cf76aedce0f5d0b_img.jpg\) Guidelines for the Project](#)

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

Check-list:

- Hierarchy
- Consistency
- Coherence
- Legibility

Measuring & Mapping Social Vulnerability in Flooding Events

This project aims to better define and evaluate social vulnerability during flooding events through the development and comparison of three methodologies. The first method, *Hazard Life*, was developed to measure the social vulnerability aspects of a hazard model, offered by the Federal Emergency Management Association (FEMA) through a weighted overlay analysis of the census block level. In order to increase the granularity of the analysis, the *Hazard Life* methodology was modified to include a watershed level through a weighted overlay analysis of the census tract level. The third method, *EV-Accessibility*, was developed to measure the social vulnerability aspects of a hazard model, offered by the Federal Emergency Management Association (FEMA) through a weighted overlay analysis of the building level. The findings of the *EV-Accessibility* methodology were compared to the inundation area of 2012's Superstorm Sandy event.

Methods & Results



2. Flooding Vulnerability Index (FVI)

- From House Use
- Income
- Ethnicity
 - Black
 - Hispanic
 - Native American
 - Asian
- Group Quarters

- New Demographics Profile
- Single-Parent Households
- Live alone
- Speak English "Less than very well"

Proximity index

- Flood Plain & Elevation

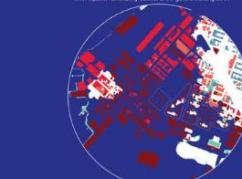
Cancer Type	Number of Patients
Lung	10
Breast	8
Prostate	8
Colon	5
Ovarian	9
Other	2

The Proximity Index: Buildings were assigned a score based on their location within a 1000-foot radius and their elevation as follows: +3.0 for buildings above the 500-foot floodplain, +2.0 for buildings between the 500-foot floodplain, and +1.0 for buildings below the 500-foot elevation. Scores were cumulative and resulted in a scoring system of 0 to 7.

Zooming in

The most impacted neighborhoods within Superstorm Sandy

A Redhook: This snapshot displays the acute vulnerability of Red Hook based on elevation and coastal proximity, creating conditions for extreme flood inundation. Though NYCHA properties are highlighted by the red color, numerous non-NYCHA structures are also vulnerable.



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 PM in the 80th percentile.

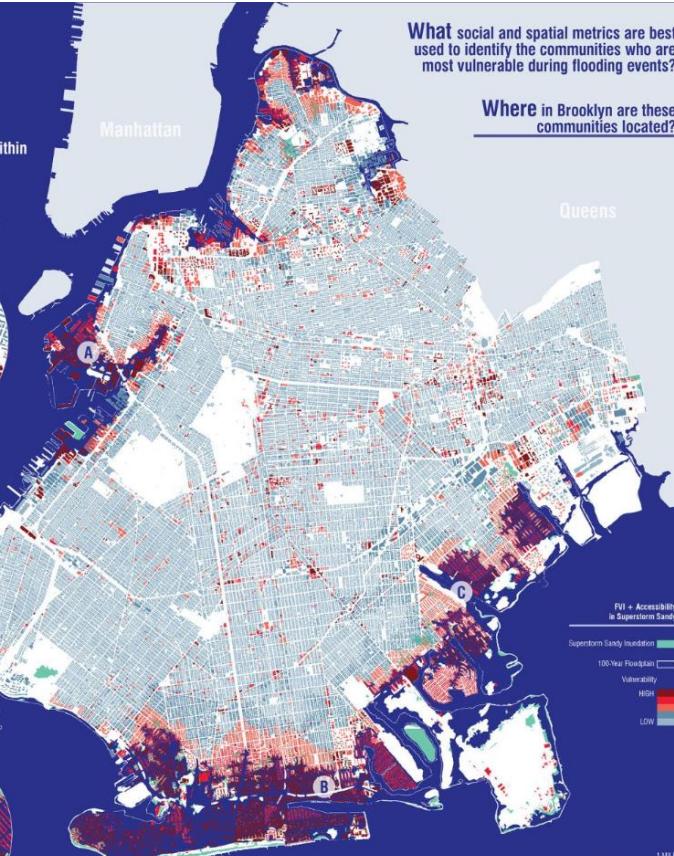


C **Canaries:**
Here we can see that the Sandy inundation extends beyond the flood plain affecting less vulnerable buildings. This shows our reliance and potential for local flooding for our FM and the need to incorporate inland flooding scenarios.



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?



Laboratory on Human- Environment Relations in Urban Systems

ACCESSIBILITY & ASSUMPTION

Examining methodological assumption and the impact of HOLC security map boundaries (1938) on health infrastructure in Brooklyn, NY (2019)

BACKGROUND

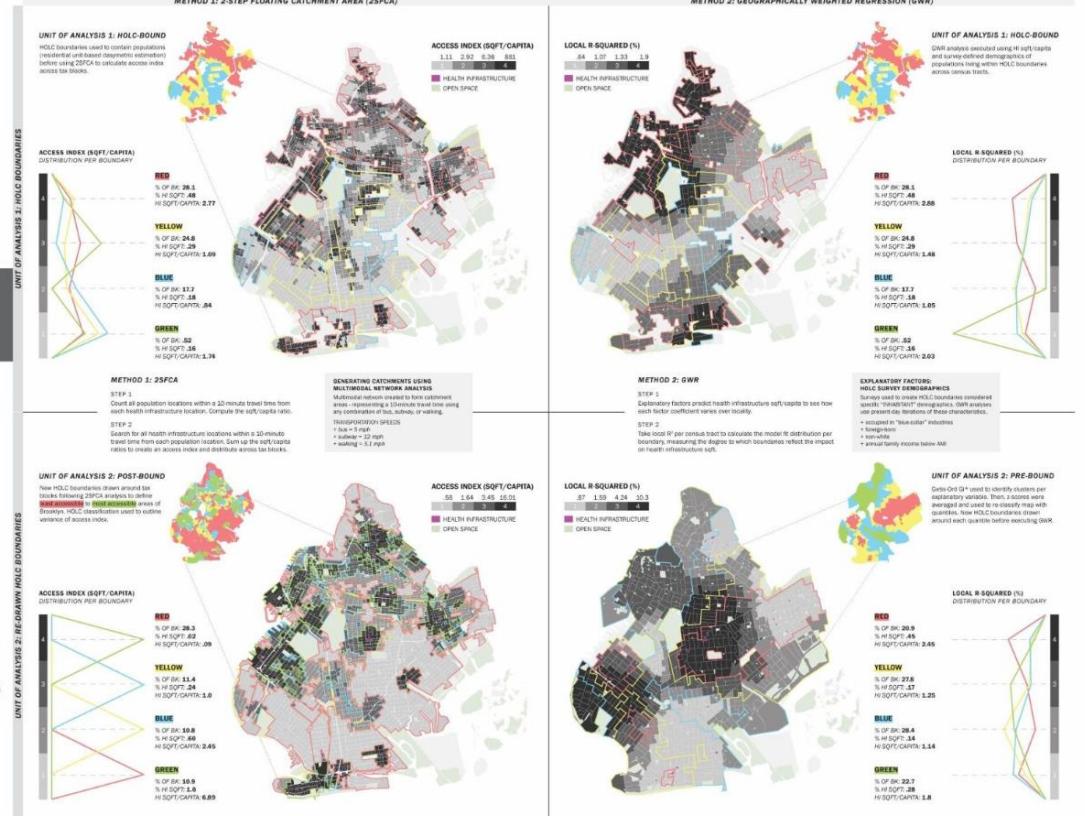
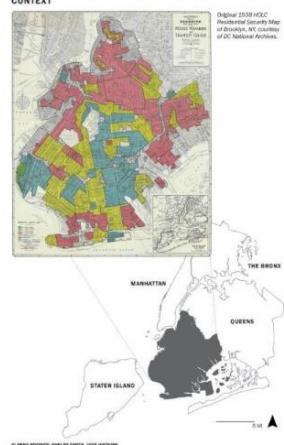
In the 1930s, the Home Owners' Loan Corporation (HOLC) created maps as part of its City Survey program to classify neighborhoods based on perceived level of lending risk. Color-coded boundaries drawn within a neighborhood revealed the following classifications: **green** for **"best"**, **blue** for **"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 immediate adjacent analyses situated in the matrix.

◎ 人物



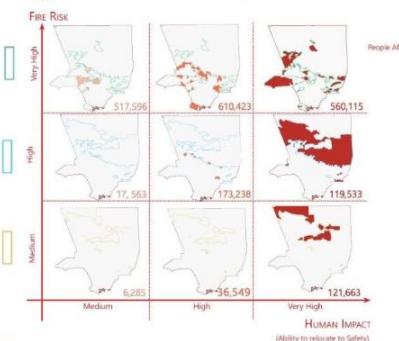
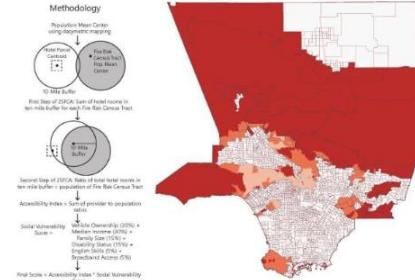
Measuring Human Impact of Wildfires in Los Angeles County

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.

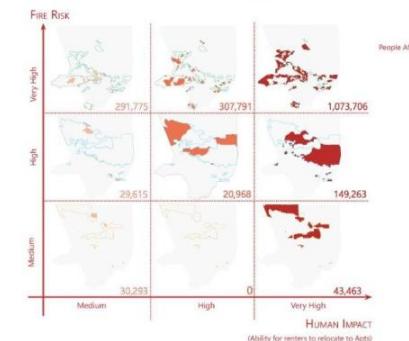
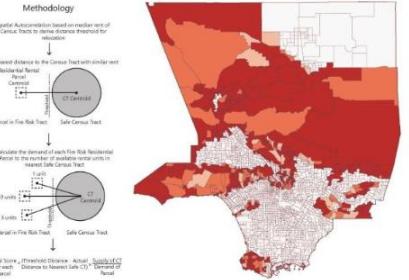
Although the California Department of Forestry and Fire Protection (CAL FIRE) produces "fire risk" maps for every county in the state, the risk levels represent "burnability" based on slope and vegetation. Wildfires are natural phenomena that have had profound evolutionary impacts on the earth's fauna 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.

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



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

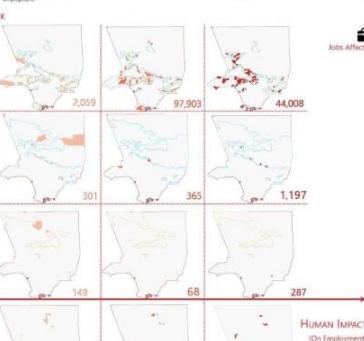
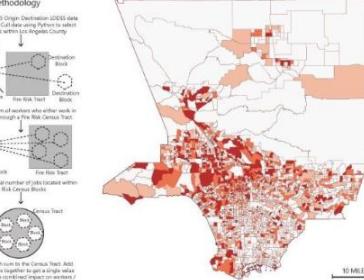


CAL FIRE's Current Wildfire Risk Map

here, 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?



III. Countywide Impact of Wildfires on Employment



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?



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

Census Harbesz Pseudo F-Statistic

$$(R(n-1))(1-R)/n-c$$

METHOD 2. DIVERSE
where people are diverseland use dissimilarity index
multi group Shannon entropy index

$$H = \sum_{i=1}^n p_i(E_i) \cdot H(E_i)$$

+ Iterative Getis-Ord Gi* Hotspot

METHOD 3. SIMILAR
where the built environment is similar
clustering grouping similar built environment

Census Harbesz Pseudo F-Statistic

$$(R(n-1))(1-R)/n-c$$

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

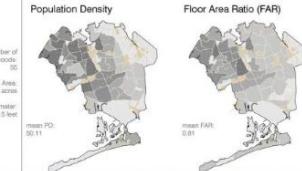
+ land use dissimilarity index

+ Iterative Getis-Ord Gi* Hotspot

2. RESULTS



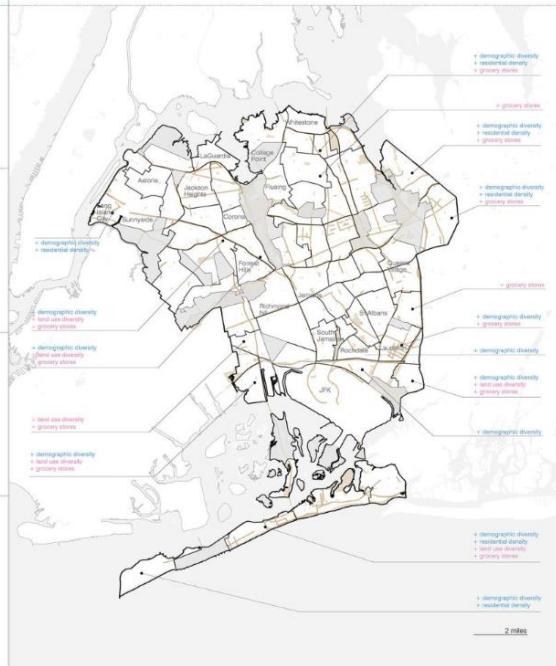
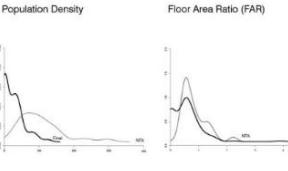
3. COMPARE ACROSS



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 final map was produced by departing from the NTAs and modifying them with our methods while pointing out an inconsistency. Then we classified the areas in:

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



Consistency

WHAT IS MY NEIGHBORHOOD?

The impact of boundary definition in the measurement of socio-economic and environmental characteristics in urban systems

Melissa Pang, Glòria Serra-Coch, François Golay, Maria Hechen, Claudia R. Binder

GOAL

Shed light on the impact of neighborhood boundary definitions on urban systems' analysis.

Compare three conceptualizations of neighborhoods:
(i) functional neighborhoods, (ii) perceived neighborhoods, and (iii) activity spaces...

...to understand potential data biases in sustainability, livability or well-being assessments that can, in turn, affect policy making and urban planning.

METHODOLOGY

1. LIT REVIEW

conceptualization of neighborhood:
(i) functional
(ii) perceived
(iii) activity space

conceptualization of urban system:
(i) People: socio-demographics
(ii) Place:
- Built environment
- Natural environment

2. DATA COLLECTION

Secondary sources:
- STIG data*: open
and limited access

similarity of urban form
neighborhood design criteria

3. BOUNDARY CREATION

individually drawn
→ (i) functional
everyday destinations
→ (ii) perceived
everyday destinations
→ (iii) activity space

4. COMPARISON

1. Selection of 1 representative functional neighborhood
2. Aggregation of urban system characteristics to equivalent perceived neighborhood and activity space
3. Intra: same type of neighborhood - different people
 - 1. Size and compactness differences
 - 2. Aggregated characteristics differences
4. Inter: different types of neighborhoods
 - 1. Size and compactness differences
 - 2. Aggregated characteristics differences

TAKE-AWAYS

- Interpersonal communication, including informal exchanges.
- The role of communication as well as its coherence and effectiveness.
- Understanding existing infrastructure, conditions and their regional differences.
- A clear and flexible regulation framework.
- A straightforward bundled business model.
- Interacting and coordinating key actors: energy utilities, energy technology providers, public entities, institutional investors, engineers

FUNCTIONAL

This research compares three conceptualizations of neighborhoods: (i) functional neighborhoods, perceived.

We take a geographical approach focusing on proximity effects and the role of spatial and social proximity relevant for the diffusion of innovations.

1. similar urban form characteristics
 - density
 - building type
 - layout
 - use
 - transport infrastructure (Dengler, 2009)
2. neighborhood design criteria

PERCEIVED

This research compares three conceptualizations of neighborhoods: (i) functional neighborhoods, perceived.

We take a geographical approach focusing on proximity effects and the role of spatial and social proximity relevant for the diffusion of innovations.

can you draw the boundaries of your neighborhood?

1. responder 1
2. responder 2
3. responder 3
4. responder 4

ACTIVITY SPACE

This research compares three conceptualizations of neighborhoods: (i) functional neighborhoods, perceived.

We take a geographical approach focusing on proximity effects and the role of spatial and social proximity relevant for the diffusion of innovations.

where do you live?
where do you shop?
where do you work?
where do you play?
where do you sleep?
bounding polygon = convex-hull

Intra-COMPARISON

Geometric characteristics



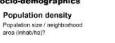
Perceived



Activity Space



Socio-demographics



PEOPLE



PLACE



Built environment



Natural environment



Contact: Melissa Pang | Herus, EPFL | melissa.pang@epfl.ch

This project (100587-05) is carried out with the support of the Swiss Federal Office of Energy (SFOE).

The authors of this paper bear sole responsibility for its conclusion and findings.

with the support of:



Swiss Federal Office of Energy

HERUS

Laboratory on
Human-
Environment
Relations in
Urban Systems

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

Anikita Singhi, Aristide Athanassiadis, Claudia R. Binder

Relevance

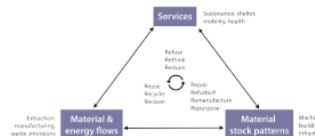
- Decent housing is a core sustainable development goal and a fundamental human right. It is currently not met for a quarter of the global population
- Construction sector is the world's largest consumer of raw materials, and 40% of global CO₂ emissions are attributed to housing and construction
- The challenge of providing decarbonised, decent housing differs per urbanisation context

Circular city ≠ Circular economy

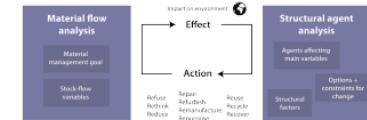
- Circular economy proposes strategies to reduce resource use, reuse, building, and waste generation and demolition waste
- However, meeting housing needs within climate targets requires attention to more than material and energy stocks and flows
- A circular city must consider trade-offs in the configuration 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).

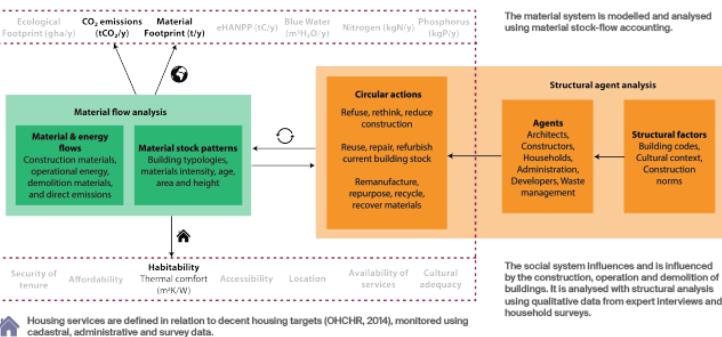


Social structures, actors and their actions restrict or enable strategies for managing material stocks and flows (Binder, 2007).



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.



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



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

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?



PEOPLE

a neighborhood is
defined by the people
living there

Population
Age
Race
Education
Income
Poverty Rate
Unemployment
Employment
Foreign born

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 Length
Building Height
Lot Area
Lot Width
Lot Length
Street Width
Street Length

2. RESULTS



number of
Neighborhoods
5
Mean Area
1203 acres
Mean Perimeter
4791.5 feet

Population Density (approx. 2010)

mean PO: 50.11

3. COMPARE ACROSS



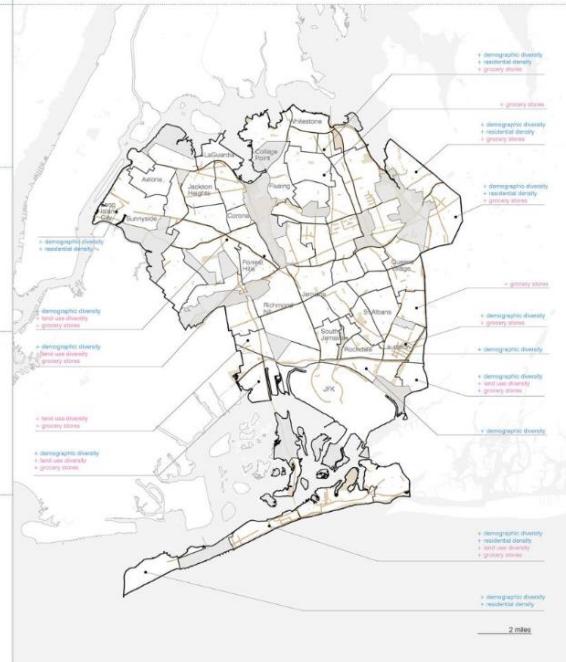
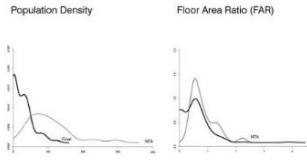
mm
0.1

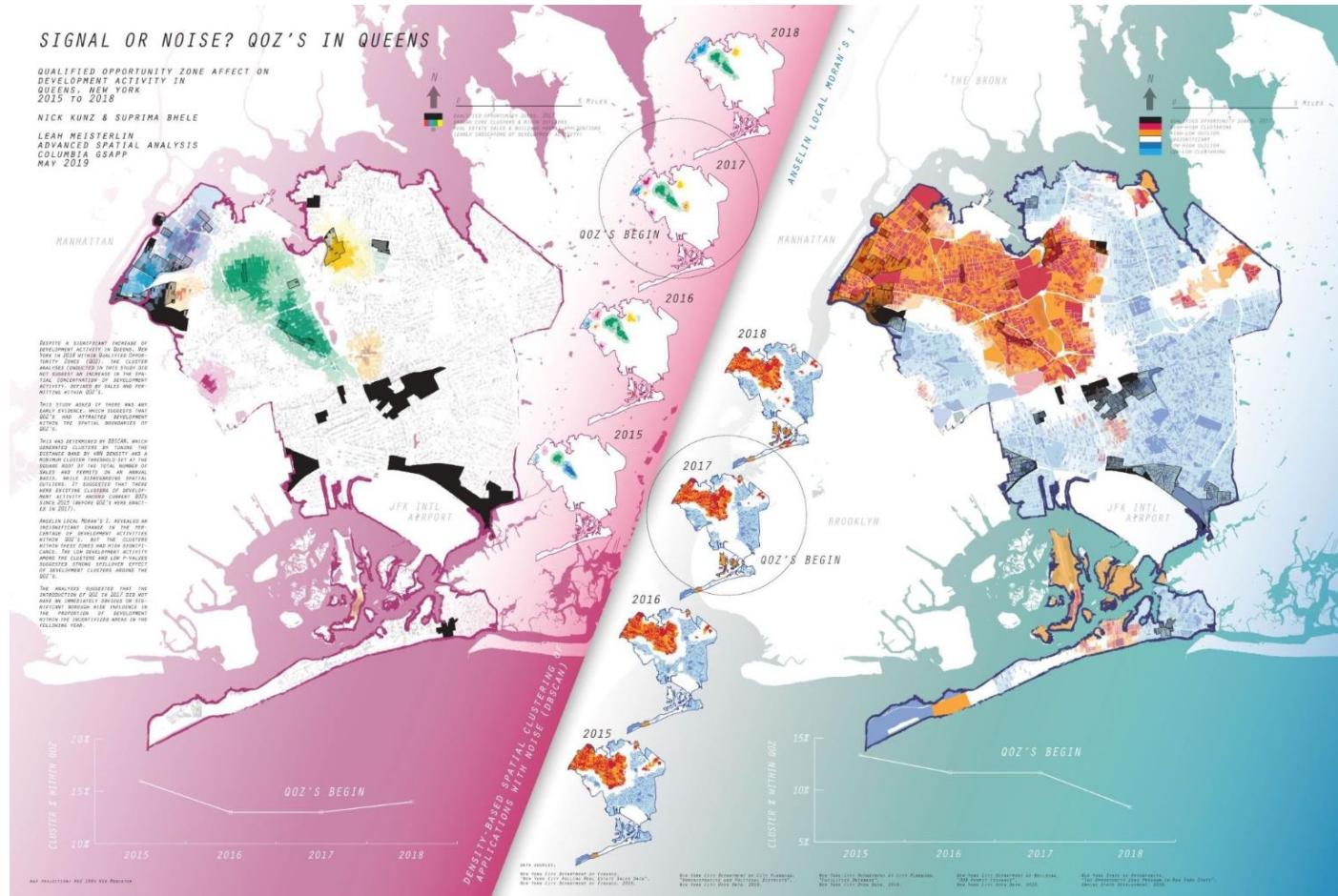
4. CONCLUSION

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

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) neighborhood





- Minimum ink rule
- Keep text to a minimum
- Minimise mixing fonts (and for a reason)

Crowded ER Waiting Rooms – Are Freestanding ERs The Way To Go? Jesse Keats

INTRODUCTION

Overcrowding in the Emergency Room is a problem that impacts every hospital in the US. Overcrowding is not just a hospital issue, however. There are many intricate factors that play into why each ER is overcrowded. Overcrowding has resulted from legislation that does not allow a hospital to treat patients outside of the hospital, long wait times, mass casualties, the need for specialized care, etc. Overcrowding can negatively impact patients by lengthening their stay in the hospital and even reducing their chance of survival (Kane, 2010; McCayen, et. Al, 2006; p.496).

To help alleviate the overcrowding problem, free standing ERs were introduced to help decrease the amount of crowding in the hospital ERs.

A free standing ER can most simply be defined as an Emergency Department that is open 24/7, offering the same care as a hospital Emergency room but can not admit a patient because it is not connected to a hospital (Alexander J. Alexander, 2010, p. 327).

SIGNIFICANCE

In 2006, there were 123.5 million ER visits in 2015 there were 126.6 million ER visits in the US alone. This was a 10.6% increase in three years. This number continues to grow (Wright, R., 2016).

In 2014, a study suggested that wait times in free standing ERs were longer than a 30 second difference in wait times compared to freestanding ERs (Wright, R., 2016).

In 2014, a study that compared academic free standing ERs to hospital ERs suggested that there was less than a 2 minute wait difference (Deyton, 2014, p. 148).

48 Percent of all patients seen in the ER require some kind of specialized care (Apgar, 2010, p. 788).

POSITION STATEMENT

Free Standing ERs are not the answer to the problem of overcrowded ERs.

There are many factors that cause overcrowding in an ER.

The type of ER that treats patients is not the only factor in decreasing overcrowding.

SUPPORT FOR POSITION

According to Alexander J. Alexander, who conducted a study on free standing ERs, suggested that the wait times in a free standing ER compared to a Hospital ER are very similar.

A study that observed academic free standing ERs compared to the national average ER wait time suggested that there was less than 2 minutes in wait time difference (Deyton, 2014, p. 137).

The problem of overcrowding is multifaceted, it is not a "Hospital problem". It is not a "Hospital ER problem". It is a "Hospital and freestanding hospital of primary care doctors, ERs are federally mandated to treat every patient" (Barash, 2012, p. 308).

IMPLICATIONS FOR PRACTICE

According to the previous studies, it can be understood that Free standing ERs are not the answer to overcrowded ERs. Multiple studies have suggested that the wait times at a freestanding ER and the wait times at a hospital ER are almost identical. This means that other options should be explored to reduce overcrowding in the emergency department.

In a study by Emily L. Apgar, 18% of patients seen and discharged from the ER needed to be seen by a specialist. This results to a large amount of patients in an emergency room that need further treatment. Nurses could help reduce overcrowding by receiving training in specialty fields. Having adequate nurses and physicians who can treat patients more quickly can in theory reduce over crowding.

In 2014, the University of Kansas Medical Center (KUMC) in Kansas City hired RSM accredited nurses in the ER as a flow coordinator. This reduced the average length of stay of each patient by 87.6 minutes. The implementation of a nurse coordinator suggests that nurses in a leadership position to help manage the flow of patient care can greatly reduce the length of stay of each patient in the ER (Wood, 2014, p. 1).

CONCLUSION

After researching the idea of overcrowding in the ER compared to overcrowding in a free standing ER, it can be concluded that there is not much of a difference when it comes to wait times. Both hospital ERs and free standing ERs both struggle with the same types of problems. Both receive critically ill patients and must treat them regardless of what kind of facilities the patients have. The main idea of overcrowding is a much more complex problem than the type of ER that is treating the patients. Nurses could help alleviate the strain on ERs by specializing in different fields of expertise to help aid patients that need specialized care. The idea of a flow coordinator also needs to be put into practice to reduce ER wait times. A nurse coordinator has the potential to direct people where they need to be. Nurses could also advocate for better staffing ratios, prepare for disaster situations, and work as a team to help as many patients as possible. Nurses and physicians need to be advocates for patients. Nurses are trained in prioritization and should practice their skills to best help to community.

REFERENCES

Apgar, E. L. (2010). *Emergency Department Resource Guide*. (2nd ed.). New York, NY: Springer.

Alexander, J. A. (2010). *Emergency Department Resource Guide*. (2nd ed.). New York, NY: Springer.

Barash, P. (2012). *Barash's Clinical Medical Decision Making: Emergency Medicine*. (3rd ed.). New York, NY: Lippincott Williams & Wilkins.

Deyton, L. A. (2014). *Emergency Department Resource Guide*. (2nd ed.). New York, NY: Springer.

Wood, C. (2014). *Emergency Department Resource Guide*. (2nd ed.). New York, NY: Springer.

Wright, R. (2016). *Emergency Department Resource Guide*. (2nd ed.). New York, NY: Springer.

Photograph retrieved from www.hcscn.org

Early Childhood Literacy Programs in Canada

Barbara Ballo-Boudreau & Dorothy E. Pauly, in partnership with Carol McDougall & Shonda Lafferty, of Read to Me! Early Success Literacy Program & Vivian Howard of Dalhousie's School of Information Management

DALHOUSIE UNIVERSITY

Background

More than 42% of Canadians do not have adequate literacy skills for succeeding in Canadian society (1). Early literacy programs provide important resources and services for children and families. As a result of program development, currently, Canada lacks a coherent approach and programs often operate in isolation despite common needs.

In partnership with Read to Me! Nova Scotia Family Literacy Program, the researchers sought to gain an understanding of early childhood literacy programs in Canada by identifying programs and gathering information on their operations, programming and challenges.

Key findings

Target populations
Programs strive to meet the diverse needs of their communities, and most target specific populations. Many diverse families facing economic, social, geographical and educational barriers.

Program characteristics:
Survey respondents connect with their communities through various means.

Programs Offered

Point of Contact

Funding

Survey respondents indicated a range in funding sources. Only 9% of programs receive federal funding.

Challenges

While programs face many challenges, three key challenges emerged from survey responses:

Funding: Funding underlies all aspects of early literacy programming. Relatively programming faces a lack of resources, including as a barrier. Many noted that program demand exceeds availability, and that they lack the resources to hire appropriate staff, and quality quality resources.

Outreach challenges included engaging parents and communities, creating accessible programs, connecting with specific target populations and developing successful marketing strategies. Given the community perspective, outreach challenges that programs have met with difficulty in advancing the value of early literacy and their programs, resulting in challenges securing community understanding and support.

Research: Research and evaluation strategies can increase program effectiveness and lessen the gap between what is known and what is possible. Program challenges include:
• programmatic issues
• flexibility and consistency among staff
• maintaining program momentum
• responding to meet community needs
• fulfilling administrative requirements

Recommendations

From the survey and literature review came the following recommendations for moving forward:

1. Funding: Establish sustainable and flexible funding for early literacy programming.

2. Staff training: Provide opportunities for ongoing training for staff and volunteers to support and improve programming.

3. Promotion and program materials: Programming material should be inclusive and reflect the community served. This includes developing practices for program models and resources to enhance training, program and facility resource sharing, training and evaluation.

4. Network: While many programs have developed relationships with local organizations, there is a lack of communication between municipalities and across provinces. A network of practitioners is key to the success of early literacy programming. This can be achieved through approaches to literacy. A national strategy that supports early literacy initiatives and the unique needs of Canadians and their programs, resulting in challenges securing community understanding and support.

5. Research: Practitioners have limited opportunities to participate in research. Collaboration with researchers and partners can help support high quality research that is relevant to front line practitioners. Many areas of early literacy programming and programming require further research. While areas like funding and resource sharing need investigation, there are also methods for transferring research into accessible models for practice are explored.

Population Sample

Although the majority of completed surveys were returned from Ontario, there were respondents from each province as well as one organization operating in the Territories. Respondents were distributed between urban settings (34%), rural settings (34%), or both (31%). Most respondents operate at a municipal level (78%); only 3% indicated regional operations.

Research

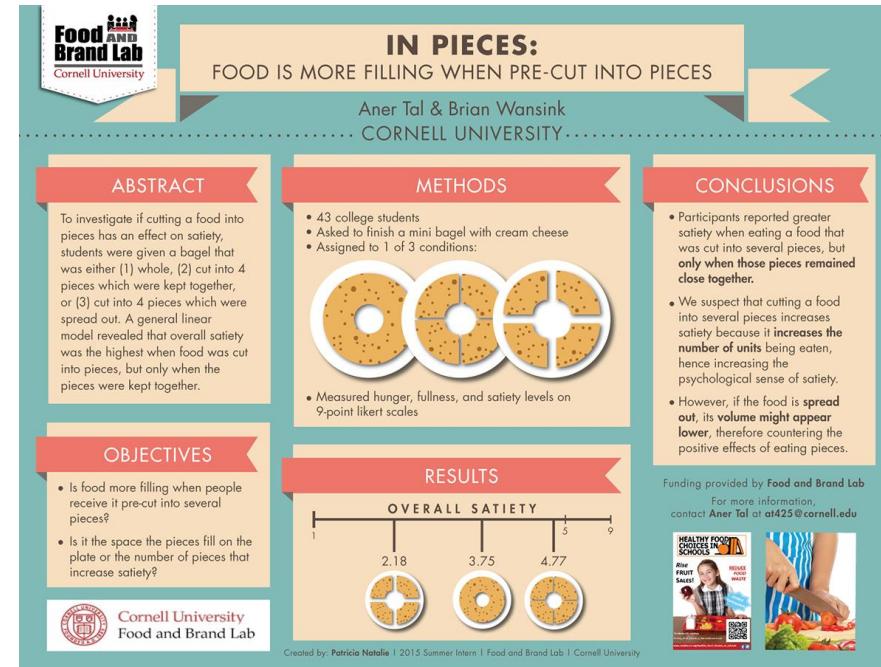
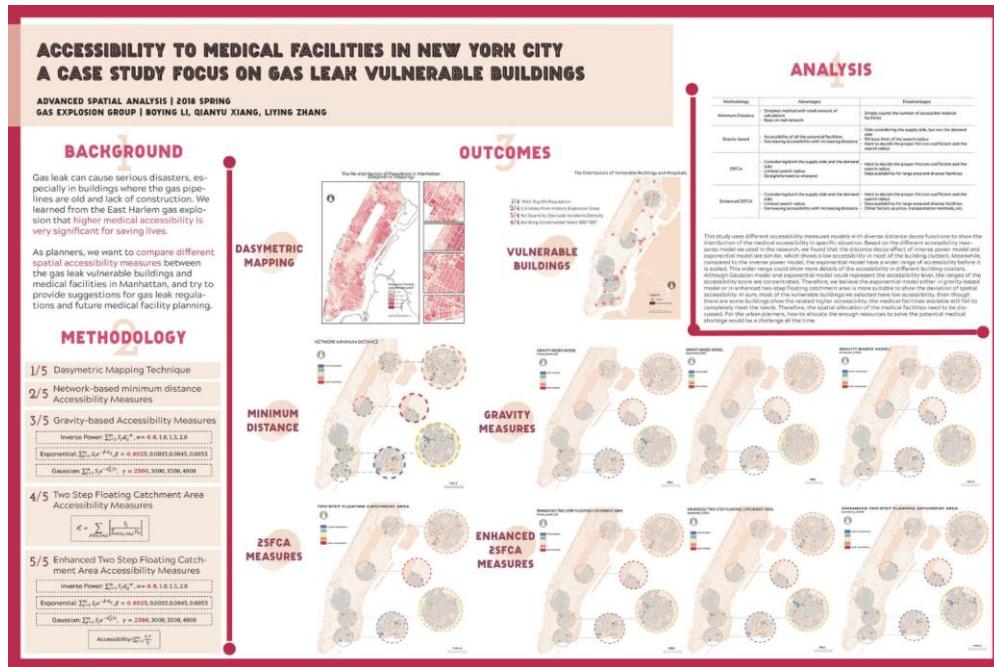
Research and evaluation strategies can increase program effectiveness and lessen the gap between what is known and what is possible. Program challenges include:
• programmatic issues
• flexibility and consistency among staff
• maintaining program momentum
• responding to meet community needs
• fulfilling administrative requirements

Conducting Research

Although the majority of completed surveys were returned from Ontario, there were respondents from each province as well as one organization operating in the Territories. Respondents were distributed between urban settings (34%), rural settings (34%), or both (31%). Most respondents operate at a municipal level (78%); only 3% indicated regional operations.

References: (1) Canadian Language & Literacy Research Network (2009). National literacy for early literacy. Retrieved from <http://www.literacynetwork.ca/NLL/forliteracy.htm>
For access to the executive summary, full report and additional resources please visit www.readtome.ca/research.htm or contact us at earlyliteracysurvey@gmail.com

- Minimum ink rule
- Keep text to a minimum
- Minimise mixing fonts (and for a reason)



Less is more

- Minimum ink rule
- Keep text to a minimum
- Minimise mixing fonts (and for a reason)

**PIGS IN SPACE:
EFFECT OF ZERO GRAVITY AND
AD LIBITUM FEEDING ON WEIGHT
GAIN IN CAVIA PORCELLUS**

Colin B. Purrington
6673 College Avenue, Swarthmore, PA 19081 USA

ABSTRACT:
One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term study of guinea pigs (Cavia porcellus) (Oryzias porcellus) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

INTRODUCTION:
The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfit. Indeed, everyday today for hundreds of millions of people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact, tauter structure (Xavier 1965).

Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight. Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating news ways to pay for products and services that they cannot actually afford. Together, these factors open the possibility that moving to space could cure overweight syndrome quickly and permanently for a large number of humans.

We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

CONCLUSIONS:
Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

ACKNOWLEDGEMENTS:
I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, the High Fructose Sugar Association, Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Mariana Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Cuy Foundation for generously donating animal care after the conclusion of the study.

LITERATURE CITED:

NASA. 1982. Project STS-XX: Guinea Pigs. Leaked internal memo.
Sekulic, S.R., D. D. Lukac, and N. M. Naumovic. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. *Medical Hypotheses*. 64:221-228.
Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. *Journal of Obesity*. 2:23-40.

Less is more

- Minimum ink rule
- Keep text to a minimum
- Minimise mixing fonts (and for a reason)

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.

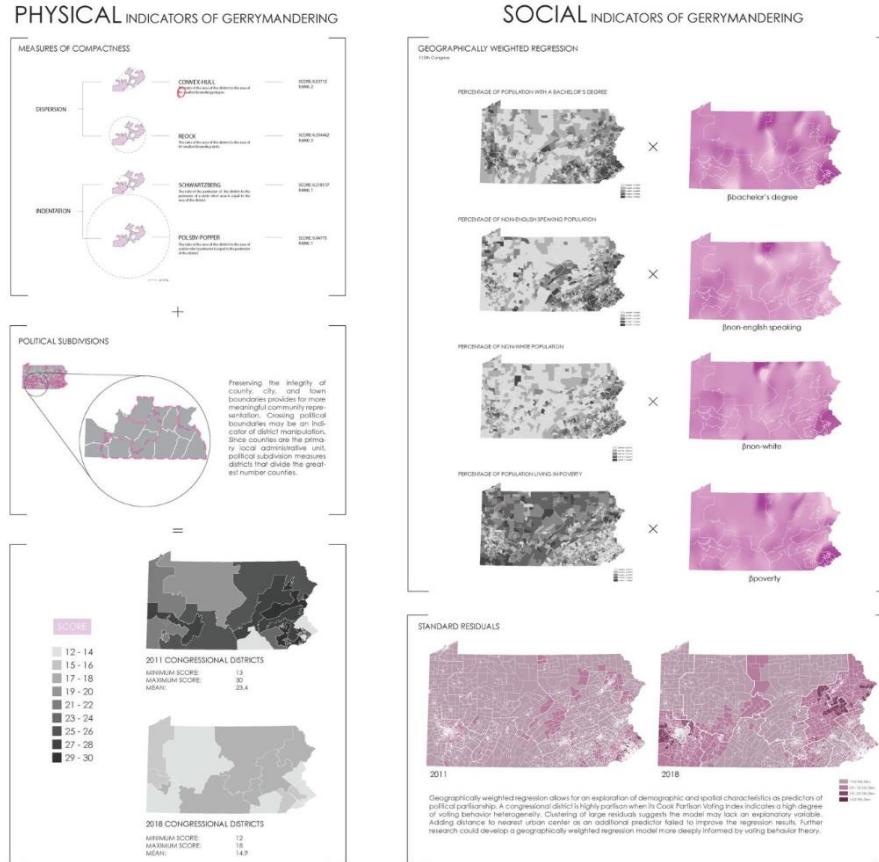
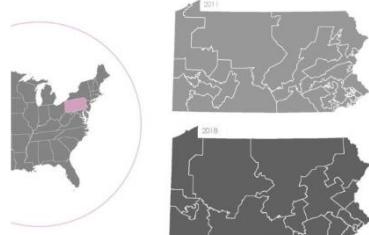
Single-member district plurality voting remains the status quo in American legislative elections, emphasizing the importance of geographically defined districts. How these districts are shaped to a large extent determines who can gain and maintain legislative power.

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



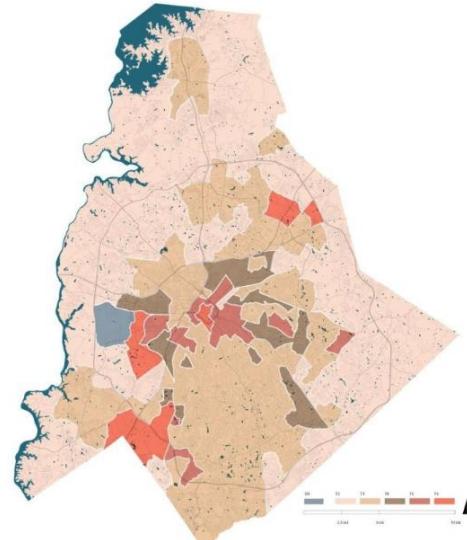
ETHICS AND/OF UNCERTAINTY: SPECULATIVE URBANISM AND THE RISE OF SYNTHETIC PEOPLE

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 be used to predict for policy-making. In this paper, we argue that synthetic populations for calculable urban futures will expose the logics underlying synthetic populations – 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.

CASE STUDY CITY: CHARLOTTE, NORTH CAROLINA



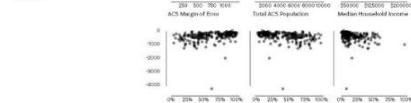
Synthetic populations' describe a fictitious but statistically representative urban populace. Materially, it is a dataset comprised of individual-level statistics calculated from aggregate data.

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.

Synthetic Population Error
 $\delta = T - E$
 where, T is the synthetic population estimate and E is the ACS population estimate

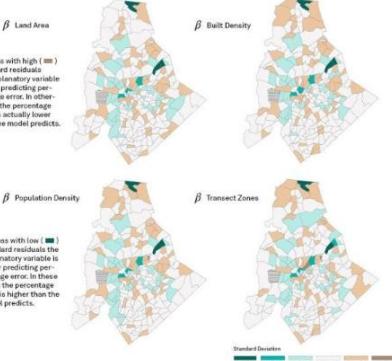
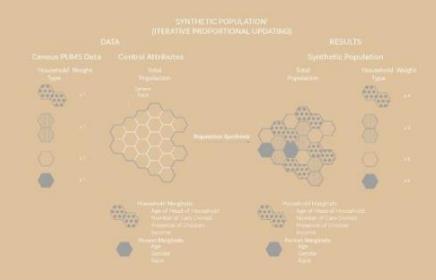
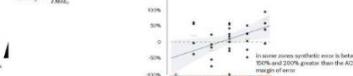


Total Absolute Error by Zone
 $TAE_i = \sum_{j=1}^n |T_j - E_j|$
 where, T_j is the synthetic population estimate and E_j is the ACS population estimate

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

Difference Between Total Absolute Error and ACS Margins of Error
 $\Delta E_i = TAE_i - TAE$
 where $TAE_i = \sum_{j=1}^n |T_j - E_j|$

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



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	Acc	$\hat{\epsilon}$	Adjusted $\hat{\epsilon}^2$	Residual Squares
Population Density	-572.548	0.148	0.064	0.968
Built Density	-569.299	0.106	0.043	0.1010
Land Area	-565.968	0.131	0.044	0.982
T-zone	-578.004	0.159	0.075	0.984

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.

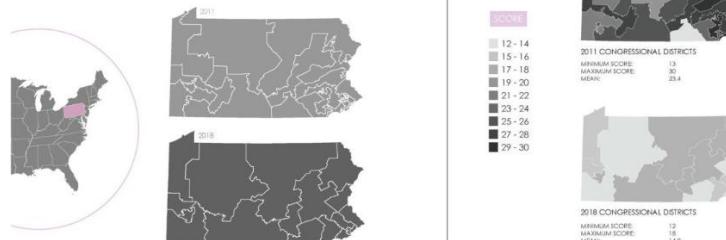
Single-member district plurality voting remains the status quo in American legislative elections, emphasizing the importance of geographically defined districts. How these districts are shaped to a large extent determines who can gain and maintain legislative power.

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

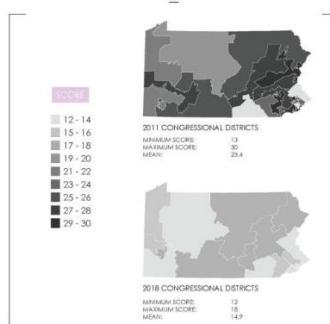
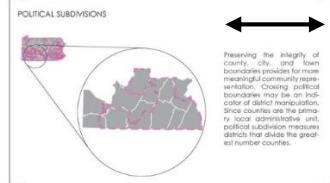
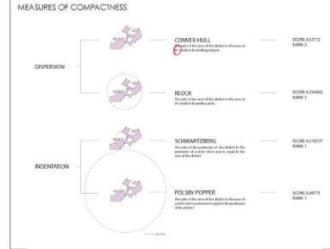


RESEARCH QUESTION To what extent are legal tests for gerrymandering consistent with a variety of statistical and spatial methods to detect gerrymandering?

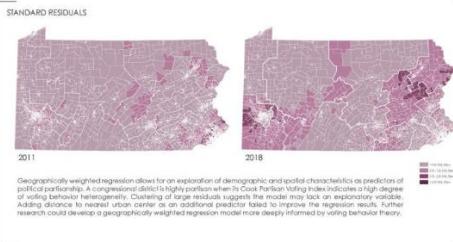
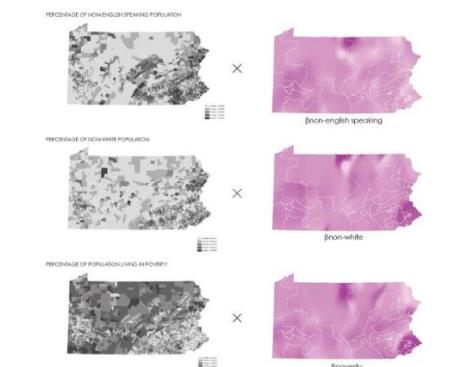
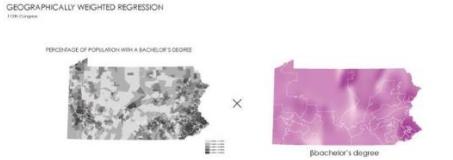
PENNSYLVANIA Congressional Maps



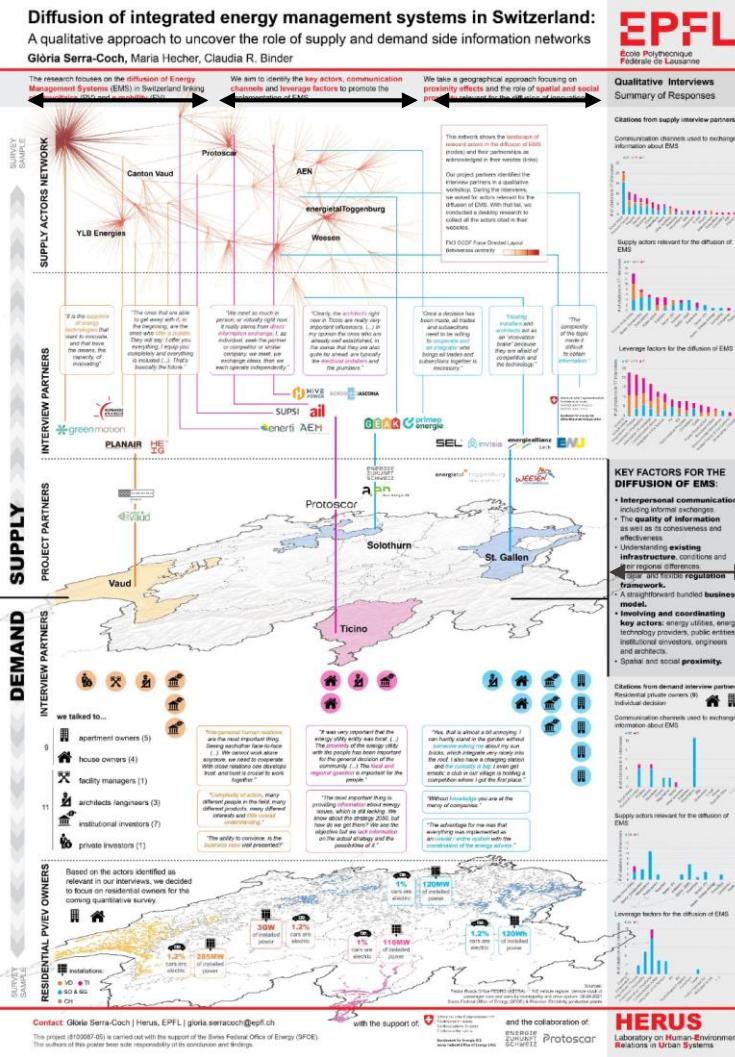
PHYSICAL INDICATORS OF GERRYMANDERING



SOCIAL INDICATORS OF GERRYMANDERING



Break text into readable blocks



**PIGS IN SPACE:
EFFECT OF ZERO GRAVITY AND
AD LIBITUM FEEDING ON WEIGHT
GAIN IN CAVIA PORCELLUS**

Colin B. Purrington
6673 College Avenue, Swarthmore, PA 19081 USA

ABSTRACT:
One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never even gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term experiment in a colony of Guinea pigs (*Cavia porcellus*) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

INTRODUCTION:
The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfits. Indeed, exercise today for hundreds of million people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact tertiary structure (Xavier 1965).

Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight. Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating news ways to pay for products and services that they cannot currently afford. Together, these factors open the possibility that moving to space could cure overweight syndrome quickly and permanently for a large number of humans.

We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

CONCLUSIONS:
Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

ACKNOWLEDGEMENTS:
I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Mahiana Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Cuy Foundation for generously donating animal care after the conclusion of the study.

LITERATURE CITED:

NASA. 1982. Project STS-XX: Guinea Pigs. Leaked internal memo.

Sekulić, S.R., D. D. Lukáć, and N. M. Naumović. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. *Medical Hypotheses*. 64:221-226.

Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. *Journal of Obesity*. 2:23-40.

SPACE-EXES

MATERIALS AND METHODS:
One hundred male and one hundred female Guinea pigs (*Cavia porcellus*) were transported to the International Space Laboratory in 2010. Each pig was housed separately and deprived of exercise wheels and fresh fruits and vegetables for 48 months. Each month, pigs were individually weighed by duct-taping them to an electronic balance sensitive to 0.0001 grams. Back on Earth, an identical cohort was similarly maintained and weighed. Data was analyzed by statistics.

RESULTS:
Mean weight of pigs in space was 0.0000 ± 0.0002 g. Some individuals weighed less than zero, some more, but these variations were due to reaction to the duct tape, we believe, which caused them to be alarmed push briefly against the force plate in the balance. Individuals on the Earth, the control cohort, gained about 240 g/month ($p = 0.0002$). Males and females gained a similar amount of weight on Earth (no main effect of sex), and size at any point during the study was related to starting size (which was used as a covariate in the ANCOVA). Both Earth and space pigs developed substantial dewlaps (double chins) and were lethargic at the conclusion of the study.

**PIGS IN SPACE:
EFFECT OF ZERO GRAVITY AND
AD LIBITUM FEEDING ON WEIGHT
GAIN IN CAVIA PORCELLUS**

Colin B. Purrington
6673 College Avenue, Swarthmore, PA 19081 USA

ABSTRACT:
One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never even gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term experiment in a colony of Guinea pigs (*Cavia porcellus*) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

INTRODUCTION:
The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfits. Indeed, exercise today for hundreds of million people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact tertiary structure (Xavier 1965).

Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight. Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating news ways to pay for products and services that they cannot currently afford. Together, these factors open the possibility that moving to space could cure overweight syndrome quickly and permanently for a large number of humans.

We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

CONCLUSIONS:
Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

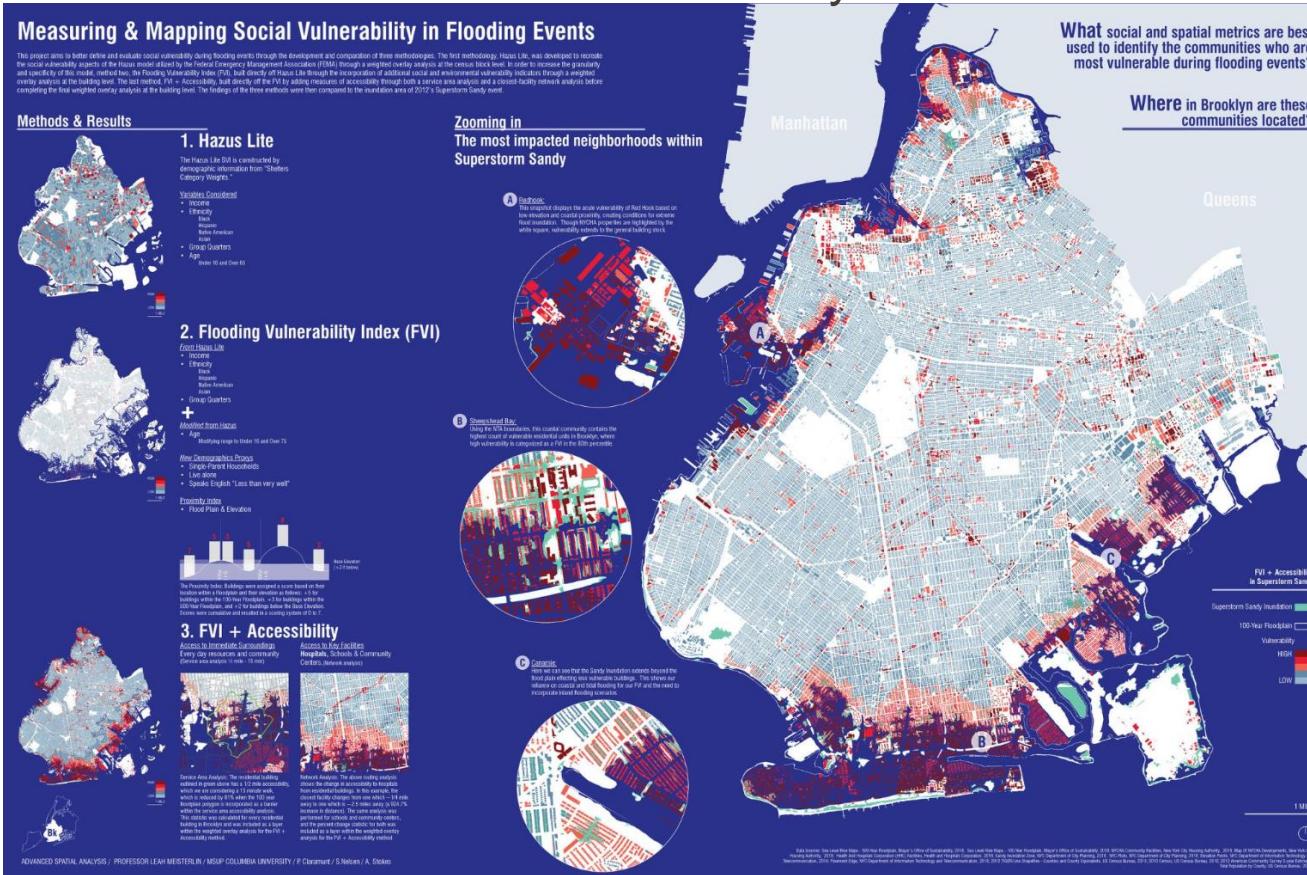
ACKNOWLEDGEMENTS:
I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Mahiana Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Cuy Foundation for generously donating animal care after the conclusion of the study.

LITERATURE CITED:

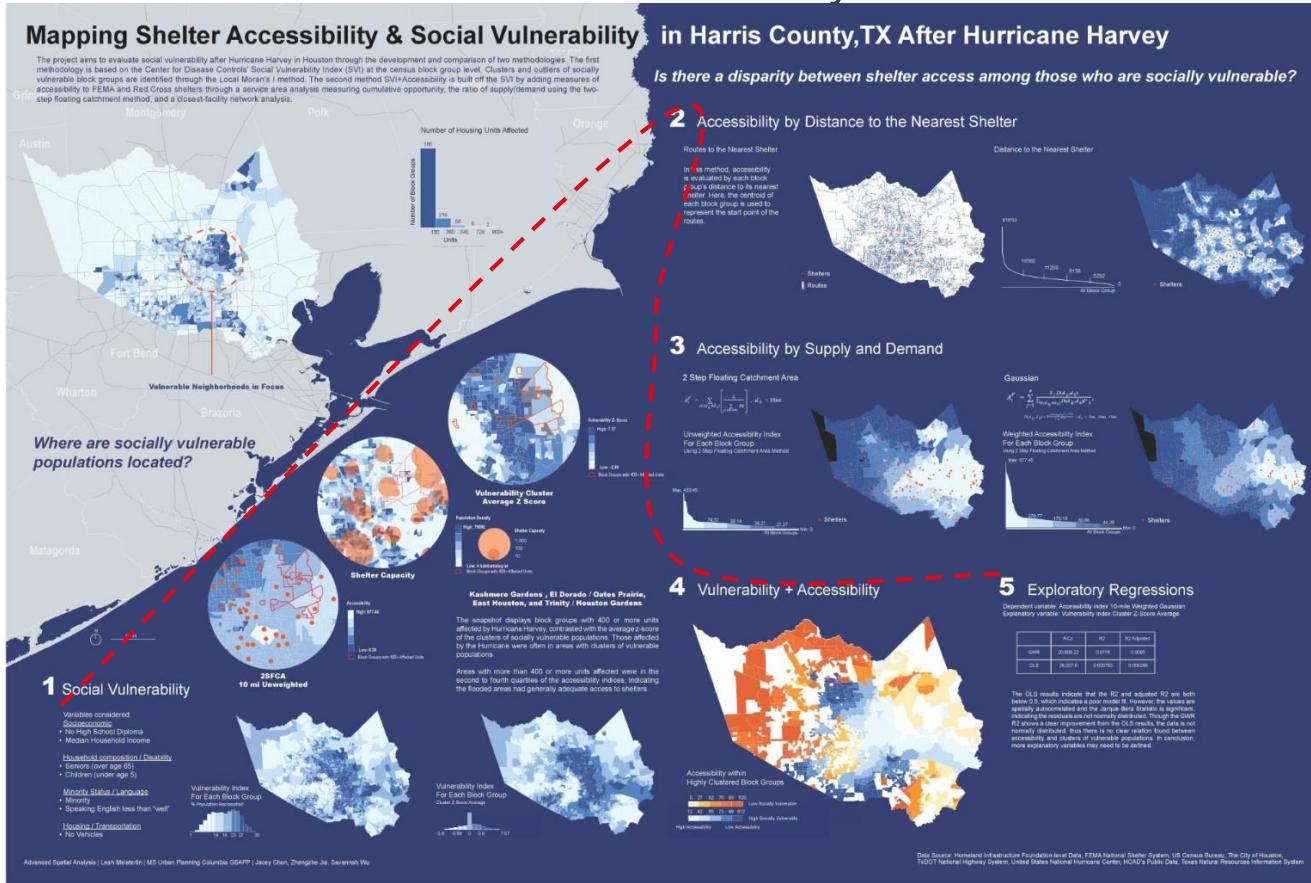
NASA. 1982. Project STS-XX: Guinea Pigs. Leaked internal memo.
Sekulic, S.R., D. Lukab, and N. M. Naumovic. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. *Medical Hypotheses* 64:221-226.
Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. *Journal of Obesity*. 2:23-40.

This is visual

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



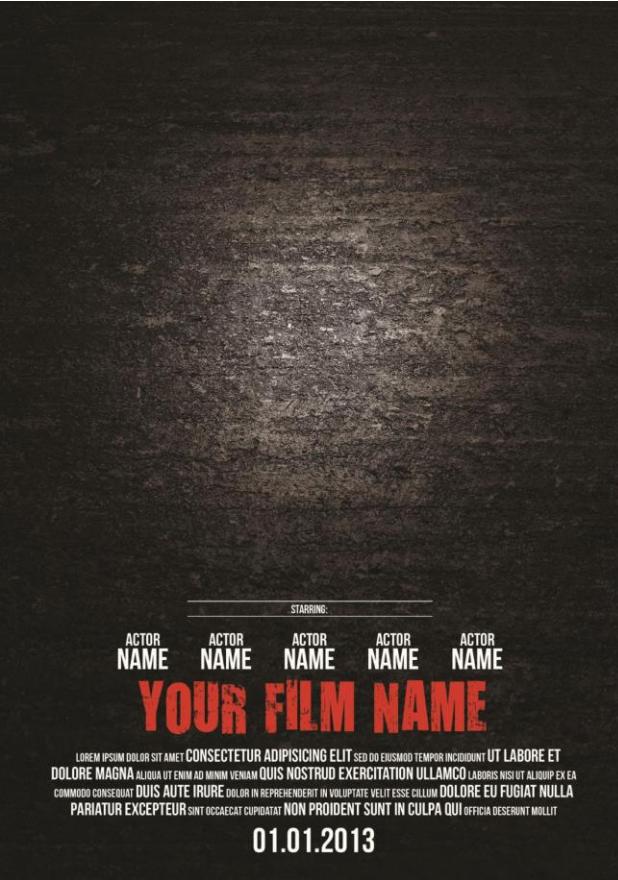
- Diagrams are your friends
- Images can also be your friend
- Direct your audience



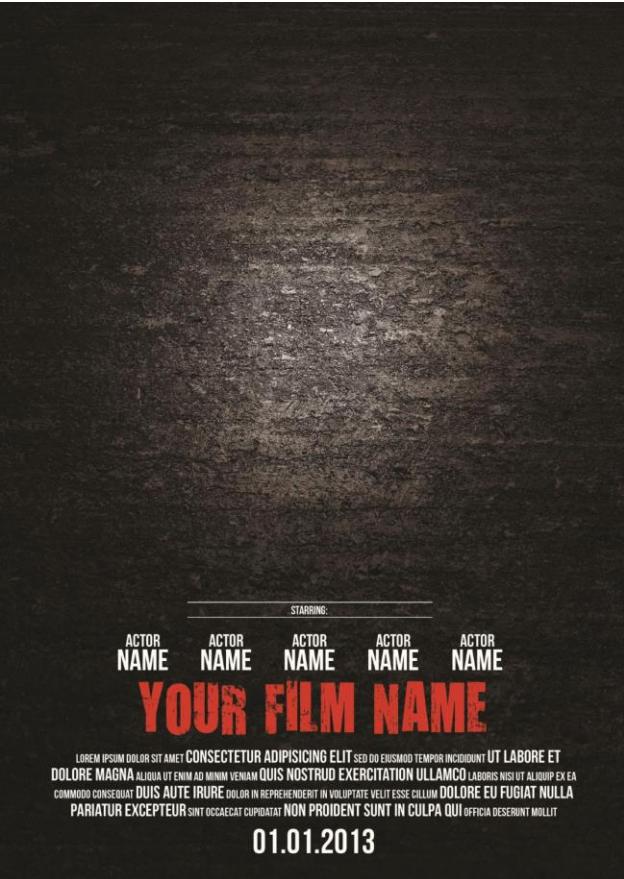
Composition rules

- Weight to the bottom
- Western reading: top to bottom, left to right
- Colors have (and should have) meaning
- Golden ratio
- Proportions $\frac{1}{2}$, $\frac{1}{3}$... “*a quien modula dios le ayuda*”
- Matrix vs. Follie systems

Weight to the bottom



Weight to the bottom



Weight to the bottom

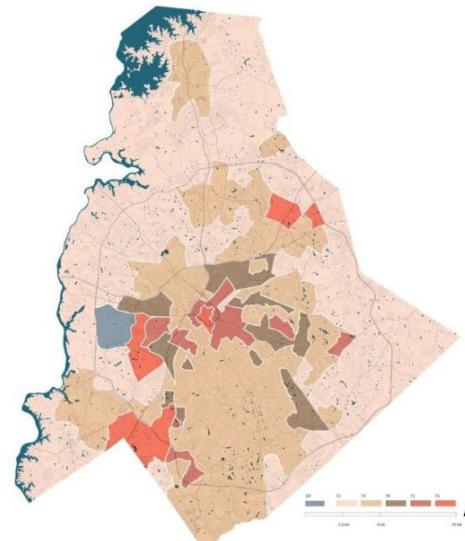
ETHICS AND/OF UNCERTAINTY: SPECULATIVE URBANISM AND THE RISE OF SYNTHETIC PEOPLE

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 research uses two 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, speculate on the stakes of this uncertainty for the creation of a just city.

CASE STUDY CITY: CHARLOTTE, NORTH CAROLINA

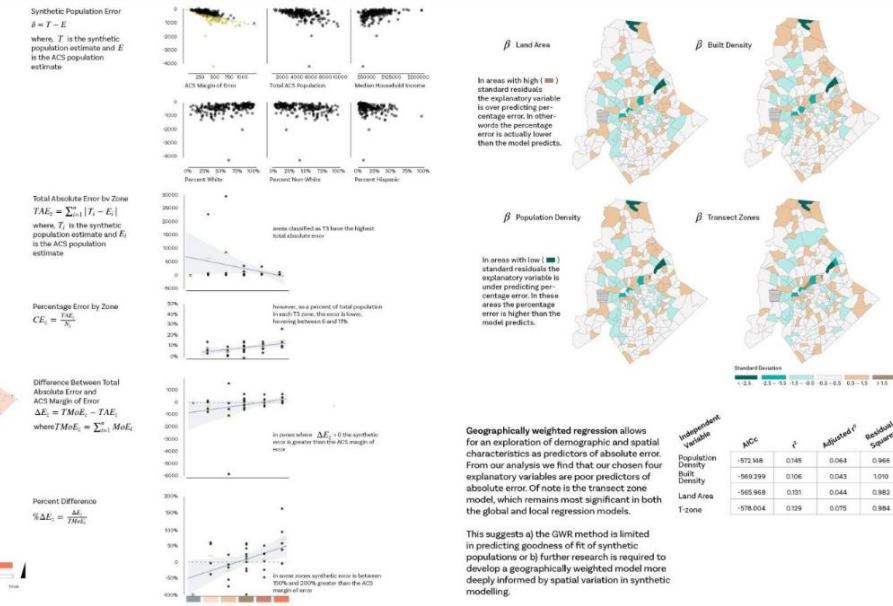


Synthetic populations' describe a fictitious but statistically representative urban populace. Materially, it is a dataset comprised of individual-level statistics calculated from aggregate data.

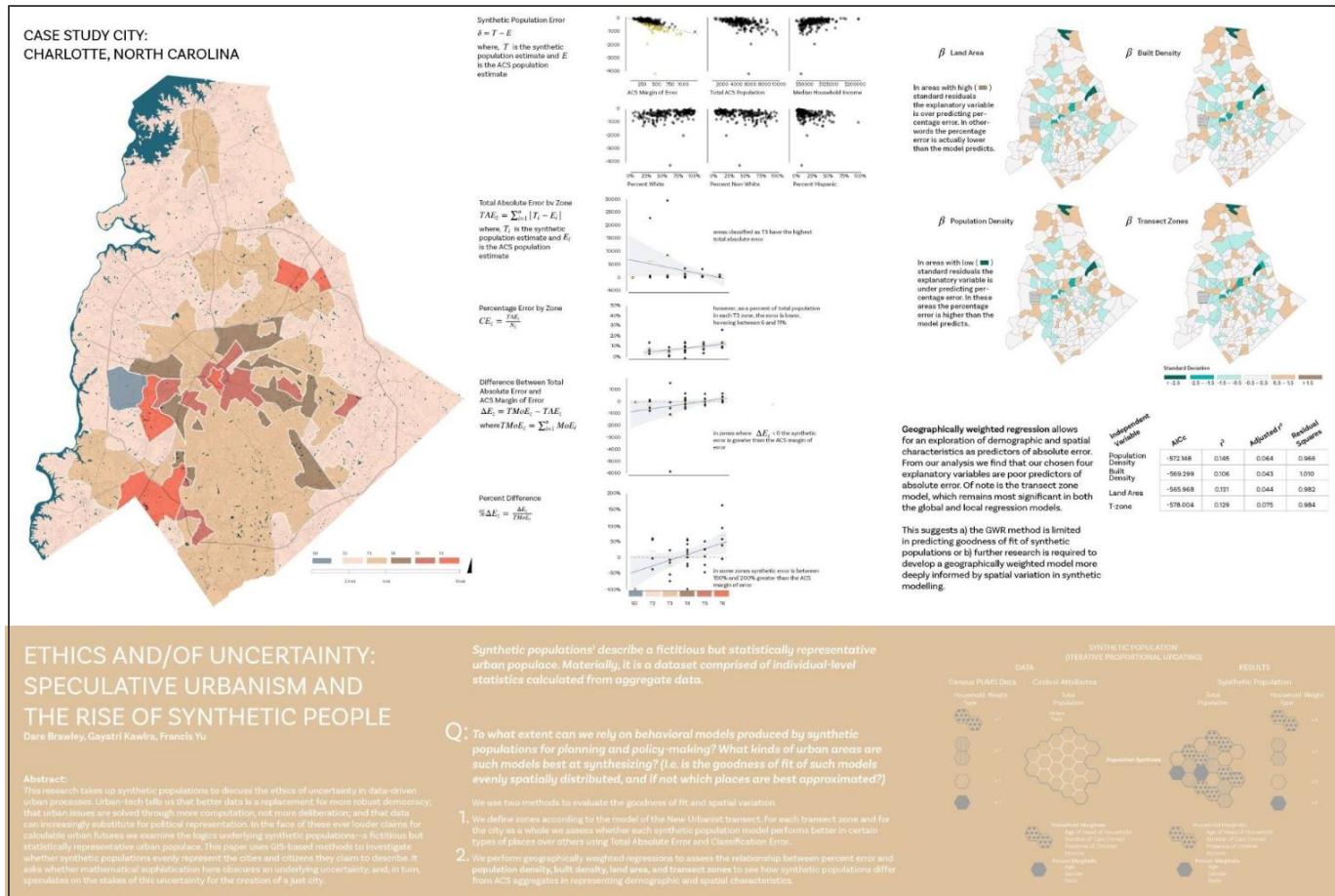
Q: To what extent can we rely on behavioral models produced by synthetic populations for planning and policy-making? What kinds of urban areas are such models best at synthesizing? (i.e. is the goodness of fit of such models evenly spatially distributed, and if not which places are best approximated?)

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

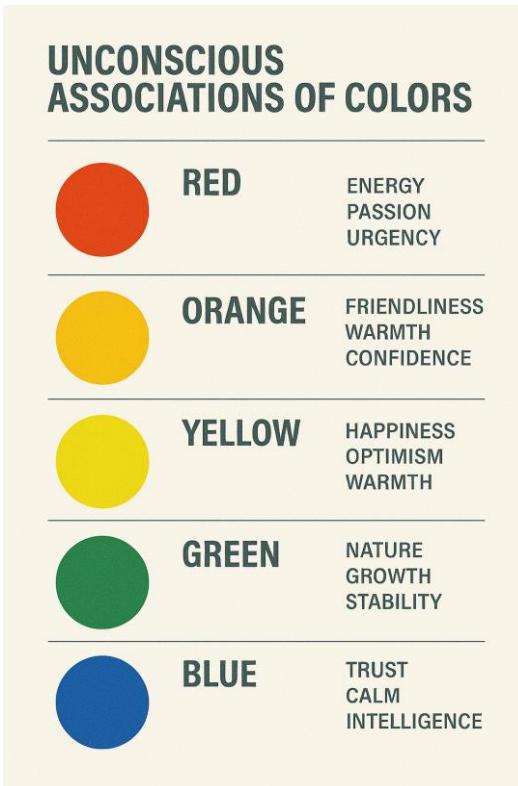
1. We define zones according to the model of the New Urbanist transect. For each transect zone and for the city as a whole we assess whether each synthetic population model performs better in certain types of places over others using Total Absolute Error and Classification Error.
2. We perform geographically 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.



Weight to the bottom



Colors have meaning



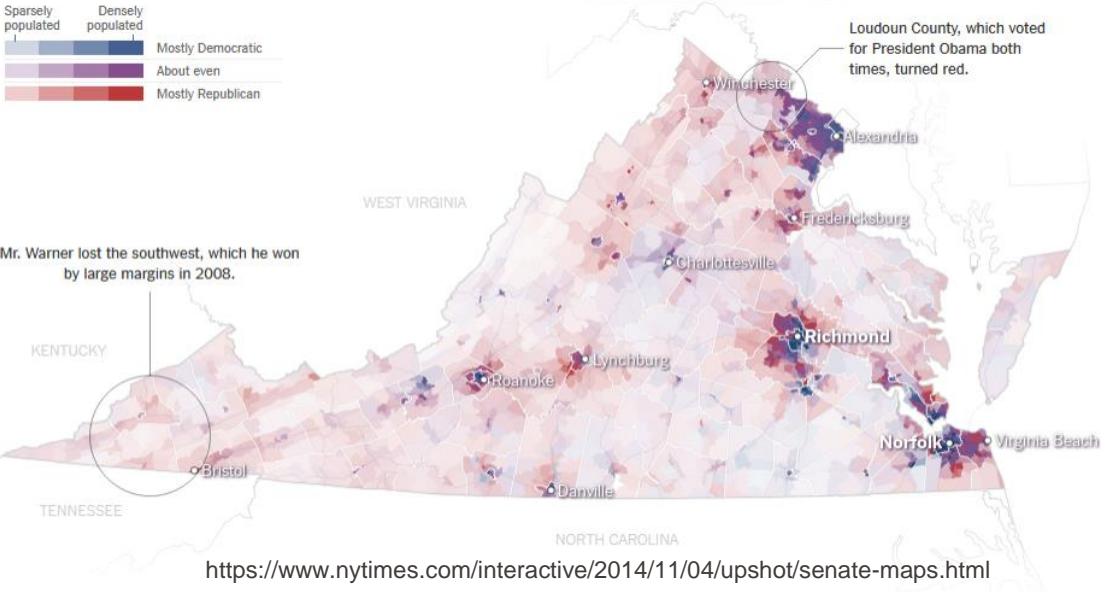
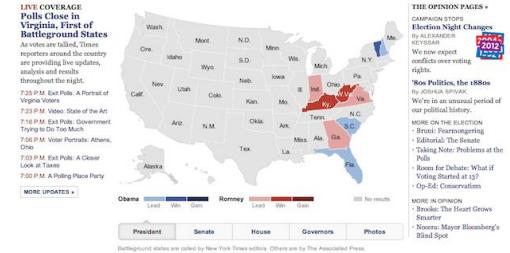
<https://www.webfx.com/blog/web-design/psychology-of-color-infographic/>
<https://etoninstitute.com/blog/infographic-colors-around-the-world/>
<https://www.color-meanings.com/color-symbolism-chart/>
<https://praxent.com/blog/color-psychology-brands-infographic>

<https://venngage.com/blog/infographic-design-the-dos-and-donts-of-color-selection/>
<https://venngage.com/blog/infographic-design-the-dos-and-donts-of-color-selection/>

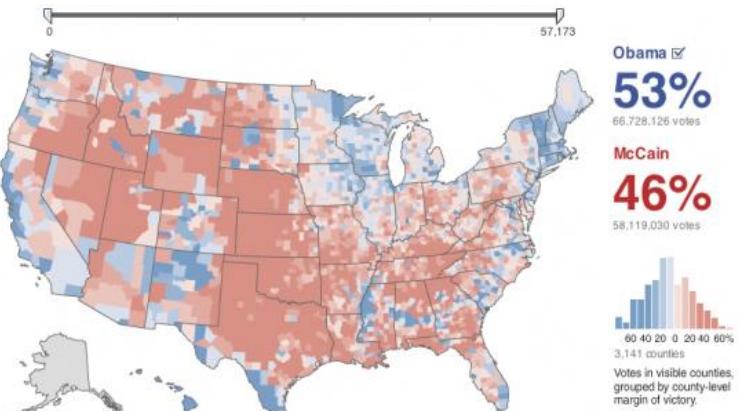
Colors have meaning



After Hard-Fought Campaign, Results Start to Trickle In

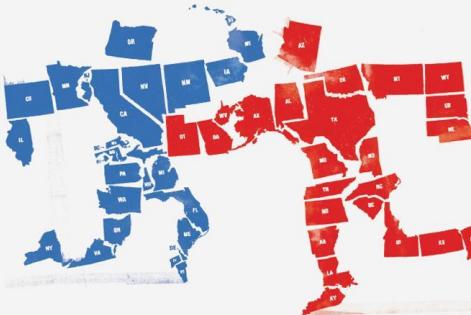


<https://www.nytimes.com/interactive/2014/11/04/upshot/senate-maps.html>



11 DAVE EGGERS reviews Jonathan Miles's new novel, 'Want Not'
12-14 LEGAL AFFAIRS New books by Dershowitz, Posner and Grisham
17 THE LUMINARIES Eleanor Catton's Man Booker Prize-winning novel
19 SPECIAL CHILDREN'S BOOKS ISSUE The Best Illustrated Books of 2013

Book Review



War of Umbrage

By Michael Kinsey

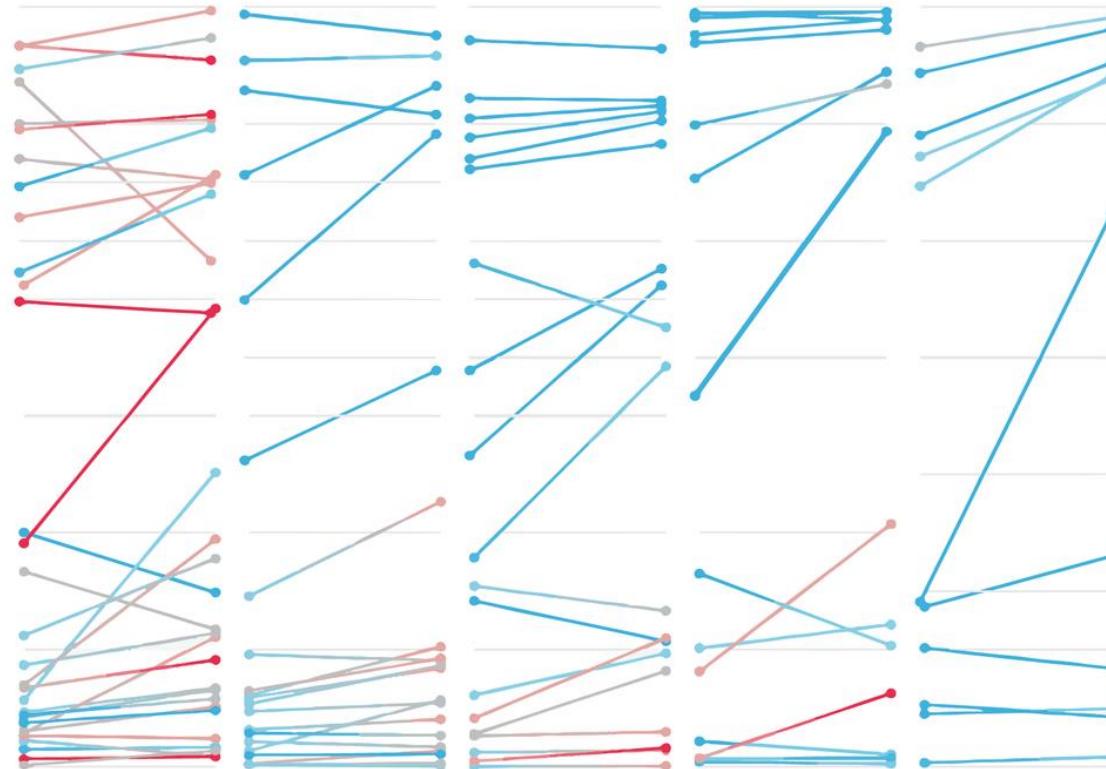
By TWILA D. KINSEY
"CHASMAL" IS THAT A WORD? Here, I'll use it in a sentence for you: "Romney had been turfed out of office in 2006, losing his re-election bid by a chasmal 38-point margin." According to Merriam-Webster, it is indeed a word, meaning "resounding a chasm." In other words, *Romney got beaten badly*. But in other words, *Romney got beaten badly*. But in other words, when "chasmal" is available?
How about "suasive," as in: "Romney was

of how jaundiced Stevens was about society — which made Stavov's advocacy for the gay as V.P. all the more "naïve." In the context, it must mean the same as "naïve," and you do save three characters, though, if you shorten it to "naïve."

Or what about "asciunate"? Or "bent"? Or "pyratic"? Or "hogger" and "omeness," or "coriacous" or "vomitous" or "euneticism"? Make sure to have a Scrabbdictionary nearby when you read "Double Down."

DOUBLE DOWN
Game Change 2012
By Mark Halperin and John Heilemann
Illustrated, 489 pp. The Penguin Press. \$39.95.

Colors have meaning



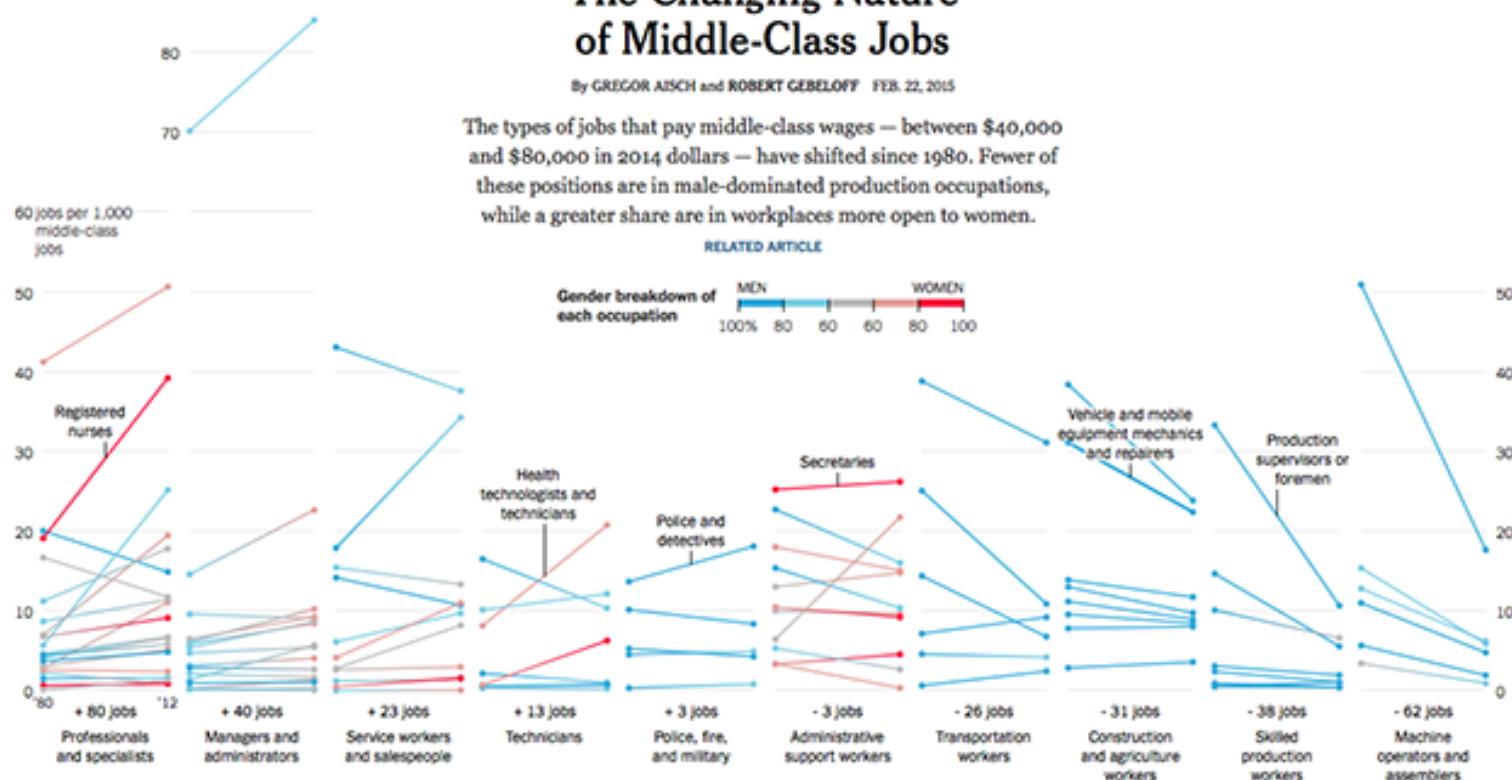
Colors have meaning

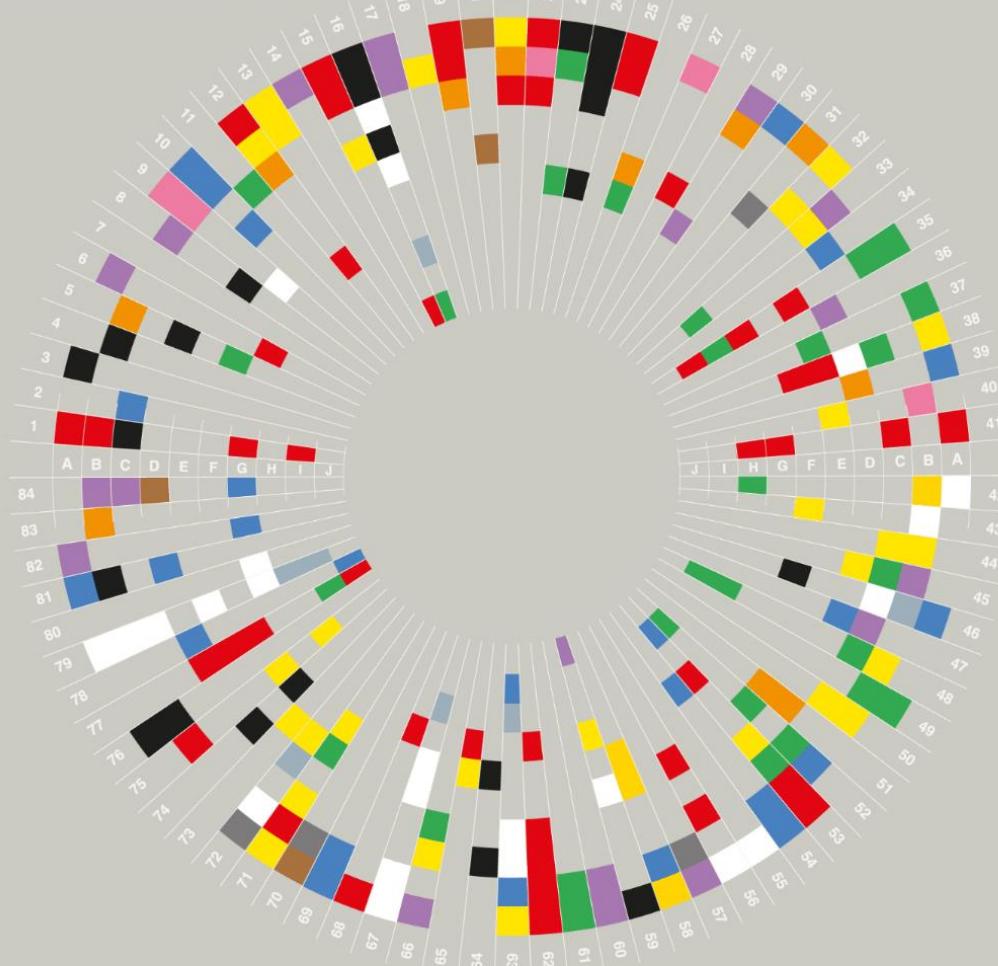
The Changing Nature of Middle-Class Jobs

By GREGOR AISCHE and ROBERT GEBELOFF FEB. 22, 2015

The types of jobs that pay middle-class wages — between \$40,000 and \$80,000 in 2014 dollars — have shifted since 1980. Fewer of these positions are in male-dominated production occupations, while a greater share are in workplaces more open to women.

RELATED ARTICLE





A Western / American	1 Anger	19 Desire
B Japanese	2 Art / Creativity	20 Earthy
C Hindu	3 Authority	21 Energy
D Native American	4 Bad Luck	22 Erotic
E Chinese	5 Balance	23 Eternity
F Asian	6 Beauty	24 Evil
G Eastern European	7 Calm	25 Excitement
H Arab	8 Celebration	26 Family
I African	9 Children	27 Femininity
J South American	10 Cold	28 Fertility
	11 Compassion	29 Flamboyance
	12 Courage	30 Freedom
	13 Cowardice	31 Friendly
	14 Cruelty	32 Fun
	15 Danger	33 God
	16 Death	34 Gods
	17 Decadence	35 Good Luck
	18 Deceit	36 Gratitude

37 Growth	55 Luxury	73 Royalty
38 Happiness	56 Marriage	74 Self-cultivation
39 Healing	57 Modesty	75 Strength
40 Healthy	58 Money	76 Style
41 Heat	59 Mourning	77 Success
42 Heaven	60 Mystery	78 Trouble
43 Holiness	61 Nature	79 Truce
44 Illness	62 Passion	80 Trust
45 Insight	63 Peace	81 Unhappiness
46 Intelligence	64 Penance	82 Virtue
47 Intuition	65 Power	83 Warmth
48 Religion	66 Personal power	84 Wisdom
49 Jealousy	67 Purity	
50 Joy	68 Radicalism	
51 Learning	69 Rational	
52 Life	70 Reliable	
53 Love	71 Repels Evil	
54 Loyalty	72 Respect	

■ Yellow
 ■ Grey
■ Gold
 ■ Silver

Clean Development Mechanisms Pre Assessment Tool – CDM-PAT: The e-tool steering towards the reduction of CDM transaction costs

Flamis A., Doukas H., Patlitzianas D. K. and Psarras J.

Management & Decision Support Systems Laboratory, Department of Electrical and Computer Engineering National Technical University of Athens, Iroon Polytechniou 9, 157 73, Athens GREECE

1. Scope

CDM - Pre-Assessment Tool (CDM-PAT):

- > Project developers will be able to quickly explore whether their project idea would qualify for eventual implementation under the CDM.
- > A freely accessible web-based project assessment tool which navigates project developers through four pre-assessment stages for the selection of promising CDM projects.
- > The clear menus and the user-friendly structure will also facilitate users who are less familiar with the CDM procedures and modalities.

2. CDM-PAT Structure

Modules:

- 1. Check of criteria set by the Kyoto Protocol and Montreal Protocol
- 2. Project cash flows and Financial Indicators
- 3. Project risk
- 4. Barriers to the project implementation
- 5. Effects to selected Sustainable Development Indicators

Typical Outputs:

- Financial Feasibility
- Risk Analysis
- Advisory Report
- Scale

3. Sustainable Development (SD) Assessment

For every dimension of sustainable development a set of 11 internationally accepted criteria is used:

- > Pair wise Comparison: The project developer is compiling the criteria importance by comparing each one with the others.
- > Use of the Multi-Attribute Utility Theory (MAUT): $U(P) = \sum_{i=1}^n u_i(x_i) \cdot w_{i,n}$

4. CDM-PAT Reports

Two customized reports: a Brief and an Extensive:

- > A first assessment of the project's financial viability
- > The impact of the risks identified
- > The additionality of emission reductions
- > Project's likely contribution to SD
- > An overall recommendation to the project participant as a CDM investment

5. Application to projects in the Mediterranean

CDM-PAT has been applied in 21 CDM project proposals:

- > 7 Mediterranean countries
- > 3 Solar, 6 Wind, 6 Energy Management, 1 Fuel switch to natural gas and 5 Waste

CDM-PAT Architecture

CDM-PAT architecture consists of four main components:

1. System Mapping
2. Monitoring
3. Assessments
4. Sustainable Investments

6. Conclusions

> The recommendations of CDM-PAT on potential CDM projects in the Mediterranean region were favourable for:

- ✓ Renewable Energy Sources projects
- ✓ Energy Efficiency Technologies
- ✓ Projects that contribute to the promotion of sustainable development, a cleaner environment

> CDM-PAT may provide essential services to:

- ✓ Potential CDM investors
- ✓ Host countries
- ✓ CDM funding organizations

Complex CDM-PAT forms

Source: Diomidis Spinellis; Copyright Licens

WHAT IS MY NEIGHBORHOOD? The impact of boundary definition in the measurement of socio-economic and environmental characteristics in urban systems

Melissa Pang, Glòria Serra-Coch, François Golay, Marie Hecher, Claudia R. Binder

GOAL Shed light on the impact of neighborhood boundary definitions on urban systems' analysis

Compare three conceptualizations of neighborhoods: (i) functional neighborhoods and (ii) activity spaces...

...to understand potential data biases in sustainability, livability or well-being assessments that can, in turn, affect policy making and urban planning.

METHODOLOGY

1. DATA COLLECTION

conceptualization of neighborhood:

conceptualization of urban system:

secondary sources:

2. BOUNDARY CREATION

similarity of urban form

neighborhood design criteria

individually drawn

3. PERCEIVED

Primary sources:

4. COMPARISON

1. Selection of representative functional neighborhoods

2. Aggregation of urban characteristics to encompass perceived neighborhood and activity space

Inset: same type of neighborhood - different people

Size and compactness differences

2. Aggregation of urban characteristics

Interfering between different types of neighborhoods

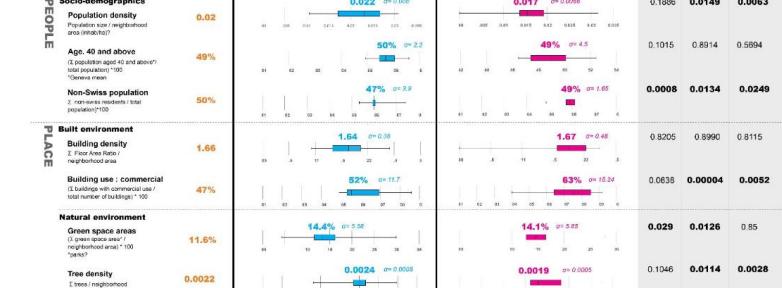
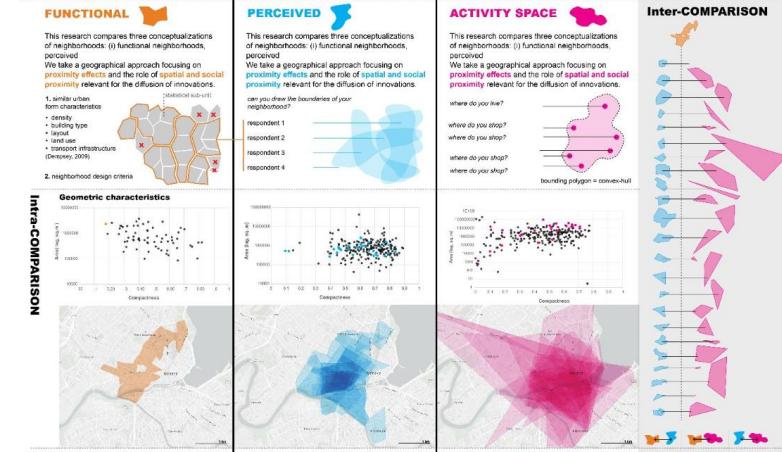
Size and compactness differences

2. Aggregated characteristics differences

TAKE-AWAYS

- Interpersonal communication
- Individual and mutual exchanges
- The quality of neighborhood as well as its compactness and effectiveness
- Understanding existing infrastructure conditions and their regional differences
- A clear and flexible regulation framework
- A straightforward bundled business model
- Interacting and coordinating key actors: energy utilities, energy technology providers, public entities, institutional investors, engineers

Inter-COMPARISON

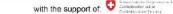


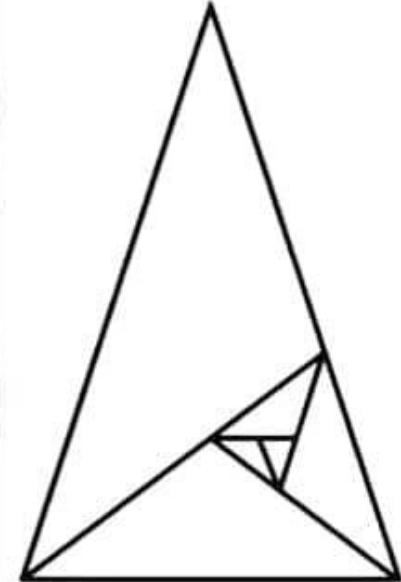
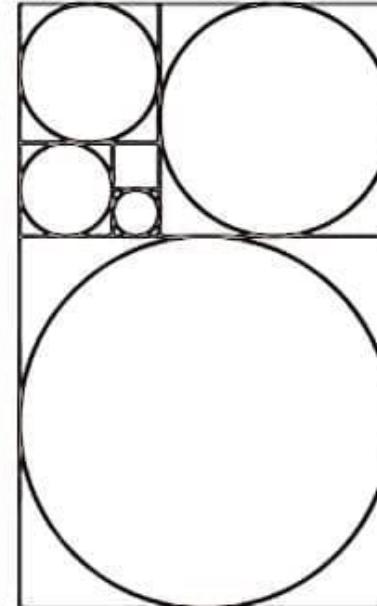
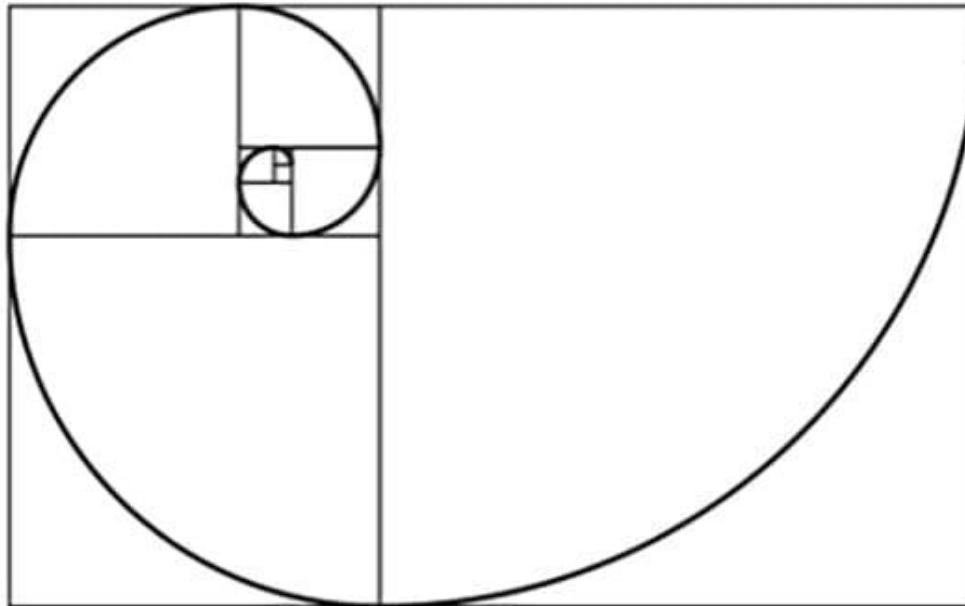
Contact: Melissa Pang / Herus | melissa.pang@epfl.ch

This project (105087-05) is carried out with the support of the Swiss Federal Office of Energy (SFOE).

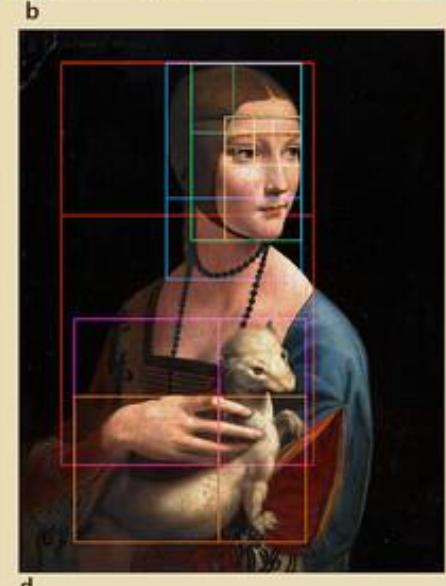
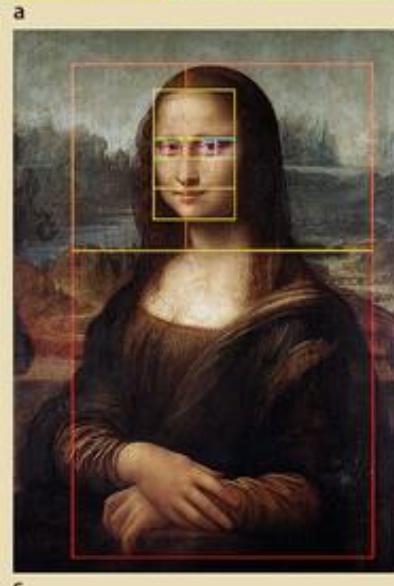
The authors of this paper bear sole responsibility of its execution and findings.

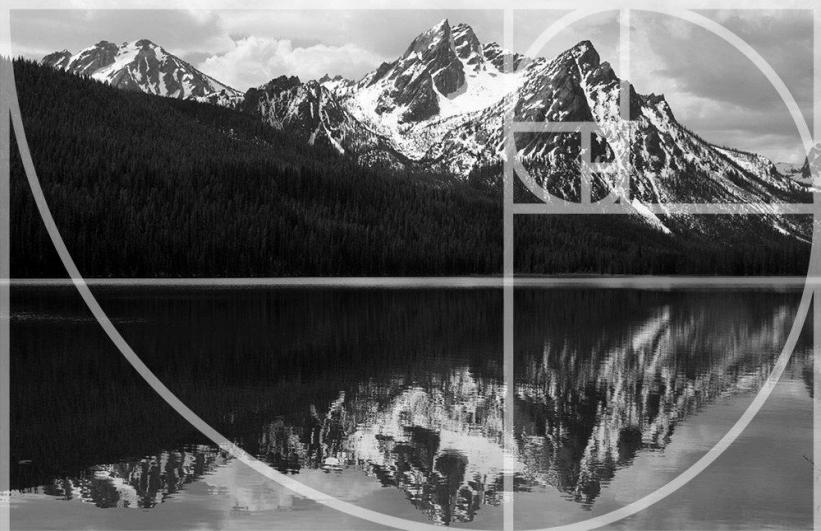
with the support of:

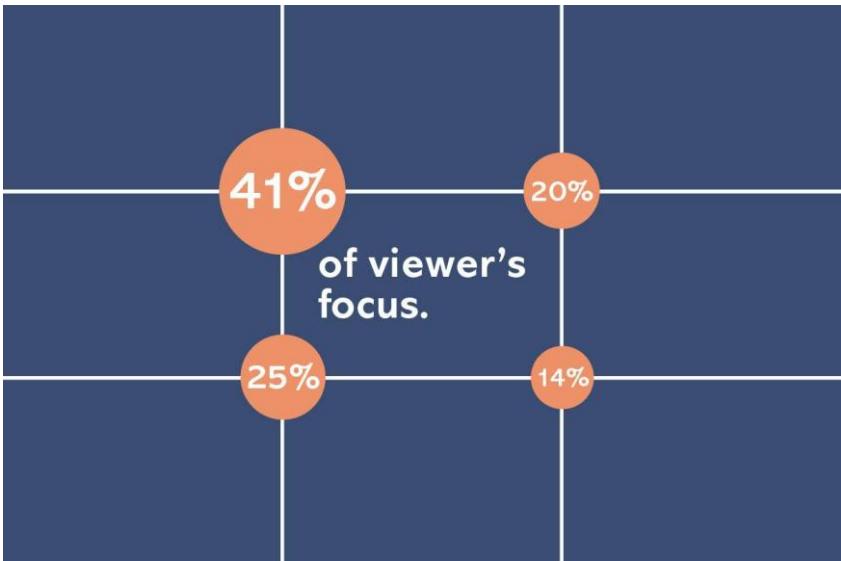


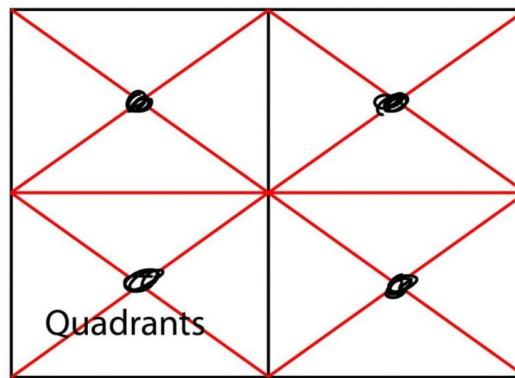
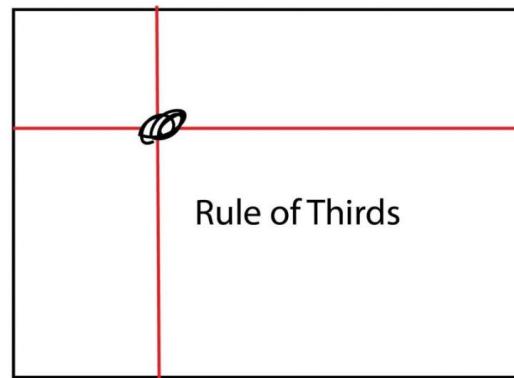
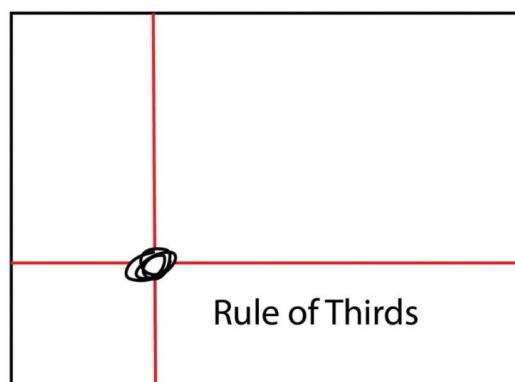
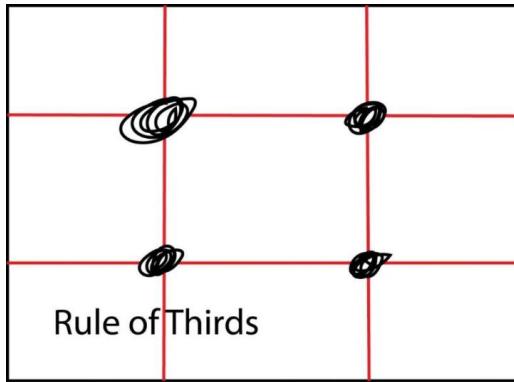








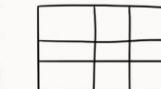




A BEGINNERS GUIDE TO COMPOSITION



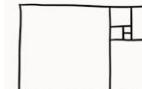
Rule of Thirds



Golden Section



Golden Triangles



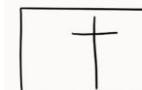
Spiral Section



Golden Spiral



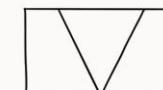
Harmonious Triangles



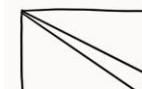
Cross



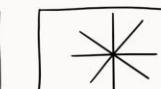
Focal Mass



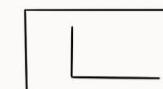
V-Arrangement



Diagonal



Radial



L-Arrangement



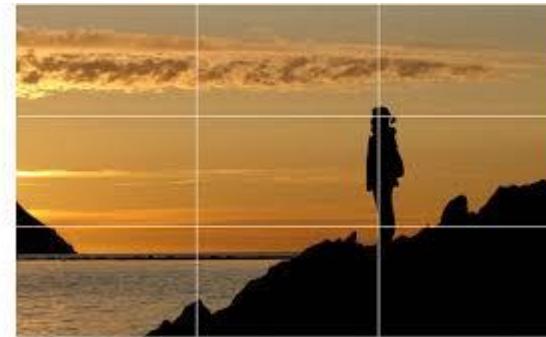
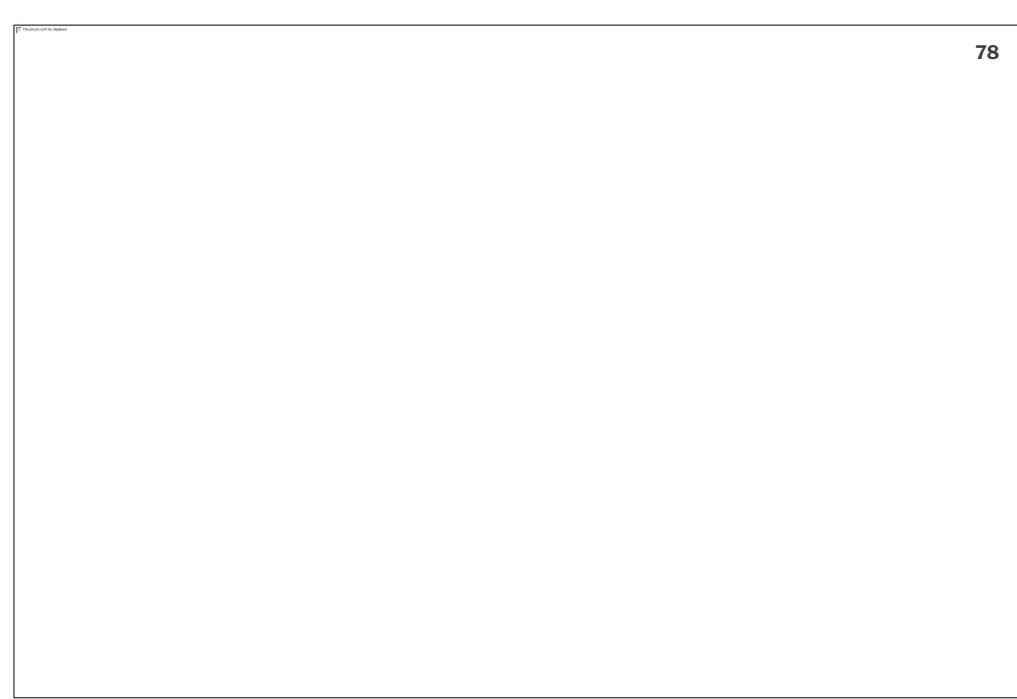
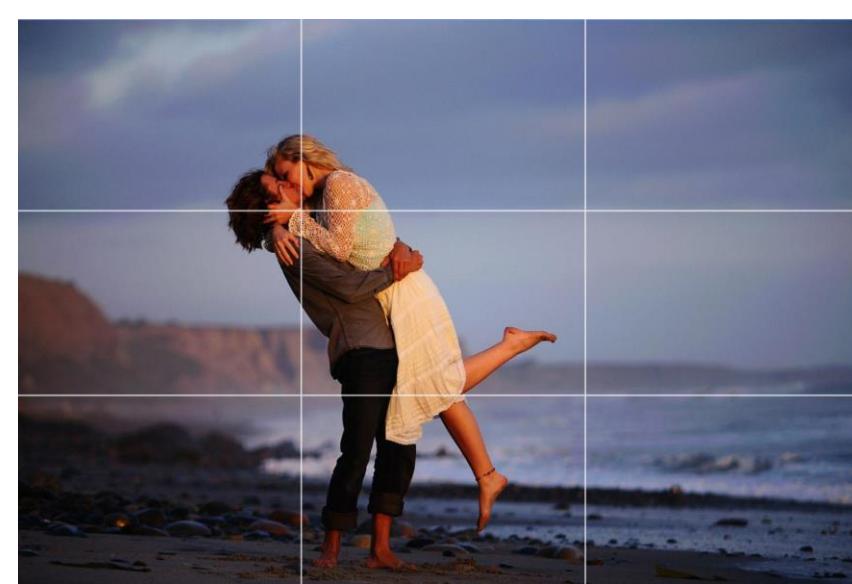
Compound Curve



Pyramid

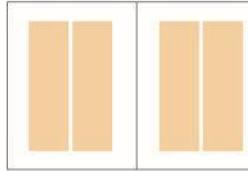
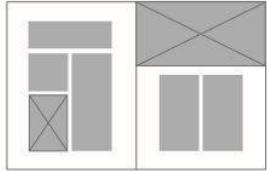


Circular

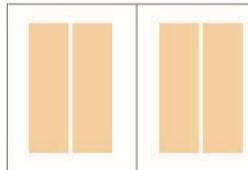
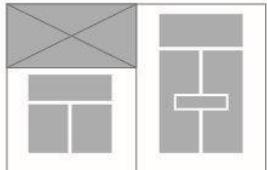


Other ratios

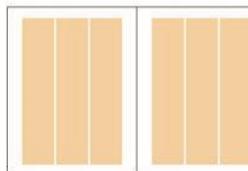
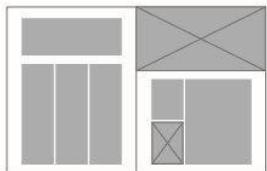
Page Layout Grids



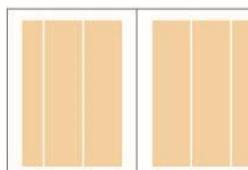
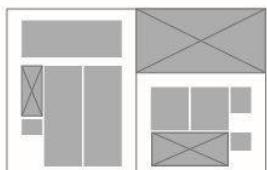
2 Column Grid



2 Column Grid

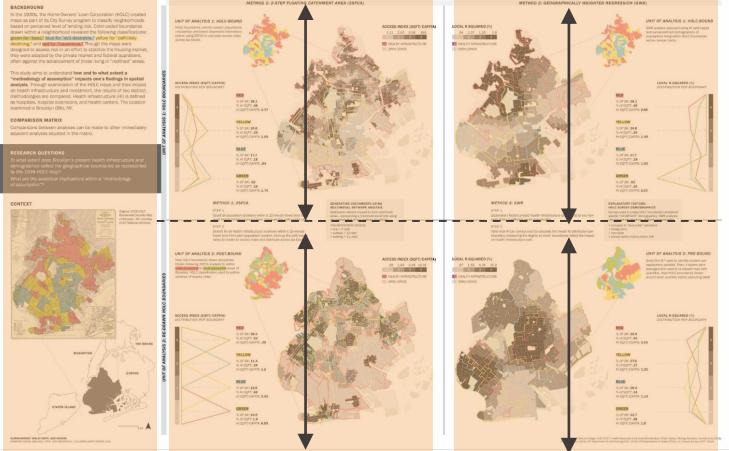


3 Column Grid

Diagram: www.gridsumo.com3 Column
Asymmetrical
Grid

ACCESSIBILITY & ASSUMPTION

Examining methodological assumption and the impact of HLOC security map boundaries (1938) on health infrastructure in Brooklyn, NY (2019)



the LIBERTY BELL: cracked & packed

PHYSICAL INDICATORS OF GERRymandering

MEASURES OF COMPACTNESS

POLITICAL SUBDIVISIONS

REGRESSION INDICATORS OF GERRymandering

STANDARD RESIDUALS

SOCIAL INDICATORS OF GERRymandering

GEOPOLITICALLY INFLUENCED DIVISIONS

GEOPOLITICAL DIVISIONS

REGRESSION INDICATORS OF GERRymandering

STANDARD RESIDUALS

Drawing neighborhood boundaries in Queens, NY

A.F. López Zamora | J. A. Romeo | G. Serra Coch | M. Uchida, Advanced Spatial Analysis, Spring 2018, MS UR, 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?



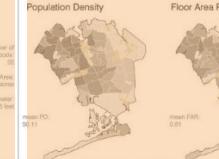
2. RESULTS

NTAs
Number of Neighborhoods: 95
Mean Area: 1000 acres
Mean Perimeter: 47913 feet



3. COMPARE ACROSS

Population Density
Floor Area Ratio (FAR)
Mean PD: 9011
Mean FAR: 0.81



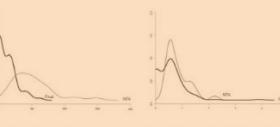
4. CONCLUSION

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 comparing from the NTAs and modifying them when our methods were pointing out an inconsistency.

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

Population Density
Floor Area Ratio (FAR)



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

METHOD 2. DIVERSE
where people are diverse
land use dissimilarity index
multi group Shannon entropy index
 $H = \sum_{i=1}^n [f_i \ln f_i]$

+ Iterative
Getis-Ord Gi* Hotspot

METHOD 3. SIMILAR
where the built environment is similar
clustering
grouping similar built environment

Calinski-Harabasz
Pseudo F-Statistic
 $(R/(n-1))(1-R^2/n)$

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

Number of Neighborhoods: 95
Mean Area: 1022 acres
Mean Perimeter: 4622 feet



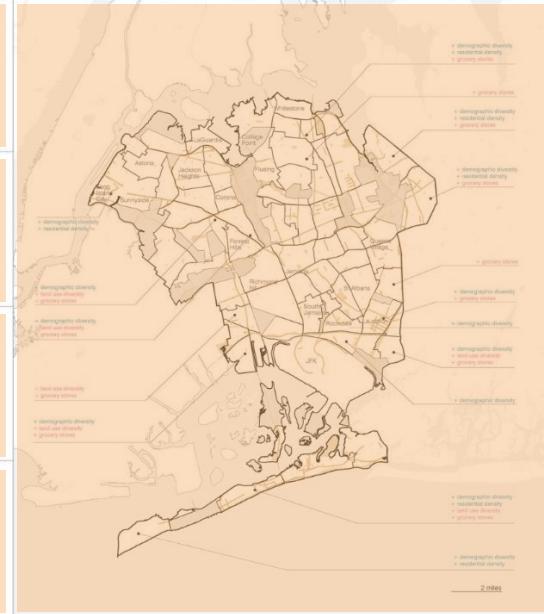
Number of Neighborhoods: 95
Mean Area: 404.8 acres
Mean Perimeter: 3083 feet

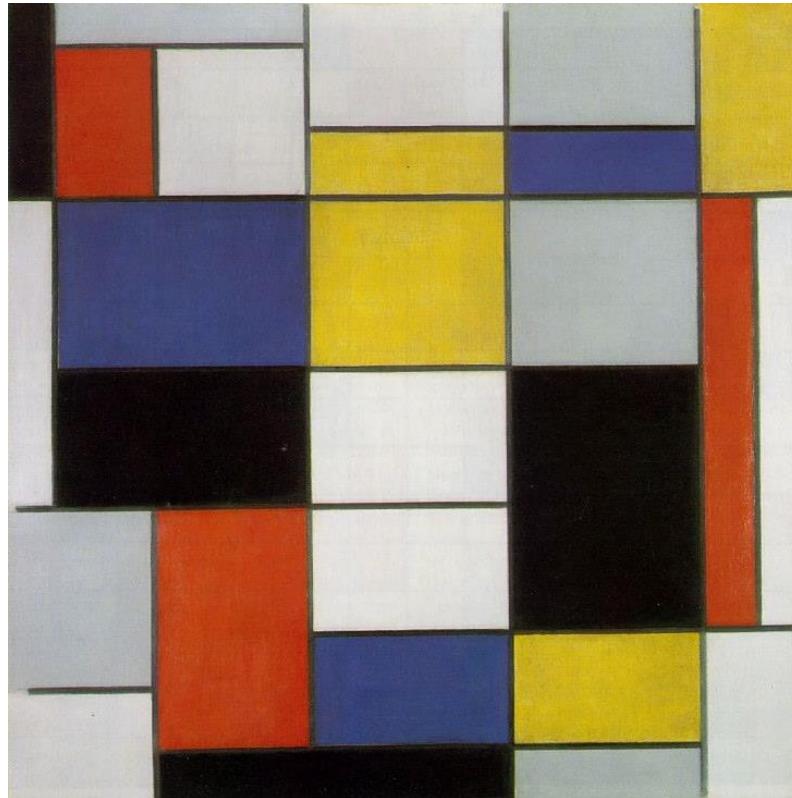


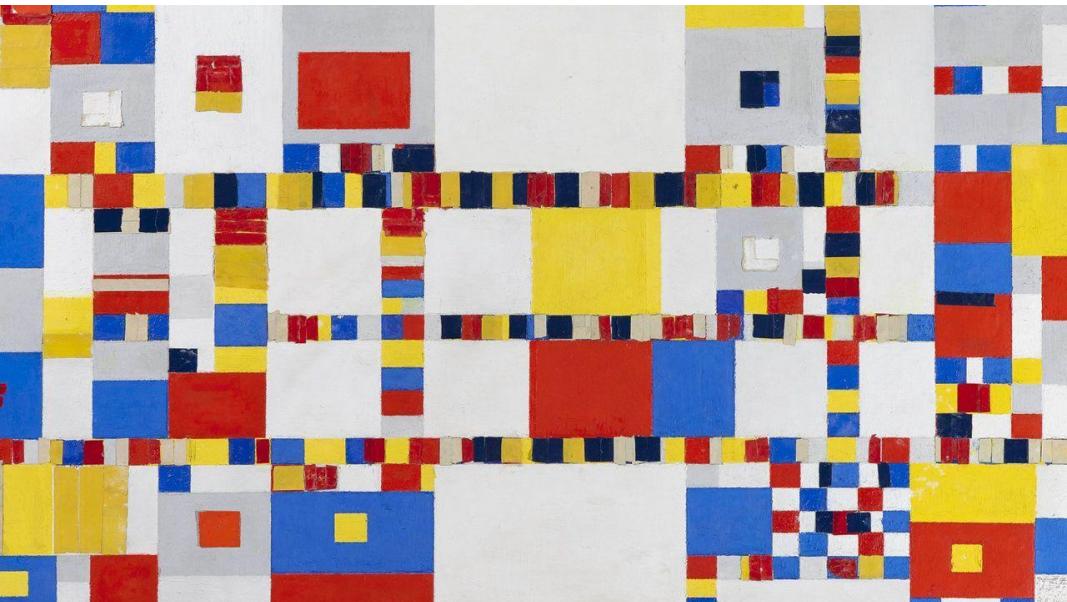
Number of Neighborhoods: 95
Mean Area: 404.8 acres
Mean Perimeter: 3083 feet



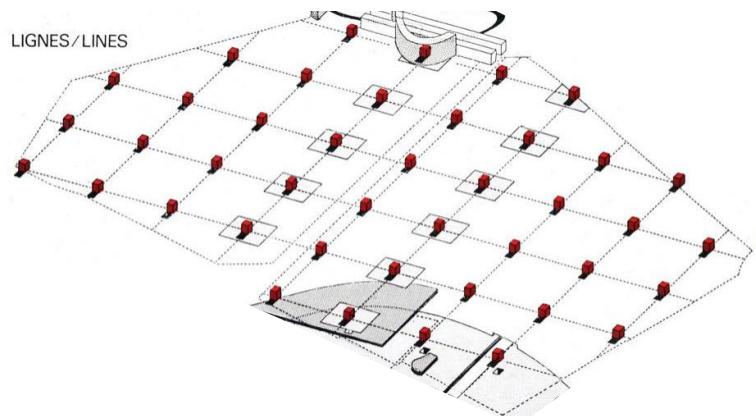
Number of Neighborhoods: 95
Mean Area: 1030 acres
Mean Perimeter: 3570 feet



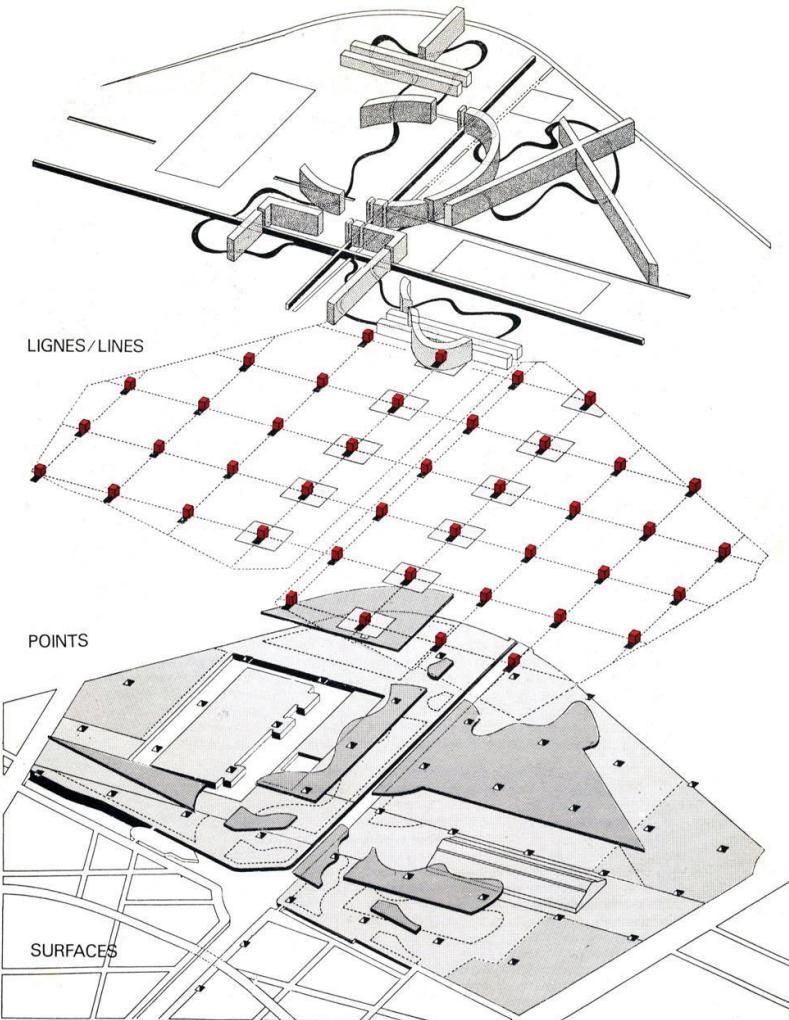




Matrix vs. Folie



LIGNES/LINES



LIGNES/LINES

POINTS

SURFACES

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

Drawing neighborhood boundaries in Queens, NY

Á.F. López Zamora | J. A. Romeo | G. Serra Coch | M. Uchida . Advanced Spatial Analysis, Spring 2016, MS UR 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?



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
($R^2(\text{Inc-1})/(1-R^2(\text{Inc}))$)

METHOD 2. DIVERSE
where people are diverse
land use dissimilarity index
multi-group Githens entropy index
 $H = \sum_{i=1}^n (H_i E_i) / E$

+ 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 Length
Building Height
Lot Area
Lot Width
Lot Length
Street Width
Street Length

METHOD 3. SIMILAR
where the built environment is similar
clustering
grouping similar built environment

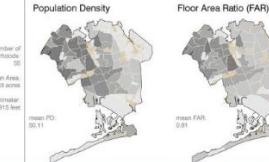
Calinski-Harabasz
Pseudo F-Statistic
($R^2(\text{Inc-1})/(1-R^2(\text{Inc}))$)

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. RESULTS



3. COMPARE ACROSS



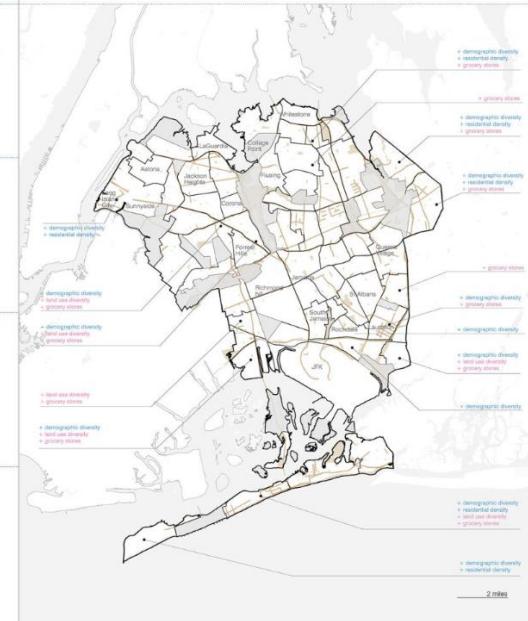
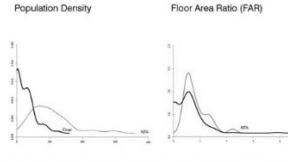
4. CONCLUSION

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 neighborhood map combines the 4 methods. The boundaries were produced by departing from NTAs, and this is where our methods were pointing out an inconsistency.

Then we classified the areas in:

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



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?

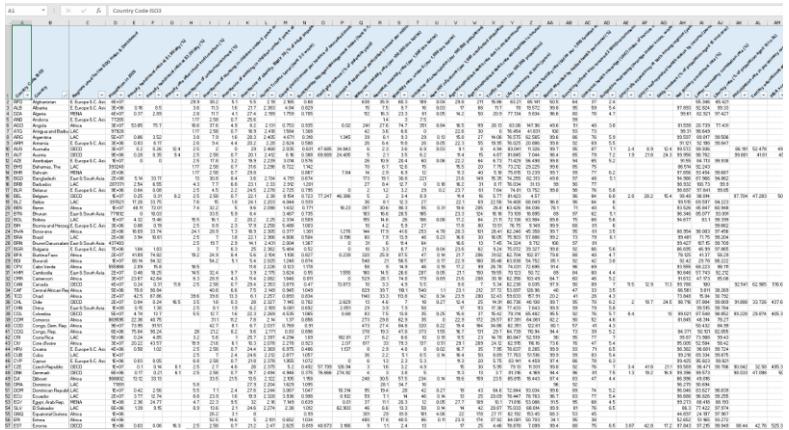
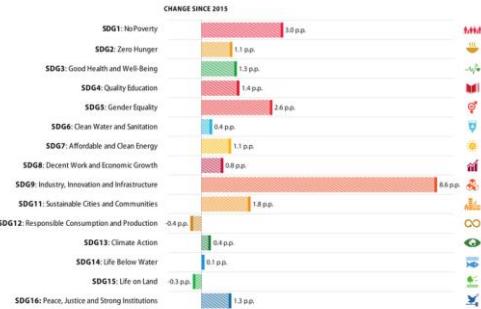


Figure 2.7 | Progress in the world for each SDG since 2015 in percentage points



Note: Population-weighted averages. Insufficient data for SDG 10 (Reduced Inequalities) and SDG 17 (Partnerships for the Goals). Time series data for SDG 12 (Responsible Consumption and Production) is only based on the indicator "Electronic waste (kg/capita)".

Source: Authors' analysis

Data
visualization
makes
information
accessible

For each figure, think about:

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

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

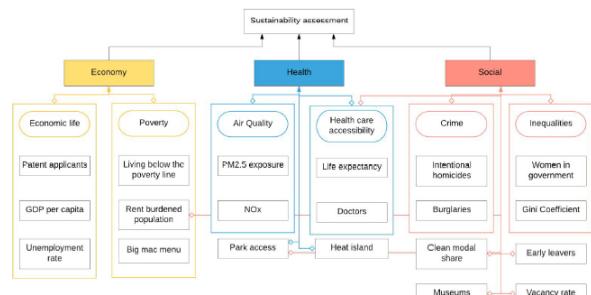


Figure 2: Conceptual Framework

	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

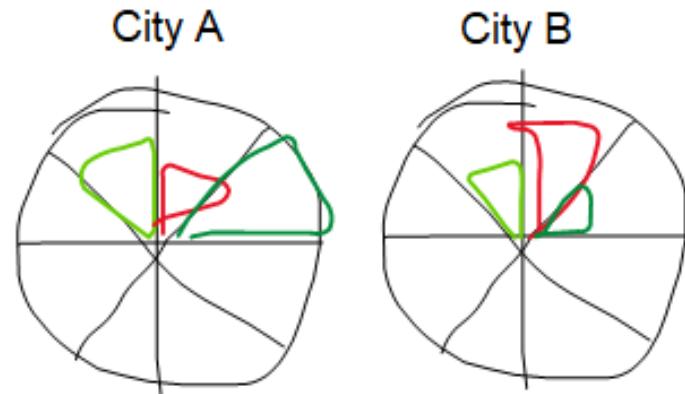
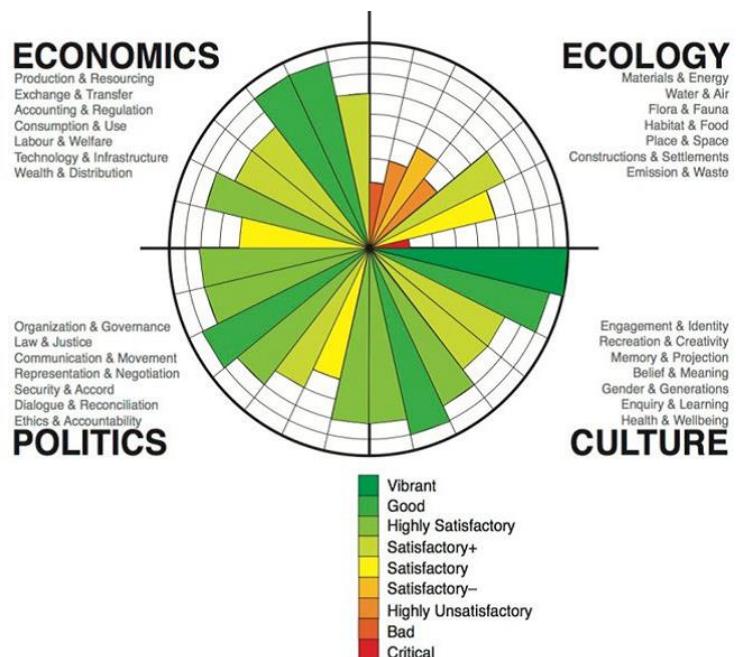


Figure 2: Scheme - Sustainability Conceptual Framework

Example: Result of your SA

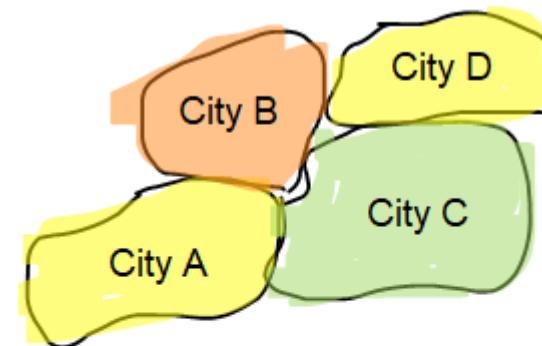
- Purpose (the why) Illustrating which of the selected cities (A, B, C and D) is the most sustainable
- Content (the what) Comparison of the sustainability score of four cities (per domain? per goal? per indicator? per city?)
- Structure (the how) ?
- Formatting (everything else) ?

Examples



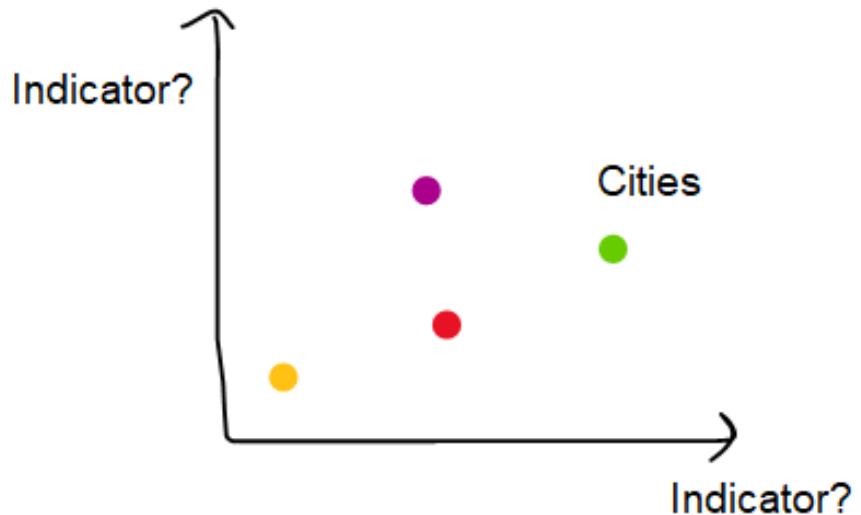
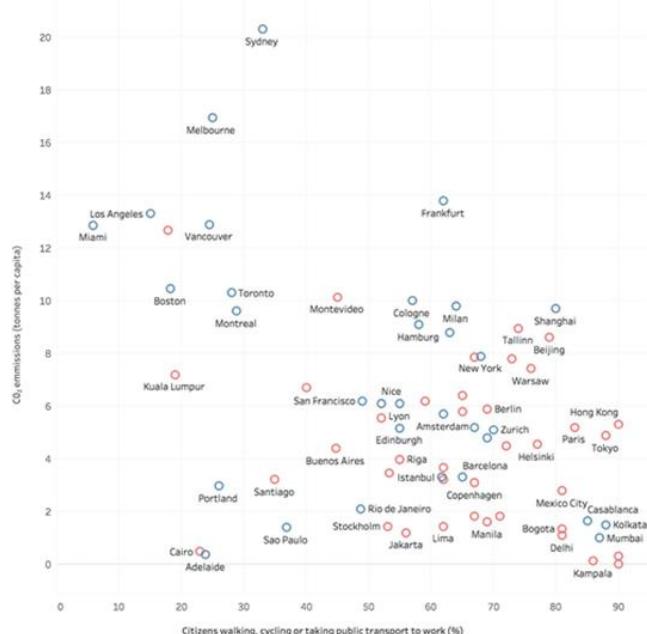
Domains?
Goals?

Examples

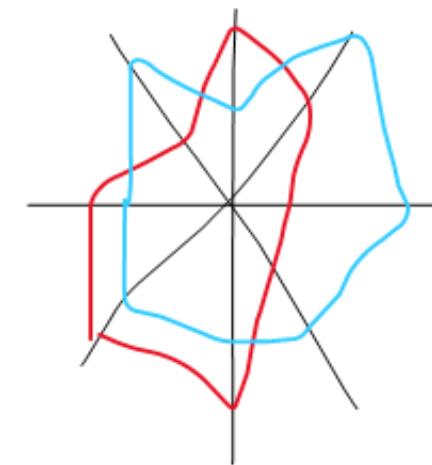
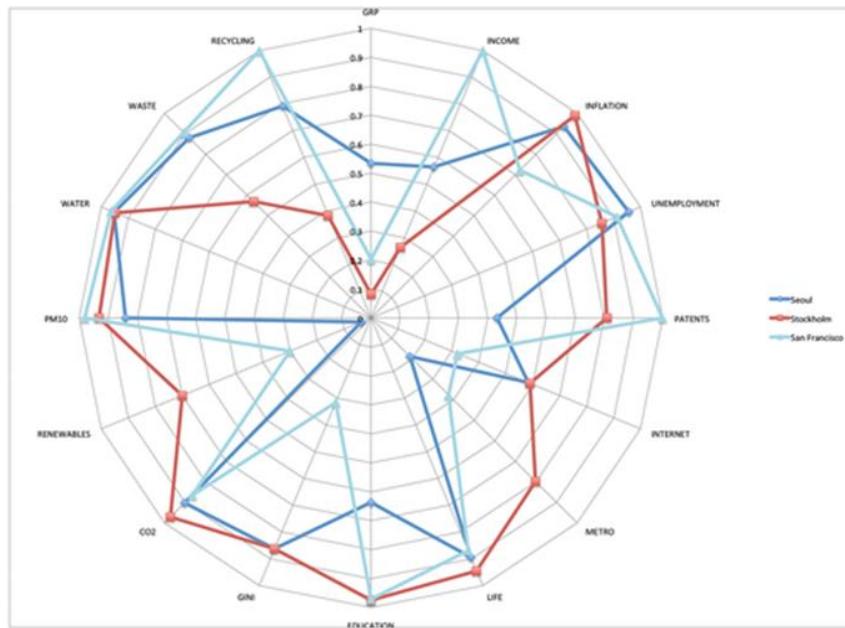


Total sustainability score?
Domains?
Goals?
Indicators?

Examples



Examples

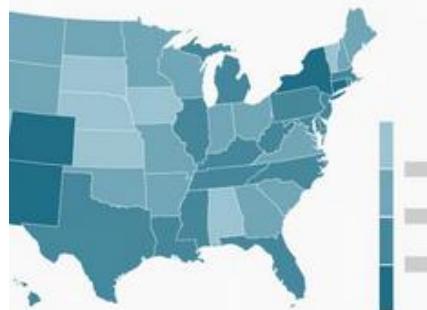


Domains?
Goals?
Sensitivity analyses?

How to choose your colors?

color schemes

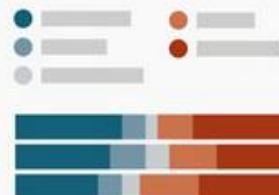
SEQUENTIAL



CATEGORICAL

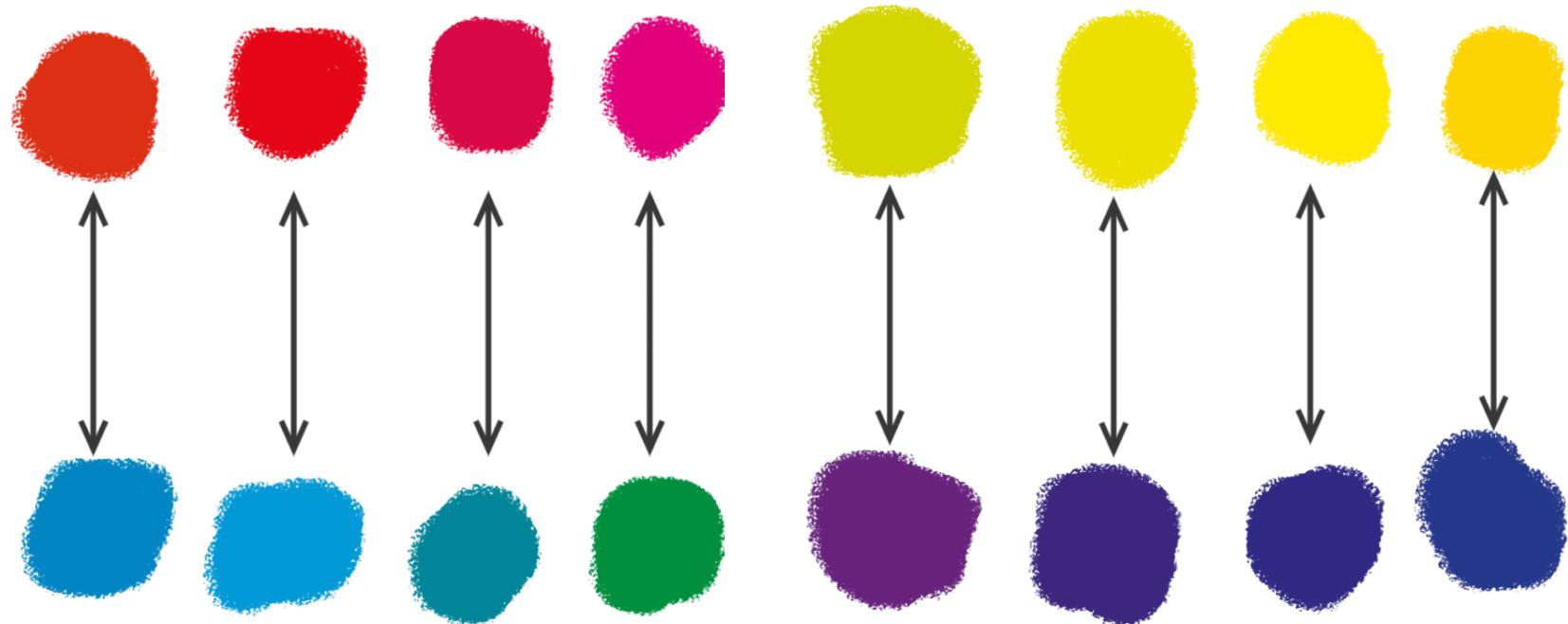


DIVERGING



How to choose your colors?

Complementary colors



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

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