DATA-BASED URBAN HERITAGE POLICY ASSESSMENT:
EVALUATING TEL AVIV’S PRESERVATION PLAN

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Abstract

Urban heritage policies are rarely assessed on a regular or continuous basis. Formal indicator guidelines and scholarly work address some possible evaluation methods for urban heritage policies, but a gap exists between the generalized work and limited on-site implementation. Spatial and non-spatial datasets should contribute to our understanding and refinement of such policies. Yet, in practice, data and the proper assessment mechanisms are often lacking.

This research presents Tel Aviv’s 2650b preservation plan as a case study to explore possible assessment methods of policy effectiveness. Tel Aviv is the second-largest city in Israel. In 2003 UNESCO declared the White City of Tel Aviv, the center-city area, a World Heritage Site (WHS). UNESCO based the designation on an outstanding synthesis of the Modern architecture movement and an outstanding example of new town planning of the 20th century. Municipal plan 2650b was enacted in 2008 and is linked to the WHS, protecting modern architecture and mainly focusing on the center-city area. The Plan classifies properties into two preservation levels and three architectural styles. The city’s online building archive facilitates analysis and evaluation of plan 2650b. The Plan has been in place for over a decade, during which no data-driven comprehensive evaluation or monitoring processes occurred.

Relying upon Kitchin’s definition of effectiveness, in the context of urban indicators, as “whether goals and objectives are being met – doing the right things,” this research asks: what factors correlate with the effectiveness of Tel Aviv’s preservation plan? Three sub-questions lead the research: Are the Plan’s goals being met? Are they being met in the same way throughout the Plan area? And, how, if at all, are pre-existing characteristics of the properties addressed by the Plan? The study assesses the outlined goals and presents a roadmap for constructing indicators
and spatial analysis for a specific policy.

The study approach uses an author-created property-level database to assess proposed customized indicators and run spatial analysis. It finds that the prevalence of preservation varies across space, among architectural types, and between the two preservation-restriction levels. In particular, the Plan is relatively less effective at preserving Modernist buildings. These findings reveal the inconsistency of the Plan at protecting the Modernist architecture at the core of the global designation. The results stress the need for data collection, setting numeric objectives, monitoring plan outcomes, and potential future research to realign incentives with preservation goals.
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1. Introduction

The historical period perceived as preservation-worthy is getting closer and closer to our present time. Today, categories expand not only to closer periods but also to non-monumental architecture. In parallel to the expansion of preservation categories, smart city notions are rapidly gaining prominence. Governments at all levels are increasingly using data to better and more efficiently manage administrative functions and run public programs. While ‘smart’ in the urban context has many possible definitions and manifestations, data usage is among its core building stones. The data revolution, as Kitchin describes it (Kitchin 2014), has not skipped the preservation field. In a 2019 book, Avrami covers data-based processes and implications within the preservation realm (Avrami 2019). The expansion of quantitative methods within a qualitative-based field creates tension and provides a new opportunity for researchers to explore the connection. Quantitative methods, enabled by the increasingly available databases, have the potential to complement and improve existing qualitative ones. Despite the rise of smart city notions and the use of data within preservation, there is a gap between the proposed tools and implementation. There are not a lot of available examples regarding evaluation tools used in municipal-level preservation policies. This paper uses Tel-Aviv’s plan 2650b, a large-scope preservation plan, as a case study to explore possible data-based methods and ways to evaluate the effectiveness of an in-place plan.

In 2008, Tel Aviv, the second-largest city in Israel, legalized plan 2650b, a newer, large scope preservation policy (Tel Aviv Planning Agency 2008b). In 2003, following a lengthy process, UNESCO officially declared the White City of Tel Aviv, the center-city area, a World Heritage Site (WHS) (Tel Aviv Planning Agency 2008b). The designation rationale includes the city’s outstanding implementation of a synthesis of the Modern architecture movement and an
outstanding example of a new city of the 20th century (Tel Aviv Municipality 2002). Municipal plan 2650b is set to require and facilitate the preservation of about a thousand buildings, many of which are within the WHS area. The Plan links directly to the WHS declaration, focusing mostly on the center-city area. Plan 2650b is a suitable case study since the policy has defined goals, a finite and static building list, and limited preservation categories. The city’s building archive, which stores site-level data, is open to the public and available online. The archive provides dated files that allow tracking activity for each listing.

UNESCO adopted the World Heritage Convention in 1972 (UNESCO 1972). It includes “a list of properties forming part of the cultural heritage and natural heritage… which it considers as having an outstanding universal value in terms of such criteria as it shall have established” named ‘World Heritage List’ (UNESCO 1972, 6). Since then, UNESCO’s committee has added 1,121 sites from 167 states to the list.1 Alongside its accomplishments, the WHS program has many flaws and limitations and faces multiple challenges, discussed in length by scholars (Keough 2011; Meskell 2018; 2013; Labadi 2019). However, one cannot deny the WHS program’s contribution to raising preservation awareness around the world. Therefore, using the Plan as a case study has global relevance since it can inform other existing or future World Heritage Sites and their needed evaluation processes.

This study evaluates a preservation plan within the larger preservation and data usage contexts with a particular focus on effectiveness. To do so, this study uses Kitchin’s definition of effectiveness: “whether goals and objectives are being met- doing the right things.”2 (Kitchin, Lauriault, and McArdle 2015, 9). The study answers three sub-questions: Are the Plan’s goals

1 As of April 2021, according to UNESCO’s official website.
2 While Kitchin’s discussed effectiveness in the context of urban indicators, the definition also applies more broadly.
being met? Are they being met in the same way throughout the Plan area? How, if at all, are pre-existing characteristics of the properties factored into or addressed by the Plan? There is an overlap between these questions, but each provides something that the others do not cover in full. All three feed into the larger research question: What spatial and non-spatial, policy-induced, and/or pre-existing factors correlate with the effectiveness of the preservation plan of Tel Aviv?

2. Background

In 2008, Tel Aviv municipality legalized a new preservation plan, focusing mainly on the city-center area, also known as ‘the White City.’ Five years before, in 2003, UNESCO declared the White City of Tel Aviv a World Heritage Site, the second (part of a) modern city to be designated so, with Brasilia the first. Lengthy processes predated both UNESCO’s designation and the Plan. Scholars named the ‘White City’ exhibition by curator Michael Levin in 1984 as the first major milestone or a defined starting point. They discuss the combination of elite-group advocates and political circumstances that facilitated both efforts (Miterani 2008; Alfasi and Fabian 2009; Roțbard 2015).

Tel Aviv began as a few Jewish neighborhoods north of the ancient port city of Jaffa, the first of them built in 1887 (Aleksandrowicz, Yamu, and Nes 2018).3 One of these neighborhoods was named Tel Aviv, which gained a ‘township’ status in 1921, not long after the British occupation took place (Aleksandrowicz, Yamu, and Nes 2018). Its territory covered the near totality of Jewish neighborhoods north to Jaffa (Aleksandrowicz, Yamu, and Nes 2018). The historic Tel Aviv city gradually developed northwards, with variations in the urban and architectural styles between developed areas (Tel Aviv Municipality 2002). The nomination files

3 Neve Tzedeq neighborhood was the first to be built in 1887.
for the WHL offer a division into five main districts: Neve Tzedek, the Red City, Lev Hair, Central White City, and Northern White City (Tel Aviv Municipality 2002). Reviewing Figure 5, these are organized from south to north, according to their development. Neve Tzedek is the first Jewish neighborhood and includes a mixture of Templer and Jaffa construction features. The Red City district has a mixture of eclectic architecture with some international style ones.\(^4\) Lev Hair (in Hebrew: the heart of the city) has a mixture of eclectic and international style buildings. Both White City districts include international-style buildings and are built according to Sir Patrick Geddes’ plan (Tel Aviv Municipality 2002).\(^5\) These five districts also vary in the size and shape of lots, urban grid, building height and time of construction, materials used, and open spaces (Tel Aviv Municipality 2002). They constitute the ‘historic’ city that “was designed and formed during Tel Aviv’s first fifty years” (Tel Aviv Municipality 2002, 37). Most of Plan 2650b’s listings are within Central White City, Red City, and Lev Hair sub-sectors.

The Plan, which has most of its listings within UNESCO’s designation area, defines goals, categories, and implementation mechanisms. The finalized version of the Plan lists three goals: implement preservation to expose built heritage and architectural values, use preservation as a way of urban revival, and create incentives and organizational mechanisms to carry out the Plan (Tel Aviv Planning Agency 2008b).\(^6\) The Plan lists 981 specific sites within the Plan area, classified into ‘regular’ and restricted preservation status and three architectural styles: international, eclectic, and special (Figure 1-4). The Plan specifies restrictions, incentive categories, and the operative systems that need to be set to carry out the Plan orders. Although the Plan authority area is the entire city, most properties (83%) are within UNESCO’s designated

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\(^4\) Named after eclectic styles buildings’ colors.
\(^5\) Tel Aviv mayor hired Sir Patrick Geddes in 1925, who prepared the city’s urban masterplan.
\(^6\) Author’s free translation of the three goals.
The designated area itself (including buffers) constitutes 7% of the overall city area.

The definition of what constitutes building preservation varies between different schools of thought, eras, and places. Since plan 2650b’s core intent is to promote buildings’ preservation, the study will clarify what a ‘preserved’ building means in this context. The Plan has an accompanying document titled ‘guidance for building restoration in Tel Aviv’ (Tel Aviv Planning Agency 2008a). The guidance states the two levels of preservation given under plan 2650b. The ‘regular’ preservation level is defined as “thorough preservation of the building envelope and the stairway shafts while exercising building rights available to the lot” (Tel Aviv Planning Agency 2008a).8 Restricted preservation is “thorough preservation of envelope and of interior spaces if they are found to have a historic architectural value, based on the documentation file. Building additions that decrease the buildings’ architectural value are prohibited (excluding exemptions that were stated directly within this plan)” (Tel Aviv Planning Agency 2008a).9 As seen, both definitions address first the exterior of the building and stress its complete renovation. Most listings have private owners and private usage. So, if the public is to ‘be exposed’10 or enjoy this good, it is mainly through the exterior facades. The main difference between the two is the ability to exercise building rights within the regular level, meaning to add floors to the lot if rights were not fully used, and the possibility to enforce interior space preservation for restricted level. The public discourse is divided regarding these definitions of preservation and their implications,

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7 Including the buffer zone area.
8 Author’s free translation. In the original text (Hebrew), the word used is ‘integral’. In the context (and jargon) it can be read as ‘not-partial’ and also as not-superficial, in a sense that the needed restoration is of the envelop itself (windows, structural supports or updates, the usage of specific materials) rather than a mere cover-up with a new layer of paint.
9 Author’s free translation.
10 Author’s free translation of part of the first goal of plan 2650b.
especially in regard to the regular preservation and its permitted additions (Zandberg 2016). However, this study does not engage in the architectural or ethical debates regarding the correctness of said definitions. Instead, it examines the Plan’s effectiveness according to its own terminology and emphasis.

The two preservation levels of the Plan set two different calculation processes for developers’ building rights. For regular preservation, the rights are limited to the original lot’s specifications, with various plan-defined variances such as lot coverage\textsuperscript{11} increase of up to 60-70\% (Tel Aviv Planning Agency 2008b).\textsuperscript{12} In other words, regular preservation only allows renovation and addition of floors to the existing building, with variances that translate into a larger added area and fewer architectural restrictions.\textsuperscript{13} An example of a regular level building that completed a preservation process can be seen in Figure 6 and Figure 7. In this example, the added floors differ from the original ones in size. Because restricted preservation prevents any additions (or demolition), including the ones given by the lot’s plans, alternative compensation and incentives are used: rights transfer of the unbuilt area (again, in regard to existing lot’s regulation). A different lot in Tel Aviv can receive (buy) the building rights if it is within a defined perimeter stated on the Plan 2650b map (appendix A).\textsuperscript{14} A municipal-created slideshow explaining the rights transfer mechanism indicates that lots outside this area bought rights as well (Cook n.d.). Over the years, the municipality devised compensation measurements for this complex process (Smolsky 2016).\textsuperscript{15} The transfer rights are calculated differently for various building parts, including unbuilt floor

\textsuperscript{11} Building Coverage Ratio (BCR).
\textsuperscript{12} Section 2 in appendix D of the Plan.
\textsuperscript{13} Such as the permission to construct new balconies outside building lines, in a way that continues the original balconies.
\textsuperscript{14} Marked in orange line on the blueprint map in appendix A.
\textsuperscript{15} For example, giving more sqm if the receiving lot is in a less attractive area.
areas, unbuilt basements, and open balconies. Each component is multiplied by a fixed numeric incentive value (set by plan 2650b) and summed. There are several other parts to the incentive, such as ‘incentive for the preparation of historic documentation file,’ with each differently calculated and manifested in additional transfer rights. Eclectic buildings receive a higher multiplication rate since the appraisals stated the façade preservation is more costly for this type.\textsuperscript{16} To successfully calculate each category’s maximal aerial rights, a level of expertise of both Plan 2650b and various overlapping municipal plans is needed.

The study will not go in-depth with such calculations but stresses the fundamental difference between the two levels, in both the physical implementation and the monetary mechanisms that support it. In terms of the incentives’ success, Salinger concluded in his dissertation that the restricted level incentives are sufficient and that they are “undoubtedly more substantial than the limited incentives given to regular level” (Salinger 2011, 216).\textsuperscript{17} He finds that regular level buildings’ market value is lower by 13% compared to unlisted buildings, while restricted level ones don’t display this gap (Salinger 2011).\textsuperscript{18}

The Plan has been in place for over a decade, during which no data-driven comprehensive evaluation or monitoring processes occurred. While the Plan does not directly specify monitoring, the third goal states “to construct mechanisms that are needed for the implementation of the plan.”\textsuperscript{19} This study argues that evaluation and monitoring are part of these crucial mechanisms. The nomination file of the White City includes a short monitoring section (Tel Aviv Municipality 2002). The section lists key indicators, administrative arrangements for

\textsuperscript{16} Dr. Jeremie Hoffmann, Telephone conversation with the author, March 2021 (information from a technical query with the head of the conservation department - Tel Aviv-Yafo municipality).
\textsuperscript{17} Author’s free translation.
\textsuperscript{18} As of 2011 when the dissertation was published.
\textsuperscript{19} Author’s free translation.
monitoring, and the results of a previous monitoring exercise. Since the nomination predates plan 2650b, the limited numeric result does not relate to it. The key indicators that are mentioned are very limited, and a database is not discussed. Despite the stated intent, it does not appear that these indicators were regularly used over the years, nevermind published. UNESCO’s operational guidelines require that “a regular review of the general state of conservation of properties… shall be done within a framework of monitoring processes for World Heritage properties, as specified within the Operational Guidelines” (UNESCO 2019, 29). The only periodic report available to date (UNESCO 2014) refers to the Plan as one of the municipal levels’ required legislation. The same report states under ‘monitoring’ that, “there is considerable monitoring, but it is not directed towards management needs and/or improving understanding of Outstanding Universal Value” (UNESCO 2014, 8). An internal report from 2017 by the municipal comptroller points out deficiencies in preservation data collection and linkage (Tel Aviv Municipality City Comptroller 2017). Its findings aligned with the lack of monitoring presented. The lack of monitoring highlights that commitments towards UNESCO are not always prioritized or materialized at the municipal level. On the other hand, the municipality’s internal review shows self-examination, capacity, and willingness for data collection and data usage improvements. In addition to its WHS status, Tel-Aviv aspires to adopt the Historic Urban Landscape approach and hosted the ‘Cities Reporting: HUL Approach in Modern Cities’ international forum in 2018. The HUL guidebook states knowledge and planning tools and regulatory systems as part of the proposed toolkit, with a specification of GIS, big data, and policy assessment (Veldpaus et al. 2016). Despite various calls

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20 under section II.F.
21 The report titled ‘municipal aspects of historic building preservation’. Under ‘supporting computations systems’ the report states, among other notes, that there isn’t an overall database of preserved buildings that includes under one building-entry the links to all its relevant preservation-related data. In addition, it states that the municipal systems are not linked/coordinated, so that double entries are needed, and no sufficient link between the procedural systems.
for monitoring, little Plan assessment has been achieved.

The Plan is working in an apparent way: some buildings are preserved, and the municipality created suitable bureaucratic systems. However, without periodic monitoring and evaluation of all listings, the Plan’s effectiveness remains unclear. It is also unknown whether the Plan works evenly for different classifications and throughout the area. Possible limitations remain hidden. Since the Plan prohibits demolition and requires specific, coordinated maintenance, buildings can become an urban eyesore. In these cases, heritage is not well maintained, and the building can impair the street’s overall appearance. An overall evaluation of the Plan can guide the municipality to suggest alterations in planning future preservation policies.

Besides the local, practical benefits of such evaluation, there is also a global, general one. UNESCO’s WHS guidelines and the HUL approach advocate data collection, data usage, and monitoring. Cities that aspire to participate in the HUL or gain WHS status can benefit from implementation case studies. The evaluation of the Tel Aviv plan, in spatial and non-spatial ways, can contribute to the growing body of knowledge. With contextual adjustments, this evaluation could be replicated for other preservation plans or at least inspire similar work.

Figure 1 (left): Liebling House, 29 Idelson St., International Style
Figure 2 (Right): 23 Bialik St., Eclectic Style
Source: Both photos by Ohad Ferrera, 2021, as requested by the author
Figure 3: 11 Bialik St., Special Style  
Source: Photo by Ohad Ferrera, 2021, as requested by the author

Figure 4 (left): Map of Plan 2650b listings by architectural style & UNESCO’s designation areas  
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Figure 6 (left): Regular level, international style building before preservation, 8 Pinsker St., taken 2011
Figure 7 (right): 8 Pinsker St., after preservation, taken 2018

Figure 8 (left): 4 Gilboa St., international style, not preserved
Figure 9 (right): Kiryat Sefer St., international style, preserved
Source: Both photos by Oded Fux, 2021, as requested by the author
3. Review of literature

Tel Aviv’s 2650b preservation plan evaluation has three contexts. The first is the global: trends in preservation, especially in regard to UNESCO’s world heritage sites. The second is methodological: policy assessment and the emerging usage of data within the preservation field. Lastly, the local context covers the critique revolving around the White City’s nomination and preservation.

3.a. A shift in preservation approaches

In assessing current urban preservation policies, the gradual shift in urban heritage perception must be explored. Multiple organizations’ documents, reports, declarations, and scholarly work reflect this shift. In Reconnecting the City, Bandarin describes the historical background resulting in separated management processes of historic areas and urban development (Bandarin and Oers 2014). He claims that urban conservation, as it was shaped in the second half of the twentieth century, reached its limits. The book is a call to reconnect the domains of urban development and urban conservation, focusing on the Historic Urban Landscape approach as a way to do so. In 2011, UNESCO introduced the HUL approach as an addition to its existing guidelines. It regards an urban area as a result of historical layering. The definition extends from the former geographic notion of ‘historic center’ to include a broader urban context. The HUL approach aims to integrate the goals of urban heritage conservation and those of social and economic development (UNESCO 2011). It is an answer to the management of urban World Heritage Sites under new development pressure forms (Zancheti and Loretto 2015). The HUL report states that data collection is “an essential part of the knowledge of urban areas” (UNESCO 2011, 5). A 2016 HUL guide maps six critical implementation steps. Within them, there are action prioritization and establishing a framework for local management (Veldpaus et al. 2016).
The White City of Tel-Aviv is a World Heritage since 2003. The only periodic report published so far (UNESCO 2014) states that monitoring is implemented but not in full or towards management needs. While plan 2650b attempts to address the challenges of integrating preservation with and alongside development, the municipality does not directly monitor said effort’s outcomes. The project can contribute to the growing body of work regarding the HUL’s recommended tools and critical steps while proposing an evaluation scheme that can be adjusted to different WHS and HUL cities.

3.b. Policy evaluation and data within preservation (methodology)

“Policy evaluation is the formal process of assessing what has gone before, in order to determine future policy priorities” (Perche 2011). An OECD report that stresses the importance of evaluation to public governance offers several evaluation definitions, including “an examination of the efficiency and effectiveness of policy” (OECD 2020, source: Ministry of Finance of the Netherlands, 2018). The report distinguishes between policy evaluation, as issue-specific and episodic, from policy monitoring, which is ongoing and can be broader in the scope of issues. Such evaluations often use indicators. Indicators are frequently used in urban planning, as Zegras presents with chronological examples dating to 1945 (Zegras et al. 2004). Indicators help measure and monitor conditions and change, but by themselves, they do not explain the underlining causes for said conditions (Lawrence 1997).²² Despite their limitations and depending on their validity and reliability, indicators can help better understand the current state of a policy, highlight areas for improvements and enhance management and accountability (Zegras et al. 2004). Indicators are a part of a larger group of data-driven tools that are gradually gaining prominence within the preservation realm.

²² As quoted in (Zegras et al. 2004).
3.b.i. Preservation & Data

While the concepts of policy assessment and quantifiable measurements are not new, the growing innovative usage of data within the preservation field is relatively new. A systematic, keywords analysis of HUL-related scholarly work revealed that ‘data’ was only recently (starting 2016) added to the list of frequently used terms within HUL-focused essays (Ginzarly, Houbart, and Teller 2019). The essay concludes that the academic discussion “does not elaborate much on how to move from theory to practice” (Ginzarly, Houbart, and Teller 2019, 1012). Though some comprehensive case studies and reports, such as in City Development: Experiences in the Preservation of Ten World Heritage Sites (Rojas et al. 2011) are available, this gap is still evident, especially in regard to data-driven aspects.

Integrating data into urban heritage processes is a logical step, considering the growing availability of datasets and data tools in urban planning. Reports such as Measuring Economic Impacts of Historic Preservation (Rypkema 2011) stress the importance of data collection, analysis, and dissemination in preservation processes. ICCROM’s 6th International Seminar on Urban Conservation (International Seminar on Urban Conservation et al. 2012), Measuring Heritage Conservation Performance, is a testament to the preservation realm’s shift and focuses on developing new measurement tools and standards. It underscores two notions: ideas regarding the measurement of heritage aspects are developing on a global scale, and that data is a fundamental part of these developments. Preservation and the New Data Landscape summarizes the efforts of introducing data to the field while presenting different use cases and raising theoretical and technical questions (Avrami 2019). The book ends with an action agenda that calls for a better understanding of preservation’s social-spatial relationships and for assessment of preservation policies’ outcomes. The conventions of both Avrami and ICCROM underscore challenges regarding data collection, methods, and tools and stress the need for further research.
3.b.ii. Preservation Policy evaluation: Indicators & Spatial analysis

Indicators for cultural heritage emerged in the 1990s on an international level due to documents developed by the OECD, UNESCO, UNCHS, and EC (Sowińska-Świerkosz 2017). In her review of work published between 2006 and 2016, Sowińska-Świerkosz identifies four thematic Cultural Heritage definition groups and 259 CH-indicators that are extremely diverse. One of the most recent indicators examples is UNESCO’s Culture 2030 Indicators (Hosagrahar and UNESCO 2019). The framework references existing frameworks such as the Sustainable Development Goals (SDG), the Framework for Cultural Statistics (FCS), and UNESCO’s previous guide, the CDIS (2014). The guide includes indicators for sustainable management of heritage, divided into international, national, and municipal levels. It concludes that the offered indicators “have been conceived as an aspirational tool to support countries and cities in assessing their own progress and measuring the impact of their policies” (Hosagrahar and UNESCO 2019, 94).

In addition to indicators (and in overlap with them), some case studies focus on spatial analysis of preservation sites. The ICCROM convention book includes an essay about spatial analysis in heritage economics, with a call to “identify the organization in space of heritage’s economic use and non-use values” (Ost 2012). Spatial analysis can be used in a broader context than economics as an exploratory tool and to better inform policies. In a chapter Spatializing Values in Heritage Conservation, Avrami states that mapping holds inherent power, maps are never neutral, and that “mapping is a political and creative process” (Harley 1989).

In the context of Tel Aviv’s 2650b preservation plan, research from 2011 has shown that clustering of preservation listings increases the premium value of the building (Salinger 2011).

23 As cited by (Avrami et al. 2019, 38).
The research’s focus was on economic components, and it incorporated the use of spatial attributes. In her work from 2008, Miterani analyzed the plan’s listings’ geospatial distribution using city block units (Miterani 2008). The two dissertations underscore the usage of spatial methods in combination with non-spatial tests for the examined area.

3.b.iii. Existing gaps

There are gaps between the growing scholarly body of work on data use within preservation and its implementation. The first gap is between the variety of proposed methods in comparison to the ones that are in actual use. More specifically, since some of the proposed urban indices are relatively new, they are not yet in widespread use. The extensive guides and scholarly work involving urban heritage indicators are far from being fully implemented within municipal or governmental levels. Second, some of the existing proposals are generalized and not within a specific context. Third, current case studies, such as some presented in ‘Reshaping Urban Conversation,’ do not focus on data use and analysis or mention it as a future needed step (Roders 2018). Lastly, existing case studies often lack a critical component and remain mostly descriptive.

In addition to these identified gaps, there is often a missing link when reading about preservation in cities. A case study or an official website states that X buildings are under some preservation status. It will then jump into describing various effects or aspects of said designation on the area (if such data is available). It seems like an embedded assumption that being designated is equivalent to the actual maintenance and preservation of buildings. While this might be the case for some policies or cities, it is questionably the case for all. The immediate outcomes of a plan, or monitoring the state of buildings, are not discussed or at least not often published. The research addresses this missing link while contributing to the literature and reducing the identified gaps, demonstrating quantitative evaluation of a preservation plan using indicators and spatial analysis.
3.c. The local context: Preservation in Tel Aviv, Plan 2650b

The designation of the White City of Tel-Aviv as a World Heritage Site and the preservation plan 2650b that followed in 2008 are a culmination of a lengthy process. Scholars identify the ‘White City’ exhibition (Levin, 1984) as a distinct starting point. It was a combination of national political circumstances and an elite group’s deliberate efforts, an idea that was gradually gaining consensus, that led to the World Heritage Site’s nomination and designation (Alfasi and Fabian 2009; Miterani 2008; Rotbard 2015). Nitzan-Shiftan’s essay, titled ‘Whitened Houses,’ refers to the process as ‘the new historiographic construction of the Israeli architecture.’ (Nitzan-Shiftan 2000, 229) She discusses the political and cultural context that led to an ignited interest in the modernistic style (Nitzan-Shiftan 2000).24

The White City is not the only historical site within Tel Aviv-Yafo, but the only one with UNESCO’s designation. It is also not the first preservation effort; the fight against Jaffa’s demolition in the 1960s predates it (Alfasi and Fabian 2009). Jaffa is an ancient port city within the Mediterranean Sea. During the 1870s and 1880s, it grew outside its historic city walls (Aleksandrowicz, Yamu, and Nes 2018). From 1887 onwards, several Jewish neighborhoods were established north to Jaffa, until the foundation of the Tel Aviv neighborhood in 1909. Under the British occupation, in 1920, Tel Aviv was granted a “township” status. Its territory included nearly the totality of Jewish neighborhoods in Jaffa (Aleksandrowicz, Yamu, and Nes 2018). In the aftermath of the Arab-Israeli 1948 war, in 1950, Jaffa and Tel Aviv were merged into one municipality, Tel Aviv-Yafo (Aleksandrowicz, Yamu, and Nes 2018). Rotbard discusses Jaffa’s disregard, which he refers to as ‘the Black city’ compared to the White City (Rotbard 2015). The decision over what is worthy of preservation and which parts of the city should be addressed

24 The quote is the author’s free translations.
while others are left untreated is a topic of many scholarly works. Rozenholc describes said preservation process as ‘heritagization’ and ‘deterritorialization’ (Rozenholc, Tufano, and Velguth 2018).

The critique about the designation’s selective nature echoes a larger global debate regarding the WHS mechanism, politics, role, and outcomes. In her book, Meskell addresses the underlining politics of World Heritage Committee decisions, favoring European ideals and “enduring Eurocentrism within the WHC” (Meskell 2018, 116). She states that “the listing of sites is infused with the most intense national aspirations of territoriality, identity claims, and economic ambitions” (Meskell 2018, 140). To some extent and in a localized manner, these components are echoed in the White City nomination critique. In addition to its stated goal of attracting economic activity, some argue that it set a specific narrative that emphasizes some identities while ignoring other valid stories and a more complex, layered reality (Roṭbard 2015; Nitzan-Shiftan 2000).

The site’s political context is an integral part of any debate over preservation plans in Tel Aviv. While acknowledging this discourse, it is out of the research’s scope. This work aims to contribute to preservation policies’ evaluation and monitoring methods, with the 2560b plan as a case study. Hopefully, the research results and recommendations will be used in the future for other preservation plans in Tel-Aviv and elsewhere that might take upon themselves the complicated task of remedying these contested topics or focus on what some perceive as unaddressed sites.

3.d. Conclusion

There is a gap between scholarly work on preservation monitoring and on-site implementation that invites further research to support a data-driven preservation approach. The preservation field is moving from a problem-solving mode into a decision-making one (Mason
While Mason states this within a context of economic valuation, it is not limited to it. Data usage in preservation management, and preservation proposals, enables this shift towards decision-making. Furthermore, it is inherently linked to the merging of development and preservation, echoed in the HUL approach, and facilitates it.

The research relates to all three bodies of knowledge. It enhances the municipality’s ability to successfully monitor and adjust current preservation policies and possible pipeline future ones. The study contributes to WHS monitoring, and more generally, to cities that aspire to preserve and monitor built heritage. And lastly, it increases the number of available case studies of data usage in a preservation-management context while providing a roadmap for similar evaluations. While the research customized the methods to the specific context, its constructions and, with some adaptation, conclusions could be replicable to other cases and sites.

4. Methods

The introduction states three guiding questions: Are the Plan’s goals being met? Are they being met in the same way throughout the plan area? How, if at all, are pre-existing characteristics of the properties factored into or addressed by the plan? Both spatial and non-spatial analyses of an assembled dataset answer these questions to some extent. The non-spatial part consists of selected customized indicators that align with the Plan’s declared goals. The indicators mainly answer the first guiding question of meeting the goals and, to some extent, the third question regarding pre-existing characteristics. The spatial analysis includes a combination of unit-based mapping\(^{25}\) and density analysis of the Plan’s outcomes. It informs the second guiding question regarding the spatial variance of the plan. In addition, it answers in part the third

\(^{25}\) Polygons (shapefiles) of pre-existing areal boundaries.
question since the geographic units used embed pre-existing built-environment characteristics, as explained below. Before reporting on said analyses, this study examines Plan 2650b’s internal structure to account for the Plan’s embedded differences.

4.a. Research area

Plan 2650b’s jurisdiction area encompasses the entirety of Tel-Aviv. However, the Plan’s historic listings are distributed within a smaller area, as seen in Figure 4. Of the Plan’s listings, 82% are within UNESCO’s designation zones or buffer-area (Figure 4). The research focuses on the listings area rather than Tel Aviv’s entirety since it reviews the plan’s effectiveness through its immediate outcomes, which are listing-based.

4.b. Analysis of plan 2650b categorical and spatial structure

Miterani and Salinger presented the Plan’s division of architectural styles and preservation levels. In addition, they covered the architectural style and preservation level categories unequal distribution across historical areas (Miterani 2008; Salinger 2011). Similarly, this research reviews the distribution of said categories while using two relevant geographic units: UNESCO designation zones and the sub-sectors by design features, as given in the UNESCO nomination files (Figure 4 and Figure 5). The decision to use the two geographic units for both this analysis and others in the study is explained in section 4.d.i. below.

Each listing assigned one of the two preservation levels based on its weighted score in a preliminary survey. The survey was carried out by the municipal preservation experts, factoring the seven parameters detailed in Table 1 below, with the threshold between categories being 33 points (Miterani 2008; Salinger 2011).\(^26\) The range of possible scores is 20 to 60, with 20 being

\(^{26}\) A building with above 33 points is within the restricted category. A building with 20 to 33 points received a regular preservation level. Buildings with below 20 were not included in the list.
the threshold for entering the list (Miterani 2008). However, in the sample collected for this study, there are three observations with lower values. The survey included seven unequally weighted parameters, summed to the overall score (Table 1). To differentiate these parameters from this study’s proposed indicators, they are referred to as ‘original-survey parameters.’ The municipal archive provided original-survey parameters for selected buildings. Since some buildings were missing the ranking chart, this test sample is 65% of all listings, smaller than the other analyses’ sample. These scores demonstrate the uneven distribution of preservation levels across architectural categories.

<table>
<thead>
<tr>
<th>Value</th>
<th>Criteria</th>
<th>Weight</th>
<th>Score</th>
<th>Conservation values degrees</th>
<th>Overall weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectural</td>
<td>Design</td>
<td>2</td>
<td>6</td>
<td>Building according to the style principles, with unique composition and rare details, or a landmark in the evolution of the style</td>
<td>4 to 12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Representation of the architectural style</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Characteristic details, ornaments, high-quality finish materials</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interior/ exterior spaces</td>
<td>1.5</td>
<td>6</td>
<td>Planning of unique interiors with rich details</td>
<td>3 to 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Exceptional planning of the entrance lobby and yards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Typical entrance design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction and materials</td>
<td>1</td>
<td>6</td>
<td>Innovative building techniques in the constructive solution or using rare materials</td>
<td>2 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Mechanical solutions and specific solutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Typical construction method of that time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Architect</td>
<td>1</td>
<td>6</td>
<td>A renowned architect that the building is a milestone in his work or that little body of work remains</td>
<td>2 to 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Renown local architect that dozens of his buildings remain</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Unfamiliar architect</td>
<td></td>
</tr>
</tbody>
</table>

27 Scores of 16, 18.5 and 19.5.
Table 1: Original survey parameters, weights, and possible scores (Author’s free translation)

<table>
<thead>
<tr>
<th>Urban Location 2</th>
<th>Physical condition 0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Preservation complex</td>
</tr>
<tr>
<td>4</td>
<td>Part of a house sequence or with high exposure</td>
</tr>
<tr>
<td>2</td>
<td>Isolated</td>
</tr>
<tr>
<td>6</td>
<td>A structure representing a social idea or important public building</td>
</tr>
<tr>
<td>4</td>
<td>Related to political, cultural, or economic history of the city or state</td>
</tr>
<tr>
<td>2</td>
<td>The building was used as a residential house of an important figure or was built by one of the founding families</td>
</tr>
<tr>
<td>6</td>
<td>Good physical condition</td>
</tr>
<tr>
<td>4</td>
<td>Good physical condition but went through many alterations</td>
</tr>
<tr>
<td>2</td>
<td>Hazard building that requires reconstruction on multiple parts</td>
</tr>
</tbody>
</table>

4.c. Indicators formation

This study incorporates a specific set of relevant indicators for plan 2650b’s evaluation that are available given the existing data.28 These indicators align with the plan’s three declared goals:

1. To use preservation to **expose** the architectural values of the buildings as they were planned or as they were originally built, to preserve the built heritage of the city, and to enhance the architectural level of the city while exposing them to the **general public**.

2. To use preservation as **leverage** to regeneration and urban renewal, including to attract new **economic, cultural, and tourist** activities to the center city.

3. To create **incentives** for the preservation of buildings and **new systems/mechanisms** that are needed to fulfill the Plan.29

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28 Or data available for collecting.
29 The goals stated here are the author’s free translation, from the files of plan 2650b.
Each proposed indicator reflects a specific goal’s success or the extent to which the Plan has achieved it so far. Considering the available data and in light of this study’s limited scope, the indicators focus on goals one and three of the Plan. These are the immediate goals that are most directly related to the outcomes. The second goal is related to more indirect economic and social impacts. A selection of proposed indicators that can be used to assess the second goal, based on the extensive economic-related indicators literature (Rypkema 2011; Ost 2012; Hosagrahar and UNESCO 2019), can be seen in Appendix B.

Due to the limited scope of this study, economic effects are excluded from this research. Accounting for the direct and indirect economic and social impacts of a plan in said area that is still in place today requires extensive financial and cultural knowledge of historical and current trends. For example, other contributing factors must be considered, including possible statutory changes, inflation, and other external factors that might encourage or discourage population changes or economic growth in an unrelated way to the specific plan in question. It requires layering various parameters, and most importantly, multiple past and current valid datasets, some of which are publicly available and some are internal and require collaboration. While such datasets exist for Tel Aviv, to some extent, to be useful in such analysis, they require multiple adjustments since their focus, scope, and scale are not directed towards the specific site and buildings.30

Table 2 presents the relationship between each proposed indicator and goals one and three. Goal one’s indicators are the immediate categorical outcomes, while goal three’s indicators are technical or plan-mechanism-related.

30 Economic-related studies examples are available in PlaceEconomics company’s work and other research reports and are recommended for future analysis.
Table 2: Customized indicators, numbered and with their respective Plan goals

<table>
<thead>
<tr>
<th>Index</th>
<th>Plan’s goal</th>
<th>Indicator</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>% buildings that went through preservation under the Plan beginning 2008</td>
<td>#preserved / #all listings *100</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>% of each architectural style preserved</td>
<td>#preserved-of-category / #all-in-category *100 (for all three styles)</td>
</tr>
<tr>
<td>3</td>
<td>1 + 3</td>
<td>% of restricted preserved % of regular preserved</td>
<td>#preserved-of-category / #all-in-category *100 (for restricted and regular)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>% of styles preserved in regular/restricted</td>
<td>#preserved-of-category-and-style / #all-in-category-and-style <em>100 (for all 2</em>3 options)</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Ground floor size by preservation categories</td>
<td>Median value</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>% preserved with special easements orders</td>
<td>#preserved-of-category / #all-in-category *100</td>
</tr>
</tbody>
</table>

4.d. Spatial analysis

While quantitative indicators provide a general picture of outcomes or effectiveness, they do not offer insights regarding outcomes’ spatial distribution. Outcomes can vary significantly across space due to various factors, such as a listings location in a highly desirable neighborhood or the unique character of the listings in a given area.

Within preservation-related literature, spatial attributes are primarily used to inventory or map the historic area or the selected buildings. Slightly more advanced maps will include categories (legend explaining specific attributes of the listings). Sometimes maps will even go as far as to aggregate the listings into specific areas, districts, or neighborhoods. These tools are effective in displaying the locations of inventoried properties, but it is oftentimes their sole role. Various reports display more advanced uses of spatial tools.31

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31 Such as ones by PlaceEconomics (for example where another data layer, such as population density, is factored) or in the research by Ryberg-Webster of Federal Rehabilitation Tax Credits in Richmond, Virginia, display more advanced uses (Ryberg-Webster 2015).
This study introduces both aggregation-based mapping and density analysis of spatial data. Aggregated mapping, using existing geographic divisions, identifies potential areas that are over-performing or under-performing. The density analysis adds nuance to this initial analysis by identifying smaller areas requiring special intervention, regardless of pre-existing geographic units.

When using pre-defined geographic units, we encounter the Modifiable Areal Unit Problem (MAUP). According to Wong, “The essence of the MAUP is that there are many ways to draw boundaries to demarcate space into discrete units to form multiple spatial partitioning systems” and that different drawn units can result in a range of outcomes (Wong 2009, 2–3). In other words, a change in the dividing geographical units might lead to a change in the results. In addition, the internal distribution of outcomes within each geographic unit is unknown. If, for example, an area has an overall high preservation rate but smaller low-performing areas within it, the density analysis will reveal that. Another case might be that the cause for an entire area’s low preservation rate is a small area, such as a few adjunct city blocks. The density analysis will highlight said area while the aggregated mapping might not.\(^{32}\) The density analysis is a way to account for the MAUP by reviewing both analyses side by side. Furthermore, the units used in this study were not specified for this specific plan. Therefore, they are somewhat arbitrarily drawn with respect to the Plan’s distribution of different-style buildings. Offering both methods, aggregation and kernel density, the research urges planners to choose the scale and areas suitable for their potential interventions and query needs.

\(^{32}\) Depends on the size of the geographic units that are being used for aggregation.
4.d.i. Aggregation to geographic units

Multiple existing geographic units, such as neighborhoods, quarters, sub-quarters, and city blocks, divide the Plan area. However, the aggregation analysis uses two other available geographic divisions relevant to the Plan’s outcomes. The first set of geographic units is UNESCO’s designations zones A, B, and C and the buffer zone, which together comprise the WHS area’s entirety (Figure 11 on the next page). The second set includes the sub-sectors by design features, as given within the nomination files submitted to UNESCO (Figure 10). The first set of units simply asks whether the Plan outcomes vary within the designation area. The design sub-sectors are more informative and probably more important. These areas, created by experts, reflect the ‘districts according to architectural features’ of the city and differ in street grid, property sizes, architectural styles, year of establishment, and historical functions and activities (Tel Aviv Municipality 2002, 34). Therefore, they embed the pre-existing characteristics of each area. There is some overlap between the two units, such as the Bialik area, which is the same as zone C. However, the historic sub-sectors cover more area, to both north and south. The variance in character between these sub-sectors is higher than between the designated zones. Since the Plan’s listings exceed the area of the WHS, the usage of these larger units is needed.

This study utilizes kernel analysis from various possible density-based analysis tools. The analysis, conducted using ArcGIS pro, aims to add nuance to the aggregated mapping while moving beyond the issues in artificial geographic boundaries. The Kernel density method uses quadric distribution on each point in the given sample, creating a raster layer. This layer sums each cell’s value in the observed area for a given radius, divided by the overall points’ number within the same radius (Silverman 1986). In the kernel density analysis, the effect of a given

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33 There are other density options, such as point-density analysis or density-based clustering.
34 For more information about the kernel density tool:
point decreases as its distance increases from the cell under analysis. The kernel tool creates a smooth surface. As research that aims to convey outcomes to planners and non-experts, the visualization’s clarity was a priority. That said, there is more than one way available to account for smaller-scale density or preservation levels.

The input for the kernel density is both the overall sample population and the ‘non-preserved’ sub-group for comparison. The output raster of the not-preserved group is sorted into quantiles (n=10), and the highest quantile is extracted into a shapefile layer. Using the highest quantile is one way to mark the densest non-preserved areas. Each polygon receives a unique ID number and the count of overall non-preserved buildings within it.

The research’s initial assumption is that the kernel test output values will not differ significantly from the aggregated test. Instead, it is that these output maps will complement the aggregated maps and tell a more detailed story of outcomes’ spatial distribution. By identifying underperforming smaller areas, both in maps and in the attached table, the density analysis allows further qualitative and quantitative queries of these smaller city blocks.

4.e. Data

The research’s most needed information is the current set of outcomes for each plan’s listings. As discussed in the introduction, the overall exterior look receives high significance in the Plan-led preservation process. A building may or may not go through a preservation process, according to its owners’ decision. While municipal data are available on an individual building level, an aggregated designated dataset was not publicly available at the time of the study.

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35 Same test can be made using the ‘preserved’ points to map the highest performing areas.
36 The inputs for the kernel density are 5m cells and a search radius of 150m. Inputs ranging from 50m to 200m radius were tested, and are within appendix C.
37 This is one possible way. Values can be sorted by other divisions, according to a set threshold, or to be presented in full. This is a subjective choice that is made to highlight the initial kernel outputs.
Therefore, the construction and aggregation of the dataset were, in most parts, manual.

The creation of the dataset used for the different analyses was a multi-stage process. The first step was to recreate the table of listings from the Plan appendix (scanned pdf in Hebrew only) into Excel (and English). The second step was adding identified attributes that match the proposed indicators to the dataset. These were filled based on publicly available data within the municipal archive, often crossed or compared with external sources (Table 3 below). After completing the tabular dataset, the ‘ggmap’ package in R enabled spatial geocoding of the list (using Google API) while manually verifying each point’s correct location. The data in its spatial form enabled the addition of more attributes by merging (through spatial join) and other geoprocessing tools using ArcGIS.

<table>
<thead>
<tr>
<th>Summary of dataset creation steps:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formatting the original list from the plan’s appendix within an excel sheet</td>
</tr>
<tr>
<td>2. Manually adding outcome and attributes</td>
</tr>
<tr>
<td>3. Geo-coding the data into a shapefile using google package in Rstudio</td>
</tr>
<tr>
<td>4. Adding attributes from other shapefiles &amp; creating ones using geoprocessing tools</td>
</tr>
</tbody>
</table>

Following the indicators described in 4.b., Table 3 presents the collected attributes alongside an explanation and possible inputs:
The study uses multiple sources to determine the preservation outcome for each property since 2008. The first and primary source is the municipality’s online building archive. The archive provides scans of paper documents, organized chronologically and thematically, for each building. While useful, the scanned files are not readable through automated code and are available in Hebrew only. To cross-validate archive entries, which sometimes lack data or provide a partial image of processes, the study uses external sources:

- **Google map street view** that presents pictures of most structures, last updated in 2015. The platform allows verifying buildings that were preserved before or during 2015.

- **External architects, developers, and construction companies’ sites** that elaborate on projects and completion years. Many of these sites include pictures of the preserved

### Table 3: Assembled attributes

<table>
<thead>
<tr>
<th>Assembled attributes</th>
<th>Explanation</th>
<th>Possible inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preserved since 2008</strong></td>
<td>A complete explanation for this row is provided in the text and table 4 below</td>
<td></td>
</tr>
<tr>
<td>Document Year</td>
<td>When possible, the year of the form was used for validation. When it was clear that the process accrued after 2007 but with no distinct end-date mentioned, this attribute is ‘NO_YR’. This part was for internal use and is not incorporated in any of the final analyses, partly due to possible inaccuracies of identifying project completion year.</td>
<td>SPECIFIC YEAR, NO_YR</td>
</tr>
<tr>
<td>How verified</td>
<td>Internal attribute indicating which source provided the needed verification for the ‘preserved’ attribute, stating whether the primary source was the municipal archive or a third party</td>
<td>External_sites, form_4, completion_form, given_prmt, on-site picture</td>
</tr>
<tr>
<td>Usage before (for preserved only)</td>
<td>The active usage of the building before it was preserved.</td>
<td>Hotel_or_vacation_rental, Commercial_or_office, Public, Residential_mixed, Residential_only, Vacant</td>
</tr>
<tr>
<td>Usage after (for preserved only)</td>
<td>The active usage of the building after it was preserved.</td>
<td>Hotel_or_vacation_rental, Commercial_or_office, Public, Residential_mixed, Residential_only</td>
</tr>
<tr>
<td>Ground floor size</td>
<td>Calculation of the GF based on municipal building shapefile</td>
<td>Square meters (SQM)</td>
</tr>
<tr>
<td>Original ranking</td>
<td>(discussed in 4.b., the original-survey parameters scores for listing)</td>
<td>Numeric, range 20 to 60</td>
</tr>
</tbody>
</table>
building during or after construction, sometimes with a ‘before’ picture as well.

- **Preservationist and real-estate oriented sites** that track changes (with before & after pictures)\(^{38}\)
- Dedicated magazine (architecture/culture/lifestyle) **articles** surveying a specific building’s preservation process or completion.
- **On-site photographs** (from 2021, taken by colleagues in Tel-Aviv to author’s request).

In most cases, while the archive supported the final entry, the classification is underscored by an additional source. A summary of the decision-making process and the thresholds used for the ‘preserved’ entry is in Table 4.

<table>
<thead>
<tr>
<th>Available findings</th>
<th>‘Preserved since 2008’ column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction permit + final form (either ‘form 4’ or ‘Completion form’) of comprehensive preservation (not a partial renovation of a floor, for example) Note: Often with supporting imagery found online</td>
<td>YES (OR) IN_PROGRESS</td>
</tr>
<tr>
<td>Permit or renovation-permit with no final form + external source image (and oftentimes description)</td>
<td>161 listings (18% of all)</td>
</tr>
<tr>
<td>A clear indication of preservation from external sources with missing archive documentation (rare)</td>
<td></td>
</tr>
<tr>
<td>One of the three rows above but before 2008 (before plan 2650b) Note: not all preservation before is documented. This is an internal indication and equals NO for analysis purposes.</td>
<td>BEFORE_2008 (no in the analysis) 16 listings, 1.7%</td>
</tr>
<tr>
<td>Partial indication without a way of verification</td>
<td>MAYBE (not in sample) 91 listings, 9.1%</td>
</tr>
<tr>
<td>A clear indication of ELEVATOR addition ONLY (with no additional preservation process). Equal to NO for analysis purposes.</td>
<td>ELEVATOR_ONLY (no in the analysis) 12 listings, 1.2%</td>
</tr>
<tr>
<td>No indication of forms or external sites</td>
<td>NO 701 listings, 71%</td>
</tr>
<tr>
<td>Indication of partial (small) renovation within the building</td>
<td></td>
</tr>
</tbody>
</table>

*Table 4: Decision-making process for the ‘preserved since 2008’ attribute*

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\(^{38}\) Such as [http://www.project-tlv.com](http://www.project-tlv.com) and [https://www.madlan.co.il/](https://www.madlan.co.il/)
4.f. Limitation of Data collection & Sample size

The survey of secondary data sources (i.e., not by surveying the physical sites) proved most successful. The sample of validated-only observation has surpassed the initial expectation of size. However, there were some notable limitations to the data collection:

- **Missing and/or incomplete archive files**
  Files that did not match the address or could not be found. Or, files that some of the forms expected to see in this state of preservation were missing.

- **Inability to account for pipeline projects**
  Some projects received permits but haven’t started (for various reasons). It is unclear in these cases whether they are in progress now, weren’t started yet, or will not start in the future (for example, a developer chose not to move forward with the project after receiving a permit). In addition, the ones that are in progress but haven’t finished haven’t received the final documentation yet, and not always evident/clear from external sources. Where possible, it is indicated in the created dataset if a project is currently in progress. The relatively few cases categorized as ‘in-progress’ regard as ‘yes’ since these projects are most likely to be completed.

- **Limited attribute scope**
  The number of collected attributes is limited. This is due to the limited scope of research and, sometimes, lack of publicly available or organized datasets. Hampel’s advice to limit the attributes and ‘focus only on the questions that will have an immediate impact’ leads this study (Avrami 2019, 47). This cautionary advice proved crucial once realizing the seemingly unlimited number of collectible parameters. Therefore, the devised indicators guided the processes through adjustments to the available data.

- **Built environment features’ correlation**
  While the research covers built-environment characteristics in part, it does not directly
address other layers of urban structures such as public spaces and land uses. Some of these layers are available within the municipality platform. Testing the outcomes correlation to them might yield a better understanding of causes and is recommended for future researches.

- **Evolution over time**

  Reviewing trends over time is a valuable evaluation tool. The initial intent was to use the year of permits and incorporate such analysis. However, the collected years’ validity is less robust than other collected data: the date of permits does not always reflect the actual project completion date, some buildings lack the formal files, and for others, the research relied on informal websites for dates. Therefore, this attribute is only used internally to verify that a project was indeed finished during or after 2008, but not for other analyses. If someone is to perform such an analysis, the date of completion for each preservation project should be verified.

5. Findings

5.a. **Plan 2650b categories and spatial distribution analysis**

The Plan’s categories are not even in size and ratio. Crossing the Plan’s categories, both eclectic and special style buildings have higher restricted level percentages (Figure 12). Among all listings, 29% of all special styles are restricted, 36% of all eclectic, and only 13% of international (Figure 12). It is important to note that these are ratios, and the 104 restricted international buildings surpass the 62 eclectic ones in number.

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39 Through the historic sub-sectors used for aggregation, that differ in characteristics such as urban grid, lot size, and building materials, embed built-environment attributes within them.

40 These figures are not restricted to those that are within the sample, but of the overall Plan’s list.
The Plan’s distribution of the three architectural styles varies across space in alignment with the distinct sub-sectors (seen in Figure 5). The northern area of the Plan includes few eclectic buildings. In contrast, the southern area, divided by Bugrashov St., displays fewer international-style buildings (Figure 5). The spatial distribution of the Plan’s categories across areas is presented in Figure 14 and Figure 15. UNESCO’s designation zones include few eclectic-style buildings, with the ones are included located mainly within zone C (Figure 14). The highest number of restricted buildings, 60, is located within the buffer zone and not the three designation zones (Figure 14). From the historic sub-sectors, the Red City presents the highest amount of eclectic buildings. The Red City and the Central White City sub-sectors have the highest amount of restricted buildings, but as the bars indicate, the ratio of restricted to all is higher within the Red City (Figure 15). As seen in Figure 15, the Red City contains most of the eclectic style buildings, which explains the high percentage of restricted buildings within that area.

Figure 12: Preservation level by architectural style
Figure 13: Listings by architectural style

<table>
<thead>
<tr>
<th>Architectural Style</th>
<th>Regular level</th>
<th>Restricted level</th>
</tr>
</thead>
<tbody>
<tr>
<td>International style</td>
<td>86.1%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Special style</td>
<td>70.2%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Eclectic style</td>
<td>63.8%</td>
<td>36.2%</td>
</tr>
</tbody>
</table>

Overall Plan's Listings = 981

<table>
<thead>
<tr>
<th>Architectural Style</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eclectic style</td>
<td>75.7%</td>
</tr>
<tr>
<td>Special style</td>
<td>17.4%</td>
</tr>
<tr>
<td>International style</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

Overall Plan's Listings = 981
Since the original survey scores dictated the level of preservation of a building, it is not surprising that these scores differ between eclectic and non-eclectic buildings. The research examines the original survey scores for each building to understand the uneven distribution of restricted buildings between styles.\textsuperscript{41} It does so by dividing the collected scores into eclectic and

\textsuperscript{41} For 65\% of all listings, where this data is available.
non-eclectic and reviewing each parameter’s average score (Table 5). As seen in Table 5, the total mean value for eclectic buildings is two points higher. Reviewed by parameters, four parameters have a higher mean score for the eclectic group.

Multiple reasons could account for this gap. The evaluation of architectural design, the architect’s importance, and the historical significance of a building are all dynamic and subjective. The archive files containing the ranking do not include the reasoning or written narrative for these scores. The lack of written explanation and the nature of these parameters calls for qualitative research if one wishes to explore these differences. While examining alterations to the Plan, the original survey ranking could be revisited and re-examined. It is possible that the weights given to each parameter need to be adjusted or that the parameters themselves might be altered. The Plan still follows the ranking given within the original survey in 2003. By relying on this ranking and keeping the existing division of restricted and regular level, the municipality de-facto accepts that no change in stated values or expert opinion has occurred within the years that passed.

<table>
<thead>
<tr>
<th>Original survey parameters mean scores by eclectic and non-eclectic</th>
<th>1. design</th>
<th>2. interior/exterior spaces</th>
<th>3. construction and materials</th>
<th>4. architect</th>
<th>5. location</th>
<th>6. historical or social value</th>
<th>7. physical condition</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eclectic (112 rows)</td>
<td>7.5</td>
<td>4.1</td>
<td>2.6</td>
<td>3.1</td>
<td>11.4</td>
<td>0.8</td>
<td>1.3</td>
<td>31.2</td>
</tr>
<tr>
<td>Non-eclectic (533 rows)</td>
<td>6.6</td>
<td>4.0</td>
<td>2.6</td>
<td>2.9</td>
<td>11.0</td>
<td>0.5</td>
<td>1.3</td>
<td>29.2</td>
</tr>
</tbody>
</table>

*Table 5: Original survey scores by the survey parameters, for a sample of 65% of all listings*
5.b. Customized quantitative indicators of effectiveness for plan 2560b

The methods section included six proposed customized indicators to account for the Plan’s effectiveness. Figure 16 presents the indicators’ calculated values based on the collected sample. The first indicator, 18% preserved since 2008, suggests that the Plan’s effectiveness can still be improved after the 13 years since its activation. As explained in the introduction, ‘preserved’ in this context is a building that went through an overall preservation process. To someone who is familiar with the center-city area, it is probably not surprising that the Plan has not reached full implementation since non-preserved buildings are evident. And yet, the low overall level of the policy is somewhat surprising. The second indicator values are less predictable.

![Figure 16: Percentage preserved since 2008, indicators 1 to 4 results](image)

Figure 16: Percentage preserved since 2008, indicators 1 to 4 results

42 A process that must have included its exterior.
While eclectic and special architecture buildings enjoy higher preservation ratios, the international style displays the lowest value. It is surprising since this is by far the largest group within the Plan, and more importantly, the style that is most linked to the White City notion (and designation). The Plan mainly aims to protect international-style buildings. Indicators three and four help explain, in part, these general results. The preservation rate of restricted buildings is 29% compared to the 15% of regular ones. As seen in Figure 12 on page 33, the percentage of restricted buildings is the lowest within the international style group. When crossing restricted and styles (indicator 4), we can see a 43% preservation rate of restricted-eclectic buildings. The regular-international group has only a 12% preservation rate. This group accounts for the majority of the sample (and overall listings) of the Plan. Its performance is by far the lowest and heavily affects the Plan’s overall effectiveness.

Practically speaking, it is not likely that any of these indicators will ever reach 100%. First, in an urban setting with multiple private owners, a 100% preservation rate is unrealistic. As Salinger covered, factors such as multiple owners per building play a role and affect preservation probability (Salinger 2011). Second, a small number of the listings went through some form of preservation prior to 2008. A building renovated in the 90s is less likely to go through an additional one in the observed timeframe. Since the Plan states no numeric target or targets over time, the baseline for analysis is subjective, as further discussed in the conclusion part.
The fifth indicator explores differences between preserved and unpreserved buildings’ ground floor size, with findings indicating that larger ground floor linked to preservation. The study examined median ground floor size for the listings, grouping them by preservation, usage, and preservation level (Figure 17). The median ground floor size of buildings that went through preservation is 28 sqm higher than that for those that have not. For the preserved buildings’ subgroups, there is a difference between buildings that changed their function and those that haven’t. This gap is a significant one of 48 SQM. A possible explanation for this gap is that a larger floorplan allows higher programmatic flexibility. When grouping the floor size by restricted and regular preserved buildings, the restricted value is 30 SQM higher than the regular level buildings. The rights transfer mechanism for the restricted level buildings is a floor-area-based one. Restricted buildings’ floor areas’ potential value may play a larger role than in the

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43 While this indicator reviews the ground floor, it indicates the potential overall SQM of the building that can be built on the lot, since it is in most cases a multiplication of the ground floor area by the available floors.
The sixth indicator presents the higher preservation level of buildings that received special-note variances. This is a rather small group of buildings (38 observations of the sample) that received some form of building rights variance within the ‘special-note’ column of plan 2650b’s appendix. Generally, the notes can be of an additional variance (38), a legal note (4), elimination of the Plan’s incentives to the property (14), or added restriction (2). Buildings that received the potential variance note have a high preservation rate of 44%. This rate surpasses all other sub-categories reviewed in indicators 1 to 4. It is not stated why these particular buildings received the special variances. A simplified conclusion from this indicator would be that added area rights will increase preservation probability. However, these added areas are given for various reasons. One, for example, states: “completion of the third floor in remission to the façade line, as well as partial addition in the columns floor are permitted” (Tel Aviv Planning Agency 2008b). A more complex but research-worthy conclusion might be that further (limited) customization of the listings’ incentives can result in higher efficiency rates. The particular reasoning or process that led to these variances might dispute or underscore this conclusion. One can also discount this group as too small for inductive reasoning; an in-depth qualitative review of this group might prove otherwise.

5.c. Spatial analysis of 2650b plan

The research uses two methods for spatial analysis: aggregation and kernel density. The aggregation method includes identifying two relevant geographic units and creating a ratio of preserved versus all listings for each set of units. The central sub-sectors, named ‘Central White

\[44\text{ Author’s free translation.}\]
City’ and ‘Lev hair’, display low preservation rates of 13% and 18% compared to others (Figure 18). The southern sub-sector Red City, which has higher totals of eclectic style buildings, displays a higher rate of 27%. When reviewing the UNESCO designation zones’ ratio, zones A and B have low preservation rates of 13% (Figure 20). Within the subgroup of restricted level listings, Central White City and Lev Hair sectors display higher values, but the Red City sector still surpasses them (Figure 19). Within designation zones A and B, the ratio for the restricted level increases to 21% and 36% (Figure 21). The spatial findings align with the categorical trends covered within the indicators section. However, the spatial distribution of said trends is surprising. The lowest rate occurs within the two largest zones of the WHC site, and more generally in the ‘central White City’ area. As the UNESCO period report explicitly mentions the plan as a protective tool, these findings contradict preliminary expectations.

45 While 18% is the average preservation rate for the entire sample, as seen in the non-spatial indicators, when reviewed spatially, it is part of the lower rates areas display.
Figure 18 (left): Map of preservation rate for all by historic sub-sectors
Figure 19 (right): Map of preservation rate for restricted level only by historic sub-sectors

Figure 20 (left): Map of preservation rate for all by UNESCO designation zones
Figure 21 (right): Map of preservation rate for restricted level only by UNESCO designation zones
The kernel density analysis largely underscores these initial findings while also providing greater nuance. The kernel analysis identified 12 distinct areas that comprise the highest quantile of non-preserved density (Figure 25). These areas differ in size and number from unpreserved buildings, ranging from 2 to 83 (Table 6). The identified areas vary across the design sub-sectors (Figure 26). Compared to UNESCO’s designation zones, there are four areas within zone A, the largest zone of the WHS, that together encompass 141 observations, 19% of all non-preserved listings (Figure 27). The Red City sub-sector displays different trends within it. It has an overall high preservation rate (as seen in Figure 18) but includes four different high-density non-preservation areas.\(^{46}\) That said, the kernel density output can vary by the size of the raster cells and the search radius used.\(^ {47}\) The identified areas might include underlying phenomena known to municipal planners outside the preservation context that link to the low preservation density. The 12 smaller areas marked by the kernel test allow for further queries, including other available block-level data that the municipality collects.

The kernel output of the non-preserved group is similar to the overall kernel output, as seen in Figure 22 and Figure 23. In other words, as of now, the test marks most of the areas that overall are densest. Since 92% of the listings are categorized as not-preserved, it is the only reasonable outcome. However, kernel density is a tool, and just as with the proposed indicators, its result will alter over time. If, for example, only 30% of the sample is not preserved, the resulting areas will be fewer and will not align with the ‘peaks’ of the overall sample. The kernel test disregards artificial boundaries that might not fit the assessment needs. It is best if used

\(^{46}\) Number 7,10,11,12 on Table 6.

\(^{47}\) The inputs for the kernel density tests used in the study are 5m cells and a search radius of 150m.
regularly, as a monitoring tool, over time to track the change of the densest non-preserved areas.

Figure 22: Map of kernel density for all sample listings
Figure 23: Map of kernel density for non-preserved sample listings
Figure 24: Map of the first quantile of non-preserved density value
Figure 25: Map of the first quantile polygons and sample listings
Figure 26: Map of the first quantile from Kernel & Sub-sectors
Figure 27: Map of the first quantile from Kernel & Sub-sectors
<table>
<thead>
<tr>
<th>Area ID</th>
<th># Non-preserved</th>
<th>Area’s boundaries or location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>83</td>
<td>North to Dizengoff Sq.: including parts of Raines, Frishman, Dizengoff, and King Shlomo streets</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>Southwest Dizengoff sq.: including Ben Ami and Aaronovitch streets</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Shimshon Hashoftim Intersection. *Only two non-preserved buildings</td>
</tr>
<tr>
<td>4</td>
<td>34</td>
<td>Ibn Gvirol, Haneviim, Levin, Dizengoff (bounding streets)</td>
</tr>
<tr>
<td>5</td>
<td>26</td>
<td>Bialik (similar to Zone C or Bialik sub-sector boundary)</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
<td>Yehuda Halevi – hashmonaim Intersection area</td>
</tr>
<tr>
<td>7</td>
<td>46</td>
<td>Alenbi, Gruzenberg, Shefer, Hacarmel (bounding streets)</td>
</tr>
<tr>
<td>8</td>
<td>11</td>
<td>Rothschild – Betzalel intersection area</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
<td>Maze and Nahmani streets area</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>Nahlat Benyamin, Ehad Haam, Alenbi, Montefiore (bounding streets)</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Hertzl, Yehuda Halevi, Heichal Hatalmud, Lilienblum (bounding streets)</td>
</tr>
<tr>
<td>12</td>
<td>9</td>
<td>Eilat – Kompert Intersection area</td>
</tr>
</tbody>
</table>

Table 6: Areas with the highest density (1st quantile of 10) of non-preserved buildings

6. Conclusions and recommendations

Despite the rise of the smart city notions and use of data within preservation, there is a gap between the available tools or potential data and the implementation of said tools and data collection. Available examples of preservation policy evaluation at the municipal level are scarce. This research used a case study, Tel-Aviv’s preservation plan 2650b, to explore possible data-based methods to evaluate the effectiveness of an existing plan. It specifically focuses on a site with both local and global significance since the Plan is in part within UNESCO’s World Heritage Site. The research incorporates indicators and spatial methods to answer the question: What factors correlate with the effectiveness of Tel Aviv’s preservation plan? The study proposes three guiding questions to assess Plan 2650b’s effectiveness and possible factors. In light of the
findings, the answer to each question is briefly summarized below.

There is no conclusive answer to the first question--are the Plan’s goals met--although the overall 18% preservation rate indicates that they are not fully or even mostly met. As stated in the findings, a 100% preservation rate is not a realistic expectation in this context. Reviewing this question reveals the shortage of concrete numeric targets of the Plan. When no target is set but generalized statements are offered instead, effectiveness remains open to interpretation by third parties. A major takeaway and recommendation of this study, in addition to the proposed methods, is for the municipality to set such goals.

The second question touches upon the spatial distribution of the Plan. As presented in the findings section, the Plan outcomes vary significantly across space. Furthermore, the low preservation rates are found in the White City areas, whether in the White City’s historic sub-sectors or UNESCO’s designation zones. While the change in outcomes across space is not surprising by itself, the low rates associated with both International-style buildings and the White City area raise questions about the Plan's effectiveness in maintaining the WHS.

The last guiding question concerns pre-existing buildings’ characteristics (and their surroundings) and how the Plan addresses them. The most immediate pre-existing aspect of the buildings is their architectural style. While the Plan classifies them and acknowledges the differences\(^{48}\), the styles’ preservation rates indicate that the Plan fails to fully factor in these differences. If one of the objectives is to preserve different styles at a similar rate, it is not achieved. Alternatively, if the objective is to prioritize international-style buildings due to UNESCO’s designation, the observed trend is the opposite. Once again, the lack of stated objectives leaves this open for interpretation. Another pre-existing condition is the physical state

\(^{48}\) As the difference in the restricted level incentives between eclectic and international buildings calculation.
of the buildings. Though the analysis does not address buildings’ physical state directly, it is one of the seven original survey parameters, but as seen in the findings section, it is the factor given the least weight. It is possible that the 2003 scores for not-preserved buildings no longer reflect their current state. Since the score might be outdated and also receives the lowest weight among the seven parameters, the physical state is not significantly factored into the Plan. The only physical building attribute covered by this study, the size of the ground floor, is positively associated with preserved status. Lastly, there are the built environment characteristics. The design sub-sectors of the spatial analysis incorporate these attributes, including historical lot size and urban grid. As seen in the findings, the sub-sectors' preservation rates vary significantly and align with the clustering of architectural styles within them. The dramatic variance in outcomes between the southern, eclectic-heavy sectors and the central ones indicates that the blanket Plan fails to address the characteristic differences. In other words, implementing the same policy, using the same tools over a fragmented and varied space, results in different outcomes.

Going back to Kitchin’s definition, the effectiveness of the Plan is measured by its goals (Kitchin, Lauriault, and McArdle 2015). Part of the problem with tackling the effectiveness question is that the goals are too broad and do not contain quantifiable objectives. This gap leaves room for interpretation of what the suitable indicators are. The Plan's effectiveness can increase in ways discussed in the text below, but it can also increase or be better addressed if the municipal planner commits to such objectives. That is to say, while some alterations are recommended, the most immediate and cost-free one can simply be restating and detailing the goals.

While the findings assist in answering, to some extent, the research questions, they are

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49 This is not to say nothing is done about buildings’ deterioration- the municipality keeps track on the state of listed buildings, and issue warnings to owners when needed. But, this process is separated and does not effect the Plan structure (it is not a feedback loop but separated maintenance monitoring done occasionally, with varying levels of success).
also relevant within the broader research’s contexts. The research sits within three contexts: local, global and methodological. The following parts present relevant findings for each context and extend beyond the immediate results to include other examples, recommendations, and future research possibilities.

6.a. Local context

The Plan’s efficiency level changes significantly throughout the categories and thorough its area. International-style buildings, in general, and the White City historic area (and designations zones A and B within them) display lower preservation rates compared to other areas. In addition, restricted level buildings, which constitute the minority of the listings, experience a higher preservation rate than the regular level ones. The southern area, divided by Bugrashov Street, is experiencing higher preservation rates. The highest preservation rate, 43%, is of the restricted-eclectic sub-group.50

A previous study that examined preservation trends aligns, to some extent, with the findings. In her research from 2008, Miterani reviewed permits issued from 1995 to 2006 for four historic areas: Red City, Central White City, Kerem Hateimanim, and Lev Hair. The Red City displayed the highest count of building permits for preservation buildings within these years. In addition, it is the only area where permits to buildings with preservation status surpassed the non-preservation buildings permits (Miterani 2008, 196–97). The method of reviewing overall permits is not identical to the approach taken in this study, and the trends she describes predates the formal legalization of the Plan. Also, the area scope and reviewed legal plans differ. Nonetheless, out of the four surveyed areas in her study, this research’s findings also display the highest preservation rate within the Red City. So, it appears the trends described follow earlier

50 24 of 55 observations in the sample.
preservation trends.

**Possible Explanations**

The causes for the trends described here are likely multiple and intertwined. Though the study does not identify causes, the findings can offer three potential explanations:

- The incentives given to restricted buildings are more appealing and adjusted to developers, in alignment with the findings of previous scholarly work (Salinger 2011).
- There might be a collective favoring of the eclectic style buildings. This inclination towards eclectic architecture can be due to its unique architectural characteristics or appeal to tourists.51 Other possible reasons might be floorplans, location within the city, or other un-identified phenomena. While local and global experts valued the international style, non-expert owners, developers, and buyers might have different preferences.
- The original-survey ranking contains favored eclectic buildings, leading to a higher restricted percentage within this group.

Within these three possible explanations, there is the causality dilemma. Without further research, it is unclear whether the restricted status, which results from the original ranking, caused the higher rate and the apparent ‘favoring’ of eclectic, or vice versa. It is also possible that the high preservation rate is a combination of all.

**Possible Interventions**

While the indicators do not explain the cause for certain trends, they shed light on possible policy interventions or suggest limited pilot programs. These interventions range from overall changes to selected areas or sites:

51 The eclectic buildings tend to differ from one another in a way that might make them more recognizable from the ‘clean’ modern style buildings, though this is a mere assumption. Miterani’s work underscores this assumption. In her dissertation, she conducted a public-opinion survey that found a preference to the eclectic style.
- **Increasing the restricted level group (overall / partial change)**

Restricted level buildings have higher preservation rates. Expanding all or some of their incentives to the overall listings population will most probably result in higher preservation rates. However, this option could increase municipality costs (in lack of revenue). Changing buildings from a regular level to a restricted one also prevents floor additions in buildings or areas that the municipal planner allowed for and might contradict planners’ initial goal of adding height in these places. Alternatively, the change could be limited to a smaller group of regular level buildings based on the original ranking by lowering the threshold score for restricted. A more compelling option is to revisit said ranking and re-evaluate the regular status buildings’ state nowadays.

- **Changing the incentives method scoring (overall change)**

Salinger proposed a new scoring method that will be based on the complexity level of a building’s preservation (upon which he elaborates) that will be used to set different incentives on a scale of 1 to 10 (Salinger 2011). This proposal is one of many possibilities to redistribute the way incentives are applied to all unpreserved buildings.

- **Introducing a third preservation level that combines the regular and restricted incentives in a new way (categorical, added category)**

There are currently two preservation levels to the policy. It is possible to introduce a third, intermediate level that combines the incentives of the two existing ones or creates an entirely different way of calculation. A third level would allow greater flexibility in setting possibly reduced compensation (relative to the restricted one) that is still more alluring than the regular level incentives.

- **Adding a new incentive to international styles buildings (categorical)**

Since the international style is at the heart of the White City designation and has the lowest preservation rate, it is possible to target this specific style. The new incentives can be in an added
area variance for regular level buildings (to simplify, an added floor or half floor to the structure) and added area to the rights transfer calculation for the restricted buildings. A simpler, and probably more productive, way is to allow specified rights transfer additions to all buildings within the style (since added floors can contradict existing legal plans of lots).

- Adding variances in targeted low-efficiency level areas (targeted areas)

Similar to the previous proposal, the municipality can target low-preserved areas, such as zone A around Dizengoff square, with an aerial variance (such as an added legal plan) that will apply only to historic listings within its perimeter.

- Adding a variance to identified structures (single-level based)

The added ‘special notes’ variances assigned to individual buildings within the list are linked to higher preservation rates. Building-based, specialized easements can be added to a chosen group of buildings that are now a high preservation priority. However, this option calls for an in-depth evaluation and can result in owners’ discontent because of the seemingly arbitrary nature of such favoring of a selected group of owners. While this can be true in part for the other categorical proposals on this list, the rationale and reasoning behind them can be easier to justify.

This list does not cover all possible alterations available. These options will benefit from further studies of the presented phenomenon and attempts to unravel the underlining causes. All proposals require appraisals’ expertise and will benefit from a further financial examination of the way incentives are being used today. They stem from the categorical or spatial aspects of the Plan. However, the municipality has various economic and political considerations interwoven in any preservation decision that might not align with some of the suggestions above.

Data & Future research needs

The findings section pointed to missing datasets and possible future research needs. Suggestions include both quantitative and qualitative needs and are summarized here:
Completing the missing (archival) data to include all observations rather than a large sample

Verifying completion year for all listings that went through preservation, for multiple research purposes

Collecting all listings’ accurate usage over time to allow temporal trend analysis

Conducting queries or in-depth case studies of possible set-backs in the low-preserved area identified within the spatial analysis part as the most densest non-preserved areas (Table 6)

Reviewing the preservation process for buildings with special order variance using qualitative methods, possibly with developers interviews, to determine causality

Re-evaluating and examining the original ranking used in the survey

Carrying out additional correlation analysis of preservation outcomes and built-environment features, such as public spaces, with possible use of regression models

Carrying out economic-based/inclined studies that incorporate tourism, GDP, and other relevant financial data in regard to the examined sites, such as the ones suggested in the indicators within appendix B

Tel Aviv collected & shared data

This research emphasizes the importance of periodic monitoring of the preserved assets or area and the collection of the relevant data within a designated system. The collection of up-to-date data, coupled with its regular examination, can allow Tel-Aviv, in particular, and other HUL cities (or those that aspire to become so in the future) to enhance their policies. Policies can be better customized and even dynamic to an extent.

52 This research covered only the preserved buildings.
In the Tel Aviv case, of layered, heterogenous, and scattered assembly of structures, it is simply not enough to store fragments of this data within the general archive system. The archive structure, and the fact that it is solely in Hebrew, prevents researchers from exploring and contributing to Tel Aviv’s preservation processes. While it might be sufficient for the bureaucratic or day-to-day needs of entrepreneurs and planners, it narrows Tel Aviv's collaborative potential. As a designated UNESCO world heritage site, the second modern city to receive this status, Tel Aviv can become a broader inspiration for data collection and usage. It can also gain from the collective global knowledge that interested students and researchers can provide by being exposed to the data.

Tel Aviv already has a beta version of an open data platform (TLV OpenData) that, with varying levels of success, offers parts of the data to download in English. This platform even includes an aggregated version of preservation buildings under different plans. However, without the added up-to-date attributes, the usage of this data is limited.

**Contextual note**

One may argue that the Plan should not be read (or analyzed) as a stand-alone, but rather within the context, and perhaps added listings, of earlier, smaller preservation plans. In addition, the study deliberately disregarded changes that buildings might have gone through before the formal legalization of the Plan in 2008. The Plan is a stand-alone policy in the sense that it provides preservation guidelines and incentives to its stated listings. This research, limited in scope and time, set to evaluate this particular plan and not the entirety of preservation-related legislation the city has ever conceived or legalized. It narrows the results of this research. The results might not reflect the on-site preservation state in full, and in this sense, might intuitively appear inaccurate to experts who are familiar with the site. In addition, the extensive (and critical) use of ratios, rather than mere counting, can also be confusing to some whose perception of the
site is through day-to-day encounters with preserved buildings or pipeline projects. None of this should decrease the validity or importance of the findings but rather frame them accurately for what they are. This is an evaluation of a policy and its implementation. It is possible that previous policies have succeeded in better preserving the international style buildings or perform better within the designation area. A comparative study that includes both this Plan and previous ones and a qualitative query about the possible/main changes between the different plans are recommended.

6.b. Global context

While the indicators proposed within this work and the findings are relevant to the specific context, they can be implemented elsewhere with changes. Cities can alter the methods and steps to create the assessment to suit other urban areas containing multiple listings. Furthermore, the binary ‘yes/no preserved’ attribute, which is at the heart of this research, could be altered into ‘yes/no maintained,’ ‘yes/no endangered,’ or even a categorical output rather than a binary one in other contexts.

The idea of creating local or municipal level indicators to facilitate periodic evaluation is reproducible for other cities. These indicators and spatial tests can complement other global or standardized indicators used for the same area or even the same policy. While global indicators might reflect on various aspects such as cultural issues or financial valuation, smaller-scale indicators can support and inform legislative activity.

An up-to-date example of possible global relevance is Asmara, Eritrea. In 2017, UNESCO declared a part of the city a WHS, as ‘a Modernist African City’. There are some similarities between Tel Aviv and Asmara since both were designated for a large agglomeration of modernistic-style buildings and are based on the same two criteria (Tel Aviv Municipality 2002; Asmara Heritage Project 2016). However, the nominated area within Asmara is
significantly bigger: the designated area and buffer zone in Asmara are five times bigger than Tel Aviv’s. The 13 years between the nomination files are evident, with Asmara’s including a specific explanation of a created database and a more elaborated proposed monitoring scheme than Tel Aviv’s nomination. Asmara’s nomination files include a monitoring section that begins with establishing “Key indicators for measuring state of Conservation” (Asmara Heritage Project 2016, 386). This chapter contains four key indicators: the state of the listed property (or infrastructure), management heritage database per property that defines permitted interventions, maintenance permit status, and disaster and risk monitoring. The nomination files explain each indicator and assign it its ideal periodic monitoring needed. Some of the attributes proposed by the AHP are the same as attributes collected or suggested within this study. For example, Asmara’s nomination files call to ‘Provide an overall and accurate picture of actual land use’ (Asmara Heritage Project 2016, 386). The key indicator segment concludes with a partial monitoring result for these indicators. In addition to the indicators themselves, the chapter mentions a database developed by the Asmara Heritage Project (AHP) for multiple purposes, including monitoring.

The detailed indicators mentioned in Asmara’s nomination appear to be a compatible tool to monitor the Plan. However, this section makes no direct mention of spatial analysis to be conducted. The Asmara designation zone is divided into 17 parts (defined as 15 areas, with some sharing the same number), which can easily present an aggregated map of the various indicators mentioned. Furthermore, since a spatial dataset seems to exist, density analysis is possible as well. Lastly, Asmara’s nomination proposal details this monitoring framework. In practice, states do not always follow the ambitious goals they set for themselves once the title is given. Fulfilling

53 The designated area and buffer zone in Asmara are of 1,683 hectares, while in Tel Aviv they are only 337.4 hectare, according to UNESCO official site.
stated goals requires a long-term effort, engagement, and funding of local parties to follow through monitoring. It might require even more to publish such monitoring if progress is not reached as expected and to perform a (somewhat) objective analysis of possible reasons.

Asmara’s WHS management plan is relatively new (proposed in 2016), but there are other WHS cities with existing preservation policies (Asmara Heritage Project (AHP) and Department of Public Works Development (DPWD) 2016). It is not enough to incorporate these tools within newer policies or management plans. Policy evaluations are also not limited to WHS or internationally acknowledged sites. Cities should create datasets and indicators and perform spatial tests to improve existing or impending policies.

As discussed within the study, UNESCO’s HUL approach can also benefit from adjustments to the proposed indicators. The approach and related reports and guides advocate for monitoring, information, and research (UNESCO 2011; Veldpaus et al. 2016). The HUL recommendations state that ‘It is essential to document the state of urban areas and their evolution, to facilitate the evaluation of proposals for change, and to improve protective and managerial skills and procedures’ (UNESCO 2011, 5). However, the variety of pilot projects reviewed, while exploring many themes, did not present a set of local quantitative indicators similar to those proposed in this study.54 The proposed indicators can be a blueprint to integrate with the HUL approach. Furthermore, the need for local customization of indicators perfectly aligns with an approach that aims to promote ‘social and functional diversity’ and acknowledges the variance between places (UNESCO 2011, 3).

54 Especially ones that are centered around a specific, existing policy evaluation.
6.c. Methodological context

The study reviewed multiple proposed preservation-related indicators of general and economic focus. Such indicators’ possible contribution is not in question, but some are too generalized to fit the municipal level, and others are not always relevant. Smaller-scaled and more nuanced indicators for preservation are available, mainly within the economic realm. These are useful to assess the economic impact of a policy, but the financial scope is limiting and does not always fit the specific research needs. In addition, the economic impact is not always the evaluation planners need most. The generalized sets of indicators are a starting point and must be complemented with customized, policy-based ones at the municipal level.

This policy can benefit from an extensive economic valuation but first requires a basic, customized one tailored to its empirical outcomes. Evaluations of preservation policies should address specific parts that are defined or set within said policies. A generalized evaluation of the Plan might not have included the fact that some buildings can exist under the Plan without going through preservation or that the Plan is structured into specific categories. In this case, it would have missed out on numerous critical findings that can offer alterations or highlight further needed research, and the evaluation’s robustness would have decreased.

Generalized indicators allow global comparison, as well as a clear and easier flow of information. They can guide cities in launching their evaluation and monitoring processes. However, for internal, day-to-day usage of cities, a mixture of customized and ‘globalized’ indicators should be used. An example of indicator usage is found within NYC’s OneNYC 2050 strategic plan, which has set indicators for each one of its stated initiatives (NYC 2019).55

55 There are overall 30 initiatives that are within eight main goals.
INDICATORS
NEW YORK CITY WILL MEASURE PROGRESS BY TRACKING THE FOLLOWING INDICATORS:

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>LATEST DATA (YEAR)</th>
<th>TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFORDABLE HOUSING UNITS CREATED OR PRESERVED UNDER HOUSING NEW YORK PLAN, LAUNCHED IN 2014</td>
<td>121,919 (2018)</td>
<td>300,000 BY 2026</td>
</tr>
<tr>
<td>RESIDENTIAL EVICTIONS BY CITY MARSHALS</td>
<td>18,152 (2018)</td>
<td>DECREASE</td>
</tr>
<tr>
<td>SHARE OF NEW YORKERS WHO LIVE WITHIN WALKING DISTANCE OF A PARK</td>
<td>81.7% (2019)</td>
<td>85% BY 2030</td>
</tr>
</tbody>
</table>

Figure 28: An excerpt from NYC 2050 plan, indicators for the initiative of ‘NYC is a patchwork of distinct and diverse neighborhoods as well as a global metropolis’, source: OneNYC 2050 plan volume 4 p.5.

Under one initiative, the NYC plan states three indicators, seen in Figure 28 above. The first and second indicators in this example are based on plans or procedures that are NYC-based. Using this within another context, such as Tel Aviv, will require adaptation. While the third indicators could be easily applied globally, different cultures might have different ‘walking distance’ standards. This example shows that even very ‘simple’ or relatively ‘general’ indicators can and should be customized to some extent to serve the location on which they are used.

Preservation policies can differ greatly from one another. Even the most basic part, the definition of what ‘preserved’ means under a policy, can change from place to place and from era to era. Policy-induced attributes and cultural or social differences make customized indicators crucial.

On the other hand, indicators should remain relatively simple and straightforward. Going back to the NYC example, these indicators and their numeric values can be understood by experts.

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56 NYC 2050 plan, volume 4 of 9: Thriving Neighborhoods.
and non-experts. An overly complicated indicator might not be able to convey its meaning to planners or practitioners. As with all data, indicators are never neutral. The creation or curation of indicators is deliberate, and therefore should be examined or revised throughout time. In this process, the planner, or curator, should strive for a fine balance between the simple and general to the nuanced and possibly more complex. Zegras offered validity and reliability as two ‘critical aspects to consider’ when using indicators (Zegras et al. 2004, 162). Validity is defined as ‘the accuracy in which the indicator measures the concept of interest’ (Zegras et al. 2004, 162). Reliability refers to the amount in which the observations of an unchanged phenomenon will remain the same using the indicators, or in other words that the indicator is not measuring something else (Zegras et al. 2004). Two data-related questions can accompany these core measurements: First, do the data exist and are they up-to-date? Or, can the city successfully assemble robust data for a proposed indicator? Second, and even more important, will the relevant parties successfully use such an indicator if in place? In a tree-falls-in-the-forest sort of way, great indicators that are never in use do not make any noise (or impact). While imperfect and incomplete, the indicators proposed within this study for Plan 2650b strive for such balance. They are a step in the direction of complete indicators formulation for tracking the effectiveness of the preservation policy.
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aviv.gov.il/Forms/%D7%94%D7%95%D7%90%D7%95%20%D7%99%D7%9D%20%D7%9C%D7%9D%20%D7%9E%D7%91%20.pdf


Appendices

Appendix A: Plan 2650b blueprint
Appendix B: Economic, tourism, and culture indicators from literature

A selection of proposed heritage indicators from reviewed literature:

<table>
<thead>
<tr>
<th>Theme</th>
<th>Indicator</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Culture</strong></td>
<td>Number of cultural institutes</td>
<td>(suggested)</td>
</tr>
<tr>
<td></td>
<td>Number of visitors</td>
<td>(Ost 2012)</td>
</tr>
<tr>
<td></td>
<td>Number of added cultural institute within the Plan’s area</td>
<td>(suggested)</td>
</tr>
<tr>
<td><strong>Tourism</strong></td>
<td>What is the total number of tourists that would be considered “heritage tourists” and what percentage do they represent of all tourists</td>
<td>(Rypkema 2011)</td>
</tr>
<tr>
<td></td>
<td>What are the trip characteristics of the heritage tourist including:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of annual trips</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of places visited</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Daily expenditures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total expenditures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How do the numbers from daily expenditures and total expenditures contrast with tourists not considered heritage tourists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are the demographic characteristics of heritage tourists and how do they contrast with all other tourists</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotels carrying capacity</td>
<td>(Ost 2012)</td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td>What is the year-to-year change in property value for residential structures within historic districts as compared to property value change for houses in the rest of the local market not within historic districts?</td>
<td>(Rypkema 2011)</td>
</tr>
<tr>
<td></td>
<td>What, if any, is the “heritage premium” paid for properties within historic districts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vacancy rates</td>
<td>(Ost 2012)</td>
</tr>
<tr>
<td></td>
<td>Number of shops</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of property sales</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultural employment (see page 54 at Culture 2030 indicators report for full description)</td>
<td>(Hosagrahar and UNESCO 2019)</td>
</tr>
<tr>
<td></td>
<td>Percentage of the contribution of private and formal cultural activities to Gross Domestic Product</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage of persons engaged in cultural occupations within the total employed population</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ratio of persons with cultural occupations within the total employed population</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Kernel density, alternative inputs

Alternative radius tested for the Kernel tests (150m radius is chosen for the analysis).