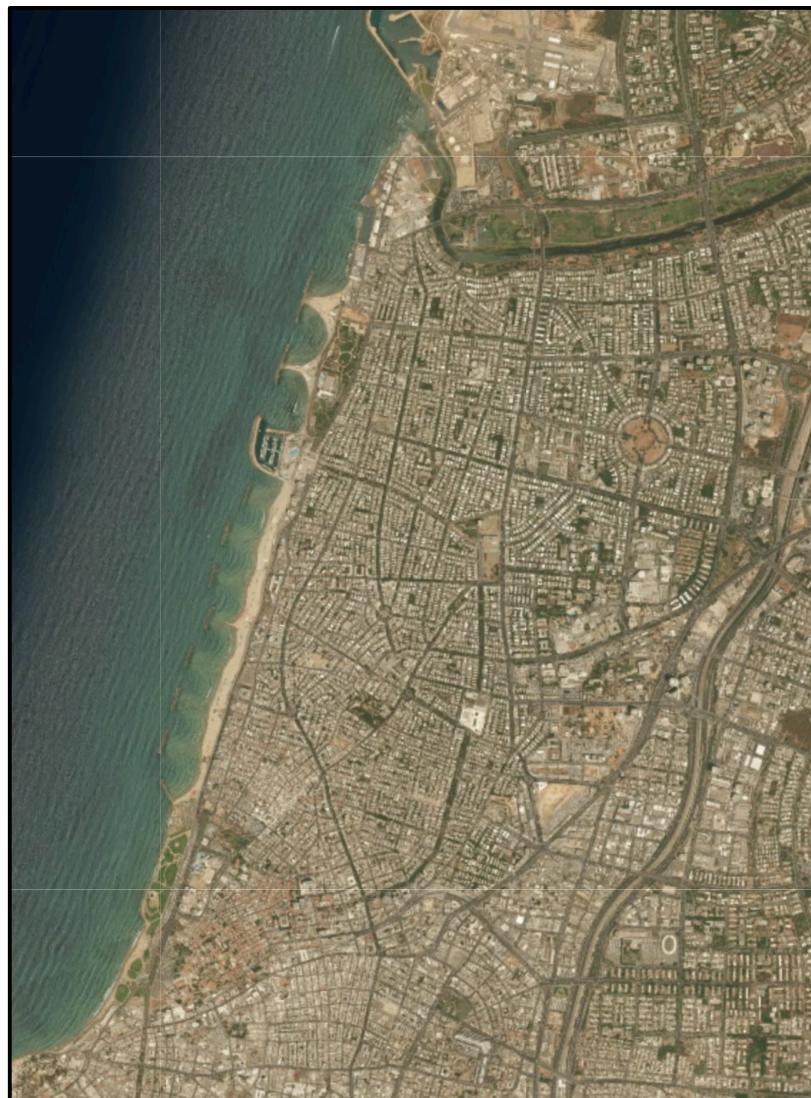


Tel-Aviv city center Rezoning Evaluation



Tel-Aviv City Center (source: Google Earth)

Final Paper draft

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Introduction

Research motivation and objective

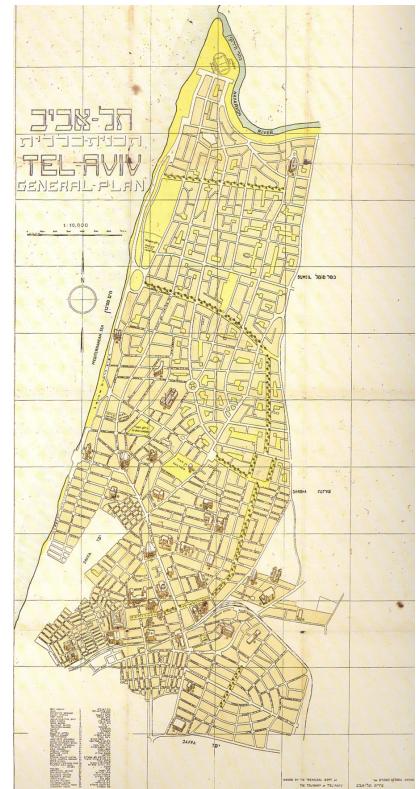
Tel Aviv city had recently (January 2018) approved a new zoning ordinance for one of its most desirable areas, Precinct no.3, also known as “*The old North*” neighborhood. Mostly built in the 1930’s, precinct 3 is one of the four precincts of Tel Aviv city center (precincts 3, 4, 5 and 6) and is known with its distinguished built environment of Bauhaus buildings and “Garden City” urban planning. The precinct also contains a meaningful part of the “White City” zone, declared a world heritage site by UNESCO at 2003. The rezoning ordinance, *Plan 3616a*, incorporates different historical ordinances of the area, and incentivizes developers to renew buildings by offering additional floor space. Since its first phases through approval, the new plan was publicly criticized by developers, planners and residents for being too restrictive to economically allow its utilization. This research aims to evaluate the economic feasibility of the new ordinance on the parcel level, and the future Floor-Area ratio (FAR) it would formulate across the precinct if fully utilized.

History of Tel-Aviv’s zoning

“Geddes Plan” (1925) and “The White City” UNESCO declaration (2003)

The typical Tel-Aviv ‘house’ and its resulting urban scape are the products of the convergence between the plan prepared for Tel-Aviv in 1925 by Patrick Geddes, ‘Bauhaus’ architecture practice brought to Palestine by European architects, and social, economic and political realities regulating the developing city during the British Mandate [1]. Geddes Plan specified a “Garden City” environment, restricted follows low density and height restrictions of the buildings, particularly in the residential areas. The “typical building” was defined as of a parcel sized $560m^2$, 3-4 stories, and setbacks from the lot lines.

In 2003, UNESCO declared the city center of Tel-Aviv, mostly built according to Geddes’s guidelines, a world heritage site. Precincts 3 and 5 of Tel-Aviv contain most of the “White City” zone.



Geddes Plan, 1925

Following the declaration, a preservation plan for the city had been approved in 2008, designating about 1,000 buildings in the city center for preservation, most of them are located in the “White City” of Tel-Aviv.



“Dizengoff Square”, Tel-Aviv City Center, White City (source: [e-architects](#))

National Zoning Ordinance no. 38 (2005)

Being Israel located on the Syrian-African Rift, it is prone to experiencing earthquakes. National Zoning Ordinance no.38 was created to strengthen and upgrade residential buildings built before 1980, in order to increase their dwellers' safety in case of an earthquake. The plan is incentive based; developers get additional floor area in exchange for improvements, or more desirably: more floor area for demolishing and rebuild the building. The dwellers benefit from all of the above for free and get new/improved apartments. Municipalities specify the incentives to be given, according to their local housing market demand. Since its approval in 2005, National Zoning Ordinance no.38 had become a lever for urban renewal.

Zoning Ordinance no. 3616a for Precinct 3, Tel-Aviv (2018)

The main objective of the new ordinance is to arrange the overlapping historical zoning ordinance of the precinct into one, incorporating the National Ordinance no. 38 incentives and UNESCO's requirements regarding the “White City”. Also, the ordinance

documentations declare that the plan should act as an urban renewal lever, thanks to its additional allowed floor area. The plan's area is 2,431 thousand square meters, about 60% of it is within the "White City" zone area (the southern part, adjacent to precinct 5). The plan aims to add floor space of 400,000 m² and 4,000 housing units to the precinct, addition to about 36,000 housing units exist. The ordinance is valid for residential lots only, including mixed use (residential + commercial) lots. The plans do not valid for preservation-designated buildings.

The new plan differs between the "White City" zone, south to Arlozorov street, and the area north to it. It allows new buildings of 5.65 to 7.65 stories (*0.65 story is due to a setback in the higher floor) to replace the old 3-4 story buildings, returning the dwellers their floor space in the new building. Following the Geddes Plan, it distinguishes commercial street by allowing larger floor area to be built within them. The plan was publicly criticized by developers, planners and residents, claiming that although the plan creates more supply of land, on the parcel level it is still too restrictive to economically allow its utilization.

Scope of Analysis

This research goal is to identify whether the additional floor area given by the new zoning ordinance of precinct 3 is incentivized enough to assure the renewal of its buildings, analyzed on the parcel level. The research assumes a same demand for land in all precinct 3 area, and assumes this demand to be high, meaning a full utilization of allowed floor area in every renewal project to be built.

This research takes into account residential buildings only, and evaluates the economic feasibility of the demolition + new construction part of ordinance 3616a, excluding building additions possibilities. Parcels designated for historic preservation were excluded from the analysis, being the rezoning not applied to them. Also, new buildings (built after 1980), not eligible for the new ordinance guidelines, were excluded from the analysis as well.

Tel-Aviv City, Israel, Precinct no.3

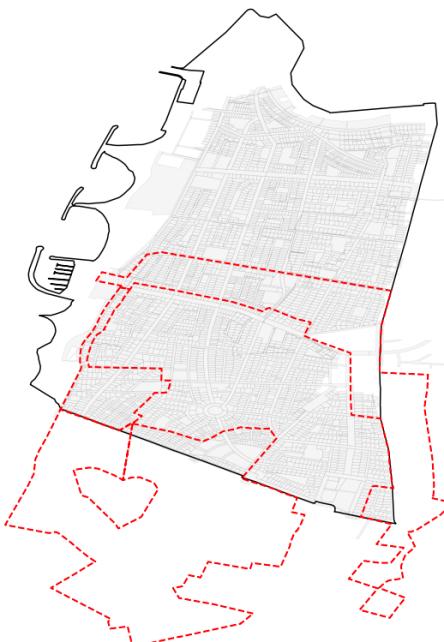


Fig.1 Precinct 3 (black boundary) and the "White City" zone (dashed red)

Having this research being conducted months only after the rezoning ordinance approved, this analysis is predictive, using real physical parameters of the buildings and parcels of precinct 3, and relying on the new ordinance itself to assess their future characteristics.

Feasibility threshold was defined as having a ratio of at most 50%-50% between existing floor area and allowed floor area according to the new ordinance, this due to the obligation of the developer to give back to the dwellers the existing floor area within the new construction. Big parcels (750m^2 or bigger) and small parcels (500m^2 or smaller) allow / require ratio of 55% in the favor of the dwellers or the developer, respectively.

Data

Data for this research were obtained through two sources:

i. [GIS Tel-Aviv](#)

The primary source of this analysis. Shapefiles containing spatial and qualitative data of the parcels and buildings in the rezoning boundaries were downloaded, as well as historic preservation designated buildings and the “White City” boundaries. Data attributes to be used were parcel ID and area (m^2), address, building footprint (m^2), number of floors and building type. Floor area and Floor-Area ratio were calculated.

ii. [Zoning Ordinance no. 3616a documentation](#) (*Hebrew content only*)

Allowed and/or future characteristics were assessed relying on the new zoning ordinance, considering new constructions only. Parcels unification options were not analyzed in this study. The plan’s guidelines and limitations were arranged in Table.1:

Tel-Aviv City // Precinct no. 3 rezoning (plan no. 3616a)											
Sub-area	commercial street?	lot size (m^2)	allowed								density coefficient
			front	side	back	footprint	#floors	FA	FAR		
Outside the "White City" boundaries (north to Arlozorov st.)	Yes		(4-6)	2.5	4.5	N/A	7.65	footprint * #floors	FA / lot size	65	
	No		4	2.5	4.5	N/A	6.65	footprint * #floors	FA / lot size	80	
Within the "White City" boundaries (south to Arlozorov st.)	Yes		4	2.5	4.5	N/A	6.65	footprint * #floors	FA / lot size	65	
	No	500 <=	4	3	5	N/A	6.65	footprint * #floors	FA / lot size	80	
		< 500	4	2.5	4.5	N/A	5.65	footprint * #floors	FA / lot size	80	
I/O	Yes/No	>= 750	(5-6)	3*	5*	55%	**	footprint * #floors	FA / lot size	65 / 80	

Table.1 Precinct 3 rezoning guideline

Methodology

The entire analysis and the code used to generate it are available in an iPython notebook, shared on GitHub: https://github.com/danachermesh/Tel-Aviv_RezoningFeasibility/blob/master/Tel-Aviv_RezoningEvaluation.ipynb.

1. Data Cleaning and Munging

First, parcels and buildings shapefiles were spatially joined in order to assign buildings to parcels, divided to parcels within the White City Zone and outside of it, for the further calculations. About 60% of precinct 3 parcels are in the White City Zone. Historic preservation designated buildings' shapefile was joined in order to drop them from the analysis. Then, buildings of types 'public use buildings' and 'under construction' were excluded, as well as buildings with more than 4 stories or less than 3 stories, assuming the formers to be new buildings and the latter to be temporal / other special, non-residential building type, both not eligible for the rezoning. Finally, due to different guidelines to commercial streets by the new ordinance, parcels located in these streets were separated to different datasets. Overall, 2,163 parcels were found valid for this analysis, about half of the precinct's parcels.

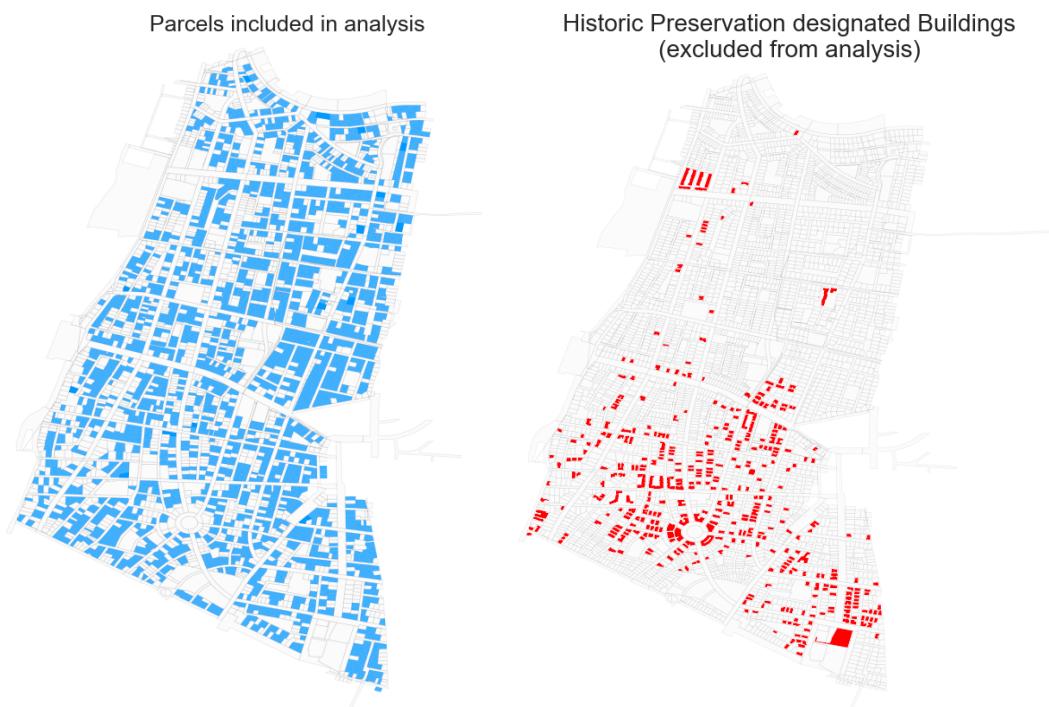


Fig.2+3.left: 2,163 Potential to renewal parcels according to the rezoning ordinance; **right:** buildings designated for historic preservation, excluded from the analysis.

2. Current built environment

Floor area was calculated by multiplying building's footprint by its number of floors. Floor-Area ratio (FAR) was then calculated, dividing the floor area by the parcel's area.

3. Future built environment

The assumption is that being precinct 3 a highly desired area in the city, a full utilization of allowed floor area is expected for each building to be built.

According to the rezoning ordinance no. 3616a, calculations were conducted to assess future built area (see Table.1). The allowed number of floors is based on whether the parcel is within or outside the “White City” zone, whether it is located in commercial street and for the “White City” zone, whether its area is larger or smaller than 500m². As regard to *allowed footprint*, the ordinance defines a maximum of 55% footprint of the parcel's area for parcels larger than 750m², and defines required setbacks (front, side and back) for parcels smaller than 750m². The outcome footprint for these parcels usually ranges between 42%-58% of the parcel's area. For this analysis, footprints percentages of small parcels were randomly chosen between this range, then multiplied by the allowed number of floors to define *allowed Floor Area* for each parcel. *Allowed FAR* was finally calculated as well.

4. Feasibility

Economic feasibility threshold was defined as being the current floor area 50% or less than the allowed floor area, considering the give backs of the current floor space to the dwellers. This rule-of-thumb also takes into account costs of demolition, licensing's costs, construction costs and housing costs for the temporally evacuated dwellers, as well as the higher value of land for the additional, newly built floor area. Exceptions to this threshold are big parcels (defined as parcel area equals 750m² or bigger) and small parcels (500m² or smaller), allowing / requiring ratio of 55% in the favor of the dwellers or the developer, respectively. The ratio of the current and allowed floor area for each parcel was calculated, then a binary outcome of 1=*feasible* or 0=*not feasible* was assigned to each parcel according to the rezoning ordinance and the feasibility threshold.

Results

As for the current built environment of precinct 3, the majority of the buildings in precinct 3 are currently built with FAR ranged between 1.3-2, generating the well-known continuous, coherent urban landscape of Tel-Aviv, as can be seen in Fig.4. The frequency distribution of the current FAR across the precinct, within and outside the “White City” zone, is shown in Fig.5:

Current Floor Area Ratio (FAR)

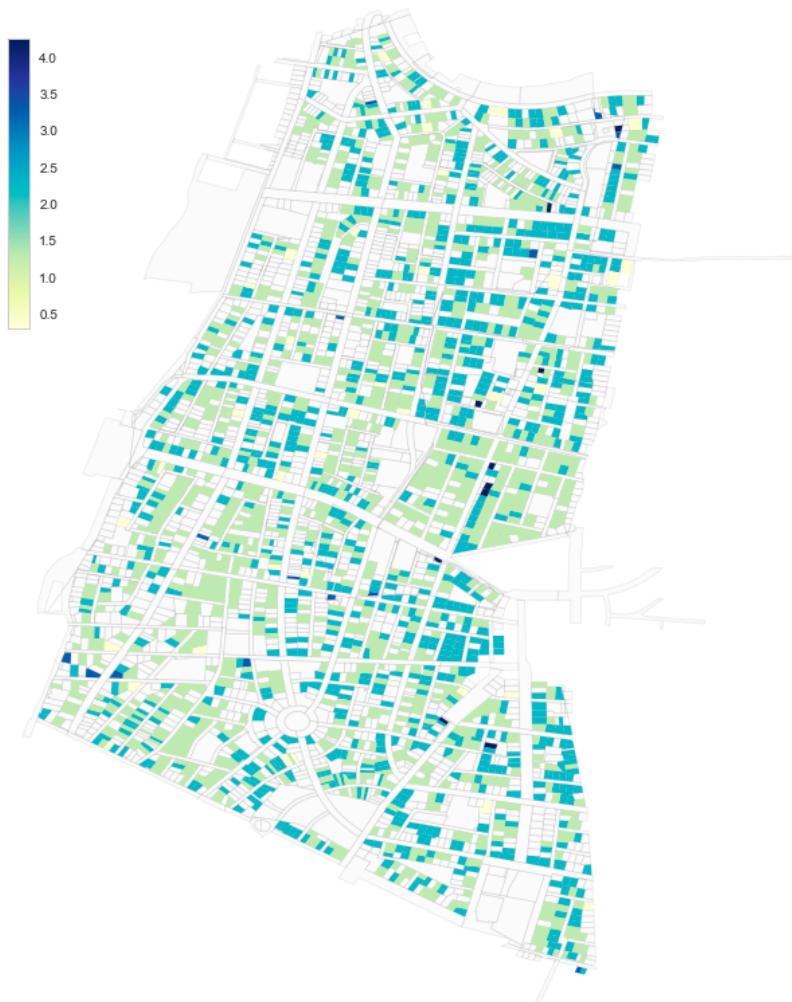


Fig.4 Current FAR precinct 3 >>

Existing FAR frequency distribution, Precinct no.3

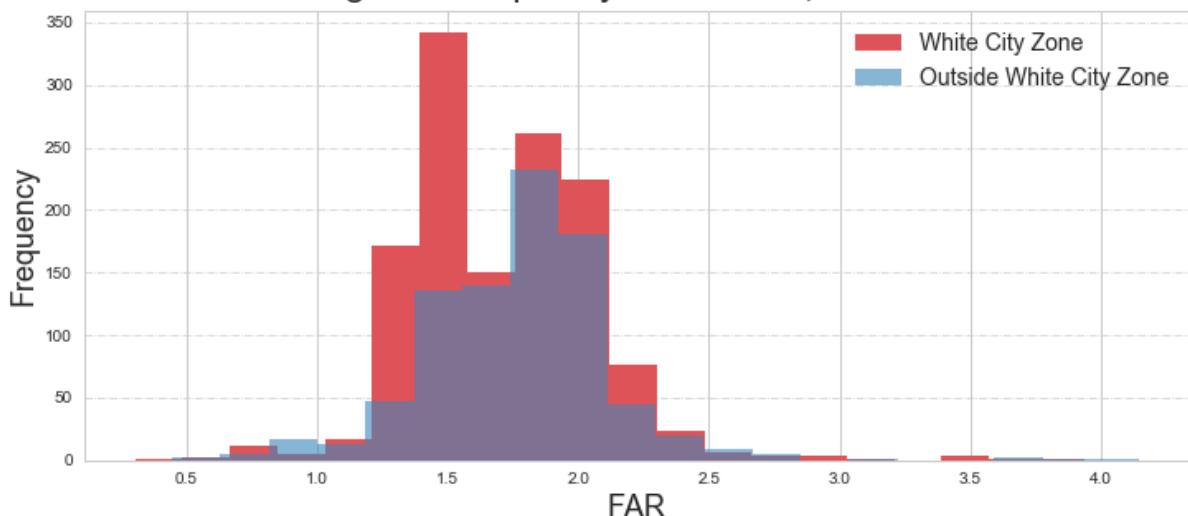


Fig.5 Frequency distribution of current FAR, precinct 3; Within and outside the “White City”.

Fig.5 shows no significant difference between the FAR distribution within the “White City” zone and outside of it.

Fig.6 and Fig.7 are a map and a frequency distribution of allowed FAR, assuming full utilization of the rezoning ordinance to all eligible parcels. A dramatic change of the well-distinguished, unique urban landscape of the precinct towards wider distribution of FAR across the precinct is shown, mostly noticeable between the “White City” Zone and outside of it.

Fig.6 Allowed FAR, rezoning fully utilized across the precinct. The northern part, outside the “White City” zone, gains significantly higher FAR >>

Allowed Floor Area Ratio (FAR) according to Precinct no.3 rezoning

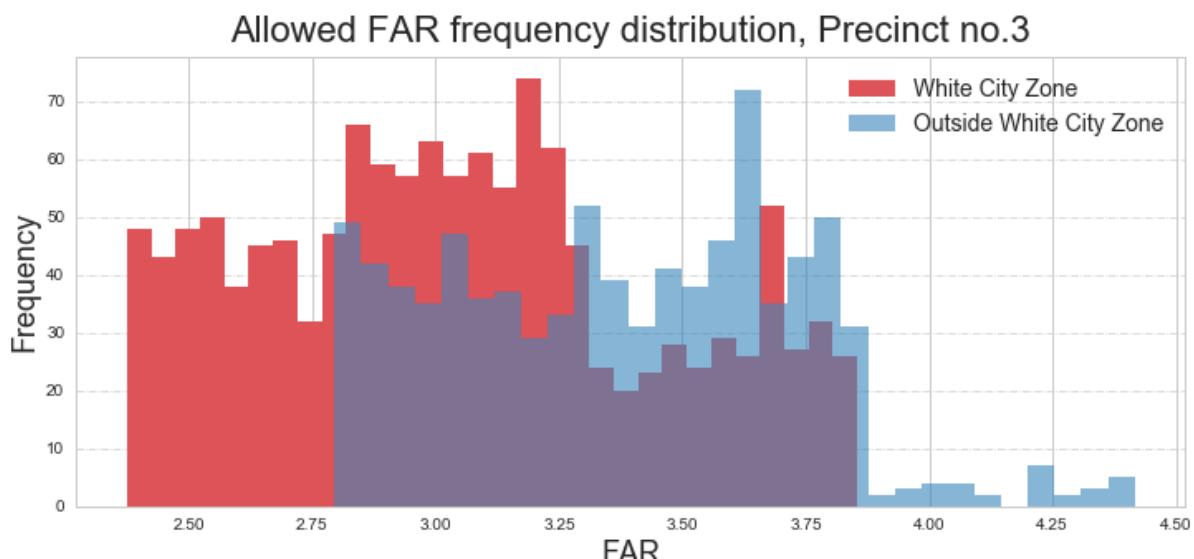
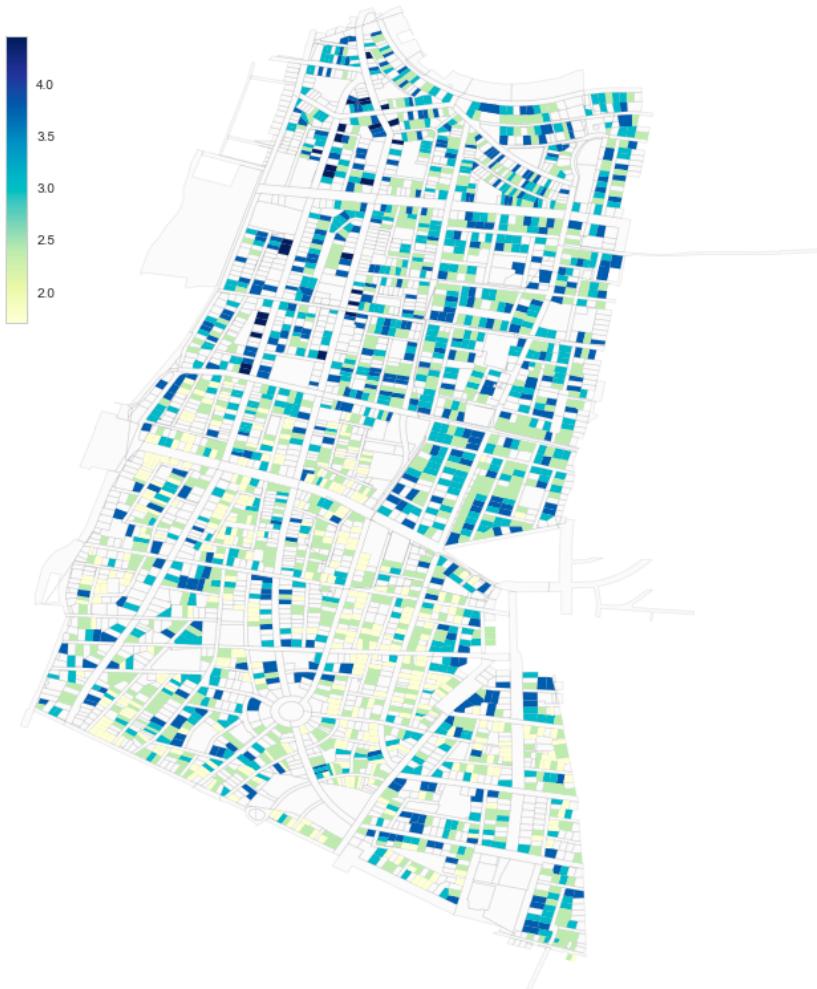


Fig.7 Frequency distribution of allowed FAR, if rezoning fully utilized across the precinct; FAR outside the “White City” zone (blue) show higher results, while the “White City” zone (red) stays relatively closer to current FAR’s. Overall, FAR distribution is widening.

The feasibility results were outstanding; according to the assumptions of this analysis, only 554 parcels (out of 2163 parcels analyzed, a share of 25%) were found feasible enough for renewal by the new ordinance. The feasible and not feasible parcels are shown in Fig.8:

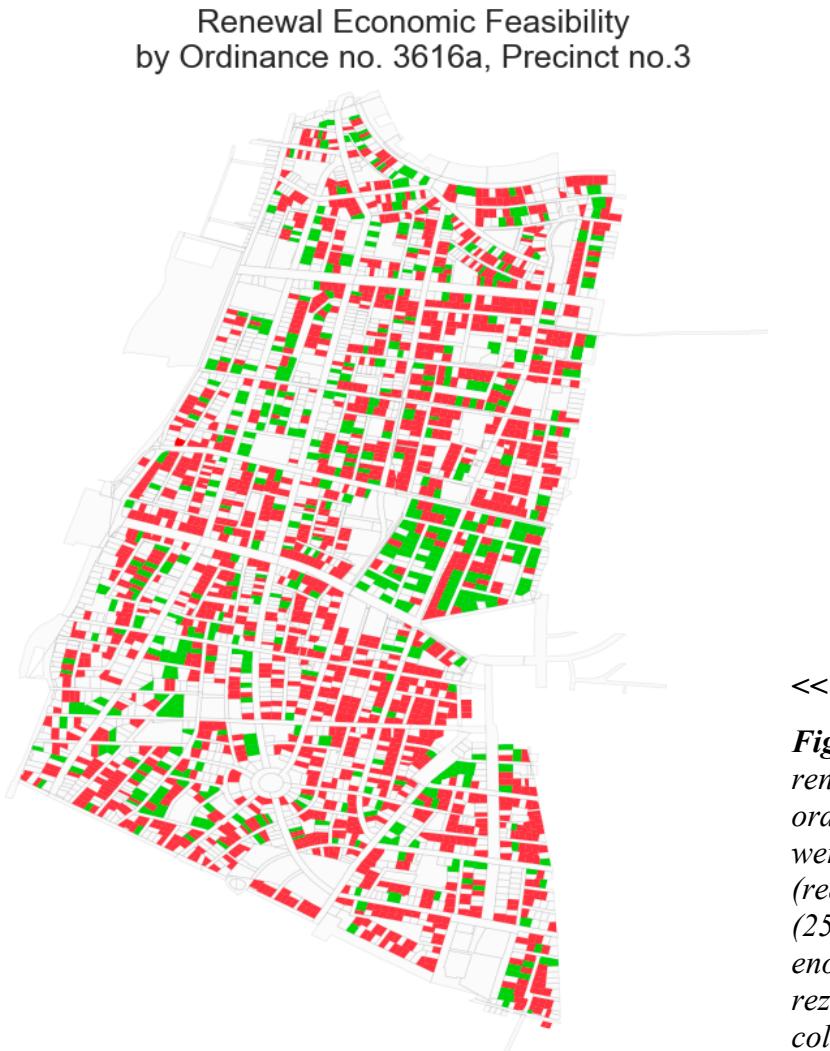


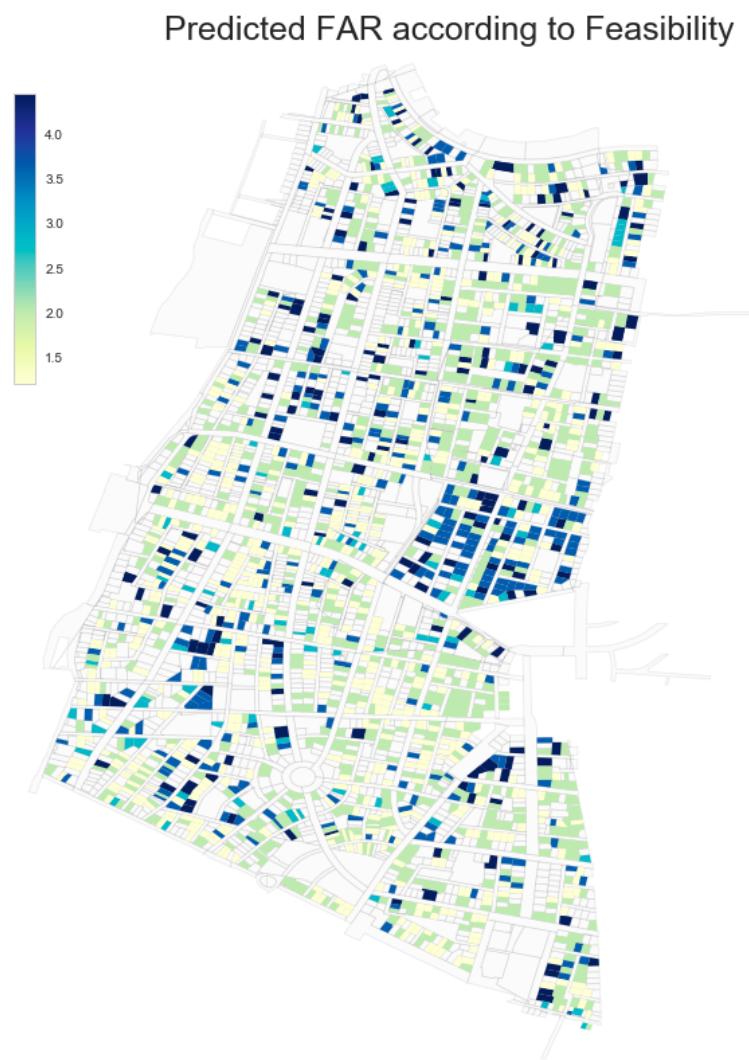
Fig.8 Economic Feasibility for renewal by the new zoning ordinance. 1609 (75%) parcels were found to be not feasible (red color). Only 554 parcels (25%) were found feasible enough for utilizing their rezoning possibilities (green color).

Considering the 471 parcels in the precinct that are designated for historic preservation, it appears that the rezoning, although allowing much more floor area, leaves **more than 75% of the precinct's buildings** not feasible enough for its utilization. Fig.9 maps the anticipated FAR according to the feasibility results, meaning plotting the *allowed FAR* for parcels that were found feasible, and the *current FAR* for parcels that were not found feasible for the rezoning utilization. Fig.10 shows the frequency distribution of the anticipated FAR across the precinct, following the same methodology.

Fig.9 Anticipated FAR according to feasibility results. 554 parcels (25%) assumed to be renewed thus show their allowed FAR guided by the rezoning ordinance, while the rest 75% show their current FAR.

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Neither the map nor the histogram follow any common sense of urban structure. The anticipated urban realm according to the new ordinance, considering feasibility threshold for a project to be conducted, is a mixture of many old and relatively small amount of new buildings, practically leaving this meaningful precinct to deteriorate.



Predicted FAR frequency distribution according to Feasibility, Precinct no.3

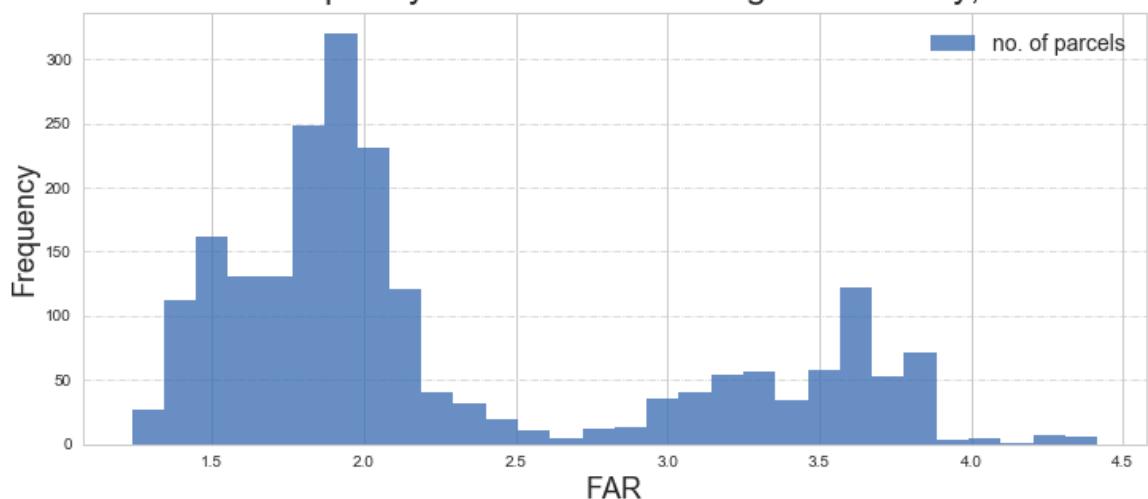


Fig.10 Frequency distribution of anticipated FAR, rezoning utilized only for parcels that were found feasible according to the new ordinance.

Conclusion

Discussion and Implications

This study evaluates the new zoning ordinance of precinct 3 of Tel-Aviv, by depicting the future FAR to be generated by it if fully utilized, and more importantly, by assessing the economic feasibility of this ordinance on the parcel level. The analysis showed a significant share of precinct 3 to have no economic justification for utilizing the new ordinance. Also, it was shown that if fully utilized, the urban scape of Tel-Aviv city center will change dramatically towards an opposite-gradient of densities, keeping lower FAR in the “White City” zone (close to the city center), and generating higher FAR outside of it.

These results rise questions regarding the objectives of the new ordinance and whether the plan actually directs the city and its urban realm towards them. Will the plan’s guidelines truly preserve the quality of the landscape of the city center of Tel-Aviv? And is the plan a real lever for urban renewal, knowing its incentives are profitable enough to allow such a small portion of its area to be utilized? These two questions, leading and motivating this study, should inform the local planners and make them reassess this plan and the future ordinances that are under different planning phases these days in Tel Aviv. Also, this research should raise a discourse regarding master plans and policy analysis, and the way big data tools and techniques can be applied to urban planning, leveraging it by allowing qualitative and granular spatial analysis.

Future Research

In order to address the problem of its feasibility, ordinance no. 3616a allows an optional *parcels unification* of two small parcels ($500m^2$ or less), using their shared side-face to build one building on both lots to create a higher footprint for each of them. This possibility makes the new ordinance as a whole more feasible. A future research is needed in order to assess what share of the parcels is anticipated to be redeveloped considering this possibility.

Moreover, a similar zoning is about to be approved for precinct 4 (“The new north” neighborhood, eastern to precinct 3), giving much higher incentives mostly due to the fact that precinct 4 does not contain the “White City” zone. This plan is considered very profitable. Having these two-adjacent precincts a similar, continuous urban scape today, it will be interesting to assess the future urban scape the two ordinances would actually generate, considering their economic feasibility and anticipated utilization.

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