



Datascaping Historic Urban Landscapes towards Spatial Sustainability

The Case of Jaffa's Contested Urban Heritage

Komal Mohan Neeta Potdar

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HERI LAND
Cultural Heritage
and the Planning
of European Landscapes



Dedicated to:

All “once-important things” that transcended place, time, and people.
Journeyed, transformed, adopted or forgotten, oppressed and collaborated with,
commodified and reshaped into new meanings, reaching distant shores,
yet they never truly vanished and silently continue to exist.



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केल्याने होत आहे रे। आधी केलेची पाहिजे ॥

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समर्थ रामदास स्वामी
श्री मनाचे श्लोक

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 - (ii) Social values show a more dispersed pattern, extending northward along the coastline and into North Jaffa and Neve Tsedek, revealing networks of community activity and public engagement within accessible shared spaces.
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 - (iv) Ecological values are distributed primarily along the coastline between Jaffa and Tel Aviv, foregrounding the role of natural systems as among the few spatially accessible and inclusive landscapes within an otherwise intensifying urban environment.
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Lists of Acronyms, Charters and Guidelines, and Glossary of Terms

List of Acronyms	
AHD	Authorised Heritage Discourse
Burra Charter	ICOMOS Charter for Places of Cultural Significance
CoE	Council of Europe
CHS	Critical Heritage Studies
GCP	Ground Control Points
GIS	Geographic Information System
GST	General Systems Theory
HUL	Historic Urban Landscapes
IAA	Israel Antiquities Authority
ICCROM	The International Centre for the Study of the Preservation and Restoration of Cultural Property
ICOMOS	The International Council on Monuments and Sites
IHC	Convention for the Safeguarding of the Intangible Cultural Heritage
IHD	Inclusive Heritage Discourse
IUCN	The International Union for Conservation of Nature
LRT	Light Rail Transit by the NTA Metropolitan Mass Transit System Ltd. for Tel Aviv metropolis
NUA	New Urban Agenda
OECD	Organisation for Economic Co-operation and Development
OUV	Outstanding Universal Value
QGIS	Quantum Geographic Information System (Open Source)
SDG	Sustainable Development Goals
SES	Socio-Economic Status
SoC	State of Conservation reports (UNESCO World Heritage Committee)
SPNI	Society for the Protection of Nature

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List of Acronyms	
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UN-Habitat	United Nations Human Settlements Programme
USGS	United States Geological Survey
UIS	Urban Information System

List of Charters and Guidelines	
1964	ICOMOS Venice Charter- International Charter for the Conservation and Restoration of Monuments and Sites
1972	UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage
1987	ICMOS Washington Charter for the Conservation of Historic Towns and Urban Areas
1987	WCED Report of the World Commission on Environment and Development: Our Common Future (Brundtland Report)
1994	ICOMOS Nara Charter for Authenticity
1998	ICOMOS Burra Charter
2002	ICOMOS Xi'an Declaration on the Conservation of the Setting of heritage structures, sites, and Areas
2005	UNESCO Vienna Memorandum- World Heritage and Contemporary Architecture - Managing the Historic Urban Landscape
2005	UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions
2011	ICOMOS Valetta Principles for the Safeguarding and Management of Historic Cities, Towns, and Urban Areas
2011	UNESCO Recommendation on the Historic Urban Landscapes
2013	UNESCO The Hangzhou Declaration: Placing Culture at the Heart of Sustainable Development Policies.
2015	UNESCO Policy Document for the Integration of a Sustainable Development Perspective into the Processes of the World Heritage Convention
2015	UNDRR Sendai Framework for Disaster Risk Reduction 2015–2030
2015	UN Habitat III Issue Paper 4: Urban Culture and Heritage
2015	UN Transforming Our World: The 2030 Agenda for Sustainable Development. United Nations General Assembly.
2016	UNESCO Culture Urban Futures: Global Report on Culture for Sustainable Urban Developmen.
2017	UNESCO Culture in Sustainable Development: Insights on the Implementation of Article 13
2017	UN Habitat New Urban Agenda
2018	UNESCO - WHITRAP Implementation of the UNESCO Historic Urban Landscape Recommendation
2019	UNESCO Culture 2030 Indicators.
2020	UNESCO World Heritage Centre, ICOMOS, ICCROM, Heritage in Urban Contexts: Impacts of Development Projects on World Heritage Properties in Cities, Agency for Cultural Affairs Japan, and Kyushu University
2020	UN-Habitat Illustrated New Urban Agenda
2022	UNESCO World Heritage Canopy: Heritage Solutions for Sustainable Futures
2023	UNESCO Urban Heritage Atlas: A Tool for Managing Urban Heritage
2025	UNESCO State of Conservation Information System (SOC)

Glossary Of Terms	
Attributes	In the context of the Historic Urban Landscape approach, attributes are the tangible and intangible characteristics of an urban environment, including physical fabric, spatial organisation, natural features, social practices, and cultural memory which contribute to its significance and identity
Capacity building	The process of strengthening the skills, knowledge, institutions, and resources available to communities, organisations, and governance systems to plan, manage, and sustain urban heritage and development effectively
Composite	A reading or representation formed by layering multiple distinct data types or information into a single interpretation that reveals relationships invisible in any one layer alone
Contestations / Contested Urban Heritage and Landscapes	The condition in which competing claims, narratives, or interests over space, heritage, identity, or governance are actively disputed by different actors, communities, or institutions, reflecting underlying power asymmetries and unresolved social tensions
Datascape	An interdisciplinary, design-driven method that visualises and interprets heterogeneous spatial data, integrating informal, relational, and performative urban knowledge; to generate, communicate, and operationalise heritage and community insight into actionable planning outcomes
Dialectic	A mode of reasoning or analysis that examines contradictions, tensions, and oppositions between ideas, forces, or conditions as a means of arriving at a more complete understanding; in urban heritage studies, it refers to the productive tension between competing values, narratives, and interests
Dissonance	In heritage studies, the gap or conflict between official or dominant heritage narratives and the values, memories, and identities of communities whose histories are excluded, marginalised, or misrepresented within those narratives
Divided cities	Urban environments in which physical, administrative, social, or symbolic boundaries separate communities along ethnic, national, religious, or socio-economic lines, often as a result of conflict, colonial governance, or exclusionary planning policies
Dualistic or binary approach	A mode of analysis or planning that frame complex urban conditions in terms of opposing categories. For example, such as heritage versus development, Arab versus Jewish, or preservation versus renewal which does not account for the interdependencies and gradations between them
Epistemics	Relating to the nature, sources, and limits of knowledge. In this research, it refers to how knowledge about the historic urban landscape is produced and held by different urban actors and communities alike, recognising that knowledge is shaped by position and experience, and that tacit and lived forms of knowledge are as significant as formal institutional ones
Heritagization	The process by which places, objects, practices, or memories are designated, framed, and managed as heritage, often involving selective interpretation and the privileging of certain narratives over others
Historic Urban Landscape	As a definition: Understood as the product of historically layered cultural and natural values, extending beyond the historic centre to the broader urban context and its geographical setting As an approach: HUL is a flexible, people-centred management methodology integrating territorial and historic layers with present-day, cultural, and intangible values to balance heritage conservation with sustainable urban development
Inter-disciplinarity	The integration of concepts and methods across disciplines into a single analytical framework
(HUL) Layers	The successive accumulation of cultural and natural values, structures, and practices over time within urban areas
Multicultural	Characterised by the coexistence, within a single urban space, of distinct religious, ethnic, or national communities (without implying integration, equality, or the absence of conflict)
Multi-disciplinarity	Multiple disciplines addressing the same problem from within their own separate methods, working alongside one another without a shared analytical framework

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Glossary Of Terms

Multi-scalar	Operating across, and attending to the relationships between, multiple spatial and temporal scales simultaneously, from the building or neighbourhood to the city and region, rather than treating any single scale as sufficient to explain urban or heritage phenomena
Operative (method)	A method capable of translating conceptual or theoretical frameworks into structured, actionable evidence, such as tools, indicators, or procedures, which can inform planning priorities, evaluation, and decision-making within practice.
Partitioned urban zone:	An urban area physically divided along ethno-national lines as a result of unresolved conflict over sovereignty, identity, and security, producing segregated or segmented communities within a single city.
Resilience	The capacity of an urban system, community, or heritage landscape to absorb disturbance, adapt to change, and recover continuity without losing its essential character, identity, or function
Spatial Sustainability	The capacity of urban environments to sustain social, economic, environmental, and cultural values over time, treating them as lived, negotiated, and contested within the spatial and temporal realm of the city
Trans-disciplinarity	Integration of academic and non-academic knowledge, in which practitioners, policymakers, and communities co-produce knowledge
Valorisation	The process of recognising, articulating, and enhancing the cultural, social, economic, or spatial value of heritage assets, landscapes, or communities, often as part of planning or conservation practice
Specific to Case study: Jaffa	
Atarim	The Tel Aviv-Yafo Development Company for Tourism, Infrastructure and Energy Ltd; the municipal authority responsible for managing and developing Tel Aviv-Yafo's coastline, public spaces, and tourism infrastructure
Bayara-bayarat	Arabic term for orange orchard or cultivated grove; historically central to Jaffa's agricultural economy and cultural identity, the bayarat were a defining feature of the historic urban landscape
Ha Mishlama Le-Yafo	Urban development department of Jaffa, within the Tel Aviv Municipality
Jaffa Dalet	Administrative sub-quarter of Jaffa (Quarter 7) within the Tel Aviv-Yafo municipality; among the lowest-ranking areas on the city's socio-economic index, facing compounded challenges of housing, unemployment, and social deprivation
Jaffa Gimel	Administrative sub-quarter of Jaffa (Quarter 7) within the Tel Aviv-Yafo municipality, denoting a specific neighbourhood district used for planning and statistical purposes
Jaffa/ Yafo/ Jopha	Different transliterations of the same ancient port city: Jaffa is the English and Arabic form, Yafo the Hebrew, and Jopha the ancient Greek and Latin rendering, reflecting the city's layered linguistic and cultural history
Kibbutz	A collective community in Israel, traditionally based on agricultural production and cooperative living; associated with the Zionist settlement movement of the late 19th and 20th centuries
Kikar	A Public square or plaza/ a central open space serving as a focal point for civic and social life
kol kore	Literally 'an open call' in Hebrew; a public announcement or proclamation, historically used to communicate decisions or directives to a community
Kurkar ridges	Lithified windblown sea-sand dunes resulting from transgressive coastlines and forming successive ridges along the shore running from North to South, characteristic of the Israeli Mediterranean coastline and agriculture
Mavat	The Israel Planning Administration's online platform for accessing and reviewing statutory plans, building permits, and planning documentation across Israel.
Mawassi	In Arabic, it means suction, referring to water that has been sucked out to the surface
me'avot yafo	Refers to the historic core of the city, recognised as an archaeological reserve and cultural heritage district
Sabil	A public water fountain or drinking trough, typically associated with Ottoman urban infrastructure and philanthropic endowment, serving travellers, pilgrims, and local residents
Saknat	Residential settlements or dwelling clusters established outside the fortified walls of the Old City of Jaffa during the 19th and early 20th centuries

Summary

Every city reflects a unique configuration of historical, cultural, spatial, and socio-economic processes. Yet many contemporary urban environments face increasingly similar challenges, particularly in historic cities where development pressures intersect with the ethics of conservation, the management of urban heritage, and the pursuit of sustainable urban development and cannot be addressed solely through conventional planning methods. They are especially significant given that over three-quarters of cultural World Heritage sites are located in urban areas (Pereira Roders & Bandarin, 2019; UNESCO, 2023).

While these challenges are increasingly acknowledged within international research directives and policy frameworks, such as the Historic Urban Landscape Recommendation (UNESCO, 2011) (HUL) and the New Urban Agenda (UN Habitat, 2017) (NUA), the methods in which they are conceptualised and addressed often remain normative (Fouseki, 2018). This need for contextual embedding also serves to align local practice with global sustainable urban agendas (Erkan, 2018). Meanwhile, advances in digital technologies and spatial data infrastructures are opening new possibilities for documenting, visualising, and interpreting the complex layers of historic urban landscapes (Corner, 1999; Šćitaroci et al., 2019). Since the discourse on heritage conservation has evolved from object-centered approaches towards process-oriented perspectives (Veldpaus et al., 2013; Zaninović et al., 2018) and Critical Heritage Studies (CHS) increasingly frames heritage as a vector of sustainable urban development (Janssen et al., 2017). Also, as the classical definition of sustainability shows a significant temporal deficiency when examined through a spatial-temporal lens (Najjar, 2019), thus emphasising the need of interdisciplinarity to address this gap by encouraging a critical review. This points to the need for reframing the HUL Recommendation beyond a conservation guideline and as an active spatial sustainability agenda, defined here as the capacity of urban systems to sustain social, cultural, economic, and environmental value over time. Accordingly, this study positions itself as critical-reformist: without rejecting HUL or the broader sustainability agenda, it aims to interrogate their normative ambitions and reveal the contextual and institutional conditions under which they can be meaningfully operationalised in contested urban environments.

The research is grounded in **General Systems Theory (GST)** (Von Bertalanffy, 1969), which conceptualises cities as interconnected and evolving interdisciplinary systems whose cultural, social, ecological, and spatial dimensions must be analysed

relationally rather than in isolation. This systemic perspective is complemented by CHS, which emphasises heritage as a dynamic socio-political process shaping urban identities and development. Together, the two operate at different levels of the same analysis: GST provides the systemic structure through which the city's interdependencies can be traced, while CHS provides the critical lens through which those interdependencies are read as unequal and politically produced. A mixed method strategy and a critical case study method is adopted.

It further positions datascaping as a complementary epistemic method grounded in GST, understood as an interpretive, relational, and performative approach to spatial sustainability, unfolding via iterative, process-oriented engagement with heterogeneous knowledge. Datascaping is understood both as a method (it structures the analysis and visualisation of spatial knowledge) and a scope (it expands the data considered beyond classical heritage surveys to include sociospatial, temporal, experiential, and informal knowledge). As a representational technique, it assembles, relates, and visualises spatial, historical, social, environmental, and cultural knowledge to generate new understandings of place, translating these into planning knowledge. Moreover, it is positioned not only as a representation alone, but as a proactive planning instrument, capable of informing, mediating, and anticipating development pressures while supporting adaptive, inclusive, and context-sensitive sustainability strategies.

Jaffa was selected as a critical case study to explore the dynamics of contested historic urban landscapes. In Jaffa, contestation operates across both ethno-national lines, reflecting the tensions of Arab-Jewish co-existence in Israel's mixed cities and socio-economic divides between communities of varying means, this reframing is not only a planning imperative but a condition for achieving any meaningful vision of shared urban space and spatial justice. As a historic district within the Tel Aviv-Yafo Municipality, Jaffa embodies a deeply layered urban environment, one of the oldest port cities in the eastern Mediterranean and among the few mixed cities in Israel. The city exists alongside the UNESCO World Heritage site of the 'White City of Tel Aviv', reflecting contrasting narratives of cultural heritage and urban development within the same metropolitan context. The rapid expansion of the Tel Aviv metropolis, redevelopment, infrastructure, and tourism-oriented adaptive reuse are transforming the historic urban fabric, while long-standing local communities in the urban partitioned urban zones face increasing spatial segregation, socio-economic marginalisation (Ristic & Frank, 2020). These transformations also reflect processes of heritage-led gentrification, where redevelopment and tourism-oriented investment contribute to rising property values, socio-spatial exclusion, and the displacement of long-standing local communities, particularly Arab residents. Jaffa therefore represents a complex urban setting in which capitalist, colonial, and nationalist logics intersect to shape selective recognition of urban heritage and spatial planning.

Main Findings and Conclusion

The datascaping exercises integrate qualitative and quantitative datasets to visualise complex socio-spatial dynamics within Jaffa's historic urban landscape, revealing patterns that are often overlooked in conventional planning. In particular, they show how recent processes of conservation, adaptive reuse, cultural tourism-oriented activities, urban regeneration and development, and economic revitalisation are reshaping the socio-spatial configurations and exacerbating the spatial homogeneity and socio-economic pressures. Methodologically, these explorations show how datascares generate knowledge relevant to spatial sustainability and planning decisions. By bringing together multiple datasets and perspectives, the datascaping approach makes visible forms of knowledge that are frequently absent from formal planning discussions. It enables the documentation of social dynamics, economic pressures, and cultural perceptions that are rarely captured through conventional spatial analysis but are crucial for understanding the evolving character of historic urban landscapes. While some processes of urban change may be irreversible, the findings suggest that continued development along current trajectories may risk altering key heritage and landscape attributes beyond recovery. In this sense, the method aims to provide critical evidence into planning debates. By foregrounding social processes and local cultural contexts, it encourages more careful and reflective planning practices for an inclusive approach over dominant economic-driven development initiatives.

In conclusion, 'Datascaping HUL' positions datascaping as an epistemic method for contextual integration of HUL recommendations and the NUA for achieving objectives of the urban sustainability agenda. By reframing heritage governance as a spatial sustainability practice through a critical-reformist approach it aims to new pathways in research for effective operationalised in contested urban environments. The significance of datascaping lies not simply in its capacity to visualise nuances of heritage, but in its capacity to reposition that knowledge within the processes through which urban futures are negotiated. Jaffa, in this sense, is a **critical case study with analytical transferability** through which the broader dynamics of contested urban heritage can be examined. While examined through this specific case, the dynamics of contested urban heritage and landscape shaped by ethno-national tensions, socio-economic inequality, and the selective governance of heritage recur, in varying forms, in historic cities worldwide. The insights generated by this research, therefore, can extend beyond the case study and contribute to broader discussions on understanding and addressing contested historic urban landscapes across diverse planning contexts.

Samenvatting

Elke stad weerspiegelt een unieke combinatie van historische, culturele, ruimtelijke en sociaaleconomische processen. Veel hedendaagse stedelijke omgevingen worden echter geconfronteerd met gelijksoortige uitdagingen, met name in historische steden waar de behoefte aan ontwikkeling botst met de ethiek van behoud, het beheer van stedelijk erfgoed en het streven naar duurzame stadsontwikkeling, en waar dit niet uitsluitend via conventionele planningsmethoden kan worden aangepakt. Deze uitdagingen zijn des te belangrijker aangezien dat meer dan driekwart van de culturele werelderfgoedlocaties zich in stedelijke gebieden bevindt (Pereira Roders & Bandarin, 2019; UNESCO, 2023).

Hoewel deze uitdagingen steeds vaker worden erkend in internationale onderzoeksrichtlijnen en beleidskaders, zoals de Aanbeveling inzake Historische Stedelijke Landschappen (UNESCO, 2011) (HUL) en de Nieuwe Stedelijke Agenda (UN-Habitat, 2017) (NUA), blijven de methoden waarmee ze worden geconceptualiseerd en aangepakt vaak normatief (Fouseki, 2018). Deze behoefte aan contextuele inbedding dient er ook toe om de lokale praktijk af te stemmen op mondiale agenda's voor duurzame stadsontwikkeling (Erkan, 2018). Tegelijkertijd bieden ontwikkelingen in digitale technologieën en ruimtelijke data-infrastructuren nieuwe mogelijkheden voor het documenteren, visualiseren en interpreteren van de complexe lagen van historische stedelijke landschappen (Corner, 1999; Šćitaroci et al., 2019). Ondertussen is het discours over erfgoedbehoud geëvolueerd van objectgerichte benaderingen naar procesgerichte perspectieven (Veldpaus et al., 2013; Zaninović et al., 2018) en Critical Heritage Studies (CHS) beschouwt erfgoed steeds meer als een motor voor duurzame stadsontwikkeling (Janssen et al., 2017). Bovendien vertoont de klassieke definitie van duurzaamheid een aanzienlijke temporele tekortkoming wanneer deze vanuit een ruimtelijk-temporele invalshoek wordt bekeken (Nijjar, 2019), wat de noodzaak van interdisciplinariteit benadrukt om deze kloof te dichten. Dit wijst op de noodzaak om de HUL-aanbeveling te heroverwegen, niet langer als een richtlijn voor behoud, maar als een actieve agenda voor ruimtelijke duurzaamheid, hier gedefinieerd als het vermogen van stedelijke systemen om sociale, culturele, economische en ecologische waarde in de loop van de tijd in stand te houden.

Deze studie positioneert zich als kritisch hervormingsgericht: zonder de HUL aanbeveling of de bredere duurzaamheidsagenda te verwerpen, wordt geprobeerd de normatieve ambities ervan ter discussie stellen en de contextuele en institutionele

voorwaarden blootleggen waaronder deze op zinvolle wijze kunnen worden gerealiseerd in omstreden stedelijke omgevingen als een richtlijn die systematisch is ingebed in planningssystemen, bestuursstructuren en sectoroverschrijdende besluitvormingsprocessen die in staat zijn om te reageren op de complexe en omstreden realiteiten van historische stedelijke omgevingen.

Het onderzoek is gebaseerd op de Algemene Systeemtheorie (GST) (Von Bertalanffy, 1969), die steden conceptualiseert als onderling verbonden en evoluerende interdisciplinaire systemen waarvan de culturele, sociale, ecologische en ruimtelijke dimensies relationeel in plaats van geïsoleerd moeten worden geanalyseerd. Dit systemische perspectief wordt aangevuld door CHS, dat erfgoed beschouwt als een dynamisch sociaal-politiek proces dat stedelijke identiteiten en ontwikkeling vormgeeft. Samen opereren beide benaderingen op verschillende niveaus van dezelfde analyse: de GST biedt de systemische structuur waarmee de onderlinge afhankelijkheden van de stad in kaart kunnen worden gebracht, terwijl de CHS de kritische lens biedt waarmee die onderlinge afhankelijkheden kunnen worden geïnterpreteerd als ongelijk en politiek beïnvloed. Er wordt gekozen voor een gemengde methodologische aanpak en een kritische casestudy-methode.

Bovendien wordt 'datascaping' gepositioneerd als een complementaire epistemologische methode gebaseerd op GST, die in staat is om kwalitatieve, kwantitatieve en ervaringsgerichte gegevens uit verschillende disciplines te synthetiseren om sociaal-ruimtelijke dynamieken te visualiseren en weloverwogen, inclusieve en contextgevoelige besluitvorming te ondersteunen. Datascaping wordt beschouwd zowel als een methode (het structureert de analyse en visualisatie van ruimtelijke kennis) als een reikwijdte (het breidt de in aanmerking genomen data uit voorbij klassiek erfgoedonderzoek, zodat ook sociaal-ruimtelijke, temporele, ervaringsgerichte en informele kennis wordt meegenomen). Als representatietechniek brengt het ruimtelijke, historische, sociale, ecologische en culturele kennis samen, verbindt en visualiseert deze om nieuwe inzichten in het stedelijk gebied te genereren, die vervolgens worden vertaald naar planningskennis. Bovendien wordt het niet alleen gepositioneerd als een representatie op zich, maar ook als een proactief planningsinstrument dat ontwikkelingsdruk kan onderbouwen, bemiddelen en anticiperen, terwijl het tegelijkertijd adaptieve, inclusieve en contextgevoelige duurzaamheidsstrategieën ondersteunt.

Jaffa werd geselecteerd als een cruciale casestudie om de dynamiek van omstreden historische stedelijke landschappen te onderzoeken. In Jaffa speelt de omstredenheid zich af langs zowel etnonationale scheidslijnen – die de spanningen weerspiegelt van het Arabisch-Joodse samenleven in de gemengde steden van Israël – als langs sociaal-economische scheidslijnen tussen gemeenschappen met ongelijke toegang

tot middelen; deze herkadring is niet alleen een noodzaak voor ruimtelijke planning, maar ook een voorwaarde voor het realiseren van een zinvolle visie op gedeelde stedelijke ruimte en ruimtelijke rechtvaardigheid. Als historische wijk binnen de gemeente Tel Aviv-Yafo belichaamt Jaffa een zeer gelaagde stedelijke omgeving; het is een van de oudste havensteden in het oostelijke Middellandse Zeegebied en een van de weinige gemengde steden in Israël. Tegelijkertijd ligt het naast de UNESCO-werelderfgoedlocatie 'De Witte Stad van Tel Aviv', wat contrasterende verhalen over cultureel erfgoed en stadsontwikkeling binnen dezelfde metropoolcontext weerspiegelt. De snelle uitbreiding van de metropool Tel Aviv, de ontwikkeling van infrastructuur en de op toerisme georiënteerd hergebruik van gebouwen transformeren het historische stadsbeeld, terwijl gevestigde lokale gemeenschappen in de afgebakende stedelijke zones te maken krijgen met toenemende ruimtelijke segregatie en sociaaleconomische marginalisering (Ristic & Frank, 2020). Deze transformaties weerspiegelen ook processen van door erfgoed aangestuurde gentrificatie, waarbij herontwikkeling en op toerisme gerichte investeringen bijdragen aan stijgende vastgoedwaarden, sociaal-ruimtelijke uitsluiting en de verdringing van al lang gevestigde lokale gemeenschappen, met name Arabische bewoners. Jaffa vertegenwoordigt daarom een complexe stedelijke omgeving waarin kapitalistische, koloniale en nationalistische logica's elkaar kruisen wat leidt tot een selectieve erkenning van stedelijk erfgoed en ruimtelijke planning.

Belangrijkste bevindingen en conclusie

De datascaping-analyses integreren kwalitatieve en kwantitatieve datasets om complexe sociaal-ruimtelijke dynamieken binnen het historische stadslandschap van Jaffa te visualiseren, waardoor patronen aan het licht komen die bij conventionele planning vaak over het hoofd worden gezien. Ze laten met name zien hoe recente processen van behoud, adaptief hergebruik, op cultureel toerisme gerichte activiteiten, stadsvernieuwing en -ontwikkeling, en economische revitalisering de sociaal-ruimtelijke configuraties hervormen en de ruimtelijke homogeniteit en sociaal-economische druk verergeren. Methodologisch gezien laat dit onderzoek zien hoe datascares kennis genereren die relevant is voor ruimtelijke duurzaamheid en planningsbeslissingen. Door meerdere datasets en perspectieven samen te brengen, maakt de datascaping-benadering kennisvormen zichtbaar die vaak ontbreken in formele planningsdiscussies. Het maakt het mogelijk om sociale dynamieken, economische druk en culturele percepties in kaart te brengen die zelden worden vastgelegd via conventionele ruimtelijke analyse, maar die cruciaal zijn voor het begrijpen van het veranderende karakter van historische stadslandschappen. Hoewel sommige processen van stedelijke verandering onomkeerbaar kunnen zijn, suggereren de bevindingen dat voortgezette ontwikkeling volgens de

huidige trajecten het risico met zich meebrengt dat belangrijke erfgoed- en landschapselementen onherstelbaar worden gewijzigd. In die zin beoogt de methode kritisch bewijsmateriaal te leveren voor planningsdebatten. Door sociale processen en lokale culturele contexten centraal te stellen, worden zorgvuldigere endoordachte planningspraktijken gestimuleerd voor een inclusieve aanpak, in plaats van de dominante, economisch gedreven ontwikkelingsinitiatieven.

Samenvattend positioneert 'Datascaping HUL' datascaping als een epistemologische methode voor de contextuele integratie van HUL-aanbevelingen en de NUA, met het oog op het bereiken van de doelstellingen van de Agenda voor Stedelijke Duurzaamheid. Door erfgoedbeheer te herdefiniëren als een praktijk van ruimtelijke duurzaamheid vanuit een kritisch-reformistische benadering, wil het nieuwe wegen banen in het onderzoek naar effectieve toepassingen in omstreden stedelijke omgevingen. Het belang van datascaping ligt niet alleen in het vermogen om nuances van erfgoed te visualiseren, maar ook in het vermogen om die kennis een nieuwe plaats te geven binnen de processen waarin over de stedelijke toekomst wordt onderhandeld. Jaffa is in die zin een cruciale casestudie met analytische overdraagbaarheid, waarmee de bredere dynamiek van omstreden stedelijk erfgoed kan worden onderzocht. Hoewel dit onderzoek is gebaseerd op deze specifieke casestudie, komen de dynamieken van omstreden stedelijk erfgoed en landschap – gevormd door etnonationale spanningen, sociaaleconomische ongelijkheid en selectief erfgoedbeheer – in verschillende vormen terug in historische steden wereldwijd. De inzichten die dit onderzoek oplevert, kunnen daarom verder reiken dan de casestudie en bijdragen aan bredere discussies over het begrijpen en aanpakken van omstreden historische stedelijke landschappen in diverse planningscontexten.

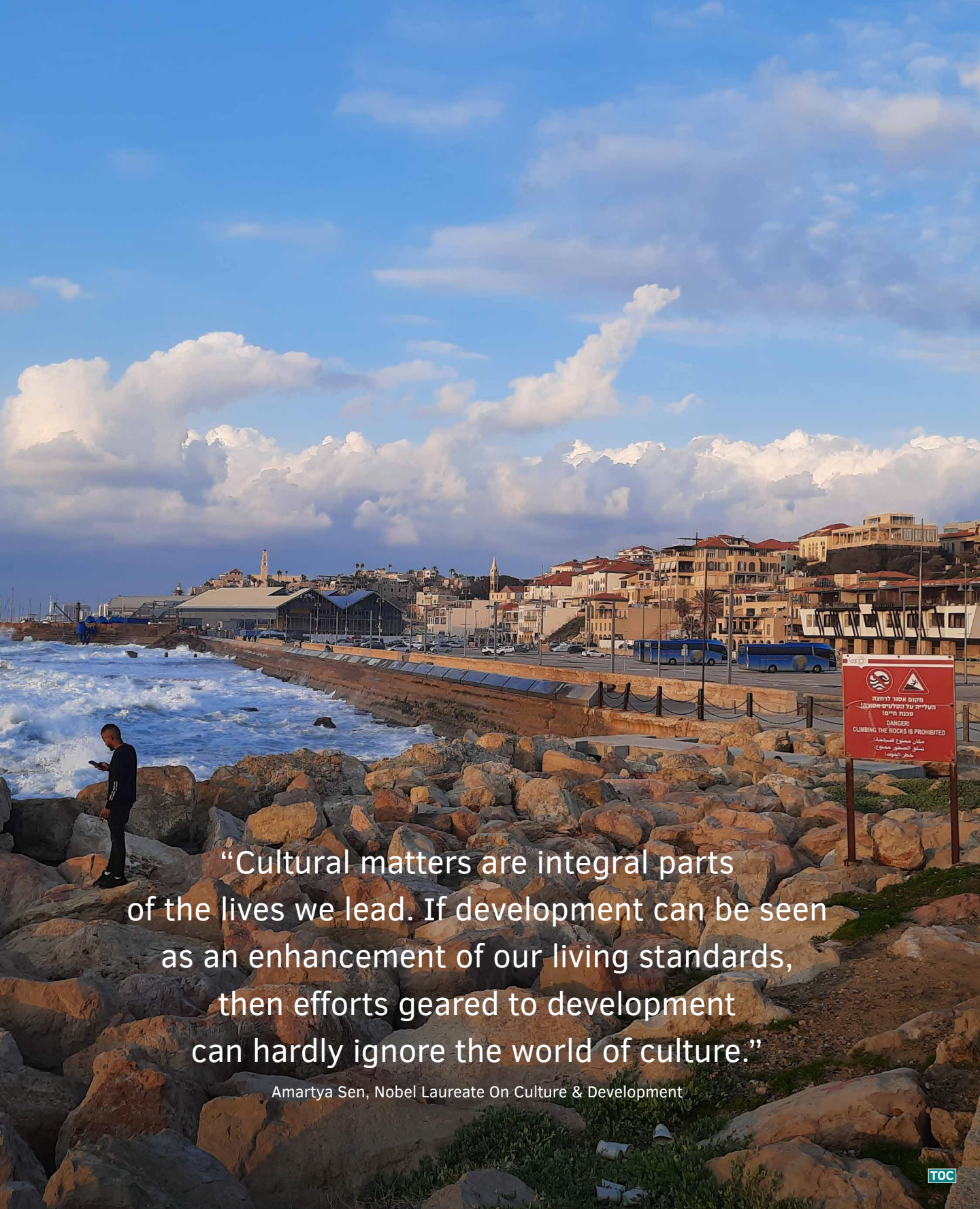


PART A

Introduction and Overview of the Research

Part A provides an overview of the whole research.

Chapter 1 provides the research background, motivation, problem field, research questions, methods adopted and conclusions drawn. It also provides an outline of the research and how the sections and chapters are laid out.



“Cultural matters are integral parts of the lives we lead. If development can be seen as an enhancement of our living standards, then efforts geared to development can hardly ignore the world of culture.”

Amartya Sen, Nobel Laureate On Culture & Development

1 Introduction

1.1 Motivation

Every city is unique, shaped by its history, geography, architecture, culture, and social, economic, and environmental conditions. While cities may share certain characteristics or be connected through various elements, all contemporary cities face a common set of challenges. These challenges are particularly acute in historic urban cores, where development pressures intersect with the need for conservation, noting that over three quarters of cultural World Heritage sites are located in urban areas (UNESCO, 2023). Although over the last decades theories and practice have evolved substantially, expanding from an object-centred approach, meaning a heritage-building-centric driven process of conservation, to a broader process-oriented approach that connects the built heritage to its environment, as well as its socio-cultural values and intangible dimensions, the application of these theories in practice remains limited and requires further attention.

Through training in conservation architecture and professional engagements with national and international governments, I have conducted research and professional engagements for the conservation of urban heritage and sustainable historic landscape planning. This experience exposed me to the persistent theoretical and methodological limitations within urban design, heritage conservation, and cultural landscape studies, highlighting critical gaps that inspired me to pursue further research and innovative approaches to address the evolving complexities of historic cities. Contemporary society is challenged with far-reaching changes, including contestation, migration, fragmentation, digital connectivity, and environmental degradation. Many examples of cities across the globe, from Venice and Barcelona facing tourism and flooding pressures, to Jerusalem grappling with contested heritage and socio-spatial inequalities, to Delhi and Mumbai confronting rapid urbanisation and informal settlement growth, and Tokyo navigating densification and seismic risk, reiterate on the growing need for methods that account for complex, layered, and rapidly changing urban challenges. Along with this, while these challenges are increasingly acknowledged within international research and policy frameworks, the ways in which they are conceptualised and addressed often remain normative and ambiguous to local contexts.

This dissertation reiterates this, as an outcome of the project HERILAND¹, a Marie Skłodowska-Curie action within the European Union's Horizon 2020 research and innovation programme. It aimed to address the challenges that current urbanised worlds face and their impact on culture, heritage, historic urban landscapes, and planning. HHERILAND was designed to underscore the importance of integrating interdisciplinary, applied research methods by involving research-based approaches with urban and rural development and into democratic decision-making processes, while recognising that such integration is often constrained by institutional, political, and power-laden planning contexts (Heriland, 2019). The project also aimed to bridge theory and practice through empirical research, secondments, and living labs, and encouraged interaction with local actors and professionals.

With these goals, as an Early-Stage researcher in the project, I conducted this research, **'Datascaping Historic Urban Landscapes for Spatial Sustainability: The Case of Jaffa's Contested Urban Heritage'** (Hereafter 'Datascaping HUL'). To translate HERILAND's objectives into practice, the historic city of Jaffa, Israel, was selected as an empirical case, given its rich architectural, archaeological, and socio-cultural heritage, along with its multi-scalar contestations and urban complexities. I sought to go beyond the popular but reductive narrative of 'Jaffa Oranges'² to examine the Israeli-Palestinian history and conflict, its socio-spatial repercussions on the mixed cities in the State of Israel and the Arab population, along with its complex socio-spatial, political, and cultural dynamics. Along with this, objective of the City Vision Plan of the Tel Aviv-Yafo municipality (2017) "... to create a space of shared existence and mutual respect integrated within the city" became a central point of inquiry through which broader questions of heritage, coexistence, and spatial justice were explored (Tel Aviv-Yafo Municipality, 2017). Given my inclination towards policy and urban planning through a heritage lens, this required me to engage deeply with local planning frameworks and documents, while decoding the local planning discourse and context, both literally and figuratively, to identify and understand the key areas of focus for the research.

¹ HERILAND is a pan-European research and training network on cultural heritage in relation to Spatial Planning and Design. It is funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 813883. Website: www.heriland.eu; <https://cordis.europa.eu/project/id/813883/fr>

² In 19th Century Ottoman Palestine, the city of Jaffa became well known for the cultivation of the Shamouti orange, a sweet, almost seedless citrus fruit with a thick peel. First developed by Palestinian Arab growers during the 1840s and 1850s, the fruit became a significant global export, with output rising from small-scale production to millions of oranges by the early twentieth century. Over time, the 'Shamouti orange' came to represent both the strength of Palestinian agriculture and a marker of national identity. The Jaffa orange, long associated with Palestinian agricultural heritage, underwent a process of dispossession in which its groves were seized, its branding altered, and its Palestinian origins obscured. (Yafi, 2025)

1.1.1 **Project HERILAND: Research and Training Network on Cultural Heritage in Relation to Spatial Planning and Design**

The HERILAND project was envisaged on Europe's long-standing tradition of preserving heritage and cultural assets across urban and rural areas, while responding to the complex challenges of the 21st Century. It called for innovative tools, updated training, and interdisciplinary, research-driven approaches that integrate heritage management with spatial planning, business activities, urban and rural development, and democratic participation in decision-making, shaping future landscapes. To address this, the project positioned heritage within five key transformative processes: Spatial Turn, Democratisation, Digital Transformations, Shifting Demographics and Contested Identities, and Changing Environments, identified as critical to contemporary heritage management. Through this framework, HERILAND aimed to train fifteen early-stage researchers with both theoretical and practical expertise via research seminars, living labs, and secondments with public and private partners. In doing so, it established a pan-European, transnational, interdisciplinary, and cross-sectoral standard for research and training. Ultimately, the project aimed to develop a transferable research design for multinational heritage management aligned with the Sustainable Development Goals, advance innovative analytical concepts and tools through real-world application, and equip researchers and practitioners with the skills needed to support co-creative approaches in spatial heritage planning (Heriland, 2019).

'Datascaping HUL' falls within the scope of the work package of 'Digital Transformations', with a primary focus is on the data-drive approaches to addressing issues of urban heritage and spatial planning. However, given the case study of Jaffa and its contested landscape, there were implicit theoretical linkages with 'Spatial turn' and 'Shifting Demographics' work packages, making it transdisciplinary research. The working title 'Datascaping Methods for Heritage Planning Professionals' was designed to comprehensively define and document urban heritage, encompassing attributes (what to conserve) (Patricia & Turner, 2012; Turner, 2018, 2023) and values (why to conserve) (Veldpaus, 2015; Veldpaus & Pereira Roders, 2017), its current or potential contribution to local life and identity, and strategies for prioritising community needs with use of data and digital tools. Grounded in established theoretical frameworks, the study evaluates interventions promoting a safe, inclusive, resilient, and sustainable urban environment in line with the SDGs, building a rationale for this approach while examining its relevance, transferability, and limits.



FIG. 1.1 The HERILAND consortium at the kick-off meeting in Amsterdam, The Netherlands, October 2019; Source: Heriland.eu

HERILAND
Cultural Heritage
and the Planning
of European Landscapes



FIG. 1.2 HERILAND transdisciplinary Ph.D. research addressing various case studies across several countries and regions: The Netherlands, United Kingdom, Sweden, Poland, Italy, Greece, Israel, and India

1.2 Research Background

Over recent decades, a spatial turn in cultural sustainability (Gould, 1996; Tally Jr., 2013; Warf & Arias, 2009; Young & Stevenson, 2013) has shaped international guidelines for managing and preserving urban heritage. Consequently, theories have expanded across disciplines, to encompass social, environmental, economic, and cultural dimensions. However, much of this expansion has remained methodologically anchored in conventional spatial representations; and bodies of literature spatial planning and heritage-specific discourse rarely examine their integration (Auclair & Fairclough, 2015; Fairclough, 2008; Janssen et al., 2017a).

The HUL Recommendation marks a significant milestone in this trajectory, positioning urban heritage as a catalyst for socio-economic development and sustainability (Ginzarly et al., 2018; Pereira Roders & Bandarin, 2019; Sonkoly, 2017) and has been variably adapted within the UN's 2030 Agenda, the UNHABITAT's New Urban Agenda (UN Habitat, 2017), and UNESCO's Culture 2030 indicators (UNESCO, 2019), which underscore the critical role of 'Cultural Sustainability' in achieving sustainable development goals. Central to this is the concept of cultural heritage as a vector proposes it as a dynamic narrative force that connecting identity, memory, and tradition to guide development, rather than preserving physical structures alones (Janssen et al., 2017a). This repositioning, however, reflects a normative shift that is not without conceptual ambiguities and tensions, particularly in how heritage is mobilised within broader development agendas. The translation of these directives into operational processes remains uneven, particularly against Target 11.4³ and successful application depends on careful contextual embedding to specific conditions (Bianca, 2015). In this regard, this study positions itself as critical-reformist: without rejecting HUL or the broader sustainability agenda, it aims to interrogate their normative ambitions and reveal the contextual and institutional conditions under which they can be meaningfully operationalised in contested urban environments.

'Datascaping HUL' responds to this gap: grounded in the HUL Recommendation and General Systems Theory (§ 2.1.1), it positions datascaping as an epistemic method, treating cartographic documentation not as a recording tool but as a means of

³ Target 11.4 seeks to "strengthen efforts to protect and safeguard the world's cultural and natural heritage," emphasising the preservation of historic sites, cultural landscapes, traditions, and ecosystems as integral components of sustainable urban development to realise SDG 11 to "make cities and human settlements inclusive, safe, resilient and sustainable". This is achieved by addressing challenges related to housing, transportation, urban planning, environmental impact, disaster risk reduction, and access to public spaces, with a focus on equitable and sustainable urban development (UN, 2015b; UN Habitat, 2017a).

constructing knowledge. Unlike conventional GIS and UIS methods, which prioritise standardised, quantitative, and administratively legible datasets, datascaping operates as an interpretive, design-driven approach that integrates informal, relational, and action-oriented urban knowledge (§ 2.3.2 for working definition). By revealing cultural values, socio-spatial configurations and spatio-temporal layers that are often obscured in conventional spatial analytics, datascaping directly addresses the gap between idealised notions of rational planning and the real, power-laden rationalities through which decisions are made (Flyvbjerg, 1998). Without such approaches, planning and decision-making risk remaining reductive, technocratic⁴, and detached from lived urban experiences.

Jaffa, a historic district within the Tel Aviv-Yafo Municipality, selected as the critical case study for this inquiry as exemplifies a historic city and urban landscape where urban heritage is contested and is deeply intertwined with social, cultural, historical, geo-political dynamics. Its stratified history sits in tension with both the UNESCO World Heritage inscription of the 'White City of Tel Aviv' and the rapid expansion of the Tel Aviv metropolis, exemplifying how capitalist, colonial, and nationalist logics intersect to shape the selective recognition of heritage. It examines how capitalist, colonial, and nationalist logics intersect to shape processes of heritage recognition and socio-spatial marginalisation (§ 5 and 6). As such, Jaffa represents the many contested mixed cities in the State of Israel but also encapsulates within its urban fabric the historical, political, spatial, and cultural tensions that characterise contested historic cities globally (§ 2.3.4 for working definition). Contested heritage and landscapes encompasses not only spatial transformation, but also the economic, environmental, political, and socio-cultural dynamics that shape urban life; extending beyond political boundaries and conventional definitions of spatial planning. Such cases of historic cities with contested landscapes that are characterised by spatial issues, or by segregation and spatial homogeneity and is insufficiently addressed within conventional spatial planning processes (Whitehand, 2010), and by limited scholarship on the practical, contextual application of the HUL framework's tools⁵ (Šćitaroci & Šćitaroci, 2019). 'Datascaping HUL' addresses this gap.

⁴ Flyvbjerg critiques the idealised notion of rational planning as overly technical and abstract, arguing that real-world decision-making is shaped by power, interests, context, and values. He highlights that "rationality" in practice is situated, relational, and contingent, and that acknowledging these real-world dynamics is essential for more reflective, democratic, and effective planning processes (Flyvbjerg, 1998).

⁵ HUL Recommendation identifies a set of four categories of tools designed to support its implementation and integration in urban heritage conservation and sustainable development: "Civic Engagement Tools (Instruments that involve a diverse cross-section of stakeholders), Knowledge and Planning Tool (Tools that support the documentation, mapping, analysis, and monitoring of cultural, natural, and social characteristics of urban areas), Regulatory Systems (Legislative and policy instruments tailored to local conditions), Financial Tools (Economic and funding mechanisms aimed at building capacity for heritage conservation)" (UNESCO, 2011, 2016)

1.2.1 Problem Field

The Brundtland Report (WCED, 1987) presented the classical definition for sustainability (meeting the needs of the present without compromising the ability of future) with an emphasis on economic, environmental and political dimensions of international development. Studies have since challenged this classical framing for disregarding cultural identity and historical continuity (Najjar, 2019; UNESCO 2019), while recent developments underscore the critical role of cultural sustainability in achieving sustainable development goals. Yet the spatial and temporal dimension remains the least articulated across both the classical and the culturally-extended framing (Hillier, 2009), pointing to the need for reforms for multi-spatial aspects of sustainability, namely, economic, ecological, social and cultural. Spatial sustainability is such an approach which aims to balance these aspects, without treating them as abstract but as lived, represented, negotiated and contested within the spatial realm of the city, and evolving along the temporal dimension.

“The spatial conditions of a city can enhance its power to generate social, economic, and environmental values and well-being” (UN-Habitat, 2020).

'Datascaping HUL' foregrounds Spatial Sustainability in this sense, documenting the cultural and historical identity of a place that provides the temporal grounding against which future development and contestation can be evaluated and reconciled (Working definition in § 2.3.3). However, the methods for effectively integrating urban conservation within sustainable urban development agendas remain insufficiently developed. Understanding why heritage management and planning continue to fall short of this integrated ambition requires examining the problem from several angles, as follows:

1.2.1.1 Urban Heritage and Need to Reframe of HUL Recommendation

Despite the emphasis on heritage as a vital component of sustainable urban development and the HUL Recommendation, it continues to be framed in ways that risk becoming normative, privileging symbolic or iconic sites. Traditional conservation and planning frameworks, in turn, remain anchored in static, dualistic approaches that fail to capture the interdependent, dynamic, and contested nature of historic cities. There is a need to further elaborate and emphasise on 'character', the distinctive qualities, identity, and attributes that give a historic area its unique sense of place and the role of the broader urban context (Fouseki, 2018). Many scholars argue that the limited adaptation is further challenged by the breadth of its conceptualisation, the difficulty of applying international guidelines across diverse

local contexts, conflicts with local regulations or traditional practices, and the practical limits of broad stakeholder consultation. This ambiguity highlights ongoing tensions between conservation priorities and contemporary urban development. Furthermore, dissonant and contested heritage are often not included in HUL Recommendation, which prioritise the illusion of ‘harmonious coexistence’ by emphasising physical and visual relationships, thereby overlooking the underlying conflicts and tensions within complex urban landscapes (§ 3.2.2 and 3.3).

In Jaffa: The case of Shuq Ha Pishpashim is an example of urban conservation justifying the need for densification and overriding the local regulations. The restored Clock Tower standing next to the market's decaying buildings sums it up: preservation here is selective and symbolic, to promote tourism while pushing out the market's informal, predominantly historic Arab trading character. Gentrification and a fragmented urban fabric will be in unintended consequence, as a result of privileging symbolic markers over the Jaffa's multi-cultural heritage (§ 6.2.2.1).

1.2.1.2 Urban Conservation and Planning Frameworks: Limitations in Addressing Spatial Sustainability

The administrative aspects of heritage conservation practice often overshadow the cultural richness and profound meaning associated with heritage, emphasising the need for holistic practices which focus on social, cultural, ecological, and economic aspects of the historic environment (Wells, 2017, 2020). Studies⁶ underline the importance of addressing spatial, social, cultural, institutional, and financial frameworks within urban environments to bridge gaps between urban heritage and sustainable development (UNESCO WHC, ICCROM, IUCN, 2020); while stressing on exhaustive documentation of HUL attributes and tailored approaches rooted in its local context (Fouseki et al., 2020; Turner & Tomer, 2013).

⁶ The international experts meeting “Heritage in Urban Contexts: Impacts of Development Projects on World Heritage properties in Cities” took place in January 2020 at Kyushu University, Fukuoka, Japan: co-sponsored by Japan's Agency for Cultural Affairs and Kyushu University in cooperation with the UNESCO World Heritage Centre, ICOMOS and ICCROM. The experts' meeting focused on ways to assess the impact on the OUV and heritage values of development projects in and around World Heritage properties in cities by considering (i) the guidance documents for the implementation of the HUL Recommendation, (ii) strategies and guidance for better integration of Management Plans for urban World Heritage properties in the urban development plans and processes and (iii) implementation of UN Sustainable Development Goals, specifically Goal 11, and the New Urban Agenda at the local level. (UNESCO 2020)

Traditional urban conservation practices have examined the binary components (space and architecture, nature-culture, tangible-intangible, urban-rural). The ongoing reliance on this binary and dualistic categorisation of heritage has hindered the development of integrative perspectives and strategies (Silva, 2010). Within this paradigm, heritage is often approached as a static object rather than as a set of interdependent, dynamic socio-spatial relationships, thereby limiting its capacity to engage with contemporary urban complexity. Although the HUL Recommendation addresses the areas beyond the historic centre, these approaches are insufficient for operationalising spatial sustainability, as they fail to account for the interdependence and dynamic interactions of heritage attributes (Couper, 2017; Silva et al., 2023). This limitation reflects a broader gap in traditional conservation practices where analytical tools capable of integrating social, spatial, cultural, and temporal dimensions remain underdeveloped.

In Jaffa: The Jaffa case demonstrates these limitations concretely: while amendments to the 1965 Planning and Building Law was intended to strengthen site conservation, its implementation by local committees has been inconsistent, and Tel Aviv-Yafo remains one of the few Israeli cities with a dedicated preservation department, exposing the disparities in legislation, resources, and expertise that constrain a genuinely integrative conservation practice (§ 6.2.1).

1.2.1.3 Plurality, Contestation, and Methodological Gaps: A Critical Heritage Study Perspective

Pluralistic attributes of historic cities may be under threat from external pressures of urban development, which can jeopardise the continuity of historical layers, spirit and feeling, and other attributes of urban heritage. There is little evidence on what triggers and shapes the valorisation of historical layers and urban heritage, or how this valorisation varies across communities and stakeholders. (Bertacchini & Saccone, 2012; Meskell & Brumann, 2015). A CHS approach interrogates how heritage values are constructed, negotiated, and contested across different social groups, rather than assuming heritage as a fixed or universally agreed category (Gentry & Smith, 2019; Harrison, 2013). It also reflects the paradigm shift in the discourse on global heritage preservation over the past decades, in which increased complexity in scale, challenges, and operations has exposed limitations in current methods for linking heritage to planning and governance (Meskell, 2013). By foregrounding issues of power, plurality, and contestation, CHS provides the conceptual lens necessary to examine whose values are prioritised in urban heritage planning and how conflicts are mediated within the HUL framework.

This simultaneously highlights the defining trait of modern societies: their inherent plurality, which shapes the spatial and cognitive dimensions essential for shaping their identity and characteristics (§ 2, 3).

In Jaffa: Cases enumerated in Chapter 6 make this contestation evident. For instance, the planning decisions taken after 1948 continue to entrench socio-spatial segregation between Jaffa's Arab and Jewish communities, case of demolition of the Old Customs House, despite its designation for preservation under National Outline Plan, reveal how competing valorisations of heritage are negotiated, and economics takes precedence in practice (§ 6.2.2 and 6.2.3)

1.2.1.4 Challenges for Interdisciplinary and Data-Driven Urban Heritage Planning

Heritage, understood as a process-oriented and spatially/temporally embedded phenomenon rather than a static object (Veldpaus et al., 2013; Zaninović et al., 2018), requires planning approaches capable of matching this complexity. Yet such approaches remain constrained by limited interdisciplinary collaboration and data tools. It often lacks effective collaboration between heritage experts, geographers, environmentalists, sociologists, urban planners, data scientists, policymakers, and community stakeholders. This gap prevents the integration of diverse perspectives and limits the potential contribution of data-driven planning initiatives. Compounding this, the tools available for data-driven planning bring their own limitations. While GIS and UIS have long been used for mapping, analysis, and planning in urban heritage contexts, they remain primarily anchored in quantifiable, administratively legible, and static datasets, excelling at measurable spatial patterns but limited in representing the relational, dynamic, and experiential qualities of historic cities. Amid the current 'digital revolution,' urban practitioners and policymakers can improve decision-making for historic urban environments by mapping data with a socio-spatial component (Engin et al., 2019). However, this advancement brings forth two further challenges: technical and analytical obstacles due to the vast and varied nature of available data, and its applicability and interoperability across the various mandates it must serve.

In Jaffa: These challenges are particularly evident in contested, mixed cities such as Jaffa, where fragmented institutional mandates and the absence of integrative socio-spatial tools have allowed heritage governance to privilege administratively legible, static preservation over the relational and experiential dimensions of a plural, contested urban landscape (§ 6.2.4).

1.2.2 State-of-the-Art in Bridging the Problem Fields

Building on the problem fields outlined in the preceding sections, this research identifies a clear gap in current scholarship on urban heritage and spatial planning, in theory and practice. It highlights the interrelated scholarly domains of urban heritage studies, spatial planning and sustainability, and data-driven applied research as key points of enquiry.

From a CHS perspective, it addresses the limitations of the HUL Recommendation with an aim to advance its operationalising and emphasis on contextual embedding through a spatially explicit and process-oriented methodology. It also incorporates mechanisms to engage local communities and stakeholders to address interdisciplinary, methodological gaps and challenges in balancing conservation with contemporary urban pressures, particularly in contested urban heritage.

In light of spatial planning and sustainability concerns articulated in the HUL Recommendation and global development agendas, it addresses the persistent gap between international heritage frameworks and local planning practices by identifying interdisciplinary opportunities between Spatial Sustainability and the tenets of the HUL Recommendation and the NUA. Analysis and evaluation carried out through secondary research reveal the direct and indirect interconnectedness of HUL attributes with the achievement of the SDGs, thereby answering the hypothesis and emphasising the need for further scholarly research.

By proposing datascaping as a value-added method to the Urban Information Systems or integrating cultural, social, spatial, and temporal knowledge into decision-making, it captures both the historical layers and evolving dynamics of contested urban landscapes. Datascaping is positioned not merely as an analytical or representational tool, but as a proactive planning instrument that can inform, mediate, and anticipate development pressures and support urban development and sustainability goals rather than responding to change only retrospectively.

By doing so, the research contributes to heritage studies, spatial planning, and data-driven urban research by demonstrating how complex socio-spatial dynamics can be analysed, communicated, and embedded in planning processes. It explicitly enables participatory and interdisciplinary engagement, encourage critical review and enables the nuanced exploration and explanation (Fairclough 2008). This approach not only extends the operational capacity of the HUL approach but also bridges conceptual discourse and planning practice through a context-sensitive, design-driven, and spatio-temporally informed methodology.

1.3 Research Framework

1.3.1 Research Approach and Theoretical Underpinnings

‘Datascaping HUL’ is grounded in the epistemic framework of **General Systems Theory (GST)** as articulated by Ludwig von Bertalanffy (1969), which holds that all systems, including biological, social, and technological systems, operate through interconnected relationships that cannot be understood in isolation. The theory challenges reductionist perspectives by emphasising that real-world problems must be examined through a lens of mutual interaction, wholeness, and dynamic processes.

This systems-based approach is particularly relevant to the HUL approach, which acknowledges cities as layered and evolving entities that are shaped by cultural, natural, and socio-political dimensions. It reflects these systemic principles to shape integrated strategies that acknowledge not only the physical fabric of historic cities but also the intangible processes, such as memory, identity, and collective perception, that define them (*Turner, 2018*). The need to go beyond disciplinary boundaries and address the interaction between rural and urban, historic, and contemporary, aligns directly with systems thinking, particularly in metropolitan contexts where pressures of urban growth and heritage conservation intersect and are often contested and where the application of spatial sustainability may provide for safe and inclusive cities.

Positioning the research objectives along with the HUL Recommendation and its four suggestive tools, it adapts the **‘Knowledge and Planning Tool’** that stresses the importance of documenting and collecting information on the attributes and values. Building on this, the study incorporates the principles of visual explanation and statistical reasoning articulated by Edward Tufte (Tufte, 1997, 2020) as well as the potential of information visualisation articulated by Colin Ware (Ware, 2004). It also draws extensively from scholarly literary works in the fields of cartography, landscape urbanism, and design (Corner, 1992, 1999; Shane, 2006), whose work is foundational for understanding cities as a landscape and the power of visual data to inform planning and decision-making. It has roots in the systematic approach to landscape planning that involves understanding the natural characteristics of a site and the relationships between spatial patterns and ecological processes across different scales (McHarg, 1969). Studies argue that well-designed visualisations are not merely illustrative but are analytical tools that reveal causal relationships,

uncover hidden patterns, and guide interpretation (Tufte, 1997). Data visualisation enables users to quickly and clearly interpret large amounts of information when it is presented effectively (Ware, 2004) while mapping can enable designers and planners not just to recognise specific opportunities within the intricate and conflicting aspects of existing conditions but also to bring those opportunities to life (Corner, 1999).

For **datascaping**, as a methodological extension of systems thinking, involves constructing layered, analytical, and performative visualisations that support hypothesis generation, comparative assessments, and scenario testing. Unlike static mapping, datascaping enables researchers and planners to embed data within spatial-temporal contexts, revealing how various cultural, ecological, and socio-economic factors co-evolve across landscapes, beyond historical ensembles and city borders. This capability becomes especially critical in the context of urban heritage, where the relationship between past and present must not only be preserved but also interpreted, communicated, and translated into actionable planning and design strategies. In this regard, datascaping functions serves as an interpretive and interactive framework that enables complex urban information, stakeholder perspectives, and layered spatial relationships to become more intelligible and operational within decision-making processes.

Critical Heritage Studies further informs the research by recognising heritage not as a fixed or neutral category, but as a socially and politically constructed process shaped by power relations, identity, memory, and representation (Smith, 2006; Meskell, 2015). In contested urban landscapes, decisions regarding what is documented, preserved, visualised, or prioritised within planning and conservation processes are inherently selective and often reflect dominant institutional, political, and economic interests (Smith, 2012; Waterton & Smith, 2010). As a result, lived, intangible, and everyday heritage values may become marginalised, reinforcing existing socio-spatial asymmetries. This perspective is particularly relevant to historic cities such as Jaffa, where competing narratives, development pressures, and urban transformations continuously negotiate the meanings, visibility, and value of heritage. In this context, datascaping provides a means of making visible plural heritage values, lived experiences, and layered socio-spatial relationships that may otherwise remain excluded from conventional planning frameworks.

'Datascaping HUL' is positioned between an overarching theoretical framework and key concepts and further broken down into a conceptual framework for illustrating datascaping; each serves a distinct but complementary role in the research design. The theoretical framework provides the foundational structure to the research, while the conceptual framework offers a rationale for conducting the research, outlining the research problem and its methodological orientation in a structured manner. Chapter 2 gives a detailed overview of the theoretical framework and key concepts guiding the entire research, while each chapter outlines the relevant key concepts adopted to address the research questions and justifies the selection of methods.

1.3.2 Research Aim, Scope and Outcome

'Datascaping HUL' hypothesises that integrating interpretive, relational, and performative approaches to spatial knowledge in heritage planning will not only strengthen decision-making and guide decision-makers towards more informed, inclusive, and context-sensitive processes, and align with global development agendas. Rather than replacing existing spatial analytics, this approach unfolds knowledge through an iterative, process-oriented engagement with heterogeneous spatial, cultural, and socio-economic realms. For this purpose, the research is divided into three key tasks, which further shape the research questions (Figure 1.3):

- I **Theoretical:** From a Critical Heritage Studies perspective, underscore the relevance and potential of the HUL Recommendation and NUA Illustrated in addressing urban heritage challenges, while advancing their operationalisation through contextually embedded, spatially explicit, and process-oriented approaches that support spatial sustainability in contested urban heritage contexts.
- II **Methodological:** Examine the potential and added value of datascaping as a method for knowledge visualisation that supports the contextual embedding of the HUL approach and the NUA guidelines. It is understood both as a method and as a scope: as a method, it structures how spatial knowledge is analysed and visualised; as a scope, it expands the range of data considered beyond classical heritage surveys to include socio-spatial, temporal, experiential, and informal forms of knowledge.
- III **Empirical:** Document the contested urban heritage and landscape of Jaffa. Examining its socio-spatial repercussions as a mixed city within the State of Israel, the dynamics of Arab-Jewish co-existence, and the socio-economic inequalities that shape spatial exclusion while identifying the challenges and opportunities for shared urban space through mixed-method analysis.

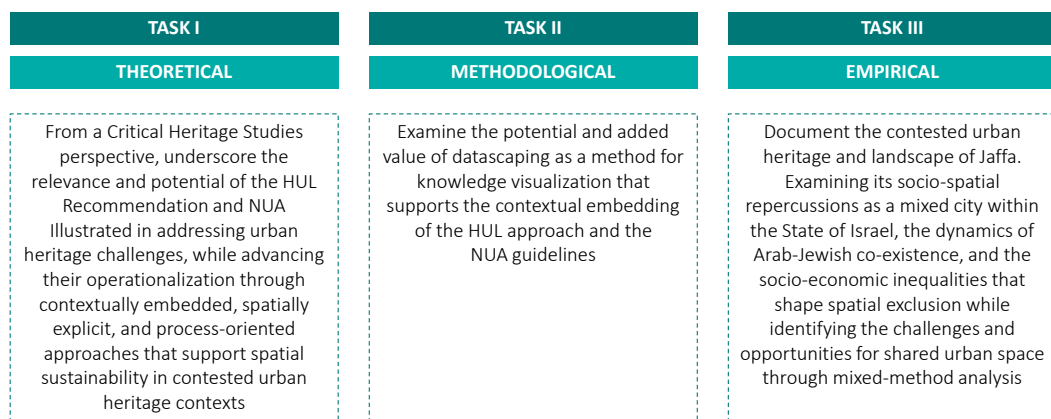


FIG. 1.3 The key tasks guiding the research and its explorations

TABLE 1.1 Outline of each chapter, its aims, relevant tasks and adopted methods

Chapter Number and Title		Aims	Research Task	Methods adopted
Part A: Introduction and Overview of the Research				
1	Introduction to the Research	ProvidesResearch background, motivation, problem field, research framework and outline of the thesis	I, II, III	Formulating research questions
Part B: Theoretical Framework, Concepts and Methods				
2	Theoretical Framework, Key Concepts, Working Definitions and Research Methods	Discusses the theoretical underpinnings and key concepts that structure the research and the hypothesis, working definitions and methods	I, II, III	Overview of all research theories, methods and definitions adopted
3	Contextual Embedding of the HUL Recommendation: Challenges and Opportunities for Spatial Sustainability	Lays the groundwork and relevant literature analysis to critically analyse evolving paradigms of the HUL Recommendation, its limitations and the need to reframe for effective contextual embedding to achieve spatial sustainability through documentation as a tool	I	Secondary Data Analysis (SDA)
4	Datascaping as an Epistemic and Operative Method	Defines the method, purpose, and execution process of datascaping, enabling methods and a three-pronged approach for a holistic method and definitions through thematic analysis of various practices of 'datascaping'	II	Thematic analysis, Content Analysis

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TABLE 1.1 Outline of each chapter, its aims, relevant tasks and adopted methods

Chapter Number and Title		Aims	Research Task	Methods adopted
Part C: Jaffa and Beyond				
5	Introduction to Case Study: Jaffa, A Historic City with Contested Heritage and Landscape	Focuses on the case study, analysing the historical evolution of Jaffa. To illustrate the spatial implications and causation of the contested urban heritage and landscape in Jaffa	I, III	Secondary Data Analysis (SDA), Case Study Research
6	Current Challenges And Opportunities For Spatial Sustainability In Jaffa	Provides an assessment of the planning frameworks in Tel Aviv-Yafo Municipality, its challenges, implications on socio-spatial configurations and the opportunity for integration of HUL approach, reframing it to conform to the context and for achieving spatial sustainability	I, III	Secondary Data Analysis (SDA), Case Study Research
Part D: Datascaping a Historic Urban Landscape: Jaffa				
7	Datascaping as a Generative Process	Introduction to 'Datascaping a HUL' and illustrates Jaffa with two datascaping methods: Eidetic generative datascaping and Archival Photography interpretation which uses archival information and geo-referencing with QGIS	II, III	Thematic Analysis, Archival Photography Analysis, Geospatial Analysis Operation, Spatial Statistics and Modelling, Secondary Data Analysis (SDA), Case Study Research
8	Datascaping as an Informative and Communicative Process	Illustrates Jaffa and its cultural heterogeneity, spatial homogeneity through two datascaping methods for visualising cultural eco-systems and heritage-led tourism and its socio-spatial implications	II, III	Thematic Analysis: Spatial Statistics and Modelling, Crowdsourcing and Volunteered Geographic Information (VGI), Land Surface Temperature Modelling with QGIS, Machine Learning: Vision Transformer (ViT) based Image Classification Architecture, Secondary Data Analysis (SDA), Case Study Research
9	Datascaping as an operative method	Explores and illustrates Jaffa in Policy, Practice, and Perception and mapping community perceptions and urban actors	II, III	In-depth interviews, Content analysis, Community Cultural Mapping, Secondary Data Analysis (SDA), Case Study Research
Part E: Discussion and Conclusion				
10	Discussion and Conclusions	Discusses key findings and conclusion with reference to the research questions, societal and scientific relevance and future research		

1.3.3 Research questions

To address the hypothesis 'Datascaping HUL,' is designed around a research question, and three sub-research questions, connected through core tasks (Figure 1.4):

Main RQ 1.0

What is the added value of datascaping in reframing and operationalising the Historic Urban Landscape (HUL) approach for spatial sustainability, and how can this support planning and decision-making in the context of Jaffa's contested urban heritage?

Sub RQ 1.a

How can the HUL Recommendation be reframed as a localised, context-specific, and integrated territorial approach to spatial sustainability in contested urban heritage contexts?

Sub RQ 1.b

How does datascaping inform sustainable spatial planning in historic urban landscapes, as a dynamic method of knowledge documentation and visualisation?

Sub RQ 1.c

What are the spatial implications of contested urban heritage in Jaffa, and how can datascaping inform design and planning frameworks towards spatial sustainability?

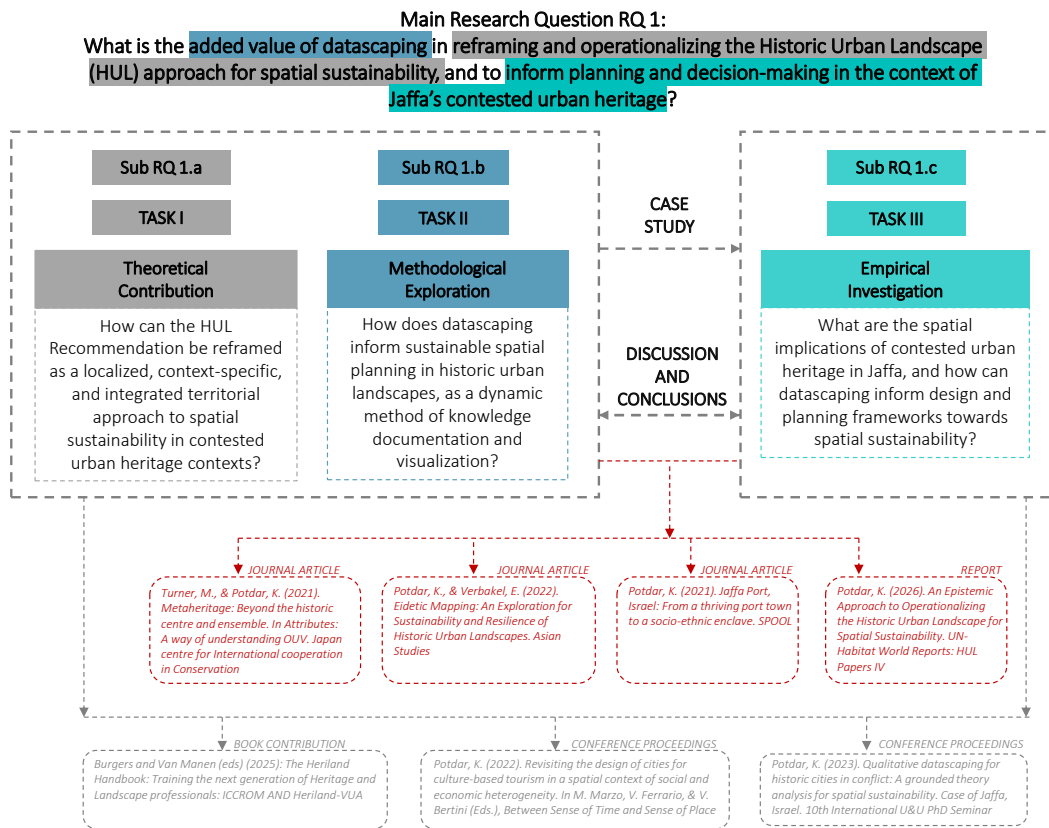


FIG. 1.4 Structure of the research questions and their inter-connections to outcomes in the form of research papers in journals, conference proceedings and book contributions.

1.3.4 Research methods

A mixed-methods approach underpins this research, combining qualitative and quantitative data within a spatial-analytical framework (Creswell & Plano Clark, 2011a). Quantitative data (secondary datasets, empirical surveys) and qualitative data (in-depth interviews, empirical observations) are assimilated and translated into spatial and non-spatial visualisations to generate and communicate information, presenting composite representations of urban environments in contexts of contested urban heritage (§ 2.2.1). This is examined through a critical case study of Jaffa (§ 2.2.2, § 5 and § 6) for its relevance to the hypothesis, as its specific conditions can make results especially

impactful thus reinforcing the broader research claims. Jaffa has a strategic importance in relation to the general problem identified here and is examined for logical deduction (Flyvbjerg 2001). It draws on critical and post-colonial perspectives to question dominant framings, and in doing so, does not merely test or extend existing theory but also considers the ethical stakes of the case and opens space for alternative interpretations or approaches.

A range of activities, including empirical research, semi-structured interviews, community mapping workshops, student seminars, design projects, training, secondments, and fellowships, contributed to shaping the aims, objectives, findings, and discussions, while advancing the evolving discourse on historic urban landscapes, spatial sustainability, datascaping, and contested landscapes (see Research Output).

1.4 Outline of the Thesis

The thesis is structured into five parts. Parts A and E are primarily presenting the overview of the research methods, theory and the conclusion to research questions. The core parts B, C, D each addressing the tasks and scholarly contribution of 'Datascaping HUL' and have interconnected dimension of the research. Part B focuses on the theoretical framework, establishing the relevance of the chosen methods and situating the research within the context of the case study. Part C provides an in-depth exploration of the case study, highlighting the challenges, gaps, and opportunities that emerge from the empirical investigation. Part D illustrates the application of the datascaping method in Jaffa in relation to the problem field and research questions (Figure 1.5).

For orientation, each chapter contains introduction, a description of the methods adopted where relevant to address the research and sub-research questions, highlighting theoretical aspects and objectives. The reader may notice some repetition in the case-study explanation as this dissertation combines journal articles, conference papers, and book contributions into one manuscript. However, this descriptive analysis is retained as it was essential for in-depth exploration, producing multifaceted and meaningful findings. As this research draws on multiple theories in line with the chapters' objectives, it may include specialised discipline-related terminology and jargon for which a glossary of terms is provided at the beginning of the book, a list of working definitions for this research is provided in Chapter 2; each chapter ends with a list of references and a bibliography on key topics of this dissertation is provided after Chapter 10.

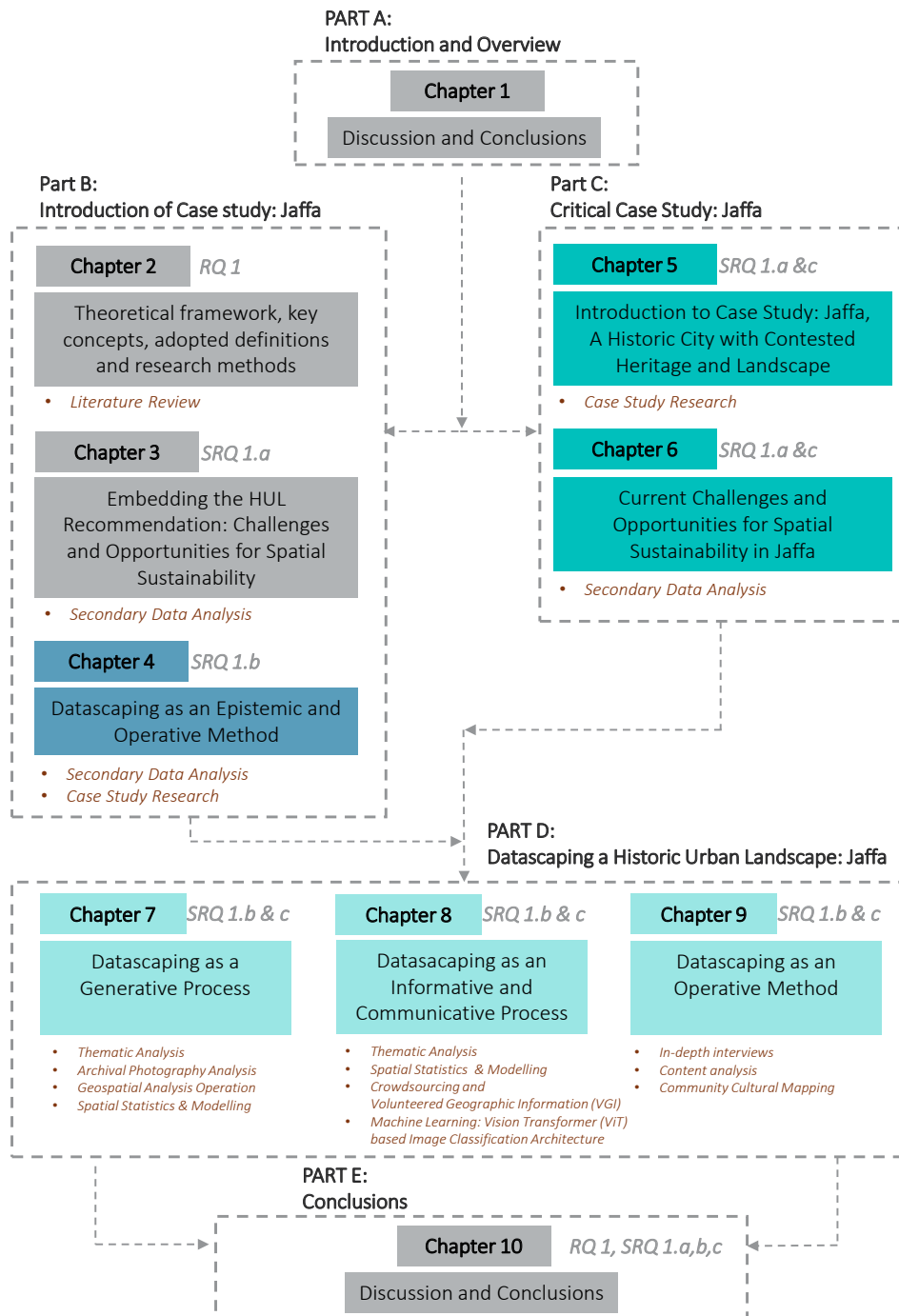


FIG. 1.5 Outline of the thesis

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Theoretical Framework, Concepts and Methods

Part B establishes the theoretical framework and methodological foundations of the research.

Chapter 2 presents the theoretical underpinnings and key concepts that structure the research, including the hypothesis, working definitions, and methodological approach.

Chapter 3 critically examines the HUL Recommendation in relation to cultural heritage, spatial sustainability, and the dynamics of urban transformation. It identifies its conceptual and operational limitations and establishes the basis for reframing HUL as a contextually embedded, localised approach to heritage and spatial planning.

Chapter 4 articulates datascaping as an epistemic method and establishes its three-pronged methodological framework: generation, information and communication, and operation. It positions datascaping as an interpretive and process-oriented approach to spatial planning.

“Evolution is most plainly, swiftly in progress,
most manifest, yet most mysterious. [...]

The patterns here seem simple, there intricate,
often mazy beyond our unravelling, and all well-nigh
are changing, even day by day, as we watch.”

Patrick Geddes, *Cities in Evolution*, 1915



2 Theoretical Framework, Key Concepts, Working Definitions and Research Methods

'Datascaping HUL' is positioned between a theoretical framework and key concepts, each serving distinct but complementary roles in the research design. The theoretical framework provides the foundational structure to the research, while the key concepts offer a rationale for conducting the research, outlining the research problem and its methodological orientation in a structured manner. It then provides a series of methods adopted for exploration and illustrates the potential of the proposed framework. By way of argumentation, this research contributes to three interrelated scholarly domains: critical urban heritage studies, spatial planning and sustainability, and data-driven applied research.

This chapter gives an overview of the theoretical underpinnings and key concepts that provide a strong foundation and structure for addressing the hypothesis and guiding the entire research. It then provides a series of methods adopted for exploration and illustrates the potential of the proposed framework. It draws on secondary sources and studies conducted by international institutions and further explores concepts, embedding them in context through a case study approach.

Furthermore, each subsequent chapter outlines the specific conceptual frameworks adopted to address the research questions and justifies the selection of methods. It functions as the rationale for conducting the study and maps the state of existing knowledge through a critical literature review to identify gaps and opportunities for methodological inquiry (Ravitch & Riggan, 2016). While the theoretical framework

informs the study's overarching analytical stance by supporting key concepts, the conceptual framework offers a structure for the research problem, scaffolds its relevance, and guides its methodological and theoretical orientation.

2.1 Theoretical Framework and Key Concepts

Theory, as a critical tool for producing knowledge, supports and enables the researcher to examine the data and explore its wider significances (Swedberg, 2014; Varpio et al., 2020). It defines the theoretical grounding of the research, links key concepts through coherent logic, and relates them directly to the focus of the study (Anfara & Mertz, 2015; Maxwell, 2013). The theoretical framework adopted in this research draws on interconnected bodies of thought, each selected for its capacity to address a distinct but related dimension of the research problem.

2.1.1 General Systems Theory and Systems Thinking

The **General Systems Theory** (Von Bertalanffy, 1969a), developed by biologist Ludwig von Bertalanffy, provides a holistic methodological framework derived from modern science. When applied to the territorial expansion of historic centres and cities at the metropolitan scale, it supports the development of sustainable and resilient urban-rural relationships (Turner, 2018). This **epistemic framework** posits that systems, whether biological, social, or technological, share certain common principles and can be studied as a whole, rather than merely as a collection of parts.

'We may state as characteristic of modern science that this scheme of isolable units acting in one-way causality has proved to be insufficient. Hence the appearance, in all fields of science, of notions like wholeness, holistic, organismic, gestalt, etc., which all signify that, in the last resort, we must think in terms of systems of elements in mutual interaction.' (Von Bertalanffy, 1969a, as quoted in (Turner, 2018))

GST constitutes functional integrities within. The components interact with one another while also operating independently; nevertheless, overall system performance emerges from the combined functions and outcomes of each component. Although viewing the system as a whole can be beneficial, doing so in an

abstract way may overlook power relations, inequalities, organisational inertia, and context-specific nuances. In this respect, linking systems theory with datascaping offers a way to bridge gaps in reactive, fragmented planning practices by supporting a more proactive, integrated approach without discrediting the relevance of existing methods. At the same time, this integration should be approached critically, as data-driven system representations may privilege what is measurable over what is socially or culturally derived, potentially marginalising qualitative forms of knowledge.

A critically reflexive application of systems theory and datascaping is therefore necessary to ensure that systemic coherence does not come at the expense of contextual sensitivity or inclusive decision-making. In other words, for an informed decision-making process, it is essential to integrate all steps in the system: feed-forward (anticipatory) and feed-back (evaluative) and feed-within (integrative) strategic information flows (Bogart, 1980; Hattie & Timperley, 2007). In an urban planning context, these steps can highlight the interdependencies of the system: feedback denoting a critical reflection of the past interventions, the success stories, the downfalls, and the improvements needed; feedforward denoting forecast trends and taking future-oriented steps and adjusting performance in anticipation of the results; and finally feed-within to monitor and assess the internal systems. It not only reveals the system's interdependencies but also highlights barriers to reversibility, emphasising the need for more reflexive, adaptive, and precautionary planning. Integrating feed-forward, feed-back and feed-within mechanisms into decision-making is essential for navigating the complexity of urban heritage systems. Datascaping strengthens this systems approach by generating multi-layered, context-rich datasets that make these relationships legible, allowing planners to detect patterns, simulate scenarios and track change more effectively. At the same time, datascares help illuminate the barriers of reversibility: the physical, institutional, economic, and socio-cultural thresholds beyond which planning decisions become difficult or impossible to reverse.

While **systems theory** offers a theoretical foundation, **systems thinking** applies it to analyse and influence real-world systems. The application of systems thinking in urban and environmental planning has been emphasised in numerous scholarly texts. Orr argues that the actual benefits of applying systems theory have been fully explored and applied only in the disciplines of computer and communications technology (Orr, 2014), and that they have limited application to the field of urban design and planning. Another scholarly study by Perdicoúlis examines the added value of systems thinking for urban planning, highlighting the systems approach's major contribution: its focus on the system's function. This applies to the system's operation rather than its appearance or physical aspects (Perdicoúlis, 2010). He stresses the key elements essential to urban and environmental planning that are

space, time and human interaction and the need for identifying the invisible and abstract interactions and functioning of the system for better informed planning interventions. These paradigm shifts enable a more nuanced interpretation of urban systems as dynamic, interconnected wholes across spatial and temporal scales (Capra & Luisi, 2014). However, despite these theoretical advantages, the practical application of systems thinking in urban planning often remains limited, constrained by institutional inertia, disciplinary silos, and the challenge of translating abstract systemic insights into actionable practice. Linking this perspective to the HUL approach, systems thinking frames heritage not as isolated monuments but as part of a living, evolving urban system, integrating tangible and intangible values, spatial patterns, and socio-cultural dynamics for a process-oriented approach to support sustainable planning, thus also linking it to spatial sustainability.

Following the established and accepted norms of objective scientific theories, the HUL approach inherently embraces these ideas of systemic thinking. It aims to bring together the multifaceted, interconnected characteristics of the historic landscape to encourage understanding and integration of shared perceptions. It underscores the significance of both natural and cultural diversity, and of their synergies as a whole. However, despite its systemic and holistic framing, the HUL approach has been critiqued for remaining largely object-centric, with limited emphasis on intangible heritage, social dynamics, and the lived experiences of communities, which can constrain its practical application in complex urban contexts.

The functional aspect of the system is theorised through studies of Patrick Geddes. He advocated the essential unity of **'Place, Work, and Folk'** (Geddes, 1915), emphasising the interconnectedness of people, their environment, and their occupations within a specific place. This theory holds that the spatial structure of cities must emerge from and support the social and functional life of their inhabitants, thereby establishing an interconnected system of functions. The theories also further emphasised the documentation of the city's historical layers and ecological setting to plan future development that respects both continuity and change. Geddes' approach to Tel Aviv reflected his broader belief that cities evolve through historical layers and ecological relationships within a regional context. Accordingly, his 1925 plan envisioned Tel Aviv growing organically from Jaffa rather than developing beside it as a disconnected modernist project, ensuring the two cities formed a coherent, complementary urban whole (Welter 2009).

Similarly, Ian McHarg argued that landscape and urban structure should not be imposed upon the environment but rather derived from a careful analysis of its natural functions and processes. In his pioneering work, *Design with Nature* (McHarg, 1969a), he promoted an ecological approach to planning that considered the

suitability of land uses in accordance with underlying physical, biological, and social systems. Both thinkers advanced a view in which urban form (structure) and human activity (function) are not separate domains but deeply intertwined within a broader natural and cultural system.

Urban theorists have highlighted how the coherence of the urban fabric, through interrelations among elements, its historic evolution, and its functions, embodies the systemic qualities of urban heritage. Choay advocates **the theory of urban historicity as a dialectical process**, viewing cities as continually shaped through the interaction of past and present forces. This thereby reinforces the notion that urban heritage encompasses both spatial and temporal integrities. Urban spaces that comprise monuments, urban fabric, and evolving functions provide the theoretical underpinning for a spatial-temporal approach (Choay, 2010). The adoption of the HUL method lies in its recognition of this spatial-temporal basis as a fundamental expression of systems thinking. It prompts the scientific discipline of conservation to go beyond physical elements and to incorporate dynamic human interaction and interpretation, connections and contextual evolution. Although this multi-dimensionality aligns with the hybrid logic of spatial sustainability, it requires integration across environmental, social, and economic spheres in theory and practice (Ahlström et al., 2020; Palmberg et al., 2017).

Based on the system's functions and planning requirements, the concept of **co-production** introduced by Ostrom, V., and Ostrom, E. is aligned. (Ostrom & Ostrom, 1977). For instance, the reciprocal interactions between system and society jointly shape knowledge of the urban space and its function. This production of knowledge does not occur in isolation but is influenced by political, cultural, institutional, and historical contexts. Subsequently, this knowledge feeds back into society through actions and policies, thus shaping public discourse and influencing how problems are defined and addressed. In other words, science also reshapes the very context that shaped it, completing the co-production cycle (C. A. Miller & Wyborn, 2017). Thus, co-production reflects the core idea of systems theory by steering the concept of how society and knowledge continuously influence and reshape each other within the urban planning process.

The wider application of the system thinking also supports the integration of **nature-based and solutions in urban contexts**, which must equally address social goals like equity, inclusivity, and well-being (Branny et al., 2022; McPhearson et al., 2021). A systems approach, therefore, cannot remain confined to ecological or technological parameters alone but must encompass the plurality of interconnected socio-ecological-technical dimensions necessary for real, transformative change. Moreover, education for sustainability has increasingly highlighted the importance of systems thinking to help people understand complex cause-and-effect relationships

within and between human and natural systems (Palmberg et al., 2017). Building this capacity for holistic understanding is vital to advancing informed planning and adaptive governance frameworks (Ripp & Rodwell, 2016).

Therefore, GST and CHS are operating at different levels of the same argument. GST establishes the ontological premise that the city functions as an interconnected system of parts, while CHS provides the critical apparatus for interpreting those interconnections as sites of power, exclusion, and contested value. Datascaping is theorised and operationalised in this context for mapping systemic relations and to make the asymmetries visible, that a purely systemic reading would otherwise flatten. Together, they frame an intellectual trajectory that understands cities as complex, dynamic, and multi-scalar socio-cultural systems, where cultural heritage dimensions cannot be separated from their spatial and political ones.

2.1.2 **Contested Urban Heritage and Landscapes: A Critical Heritage Studies Perspective**

Historic cities and their fragments of historical, cultural landscapes are interwoven with their present socio-spatial configuration (Hayden, 2009). To navigate contemporary needs while preserving historic fabric and landscapes, it is necessary to uphold values and achieve a delicate balance between social, economic, and environmental needs. Considering this necessity, the challenge of a historic city serving as a stage for contested landscapes stems from the inherent tension between conserving urban heritage and the evolving needs of contemporary urban life. These differences arise when the demands for modern infrastructure, housing, and economic development collide with the priority to safeguard historic landmarks and the unique character of these cities (UNESCO, 2020a).

In today's world, cities are becoming increasingly cosmopolitan, diverse, and heterogeneous, enriching their cultural landscapes. However, factors related to identity, memory, and ethnic diversity are also sources of contention and crisis within societies (UNESCO, 2016a). In such contexts, cities may exhibit ethnocratic dynamics, where planning and governance function as tools of territorial and demographic ordering (Yiftachel, 2006). These processes contribute to polarisation, spatial segregation, and fragmentation across populations, activities, and urban form, with contested spaces emerging as their physical manifestation.

The fragility of such cities is reflected in multiple, interconnected forms, including urban violence, ethnic divisions, socio-economic fragmentation, gender-based inequalities, health disparities, and cultural intolerance, often extending into broader

geopolitical tensions. While the specific expressions of contestation are locally grounded in historical and contextual conditions, comparative analyses across cities can reveal shared patterns and underlying mechanisms. This is particularly relevant given the limited attention in existing research to the intersection of cultural heritage and contested landscapes (Pullan & Baillie, 2013), highlighting the need to further examine the subtle dynamics of contestation and spatial segregation.

“... how cities work in real life, because this is the only way to learn what principles of planning and what practices in rebuilding can promote social and economic vitality in cities, and what practices and principles will deaden these attributes.”
(Jacobs, 1961)

This perspective shifts attention from abstract planning ideals to the lived, layered processes that generate urban fragility, contestation, and meaning. Understanding these dynamics requires examining not only the physical layout and infrastructure of cities but also the social, cultural, and historical processes that shape how urban spaces are experienced and valued. These dynamics reflect the reciprocal relationship between human agency, geography, and socio-cultural influences, where historical trajectories and contemporary pressures mutually shape urban form and function. In the case of cities, urban heritage is a critical subject to study, as invented traditions (Hobsbawm, 1983) and have been bestowed meanings through the historic urban quarters, sacred buildings, monuments, markers/ images of memory (Richards, 2002)⁷, cultural and sacred tourism (Razaq & Griffin, 2017), customs and rituals in public space (Ristic & Frank, 2020).

Since the modern concept of historic cities and urban heritage extends beyond natural and cultural attributes, it also acknowledges the dynamic forces across economic, social, and cultural spheres that result from layers of the past. Cultural and social layers are a palimpsest of historical, local, regional, national, ethnic, and contested narratives constituting the historic urban landscape and spatial practices. These contested landscapes emerge where historical configurations and narratives intersect with contemporary pressures, including modernisation, socio-economic change, and demographic shifts, producing tensions between preservation and development, shaped by competing interests and power asymmetries (Meskell, 2015; L. Smith, 2006).

⁷ This is discussed in detail in Chapter 8: Datascaping as an Informative and Communicative Process to explore ‘Revisiting the design of cities for culture-based tourism in a spatial context of social and economic heterogeneity.’ (Potdar, 2022). The chapter aims to highlight cultural tourism’s spatial fragmentation and implications by documenting cultural markers through datascaping methods and exploring ways to address these issues for practicing spatial sustainability.

"It is surprising how long the problem of space took to emerge as a historico-political problem" (Foucault, 1980)⁸

The above quote draws attention to the understanding of time and space, which is influenced by historical and political developments, and to the delayed recognition of this acknowledgement. Narratives play a crucial role in understanding social existence and, if articulated correctly, have the power to inform and empower social and spatial changes (Harling Stalker, 2009; Pullan & Baillie, 2013). Theories suggests that "... social contestation has a spatial expression, and the spatial form, in turn, shapes the contested space." (Gaffikin et al., 2010). This underscores the need for a critical lens, which situates heritage within broader social, political, and economic power structures, interrogates whose values are represented, analyses how contested narratives shape urban space, planning, and policy interventions, and highlights the integration of cultural heritage matters into sustainable urban development frameworks. Such an approach allows scholars and practitioners to move beyond descriptive accounts toward a critical understanding of urban heritage as a site of negotiation, conflict, and transformation.

Building on this, Critical Heritage Studies challenges the dominance of Authorised Heritage Discourse, highlighting how conventional heritage practices often privilege expert-led, material-focused interpretations while marginalising alternative, lived, and intangible narratives (Smith, 2012) (§ 3). In contested cities, this becomes particularly significant, as heritage is not merely preserved but actively negotiated, with competing claims over space, identity, and memory revealing and often reinforcing underlying power asymmetries.

2.1.2.1 Socio-Spatial Contestation and Conflict Urbanism

"Cultural and natural heritage are increasingly threatened by destruction not only from traditional causes of decay, but also from changing social and economic conditions, which aggravate the situation with even more formidable forms of damage and destruction." (UNESCO, 1972)

⁸ Foucault explores the idea of space as a critical element in political strategy and control, detailed in his interview titled 'The Eye of Power'. He notes that urban planning, the organisation of territories, and the management of populations have started to be seen as essential tools for economic and political objectives. This shift marked the emergence of spatial considerations as central to the exercise of power (Foucault, 1980)

These threats underscore the importance of understanding historic cities not merely as physical spaces but as complex, contested socio-cultural landscapes where heritage, identity, and contemporary pressures intersect. Historic cities, as the loci of contested space (Borén et al., 2023), often manifesting fragmented, segregated, and polarised spaces, shaped by multiple communities with diverse backgrounds, legacies, and claims (Forster et al., 2016).

Among international doctrines, NUA advocates “sustainable urbanisation, job creation, and improved quality of life, highlighting the need to integrate these principles into all urban development practices and policies”. Similarly, the Sendai Framework for Disaster Risk Reduction (SFDRR) (UNDRR, 2015) provides “..guidance on managing risks and enhancing resilience in historic cities”, while the NARA Document on Authenticity (ICOMOS, 1994) stresses on “...acknowledging cultural and social perspectives of all stakeholders in the conservation and development process.”

Cultural heritage diversity exists in time and space and demands respect for other cultures and all aspects of their belief systems. In cases where cultural values appear to be in conflict, respect for cultural diversity demands acknowledgement of the legitimacy of the cultural values of all parties. (ICOMOS, 1994)

As per the above statement, the need becomes pronounced in contexts where heritage narratives are plural and contested. Among the many definitions and circumstances of historic cities with contested urban heritage and landscapes⁹, the focus is mainly on socio-spatial conflicts in a partitioned urban zone, which entail both physical and cognitive partitions, and their ramifications of conflicting and divergent urban and territorial policies for planning and development. Uneven representations of the past emerge when certain events are amplified while others are obscured (Bakshi, 2014) (§8.2.2). As a result, some historical periods are selectively remembered, while others are marginalised and eventually erased.

“Symbolic places are remembered and forgotten, but their genesis is embodied in a cultural frame”. (Jordan J. in her book "Structures of Memory (2006), As quoted by Binder, 2012)

⁹ It refers to situations in which “...religious, ethnic, national, political, and other groups come together to claim, appropriate, use, exclude, or erase markers and manifestations of both their own and others’ cultural heritage as a way of asserting, defending, or denying important claims to power, land, and legitimacy.” (Silverman, 2011).

This further asserts the theory that the shaping of places is shaped through the interplay of policy, place and people (Thakur, 2002) and by the socio-cultural frames through which communities remember, interpret, and selectively preserve or erase their symbolic meanings over time. The production of space in these contexts demonstrates how physical, social, and symbolic processes collectively shape urban form, experience, and social hierarchies (Lefebvre, 1974a). This production is presented through the space triads: spatial practice (the perceived, everyday material use of space), representations of space (the conceived, planned, and regulated order imposed on space), and representational space (the lived, symbolically inhabited space of memory and meaning). Building on this triad, scholarly research analyses contested heritage across three interrelated dimensions:

- **Theoretical/ Empirical component (People):** Constituting memory, identity, and the production of space (Lefebvre, 1974a); Corresponding to representational space (lived)
- **Morphological component (Place):** Constitutes the genesis and physical form of space (Conzen, 1960; Whitehand, 2010); Corresponding to spatial practice (perceived)
- **Regulatory component (Policy):** Shaping the progression and transformation of space across past, present, and future through governance and external influences (UNESCO, 2011; UN Habitat, 2017)(Dobson, 2010; Fairclough et al., 2001; Pullan & Baillie, 2013; Turner, 2007); Corresponding to representations of space (conceived)

While each dimension is examined separately in the sections that follow for analytical clarity, they remain co-constitutive, no single dimension can be fully understood in isolation from the other two.

Heritage as a Contested Social Construct

The above dimensions expand the understanding of urban heritage and contestation. Urban heritage is a "...social construct, reflecting socio-economic patterns, geopolitical events, public spaces, monuments, and vernacular architecture as an inseparable whole..." (Giovannoni, as quoted by Veldpaus et al., 2013a). It carries the "...agency to transform socio-spatial relations, and dynamism plays an active role in inquiring, critiquing, subverting, and transforming the present." (Ristic & Frank, 2020). Current trends in urban regeneration are increasingly revealing pronounced tensions between cultural heritage and urban development, with heritage simultaneously functioning as a resource for social cohesion and community mobilisation and as a source of

contestation and division (UNESCO, 2016a, Lee et al., 2017). Although heritage activism is a growing force in urban regeneration, its agency remains shaped and often constrained by power relations and political dynamics operating across different scales and among competing actors. To a great extent, supranational organisations such as UNESCO, ICCROM, and ICOMOS have made significant strides in drawing attention to contested heritage under imminent threat, promoting the preservation of built heritage of outstanding universal value through sustained engagement with academics and policymakers. The evolving discourse of CHS, however, has expanded this focus beyond individual heritage assets to encompass historic landscapes and the social, political, and spatial processes through which heritage is produced and contested, these dimensions that remain difficult to integrate within existing practice frameworks.

The history of cities also carries traumatic pasts, including war, occupation, and authoritarian rule, which shape socio-spatial and cultural dynamics (Huyssen, 2003). Urban segregation and contestation can emerge through multiple and overlapping processes, including physical divisions, socioeconomic inequalities, neoliberal policies, and conservation frameworks that inadequately account for diverse urban communities. Even in the absence of physical barriers, urban heritage can persist as a site of contestation, influencing collective memory and serving as a tool for socio-political claims in divided cities (Ashley & Frank, 2016; Ristic & Frank, 2020). This distinction is particularly important between cities contested primarily through forms of 'pluralism', which includes class, ethnicity, power, and status; and those contested through both 'pluralism and sovereignty', that involves competing claims to state legitimacy and national identity (Artopoulos & Bakirtzis, 2014; Gaffikin et al., 2010). The production of space further demonstrates how contested policies, investments, and practices materialise these struggles in the physical and social structures of the city.

Capitalist investment and neoliberal urban development can exacerbate these divides, creating tensions between safeguarding the historic character and social complexity of cities and accommodating processes of urban modernisation (Ufer, 2015). Conflict urbanism theories further illustrate how urban spaces become arenas of contestation over power, identity, and territory, where physical divisions, symbolic markers, and spatial configurations reflect broader struggles over authority and belonging (Misselwitz & Rieniets, 2006, 2009). Yet conflict is not inherently corrosive: when appropriately mediated, it can also generate social, cultural, and political connections, as divergent interests and perspectives interact within the urban arena (Flyvbjerg, 1998). In post-conflict cities, planning as a tool for reconstruction presents a complex and unstable challenge. Examining these distinctive planning histories reveals that social and cultural dynamics are central to the processes of spatial production and transformation (Hein, 2017). Understanding

how plans and policies interact with these histories can therefore provide valuable insights for developing more context-sensitive planning and peacebuilding strategies in divided urban contexts. While longitudinal studies of these transformation cycles are limited (Vernez Moudon, 1997), interdisciplinary approaches can enable collaboration between researchers, urban planners, and policymakers to analyse historical context, assess current challenges, and inform future planning (Artopoulos & Bakirtzis, 2014).

Such studies demand careful attention to ethical considerations, particularly in politically sensitive and conflict-affected contexts, which remain underdeveloped despite their importance for understanding the geopolitical and socio-spatial dimensions of contested urban heritage.

Ethical Considerations

Research in politically sensitive and contested urban environments, such as Jaffa, requires careful attention to ethical issues. These include ensuring informed consent, protecting participants' anonymity and safety, and being sensitive to the socio-political and historical tensions that shape their perspectives. Moreover, the research acknowledges the geopolitical context, recognising that interpretations of heritage, urban planning, and community narratives are often embedded within asymmetric power relations and contested histories. By adopting a reflexive approach, the study seeks to mitigate harm, avoid reinforcing dominant narratives, and responsibly represent marginalised voices, while maintaining transparency in methodology and data handling. These ethical protocols are integrated into the qualitative research methods, particularly interviews and community mapping, to ensure that the study engages critically and respectfully with contested heritage in a conflict-affected urban context.

2.1.3 Critical Case Study Research

A case study approach is one of the primary methods for investigation of social reality. It involves documentation and analysis of data within a defined context, and investigates a contemporary phenomenon through contextual enquiry (Zainal, 2007). According to Yin (1989), a case study requires examining a contemporary phenomenon within its current context through multiple sources of evidence, particularly when the boundary between the phenomenon and its context is not clearly defined (Yin, 1981, 1984, 2018). However, a critical case study is adapted

with a strategic purpose in relation to a general problem (Flyvbjerg 2001). It is narrative as it can include thick descriptions to effectively reveal the full extent of social complexity (Mc Gregor, 2024). The justification for the selection of a case study as an information-oriented selection (Flyvbjerg, 2006) yields an array of potential contributions and a purposeful strategy when working with small samples or single cases.

The critical case concept (Flyvbjerg, 2006) is deliberately chosen, not for being typical or average: it has the potential for analytical generalisation and can offer conceptual insights that transcend the immediate context (Flyvbjerg, 2006; Stake, 1988). This resonates with the core of the HUL approach and its theory, which operates between the spectrum of local heritage realities and global sustainable development frameworks. It allows the study to test and refine broader theoretical and methodological concepts. While the findings are grounded in a specific context, they offer analytical insights that can inform similar urban heritage settings. They offer generalizability not just through their findings but more significantly through the causal mechanisms they reveal, supporting broader interpretation across varying contexts.

This justification aligns with the hypothesis of how the value of the inquiry and implementing HUL recommendation for spatial sustainability lies in the specificity and uniqueness of the place under study. It enables integration of qualitative and quantitative data through comprehensive observation, reconstruction, and analysis (Johnson et al., 2007; Tellis, 1997) and is instrumental as an explicative strategy to reveal composite meanings and causal relationships within real-world contexts (Johansson, 2003).

The dynamics of contested urban heritage and landscape shaped by ethno-national tensions, socio-economic inequality, and the selective governance of heritage recur, in varying forms, in historic cities worldwide. The following comparative examples of Berlin, Beirut and Mostar, although not exhaustive, serve to illustrate diverse forms of urban contestation and their ramifications on the urban fabric and socio-spatial configurations (Figures 2.1–2.10). The degree to which these insights transfer beyond Jaffa is not fully established here, and further comparative work across other governance and socio-political settings is needed to test their broader applicability (§ 10.4 and 10.5).

2.1.3.1 Jaffa as a Critical Case Study

Using Jaffa as a critical case study (§ 5 and 6), this research positions the city, its urban and socio-spatial analysis and findings as a critical case with analytical transferability to contexts facing similar challenges. Contestation here reflects disputes over social reproduction, including class, ethnicity, power, and status, with an overarching conflict over sovereignty. Drawing on theories of conflict urbanism, Jaffa is situated as a city where planning decisions, development pressures, and community agency intersect, highlighting how urban policies determine whose narratives are prioritised and who benefits from heritage conservation (De Cesari & Herzfeld, 2015; Marcuse & van Kempen, 2000). As a politically unified yet ethnically divided mixed-city, as a partitioned urban zone, Jaffa provides a lens to examine the intersections of governance, planning, community agency and identity in shaping contested heritage (Misselwitz & Rieniets, 2006). The convergence within one bounded urban context makes Jaffa analytically suitable for understanding contested heritage more widely.



FIG. 2.1 The Stari Most bridge after reconstruction; Photo credits: Robert Dan



FIG. 2.2 Stari Most bridge after the demolition: Photo credits: Diego Sideburns/Flicker

Heritage in Mostar, Sarajevo has become increasingly ethnicised, with little attention to shared or hybrid narratives, including the socialist legacy, reflecting how heritage is closely intertwined with identity formation in post-conflict cities (Haider, 2020; Wollentz et al., 2019). The Stari Most bridge, destroyed in 1993, was reconstructed between 1997 and 2004 under the guidance of UNESCO, the World Bank, and other actors, intended as a symbol of reconciliation between Croat and Bosniak communities. While widely celebrated as a cultural and diplomatic achievement, the project has been criticised for focusing on symbolic value over local social realities, failing to address the full diversity of Mostar's population, particularly the displaced or minority Serb community (Wollentz et al., 2019).

The reconstruction also exemplifies broader theoretical debates in heritage conservation about authenticity, representation, and selective memory. By privileging ethicised heritage and monumental reconstruction, international interventions risk reinforcing binary interpretations of shared urban space, often overlooking multi-layered or socialist heritage and the city's more complex social fabric. This reflects wider tensions in post-war heritage discourse, where the internationally authorised heritage discourse may prioritise symbolism and reconciliation at the expense of inclusivity and local context (World Bank, 2005). The retention of the name 'Stari Most' despite its recent reconstruction also raises questions about authenticity and continuity, prompting reflection on whether such a structure remains old or constitutes, in effect, 'novi most' (new bridge).

(Figure 2.1 and 2.2)



FIG. 2.3 Protest against the demolition of the Palast der Republik, Berlin in 2006. Placards and banners reflect public opposition to removing the GDR-era building for the reconstruction of the Berlin Palace.; Photo credits: Mazbln



FIG. 2.4 The reconstructed Baroque façades of the former Berlin Palace juxtaposed with contemporary architecture, including the modern elevations facing the River Spree and the contemporary interior spaces, built on the site of the demolished Palast der Republik; Photo credits: Humboldt Forum / Franco Stella

The Palast der Republik (1973-76) and the Olympiastadion (1934-36) in Berlin, Germany exemplify uncomfortable heritage, sites embodying painful, contested, or divisive histories. In efforts to unify divided urban spaces, many German Democratic Republic (GDR) era structures were demolished or replaced with reconstructions of earlier 18th- and 19th-century Prussian architecture (Cochrane, 2013). Such heritage raises critical questions about confronting legacies of atrocities while shaping contemporary identities, challenging collective memory and presenting moral and political dilemmas regarding how it is remembered, interpreted, or preserved (Macdonald, 2009). The Palast der Republik reflects the complexities of East German identity and the contested politics of memory, while the Olympiastadion carries the enduring imprint of Nazi propaganda. These sites compel society to negotiate inherently contested past narratives.

The Berlin Palace (Berliner Schloss), originally damaged in World War II and demolished in 1950, was replaced by the Palace of the Republic during the GDR era (built 1973-76; the site stood empty and was used as a parade ground, Marx-Engels-Platz, for over two decades in between). Following reunification, the Palace of the Republic, claimed to be primarily contaminated with asbestos and no longer needed, was demolished, and the Berlin Palace was reconstructed as part of the Humboldt Forum, restoring its Baroque silhouette and integrating ethnological collections and cultural exhibitions in the city's historic core.

The project has been debated for prioritising symbolic nostalgia over authentic urban continuity, erasing 20th-century layers and foregrounding Prussian imperial heritage, reflecting tensions between historical reconstruction, memory politics, and heritage authenticity. The decade between the 2003 demolition vote and the 2013 start of reconstruction underscores how protracted and unresolved this contestation remained, well beyond the formal political decision.

(Figure 2.3 and 2.4)



FIG. 2.5 'Stop Solidere' protest sign in Beirut, Lebanon; Photo credits: wikimedia commons



FIG. 2.6 Zaitunay Bay marina and the Phoenicia Hotel, Beirut, post-war waterfront regeneration emblematic of privatised public space and elite-driven urban renewal in the reconstructed city centre; Photo credits: Phoenicia Hotel Beiru



FIG. 2.7 During the civil war, Beirut was split in two along 'the Green Line'; Photo credits: Wikipedia: James Case



Before



After

FIG. 2.8 Before and after of the urban renewal project in Beirut's Central Business District; Photo credits: Sol'dere

Following the Lebanese Civil War, Beirut's city centre underwent several spatial transformations, beginning with Tanzimat-era planning and the homogenisation of previously mixed territories (Davie, 1993). Solidere, a Lebanese joint-stock company, was tasked with redeveloping the Beirut Central District, including a new waterfront, upgraded open spaces, high-end retail areas, and restoration of historic buildings. While the project aimed to revive economic activity and infrastructure, it faced significant criticism for creating a disconnected "island of modernity" that erased the historic maze of alleys and spice and gold souks, displaced ordinary residents, and catered to a wealthier, more elite population (Makdisi, 1997). Luxury shops also replaced local schools and small businesses, while spaces like Place de l'Etoile remain largely empty, functioning as a buffer between Christian, Sunni, and Shia zones.

Public opposition emerged during and after reconstruction, focusing on expropriation, demolition of historic buildings, and privatisation of urban space, with later civic movements reclaiming downtown to critique social exclusion and corporate control (Alkazei & Matsubara, 2021). Scholars argue that the redevelopment undermined downtown as a space for social interaction, effectively continuing the divisive effects of the war and exposing tensions between reconstruction, urban vitality, and social inclusion (The Economist, 2019).

(Figures 2.5-2.8)



FIG. 2.9 Present day Scientology Center as adaptive reuse project





FIG. 2.10 Alhambra Cinema, an Arab cinema and cultural center in Jaffa, Jerusalem Boulevard 1937; Source: Matson Collection, Library of Congress. (Groag, 2024)

The case of contested urban heritage of Jaffa is posited within the broader political and ethical context of the region. Here, urban interventions, heritage conservation and management are often entangled with ethnic biases and unequal power relations, raising critical questions about authenticity and purpose of reuse and whether it addresses questions on segregation and marginalisation due to contested heritage reuse. For instance, the adaptive reuse of the Alhambra Cinema on Jerusalem Boulevard, raises these critical questions whether the intervention of adaptive reuse led to conservation of social values and use and it is has acted as a bridge for reconciliation or is merely a project of urban regeneration further exacerbating dissonance.

The Alhambra Cinema is in many ways a microcosm of Jaffa's twentieth-century history. The building was opened in 1937 as part of the Arab cultural renaissance under the British Mandate, first as a Palestinian cultural center and later converted to one of the largest and most luxurious cinemas in Palestine. The venue served as a host for diverse cultural activities, including film screenings, popular and classical music performances, theatrical productions, sporting events, and large-scale political and business assemblies (Groag, 2024). This flourishing was interrupted by the war and dispossession of 1948, which displaced much of Jaffa's Arab population and severed the cinema from the community it had served. In the following decades, under Israeli repurposing and the demographic change that reshaped the city, the building was converted into a live theatre. After the war in the late 1970s, the building was largely abandoned. In the early 2010s, the dilapidated building underwent adaptive reuse and restoration, marking a late-modern reinvention through global organisations, and reopened as an Israeli regional centre for Scientology.

This project, among other adaptive reuse projects in Old Jaffa, has received criticism for the complete erasure of its original cultural identity as a hub for Arab cinema and music and reproducing the dispossession and marginalisation that defines the asymmetrical relationship between Jaffa's Arab and Jewish communities. Engaging with these tensions requires reflection on whether research and planning practices reinforce existing inequalities or actively contribute to inclusive change and reform. Recognising these dynamics is essential for critically assessing the implications of heritage and planning interventions to ensuring they are not only technically effective but also socially and politically conscious.

(Figure 2.9 and 2.10)

2.2 Research Methods

The research uses a mixed-methods approach to address the complexity of data related to the case of Jaffa as a historic urban landscape, which includes both qualitative and quantitative datasets. This combination enables a more comprehensive analysis and supports the creation of knowledge visualisations that reflect the spatial and non-spatial dimensions of the urban environment and its contested heritage and landscapes.

2.2.1 Mixed Methods Research and Its Integration with Various Dimensions

As illustrated in the process flowchart, ‘Datascaping HUL’ adopts a mixed-method analysis, integrating both qualitative and quantitative data to explore datascaping methods (Figure 2.16). The rationale for this design is to provide a nuanced and comprehensive understanding of the research problem by combining multiple data sources, promoting interdisciplinary collaboration and the inclusion of diverse paradigms (Resch & Szell, 2019). This complementarity across research phases strengthens the achievement of research objectives and allows researchers to triangulate findings, enhancing validity and reliability of results and facilitating a holistic interpretation of the research questions, yielding deeper insights into the subject matter (Creswell & Plano Clark, 2011; Guest & Fleming, 2016; Greene, 2006).

Building on this foundation, the mixed-methods approach is both methodological and strategic, addressing the hypothesis. The research design aligns most closely with a convergent model, where qualitative and quantitative datasets are collected and analysed in parallel and subsequently integrated during interpretation. As per the aims and research design, it is explicitly designed around the mixed-methods purpose to capture both quantitative urban data (e.g., spatial metrics, secondary datasets) and qualitative cultural knowledge (e.g., interviews, empirical observations). This aligns with the point that integration begins with crafting a purpose and aims that justify and necessitate both data types (Curry & Nunez-Smith, 2014). For instance, insights on lived experiences and cultural values are better collated through empirical observation and interviews. Additional qualitative techniques include “...semi-structured or narrative interviews, analysed using procedures such as coding and content analysis” (Flick, 2007). Data may

also be collected through various sources such as focus groups discussions, interviews, surveys and participant observation, and audiovisual recording, and analysed through discourse or conversation analysis. Qualitative research generates knowledge from observed actions, supporting inductive development of generalisations or deductive testing of hypotheses. In parallel, secondary datasets and spatial matrices offer the opportunity for measurable data analysis. Aligning mixed-methods research with the research objectives strengthens understanding of urban dynamics, their processes, and outcomes.

Integration, as a core concept in mixed-methods research (Åkerblad et al., 2021; Hitchcock & Onwuegbuzie, 2022), remains undertheorised and inconsistently termed, variously described as combination, integration, or mixing. Recent scholarship emphasises integrative strategies that encourage deliberate decision-making across research dimensions (Åkerblad et al., 2021; Bazeley, 2012), moving beyond viewing mixed methods as merely combining qualitative and quantitative datasets. These dimensions include philosophical orientation, theoretical and conceptual frameworks, methodological design, team expertise, literature review, data, research phases, sampling, data collection, and interpretation (Fetters & Molina-Azorin, 2017). Ensuring alignment between theory, design, and practice across these dimensions makes integration a robust methodological strategy for understanding complex urban heritage contexts.

To support this mixed-method approach, the following methods and analytics are applied for data collection, formulation of research problems, datascaping and assessment of outcomes. The source and type of information (whether quantitative or qualitative) are described in detail in the following chapters.

2.2.1.1 Secondary Data Analysis (SDA)

Secondary Data Analysis involves addressing new research questions using data originally collected for a different study (Castle, 2003). It is a systematic method (though lacking a defined process in urban studies) that applies theoretical and conceptual reasoning to existing data (Johnston, 2014; Stewart & Kamins, 2012). It allows for advanced analysis, new insights, and cost-effective exploration of complex issues, especially when large or combined datasets are used (Rew et al., 2000). Adhering to the HUL approach, it enables investigation of spatial, social, and historical dynamics. It combines information from diverse sources, such as maps, archives, and satellite imagery, supporting both GIS- and UIS-based, as well as content-driven, analysis.

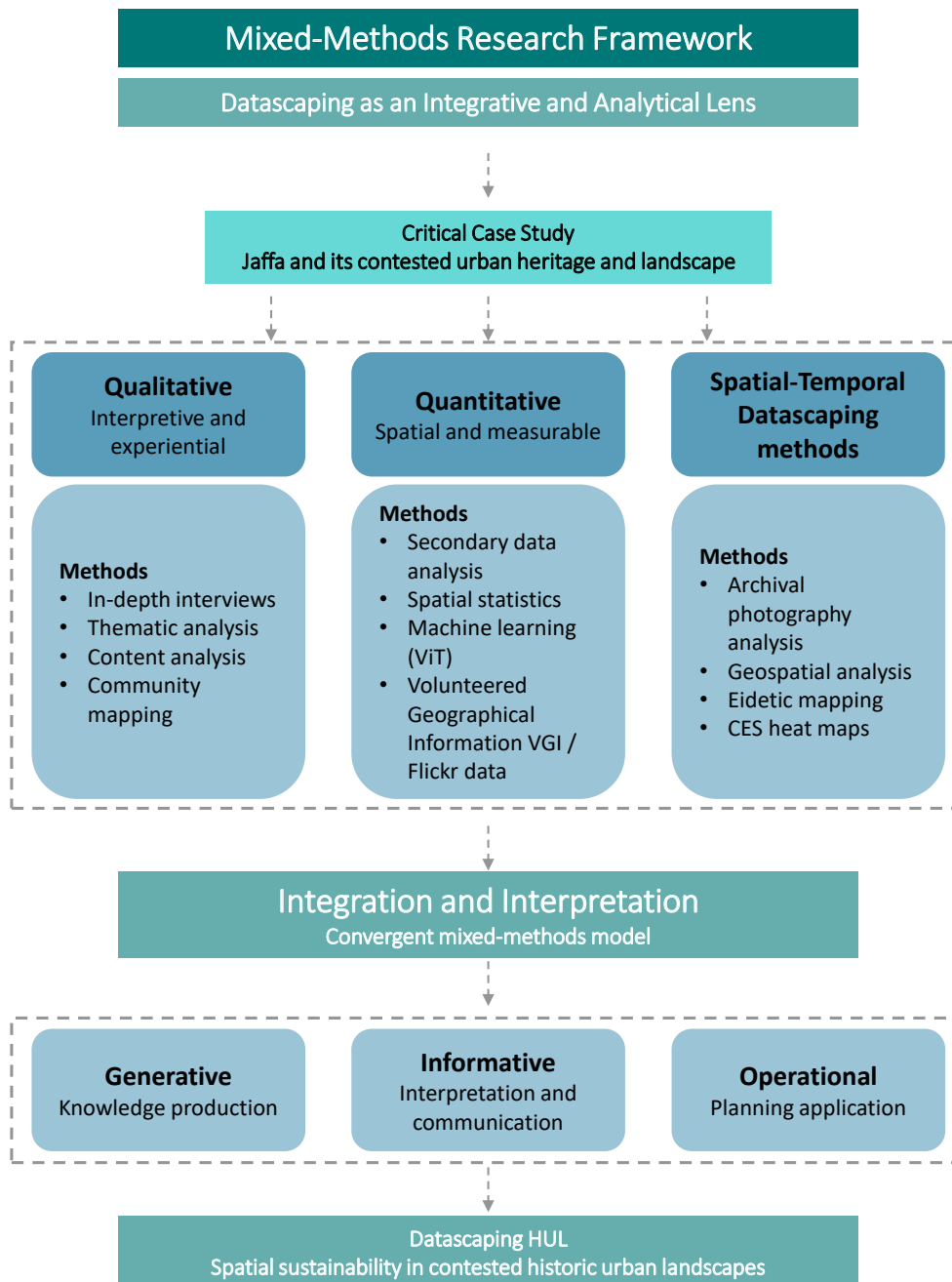


FIG. 2.11 Research methods framework illustrating the convergent mixed-methods approach adopted in 'Datascaping HUL', integrating qualitative, quantitative, and spatial-temporal datascaping methods through the critical case study of Jaffa. Figure by Author.

2.2.1.2 In-depth Interviews

The in-depth interview (IDI) method is a qualitative research method which aims to collect detailed information by engaging participants in conversations centred around relevant research themes (Porta, 2014). For empirical data collection, semi-structured interviews were planned to enable the interviewer to guide the discussion with respondents while allowing participants to express insights on their own terms (Weiss, 1994). This method is particularly effective for exploring complex issues in depth and for obtaining nuanced perspectives, which are essential for a thorough qualitative analysis (§ 9).

2.2.1.3 Thematic Analysis and Content Analysis

Thematic Analysis and Content Analysis are two commonly used approaches in qualitative research data analysis. While the boundaries of both methods are not clearly defined (Vaismoradi, et al., 2013) they are being used interchangeably to conduct studies. Research findings lie on a continuum depending on how much the data is transformed, ranging from simple description to deeper interpretation. Methods like content analysis and thematic analysis are suited to studies that focus on limited interpretation rather than theory development (Sandelowski & Barroso, 2003). It is “...a method for identifying, analysing and reporting patterns (themes) within data” (Braun & Clarke, 2006, Schneiderberg et al. (2026) and is particularly suitable for urban studies when exploring stakeholder perspectives, policy narratives, or community histories (Guest et al., 2012).

2.2.1.4 Methods Adopted for Datascaping

As per the conceptual framework, a series of methods is adopted to experiment with available datasets and illustrate the potential of datascaping for the three identified aims: generating information, communicating information, and serving as an operative method. The detail of each method is provided in the respective chapters.

- Archival Photography Analysis (§ 7)
- Geospatial Analysis Operation (§ 7)
- Spatial Statistics and Modelling (§ 8)
- Crowdsourcing and Volunteered Geographic Information (VGI) (§ 8)
- Machine Learning: Vision Transformer (ViT) based Image Classification Architecture (§ 8)
- Community Cultural Mapping (§ 9)

Various software is used in the research design and has been an essential component for analysing, visualising, and assessing data and outcomes. The software used most prominently includes QGIS (Version 3.20) and Atlas.ti (Version 22.0.x), Adobe Photoshop and Illustrator, AutoCad 2018, Zotero (Version 5.0), OpenStreetMaps, Google My Maps, and RAWGraphs.io. Online searches for archival photographs and maps from multiple credible library sources were accessed without copyright infringements.

2.2.2 Datascaping for Knowledge Visualisation

Datascaping draws on Tufte's principle of "escaping flatland" by layering complex information to reveal patterns, relationships, and structure that flat representations miss (Tufte, 1997, 2020a). This positions datascaping as a way of bringing hidden structures and dynamic functions of urban heritage to light rather than leaving diverse knowledge types to sit in parallel, unconnected. Chapter 4 elaborates this in full, examining how these theoretical principles are operationalised in practice and the disconnect that often emerges between integrative frameworks and their real-world implementation.

2.3 Working Definitions

The definitions of four key terms are extracted from Part A: Introduction, Theory and Context, which gives an elaborate analysis of each concept adopted to formulate the research questions and the framework. They resonate with the overall research aims and objectives, the explorations, and the outcomes of 'Datascaping HUL' only. The definitions may vary based on the disciplinary perspective and research methods employed.

As a Definition

Articles 8 and 9: “Historic urban landscapes are urban areas shaped by the historical layering of cultural and natural values, extending beyond the notion of historic centre or ensemble to include the broader urban context and its geographical setting. This context covers topography, geomorphology, hydrology, natural features, historic and contemporary built environments, above- and below-ground infrastructure, open spaces, gardens, land use patterns, spatial organisation, perception, visual relationships, and other structural elements. It also embraces social and cultural practices, values, economic processes, and intangible heritage linked to diversity and identity, forming the basis for an integrated approach to their identification, assessment, conservation, and management within sustainable development“ (UNESCO, 2011b)

As a Guiding Approach

HUL is operational management approach, "...essentially a new generation of urban planning, integrating territorial values with local ones, historic layers with the present-day environment, culture with nature, and intangible values with current global practices" (Erkan, 2018; UNESCO, WHITRAP, 2018). It is a management framework aimed at productive, sustainable development of urban space, balancing heritage conservation with social and economic development needs. It is less as a static category of urban area and more as a flexible, people-centred management methodology applicable across different urban scales and typologies, from metropolises to small and informal settlements, and usable to support both national urban policy-making and local management plans. It treats cultural diversity and creativity as core assets, offering tools to manage physical and social change while grounding this in local community traditions and perceptions alongside national and international values.

2.3.2 Datascaping

Datascaping is an interdisciplinary method for visual representation of all quantifiable forces (Amoroso, 2010), and has the potential to guide planning and design. Unlike conventional GIS- and UIS-based methodologies, which prioritise standardised, quantitative, and administratively legible datasets, datascaping is an interpretive, design-driven approach that integrates informal, relational, and performative urban knowledge. They also represent qualitative data and construct an eidetic argument (Corner, 1999), serve as a ground-truthing instrument (Girot, 1999), and aids as a gap-finder (Hein & van Mil, 2020). As an epistemic method, it mediates between interdisciplinary evidence and spatial intervention, enabling integration of diverse cultural, social, and economic inputs into decision-relevant spatial knowledge and actionable outcome. Where this plurality includes knowledge held by different societal actors, datascaping extends from an interdisciplinary method into a transdisciplinary one, where knowledge is co-produced for an actionable outcome. As a proactive measure, it supports forward-looking urban development and sustainability goals rather than responding to change only retrospectively. In this research, datascaping is conceptualised as a three-pronged approach spanning knowledge production, interpretation, and application within planning and design processes:

- **Generative:** producing spatial knowledge through the aggregation and visualisation of heterogeneous datasets, revealing what is otherwise invisible or undocumented in planning practice
- **Informative:** interpreting and communicating complex socio-spatial relationships to support decision-making, bridging the gap between technical data and contextual understanding
- **Operational:** translating spatial knowledge into actionable planning and design frameworks, enabling heritage values and community insights to inform planning priorities and interventions

2.3.3 Spatial Sustainability

Building on the theoretical discussion (§ 1.2), this research defines Spatial Sustainability as the capacity of urban environments to sustain social, economic, environmental, and cultural values over time while accommodating change and diversity within spatial systems. It moves beyond the classical framing of sustainability and its later cultural extensions by foregrounding the spatial and temporal dimension that are underexamined in historic contexts. It treats the economic, ecological, social, and cultural aspects of sustainability not as abstract targets but as lived, represented, negotiated, and contested within the spatial realm of the city, evolving along its temporal dimension.

Operationally, this research aligns to UN-Habitat's Illustrated New Urban Agenda (2020) conception of Spatial Sustainability as a means of promoting resilience, equity, inclusion, and justice while enabling the efficient management of urban development. To make this concept empirically compliant, the four dimensions are operationalised through the HUL attribute categories applied across the empirical chapters (§ 7–9): geomorphological and land-use attributes (environmental), built-fabric and infrastructure condition (built environment), socio-economic indices and community perception (social), development and tourism pressure (economic), and intangible heritage and memory (cultural).

'Datascaping HUL' highlights the connections between culture, heritage, and other SDG and targets, underscoring the relevance of the HUL approach to the global development agenda (O'Donnell & Turner, 2012; Rodwell, 2003a; M. Turner & Singer, 2014a). A culture-based approach to urban development rests on three principles: "people-centred cities are culture-centred spaces; place-based planning integrates local history and culture; and integrated policies where culture is a driver of sustainability and resilience" (UNESCO, 2016). By aligning these principles with the spatial and temporal dimensions of urban environments, they show how historic urban landscapes become spaces where layered meanings, governance processes, and competing social interests intersect. In doing so, they reinforce the concept of Spatial Sustainability as an integrative framework that links spatial planning, cultural heritage, and sustainable urban development across temporal and scalar dimensions.

2.3.4 Contested Urban Heritage and Landscapes

Theory suggests that social contestation has a spatial form and shapes the contested space. Historic cities, as loci of contested space, embody a dynamic interplay among layered historical narratives, temporal processes, and spatial configurations, in which past and present continuously interact. They can be understood and documented through three core components of: theoretical/ empirical component (People): Constituting memory, identity, and the production of space, morphological component (Place): constituting the genesis of space, regulatory component (Policy), constituting the progression and transformation of space through past, present, and future, shaped by external influences (§ 2.1.2). Together, these components frame contested urban heritage and landscape as a socially constructed, spatially manifested, and temporally regulated system shaped by competing narratives, power relations, and development pressures. Understanding the dynamics of a contested city, therefore, requires interdisciplinary collaboration to address the challenges of urban modernisation while preserving cultural and historical integrity.

Here, the focus is on historic cities with contemporary urban heritage challenges. The terms 'historic urban landscape' or 'contested landscape' align with the HUL Recommendation. They denote a spatial-temporal continuum that alternates between the political and administrative boundaries of a neighbourhood, district, city, or region while encompassing layered cultural, social, and historical meanings. It also encompasses contestation over typical pluralism issues, including disputes about social reproduction involving class, ethnicity, power, and status, overarched by contestation over both pluralist society and sovereignty, with the latter involving concerns of state legitimacy and competing claims of national identity (Artopoulos & Bakirtzis, 2014; Gaffikin et al., 2010).

Specific to Jaffa, contestation operates across two intersecting dimensions: an ethno-national dimension, reflecting the tensions of Arab-Jewish co-existence in Israel's mixed cities, and socio-economic dimensions, reflecting the inequalities between economically stronger and more vulnerable communities irrespective of religion or ethnicity. These two forms of contestation are deeply intertwined in Jaffa, where ethnicity and socio-economic marginalisation frequently overlap but do not always coincide. Thus, contested urban heritage and landscapes are approached here as socially constructed and spatially embedded systems in which plural narratives, governance processes, and urban transformation intersect, shaping both material form and collective meaning.

Read together, these concepts move from what is being studied (HUL), through how it is studied and made visible (Datascaping), to why it matters (Spatial Sustainability), and where the stakes are sharpest (contested urban heritage). This integrated framework sets the terms for the chapters that follow: Chapter 3 examines how the HUL Recommendation has been operationalised in practice and the challenges and opportunities this presents for spatial sustainability, while subsequent chapters apply datascaping as a method for analysing and interpreting contested heritage within the critical case study.

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“If I have seen further,
it is by standing on the shoulders of Giants.”

Isaac Newton

3 Contextual Embedding of the HUL Recommendation as a Means for Spatial Sustainability

This chapter is based on a published article:

- Turner, M., & Potdar, K. (2021). Metaheritage: Beyond the historic centre and ensemble. In *Attributes: A way of understanding OUV*. Japan Centre for International Cooperation in Conservation, Tokyo National Research Institute for Cultural Properties. <http://id.nii.ac.jp/1440/000090005/>; https://tobunken.repo.nii.ac.jp/?action=repository_uri&item_id=9048&file_id=19&file_no=1
- Research work conducted as part of a Research Fellowship with ICCROM Headquarters, Italy (March–August 2023)
- Potdar, K. (2023). Qualitative datascaping for historic cities in conflict: A grounded theory analysis for Spatial Sustainability. Case of Jaffa, Israel. 10th International U&U PhD Seminar, 185–196. https://orbi.uliege.be/bitstream/2268/304771/1/UU_Proceedings_FINAL_compressed.pdf

3.1 Introduction

Culture and heritage have been explicitly referenced in the 2030 Agenda for Sustainable Development (UN, 2015; UNESCO, 2019), however, the relationship between culture, heritage and sustainability remains underexplored (Auclair & Fairclough, 2015), prompting theorists and practitioners to advocate for placing ‘Culture’¹⁰ at the core of sustainable development (Sen, 1999, 2004; UNESCO, 2013). Despite these advancements, the complex processes of urban management are typically centrally managed (Bandarin, 2015) requiring further refinement to support their integration into sustainable urban development (Evans, 2005; Pereira et al., 2012).

While the normative call for integration is well established through the HUL Recommendation, the practical methods and tools required to implement it are still evolving (Erkan, 2018). Their effective implementation further depends on coordinated collaboration among multiple actors, stakeholder groups, and governance levels. In this process, urban heritage attributes play a crucial role in defining values and informing policy decisions (Turner, 2023). Yet limited research has examined how these attributes are interpreted differently across different stakeholder groups and urban scales, or how such interpretations can advance spatial sustainability objectives. Scholarly understanding of what triggers or shapes the valorisation of historical strata remains thin (Bertacchini & Saccone, 2012; Meskell & Brumann, 2015), a gap that sits uncomfortably against the growing demands placed on urban heritage frameworks to justify what they protect and why. To address this, this chapter synthesises the role of culture in spatial sustainability, as articulated in the NUA Illustrated, to examine how the HUL Recommendation can be reframed as a localised, context-specific, and integrated territorial approach to spatial sustainability in contested urban heritage contexts (Sub RQ 1.a, § 1.3.3).

¹⁰ Nobel Laureate Amartya Sen argues about how culture matters and in many ways influences development. He enlists culture as an economically remunerative activity, influencing economic behaviour, political will, participation, association and inclusion, and impact valorisation. He also stresses how not to address matters of culture through cultural determinism, bigotry, and alleviation (Sen, 2004)

3.1.1 Researching Urban Heritage Through Secondary Data Analysis (SDA)

To answer this research question, Secondary Data Analysis (SDA) is adopted (§ 2.2.1.1). Applied here, SDA begins with a clearly formulated research question, followed by an assessment of the suitability, scope, and type of existing data required (Johnston, 2014). Its principal advantage for this study is the ability to draw on large or combined datasets that would be too costly or time consuming to generate through primary research alone, while still enabling new hypotheses to emerge (Rew et al., 2000; Stewart & Kamins, 2012).

For this segment of research, the three secondary datasets are obtained from the following sources (Table 3.1). Further evaluation is carried out to address the research questions, identify overlaps, gaps, and opportunities in aligning heritage conservation with broader sustainability goals, and provide insights that would be difficult to obtain through primary data collection alone.

TABLE 3.1 Three categories of secondary data analysis and the sources of information

No.	Source of Information	Type of information and analysis conducted
1	UNESCO's State of Conservation Information ¹¹ (UNESCO 1976-2026)	A brief analysis of the SoC reports submitted by State Parties identifies 13 key threat types impacting the OUV, owing to contemporary challenges to urban environments, to document the trends (§ 3.2.3)
2	UNESCO World Heritage Endangered list (UNESCO 1976-2026)	A brief analysis of SoC reports for World Heritage sites on the Danger List, identifies three major categories of vulnerability: acute physical destruction, structural pressures from development and extraction, and systemic inadequacy and limitations, the urban heritage attributes under threat, and proposed adoption of HUL tools (§ 3.2.4)
3	UNESCO World Heritage Canopy, a repository developed under the World Heritage Sustainable Development Policy (UNESCO, 2015; UNESCO WHC, 2022).	This compiles thematic and regional case studies published on the Canopy that link heritage conservation to sustainable development, and showcases examples of the HUL approach successfully deployed. This method enabled quantitative and qualitative analysis of 59 case studies based on four categories: (i) threats and vulnerabilities, (ii) relevant SDGs targets and indicators addressed, (iii) key attributes of the HUL approach, and (iv) suggested tools for application, thereby revealing intersections between heritage-led planning for the sustainable urban agenda (§ 3.3.1, Annex I)

¹¹ The UNESCO Information System provides extensive documentation on the conservation status, threats affecting World Heritage properties, decisions adopted in World Heritage Committee meetings within a comprehensive international monitoring framework, since 1979 (UNESCO 1976-2026)

3.2 Cultural Heritage as a Vector for Sustainable Development

Sustainability has traditionally been framed through three dimensions, environmental, economic, and social, and is increasingly recognised as a four-pillar framework with the addition of culture, which mediates between the other three rather than simply sitting alongside them (Dessein et al., 2015; Meireis & Rippl, 2019). Policy initiatives have reinforced this shift, explicitly linking culture to development and sustainable urban agendas (Duxbury et al., 2016; UCLG, 2018; UNESCO, 2015), encouraging cities to integrate cultural perspectives into public policy; yet cultural sustainability remains far less embedded in practice than its economic and environmental counterparts (UNESCO, 2017). Heritage is increasingly framed as a vector within spatial planning and a key component of the NUA (UN, 2015a), but its interrelationship with planning paradigms remains comparatively underexamined (Janssen et al., 2017b). A principal challenge is the limited development of measurable targets and indicators translating normative principles into implementable frameworks: the SDG framework's 17 goals, 169 targets, and 232 indicators (Koch & Krellenberg, 2018) are supported by only a limited number of comprehensive global datasets, complicating systematic evaluation and cross-scalar comparison.

3.2.1 Critical Heritage Studies (CHS) and HUL Recommendation: Points of Convergence

Scientific discourse in recent decades has evolved to critically examine approaches to heritage conservation, management, and planning, revealing persistent dichotomies within the discipline, including nature-culture binaries (Taylor et al., 2023), architecture and space binaries (Aziz Amen & Kuzović, 2018) and the Eastern and Western philosophical dichotomy on heritage (Gao & Siân, 2020), pointing to a gap worth expanding on.

Critical Heritage Studies (CHS) views cultural heritage as a political, cultural, and social issue (Graham & Howard, 2008; Harrison, 2013; Waterton & Watson, 2015), though its limited critical inquiry into conventional heritage approaches may impede the approach itself (Gentry & Smith, 2019). It goes beyond the normative definitions of urban heritage to examine the interconnections of place, people, and policies (UNESCO, 2016a), showing differences between preservation, conservation, heritage

planning, and urban renewal in how they understand heritage values and adaptation (Patiwael et al., 2019) further highlighting the fragmented and contested nature of heritage practice. Although stewarding the past is crucial, this traditional attitude can outweigh cultural heritage's potential as a mediator for managing change, evident in the promotion of Inclusive Heritage Discourse (IDH) against the tenets of Authorised Heritage Discourse (ADH)¹². typically adopted for material culture under a 'conserved as found' philosophy, subverts non-conformist and alternative approaches to heritage narratives, reinforcing existing social hierarchies and perpetuating power relations among experts, institutions, and intergovernmental frameworks, thus diminishing heritage's potential to serve as an agent of change (Aronsson, 2014a; Kisić, 2013a).

These challenges are more noticeable amid contemporary urbanisation pressures, requiring the urban heritage and spatial sustainability discourse to adopt methods for identifying and acknowledging the limits of acceptable change in a historical context¹³ (Bandarin, F. & Van Oers, 2012a; Pereira Roders, 2013). It refers to context-specific thresholds beyond which transformation undermines a historic environment's attributes, values, identity, and sense of place¹⁴ (§ 5 & 6). Rather than preventing change, the concept seeks to calibrate the degree, pace, and scale of intervention a place can absorb without eroding its cultural significance. The challenge lies in exploring and implementing IDH, which views heritage as a cultural process, inviting a critical gaze and facilitating an examination of the consequences of defining particular sites, practices, narratives, and identities as heritage (L. Smith, 2014).

¹² AHD conceptualises heritage as material, finite, and fragile, prioritising the preservation of physical assets and treating them as non-renewable resources requiring protection (L. Smith, 2014)..

¹³ Within Critical Heritage Studies and related urban conservation discourses, "...define urban heritage conservation as the 'management of change'" (Gilberto, 2018), acknowledging that historic cities are dynamic and continuously evolving rather than static. The concept of 'limits of acceptable change' refers to the threshold beyond which alterations to a historic urban area compromise its authenticity, integrity, spatial structure, or cultural significance. Although not always explicitly framed under this exact terminology in early urban conservation charters, the principle is embedded in the Washington Charter for the Conservation of Historic Towns and Urban Areas (ICOMOS, 1987), the Nara Document on Authenticity (ICOMOS, 1994), the Vienna Memorandum on World Heritage and Contemporary Architecture (UNESCO, 2005c), and the Recommendation on the Historic Urban Landscape (UNESCO, 2011c), which collectively establish criteria for managing change in urban environments, which however, needs further refinement.

¹⁴ Relph emphasises that when describing a space, which is different from a landscape in its tangible form, it almost always involves an underlying sense of place or emotional meaning attached to it, making it intangible and amorphous. This concept is explored in depth in Chapter 5 and 6 through detailed analysis of Jaffa as a case study and the myriad meanings and perceptions of sense of place and placelessness (Relph, 1976a)..

Heritage is a powerful resource for creating a future and the recognition of how a fundamental reconceptualisation of heritage is uniquely placed not only to address claims about identity, ancestry, and cultural transmission but to engage with key moral-ethical issues of our times. (Butler, 2006; Gentry & Smith, 2019)

These challenges underscore the limitations of conventional, technical approaches to urban heritage, which often overlook the social and cultural nuances producing urban alterities (Lefebvre, 1996a; N. Smith, 1996a) (§ 5.1). Uncontrolled, rapid urban growth can intensify fragmentation and negatively affect the quality of urban and rural environments. Consequences include, but are not limited to “...excessive building density, standardised and monotonous buildings, loss of public space and amenities, inadequate infrastructure, debilitating poverty, social isolation, and heightened vulnerability to climate-related disasters” (Cave & Negussie, 2017; UNESCO WHC, ICCROM, IUCN, 2020). These conditions demand a shift beyond the ADH and binary-driven approaches and toward an IDH process. This perspective positions heritage as a dynamic, relational component embedded in social, cultural, and political processes, supporting multi-stakeholder consultation, interdisciplinary analysis, and adaptive governance.

3.2.1.1 Temporal Dynamics and the Pace of Urban Transformation

Urban transformation does not occur in isolation; it unfolds through the interaction of internal urban dynamics and external socio-economic pressures. For this, the dimensions of endogenous lifecycles and exogenous drivers¹⁵ (Benjamin, 2016; Wegener, 1986a) provide an analytical framework for examining how internal urban rhythms interact with external factors over time. In this research, the distinction in endogenous lifecycles is applied at two complementary levels: first, to analyse temporal dynamics of urban transformation, and second, to examine how institutional capacities and policy environments act as mediators. This dual application extends the framework while remaining consistent with its systemic foundations.

¹⁵ Exogeny: The influence of external forces or elements that originate outside a system, culture, or place, often shaping it from the outside. Endogeny: The influence of internal forces or elements that arise from within a system, culture, or place, reflecting its inherent dynamics or traditions (Benjamin, 2016)

The temporal dynamics refer to varying speeds and durations of change across different urban layers (Brand, 2018; Orr, 2014; Snickars et al., 1982; Von Bertalanffy, 1969b). Drawing on the concept of pace layering, urban systems can be understood as comprising elements that evolve at distinct temporal rates, including spatial form, urban fabric, infrastructure networks, and patterns of use (§ 9.3.1 and Figure 9.1 and 9.2). These layers differ in lifespan, ageing processes, seasonal demands, and the velocities of material and infrastructural flows (Krishnan et al., 2024). Together, these differing temporalities shape how urban systems absorb, resist, or adapt to interventions and external pressures over time (§ 9). The institutional capacity perspective further considers how governance models, organisational culture, staff commitment, and material and financial resources shape planning systems' ability to respond to these layered temporal dynamics. This is particularly important in historic urban landscapes, where institutional fragmentation and uneven governance capacities frequently influence which, urban attributes are prioritised, transformed, neglected, or conserved over time.

Exogenous drivers, by contrast, originate outside the internal rhythms of the urban system. These include extreme climate events, environmental disasters, economic crises and restructuring, demographic shifts, technological change, national and supranational policy reforms, shifting social values, and the broader socio-economic context within which cities operate (Batty, 1996; Wegener, 1986a). The interplay among governmental, private-sector, and academic agendas further conditions how heritage planning is framed and implemented.

Periods of accelerated endogenous urban growth, particularly when intensified by exogenous economic pressures, can exceed the regulatory and strategic capacity of planning systems. In such contexts, planning shifts from a proactive to a reactive mode, and the resulting spatial configurations become path-dependent (§ 6). These historically embedded patterns subsequently delimit the range of feasible heritage and development interventions. These layered temporal and institutional dynamics, and the constraints they produce, form the analytical foundation of 'Datascaping HUL'. Within this research, they provide a basis for understanding how differing speeds of change, governance structures, and socio-spatial processes shape the transformation, continuity, and resilience of historic urban landscapes across time.

3.2.2 The HUL Recommendation Revisited: Insights, Limitations and the Case for Reframing

The HUL Recommendation underwent a series of discourses (Hall, 2005; L. Smith, 2006) and paradigms¹⁶ (G. J. Ashworth, 1994; Pendlebury, 2013). The promulgation of many standard-setting instruments, international directives, and charters from 1970 onwards altered the definitions of urban heritage, territory, and society (Sunkoly, 2017). The Venice Charter (ICOMOS, 1964) defined urban heritage as “...historic monument embraces not only the single architectural work but also the urban or rural setting”. The Washington Charter in 1987 (ICOMOS, 1987) identified “...various elements of historic towns and cities that convey the historic character of the town or urban area, as well as all material and spiritual elements that express this character”. As per the Vienna Memorandum (UNESCO, 2005b),

The future of our historic urban landscape calls for mutual understanding between policymakers, urban planners, city developers, architects, conservationists, property owners, investors, and concerned citizens, working together to preserve the urban heritage while considering the modernisation and development of society in a culturally and historically sensitive manner, strengthening identity and social cohesion.

The Council of Europe Framework Convention on the Value of Cultural Heritage for Society, the Faro Convention, also recognises heritage in “...all aspects of the environment resulting from the interaction between people and places and through time.” (Council of Europe, 2005) and is essential in furthering the HUL tool on Civic Engagement. Urban landscapes shifted from being based on sensory perception of cities to being understood as physical systems (Conti, 2008; Van Oers, 2010) composed of buildings, spatial layouts, open spaces, and their interrelations. Their urban form is too complex to be fully understood in a single framework, requiring different analytical models to capture the structure of historic urban spaces (Madanipour, 1996). The past decades have seen an evolution in theories addressing the spatial configurations of historic cities, adhering to more process-driven methods of design and planning and diverging from the conventional category-driven approaches (Veldpaus et al., 2013a; Zaninović et al., 2018)¹⁷. Cultural landscapes (Taylor & Lennon, 2012), Historic Landscape Characterisation (Dobson,

¹⁶ A paradigm shapes our ontological, epistemological, and methodological perspectives. It influences the discourse, or “...the system of statements made about aspects of our world, which inherently carries a set of assumptions, biases, insights, and paradigms resulting from discourses.” (M. Allen, 2016; Patiwaal et al., 2019).

¹⁷ The HUL Recommendation expands beyond the heritage-object-based methods that privilege “the tangible dimension of cultural heritage assets, e.g., building materials, façades and structures, and building ensembles, to a more integrated outline that valorises the intangible values, urban processes and evolving social practices” (Veldpaus et al., 2013a)

2010; Fairclough et al., 2001; S. Turner, 2007), and the HUL Recommendation are significant advances, in theory, stressing the inclusion of spatiality and temporality in conservation and urban heritage discourse. The European Spatial Development Perspective (ESDP) articulates a similar agenda around natural and cultural heritage:

Natural and cultural heritage in the EU is endangered by economic and social modernisation processes. European cultural landscapes, cities, and towns, as well as a variety of natural and historic monuments, are part of the European heritage. Its fostering should be an important task for modern architecture, urban and landscape planning in all regions of the EU (European Commission, 1999)

HUL Recommendation came to be seen not only as transmitter of culture but also as composers, actively shaping its expression, although their scope and application have limitations (Czepczyński, 2008). Few urban planners and conservation professionals fully recognise the connections between urban form and the historical grain of the city (Whitehand & Gu, 2010a).

“The city is two things: a large collection of buildings linked by space, and a complex system of human activity linked by interaction.” (Hillier & Vaughan, 2007)

Although the HUL Recommendation provides a valuable framework, many scholars argue that it remains primarily focused on physical form at the scale of urban areas rather than individual sites. They also note that it gives limited attention to diversity, communities, and intangible heritage, which are often overshadowed by traditional conservation priorities (Fouseki, 2018). Notably, despite the HUL Recommendation's own definition explicitly extending beyond the historic centre to encompass the "broader urban context" and its geographical setting, as well as the "social and cultural practices and values" embedded within it, these two dimensions are rarely operationalised in practice or engaged with critically in the literature which undermines the integrated approach the framework claims to offer. Moreover, it remains a challenge to adapt it due to multiple factors: the breadth of its conceptualisation (Rey-Pérez & Pereira Roders, 2020a; Pereira Roders & Bandarin, 2019); posing limitations to translating into practice (Veldpaus, 2015; Veldpaus & Pereira Roders, 2017a)¹⁸; structural limitations, including ambiguities in identifying urban attributes and managing change across scales (UNESCO WHC, ICCROM,

¹⁸ In this systematic analysis the authors present an overview highlighting the limitations and challenges of the process in four categories: a) integration of heritage policies in sustainable development frameworks and urban policies; b) definition of heritage in terms of attributes and values; c) focus on the management process rather than heritage categories; and d) widening of the definition of actors to be involved. These challenges are analysed through in-depth interviews and content analysis (§ 9.3 and 9.4)

IUCN, 2020); application of conceptual international guidelines to operational national and local policy remains challenging due to the diversity of local context, and vagueness may allow for misinterpretation (Gaillard & Rodwell, 2015; Ronchini et al., 2018); local regulatory differences and conflicts with traditional or indigenous practices (Ginzarly et al., 2019); economic interests and urban revitalisation often take priority over heritage preservation, limiting HUL adoption, and politically powerful groups focus on material heritage for economic gain, complicating HUL implementation (Grefe, 2004; Rey Perez & Gonzalez Martinez, 2018); emphasis on wide stakeholder consultation, participation, and consensus-building may impede results and effective implementation HUL emphasises public participation and consensus-building, but practical implementation remains limited, adding further complexity (Hoftberger, 2023; Coimbra et al., 2025); and with attention on urban pressures like climate change and development, where contemporary projects are often seen as compromising heritage value, particularly regarding visual or aesthetic impacts (Bandarin, F. & Van Oers, 2012a; G. Wang, 2014).

Recognising these limitations, the merits of urban dynamism, urban structure and scales, temporal legibility, and time depth as cultural values offer a pathway to address the dichotomy between heritage and development (Fouseki et al., 2020). Cities are outcomes of temporalities and organisational imperatives across scales, where actions shape the material and environmental attributes, and urban heritage has expanded in type, scale, and the time interval between creation and preservation (De La Torre, 2013), allowing for change management. This perspective allows for documenting the dynamic forces and processes shaping a specific urban environment, defining its distinct spatial character and enabling urban planners and actors to identify the underlying organisational logic of the urban fabric and extend them into future development, ensuring spatial and temporal coherence (Bianca, 2015). The interpretation of the HUL Recommendation must move beyond its current framing, serving not only as a means to comprehend the past and present, but as a reoriented account for shaping more equitable urban futures (J. Smith, 2015). This perspective exposes the limits of treating the HUL as a sufficient guiding framework in itself, and instead points toward the **need to reframe its approach to better balance temporal depth and urban transformation in historic cities, ensuring their plurality and socio-spatial identity are sustained on more inclusive terms**. One that foregrounds inherited spatial logic and contemporary change as equally legitimate forces in shaping the city.

3.2.2.1 Integrated Territorial Urban Conservation (ITUC)

In 1995, ICCROM¹⁹ launched the Integrated Territorial and Urban Conservation Programme (ITUC) to address broader challenges in historic cities. Significantly, it sought to reframe urban conservation not as a site-bound practice but as a process embedded within wider planning frameworks, with a focus on landscapes and larger territories, from neighbourhoods to metropolises, recognising the dynamic and evolving interconnection between people, place, and heritage. The programme stressed "...the creation of practical tools and guidelines for maintaining and monitoring the impact of environmental changes on built heritage, rethinking conservation materials and techniques for sustainability, and developing planning strategies to integrate heritage into the urban development agenda" (ICCROM, 2000). This systemic orientation anticipated many of the principles later formalised in the HUL Recommendation. Mironowicz's observation that urban growth operates at two levels: changes in city size and changes in internal urban structure (Mironowicz, 2014), underscores the scalar complexity that ITUC sought to address. Jokilehto similarly noted the dual character of urbanisation: its capacity to erode the authenticity of historic fabric while simultaneously enhancing awareness of local culture (Jokilehto, 2010b, 2010a, 2015). ITUC's response was to promote place-based, context-sensitive approaches, making local knowledge central to identifying appropriate conservation solutions through multi-level engagement (European Policies Research Centre, 2017). Rather than prescribing universal methods, it emphasised the importance of locally grounded reform, a position that remains relevant given the persistent criticism that international frameworks like HUL struggle to translate across diverse local contexts. In this regard, ITUC provides an instructive systemic precedent for embedding heritage conservation within the broader temporal, institutional, and socio-economic dynamics that shape urban development and a reminder that the gap between framework and implementation is not new.

¹⁹ ICCROM is an intergovernmental organisation working in service to its Member States to promote the conservation of all forms of cultural heritage in every region of the world. It is an advisory body to the UNESCO World Heritage Committee and provides expert advice and support to the Committee on the conservation and management of World Heritage properties. This support includes capacity building, advisory missions to World Heritage properties, and participation in the State of Conservation process. (ICCROM 2023). The author had the opportunity to undertake a 'Research Fellowship' in 2023 at ICCROM Headquarters, Rome, Italy.

3.2.2.2 Towards a Contextually Embedded Heritage Practice

“Urban planning should prioritise sustainability and contextual sensitivity.”
(J. Smith, 2020)

Foregrounding multi-scalar urban contexts and living traditions, the adoption of the approach explicitly necessitates localisation. Its guidelines cannot operate abstractly but must be translated into context-specific governance structures and embedded in political realities and local cultural narratives, which may at times conflict. When government commitment ensures the adoption of the HUL approach, it can open up two potential paths (Erkan, 2018): the revision of national urban policies and the development of management plans or city-level mechanisms. While these pathways appear procedurally straightforward, their practical implementation raises unanswered issues concerning scale, accountability, and institutional logic. With the requirement that these trajectories, be enacted in conjunction with the four tools and six steps of the HUL Recommendation²⁰ comes the presumption of administrative stability and inter-sectoral coordination, conditions that may be extremely limited in practice. This mirrors critiques of SDG localisation that highlight the gap between global ambition and municipal governance capacity, where 65% of SDG targets have a high risk of failure without the integration of local urban stakeholders²¹ (Misselwitz & Salcedo Villanueva, 2015). The lack of spatially disaggregated data²², operationalisation, and capacity gaps are significant constraints to effective monitoring and implementation (Dick, 2016).

²⁰ The HUL Recommendation propose a set of four tools: Knowledge and Planning tool (Includes documentation), Regulatory systems (concerns with the management frameworks), civic engagement (Concerns participation and inclusion), and financial tools (Includes economic aspects). All these tools play a crucial role in interdisciplinary approaches to integrating urban heritage into planning and decision-making processes as a resource for holistic design and sustainable urban development. The six steps are sequential actions: resource mapping, value consensus-building, vulnerability assessment, policy integration, action prioritisation, and partnership-based governance implementation.

²¹ Numerous additional SDGs and targets are closely connected to action at the local or urban level, yet they do not explicitly acknowledge this linkage. As Misselwitz and Salcedo Villanueva (2015) observe “ 21% of the 169 targets can only be implemented with local stakeholders, 24% require implementation in collaboration with local actors, and a further 20% would benefit from a much stronger orientation toward local urban actors” (Dick, 2016; Misselwitz & Salcedo Villanueva, 2015)

²² Disaggregation at city scale refers to the classification and segmentation of data at various urban scales (e.g., districts, neighbourhoods, or census tracts) to capture spatial inequalities, socio-economic disparities, and uneven development patterns within cities, rather than relying solely on national or aggregated municipal averages. (Elaborate explanation and application in Chapters 4, 7, 8 and 9)

Efforts by policymakers, practitioners, and researchers to operationalise the framework focus on developing tools that adapt to specific contexts rather than applying it in a rigid or uniform way. As Larsen and Logan (2018) explain, there is greater emphasis on local knowledge and collaborative decision-making, which shifts authority toward those directly engaged with the issues while also reinforcing accountability for external actors who hold influence (Thompson & Wijesuriya, 2018, Larsen & Logan, 2018). In contested urban contexts, the localisation of international directives, however, can risk reinforcing dominant narratives under the appearance of consensus, while marginalised identities remain insufficiently represented.

One of the central concepts of the HUL Recommendation is the recognition of urban strata and their continuity across temporal and spatial scales. However, the process of identifying and documenting these layers is inherently political, as competing actors may prioritise contested narratives of identity, reinforce nationalist claims and mobilise heritage to legitimise development agendas, thus leading to exclusionary practices. The literature on contested heritage and urban memory (Tunbridge & Ashworth, 1996; Graham & Howard, 2008) underscores how selective recognition of the past shapes present power structures. The increasing urgency of negotiating these strata amid rapid urbanisation (UNESCO, 2016c) does not dissolve these tensions but deepens them (§ 5 and 6).

These endorsements by various instruments, such as the Florence Declaration on Heritage and Landscape as Human Values (ICOMOS, 2014) underscore that “... localisation involves negotiation among stakeholders, where heritage can both enable inclusive urban identities and expose conflicts between dominant and marginalised narratives”. Since localisation is shaped by power relations, governance capacity, and institutional priorities, it may reinforce or challenge selective heritage recognition and the ADH process. While the adoption of the HUL approach promotes the establishment of an inclusive urban governance which is accessible and encourages the participation of all individuals (Rey-Pérez & Pereira Roders, 2020a) (UNESCO, 2013), its transformative potential depends less on formal endorsement and more on how contested narratives, institutional asymmetries, and socio-political dynamics are addressed in practice. Localisation, in this sense, is both the promise and the vulnerability of the HUL framework and it is precisely this tension that the present research seeks to interrogate. It therefore cannot be treated as a neutral implementation mechanism, but must be understood as a fundamentally political and context-dependent process

3.2.3 The State of Conservation as Evidence: Threats, Patterns and Systemic Pressures

To take stock of the exogenous drivers and challenges faced in contemporary cities and urban heritage practices, a secondary data analysis of UNESCO's State of Conservation (SoC) reports offers critical insight into how these dynamics manifest as concrete threats and vulnerabilities in urban areas with World Heritage status. One in three properties is located in urban areas, and over 50% of all SoC reports examined historic urban centres underscoring the increasing challenges of uncontrolled urban development and reconciliation of heritage conservation measures with urban and spatial planning (UNESCO, 2025). An analysis of SoC reports submitted to UNESCO by States Parties, available as Periodic Reporting on the State of Conservation Information²³, presents a classification of 13 threat categories to cities and urban areas with World Heritage properties, including natural, cultural, and mixed sites. The distribution and intensity of these threats across historic cities are directly relevant to the hypothesis of 'Datascaping HUL'. The analysis reveals the dominant threat categories (Figure 3.1): Management and Institutional factors (40%), Building and Development (25%), Transport Infrastructure (10%), Social and cultural uses of Heritage (9%) and Other human activities (7%).

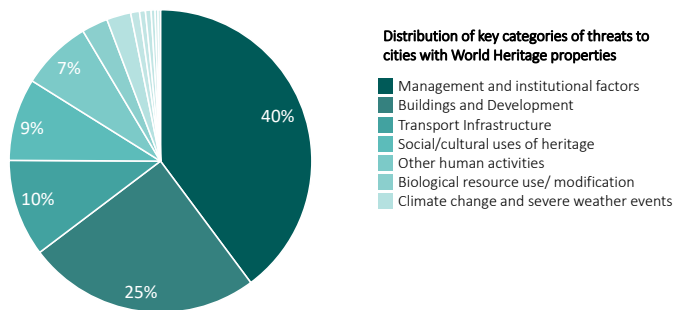


FIG. 3.1 Distribution of the 13 threat categories affecting cities and urban areas with World Heritage status, per the State of Conservation Information System (SoC), showing the five most relevant to this research. Source: UNESCO SoC Information System, 2023

Secondary pressures include: Biological resource use/ modification (7%) and Climate change and severe weather events (3%). At the sub-category level (Figure 3.2), the gradations of risk illuminate not only material degradation and environmental vulnerability, but also pressures arising from urban expansion, tourism intensity, infrastructure development, and shifting socio-economic conditions thus revealing the ramifications across limitations of management and legal frameworks, planning and economic challenges, and the absence of an integrated urban conservation approach.

²³ The State of Conservation Information System (UNESCO, 2025) provides extensive, reliable data on World Heritage conservation status and threats from 1979 to the present. It grants access to thousands of reports and World Heritage Committee decisions, forming a comprehensive monitoring system for international conventions.

The discussion around this theme stresses the need for refining methods evaluating the impact, acceptable limits of change and methods to identify the attributes of value in a dynamic urban context and push for adequate anchoring of management plans in local legal mechanisms, systems, and processes for urban development (UNESCO, 2019c; UNESCO WHC, ICCROM, IUCN, 2020)

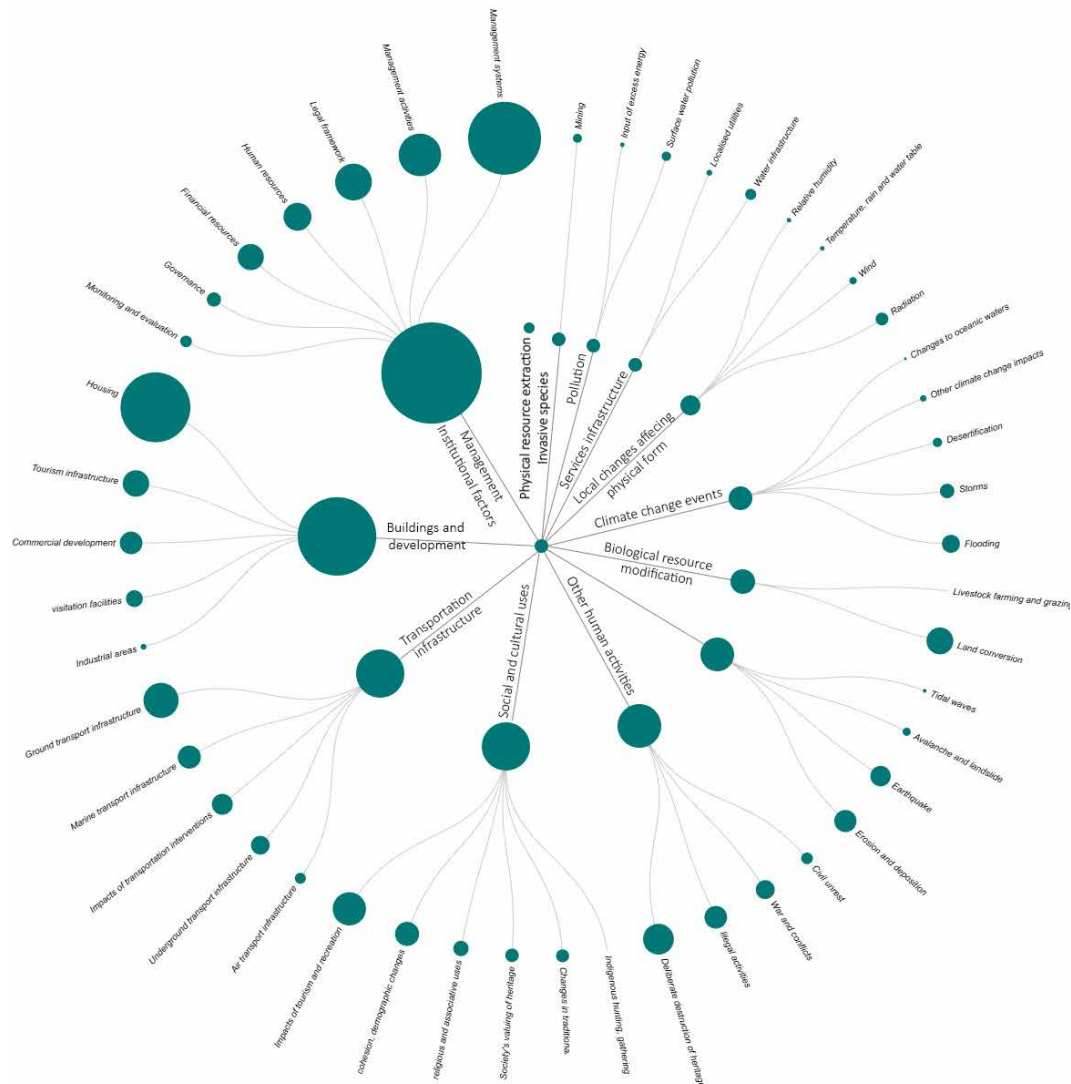


FIG. 3.2 Dendrogram showing the distribution and occurrences of key threat categories and sub-categories to World Heritage properties as per the State of Conservation Information System (SOC) over the years; Source: UNESCO State of Conservation Information System 2023

3.2.4 The World Heritage List in Danger: Trends, Vulnerabilities and the Limits of Implementation

As for the World Heritage properties, amongst the 1 199 sites (as of 2024), 321 are historic cities or archaeological, cultural, and architectural sites situated within a historic urban environment. 18 sites are listed on the endangered list. The State of Conservation Information System (UNESCO, 2025) reports reveal the challenges as a direct (physical damage due to armed conflict²⁴) or indirect consequence of various external pressures (impacts of planning and regulations, and development pressures). A systematic analysis of SoC reports for endangered WH sites identifies three overarching vulnerability domains:

- Acute physical destruction and socio-demographic erosion: Conflict, demolition, vandalism, displacement, gentrification
- Structural pressures from development and extraction: Large-scale urban growth, infrastructure expansion, and resource exploitation that progressively transform or degrade heritage fabric and landscapes
- Systemic inadequacy and institutional fragility: Regulatory and governance inefficiencies and limitations

The suggested remedial measures across these reports point predominantly toward the Knowledge and Planning Tools (35%) and the Regulators Framework tool (40%) (Figure 3.3). This complementarity of knowledge and governance structures signals the potential for spatial analytics, data integration, and planning mechanisms to positively influence heritage management and advance spatial sustainability objectives. Yet a significant implementation deficit persists. Although the SoC reports reference the HUL Recommendation and its tools within adopted decision directives, intergovernmental monitoring and evaluation teams demonstrate limited expertise in HUL implementation, resulting in shallow engagement with its principles and, in some cases, the non-adoption of HUL tools altogether. This is not a marginal observation: it points to a structural disconnect between the normative ambitions of the HUL framework and the institutional capacity required to operationalise it. The gap between theory and practice, in this regard, is not incidental but symptomatic of the broader limitations this research seeks to address.

²⁴ The topic 'Physical damage due to armed conflict' is not a subject of discussion in this research. However, it discusses the challenges due to plurality and ethnic tensions in cities and urban areas, leading to contested landscapes. Chapters 5 and 6 give an overview of the case of Jaffa, highlighting the underlying factors and influences that lead to a contested landscape: contested spaces arising due to ethnic tensions or plurality, and conflicts due to sovereignty.

While the World Heritage Committee's State of Conservation and Periodic Reporting mechanisms register these threat categories, the Committee's capacity to act on them remains uneven. As per the analysis, site managers overwhelmingly rely on generic Regulatory Framework tools (32%) rather than heritage-specific instruments such as the HUL Recommendation, whose own intergovernmental monitoring teams report limited expertise in its implementation. In short, the Committee identifies threats comprehensively but responds to them narrowly, applying similar tools regardless of context. Datascaping addresses this by turning global threat statistics into place-specific insights, helping match each site with the tool best suited to its particular threats While the World Heritage Committee's State of Conservation and Periodic Reporting mechanisms comprehensively identify these threat categories, its response remains narrow. Site managers overwhelmingly rely on generic Regulatory Framework tools (32%) rather than heritage-specific instruments such as the HUL Recommendation. This limited implementation is reported by their own intergovernmental monitoring teams. Datascaping addresses this gap by turning global threat statistics into place-specific insights, helping match each site with the tool best suited to its particular threats.

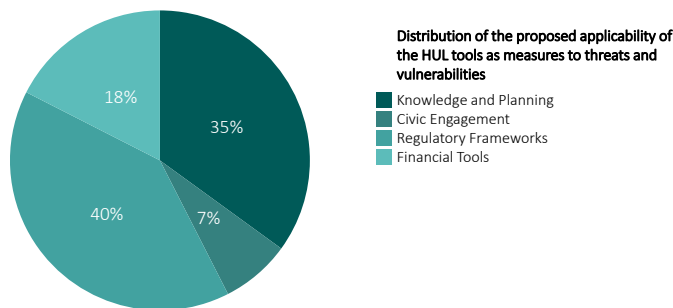


FIG. 3.3 The distribution of the HUL tools recommended to site managers to address the multitude of threats and vulnerabilities thus suggests the potential to influence the integration in management and planning at various urban scales.

3.3 Interdisciplinary Pathways to Spatial Sustainability

Building on the theoretical discussion (§ 1.2), this research defines Spatial Sustainability as the capacity of urban environments to sustain social, economic, environmental, and cultural values over time while accommodating change and diversity within spatial systems. It moves beyond the classical framing of sustainability and its later cultural extensions by foregrounding the spatial and temporal dimension that are underexamined in historic contexts. It treats the economic, ecological, social, and cultural aspects of sustainability not as abstract targets but as lived, represented, negotiated, and contested within the spatial realm of the city, evolving along its temporal dimension.

The Culture 2030 Indicators (UNESCO, 2019a) further identified that culture and heritage are linked to multiple SDG targets. The explicit mention of **culture as a catalyst** for over ten objectives clearly illustrates the systemic potential of this integrated approach. This interdisciplinarity, when illustrated (Figure 3.4), underscores the importance of an integrated approach and of identifying targets, indicators, and their associated attributes as entry points for intervention. Although culture-related data is generally fragmented and generated by various institutions and agencies²⁵, this framework of attributes, targets and indicators enables the consolidation of relevant data while emphasising the implementation and impacts of culture-related interventions across other policy areas. It also provides a unique method for measuring and collecting cultural data, which is essential for promoting culture within the SDGs and for incorporating it into national and urban development plans and policies.

Taken together, these frameworks indicate that spatial sustainability is unlikely to be achieved through solely through sectoral or disciplinary actions and instead it relies on the integration of cultural, social, environmental, and economic dimensions. Culture and heritage therefore function not as isolated policy domains, but as transversal drivers of sustainable urban transformation. This underscores the need for interdisciplinary planning approaches that move beyond coordination between sectors toward the genuine integration of knowledge systems and governance practices.

²⁵ Culture-related data includes, but is not limited to, tourism, cultural institutions, artists, theatres, performances, cultural heritage monuments and attractions, conservation, archaeology, and museums. These are managed under different departments given their varied disciplinary nature; hence, the data is fragmented under the auspices of different departments and Ministries as well. This is evident from the culture 2030 indicators (UNESCO, 2019a).

This highlights the mutually reinforcing relationship between heritage and sustainable development, which is also well supported in the literature (Larsen & Logan, 2018). This relationship between heritage and sustainable development is subsequently investigated through secondary data analysis to assess its practical expression.

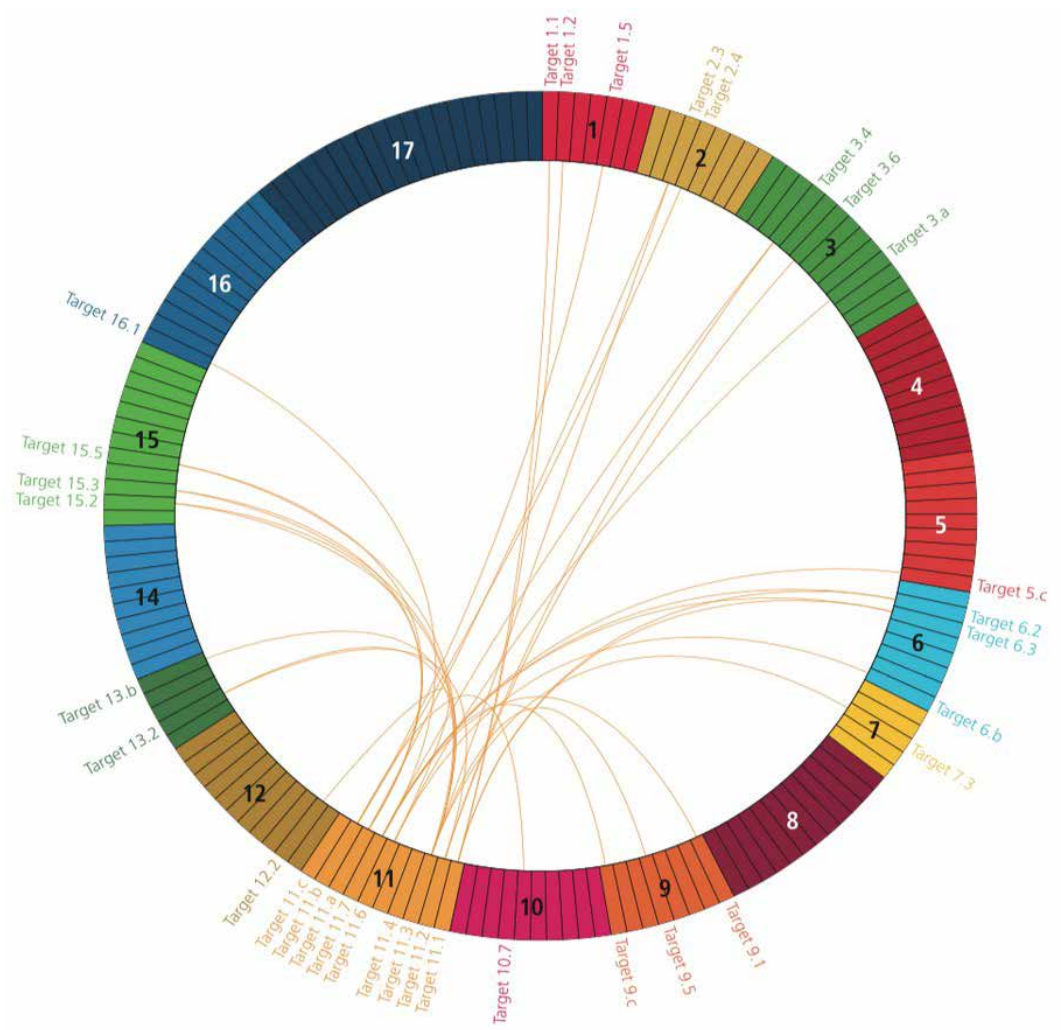


FIG. 3.4 Synergy and close association between SDG 11 on sustainable cities and human settlements with other SDGs; Source: <https://www.urbanagendaplatform.org/new-urban-agenda-localise>

3.3.1 Beyond SDG 11: The Cross-Cutting Potential of HUL Attributes for Spatial Sustainability, an Evidence from the UNESCO World Heritage Canopy

The World Heritage Sustainable Development Policy commits to integrating a sustainable development perspective into the processes of the World Heritage Convention, establishing principles that connect the protection of Outstanding Universal Value with sustainable development (UNESCO, 2015). In line with this, the Canopy platform²⁶ was launched as a thematically and regionally comprehensive information source to advance understanding of the urban sustainability agenda's integration and implementation. Janssen et al. observe that planning paradigms have evolved accordingly, moving toward more interdisciplinary and integrative methods (Janssen, 2014; Janssen et al., 2017b), underscoring the importance of initiatives that operationalise this shift by identifying overlaps between sustainability goals and urban heritage planning.

To examine where these overlaps materialise in practice, a quantitative analysis is conducted on 59 case studies from the Canopy platform (Annex I). As outlined in the research methods section (§ 3.2), each case study was assessed across four categories:

- i threats and vulnerabilities,
- ii relevant SDGs targets and indicators addressed,
- iii key attributes of the HUL approach, and
- iv suggested tools for application.

The analysis confirms the intersection of the HUL Recommendation with the sustainable urban agenda, further substantiating the proposition that **'Culture functions as an enabler within the SDG framework'**. The diagram gives an overview of the links and the HUL attributes that imply the successful application towards these targets (3.5).

²⁶ The key aspects of the UNESCO World Heritage Canopy: "i) The importance and beneficial impact of heritage on sustainable development both within and around World Heritage sites, providing advantages to local communities. ii) Effective approaches for sustainable development in and around World Heritage sites that align with heritage preservation objectives while protecting their Outstanding Universal Values, iii) Examples of heritage management practices, policies, and initiatives that promote sustainable development across different thematic areas and solutions that integrate heritage engagement for sustainable outcomes "(UNESCO WHC, 2022)

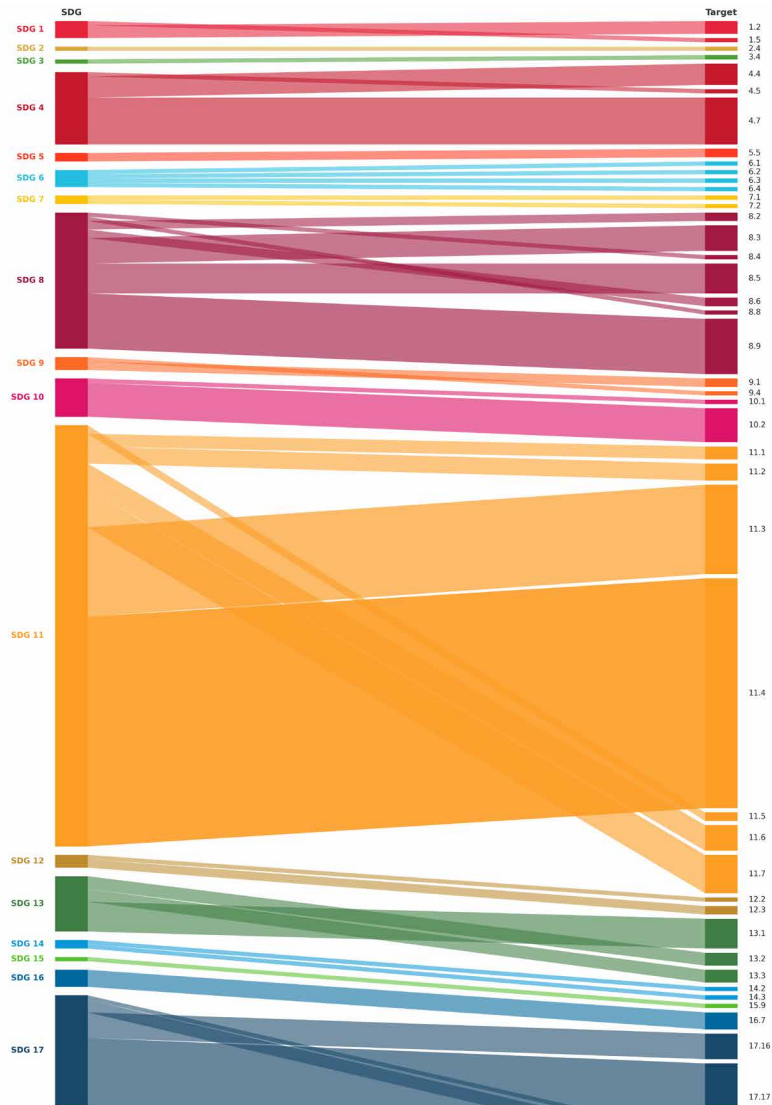


FIG. 3.5 An alluvial diagram²⁷ mapping the frequency of SDG targets addressed across 59 case studies, with band width proportional to frequency of occurrence and colour corresponding to each SDG. The diagram demonstrates the cross-target reach of heritage-related interventions, revealing that while SDG 11 dominates, there are significant connections extend across SDGs 4, 8, 10, 13, 16, and 17. This underscores the systemic relevance of urban heritage management well beyond its primary sustainable development target. Data Source: UNESCO World Heritage Canopy, 2023; Figure created using www.rawgraphs.io; Refer to Annex I for detailed analysis

²⁷ An alluvial diagram shows correlations between categorical dimensions representing them as flows, visually linking categories with shared items. Each rectangle represents a unique value in the selected dimension; its height is proportional to its value. Correlations are represented with curved lines whose width is proportional to their value. Source: <https://app.rawgraphs.io/>

The analysis demonstrates sufficient links to multiple targets across the 17 SDGs in varying degrees that connect to other dimensions of urban heritage management and spatial planning. The identified connections operate at three levels:

1 Direct and targeted connections:

- conservation of natural and cultural heritage (SDG 11: Sustainable cities and communities)

2 Explicit connections:

- the value of dissemination and information sharing (SDG 4: Quality education),
- promoting sustainable tourism, creating jobs to promote culture (SDG 8: Decent work and economic growth),

3 Implicit connections:

- basic health infrastructure and quality of life (SDG 3: Good health and wellbeing, SDG 6: Clean water and sanitation),
- addressing issues of access, socio-economic segregation, fragmentation (SDG 10: Reducing inequalities),
- building resilience infrastructure (SDG 9: Industry, innovation and infrastructure)
- urban resilience, risk management and preparedness (SDG 13: Climate action),
- sustainable use and development of ecosystems, landscapes (SDG 15: Life on Land)
- reducing inequalities by addressing contestation, polarisation issues (SDG 16: Peace, justice and strong institutions).
- expanding collaboration through interdisciplinary measures and actors, institutions and communities (SDG 17: Partnerships for the goals),

The distribution of HUL tools successfully integrated across these cases demonstrates that knowledge, documentation, and community participation are foundational (Figure 3.6), and that their relevance cuts across multiple SDG targets rather than being confined to SDG 11 alone (Figure 3.7). This cross-target relevance presents a notable pattern of association between theory and practice, and is directly relevant to the hypothesis of 'Datascaping HUL'. The depth of these connections has not been fully explored within the scope of this research; nevertheless, the analysis establishes a sufficient evidential basis for the subsequent empirical investigations in Chapters 5 and 6.

Further to this, The analysis of urban heritage attributes (Figure 3.8) demonstrates the frequency and varying relevance of each attribute across the SDGs, revealing the multitude of ways in which the HUL approach can be mobilised to address contemporary urban challenges. Contextual embedding emerges as a critical

methodological step: through the application of HUL tools, it enables the identification of core issues and the attributes that are threatened or vulnerable, translating the framework from an abstract set of principles into a practice and policy instrument. The historic built environment is unsurprisingly the most prominent attribute across cases, given the focus on World Heritage sites and historic urban cores but economic factors, social and cultural practices, and natural environmental attributes also show significant representation, underscoring the breadth of the HUL framework's applicability.

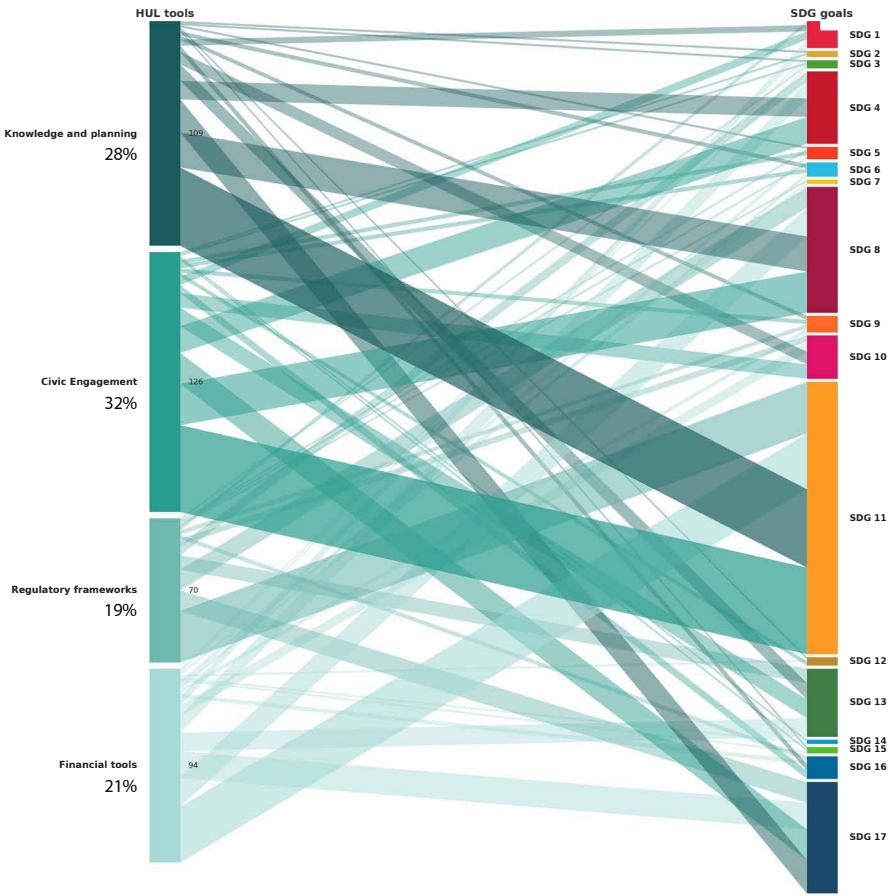


FIG. 3.6 Relevance of the four HUL tools across all SDGs, highlighting the centrality of the knowledge and planning tool as a cross-cutting instrument. UNESCO World Heritage Canopy, 2023; Figure created using www.rawgraphs.io; Refer to Annex I for detailed analysis

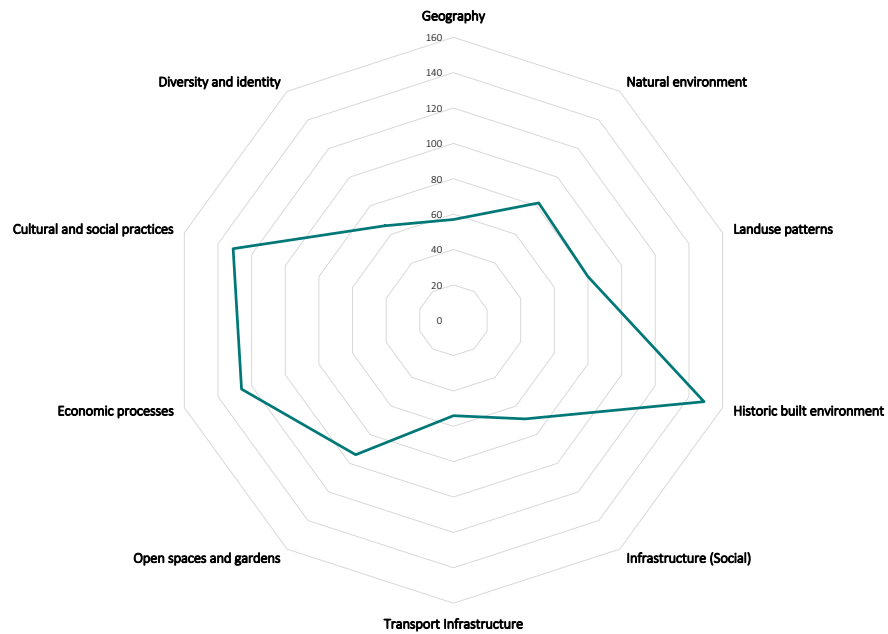


FIG. 3.7 Radar diagram illustrating the cumulative frequency of HUL attributes across all 17 SDGs and 59 case studies. The diagram reveals that Geography, Natural Environment, Land use Patterns, and Historic Built Environment are the most prominently recurring attributes in HUL-based sustainability practices, while Transport Infrastructure and Open Spaces and Gardens show comparatively lower engagement. This aggregated view underscores that the HUL approach extends beyond heritage conservation alone, engaging with broader dimensions of urban development, from economic processes and social infrastructure to environmental and cultural systems and highlights the thematic threads through which it intersects with the global sustainability agenda

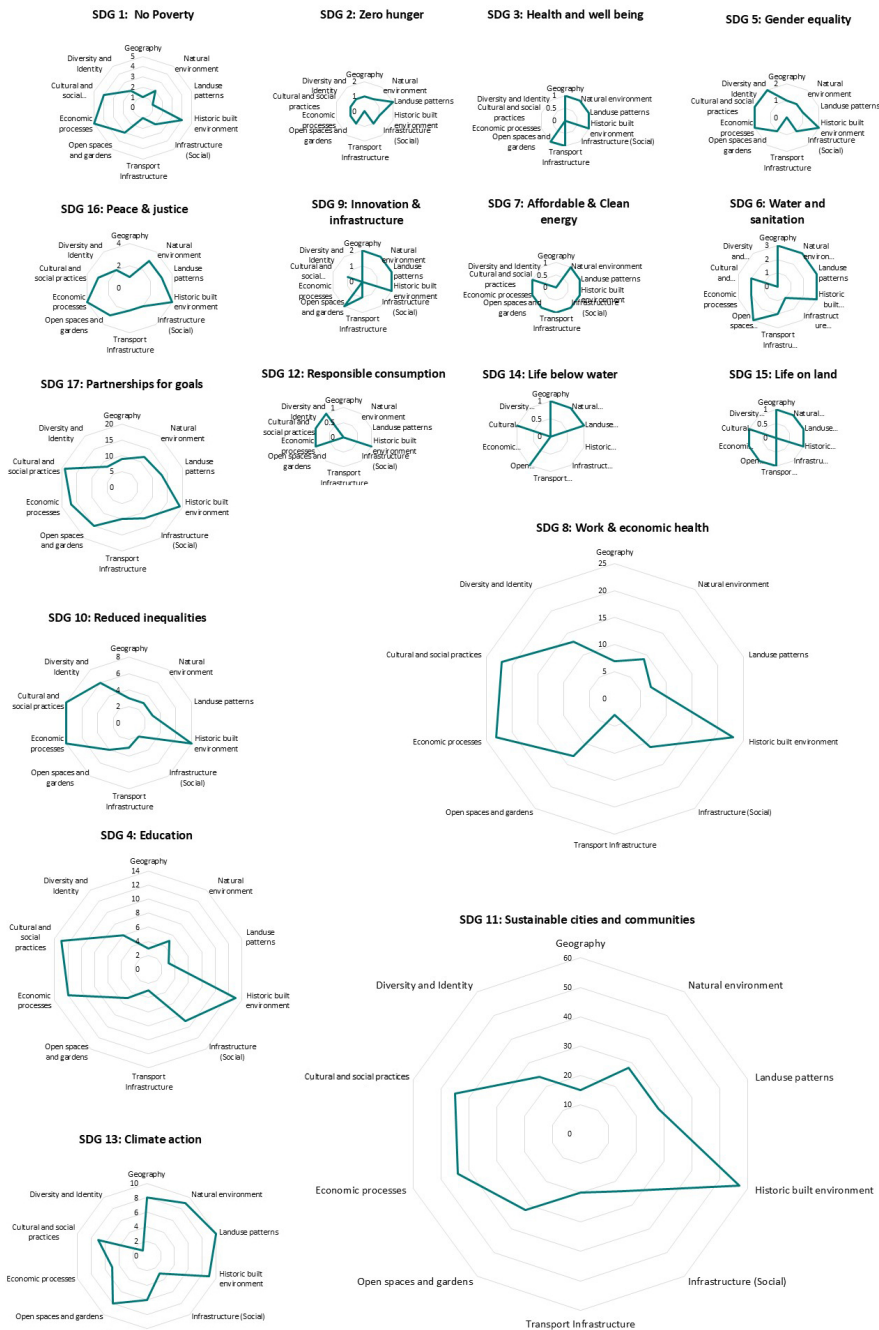


FIG. 3.8 Per-SDG radar diagrams depicting the frequency and relative weight of ten HUL attributes across 59 case studies. The varying scales across diagrams reflect differing levels of SDG engagement, with SDG 11 (Sustainable Cities), SDG 8 (Work & Economic Health), and SDG 4 (Education) showing the greatest overall attribute coverage

A comparison of suggested measures across the Canopy platform case studies and the SoC reports reinforces that the four HUL tools offer multi-faceted outcomes across governance and planning contexts. Critically, the identification and categorisation of attributes constitutes a central methodological step, one that reveals not only their relevance to sustainability-oriented strategies but also the degree to which culture and heritage remain analytically underweighted in SDG monitoring frameworks. Although certain SDGs explicitly reference culture, heritage, and the urban environment, the systemic significance of these dimensions is not yet fully reflected in how targets are operationalised, monitored, or localised, a gap that this research directly addresses.

3.4 Discussion

The lens of Critical Heritage Studies deepens this by reframing heritage as inherently politically and socially embedded. It is shaped by power relations, identity, and governance. This supports a normative shift toward inclusive heritage development (IHD), enabling multi-stakeholder consultation, participatory engagement, and context-sensitive decision-making. Ultimately, it strengthens the relational foundations required for spatial sustainability.

Importantly, HUL does not aim to arrest urban change. Instead, it seeks to calibrate its degree, pace, and scale within context-specific thresholds. Thus, conservation becomes compatible with adaptive governance. Programs such as ITUC reinforce this by promoting integration across scales and sectors. By acknowledging multi-scalar temporalities and varying speeds of urban change, the approach addresses the mismatch between accelerated endogenous growth, exogenous pressures, and institutional capacity. Yet this potential depends on contextual embedding, localisation of guidelines, and the structured identification and documentation of urban attributes. Without these, HUL risks remaining normative. Only when operationalised through systematic tools and participatory processes does it offer a coherent pathway for aligning heritage governance with spatial sustainability in historically stratified and contested urban landscapes.

The analysis of the SoC reports for World Heritage properties in Danger List substantiates these concerns empirically. Physical damage, urbanisation pressures, and external interventions, intensified by climate change and socio-political conflict, expose persistent gaps in governance and cross-sector coordination. More than half of the reports identify pressures related to urbanisation, housing, and weak governance. This points to a systemic shortcoming: the absence of integrated planning significantly increases risk and as a result, managing urban change remains fragmented. There is a clear need to align heritage management more closely with spatial planning tools.

The Canopy platform analysis complements this. Urban attributes emerge as the critical connecting link between heritage management and SDG targets. In particular, documenting these attributes and applying the four HUL tools reveals their cross-target reach well beyond SDG 11. This analysis demonstrates enabling capacity rather than proven effectiveness, a distinction that matters. Although only certain SDGs and targets are explicitly linked through planned actions, the broader implication is that HUL holds an integrative potential. Realising HUL's integrative potential requires operationalisation within frameworks capable of producing measurable outcomes.

Importantly, integrating HUL into spatial planning requires a conceptual shift. Rather than treating heritage as fixed or isolated, it must be embedded within multi-level planning processes. The critical enabler is the systematic identification and documentation of urban heritage attributes as structured metadata, supporting coordination across sectors and governance levels. The datascaping chapters demonstrate how this can be approached methodologically. Broader operationalisation across national and local levels remains both the logical extension of this research and its most pressing practical implication.

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Horace
Richter
Gallery

“Technology can be a good servant
but a poor master.”

Vernez Moudon, 1997

4 Datascaping as an Epistemic Method

4.1 Conceptualising Datascaping

The advancement of technology over the past decades has expanded the potential for innovative, interdisciplinary spatial planning methods and tools for spatialising diverse datasets for research and application. When integrated across “...scientific disciplines and societal stakeholders” (Kuhn, 2012), it enables cross-sectoral collaboration to address complex societal problems across disciplinary boundaries and support informed decision-making. The plurality of information, layered through shared spatial and temporal perspectives, extends beyond traditional planning boundaries and deepens understanding of historical and spatial transformation and their social and cultural interconnections (Hein & Mil, 2019). What remains insufficiently developed in the literature is not only a conceptual recognition of plurality, but a practical method for translating that plurality into spatial decision-making without reverting to expert-led simplification. NUA (Article 157) further emphasises the aggregation, standardisation, and visual integration of data across scales and sectors, enabling datascaping to reveal the interdependencies among spatial, social, cultural, and temporal processes within urban landscapes (Abrahamse & Kosian, 2013a). Knowledge visualisations offer distinctive perspectives for documenting cultural and social processes (Bodenhamer et al., 2015). However, since maps function both as a conceptual and an instrumental tool (Paez, 2019a), their effectiveness depends on the alignment between data quality, visualisation methods, and intended spatial application (Ormeling and Kraak 2008).

Many studies show how in-depth insights for spatial and cultural dynamics is not a possibility with the expansion of technology and GIS-based research (Hein & Mil, 2020). Yet the adaptation and integration of innovative mapping methods within planning systems remains limited. While visualisations may incorporate artistic techniques, their purpose remains communicative rather than expressive; they are structured representations shaped by scientific principles (Eckert, 1908; Griffin & Wilson, 2021). Visualisations also function within cognitive systems²⁸ as a means of organising and conveying information (Ware, 2004). Taken together, these technological and methodological developments offer significant potential for strengthening spatial planning by connecting data, disciplines, and stakeholders in more integrative ways. Taken together, these technological and methodological developments highlight the potential of innovative visualisation methods to strengthen spatial planning by connecting data, disciplines, and stakeholders in more integrative ways. Against this context, Part C of the thesis uses datascaping experiments to examine how datascaping can inform sustainable spatial planning in historic urban landscapes as a dynamic method of knowledge documentation and visualisation (Sub RQ 1.b, § 1.3.3).

4.1.1 **Beyond Mapping: Why Datascaping Matters**

The term 'datascaping' is used deliberately to extend practice and research beyond conventional mapping and visualisation, which often present spatial information as static or singular, limiting its capacity to address complex urban conditions.

Datascaping as a methodology implies decision-making and planning: design and planning's creative, critical role is shifting from an ideological focus toward interdisciplinary documentation of the social, political, and economic dimensions of spatial information (Weller, 2006). A heuristic approach (§ 4.3.1) complements this shift, offering a flexible, process-driven framework for selecting, organising, and interpreting diverse datasets (historical records, stakeholder narratives, GIS data, socio-economic indicators) to identify what's most relevant to a given analytical or planning goal.

Datascaping represents a methodological shift: maps are not merely outputs but interpretive, dynamic processes that construct meaning through layered spatial, social, cultural, and ecological data (Corner, 1999a; Pickles, 2004). This generative, communicative aspect means data is synthesised over time to reveal relationships,

²⁸ Cognitive system theory is an interdisciplinary field examining the ways in which thinking, and comprehension emerge from complex systems that constitutes humans, tools and their environments.

patterns, and hidden narratives (Crampton, 2001; Hein & Mil, 2020) (§ 7- 9), accounting for incomplete information, contested values, and emergent patterns in urban heritage contexts. Unlike traditional mapping, which isolates datasets, datascaping's epistemological shift²⁹ enables a richer, more integrated view of urban environments, especially where spatial and historical complexities intertwine (Abrahamse & Kosian, 2013; Bandarin & Van Oers, 2015).

This aligns with post-representational³⁰ and phenomenological cartographic³¹ theories, which reject maps as neutral representations of reality, viewing them instead as situated, embodied, subjective constructions of knowledge (Dodge et al., 2011; Kraak & Ormeling, 2020) (§ 7). Datascaping thus combines the technological capacity for spatial data visualisation with a critical, interdisciplinary framework for understanding place, time, transformation, and decision-making.

Across urban heritage and spatial planning research, a multi-layered disconnect persists between theoretical frameworks, methodological tools, and practical implementation that is limited integration across disciplines, underdeveloped analytical methods, and persistent difficulty translating policy into practice (Auclair & Fairclough, 2015; Janssen et al., 2017a; Bianca, 2015; Šćitaroci & Šćitaroci, 2019; Flyvbjerg, 1998) (§ 1 and 3). Despite expanding scholarship on heritage-led sustainable urban development, much of it remains anchored in conventional spatial representations, binary categorisations, and administratively driven processes, limiting its capacity to capture the dynamic, contested nature of historic cities. Translating these frameworks into practice is therefore uneven, constrained by bureaucratic, regulatory, and contextual limitations: centralised, unified planning systems tend to prioritise procedural consistency over contextual responsiveness, limiting their capacity to integrate socio-cultural, economic, environmental, and temporal dimensions interactively.

²⁹ *Epistemic method is used in relation to the strategies and practices assumed to promote the 'truth' (Cetina, 2003). In this chapter, the shift refers to the structured approach that facilitates the production, interpretation, and application of knowledge necessary for informed and context-sensitive decision-making in historic urban environments. "It is the critical examination of how urban spatial configurations, socio-technical networks, and governance structures interact to shape the creation, circulation, legitimation, and utilisation of knowledge within cities, with a particular focus on the power dynamics and ethical considerations that underpin these processes." Source: Sustainability Directory*

³⁰ Post-representational cartography says maps are not perfectly objective or exact. Instead, maps are shaped by people's choices, culture, and politics, so they create meaning rather than just show reality (Crampton, 2009; R. Kitchin & Dodge, 2007)

³¹ Phenomenological cartography emphasises human experience and perception of space. It focuses on how people live in, move through, and feel places, rather than simply depicting their physical layout from a detached or objective viewpoint (Casey, E. S., 1996; Tuan, 2001a)

These challenges are reinforced by limited collaboration between heritage experts, planners, data scientists, and stakeholders, and by underdeveloped interpretive, context-sensitive analytical tools. Conventional GIS- and UIS-based methodologies, while effective for quantifiable spatial analysis, remain limited in representing relational, experiential, and contested urban conditions, often privileging reactive over pro-active planning. This highlights the need for more integrative, adaptive, decentralised approaches bridging conceptual discourse, methodological innovation, and practical application. This is not about promoting datascaping over UIS/GIS, but about its potential to complement existing methods by integrating diverse sources and perspectives. Where a traditional UIS is a structured, centralised repository for official planning data (GIS), datascaping is a more dynamic, creative, interpretive, and inherently heuristic process for visualising vast, often non-traditional, real-time datasets to reveal invisible urban patterns, providing a structured yet flexible workflow for exploring, selecting, and synthesising heterogeneous urban data. Through iterative problem-solving and heuristic reasoning, planners navigate incomplete, complex, or uncertain information, uncover patterns and relationships, and refine insights over time thus allowing datascaping to function as both an analytical tool and a methodological framework supporting adaptive decision-making in heritage and urban planning contexts (Table 4.1).

TABLE 4.1 The core differentiation between Urban Information System and Datascaping

Comparison Criteria	Urban Information Systems (UIS)	Datascaping
Core intent	Urban Information System tells you <i>what</i> is in the city	Datascaping helps in understanding <i>how the city feels and functions</i>
Data Sources: Official vs. Opportunistic	Relies of traditional and structured datasets, such as cadastre maps, AutoCAD files, property records, zoning and regulatory maps, census data	Leverages unconventional data sets: participatory or citizen-generated data (complaints, preferences, voting, community reporting); service- or activity-based digital traces (Uber, Strava, mobility apps, platform-generated data); Derived or transformed quantitative data (converting official statistics (like census data) into visualisations for analysis, web-scraped real estate listings)
Static Structure vs. Dynamic Flow	Often contain static, physical elements (buildings, roads, infrastructure)	Integrates socio-cultural nuances, flows, behaviours, social dynamics and memory and identity
Mapping vs. Visualisation	Uses traditional cartographic methods as well as Geographic Information Systems (GIS) to create precise, 2D, or 3D planimetric maps for regulatory compliance	With traditional and GIS methods includes interactive, artistic visualisation techniques to make invisible data tangible, as a blend of digital and embodied worlds to allow for a more experiential understanding of the city
Management and administrative vs. Exploratory and informative for decision making	Designed for the systematic, long-term management of urban data for planning and administration	Intended to explore, analyse, and communicate complex scenarios, often to influence decision-making
Structured vs. Experimental	Adheres to strict data standards, layers, and validation	Often engages with disaggregated and heterogeneous datasets that may require merging and processing

Historical data has become central to understanding and shaping cultural landscapes since the decline of functionalist planning in the 1970s (Abrahamse & Kosian, 2013). Given that urban development is fundamentally driven by spatial representation, the advancement of datascaping methods is not optional but necessary to enhance this process. In parallel, the quality of urban design plans and policies depends on innovation that integrates interdisciplinary and multi-actor perspectives, insights that are often excluded from formal planning frameworks (Angelova et al., 2015; Bratuškins et al., 2020; Kunze et al., 2012). Therefore, examining how economic, socio-cultural, environmental, and political dynamics interact and evolve across actors and urban spaces is essential for capturing urban complexity and enabling more adaptive and responsive forms of governance (Corburn, 2017; Healey, 2007).

This methodological shift also has theoretical implications for heritage studies. Authorised Heritage Discourse (AHD) has historically privileged expert-led valuation, material fabric, and stable categorisations of significance, whereas critical, inclusive heritage paradigms emphasise plural, contested, lived meanings of place. Datascaping is relevant here because it does not simply visualise heritage assets; rather, it brings heterogeneous and often conflicting forms of knowledge into relation, including temporal change, community narratives, socio-economic pressures, and spatial inequalities. In this sense, datascaping does not replace heritage paradigms, but reconfigures how they can be operationalised in planning practice. As a design-driven, interpretive, contextually embedded method, it enables holistic, collaborative, adaptive approaches that operationalise the HUL approach and navigate the complexity and plurality of urban environments.

This distinction, when read through the lens of People, Place, and Policy (§ 3.2.1), clarifies how each system contributes to practice. In terms of Place, the two systems draw on markedly different kinds of spatial data, reflecting distinct vantage points on the same city. In terms of People, the divergence is clearest: where UIS treats the city primarily as physical infrastructure, datascaping foregrounds the social dynamics, memory, and identity that conventional datasets may overlook. Finally, in terms of Policy, the two systems emerge as complementary rather than competing, each contributing a different layer of evidence to planning and decision-making. Integrated together, this suggests that planning policy need not choose between the two, but should treat datascaping as a mechanism for embedding People- and Place-based knowledge into Policy processes that have historically privileged structured, official data alone.

Indexing the literature on datascaping revealed multiple perspectives on the method, which were categorised according to their relevance to urban planning processes. To structure this synthesis, the four dimensions of urban planning proposed by De Vries (2002): analysis, assessment, decision-making, and implementation (DÜHR, 2007), served as an organising framework, through which the reviewed sources were consolidated into three core dimensions of datascaping, each defining scope and methodological perspectives which are supported by the scholarly literature. These are summarised in Table 4.2 and visualised in Figure 4.2, which illustrates how the three dimensions operationalise datascaping within spatial planning practice. Building on this synthesis, 'Datascaping HUL' adopts these three dimensions of generation, information and communication, and operation as its methodological foundation. Across all three, spatiality functions not as a neutral backdrop but as a structuring factor through which urban relationships, distributions, and inequalities are revealed, interpreted, and acted upon. Equally, temporality operates not as an added layer but as a constitutive dimension through which urban transformation is analysed, communicated, and operationalised. Importantly, datascares need not be purely spatial; non-spatial ones can synthesise temporal, social, cultural, or thematic information to surface patterns and relationships that exceed geographic coordinates.

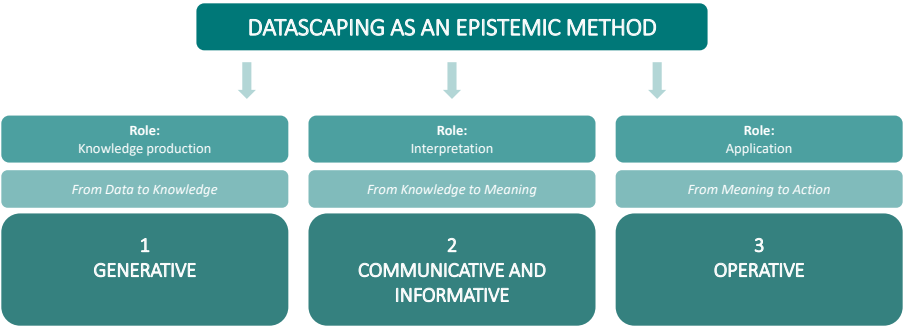


FIG. 4.2 The three dimensions of datascaping and its applicability to planning, assessments, and decision-making. Adapted from Four dimensions of spatial planning, De Vries (2002) Source: (DÜHR, 2007)

TABLE 4.2 Three Core Dimensions of Datascaping: Conceptual Scope and Practical Application

1	Datascaping as a generative process	
Role	Knowledge production: From data to knowledge	
Definition adopted for this research	Datascaping as a generative process refers to the creation of spatial representations of information that go beyond traditional quantitative mapping. It uses rhetorical and instrumental imaging techniques to gather and present information in an innovative knowledge representation format. They challenge preconceived notions and actively embrace restrictions and regulations. This can be useful for revealing and constructing arguments about the spatial implications of shaping forces, enabling new perspectives, particularly those that are often marginalised or invisible in everyday life.	

	Conceptual Definition and Theoretical Context	Source
1.1	The datascapes differ from the quantitative maps of conventional planning in their imaging of data in knowingly rhetorical and generatively instrumental ways. They are designed not only to reveal the spatial effects of shaping forces (such as regulatory, zoning, legal, economic, and logistical rules and conditions) but also to construct an eidetic argument in space-time geometry. It reveals new possibilities which are latent in a particular field and frames issues and challenges differently to promote novel methods and solutions to address them.	(Corner, 1999b, 1999a) (Amoroso, 2015)
1.2	Datascapes are spatial representations of information	(K. M. Chan, 2014).
1.3	Datascapes focus not on embedding remote contexts but on the existence of local digital contexts that often remain invisible or inaccessible within the daily experience of our landscapes. Datascapes can enable the telling of stories from alternative perspectives, such as those disadvantaged or marginalised	(Kabisch, 2008).
1.4	Datascapes enables awareness of and engagement with the hybrid digital/physical spaces people traverse and inhabit in their everyday lives	(Kabisch, 2008)
1.5	The term 'visualisation' refers to the added capabilities of interactive mapping software, such as three-dimensional views, adding or removing data layers during data exploration, and interactive map queries	(Crampton, 2001)
1.6	Datascaping is the practice of assembling, interpreting, and visualising data as a design method that foregrounds context, constraints, and negotiation. Rather than imposing a preconceived form, it treats data as a generative material, where regulatory, spatial, and socio-political conditions shape the design outcome. By doing so, it reveals how subjective intentions can be embedded within seemingly objective visualisations, granting them persuasive and operational authority	(Weller, 2006)

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TABLE 4.2 Three Core Dimensions of Datascaping: Conceptual Scope and Practical Application

2	Datascaping as a communicative and informative process	
Role	Interpretation: From knowledge to meaning	
Definition adopted for this research	Datascaping as a communicative and informative process involves creating visual representations that capture and convey aspects of urban and landscape systems. By breaking down data into layers and attributes, datascaping reveals spatial conditions, support adaptive planning, and highlight areas for negotiation, enabling more responsive and inclusive decision-making in spatial planning. These maps are meant to be informative, revealing, and suggestive, offering solutions to urban challenges and helping people understand and navigate the changing environment	
	Conceptual Definition and Theoretical Context	Source
2.1	A way of representing the world, a visible image of, if not the world, then an aspect of that world	(Cosgrove, 2012; Vaughan, 2019)
2.2	With the visualisation of data, datascaping has the potential to offer solutions to urban constraints	(K. M. Chan, 2014).
2.3	Datascaping as a means to the identification of 'areas of negotiation' and mapping in the process of spatial planning	(J. Hoffmann, personal communication, August 12, 2021).
2.4	Maps of landscape systems reveal the spatial conditions that inform adaptive planning strategies and design principles. Decomposing the urban landscape into layers according to the dynamic of change is a proven method to help understand the urban landscape system	(Nijhuis & Pouderoijen, 2014) (Nijhuis et al., 2020)
2.5	A powerful map embodies four characteristics: it is informative, revelatory, seductive, and suggestive	(Amoroso, 2010).
2.6	Environments, townscape, or landscapes, when considered for the information they hold, can be termed 'datascaping'. People such as tourists moving from one environment to another are moving between datascaping	(Machin, 2000).

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TABLE 4.2 Three Core Dimensions of Datascaping: Conceptual Scope and Practical Application

3	Datascaping as a communicative and informative process	
Role	Application: From meaning to action	
Definition adopted for this research	Datascaping as an operative method for decision-making uses the persuasive power of data-driven visualisations to inform and guide urban design and planning. By employing spatial digital tools and illustrating complex relationships among various information types, datascaping actively support the design process. They assist designers in conceptualising, making informed choices, and understanding system interactions, and connecting users, planners, and designers by making complex ideas accessible and relevant to today's challenges	
	Conceptual Definition and Theoretical Context	Source
3.1	Derived from numbers, quantities, facts, and pure data, datascaping have great persuasive force in the hugely bureaucratic decision-making and management aspects of contemporary city design	(K. M. Chan, 2014) (Amoroso, 2015).
3.2	Datascaping and the use of spatial digital tools such as aerial photo modelling, geographic information system analysis, and space syntax can be explored to trace the continuity of the historical landscape in the built environment	(X. Wang et al., 2018)
3.3	By visualising and clarifying relationships between spatial, temporal, quantitative, and qualitative information, datascaping act as generative and communicative agents. More than mere presentation tools, they serve an active role in the design process by helping the designer think through concepts, make decisions, and understand how different systems relate to one another, as well as form, mass, and material. But perhaps more importantly, they serve as important mediators between designers and the public, bringing complex ideas to life and solidifying the role of design in addressing our most important contemporary challenges	(Hansen, 2015) (Amoroso, 2015)
3.4	The spatial relationships between environmental circumstances and human actions or interventions can be studied using cartographic explorations and datascaping to identify important conditions, critical driving forces, and the effects of distinct dynamics	(Nijhuis et al., 2020).
3.5	Datascaping isn't preoccupied with abstract theory or aesthetic ideals. Instead, it's about blending imagination and practicality, using data not just to describe or represent, but to propose new, actionable, and sometimes unexpected solutions	(Belesky et al., 2020)

4.2.1 Datascaping as a Generative Process

The term 'generative' refers to any process capable of producing new and diverse outcomes from given inputs. In urban planning, a generative approach translates into frameworks that support the adaptive evolution of cities, enabling urban environments to respond to changing social, cultural, and spatial conditions. This approach emphasises participatory design, phased implementation with sensitivity to local contexts; it aligns with the theory of cities as 'organised complexity,' (Jacobs, 1961). Within this framework, datascaping functions as a generative process by using data not only to document conditions but to reveal possibilities, reframe challenges, and support informed decision-making. In this way, datascaping shifts data from a descriptive resource to a strategic planning instrument, enabling adaptive and inclusive urban development.

4.2.2 Datascaping as a Communicative and Informative Process

This premise builds on the trace concept combining 'Landing' and 'Finding' steps. The growing need to understand the built environment as a complex interplay of tangible and intangible elements has evolved alongside a critical reassessment of the modernist approach³³, which is often interprets spatial issues solely through a functional lens. This shift has paved the way for new approaches in architecture and planning theory, emphasising a more nuanced understanding of space that integrates cultural, social, and experiential dimensions (Ceccarelli, 2015). These are meant to inform, reveal insights, and suggest possibilities, offering solutions to urban challenges and helping people make sense of the ongoing changes in their environment. In conclusion, it does not merely visualise urban complexity, it actively restructures how that complexity is perceived, debated, and governed. Materially, it disrupts the primacy of AHD³⁴ by shifting evidentiary weight away from fixed inventories and expert classifications toward revisable visualisations that incorporate inclusive, temporal, and relational knowledge. This creates shared evidentiary ground for stakeholder engagement, supports anticipatory planning, and enables trend projections.

³³ Modernist approach in urban planning and architecture, prominent in the mid-20th century, emphasised functionality, rational design; It stressed on the four key functions of a city for urban planning: dwelling, work, recreation (use of leisure time), transportation (Le Corbusier, 1933)

³⁴ Here, disruption is understood as a complex, multi-layered phenomenon that challenges established orders and produces shifts across social, spatial, and epistemic domains (El Maarouf et al., 2025; Vollmer, 2013). In this sense, the reconfiguration aligns with critiques of Authorised Heritage Discourse and with Critical Heritage Studies' emphasis on heritage as plural, contested, and socially constructed (Harrison, 2020; Smith, 2015)

4.2.3 Datascaping as an operative method

Datascaping as an operative method³⁵ leverages the persuasive power of data-driven visualisations to guide urban planning. By visualising how knowledge is structured and circulated within the urban fabric, datascaping makes epistemological insights actionable. The epistemological perspectives on urban heritage examines how the city's design, layout, and structure influence how people think, learn, and share knowledge. It emphasises the active role of the cities to shape knowledge, rather than treating them merely as passive containers for action (Sustainability Directory, 2024). This distinction is crucial because urban planning often navigates two complementary approaches focussing on: (i) spatial arrangements and outcomes and on what planning aims to achieve, (ii) on processes behind planning decisions, looking at how planning decisions are made (Fainstein & DeFilippis, 2016). These differing perspectives shape priorities and questions, highlighting the ongoing debate over the purpose and methods of planning. Rather than merely informing decisions, datascaping provides a transparent platform where competing priorities can be negotiated and aligned within future-oriented urban strategies. Ultimately, datascaping emphasises action and implementation, operating both as a way of knowing (epistemic) and a way of doing (operative), actively shaping planning decisions, policies, and interventions.

³⁵ Operative means active and practical. Datascaping is used in this research as a working method that brings together spatial and cultural data to create visual tools. These tools help with understanding, analysing, and making decisions in historic urban areas.

4.3 Datascaping: Between Visualisation and Knowledge Construction

As James Corner writes, “...mapping is neither secondary nor merely representational but doubly operative, which includes digging, finding, and exposing on the one hand and relating, connecting, and structuring on the other.” (Corner, 1999a). It is thus not a passive act of representation but an active process of knowledge production. Datascaping builds on this premise: operationalised as a research method, it simultaneously constitutes a dataset and an exploratory analysis instrument, combining interactive tools to visualise, aggregate, and filter metadata dynamically in ways that support the emergence of new hypotheses and interpretations. Visualisation itself can be conceptualised as a three-dimensional space in which social, spatial, and temporal dimensions of data overlap and interact continuously, without clear boundaries (MacEachren, 1994) (Figure 4.3). This framework positions visualisation along three axes: presentation of known versus unknown information, degree of human–map interaction, and audience, from private to public, underscoring that visualisation is never neutral but varies in purpose and function depending on design and use (MacEachren, 1994; DÜHR, 2007). This model is directly relevant to datascaping, guiding the design of interactive, layered maps that reveal hidden spatial patterns while supporting stakeholder engagement, so that data is not only represented but explored, interpreted, and communicated across different user groups.

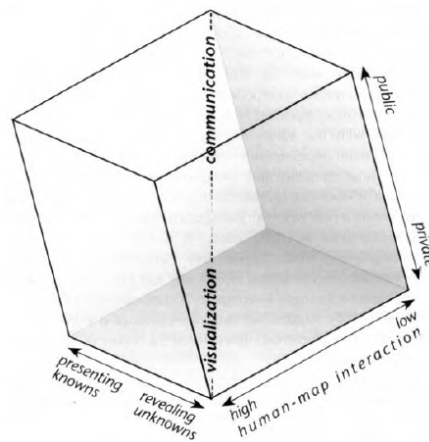


FIG. 4.3 MacEachren's three-dimensional framework illustrates visualisation as an active and iterative process, where mapping moves between revealing unknowns and presenting knowns, varying levels of human and visualisation interaction, and functions of communication and exploration, highlighting how visualisation both generates and structures knowledge.; Source: (DÜHR, 2007; MacEachren, 1994)

Cosgrove notes that, despite its evolving definitions, mapping remains “...a way of representing the world, a visible image of, if not the world, then an aspect of that world.” (Cosgrove, 2008; Vaughan, 2019a). Datascaping extends this beyond representation toward an active, interpretive practice that shapes how urban realities are understood, thus enabling the simultaneous analysis of urban complexity as a relational assemblage whose significance is produced through interactions among attributes, values, actors, scales, and temporalities, and thereby supporting more integrated, informed planning and design decisions. This is consistent with:

There is explicit recognition that many large data sets, whether produced for input to computer models or as outputs or simply as raw data captured by digital instruments, needed to be understood holistically using the synthetic properties of the mind and eye in unaided form. (Batty et al., 2004)

Despite growing efforts to map, survey, and document the diachronic complexity of urban morphology, a significant gap remains in integrating cultural mapping into design-oriented and decision-making frameworks: one requiring the synthesis of morphological, socio-cultural, and temporal data into coherent visual platforms linking heritage values to spatial transformation processes. Human perception is essential to interpreting landscapes, yet reality exists independently and should not be reduced to subjective interpretation alone (Girod, 1999; Tuan, 1982); datascaping must therefore balance interpretation with grounded analysis, a principle consistent with the HUL approach's conceptualisation of urban heritage as a holistic entity composed of multiple interacting attributes. Yet, in data-rich contexts, the challenge is not the lack of information but the ability to interpret its relevance and act upon it (Lawrence, 1997a), making integrative visual methods essential for translating complex data into actionable knowledge.

In inter-sectoral decision-making, design, and planning processes, maps function as standard tools for identifying, characterising, and locating spatial attributes and qualities of the city (Duxbury, 2005). Yet while often treated by geographers as precise, objective representations of complex spatiality, maps are equally shaped by scale, pattern, and socio-spatial perspective, operating not merely descriptively but as a strategic enterprise for unfolding new realities from existing conditions (Corner, 1999). This repositioning of datascares, from neutral record to strategic instrument, is the premise from which the heuristic approaches discussed below are developed thus laying the theoretical basis for heuristic approaches through which such knowledge is subsequently applied in practice.

4.3.1 **Heuristic Reasoning³⁶: From Problem Expansion to Problem Reduction**

Datascaping, as an operative method, can incorporate a heuristic approach to problem-solving to strengthen knowledge visualisation and interpretation. Problem expansion entails deliberately exploring the full scope and boundaries of a problem, uncovering latent or unforeseen issues, and visualising the interconnections among spatial, social, and cultural layers. Within datascaping, this allows planners to identify root causes, hidden patterns, and complex relationships in urban heritage contexts by integrating multiple datasets such as archival records, GIS layers, socio-economic indicators, and stakeholder narratives, an approach that reflects triangulation³⁷ by cross-validating insights from diverse sources (Cohen et al., 2002). When stakeholders and decision-makers are brought into this process, their narratives and priorities become part of the evidence base itself, rather than being consulted only after the analysis is complete. Problem reduction involves breaking complex problems into manageable sub-problems or components that can be analysed systematically (Volkema, 1983). In datascaping, this can guide workflows that isolate specific spatial, temporal, or social aspects for deeper examination, enabling focused interpretation and targeted decision-making. By combining problem expansion and reduction heuristics, datascaping becomes a process-driven tool that balances broad exploration with structured analysis, while triangulation ensures the robustness and reliability of the resulting interpretations, supporting iterative knowledge generation and actionable insights for planners, researchers, and decision-makers.

³⁶ A heuristic is a practical, experience-based approach to problem-solving that adapts through exploration and judgement rather than following a fixed formula. Heuristics are mental shortcuts or rules of thumb that allow people to make quick, "good enough" decisions under uncertainty, using limited information and minimal cognitive effort (Manley et al., 2015; Hjeij & Vilks, 2020). In urban planning, however, reliance on such familiar decision-making paths can restrict opportunities for innovation. In the context of urban heritage and spatial sustainability, where problems are rarely well-defined and often involve competing values across scales and stakeholders, heuristic reasoning offers a way to navigate this complexity iteratively rather than through a single predetermined method. A heuristic approach is a structured yet adaptive mode of inquiry, drawing on experience-based strategies, iterative exploration, and informed judgement to guide analysis under uncertainty. Rather than seeking fixed or optimal solutions, it supports context-sensitive interpretation, with insights refined progressively through interaction with complex spatial data.

³⁷ Triangulation is defined as an attempt to map out and more fully explain the richness and complexity of data by examining it from multiple perspectives. It also serves as a method of cross-checking information from different sources to ensure consistency and validity in the data (Cohen et al., 2002; Creswell & Plano Clark, 2011). In this research, triangulation forms a key basis for data validation.

4.4 Typologies and Operational Dimensions of Datascaping

Datascaping can be understood through a set of overlapping typologies and functional approaches that define how data is structured, interpreted, and applied. These categories are not fixed but reflect the flexible and iterative nature of datascaping in addressing urban environment and its complexity.

4.4.1 Process Datascapes

The process approach is differentiated based on geospatial correlation. Information visualisation (knowledge visualisation in this research) refers to the intersection of exploratory and presentation of data, with or without geospatial correlation³⁸ (Kraak & Ormeling, 2020). Process datascapes refers to the design and method applied to the visualisation based on the desired outputs: they could range from thematic maps, topographic maps, and analogue data to name a few (Figure 4.5). Visualisation approaches with application of cartography enables different possibilities along the dimensions of geospatial relevance and purpose, from exploration to presentation and spatial to non-spatial (Figure 4.4). Datascaping operates across these domains, integrating exploratory analysis and communicative visualisation to interpret and convey both spatial and non-spatial data effectively. It may also involve comparative analysis of different data representations, including geospatial, thematic, and temporal forms. Such comparisons can reveal informative patterns and trends for analysis and assessment, based on key variables such as socio-economic indicators, spatial characteristics, and environmental factors.

Read through the People, Place, and Policy lens (§ 3.2.1), the geospatial domain in Figure 4.4 corresponds most closely to Place, while the non-geospatial domain captures the lived, narrative dimensions of People; information visualisation, sitting at their intersection, is where these are translated into a form usable for Policy.

³⁸ Scholarly studies classify geospatial co-relation in two forms of visualisation: “(i) Scientific Visualisation: the use of interactive visual representations of scientific data, typically physically based, to amplify cognition. This is primarily through a confirmatory analysis of a known hypothesis. (ii) Information Visualisation: the use of interactive visual representations of abstract, non-physically based data to amplify cognition. This is primarily through an ‘exploratory analysis’ to arrive at an inference without a known hypothesis.” (Card et al., 1999; Keim & Ankerst, 2001; Nagel, 2006; Rheindorf, 2019)

This positions the four HUL tools across the same field: Regulatory Systems and Knowledge and Planning draw more heavily on the geospatial, cartographic domain, while Civic Engagement operates predominantly within the non-geospatial, exploratory space where community narratives are registered.

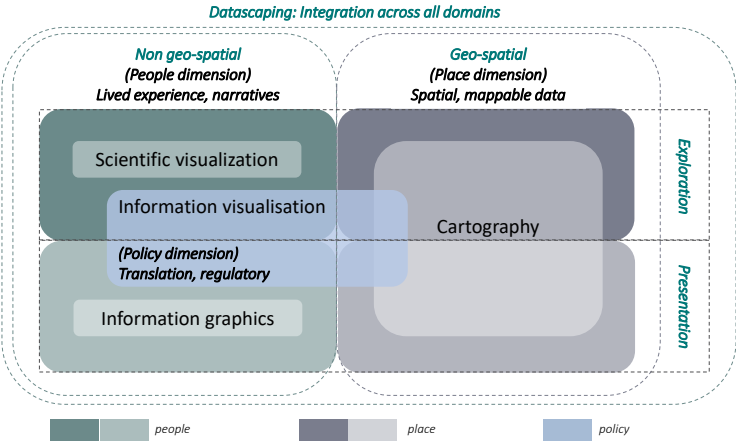


FIG. 4.4 Overlapping domains of scientific visualisation, information visualisation, information graphics, and cartography, adapted for datascaping; Source: adapted from Kraak & Ormeling (2020) by author

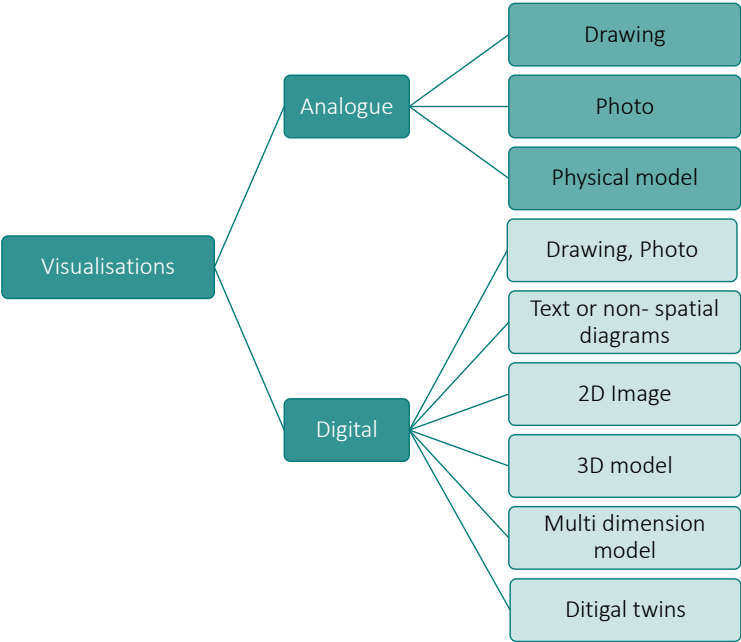


FIG. 4.5 Classification of visualisation types into analogue and digital categories, illustrating a range of representation methods from drawings and physical models to multi-dimensional models and digital twins; Adapted from (Angelova et al., 2015)

4.4.2 Spatio-Temporal Approach

Engineers create localities, but time is needed to create a place (Lowenthal, 1966; Lynch, 1972; Tuan, 2001)

As studies define “historic urban landscapes are shaped by natural, cultural, and socio-economic processes that influence them spatially, temporally, and experientially” (Van Oers 2010; Silva, 2023) (Figure 4.6). This layered nature is essential for understanding the dynamic identity and evolving character of these landscapes over time. Temporal data reflects a specific state at a given moment and is essential for analysing trends in areas such as weather, traffic, demographics, and environmental monitoring (Balamurugan et al., 2024). It plays a key role in identifying changing patterns over time and typically involves a range of primary data types, often numerical, used to capture and assess time-based information. Hence, spatio-temporal datascaping, which integrates temporal evolution with spatial dimensions, enables the analysis of change, dynamism, and the emerging patterns, providing a critical basis to address concerns for informed planning and decision-making.

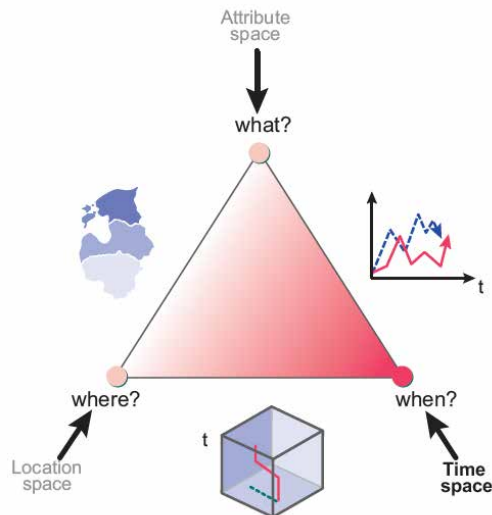


FIG. 4.6 Conceptual framework illustrating the integration of attribute: people, place and location, and time dimensions ('what', 'where', and 'when') in spatial analysis, forming the basis for multidimensional datascaping and the interpretation of complex urban system, Source: (Kraak & Ormeling, 2020)

4.4.3 Iterative and Functional Approach

Datascaping is highly dependent on spatio-temporal variables and relationships, unfolding through linear or cyclic iterations depending on data input, analysis, and desired outputs. The Core Process (Figure 4.9) formalises this: rather than a fixed or arbitrary sequence, it is shaped by, and dependent on, the research question or hypothesis, the availability of datasets, and the desired results for policy or intervention. Each stage continuously informs and reshapes the others, allowing the framework to evolve in response to new data, interpretations, and shifting objectives.

In the cyclic iterations of Research-Analysis-Synthesis-Presentation, multiple sequences may be repeated and refined based on input data and evolving objectives (Figure 4.7). For instance, if datascaping is applied to participatory planning and decision-making through Public Participation Geographic Information Systems (PPGIS), each stage of consultation and feedback generates iterative datascaping, evolving until a final outcome is reached.

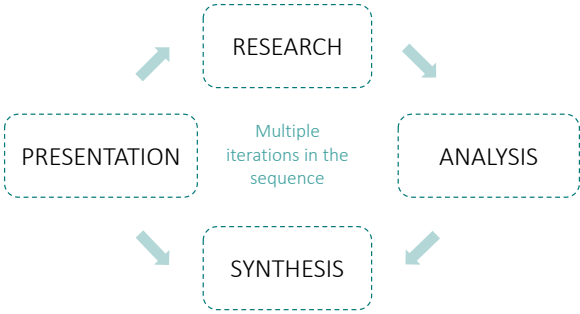


FIG. 4.7 The cyclical and iterative nature of the datascaping process, moving through Research, Analysis, Synthesis, and Presentation as continuously informing and refining stages of knowledge production

These cyclic iterations are built from single iterations, a linear approach, constituting one sequence in the process. This can occur where datascaping is intended primarily to generate or communicate information, forming the basis of a hypothesis. Girot's trace concept (1999) describes landscape as a palimpsest of successive interventions, where present conditions carry visible and latent traces of past cultural, ecological, and spatial processes. This framework resonates directly with the Landing-Grounding-Finding-Founding stages, which similarly work by uncovering successive, layered traces of a site. In particular, the stages of Grounding and Finding focus on revealing both visible and hidden layers of a site, informing the development of datascapes that visualise complex urban conditions for research, planning, and decision-making (Figure 4.8 and § 7.4.2).



FIG. 4.8 A single application of the sequence: Landing, Grounding, Finding, and Founding, applied consistently across this thesis, involving a progressive uncovering of successive layers of data, both visible and latent, to yield meaningful narratives that inform further action in historic urban contexts.

The workflow outlines a sequence from problem framing and data structuring to visualisation, interpretation, and decision support, demonstrating how datascaping moves beyond representation toward actionable knowledge production (Figure 4.9). The inclusion of an iterative feedback loop emphasises the method's adaptive, non-linear dynamic nature, enabling continuous refinement based on emerging insights and stakeholder inputs. Together, this framework establishes datascaping as a repeatable and robust approach for supporting analysis, scenario-building, and decision-making. The structure and emphasis of this workflow shifts depending on who is using it: planners and policymakers tend to prioritise the synthesis and decision-support stages, while researchers engage more deeply with data structuring and interpretation, and community stakeholders are primarily involved at the participatory, feedback-generating stages. The replicable method is operationalised as a step-by-step protocol following the explorations and analysis carried out in 'Datascaping HUL'. (Table 10.1 and § 10.2, Sub RQ 1.b).

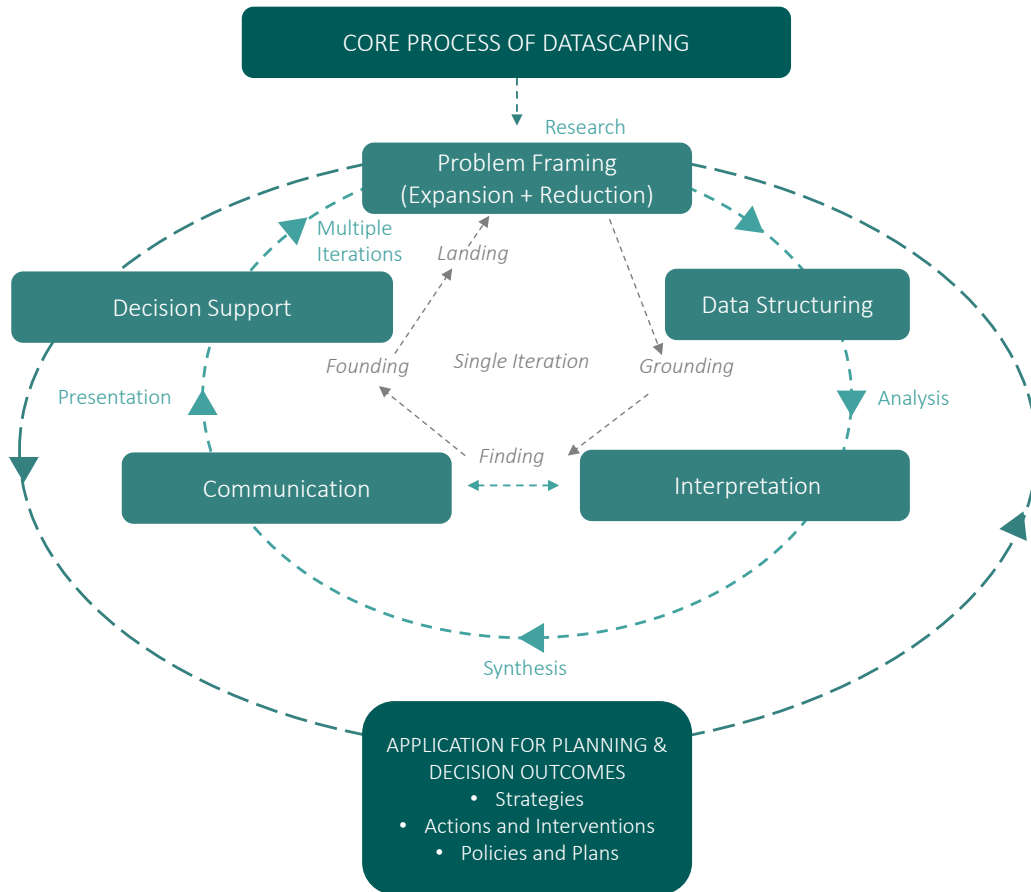


FIG. 4.9 Methodological framework of datascaping illustrating the iterative core process through problem framing, data structuring, interpretation, communication, and decision support. The two interlocking feedback loops emphasise the non-linear, cyclical nature of the process, where outputs continuously feed back into earlier stages before culminating in actionable planning, intervention, and policy outcomes. Labels indicate how this loop corresponds to the Research-Analysis-Synthesis-Presentation cycle of multiple iterations (Figure 4.7) and the Landing-Grounding-Finding-Founding as single linear iteration of the sequence (Fig. 4.8): one full turn through the Core Process is, by definition, one iteration of both. This correspondence is operationalised as a replicable protocol in the concluding chapter (Table 10.1)

4.5 **Datascaping in Practice: Historical Precedents and Contemporary Applications**

Datascaping is not an invention but an evolving method — one that has long underpinned spatial inquiry and urban knowledge production. What has changed over time is not the intent, but the tools, scale, and complexity with which it is applied. The following examples trace this evolution, revealing how datascaping has consistently shaped urban understanding across different historical and technological contexts, and underscoring the need for its further consolidation as a structured and coherent methodological framework in contemporary planning practice.

4.5.1 **Empirical Insights from History**

Mapping and cartography have long functioned as both method and tool for social inquiry, with their application in social investigation reaching its peak in the 1880s (Vaughan, 2019a). The following examples illustrate how cartographic, quantitative, and qualitative approaches converge into what can be understood as early forms of datascaping, revealing complex urban conditions through spatial representation. At the urban scale, these cases demonstrate the capacity of datascares to support disciplinary hypotheses and institutional agendas by employing diverse attributes as evidence. They highlight the dual nature of spatial documentation, showing how such methods have been used both constructively and how in some instances, to reinforce processes of discrimination and marginalisation within urban contexts.

4.5.1.1 The Cholera Map, London

To underline the use of maps as a method for social inquiry, the 1854 Cholera map of London stands as the finest example of early datascaping. This case addresses critical urban conditions, including poverty, poor health, and inadequate sanitation, highlighting the need for systemic improvement. The use of mapping as a statistical and analytical method was pioneered by John Snow, whose work established a direct correlation between contaminated water sources and the spread of cholera. By mapping cases and identifying their concentration around a faulty water pump, Snow challenged the prevailing belief in airborne transmission and empirically demonstrated the waterborne nature of the disease (Vaughan, 2019a). This example illustrates how maps function not merely as records of information but as analytical tools that generate and communicate evidence. In this sense, datascaping enables the interpretation of complex urban phenomena, supporting planners and decision-makers in identifying root causes and guiding targeted interventions through informed planning, resource allocation, and policy development (Figure 4.10).

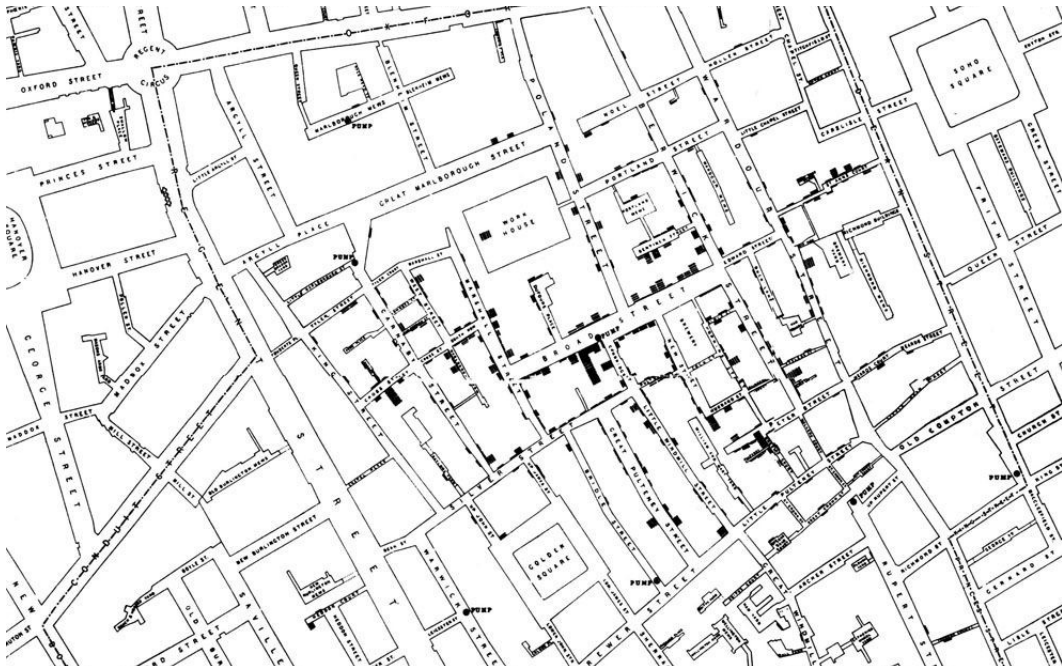


FIG. 4.10 Map created by John Snow in 1854 which shows cholera cases that are geospatially marked on the city map of London. This critical enquiry led to the inference and finding of the root cause of the outbreak, which was due to a polluted water pump in that area. Map of the book "On the Mode of Communication of Cholera" by John Snow, originally published in 1854 by C.F. Cheffins, Lith, South Hampton Buildings, London, England. The image is a digitally enhanced version found on the UCLA Department of Epidemiology website. Courtesy: (Vaughan, 2019)

4.5.1.2 New York City Ordinance drawings

Manhattan Island emerged as a highly profitable real estate market during the Industrial Revolution, driven in part by the advent of steel-frame construction. Given the economic benefits, developers and landowners endeavoured to maximise the returns which resulted in intensified development and dense building patterns. To combat the increasingly congested urban conditions and curb the illegal development the New York City Zoning Ordinance of 1916 was introduced to regulate building form, control density, and address unplanned growth. The drawings presented by Hugh Ferriss in 1922 helped clarify the spatial implications of zoning on skyscraper design. They served as visual guides for architects and planners, making it easier to understand the legal and textual complexities of the bylaws (Amoroso, 2010) (Figure 4.11). As such, they can be understood as early datascares, revealing otherwise abstract regulatory requirements through a visual medium. This example demonstrates the capacity of visual representations to make intangible planning controls legible, particularly through techniques such as three-dimensional visualisation, thereby supporting clearer communication, interpretation, and implementation of urban regulations.



FIG. 4.11 Rendering by artist and architect Hugh Ferriss of a high-rise building for New York City. This is an early proposal for the setback skyscraper form to characterise many skyscrapers built from the mid-1920s to the ca. 1950s.; Source: Diital Library collections, Columbia University Library (2023)

4.5.1.3 Insurance maps of Istanbul

Insurance maps of Istanbul, known as the Pervititch maps and first created in 1922, were detailed cartographic documents used to assess fire risk and determine insurance premiums for buildings (Figure 4.12). These maps contained comprehensive information with detailed legends all of which were essential for evaluating potential hazards. It described each property thoroughly by recording construction materials, building heights, and occupancy types, and qualitative assessments as well to gauge the fire risks³⁹ (Sabancıoğlu, 2003). By integrating quantitative data with qualitative assessments, such as material conditions and risk indicators, the maps provided a comprehensive understanding of urban vulnerability. In a rapidly urbanising and industrialising Istanbul, they played an important role in informing urban planning and risk management, contributing to the development of safety regulations. Today, these maps remain valuable for historical and spatial analysis due to their precision, level of detail, and ability to document both physical and functional characteristics of the urban fabric.

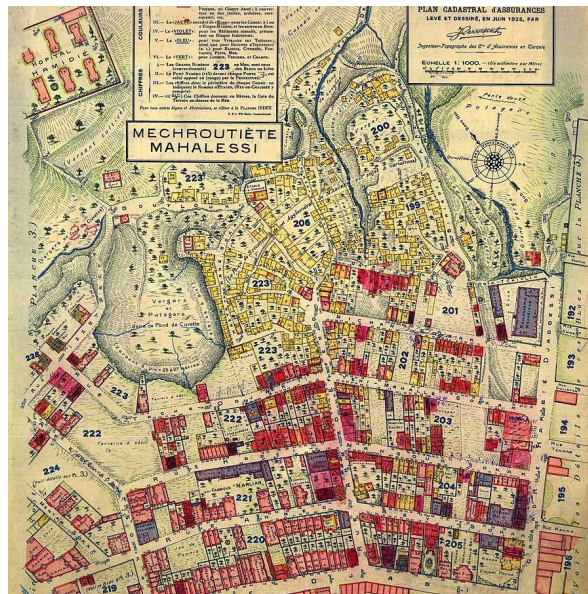


FIG. 4.12 Nişantaşı section of the Pervititch Insurance Maps of Istanbul (1925), employing a colour-coded system to classify buildings by construction material and fire risk. The detailed recording of building heights, occupancy types, and material conditions across numbered blocks represents an early integration of spatial and qualitative data for urban risk assessment; Source: SALT Research Archives

³⁹ The maps provided detailed graphical as well as textual description, E.g.: Market section with detailed with its qualitative description and recommendations; “although bags, garbage, and pieces of paper on the floor of the Fruit Market in Timurtas, Street in Eminönü section no. 77 constitute a fire risk, firefighting department can easily be reached due to the location” (Sabancıoğlu, 2003)

4.5.1.4 Redlining Maps in the USA

This is an example where generative mapping, when employed for specific institutional purposes, can lead to unintended outcomes. The 1936 map created by the Home Owners' Loan Corporation (HOLC) under the directions of the Federal Housing Administration (FHA) exemplify how cartographic practices were used to structure and legitimise inequality. These maps classified neighbourhoods according to perceived residential security and investment risk, using a colour-coded system. However, analysis of the underlying data reveals that areas marked in red were largely populated by racial and ethnic minority communities and often corresponded to older urban districts. Appraisal guidelines explicitly advised financial institutions to avoid such areas, referring to the presence of 'inharmonious racial groups' and encouraged the use of restrictive zoning to maintain spatial segregation (Rose & Kým Nam Miller, 2016; Schill & Wachter, 2001). As a result, access to federal housing loans became highly unequal, with fewer than 2% of African Americans receiving support. Scholars argue that these redlining practices systematically denied investment to minority communities, reinforcing long-term patterns of racial segregation, economic disparity, and spatial injustice (Madrigal, 2014) (Figures 4.13 and 4.14)

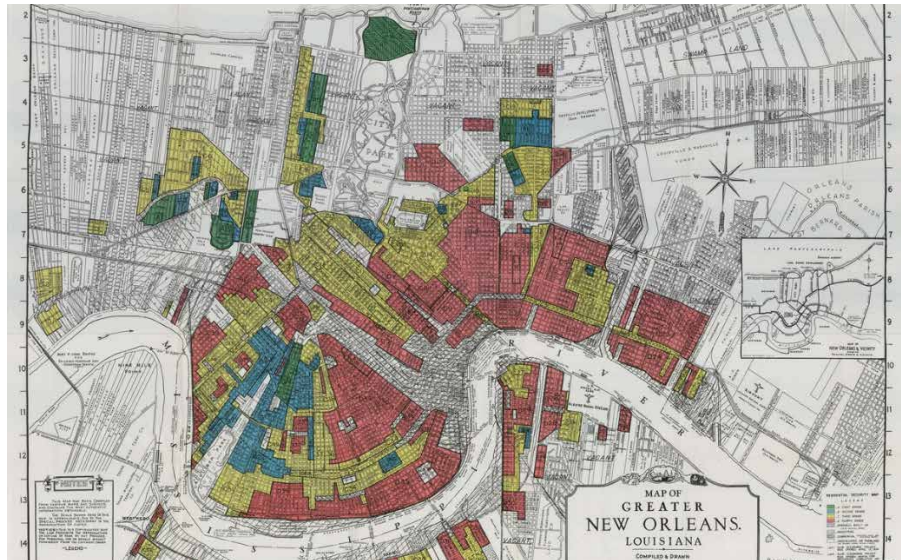


FIG. 4.13 The original HOLC map of New Orleans which classified neighbourhoods according to perceived residential security and investment risk, using a colour-coded system: Green denotes the most favourable areas, blue indicates relatively desirable ones, yellow reflects areas in decline, and red marks those that are considered hazardous; Source: www.npr.org

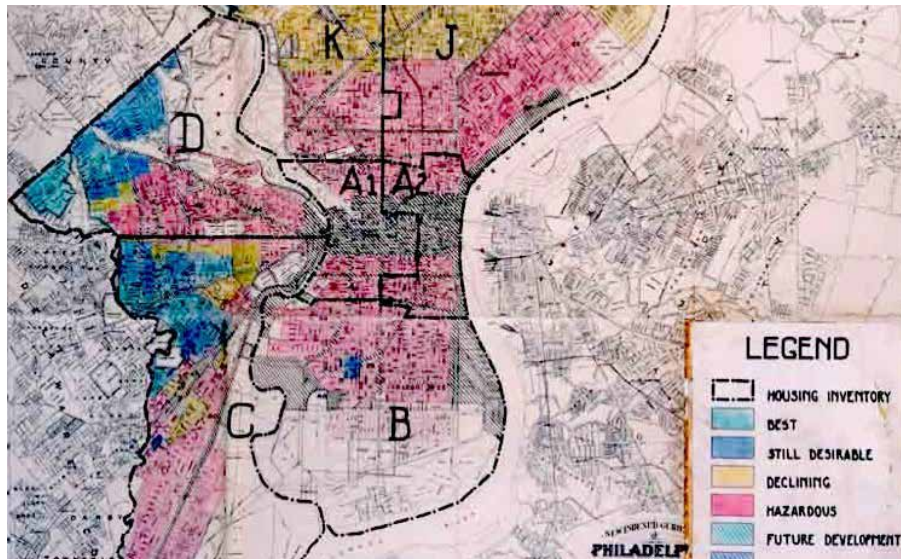


FIG. 4.14 A 1936 HOLC map of Philadelphia illustrating redlining practices, where neighbourhoods were categorised by perceived mortgage investment risk. Areas labelled as 'hazardous' were often minority communities, leading to restricted access to housing finance and long-term urban inequality; Source: cml.upenn.edu

4.5.2 Contemporary Evolution and Applications

While early forms of datascaping integrated spatial representation with statistical and qualitative analysis, contemporary practices have evolved into dynamic, multi-layered, and participatory processes. Advances in digital technologies, big data, and real-time sensing have transformed datascaping from a representational tool into an operational and interpretive framework for urban planning and governance (Batty, 2013; Kitchin, 2014). Contemporary datascaping also incorporates participatory and crowdsourced data, aggregates live information on mobility, environment, and infrastructure, supporting continuous monitoring and responsive decision-making and adopts innovative tools such as digital twins to further extend these capacities by enabling simulation and scenario testing. Environmental and climate-focused datascaping further demonstrate this evolution. Layered visualisations of urban heat, flood risk, and ecological systems synthesise diverse datasets to support resilience planning and risk mitigation. These integrative representations enable planners to identify vulnerabilities, evaluate trade-offs, and design targeted interventions across spatial and temporal scales (Corner, 1999b).

4.5.2.1 Mapping Shade and Thermal Comfort for Visualising Urban Heat in Tel Aviv-Yafo

The Shadow Map of Tel Aviv-Yafo (Aleksandrowicz, 2022) exemplifies a contemporary datascaping approach developed to address the challenge of prioritising urban heat mitigation strategies to address impacts of climate change. While the effectiveness of measures such as tree planting is well established, their large-scale implementation often lacks evidence-based tools for spatial prioritisation. In response, this method integrates high-resolution spatial data and GIS-based modelling to analyse street-level shading conditions across the city. By producing detailed shade maps and systematically mapping street trees, it establishes a spatial hierarchy of shade availability, enabling municipalities to identify shade-deficient areas and assess the potential for tree planting based on the physical characteristics of the urban environment (Figure 4.16). This approach demonstrates how datascaping can support more efficient allocation of resources by translating climatic and spatial data into actionable planning insights. It also underscores the importance of data quality, resolution, and interpretation in shaping the reliability and applicability of such visualisations in urban decision-making.



FIG. 4.16 **L:** Summer shade index map of Tel Aviv-Yafo illustrating spatial variations in solar exposure and thermal comfort across urban neighbourhoods; **C:** Map indicating the required number of additional street trees to address shade deficiencies and prioritise targeted heat mitigation interventions; **R:** Street tree density map showing the distribution of existing vegetation and highlighting disparities in urban canopy coverage across the city; Source: (Aleksandrowicz, 2022)

4.5.2.2 Embedding Hydrological Data in Urban Space: Datascaping the Water Square Benthemplein

The Water Square Benthemplein in Rotterdam exemplifies a contemporary datascaping approach in which environmental data is translated into spatial design to address urban climate challenges. Developed as part of the city's climate resilience strategy, the project designed for Rotterdam Municipality, integrates hydrological data, rainfall patterns, and urban catchment analysis into a multifunctional public space that operates both as stormwater storage and as an everyday recreational environment. Through a system of interconnected basins that collect and retain rainwater during heavy precipitation, the square visualises and operationalises otherwise invisible water flows within the city (Boer et al., 2010).

Importantly, the project incorporates strong participatory processes, where local stakeholders, including residents, students, and nearby institutions, contributed to shaping the design, use, and character of the space. This ensures that the datascape not only responds to environmental performance but also reflects social needs, behaviours, and local identity (Figure 4.17).

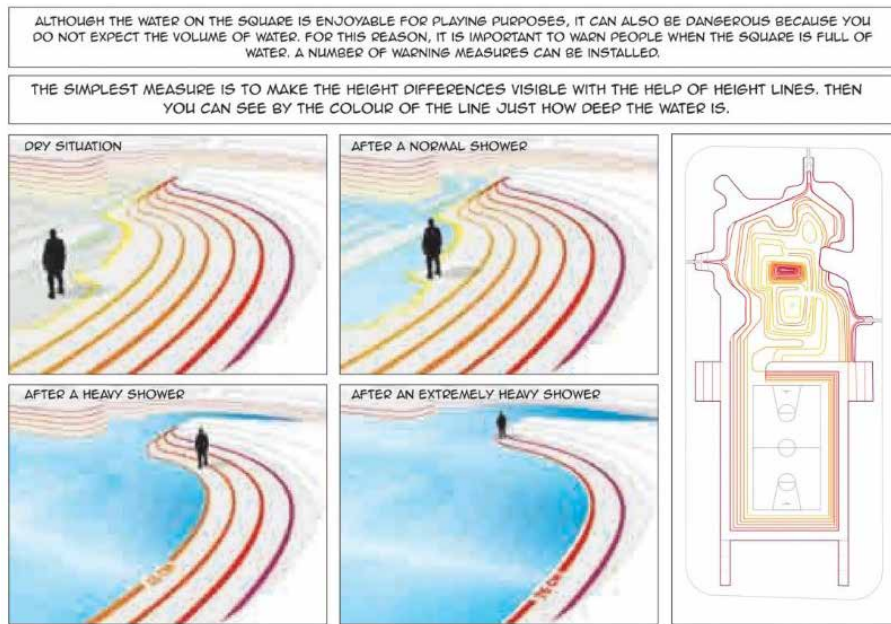


FIG. 4.17 Visualisation of the Water Square Benthemplein showing graded and colour-coded stormwater flood lines to factor the changing water levels under varying rainfall conditions and used for design intervention, making hydrological processes legible and safe for public interaction; **R:** Spatial layout and use diagram of the Water Square Benthemplein illustrating the integration of stormwater storage, public space, and user activities, informed by participatory design and multifunctional urban planning principles; Source: (Boer et al., 2010)

This intervention demonstrates how datascaping can move beyond representational mapping to become embedded within the physical fabric of the urban environment, enabling evidence-based prioritisation of climate adaptation measures.

By combining environmental processes, spatial morphology, and participatory inputs, the water square reflects a shift toward integrative and performative planning approaches that support urban resilience while enhancing public space quality. At the same time, it underlines the importance of governance coordination, stakeholder engagement, and long-term maintenance in ensuring the effectiveness of such data-informed urban interventions.

4.6 Discussion

Datascaping enables data disaggregation⁴⁰ at multiple scales: house, monument, neighbourhood, or city, it allows planners to understand both localised and systemic patterns and their interactions, making analysis more granular and decision-making more precise. However, this scalar flexibility also demands careful calibration, the risk of data overload or misinterpretation increases as layers multiply, making methodological rigour and selective judgment essential. A clearer understanding of the connection between localisation and data disaggregation is needed to prevent shortcomings in the process. These perspectives could range between spatial and urban planning, landscape, architectural, cultural and historical, technical and infrastructural, legal, economic, and ecological perspectives (Šćitaroci et al., 2019a).

Datascaping methods can facilitate improved processes where some urban planning and conservation inputs grant limited recognition to the historical urban fabric of the city (Whitehand and Gu 2010). For cross-sectoral and interdisciplinary processes, datascaping offers both quantitative and qualitative analysis to identify, characterise, and geographically locate spatial attributes and components (Duxbury, 2005b). Much of the existing literature on data-driven urbanism remains predominantly focused on technologically oriented paradigms of smart cities, emphasising efficiency, economic growth, governance, and quality of life, while insufficiently addressing the complex and interrelated challenges of spatial sustainability (Kitchin, 2014). Their role within planning practice remains selective and often technologically driven rather than methodologically integrated. This reveals a critical gap in how data-driven approaches are conceptualised and applied, particularly in relation to cultural landscapes and heritage contexts. In this regard, the application of datascaping to historic urban landscapes becomes particularly significant. As detailed in Table 4.3, this trajectory can be traced across precedents illustrated earlier, where each demonstrates how datascaping has operated as an analytical and decision-support device across public health, planning, and heritage governance. Along with this, mapping the frameworks of planning, values, stakeholder analysis, and mandates of various organisations and institutions operating at different urban scales can also present information on cohesion or conflict in values. This not only gives a holistic view of the present systems and limitations, but also acts as an enabler, as a tool to support the decision-making processes.

⁴⁰ Data disaggregation involves dividing collected data into distinct subgroups to reveal specific underlying patterns. By adequate sampling and categorisation of the subgroups, disaggregation can offer valuable and essential insights for research and practical applications.

TABLE 4.3 Summary of HUL Attributes, Datascape Type, and Corresponding SDG Targets

Map Description	Method / Approach	Key Planning Issue targeted/ addressed	Interpretive relevance to HUL attributes	Interpretive relevance to SDG Targets	Relevance to Datascaping (this thesis)
Fig. 4.10: Cholera Map of London Cholera case locations plotted against a contaminated water pump; urban socio-economic status, sanitation and public-health conditions.	Geospatial plotting of disease cases overlaid on the city map to trace a common source	Demonstrated that mapping can generate evidence and causal inference and not merely record information; Challenged the prevailing airborne-transmission theory	Infrastructure (water/sanitation); Built environment; Public-health data	3.9: Reduce illness from water, sanitation and hygiene; 6.1: Achieve access to safe drinking water; 11.1: Ensure access to adequate, safe basic services	Foundational precedent for datascaping as an analytical tool that supports root-cause identification and targeted intervention, not merely documentation
Fig. 4.11: New York City Ordinance Drawings Spatial implications of zoning bylaws on skyscraper form, density and massing.	Three-dimensional visualisation translating legal and textual complexities of the zoning bylaws and its requirements into visible spatial form	Made intangible regulatory controls legible to architects and planners; Largely design-normative, with limited capture of social or lived dimensions.	Built environment; Regulatory / planning frameworks	11.3: Enhance inclusive and sustainable urbanisation and participatory planning; 11.a: Strengthen national/regional/ urban planning links	Precedent for translating regulatory and textual data into visual, spatially legible form, relevant to reading planning frameworks as a data layer
Fig. 4.12: Insurance (Pervititch) Maps of Istanbul Construction materials, building heights, occupancy types and fire-risk assessments at building scale	Detailed cartography combined with descriptive legends integrating quantitative and qualitative spatial data	High granularity and precision valuable for spatial analysis; Originally produced for insurance/risk purposes, so the lens is selective rather than conservation-driven	Built environment (fabric detail); Infrastructure; Land use	11.5: Reduce deaths and losses from disasters 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage 9.1: Develop quality, reliable, resilient infrastructure	Precedent for combining quantitative and qualitative data at fine (building) scale, relevant to disaggregated, multi-scalar datascaping

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TABLE 4.3 Summary of HUL Attributes, Datascape Type, and Corresponding SDG Targets

Map Description	Method / Approach	Key Planning Issue targeted/ addressed	Interpretive relevance to HUL attributes	Interpretive relevance to SDG Targets	Relevance to Datascaping (this thesis)
Fig. 4.13 -14: Redlining Maps (HOLC) Neighbourhood-level classification of perceived investment risk, correlated with race and ethnicity.	Colour-coded risk zoning derived from discriminatory appraisal criteria	Cautionary example: mapping was used to institutionalise segregation and restrict access to housing finance for minority communities	Socio-economic processes; Land use; Demographic / community identity	10.2: Promote social, economic and political inclusion of all 11.1: Ensure access to adequate, safe and affordable housing 16.b: Promote non-discriminatory laws and policies	Critical precedent showing datascape are not neutral: methodological and categorisation choices carry political consequences
Fig. 4.15: Cognitive Map of Paris Residents' subjective perceptions of the city, aggregated by frequency of mention.	Hand-drawn cognitive maps collected from residents; Converted into a frequency-based word cloud / spatial representation.	Captures lived experience and spatial cognition beyond physical or quantitative mapping; Limited by participant self-selection and by frequency as a proxy for significance	Intangible social-cultural heritage; memory, identity, perception	11.3: Enhance inclusive and sustainable urbanisation and participatory planning 11.4: Strengthen efforts to protect and safeguard cultural heritage 4.7: Ensure appreciation of cultural diversity	Precedent for value analysis of intangible heritage and documenting through community perception
Fig 4.16: Shade Map of Tel Aviv-Yafo Street-level shading conditions, tree canopy distribution and thermal comfort across the city	High-resolution GIS modelling producing shade-index, tree deficiency and canopy-density maps.	Enables evidence-based prioritisation of heat-mitigation resources; reliability depends heavily on data resolution and quality	Natural environment; Infrastructure; Climate / environmental data	13.1: Strengthen resilience and adaptive capacity to climate hazards 11.7: Provide universal access to safe, green and public spaces	Precedent for climate and environment focused datascaping directly relevant to spatial sustainability and resilience planning

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TABLE 4.3 Summary of HUL Attributes, Datascape Type, and Corresponding SDG Targets

Map Description	Method / Approach	Key Planning Issue targeted/ addressed	Interpretive relevance to HUL attributes	Interpretive relevance to SDG Targets	Relevance to Datascaping (this thesis)
Fig 4.17: Water Square Benthemplein Rainfall patterns and urban catchment data embedded into a multifunctional public space.	Participatory design translating environmental data into a physical stormwater storage and recreational space.	Moves datascaping from representation to an embedded, performative intervention; Effectiveness depends on long-term governance and maintenance	Hydrology; Infrastructure; Open space; Participatory socio-cultural process	11.b: Increase cities implementing integrated policies for resilience and climate adaptation 13.1: Strengthen resilience and adaptive capacity to climate hazards 11.7: Provide universal access to safe, green and public spaces	Precedent for participatory datascaping that bridges environmental data with community and identity
Fig 4.18: Crossrail Excavation Stratified archaeological remains and archival records of a historic burial ground used largely by marginalised populations	Establishing connections with excavation and archival records and findings from mapping them spatially	Reveals archaeological unexcavated and inaccessible heritage layers; Shows large infrastructure projects can function as platforms for heritage knowledge production and inquiry	Below-ground archaeology; Cultural history; Socio-cultural memory	11.4: Strengthen efforts to protect and safeguard cultural heritage 11.3: Enhance inclusive and sustainable urbanisation and participatory planning	Precedent for integrating below-ground and archaeological data into spatial planning

4.6.1 Limitations

Although this chapter elaborates on the need for and methods of datascaping, the method is primarily outlined to highlight its relevance for the HUL approach. Part D of the thesis illustrates different explorations of datascaping, drawing on the methods and data collection strategies presented in this chapter, and applies datascaping as a tool to read, document, analyse, and assess historic urban landscapes across three dimensions. This exploration and illustration of datascaping is limited in this thesis, to demonstrate the methods and their advantages of contextual embedding while stressing the potential for replication and application across other case studies or datasets. Having said that, the conclusion chapter outlines the type of data as applicable to the HUL approach as a means for spatial sustainability, which requires further research for contextual embedding and replication to local contexts. There are other methods and conditions of datascaping which can be delved further as a focus on the continuation of this research.

Since we are exploring 'datascapes' and knowledge visualisations, the acquisition of data plays an important role and needs to be understood in terms of collection, processing, storage, and replication. It can be collected over a period of time, over varied time spans and geospatial resolution, with means of manual or technological data collection. This research focuses on illustrating various data acquisition and explorations of visualisations based on the availability, access and legibility of data applicable to the research objectives. However, it is acknowledged that data availability and accessibility vary significantly across geographies and institutional contexts, which may affect the replicability of the methods demonstrated here. Nevertheless, the data acquisition process, particularly in terms of harmonisation, replication, and long-term sustainability, presents a significant challenge that this thesis does not fully resolve. These issues must be addressed to fully realise the potential of datascaping as a robust and transferable method for integrated urban heritage management and spatial planning.

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Critical Case Study: Jaffa

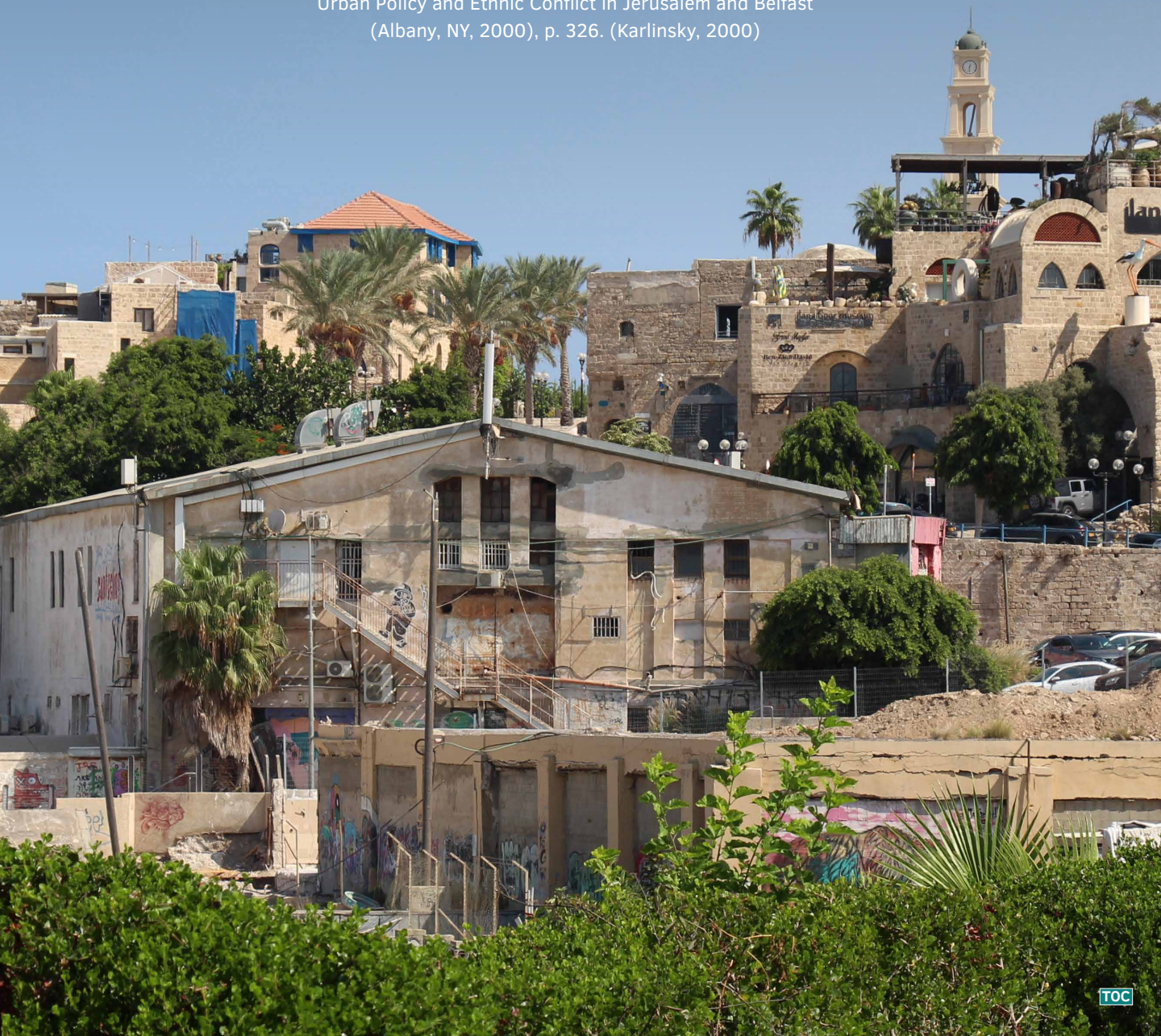
Part C examines the dynamics of contested urban landscapes through an in-depth analysis of the case of Jaffa and its landscape, exploring its historical evolution, contemporary socio-spatial challenges, and opportunities for integrating the HUL approach within urban planning.

Chapter 5 focuses on analysing the historical evolution of Jaffa. To illustrate the spatial implications and causation of the contested urban heritage in Jaffa.

Chapter 6 provides an assessment of the planning frameworks in Tel Aviv-Yafo Municipality, its challenges, implications on socio-spatial configurations and the opportunity for integration of HUL approach, reframing it to conform to the context and for achieving spatial sustainability.

“Polarised cities are not simply mirrors
of larger nationalistic ethnic conflicts,
but instead can be catalysts through which
conflict is exacerbated or ameliorated.”

Scott A. Bollens, *On Narrow Ground:
Urban Policy and Ethnic Conflict in Jerusalem and Belfast*
(Albany, NY, 2000), p. 326. (Karlinsky, 2000)



5 Jaffa: A Historic City with Contested Urban Heritage and Landscape

Part of this chapter is based on a published article:

– Potdar, K. (2021). Jaffa Port, Israel: From a thriving port town to a socio-ethnic enclave. *SPOOL*, 8(2), 81–98. <https://doi.org/10.7480/spool.2021.1.5902>

This chapter introduces Jaffa as a critical case study, representing a city with contested heritage and urban landscape impacted by asymmetric power relations and conflicting narratives, where the state-led planning and heritage regimes actively reorder spatial, historical, and political claims. Rather than reducing contestation to the coexistence of multiple narratives, the chapter frames Jaffa within asymmetrical power relations and governance structures that actively shape spatial, historical, and socio-cultural transformations. The aim is to position Jaffa as a representative example of a historic urban landscape (see Definition §2.3.1.1), reflecting the interplay between historical transformation, heritage conservation, and contemporary urban development. In doing so, it provides a lens for understanding how spatial, cultural, and socio-economic dynamics create, shape, and reconfigure contested urban heritage over time. Together with Chapter 6, this section presents the contextual and analytical foundation to provide empirical evidences through datascaping explorations.

5.1 Tracing the Formation and Transformation of Jaffa's Historic Urban Landscape

The evolution of cities and towns over centuries reflects the reciprocal relationship between human activity, geography, and socio-cultural influences. This diachronicity is evident in the historical town of Jaffa, Israel (then Mandatory Palestine) illustrating how it emerged, thrived, and declined. Owing to shifting economics, demographic composition, exclusivist attitudes and contesting governance agendas, the historic city witnessed significant alterations in socio-spatial configurations and production of urban alterities⁴¹ (Lefebvre, 1996; Smith, 1996). Given these dynamics and ambitions of Tel-Aviv Metropolitan's urban sustainability goals, there is a need to identify determinants that catalyse, influence, and shape historic cities and their socio-spatial and economic order. These determinants, understood as HUL attributes of social significance and spatial characteristics, portray tangible and intangible markers of memory (Belanger, 2002). Being anchored in collective memory and identity, they require critical recognition and integration within planning and conservation processes.

The following sections trace these determinants through key phases of Jaffa's development, emergence as a port city, formation of its cultural landscape, and subsequent transformations, establishing a foundation for understanding its contemporary socio-spatial dynamics and contestations.

5.1.1 Trade Networks and the Emergence as a Port City

The Ancient trade route of Via Maris was a great channel of cultural influence and interaction among civilisations in the Mediterranean basin and the Fertile Crescent. This sea route between Egypt and Damascus witnessed the emergence of many port towns and cities, products of favourable coastal geography. The few natural bays and anchorages located on the southern coast of present-day Israel were developed as the ports of Jaffa, Ashdod, and Acre.

⁴¹ Urban alterities refer to the production of 'otherness' within urban space: the spatial, social, and cultural marginalisation of certain groups, communities, or neighbourhoods through planning, governance, and economic processes. In the context of historic cities, urban alterities manifest as contested spaces where dominant narratives and power structures determine whose heritage, identity, and presence is recognised, preserved, or erased. The concept draws on Lefebvre's notion of the right to the city and Smith's work on gentrification as a spatial expression of social inequality.

The breakwater technology was non-existent before the eighth century B.C.E. (Dothan, 1973); many other cities were located relatively far from the beach which bestowed prominence on these port towns. Jaffa holds biblical importance⁴² (Bacci & Rohde, 2013) and bears testimony to cultural evolution within a desert landscape, and is a palimpsest of architecture, port activities, and multicultural society. Increased commercial traffic in the Levant region⁴³, along with the opening of the Suez Canal and the advent of steamship technology, propelled the port to the forefront as a leading port in the Mediterranean, alongside Beirut and Alexandria (Kark, 1990a) (Figure 5.1 and 5.2). These ports also served as transit ports for pilgrimage and entry to Jerusalem and other holy sites, with Jaffa gaining eminence particularly due to its proximity to Jerusalem.



FIG. 5.1 An 1843 lithograph showing ancient Joppa (Jaffa) in the backdrop and a group of pilgrims of various religions traversing through the port town; Source: David Roberts travel lithographs; Courtesy: www.picryl.com

⁴² References from the Bible: Story of Jonah, who fled from the presence of God and boarded a ship at Jaffa. When a storm endangered the vessel, Jonah told his companions to cast him overboard to calm the sea. After three days, he was swallowed by a whale, which cast him ashore. Other stories: Tabitha's restoration to life and Peter's conversion of Gentiles.

⁴³ Levant was the name of a large and prosperous ancient country (at times independent, at others a tributary to Egypt) located in the Levant region of present-day Lebanon, Syria, Jordan, and Israel. It was also known as Phoenicia.

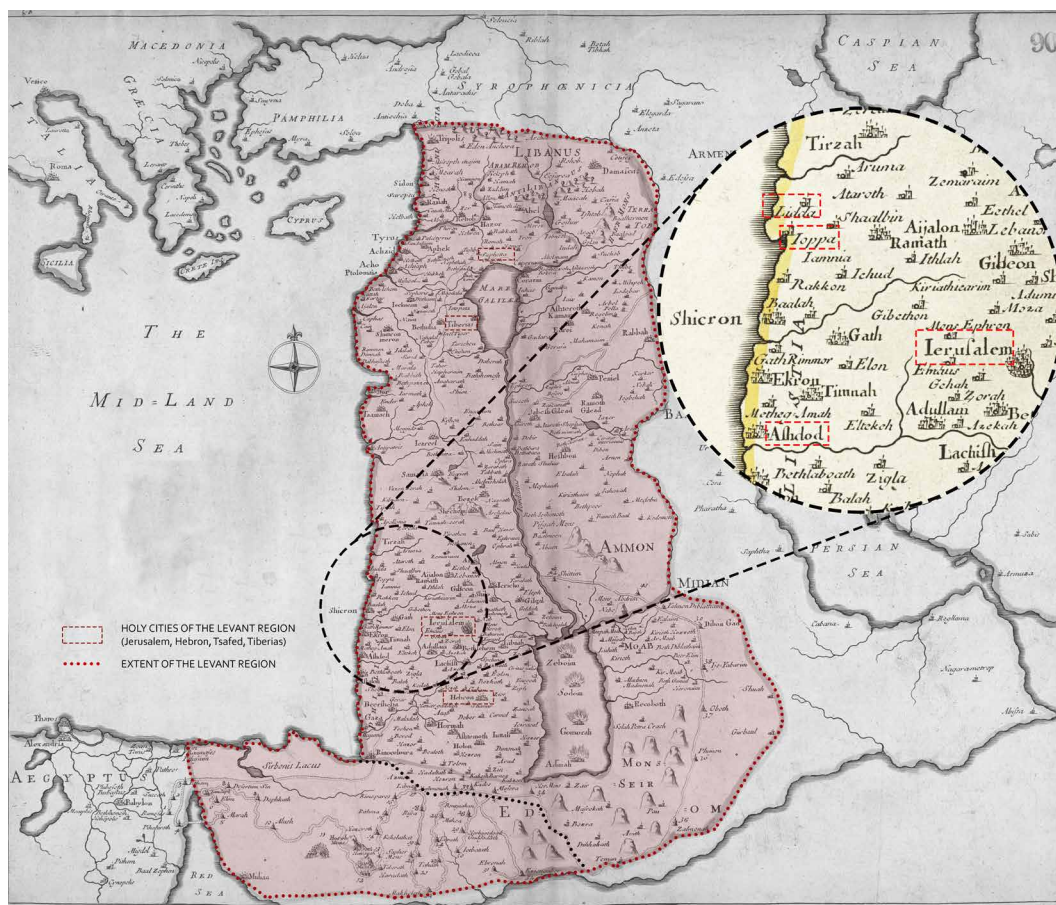


FIG. 5.2 Map of the Levant region, derived from the original map by Philip Lea, dated 1692. The map shows the existence of the port town of Jaffa (Jopha in the map) along with other important inland towns contributing to the trade on the Mediterranean coast, namely Gaza, Ashdod, Akko, and the four holy cities of Jerusalem, Hebron, Tiberias, and Safed. Base map: A map of Canaan in 1692; courtesy: Norman B. Leventhal Map & Education Center at the Boston Public Library

During the Second Temple era, Jaffa enjoyed a special status as the only Hasmonean harbour; but in the succeeding Roman era, Caesarea took over as the primary coastal focus. During the Roman and Byzantine periods (6 BCE to 500 CE), it became an important commercial centre; it was occupied in June 1099 during the First Crusade to realise its main objective of recovering the Holy Land from Islamic rule. It witnessed a decline during the Battle of Jaffa in 1119 between the Crusaders and the Egyptians, destroying the wall partially; however, the power remained with the Crusaders. The Mamluks from Egypt conquered the port in the 13th Century CE, rebuilding it and reviving its markets. Hostels built by Franciscan monks,

along with Armenian and Greek Orthodox monasteries on the mound of the port town, are evidence of the multicultural nature of the port and its connection to the holy city of Jerusalem and allied pilgrim activities. In the 16th Century CE, the Ottoman period dynamically took over the port town and profoundly reshaped Jaffa's social and cultural geography (LeVine, 2005). The late Ottoman period (the late 1800s) saw the formation of new Muslim neighbourhoods, namely Ajami, Nuzha, Hursih, Irshid, Jebaliyyeh, Manshiyah, American and German colonies, and a model farm (Sarona neighbourhood) (Figure 5.3), where the Egyptian soldiers settled alongside the Christians in the north of the town. This period also witnessed the Tanzimat (1840-61)⁴⁴ i.e., reformation focused on modernising, centralising, increasing revenue, and forestalling fragmentation and conquest.



FIG. 5.3 View of the orange groves in Jaffa; Date: 1890; Source: Library of Congress, www.picryl.com

⁴⁴ Tanzimat reformation laws aimed at the revival and regeneration of religion and state, land and community and granting of political equality with a desire to win European diplomatic support. This had a clear impact on the growing population of Jews in Jaffa..

5.1.2 Jaffa's Cultural Landscape: Environmental, Geographical, and Economic Dimensions

Historic cities are manifestations of the communities that inhabit them, reflecting their needs, customs, events, and ideologies (Amit-Cohen, 2009). Jaffa's cultural significance is interwoven with its landscape narrative and evolving land uses, namely agricultural, industrial, and residential (LeVine, 2005).. Its hinterland contributed significantly to agriculture, contrasting with old Jewish communities in the four holy cities of Jerusalem, Hebron, Tsfat, and Tiberias, which relied primarily on religious activities (Figure 5.2). The historic magnificence of the port town rooted in its long-standing economic vitality, is reflected in grand palatial houses characterised elaborate architectural detailing and materials, enclosed within designed compounds, orange groves, well structures, water channels, and pump systems (Figure 5.4).

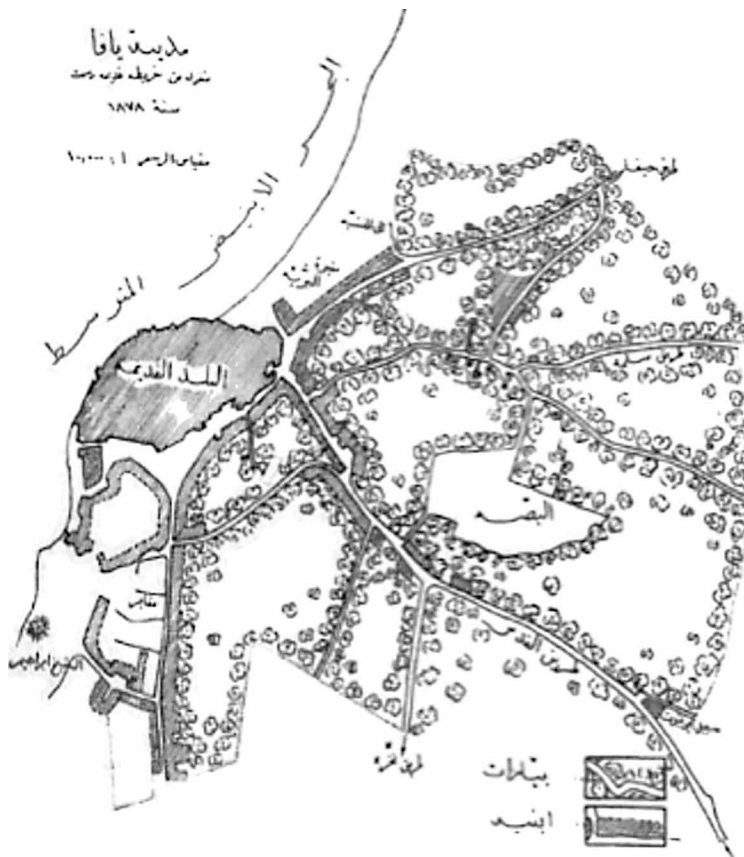


FIG. 5.4 Plan of Jaffa city from 1878, modified by Ali Miliji Mas'ud. The key shows: top-orchards, bottom- built form of the city; Source: republished in 1940 in Majallat al-'Imara, Cairo; Source: (Pullan & Baillie, 2013)

A study of the Atlas Survey of Israel (the first edition of 1955–1961 in Hebrew and 1970 in English) reveals a large forest, agricultural land and swamp areas surrounding Jaffa's built-up area (Kark & Levine, 2012). Due to the presence of calcareous sandstone, red sand, and loam along the coast, locally called *kurkar*⁴⁵, aquifers supported local agriculture (Illustrated in § 8). The agricultural hinterland of Jaffa, one of the largest in the country, was at the forefront of citrus production and export and gained prominence by the end of the 19th century as a major economic centre and port (Goren, 2015a). The geology of this coastal plain, dune fields, and hydrology shaped the ecological landscape and its implications on the culture and economy of the region. Traditional *mawassi*⁴⁶ agricultural system was developed to harness shallow coastal groundwater. To protect crops from encroaching dunes extending up to five kilometres inland from Caesarea to Jaffa, palm trees, and other crops were planted (Kark & Levine, 2012). These landscape attributes collectively contributed to infrastructural development of the port and giving rise to migration of Jewish and Arab pilgrims from other regions and population growth. It was a prominent as a mixed town⁴⁷ with Muslim, Christian, and Jewish residents (Monterescu & Rabinowitz, 2007).

The spatial development of Jaffa and the surrounding villages was a concomitant and integral part of its socio-spatial economy demonstrating a well connected historic urban landscape. The villages of Jamassin East and West and Summel, in the surrounding environs, encircled a zone of pastoral and agricultural land, roads, and rivers. They were inhabited by immigrants from Egypt, Jordan, and Bedouins from South Palestine engaged in agricultural production and commerce in the port town (LeVine, 2005) (Figure 5.2). Together, it illustrates how Jaffa's historic urban landscape was not only shaped by its geography and resource base but also by interconnected systems of commerce, agriculture, mobility, and habitation, which laid the foundation for its later urban transformations (Figure 5.5). It led to quicker construction in Jaffa than in other coastal towns in the middle of the 19th Century CE: new technologies and industrial development improved health, education, transportation, and communication services. A telegraph line between Jaffa and Jerusalem in 1865, and a road and the railway line in 1871 (Kellerman, 1993a) marked major technological advancements in the region.

⁴⁵ Kurkar, known across the Middle East as calcareous sandstone or Eolianite, is a consolidated coastal rock formation of partially lithified wind-blown sand. Israel's coastal aquifer belt is covered by Holocene calcareous sand dunes susceptible to natural recharge from intense rainfall (Barzilay, 2006). Unique to Israel, kurkar ridges are fossilised dunes of quartz sand, shell fragments, and limestone, revealing ancient shorelines millions of years old. These ridges are critical ecological habitats for endemic species and a corridor between the coast and inland natural areas, but face mounting threats from urban development and climate change; Source: Atarim.gov.il

⁴⁶ Mawassi in Arabic means suction, referring to water that has been sucked out to the surface (Kark & Levine, 2012a)

⁴⁷ Mixed town or city in Israel where Jewish and Arab populations live within the same urban area, but often remain socially and spatially divided.

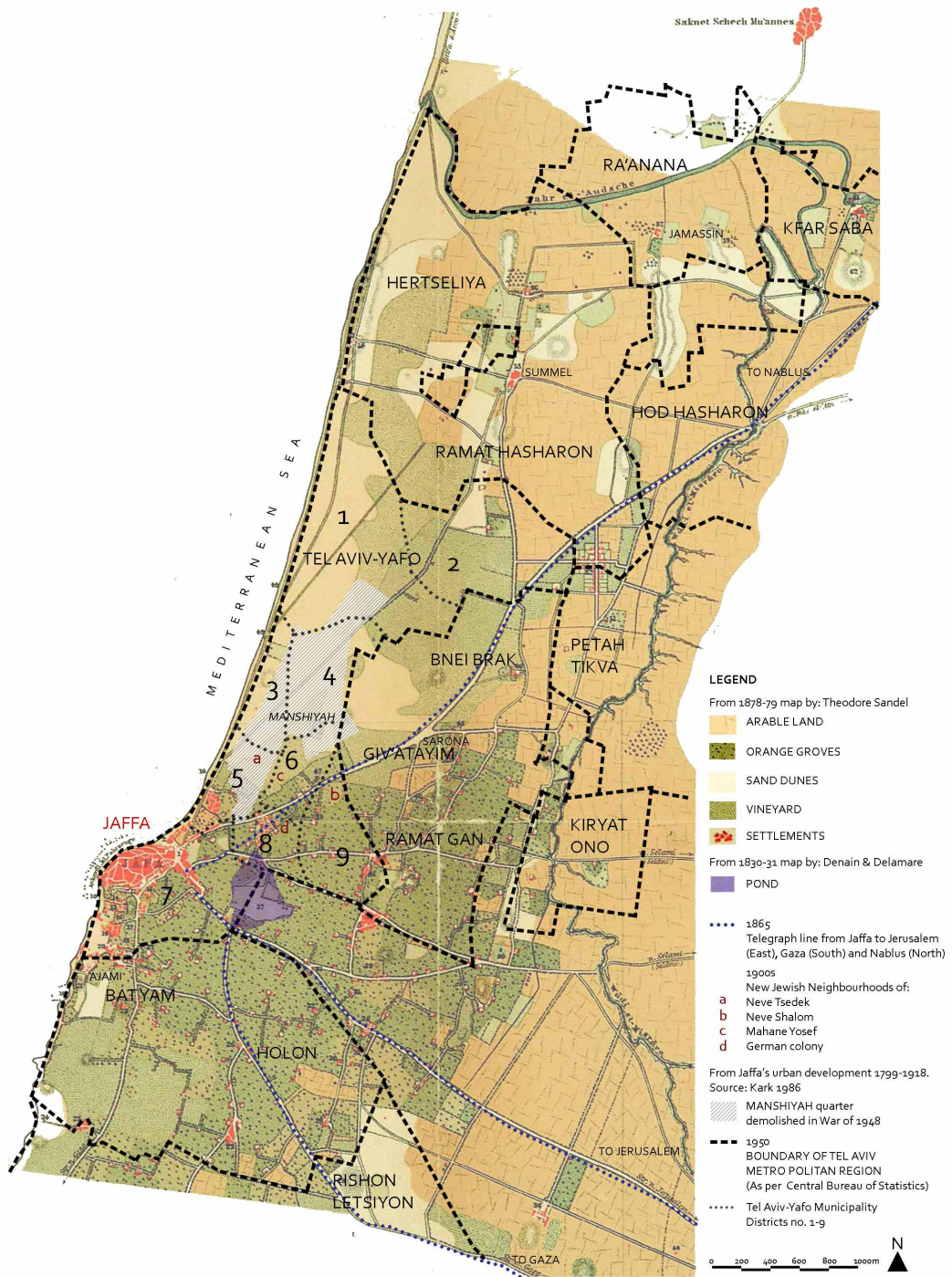




FIG. 5.5 (left page) The map demonstrates layers of information on the periods of the 1870s and 1950s. The 1870s layer demonstrates the physical landscape and its uses, with Jaffa as the main port town, German colonies and smaller villages around connected with a network of roads, telegraph lines and depicting numerous orchards, groves, and farms; Source: Baedeker guidebook map of Jaffa by Theodore Sandel, 1878-1879. (Shaham, 2011); Source: Map by Denain and Delamare, 1830-31, Bibliotheque Nationale de France, fonds géographique, Res. Ge. FF. 6421; The layer of the 1950s demonstrates the Tel Aviv-Yafo Municipal boundaries and districts, as well as the extent of the Tel Aviv Metropolitan region, built over the existing landscape. This coinciding set of information shows the evolution of an agrarian landscape into a metropolitan area, and Jaffa being the prominent port pushed to the fringes as Quarter 7 of the modern city of Tel Aviv; Source: (LeVine, 2005); Map source: Jaffa's urban development 1799-1918 (Kark, 1990a); Map created by K. Potdar (2020)

FIG. 5.6 (above) L- Abu Nabut Trough at Abu Nabut Park, Tel Aviv-Yaffo, also known as the "Well of Tabitha", is a public fountain. Built in 1815 by Mohamad Agh'a (Abu Nabut), Governor of Jaffa; Source: Talmoryair; M- An ancient and broken Arabic 'well-house' and a tin shack on top of it, that stands on Turey-Zahav St., in Shapira neighbourhood, Tel-Aviv Jaffa; Source: King Boshi; R: Clock Tower in Jaffa built by Sultan Abdul Hamid II to celebrate 25 years on the throne; Source: Bahnfreund

5.1.3 Reorganisation and Transformation of Jaffa's Urban Structure

After the siege of 1799 by Napoleon, power instability forced the Ottoman government to strengthen its presence in the region which led to the construction of a military watchtower to control the sea and its borders. This type of iconography and political partitioning of space (Gottmann, 1952) rooted in religious and military functions, reflects socially shared heritage embedded in collective memory. Following the end of Egyptian hegemony in 1840 and the stagnation of Acre in the north, the economic attention shifted along the southern Mediterranean coast. This period also witnessed the rise of Ottoman control and construction of fortification walls, gates, and water fountains to facilitate travel and pilgrimage between Jaffa and Jerusalem (Figure 5.6).

In the 1830s, Jewish immigrants from North Africa arrived in Jaffa leading to the steady growth of Jewish diaspora. The year 1882 marked the beginning of the First Aliya (Zionist immigration) and in the early 1900s, Jaffa experienced increased Jewish immigration, as many settlers remained in the port of arrival. The Jewish community in Jaffa was renewed and became the most prominent Jewish community in Mandatory Palestine outside the four holy cities of Jerusalem, Hebron, Safed, and Tiberias (Kellerman, 1993b) (Figure 5.2). New Jewish neighbouring colonies were formed, namely Neve Tsedek, Neve Shalom, Mahane Yosef, Mahane Yehuda (later renamed Kerem Ha'Tenanim), and Ohel Moshe. This transformative period of reorganisation laid the foundation of Jaffa's emergence as a dynamic cultural and economic hub, bridging historical heritage with evolving demographic and social landscapes.

5.1.4 **Decline of Jaffa Port and the Rise of Tel Aviv City and Port**

The city of Tel Aviv, founded in 1906 as a Jewish suburb, was envisaged as a modern and developed neighbourhood and perpetuated the political divide. The formation of the 'Ahuzat Bayit' society in 1906 to establish a modern and developed neighbourhood with better living conditions than the crowded Arabic Jaffa port town generated a sense of segregation by land acquisition of the unaccounted dunes to the north of the port (Figure 5.7). From 1930 onwards, the new construction was driven by 'budding modernisation, economic growth, incoming migration, and a growing sense of national awareness' (Monterescu & Rabinowitz, 2007). The Geddes Plan for Tel Aviv, identified it as a link between European planning ideals and agricultural renewal (Welter, 2009), made way for modern, Europe-inspired city focusing on Tel Aviv's northward expansion to the Yarkon (Rubin, 2013a) (Figure 5.10). Since the foundation of Tel Aviv city, Old Jaffa has witnessed a fringe condition being overshadowed economically and demographically by the expanding modern city.

Historical records show an exponential rise in the Jewish population from 1922 to 1944, which is against the gradual growth of the Arab population in Tel Aviv and Jaffa (Figures 5.8 & 5.9). As a result of the war of 1948, most of the Arabs either fled or were forced out of the country (Portugali, 1991). The population census of 2002 demonstrates the complexity of socio-spatial segregation within the city, with the Arab Muslim, Christians and other religious minorities (Bedouins, Yemenites, North African Jews, Houranis from Syria, Egyptians, Trans Jordanians, Circassians, Germans, Greek Orthodox, and Lebanese (LeVine, 2005)). concentrated in the neighbourhood of Jaffa. Such composition makes Jaffa homogenous in the regional schemes; however, it maintains its heterogeneity in the social, cultural, and economic aspects.

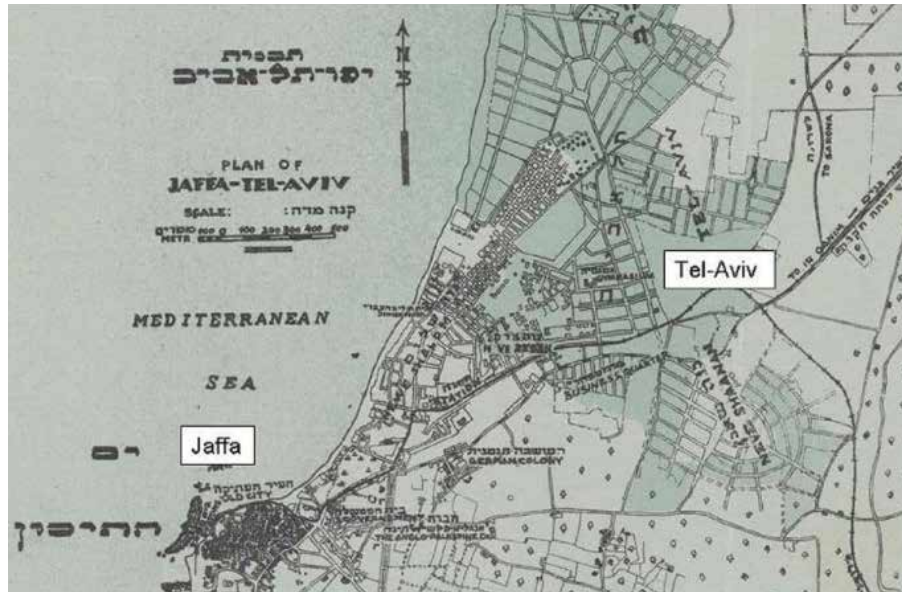


FIG. 5.7 Part plan of Jaffa-Tel Aviv, 1922; Source: Reproduced by the Survey of Egypt, the Jewish National & University Library, Eran Laor Cartographic Collection, the Hebrew University of Jerusalem; Source: (N. Rubin, 2013)

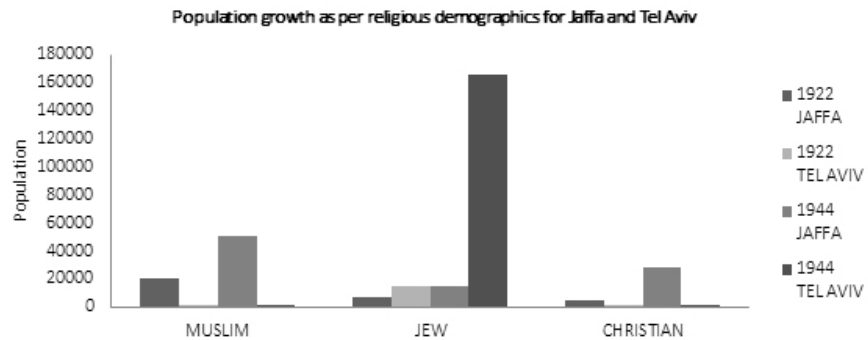


FIG. 5.8 Population growth in Jaffa and Tel Aviv; Date source: (LeVine, 2005)

Demographics as per religion based on Census 2008 for Tel Aviv-Yafo Municipality

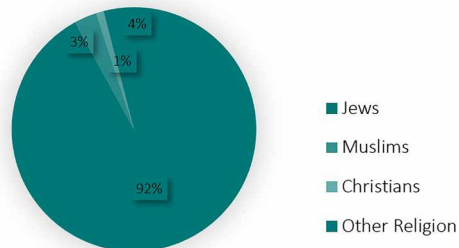


FIG. 5.9 Population census of Tel Aviv- Yafo for the year 2008; Source: Central Bureau of Statistics, Israel

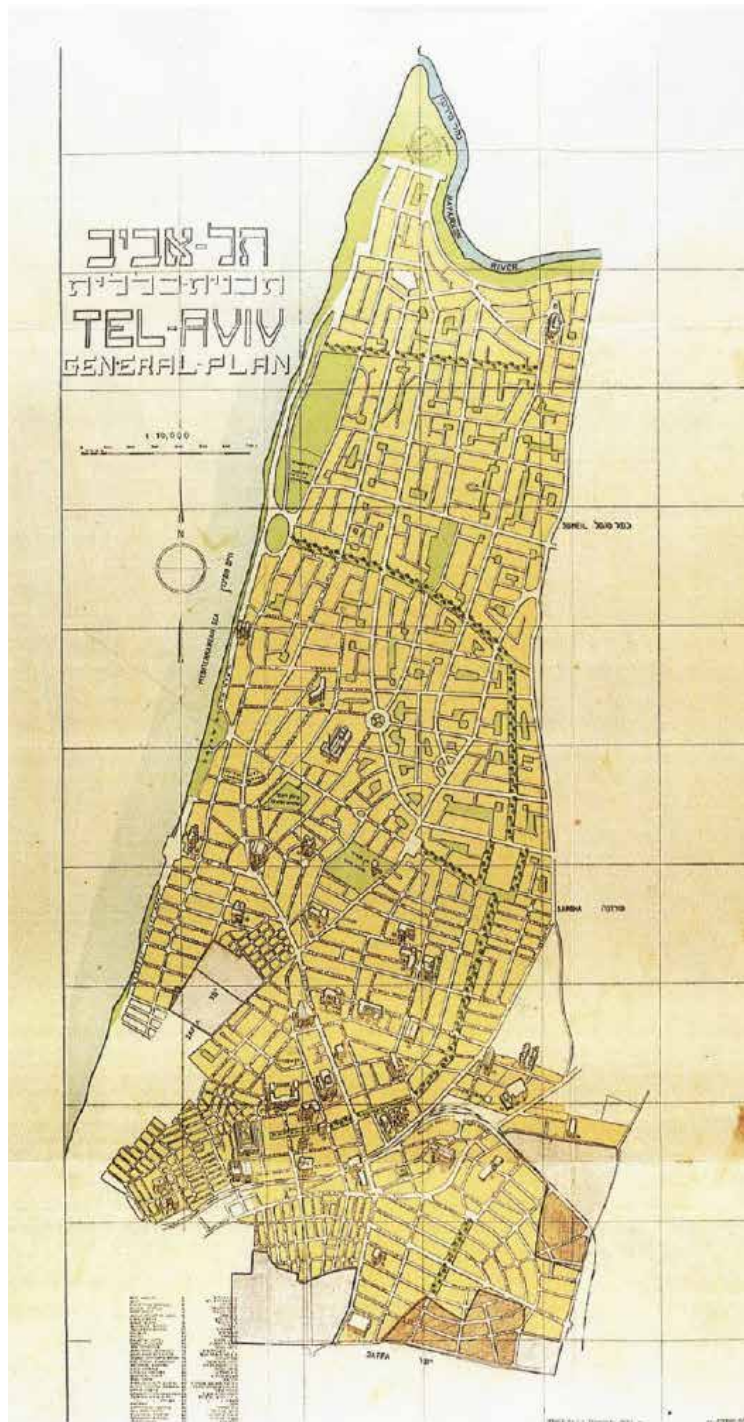


FIG. 5.10 This map shows Patrick Geddes's 1925 plan for Tel Aviv. Although Geddes himself envisioned Tel Aviv as an extension of historic Jaffa. However, current spatial configuration reflects spatial disconnection of Tel Aviv in the North from Historic Jaffa to the south, symbolising the shift from Jaffa's historical and cultural identity to the Zionist vision of a modern, European-inspired city. Source: National Library of Israel, Town planning report Tel Aviv / Patrick Geddes

Jaffa port's decline reflects structural political and economic shifts, resulting in the loss of its role as a regional maritime hub. The Arab revolt and riots at Jaffa port in 1936 led to the suspension of port operations by Arab merchants and workers, disrupting economic activity. The Tel Aviv Chamber of Commerce capitalised on this disruption to establish an alternative port, while the Jaffa Municipality opposed this development despite supporting the bargemen. The subsequent construction of a jetty in Tel Aviv contributed to a sustained decline in Jaffa's imports and exports. Under 'Operation Anchor'⁴⁸, the British Mandate demolished over 200 homes in Old Jaffa to suppress resistance and facilitate military movement (Figure 5.11; see § 7, Figures 7.3 and 7.4). During World War I, port functions were redirected to Haifa, reducing cargo flows through Jaffa. The opening of the Tel Aviv passenger terminal further reduced Jaffa's role, effectively terminating Jewish passenger traffic through the port. World War II disrupted Mediterranean trade networks, extending port closure and unemployment among Arab bargemen until 1945. Post-World War revival efforts by the Jaffa Chamber of Commerce and the Arab Higher Committee were constrained by the concurrent expansion of the Tel Aviv port and its impact on citrus exports. These efforts did not restore Jaffa's economic function or symbolic status (Goren, 2015b).



FIG. 5.11 The Old City of Jaffa, following the destruction carried out by British forces during the 1936-1939 revolt; Source: Israel State Archives, Courtesy: Palestine-Studies.org

⁴⁸ The 'Anchor Operation' was a 1936 British military campaign during the Arab Revolt, demolishing over 200 buildings along what is now Mifratz Shlomo Street to open the Old City's labyrinthine lanes to armoured vehicles and break its use as a protected refuge, displacing roughly 6,000 Arabs. It was considered a success, contributing to the near-total collapse of organised resistance nationally (Gavish, 2013). Salvage excavations revealed a destruction layer up to two metres thick, with sandstone blocks, coloured plaster, pottery, glass, and personal objects indicating continuous occupation from the Late Ottoman into the Mandate period, including a Turkish bathhouse (marked on the 1878 Sandel map) sealed intact by the debris, in use until June 1936 (Arbel, 2021; S. Graham, 2004). The British subsequently commissioned H. Kendall, who had Jerusalem architect A. Shor design a 1937 master plan introducing a plaza and two roads in an anchor-shaped layout on the cleared site, hence the name (Shemer, 2021). The plan was never implemented.

Jaffa port suffered much neglect, demolition, and drastic community shifts after Arab-Israeli War of 1948 or the Nakba⁴⁹ (Figure 5.11). Nearly all towns that are now part of Israel which had Palestinian populations were disrupted in such a way that their physical structure, social life, and historical continuity were cut short (Monterescu & Rabinowitz, 2007). The Ajami neighbourhood, historically an Arab-majority residential quarter of Jaffa, remains characterised by contested property ownership, reflecting its long history of displacement and disinvestment.

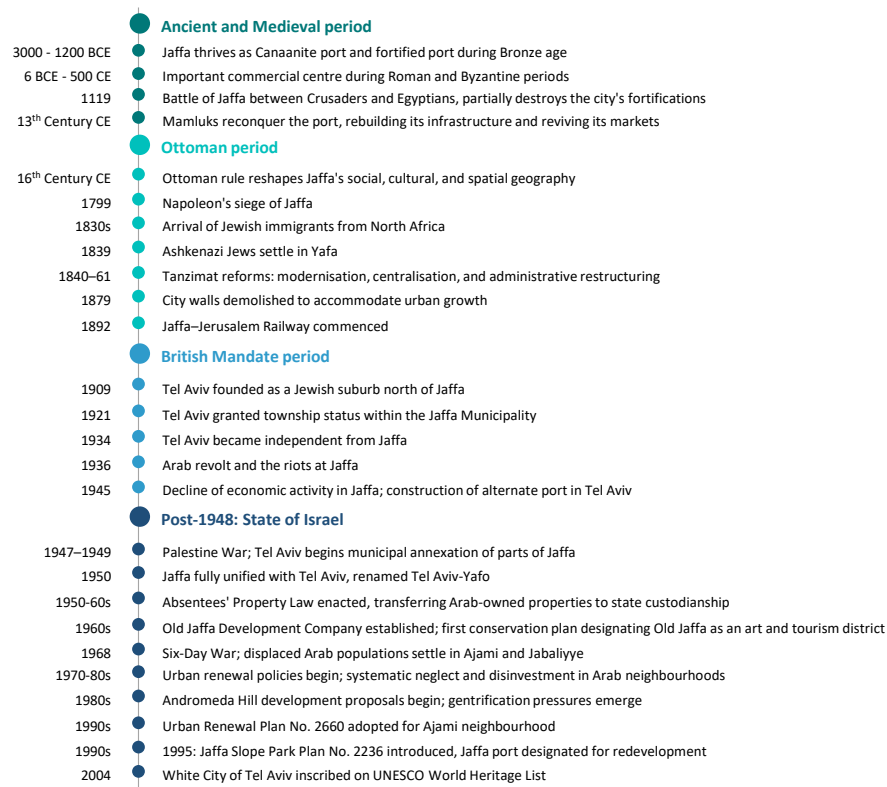


FIG. 5.12 Historical chronology of Jaffa's formation, transformation, and decline as a port city, tracing key political, social, and urban events from the Bronze Age to the UNESCO inscription of Tel Aviv in 2004. Source: The Jaffa Cultural Heritage Project, Israel Antiquities Authority

⁴⁹ The Nakba (Arabic for catastrophe) denotes the large-scale dispossession of Palestinian population and destruction of cities and towns as a result of the 1948 Arab-Israeli War. Before these events, Palestine was a diverse, multi-ethnic society; however, tensions between Arab and Jewish communities escalated in the 1930s, partly due to increased Jewish immigration from Europe and the rise of the Zionist movement seeking to establish a Jewish state.(UN, 2025)

By the mid-1930s, the growth of the Jewish Yishuv (settlement) alongside Tel Aviv significantly impacted Jaffa's economy. The increase in Jewish immigrants led to development of a modern, Hebrew-speaking urban identity, influenced by European planning ideals and garden city principles. The British carried out cartography to transfer and formalise land ownership to Zionist organisations such as the Jewish National Fund or Palestine Jewish Colonisation Association.

5.1.5 Post-1948 Urban and Socio-Spatial Restructuring

Nationalism in Israel has significant implications for socio-spatial configurations at both regional and metropolitan levels, affecting residents based on their ethnicity and socio-economic classes and manifested through political, economic, social, and cultural processes (Vaughan, 2019). The period following 1948 war witnessed discriminatory policies against the Arab population, leading to the appropriation of all communal and individual property by the state under the Absentees' Property Law⁵⁰ (Forman & Kedar, 2004; Monterescu, 2015). This resulted in the displacement of the Arab inhabitants of Old Jaffa alongside the transfer of land into Jewish ownership. The historic Manshiyah neighbourhood⁵¹, built and inhabited by Egyptian agricultural merchants, was destroyed and subsequently developed into a sea promenade and arterial roads for the metropolis (Figure 5.13).



FIG. 5.13 L- Al Manshiyah neighbourhood as a planned modern neighbourhood with two-storey residential houses, commercial streets, orchards and recreational facilities on its seashore, having the majority of Arab Muslims as well as Christian and Jewish minorities (Aleksandrowicz, 2013; Rotbard, 2015a), Source: Zochrot.org; R- Manshiyah after destruction. Located on the frontline between Jaffa and Tel Aviv, the area witnessed numerous ethnic conflicts and was also impacted by the northward expansion, which stalled Tel Aviv's development in that direction (Schwake, 2018), Source: Jewish Museum Hohenems;

⁵⁰ Absentee Property Law 1950: Introduced as emergency ordinances issued by the Jewish leadership for land acquisition for properties owned by Palestinian Arab refugees in the state.

⁵¹ In July 1948, the Tel Aviv Municipality carried out large-scale demolitions in Manshiyah, a neighbourhood in Jaffa bordering Tel Aviv. Officially framed as a security measure, the operation was part of plans to modernize southern Tel Aviv. The destruction left a lasting divide between the two cities that persists today.

Following 1948, abandoned properties in Jaffa were occupied by lower-class Jewish immigrants from the Middle East and the Balkans rather than the Ashkenazi middle class. Over time, Jaffa's annexation into Tel Aviv formalised the incorporation as the Tel Aviv-Yafo municipality, marking a shift toward institutionalised governance and planning control and the beginning of systematic neglect and disinvestment in the area (Figure 5.14). From the 1950s to the 1970s, urban policies emphasised exclusion and demolition. The first Israeli urban master plan for Old Jaffa called for the near-complete demolition of historic Arab architecture to replace it with modern housing projects (Meishar, 2018). These policies marginalised vulnerable populations and contributed to deteriorating living conditions, with the area characterised by unemployment, crime, and drug use indicating a decline in socio-economic stability.

Renaming Jaffa's Arabic Street names⁵³, first numerically and later in Hebrew, further contributed to the erasure of Arab identity. The southern parts of the city were deliberately subjected to neglect through unequal resource allocation (Rotbard, 2015a) reinforcing patterns of spatial exclusion. This approach, often described as "creative destruction"⁵⁴ was embedded in planning policies that reshaped the city's economic and cultural flows (Kark & Levine, 2012; LeVine, 2007b).

After the Six-Day War in 1967, displaced Arab populations settled in deteriorating neighbourhoods such as Ajami and Jabaliyye in southern Jaffa and areas east of Jerusalem Boulevard. These neighbourhoods, often referred to as slums, housed lower-income rural Arab migrants and became some of the country's most disadvantaged and marginalised communities (LeVine, 2007b, 2007a), consolidating socio-spatial segregation within the urban fabric. The socioeconomic decline was further intensified by prolonged state neglect, resulting in inadequate housing and limited access to resources. Wealthier Arab residents and many Mizrachi migrants relocated to newer neighbourhoods in nearby towns like Bat Yam and Holon. Although these challenges continued to the late 1990s, some residents began engaging in economic revival activities, such as opening restaurants, car repair shops, and contracting firms. Although these initiatives partially revitalised the local economy, population growth and overcrowding strained physical and social infrastructure, perpetuated Jaffa's position as a marginalised district within the Tel Aviv-Yafo municipality (Figure 5.15).

⁵³ The erasure of Arab history and identity is evident from actions such as the renaming of streets in Jaffa from Arabic to Hebrew. Changes like Dajani Street becoming Erlich Street. In recent years, Arab and Jewish activists have worked to restore some Arabic Street names, reclaiming a sense of heritage. Groups like Ufuk Yaffa, initiated through the School for Peace, are fostering collaborative efforts to recognise and honour Jaffa's diverse cultural legacy. Source: <https://thejewishindependent.com.au/signs-of-change-on-the-streets-of-jaffa>

⁵⁴ Creative destruction is a process by which existing economic or social structures are dismantled and replaced by new forms of development (Schumpeter, 1942)

5.2 The Emergence of Alterity, Segregation, Unjust Geographies

Spatial segregation is the separation or confinement of specific populations within particular areas, shaped either by imposed structures (e.g., war and conflict, policy decisions) or by localised social processes. It is closely tied to the production of spatial injustice, as it often reflects and reinforces unequal access to resources, opportunities, and power. While some forms may be voluntary and socially meaningful (e.g., identity-based clustering), segregation becomes problematic when it functions as a mechanism of control, exclusion, or structural disadvantage, contributing to broader geographies of inequality (Soja, 1985, 2010)

The histories of cities are accounts shaped by victors, exhibiting history and culture through dominant records (Rotbard, 2015b). Historical events, influential figures, and religious and national ideologies shape the identity of a place. With the beginning of the port operations, the Jaffa Municipality defended the city's borders, economy, and culture from Tel Aviv under Arab Nationalist Policies (LeVine, 2005). However, after the war of 1948 and the formation of Tel Aviv, Jaffa became a marginalised ethnic enclave in contrast to Tel Aviv, which emerged as a modern metropolitan city. This phenomenon had a profound impact on the city's borders, its socio-spatial configurations.

In the early 1920s, Tel Aviv sought to sever its ties with Jaffa, pushing for full autonomy as a Hebrew city. Although some council members were in opposition, the push for independence gained momentum (Goren, 2016). The desire for separation was not only driven by aspirations of self-governance but also by the wish to maintain Jewish influence over Jaffa's municipal affairs, reflecting Tel Aviv's growing significance. During the mid-1930s, the development of Tel Aviv had implications for the historic urban landscape of Jaffa. Originally planned as a modern suburb with the garden city concept, Tel Aviv witnessed dramatic urbanisation and shifting demographics owing to waves of Jewish immigration.

Today, Jaffa bears testimony to profound transformations in construction, demographics, and collective memory. The remnants of its fortifications narrate the evolution of one of the oldest port towns in Israel: from a culturally diverse centre to a marginalised and segregated district. This is reflected in the socioeconomic structure of Tel Aviv-Yafo, where Jaffa neighbourhoods register the lowest socio-economic status (Figure 5.15). Disparities in public space, employment, tourism, and infrastructure further highlight these inequalities. This polarised condition shapes planning decisions and reinforces segregation and gentrification, intensified by tourism and real estate pressures.

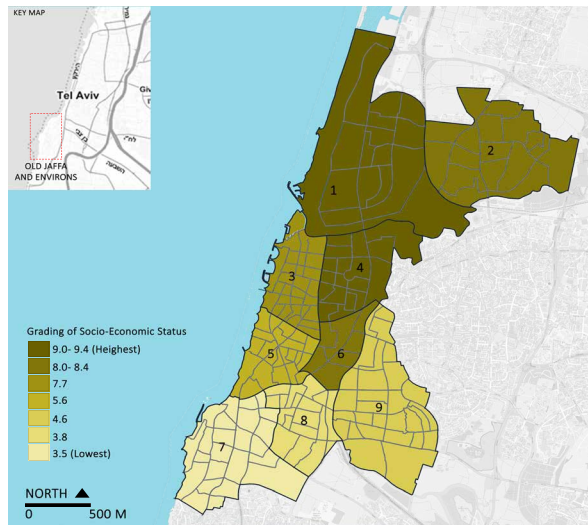


FIG. 5.15 Tel Aviv-Yafo's Socio-Economic Status (SES) mapped as per Statistical Areas and Quarters. The SES of Quarter 7 (Jaffa), the focus area for research, has the lowest score. Data source: www.tel-aviv.gov.il

The dynamics of the social composition are evident in the clustering of Jewish and Arab communities gravitating towards specific neighbourhoods. Governance policies resulted in exclusionary outcomes and deteriorating living conditions, making Jaffa an economically deprived quarter with high levels of unemployment, crime, and drug abuse.

Since Jaffa's annexation in 1950, it has been reduced to a neglected neighbourhood within the modern city. The merging of boundaries did not translate into social integration. The renaming of streets from Arabic to numbers and later Hebrew names, illustrates the symbolic erasure of local identity and memory within Jaffa's urban space. This creative destruction (LeVine, 2005) seeped into the planning policies and actions, which had implications for the city's global economic and cultural trajectories. These processes produced a spatially marginalised fringe, characterised by erasure of memory, and weakened belonging, reflecting divisions based on ethnicity and governance structures that reinforce spatial inequality (David, 1995) (Figure 5.16). The combined urban area of Jaffa and Tel Aviv can be regarded as a 'partitioned urban zone.' (Karlinsky, 2000b) shaped by historical conflict, identity formation, and the erasure of memory following the 1948 war (§8.2.2). These processes produced a spatial fringe condition. Jaffa, thus, represents a case where the disintegration of physical elements of the historic city coincided with profound transformations in social, economic, political, and cultural systems (Golan, 2020).



FIG. 5.16 Built by the empire's Governor Hassan al-Basri Aljabi in 1914, Hassan Beg Mosque; The mosque was spared during the destruction of Manshiyah in the 1948 war due to religious connotations. Later, it was proposed to be sold off as real estate to convert to a shopping mall, a move which was objected Jaffa Muslim Community. Currently, it is actively used for religious purposes, and has also seen the reconstruction of the minaret, taller than the original one. Source: The Daily News

Today, Jaffa represents a complex narrative of heritage and transformation, embodying both resilience and ongoing socio-spatial tensions. The following section discusses the current state, i.e. the late 20th and 21st Centuries and the dynamics of urban design, planning, tourism, ongoing projects, and existing frameworks to evaluate their capacity to address spatial segregation and the socio-spatial complexities of a contested historic city.

5.3 Discussion

Jaffa's story is one of a city continuously reshaped by trade, colonialism, conflict, and post-war governance. Beginning as a significant Mediterranean port, its geographical position, agricultural hinterland, particularly citrus production, and role as a gateway for pilgrimage to Jerusalem established it as a genuinely multicultural urban centre, home to Muslim, Christian, and Jewish communities, shaped as much by its ecology and commerce as by its diverse inhabitants.

The founding of Tel Aviv in 1906 initiated a structural political and economic divergence that progressively marginalised Jaffa. British Mandate policies, the Arab revolt of 1936, the redirection of port functions to Haifa and later Tel Aviv, and ultimately the 1948 war collectively dismantled Jaffa's role as a regional hub. The broader Israel-Palestine conflict, while not the central focus of this research, forms an unavoidable backdrop: its repercussions persist not at the scale of geopolitical negotiation, but in the granular, everyday dimensions of urban life, in who owns land, whose streets are named and how, whose architecture is preserved, and whose communities are recognised or erased.

Understanding this trajectory matters because Jaffa's present condition, its low socioeconomic status, spatial segregation, and contested heritage, cannot be read without the cumulative weight of these layered histories. The port, the orange groves, the Ottoman fountains, the demolished neighbourhoods, the renamed streets are not separate stories but interconnected layers of a single process through which space, identity, and memory have been continuously contested and reordered. Jaffa is therefore not simply a place with a complex past, but an active site where the unresolved socio-political tensions of the Israel-Palestine conflict continue to manifest in the built environment, making it a critically relevant lens for examining heritage, planning, and power in contested mixed cities.

The following chapter turns to the present, examining Jaffa's current socio-spatial dynamics and the planning frameworks that govern it today. It interrogates how the city envisions Arab-Jewish shared co-existence, critically assessing whether existing frameworks move beyond rhetoric toward meaningful spatial and social equity.

References

A compiled list of references for Part B is provided at end of Chapter 6

A nighttime photograph of a city street in Jaffa, Tel Aviv. On the left, a tall, modern glass skyscraper is illuminated with blue and white lights. In the foreground, two large palm trees stand prominently. Behind them, a white, two-story building with a red roof is lit up. To the right, another modern high-rise building is visible, also with some lights on. The sky is a deep blue. In the bottom right corner, there is a small green logo with the letters 'TOC' in white.

“History and politics are interwoven
but are not commensurate”

Lord Acton, cited in Samuel Tolkowsky, *The Gateway of Palestine:
A History of Jaffa*, (London, 1924), via (Welter, 2009a).

6 Negotiating Spatial Sustainability in Jaffa

Structural Constraints and Emerging Opportunities

Rather than representing a post-conflict landscape, Jaffa is better understood as a contested site where historical inequalities are actively reproduced through ongoing socio-spatial and urban development pressures, reflecting broader ethnocentric dynamics in which planning functions as a tool of territorial and demographic ordering (Yiftachel, 2006; Yiftachel & Yacobi, 2003). Building on the historical and spatial processes examined in § 5, the challenges identified in the problem field (§ 1.2.1) are narrated through the case of Jaffa, and this chapter critically examines how the legacies of planning, heritage governance, and socio-political restructuring continue to shape the present urban condition of the city. It analyses current urban planning frameworks within the Tel Aviv-Yafo Municipality and their implications for urban heritage and the historic urban landscape through a review of local and metropolitan plans: Strategic Plan for Tel Aviv-Yafo, City Vision Plan, City Resilience Plan, Tourism Plan, and Local Area Plans. Examining them enables a critical assessment of how policy intentions are translated into practice, and how they shape or constrain socio-spatial outcomes in Jaffa. In this context, the assertion that **‘the Palestinian question is an urban question’**⁵⁵ (Haas, 2019; Jabareen, 2014) foregrounds the extent to which political conflict is embedded in the production of urban space.

⁵⁵ This assertion reframes the conflict from a geopolitical dispute to one expressed and reproduced through urban space: in housing policy, land ownership, heritage recognition, and planning governance. This is particularly relevant to mixed cities like Jaffa, where the conflict manifests not as a physical border but as an internal socio-spatial condition of unequal access, asymmetric planning power, and systemic marginalisation. This research does not engage with the broader conflict directly, but recognises its repercussions as structurally embedded in Jaffa's urban condition, shaping the socio-spatial and heritage dynamics examined here.

This research does not engage with the broader Palestinian conflict; rather, it focuses on its urban repercussions as experienced within Israel's mixed cities, where ethno-national tensions are not played out at geopolitical borders but within shared municipal boundaries, neighbourhoods, and planning institutions, as is the case in Jaffa.

Numerous studies demonstrate that the coexistence of ethnic communities in Jaffa has been shaped by planning policies, land ownership regimes, and redevelopment initiatives that produced patterns of spatial segregation (Goldhaber, 2010; Monterescu, 2015; Sibley, 1995). In this context, the notion of Jaffa as a contested urban landscape is closely linked to struggles over land, governance, and spatial control, where planning policies and redevelopment initiatives actively reshape the physical as well as the social and physical fabric of the city. The process of Judaisation in Jaffa through built space can be illustrated through three phases (Huss, 2023; Monterescu, 2015):

- the post-1948 war period, where Jaffa was transformed into an impoverished, immigration extension of Tel Aviv
- the era from 1960 to 1985, characterised by enforced decline and demolition under the pretext of evacuation-construction projects (Figure 6.1)
- the transition to urban renewal and gentrification in the early 2000s.

These past and current dynamics and the implementation of several plans and policies reflect national, economic and socio-urban interests and have resulted in a segregated space and a struggle over spatial identity (Goldhaber, 2010). These dynamics reveal how dominant political narratives and planning frameworks have shaped the governance of space and heritage in Jaffa.

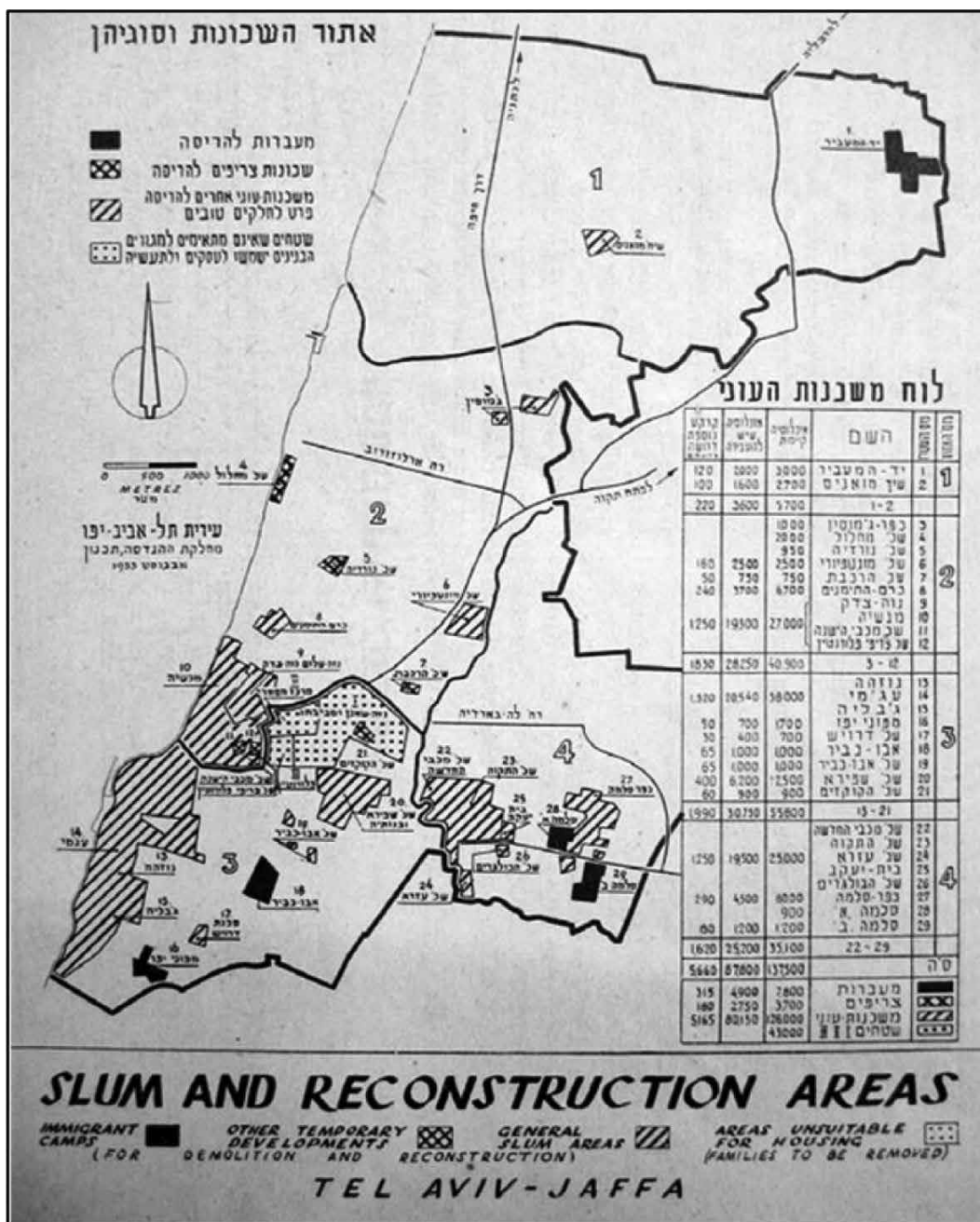


FIG. 6.1 Map showing slum and redevelopment zones in the 1954 Master Plan for Tel Aviv-Jaffa. The plan designated most of the built-up area of Jaffa (in the lower left corner) and several southern neighbourhoods of Tel Aviv for demolition (Source: Horwitz, 1954). This plan was never officially approved by the Tel Aviv Municipality; however, the plan effectively perpetuated the notion of the area as a target for various urban renewal and regeneration initiatives (Marom, 2014; Schwake, 2016)

6.1 Urban Renewal and the Remaking of Jaffa's Socio-Spatial Order

The socio-spatial transformation of Jaffa over many decades reveals spatial segregation and marginalisation of the minorities. Importantly, these processes are not only social or political but are materially embedded in the changing urban morphology: street layouts, building typologies, and spatial accessibility, which structure how heritage is experienced, practiced, and contested in everyday life. Urban planning regulations, redevelopment projects, and investment patterns have reshaped the morphology of neighbourhoods, altering street access, housing typologies, and waterfront development. This has not only deepened the divides between ethnic groups but also relegated vulnerable populations to the city's political, economic, and spatial margins (Sibley, 1995). The prolonged government neglect and discriminatory policies continue to impact the broader socio-political landscape.

In 1952, the port of Jaffa was designated as an independent unit managed by the Ministry of Transport, followed by the establishment of the Old Jaffa Development Company⁵⁶ in the 1960s. During the 1950s and early 1960s, Jaffa became the first city in Israel to implement a local preservation policy, designating parts of Old Jaffa as an architectural reservation with detailed zoning regulations (Rotbard, 2015a). This designation was later formalised in Municipal Building Plan 606A (IAA, 2013) and proposed stabilising old structures and prohibiting new construction to preserve the area's historic aesthetic. However, this selective preservation also reconfigured the urban morphology by freezing certain built forms while allowing transformation elsewhere, thereby privileging specific historical narratives and producing a selective and curated version of culture.

⁵⁶ Created in 1961 by the municipality of Tel Aviv-Yafo, The Old Jaffa Development Co. is dedicated to developing tourism in Jaffa. In 2007, it contributed as a member of the Jaffa Cultural Heritage Project, through which More than 120 archaeological excavations and numerous conservation projects were executed. Source: www.antiquities.org.



FIG. 6.2 Proposed outline plan for Midron Yaffo (Jaffa Slope Park), as approved in 1995. Light green indicates reclaimed land converted from rubble into public parkland. Source: 'Sketch for Outline Plan 2236 Midron Yaffo', architect Avner Yashar, 1995; Israel Planning Administration, www.mavat.iplan.gov.il

In the 1960s, the municipality launched the Jaffa Slope project with an aim to revitalise the decaying port and abandoned housing stock. This is also aimed at transforming Ajami and Jabaliya into affluent spaces and enhancing the seafront to support cultural tourism and recreation. First introduced in the Local Area Plan in 1995, this project exemplified municipal strategies to reshape these areas' social and physical dynamics (Goldhaber, 2010). Crucially, such interventions altered the coastal morphology and spatial connectivity, redefining how residents access the waterfront and, consequently, how coastal heritage is used, perceived, and commodified. The 'evacuation-construction' project, a component of the Jaffa Slope Plan No. 2236 (Figure 6.2), targeted the redevelopment of the Ajami⁵⁷ and Jabaliya neighbourhoods. This plan proposed displacing existing Arab and Jewish residents

⁵⁷ The al-Ajami neighbourhood is deeply tied to the events of 1948 and the ethnic cleansing of Jaffa and its nearby villages. It holds a significant place in the collective memory of Arab communities, especially the residents of Jaffa, as it was a site where Nakba survivors from the area were detained for several months and were not allowed to leave without permission from the Israeli Military Governor. Source: Zochrot.org; https://www.zochrot.org/publication_articles/view/49854/en?Remembering_Yafas_alAjami_Neighborhood

and demolishing select structures to build upscale housing for middle- to high-income groups. It also included plans for expanding construction by reclaiming land from the sea, designating dumping sites for construction waste, and creating recreational and hospitality facilities along the shoreline. These morphological transformations, demolition, land reclamation, and new construction, did not merely change the physical landscape but reconstituted the spatial conditions under which heritage could be inhabited, often displacing lived practices in favour of planned, consumption-oriented uses.

During this era, the demolition of the Herzliya Hebrew Gymnasium⁵⁸ marked a broader trend toward modernist urban redevelopment, including the construction of Israel's first skyscraper (Figure 6.3). Although the Neve Tzedek neighbourhood was also slated for demolition and redevelopment, advocacy of the middle-class residents led to its preservation. Similarly, the Urban Renewal Plan No. 2660 was adopted with an aim to "...rehabilitate the Ajami neighbourhood, presumably to benefit its current and future residents while preserving its architectural and urban heritage" (Huss, 2023). Nonetheless, the plans provided for extension to homes and larger construction attracted wealthier tenants and developers, which in turn led to gentrified neighbourhoods and marginalised the Arab population. This shift marks a transition from destruction to profit-driven urban renewal and gentrification (Huss, 2023). For instance, the Andromeda Hill housing complex⁵⁹, constructed in the 2000s, generated a homogeneous gated community in the historic old Jaffa and literally segregated the local milieu (Monterescu, 2009) (Figures 6.6 and 6.7). Here, the establishment of gated residential development pattern leading to restricted spatial permeability illustrates how urban morphology actively enforces socio-spatial exclusion while simultaneously redefining which forms of heritage remain visible or accessible.

⁵⁸ The Council for Conservation of Heritage Sites in Israel was established following the 1959 demolition of the Herzliya Hebrew Gymnasium, an event that sparked public awareness of the need to preserve the country's historic landmarks. The organisation works to protect and conserve buildings and sites connected to Israel's path to independence, particularly structures built from 1700 onward that fall outside the scope of the National Antiquities Law (§ 9)

⁵⁹ Andromeda Hill is a high-end residential complex that promotes itself as a 'city within a city'. Launched in the early 2000s, it combines historic architectural elements with modern luxury. The project illustrates processes of gentrification and spatial commodification in Jaffa, merging romanticised neo-orientalist design with upscale urban development. The project was promoted using the idea of reflecting 'Mediterranean authenticity' to appeal to and attract affluent individuals. This overshadowed the complex socio-ethnic neighbourhood dynamics in Jaffa and contributed to widening socio-economic divides and reshaping the cultural and physical character of the city's historic landscape (Monterescu, 2009)



FIG. 6.3 L- The Herzliya Hebrew Gymnasium school building, the first Hebrew high school which was demolished; Source: Library of Congress, R- Shalom Meir Tower, the first tallest skyscraper built in its location, Picture courtesy: dannythedigger.com



FIG. 6.4 L- Archival photograph of the Jaffa port from 1989. Copyright by Library of Congress, 1989. From picryl.com; Right: The current spatial configuration of Jaffa, which demonstrates modification of land use by the Municipality, and the conversion of land to 'The Slope Park' or The Ha Midron Garden after this area was abandoned and demolished. The promenade was also developed to promote cultural tourism in Jaffa, and as seen in the picture, was developed after the demolition of the old port buildings

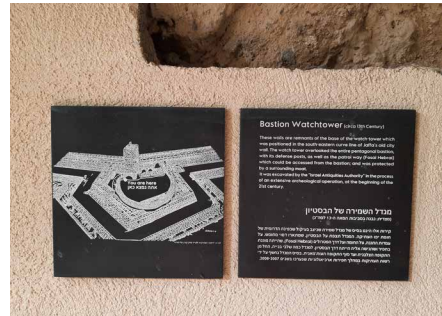


FIG. 6.5 L- The material extant of the historic port walls of Jaffa is preserved and displayed for demonstration at The Jaffa, a Luxury Collection Hotel. The hotel was reconstructed over a former hospice for malaria victims. R- This installation demonstrates and acknowledges the historical layer, and the fortification walls incorporated in the design. However, access to this information remains largely confined to visitors of the hotel, hence a limited section of society. This points toward gaps in preservation policy and a selective approach to disclosure, which in turn constrains the wider continuance of mnemonics and cultural memory

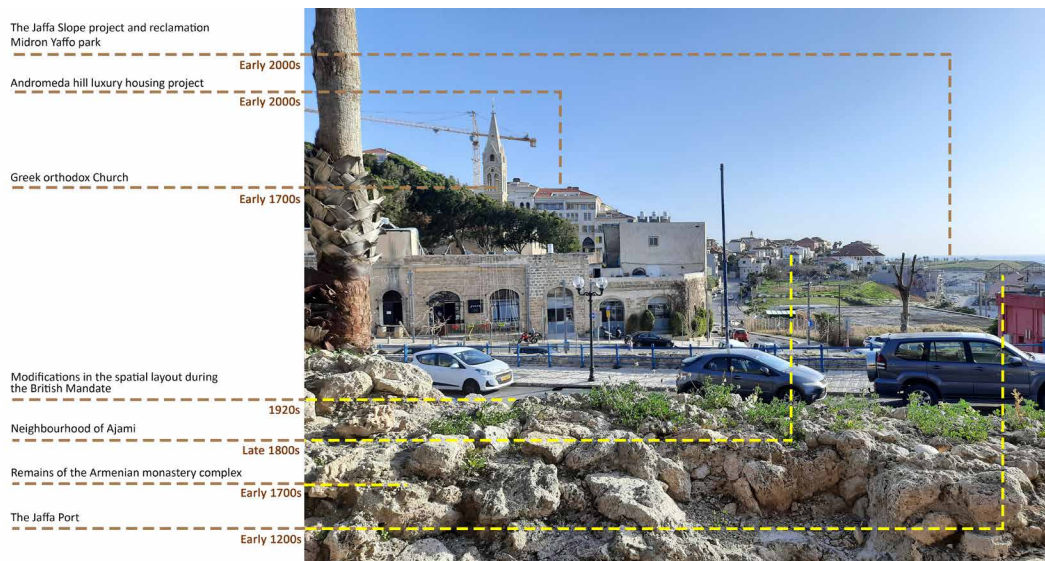


FIG. 6.6 View of Jaffa from the historic site of the Armenian monastery, demonstrating the different layers of history that form the spatial identity and the attributes of historic, archaeological, and intangible attributes



FIG. 6.7 Andromeda Hill, a collection of luxury apartments next to Jaffa port, January 28, 2011. The site opened in 2000 and blocked access from Yefet Street, which is one of Jaffa's main arteries to the sea. A petition filed by civil rights groups in 2007 won residents the right to pass through the complex between 8 a.m. and 10 p.m. Credit: Avishai Teicher, Source: 972mag.com

The housing crisis also has a different dimension: Amidar- Israel's National Housing Company⁶⁰ rents the Absentee properties as public housing apartments. There is a dire shortage of new housing as an alternative for these housing units marked as free market properties, as an economic measure. Gentrification intensifies the tensions in Arab-Jewish relations (§ 8) and this pattern of displacement recurs beyond housing policy, as urban renewal in Jaffa has repeatedly framed spatial transformation as rehabilitation while reinforcing the socio-economic and ethnic divisions that shape the city's contested urban condition.

As Jaffa transitioned into a cultural and tourist hub, its socio-spatial fragmentation became increasingly evident. Mixed-use development comprising artist colonies, a blend of high-end and lower-income residential areas, the predominantly Arab communities in Ajami neighbourhood, and the promenade and old port transformed Jaffa's cultural, social, and economic landscape. This metamorphosis turned Tel Aviv-Yafo into a representational space, defined by physical and cognitive boundaries entrenched in planning policies. These boundaries are materially embedded in zoning, circulation, and built form, shaping how heritage is produced, accessed, and experienced. In the late 1990s, Tel Aviv's Bauhaus architecture gained global recognition, achieving World Heritage status in 2004. Tel Aviv's rise occurred alongside the marginalisation of Jaffa, often overlooking its Arab history and Jaffa's significant role in Tel Aviv's foundation, development, and urban heritage (Cohen & Margalit, 2015; Fox, 2022; Mualam, 2009; Rotbard, 2015b).

Since the foundation of Tel Aviv and consequent historic events, the demographics and singular ethnic hegemony were drastically altered, which had direct implications on the plurality of the socio-spatial configuration of the historic port town. In this case due to globalisation, the spatial organisation is characterised by an agglomeration of homogenous social groups that are polarised economically, socially, and politically (Goldhaber, 2007). In this context, its urban morphology operates as both a product and instrument of socio-political processes, structuring how heritage is spatially distributed, accessed, and interpreted across divided urban landscapes. These challenges of management of mixed cities and spatial modalities of the cultural landscape, as shaped by people, imply customary-use rights and broaden the discourse of right to landscape (Egoz et al., 2011). The current practice of historic preservation and cultural tourism subverted the Arab identity, creating a representative imagined space that is sanitised and devoid of Arab presence (LeVine, 2001).

⁶⁰ Amidar is a national government-owned housing company that manages the Israel Land authorities' development arm's assets. It manages the properties listed as Absentee Property under the Absentee Property Law. (A 1954 Supreme Court ruling said that "the Absentee Property Law is meant to fill a temporary role: to preserve absentee properties lest they become abandoned and open to looting") Source: (NRC, 2017)

This sanitisation is carried out in practice through spatial interventions of restoration, demolition, and redevelopment that selectively retain some built forms and morphological elements while erasing the spatial traces of everyday life associated with Arab heritage.

To maintain its status as a UNESCO World Heritage city, Tel Aviv exercises preservation and site management policies. However, Jaffa is treated as antithetical to the Zionist project of constructing a new state, and the oriental architecture was not deemed fit for preservation. The market forces exacerbate the intensity of modernising the historic core and promote high-end luxurious housing or commercial properties, relegating the preservation approach to symbolic efforts (Figure 6.4 and 6.5). Such processes reconfigure the urban morphology into enclaves of high-end development, where heritage becomes spatially and economically exclusive rather than collectively lived. In this historic port town, the acute insufficiency of institutional urban preservation is replaced by an interest in urban heritage as a catalyst for socioeconomic change and private investment in heritage properties, which leads to appropriation, gentrification, and marginalisation, and is an oxymoron of creative destruction (Page, 1999). It is within this morphologically fractured and socio-politically charged urban condition that the following analysis of planning frameworks must be situated.

6.2 Planning Frameworks: Tensions, Gaps, and Implications for Practice

6.2.1 Planning Frameworks and Their Socio-Spatial Implications in Tel Aviv-Yafo Municipality

Urban planning in Israel experienced renewed expansion during the 1990s, following an earlier major phase between 1948 and 1955. This period was shaped by efforts to develop the built environment, support industrial growth, and manage population distribution across the country (Alfasi et al., 2012; Shachar, 1998). The **Planning and Building Law of 1965** regulated all building and land use planning in Israel, operating at three levels: national, district, and local. It aims to establish a framework for environmental planning along with land use planning, urban development, and infrastructure projects. The National plans, such as **National Outline Plans (NOPs)**, also known as **TAMA** (תוכנית מתאר ארצית *Tokhnit Mit'ar Artzit*, תמ"א) provide overarching guidelines for housing, urban renewal, transportation, and environmental conservation and influence the regional and local levels. Israel is divided into six administrative districts: The Center, Haifa, Jerusalem, North, South and Tel Aviv. The Central District surrounds the Tel Aviv District on three sides, and together they form the core of the Tel Aviv metropolitan area and are the most populous districts (Figure 6.8). District committees bridge national goals with local needs, and local planning committees (Municipalities) are responsible for detailed Town Plans and execution. However, although the seven districts of Israel each constitute a heritage preservation committee, each city may not have a historic preservation department to guide the heritage planning and management process in cities. Creating a district plan in Israel requires coordination between local and national planning bodies, alongside the active involvement of the relevant district commission. Critiques of the Israeli planning process have highlighted institutional struggles⁶¹ (Feitelson, 2018), unequal power relations, and ongoing debates surrounding proposed amendments that would transfer greater decision-making authority to local planning commissions (Alfasi et al., 2012).

⁶¹ As E. Feitelson analyses the shifting dynamics of planning in Israel and identifies two core struggles: "... the problem definition (Identification of the issue; E.g.: Issue of housing and supply- is it the issue of supply of developable land or of affordable housing policy) and over power struggle within entities and levels of organisations (Between central and local government, between elected and professional experts, between epistemic communities and between the advocacy coalitions)" (Feitelson, 2018)

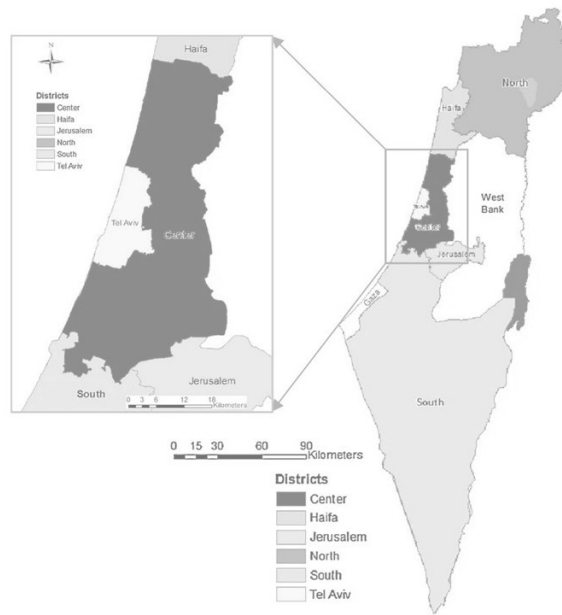


FIG. 6.8 Planning districts of Israel, with an inset showing the Tel Aviv and surrounding central districts; Source: Alfasi et al. (2012)

The state is committed to the preservation and conservation which is evident through its regulatory frameworks. For instance, the **Israel Antiquities Law of 1978** governs the protection and excavation of archaeological sites, and some provisions within the Planning and Building Law specifically address the preservation of heritage sites. Institutions such as the **Israel Antiquities Authority (IAA)** and the **Council for Conservation of Heritage Sites in Israel** play central roles in advocating for the preservation of ancient and modern heritage⁶². Tel-Aviv-Jaffa stands out as one of the few Israeli cities prioritising preserving the built environment in city planning (Alfasi & Fabian, 2009). There are disparities in legislation, resources, and expertise in other cities, even within the same metropolis, and this requires streamlined efforts in planning and decision-making. Researchers have summarised the critical challenges faced in the context of the conservation of Israel's cultural heritage (Alfasi & Fabian, 2009; Alfasi & Margalit, 2021; Fenster, 2018; Fenster & Yacobi, 2005; IAA, 2013; LeVine, 1998; Mualam, 2009; N. H. Rubin, 2018; Schwake, 2016):

⁶² While the IAA is primarily concerned with archaeological sites, the Council conserves buildings and structures that reflect Israel's more recent history, including those from the Ottoman period, the British Mandate, and early Israeli statehood.

- Limited Legal Protection for Post-1700 Sites
- Conflict of Interest at the Local Authority Level
- Weak Implementation of the Amendment No. 31 of the Planning and Building Law of 1991
- Fragmentation of resources and skills within municipal departments
- Gaps in the Legal and statutory regulatory framework
- Inconsistencies between Regional and Local needs and demands.
- Impact of Evolving Cultural and Conservation Contexts
- Limited application of evolving paradigms in spatial sustainability

Studies shed light on the practical dilemmas of conservation practice and learning lessons from the international guidelines (Rubin, 2018). The limited definition of ‘antiquities’ within the laws affects the practice of preservation and conservation, since the law applies to heritage sites built before the 1700s. The combination of urban renewal plans such as Pinui-Binui⁶³ (TAMA 38), steep rise in land value, sale of absentee-owned properties through Amidar has stirred criticism for exacerbating gentrification by displacing low-income residents in Jaffa and remains a critical issue to be addressed (BIMKOM, 2009, Flug et al., 2022). Studies highlight the praxis, ethos and rationale for preservation and conservation of the built environment is primarily led by design and architecture and are more structural than societal, and the focus being more on architectural features than on identity-stability-based aims (Mualam, 2009, 2014). The lack of concerted preservation efforts is documented in Israel’s State Comptroller survey of local and national policy in the historic preservation framework of Israel. Although over the years, there has been a shift in paradigm and inclusion of the natural environment, the lack of explicit policies towards the conservation of the social fabric or the intangible aspects is evident. The ambiguous terminology, however, permits flexible interpretation⁶⁴, which may or may not benefit the overall rationale of preservation as envisioned through the use of these terms, such as:

⁶³ Pinui Binui (פינוי-בינוי): Hebrew for ‘Evacuate and Rebuild’) is an urban renewal initiative in Israel that focuses on replacing old and unsafe buildings with modern constructions with structural stability for specific provisions. For E.g.: resistance against earthquakes. The program encourages residents and developers to participate and offers legal and financial benefits with an aim to improve living conditions while increasing urban density and often includes better infrastructure and services. (Alster, 2024)

⁶⁴ N. Mualam further argues that while architecture and design are subjective, practical perceptions can align with a common set of values, making conservation more a matter of cultural and social context than just personal preference. These values are not fixed, they are dynamic and represent an ongoing process rather than a final outcome (Lefebvre, 1974). This process relies on the perspectives of trained professionals and specialists to interpret and reflect these shared and common set of values (Mualam, 2009). He further states that an international comparison of guidelines and assessment of the term conservation for other government departments can shed light on the multitude of perceptions and shape the policies in a better way.

- preserving the urban fabric
- improve the quality of life determined by controlling the number of housing units
- preserving the appropriate historical, architectural and cultural values, for the renewal, preserving its unique character
- to operate conservation as a lever for the purpose of urban revitalisation and renewal, and, among other things, for attracting new activities, including economic, tourist and cultural, to the city centre

An amendment to the Planning and Building Law 1965, intended to strengthen site conservation, has been inconsistently implemented, with many local committees inactive or non-compliant with legal requirements (Rubin 2018). Adding to this, the uncertainty of the economic aspect of conservation makes it a weak contender in the spatial planning policies. The need for a local as well as an overarching national or regional framework is stressed in the study to aid in the implementation of conservation projects. In addition, the adoption of international guidelines is limited and needs to be adapted and anchored in law.

Another study on 'anti-displacement and affordable housing strategies' (Ramon, 2021) sheds light on the situation of housing, gentrification and the impacts of the policies on the physical, social composition of Jaffa. These areas have witnessed a stark increase in housing prices and continue to do so. Given the urban renewal plans in the 1990s and 2000s, new development, infrastructure development such as a light rail and investment in cultural tourism infrastructure are further deepening the socio-economic segregation and gentrification. Taken together, these overlapping legislative gaps, institutional inconsistencies, and market-driven pressures point to the need for a more integrated planning framework, one that is capable of addressing the socio-spatial complexities and heritage contestations that define Jaffa's urban condition.

6.2.1.1 An Overview of Municipal Frameworks and the Governance of Urban Heritage

In recent years, the municipality has demonstrated its commitment to heritage preservation through a range of urban policies, statutory plans, and implemented projects that increasingly extend beyond conventional conservation frameworks. The Town Planning schemes in Tel Aviv-Yafo over the years have gradually witnessed a changing and evolving tone, with respect to the requirements of development of local areas for the built environment, rehabilitation, public spaces, infrastructure, transportation, and quality of life (Annex II). The Tel Aviv District Outline Plan (Development Policy, 2000) frames urban development through a combination of heritage preservation, environmental enhancement, and economic revitalisation. The plan emphasises safeguarding the city's historical character and conserving its built heritage, positioning preservation not as an obstacle to development but as an integral component of urban growth (Amit-Cohen, 2005). At the same time, it promotes the improvement of public spaces: including streets, squares, residential neighbourhoods, employment areas, city gateways, and the coastline, through environmentally conscious planning approaches aimed at enhancing urban quality of life. The plan also identifies natural landscapes and cultural heritage as strategic assets, to be leveraged for tourism and recreational development, reflecting a broader vision of urban regeneration tied to economic and cultural value creation.

The **Strategic Plan for Tel Aviv-Yafo** (Tel Aviv-Yafo Municipality, 2017b) outlines guidelines focusing on sustainable urbanism and development, which is an outcome of lengthy consultations between various public and steering committees. The provisions of the Plan directed towards Jaffa are of interest here. Within the larger scheme of guidelines for the entire city, provisions for Jaffa feature under the three components: economic, social, and environmental planning guidelines.

- As the city is envisioned as an economic and cultural capital, Jaffa is considered one of the main contributors towards urban tourism. Hence, efforts towards heritage tourism, Arab-Jewish shared existence and market forces are emphasised. For developing a National and International cultural art centre, efforts for strengthening/enhancing Arab cultural identity are highlighted in the plan.
- Addressing the social aspects, Yafo (Jaffa) is envisioned as a space of shared existence and mutual respect integrated within the city. This required efforts towards preserving Yafo's special/ physical fabric, safeguarding key assets, authenticity, and tourism development hub, and involving the local population and integrative municipal initiatives to cultivate a shared existence.
- Addressing the environmental aspects through conserving and increasing the supply of sandy beaches

The **Strategic Plan for Tel Aviv-Yafo: City Resilience / June 2019** (Tel Aviv-Yafo Municipality, 2019d) focuses on multiple aspects to make the city resilient to climate change and socially inclusive and robust. Efforts are directed towards Jaffa for:

- Developing tools to reinforce the trust between Yafo's residents and the Municipality, fostering collaboration, and improving community life and public and social order.
- Focus on developing the social capital of the Arab community in Yafo, respecting their culture, and acknowledging their collective narrative.
- Strengthen the normative middle class within Yafo's Arab community by addressing their unique needs, being attentive to their concerns, and enhancing their sense of involvement and connection with the Municipality.
- Consolidate municipal efforts to address critical social issues, including housing, youth and child welfare, public order, and community involvement.
- Rethink governance frameworks specific to Yafo to better align with its needs.

As per the **Tourism Master Plan 2030 of Tel Aviv-Yafo Municipality** (Tel Aviv-Yafo Municipality, 2019a), Jaffa is one of the focus areas for planning interventions.

- The plan aims to devise a strategy for advancing tourism by regulating and promoting the multicultural heritage of the historic area
- It proposes to maximise the neighbourhoods' assets cautiously and sensitively while involving the local population in accommodations-related and home hospitality initiatives and concurrently promoting sites of religious association
- The plan envisages catering to the multicultural nature of Jaffa, the current impacts of tourism on social order, economics, and the historic urban fabric, thus emphasising the need to document and assess Jaffa's characteristics and values and the current impacts of tourism

The Tel Aviv-Yafo municipality, in collaboration with the White City Center- Liebling Haus⁶⁵ has been actively exploring the potential of the Historic Urban Landscape (HUL) approach. Such avenues encourage innovative thinking and approaches to conservation strategies, presenting an opportunity to view Tel Aviv-Yafo as a diverse city shaped by its rich historical, cultural and social heritage. It brings forth the concept of preservation of the unique character of the historic fabric while also supporting development, urban renewal and dovetailing the needs of spatial sustainability (Gottesman & Hoffmann, 2019). The City Vision plan (Tel Aviv-Yafo Municipality, 2017a) highlights the need for developing Jaffa (Referred to as Yafo):

⁶⁵ The White City Center, was founded to promote a deeper understanding of Tel Aviv's urban heritage, which is a joint initiative between the Tel Aviv-Jaffa Municipality and Germany's Federal Ministry of Construction. It is located in the historic Liebling House. The center focuses on the city's modernist

"As a space of shared existence and mutual respect integrated within the city, aiming to promote integrative initiatives through a multidisciplinary action plan⁶⁶ and advance planning to preserve the unique features of Yafo's social and physical fabric."

Having outlined these plans and policies, the discussion now turns to the challenges of their implementation, illustrated through cases of development projects across Jaffa.

6.2.2 **Challenge # 1: Overcoming Path Dependency and the Entrenchment of Socio-Spatial Segregation**

The development of Jaffa's historic areas, such as the port, Neve Tzedek, and Ajami, reflect a path-dependent process in which early urban planning decisions, particularly after 1948, continue to shape present outcomes. Path-dependent institutional mandates in Tel Aviv-Yafo reinforce institutionalised and routine heuristic practices that rely on established categories and precedents, constraining rather than enabling adaptive responses to Jaffa's complex socio-spatial realities (§ 4.3.1). These policies entrenched socio-spatial segregation, marginalising Arab and socio-economically weaker communities, while subsequent practices, from demolition to gentrification, reinforcing historical inequalities (Goldhaber, 2010; Monterescu, 2009). Jaffa thus exemplifies how early planning decisions continue to shape the city's socio-economic and spatial configurations, and its contemporary challenges

This is evident in the disintegration of the historic city's physical fabric alongside dramatic transformations in its social, economic, political, and cultural systems (Golan, 2020), driven by socio-economic disparities rooted in both historical inequalities and contemporary neoliberalism and globalisation. Jaffa encapsulates the spatial conflict dynamics of the nation-state, exceptional within Israel for its prevalent ethnic segregation (Monterescu, 2017).

architecture, its cultural significance, and its continuing impact. It works to expand the idea of urban conservation by viewing heritage as a complex blend of architecture and cultural context. The author carried out part of her PhD research through a secondment at the center. Website: www.lieblinghaus.org

⁶⁶ The multidisciplinary action plan encompasses areas such as education, community engagement, culture, sports, and tourism, involving both Arabs and Jews from across the city. It aims to strengthen the ongoing initiatives and create new strategies to foster collaboration and achieve shared objectives (Tel Aviv-Yafo Municipality, 2017a)

6.2.2.1 Case of Shuq Ha Pishpashim (Greek Market) Renewal Project

The Shuq Ha Pishpashim (Modern name: Greek Market) compound (Figure 6.9) presents a case of historical layering and development over a period, and a complex case of economic pressures and conflicting interests of regional and local governance. The compound dates to the early 20th century CE, when it was built by the Greek Orthodox Church. The site had previously been agricultural land in historic Jaffa, which was transformed during the British Mandate due to extensive construction. Archaeological excavations show that the market mainly belongs to the Crusader, Mamluk-Early Ottoman, and Late Ottoman periods. Pottery shards from the Hellenistic, Byzantine, and Early Islamic periods were also uncovered (Arbel, 2016, 2017).

The market compound falls under the City Development Plan No. 2572 Kikar Ha Shaaon, along with the Clock Tower and the flea market. The plan applies to North-West Jaffa and addresses redevelopment proposals in three tourist zones: the port, the Old City, and the market area. It has received €12 million in funding (Globes & Shalita, 2012). The 7500 sq. m. area of the Greek market compound contains thirteen designated buildings for preservation at various levels. The policy also aimed at controlling the permits for businesses such as restaurants so that they do not exceed 25% of the total commercial area. This area's redevelopment and infrastructural upgrade brought in investments and new business in the form of café restaurants, merchandise, and city services (schools, social services, etc.). However, this process soon brought in gentrification and brought new residents to impact the low-income residents and veteran business owners, dramatically altering the historic socio-spatial configurations of the area (Globes & Shalita, 2012; Ramon, 2021). A Policy for Flea Market Discussion of Policy Approval (2572/2) (Ramon, 2021) was granted an additional 40,000 sq. m. of building permits for additional floors (Figure 6.10). In 2018, private investors purchased the Greek market for NIS 243 million (approximately € 60 million). The District Committee for Planning and Construction sanctioned the proposal for this compound, which includes preserving and renovating the historical buildings and transforming the complex into a combination of hotels and residences with a commercial facade by adding building rights and floors to the existing building.



FIG. 6.9 View of Shuk HaPishpashim (the Flea Market) and the Ottoman Clock Tower from Clock Tower Square, Old Jaffa. The juxtaposition of the restored clock tower and the visibly deteriorating historic commercial buildings illustrates the selective nature of heritage conservation in Jaffa



FIG. 6.10 Proposed external design and layout of the Shuk Ha Pishpashim/ Greek Market, designed by Ilan Pivko architects. The render depicts a sanitised, consumption-oriented streetscape that raises questions about the displacement of the market's existing informal character and its predominantly Arab trading community; Source: Ilan Pivko Architects

However, the proposal was opposed by the Tel Aviv-Yafo Municipality as the plan did not justify the increase in construction volumes in the area. They recorded the objections to the addition of built-up volume through permission for additional floors and rights as incentives for the preservation of the buildings, and the new proposal does not justify the breach of the existing City Development Plan for the additional transfer rights and incentives (Tzur, 2020). Many other objections submitted on the plan highlight the need to preserve the current spatial configurations of the historic area, protect the veteran merchants, mitigate densification, address vehicular traffic and parking issues and that the residents' quality of life will be severely impacted. In 2013, the new businesses and restaurants that opened in the market composed more than 28% of the total businesses in the market, and the traditional businesses consisted of only 26%. Together, these dynamics reveal a project that preserves the market's physical fabric while displacing much of its social and economic life, replacing veteran traders with a more commercially curated tenant mix.

6.2.2.2 Light Rail Transit Development along Jerusalem Boulevard, Jaffa



FIG. 6.11 The Jaffa Electric Company's secondary power station was inaugurated in 1923 on King George Boulevard, (later renamed Jerusalem Boulevard). Despite its historical and associational value to the city, as the first power station, it was demolished in 2007 without consultation or preservation efforts, marking loss of early-20th century industrial infrastructure in Jaffa. Photo courtesy: Tel Aviv Municipal Archives; Source: (Neiman, 2018; Groag, 2024)

The Jerusalem Boulevard has a historic, social, and commercial value associated with it. It was the cultural and governmental centre of modern Jaffa before 1948 (Figure 6.11). Its development and successive renaming⁶⁷ during the Ottoman and British Mandate periods reflect the political and urban transformations of the city, where public space became a symbol of authority, modernisation, and collective memory. The Light Rail Transit (LRT) undertaken by the NTA Metropolitan Mass Transit System Ltd. for the Tel Aviv metropolis is now constructed on the boulevard and is a transformative urban infrastructure project designed to enhance connectivity between Jaffa's southern and eastern neighbourhoods and central Tel Aviv.

⁶⁷ This avenue was commissioned by the Ottoman Empire's Jaffa Governor Hassan al-Basri Aljabi commissioned the construction of this avenue in the Palestinian city of Jaffa in 1914, named after the Ottoman Jamal Pasha Boulevard after his superior, the Ottoman governor of Greater Syria. During the British Mandate period, it was named King George V Avenue.

The € 5 billion Red Line runs from Bat Yam to Petah Tikva. Proponents of LRT argue that it can boost community well-being by generating new jobs, driving economic growth, and elevating property values. However, it also impacts land development by influencing the urban growth and land use, stimulating redevelopment, and spurring property values (Cervero, R. & et. al., 2004). Property values in Jaffa are already responding: appraisers project a 10-20% rise over the next three to five years as infrastructure of the LRT nears completion and the surrounding population shifts (Petersburg, 2026) (Figure 6.12).

The construction of the LRT also witnessed a citizen activism campaign by residents that objected to the felling of full-grown trees on the boulevard (Globes & Zagrizak, 2023). An agreement to modify the light rail route on Jerusalem Boulevard, ensuring the preservation of 26 Ficus trees along the street was reached after three years of advocacy civil society, the Tel Aviv branch of the Society for the Protection of Nature (SPNI)⁶⁸ and NTA Metropolitan Mass Transit System (Figure 6.13 and 6.14). The fact that similar studies and objections are submitted to NTA to address issues of environmental and spatial impacts highlights the importance of the natural elements and their contribution towards ecosystem balance and environmental conservation⁶⁹. While the LRT is expected to bring environmental and economic benefits and improve north-south connectivity across the Tel Aviv metropolis, it also calls for careful attention to the historic urban landscape. These points highlight the need to update policies related to housing⁷⁰, commercial development, and the conservation of natural and cultural heritage. A key challenge lies in how to integrate diverse interests and perspectives into a comprehensive analysis to support balanced and informed planning decisions.

⁶⁸ The Society for the Protection of Nature in Israel (SPNI): Israel's oldest and largest independent nonprofit environmental organisation, galvanizes action, enables change, and creates a sustainable future for Israel. They engage through conservation, advocacy and activism. www.natureisrael.org/activism-conservation-education

⁶⁹ The environmentalist civil society of Israel Union for Environmental Defense (Adam Teva V'Din) along with Globes journalism conducted an investigation revealing that Metro and light rail construction in Greater Tel Aviv will lead to the removal of thousands of trees. Plans indicate that 17,000 out of 31,000 trees along the Metro route will be cut down, with only 200 relocated. Similarly, 7,200 of 16,000 trees along the red, purple, and green light rail lines will be removed, with 30 transplanted. The total number may rise as construction progresses, affecting many mature trees with high environmental value that contribute to carbon absorption, shade, and local ecosystems. Source: <https://en.globes.co.il/en/article-trees-and-parks-to-be-axed-for-metro-and-light-rail-1001353385>

⁷⁰ One form of planning discrimination is the enforcement of strict conservation requirements for construction permits. When local Arab residents cannot meet these demands, they struggle to maintain or expand their homes, leaving them in a state of uncertainty and legal vulnerability (Groag, 2024). This topic is not studied in detail for this research.



FIG. 6.12 Top Left- Construction site of the "Tel Aviv The Residences" in Old Jaffa; Top Right- Proposal of a new residential complex on the Jerusalem Boulevard; Bottom- Location of the proposed modern residential complex adjoining the historic Al-Nuzha Mosque. Such development prioritizes a fabricated Ottoman-inspired identity, masking the site's historical and urban context through a sanitised architectural narratives (Groag, 2024). The architecture of the new buildings is in complete contrast with the historic buildings on this street, and this will only increase in the coming years due to the avenues of real estate development and the growing need for housing and hotels.



FIG. 6.13 Proposed LRT along Jerusalem Boulevard in Jaffa, illustrating the transformation of a historic civic axis into a contemporary transit corridor. While the project enhances mobility and urban connectivity, it also reflects ongoing tensions between modernisation, infrastructural redevelopment, and the preservation of the boulevard's historic urban character and pressure on urban ecology and environment. Source: (Neiman, 2018)



FIG. 6.14 The completed LRT station along Jerusalem Boulevard in Jaffa reflects the integration of contemporary transit infrastructure within a historic urban landscape through the preservation of mature Ficus Sycamore trees. Their incorporation into the final design followed nearly three years of advocacy efforts led by environmental activists, local residents, and civil society groups, highlighting the role of public participation and environmental consciousness in negotiating between urban modernisation and heritage preservation; Source: NTA Metropolitan Mass Transit System Ltd.

6.2.3 Challenge # 2: Complex Planning Actions and Unintended Consequences

Urban planning in Jaffa demands special attention given its complex social, historical, and economic landscape: projects aimed at improving infrastructure, boosting tourism, and stimulating economic development often generate unintended consequences: gentrification, social segregation, migration, and the commodification of local culture, sidelining the needs of long-term residents. These outcomes stem from a deeper tension between economic development and cultural preservation. These actions and the unintended outcomes are generated from various urban actors and institutions: the National, Regional and Local government, local businesses, residents, and private developers. The influx of wealthier residents in the neighbourhoods of Jaffa and the resulting rise in real estate, combined with the Absentee Property issues, has displaced lower-income, long-time residents, weakening community bonds and threatening Jaffa's historic character. This displacement disrupts established community ties and destabilises Jaffa's historic identity, eroding its cultural and social fabric (Avni, 2017; Tzur, 2020). As per reports from the Central Bureau of Statistics in 2021, the housing prices in the city have risen 40% in two years⁷¹. This not only represents the real estate index but also reflects the growing readiness of potential buyers to invest more in Tel Aviv-Yafo. The resulting socio-economic divide highlights the challenge of balancing development with heritage preservation.

6.2.3.1 Cultural Tourism and Increasing Real Estate Pressures

Tel Aviv's UNESCO World Heritage status elevated the city's global profile, but its benefits have largely bypassed Jaffa, deepening rather than bridging the historic socio-spatial divide. The political divide between Arabs and Jews resulted in a lack of interest in preserving Jaffa, the demolition of the entire Old City was proposed to bring in new development (Alfasi & Fabian, 2009a). Due to the persistence of the Preservation Commission of Tel Aviv-Yafo Municipality, Old Jaffa was demarcated as a small, preserved art and tourism district in the 1954 Master Plan. In 1961, the Old Jaffa Tourism Development Company was set up, and the first conservation plan for artists and tourism was initiated. The narrow alleyways and Middle Eastern

⁷¹ Home prices in the district increased by 15%, while the average cost of homes across the city rose by 30%. In the last quarter of 2021, the price of a four-room apartment in Tel Aviv reached NIS 4.38 million, up from NIS 3.14 million in the same period of 2019, an increase of nearly 40% in just two years (Globes & Mirovsky, 2022)..

architecture buildings are reused as museums, art galleries, souvenir shops, cafés, and restaurants and 70% of the total tourist footfall in Tel Aviv-Yafo is observed in Old Jaffa (Tel Aviv-Yafo Municipality, 2019a) (Figure 6.16). It is also argued that the inscription on the World Heritage list forfeited its political and social content to the benefit of aesthetic and commercial value (Rozenholc & Tufano, 2018). Many critics argue that the inscription and the inscribed perimeter and identified attributes of the Outstanding Universal Value (OUV) exclude the historical narrative and the linkage of the formation of Tel Aviv in relation to Old Jaffa, and that it reinforces the idea of the socio/cultural and urban segregation. While it does add value to the cultural tourism dimension, it widens the gap in the urban and social fabric (Alsayyad, 2001; Rozenholc & Tufano, 2018).

Over decades, land policies and planning frameworks, shaped by local and national actors, have steadily reworked these neighbourhoods' social and physical fabric to align with broader economic and cultural forces (Goldhaber, 2010; Mualam et al., 2020). In 2007, the port's responsibility was officially transferred to the Tel Aviv-Yafo municipality. Following this transfer, the Israel Antiquities Authority assumed responsibility for protecting and managing the city's listed historic buildings. Additionally, a policy document from 2006 designated the mound of Jaffa as a protected antiquities site, where controlled archaeological excavations have been carried out. With the emergence of Jaffa as a centre for culture and tourism, the spatial fragmentation became more apparent. This fragmentation was evident in the adoption of mixed uses across different areas, such as artists' colonies, mixed lower- and high-end residential areas, the Arab neighbourhood of Ajami, the promenade, and the old port. Neighbourhoods such as Florentine and Ajami exemplify this divide, experiencing gentrification and the displacement of long-standing residents. These areas were excluded from the broader Tel Aviv narrative, obscuring the historical significance of Jaffa. This change also brought about shifts in building uses that led to a spatially homogeneous environment⁷², one in which the living heritage of Jaffa's Arab community is rendered increasingly invisible, consumed as aesthetic backdrop rather than recognised as the foundation of the city's historic urban identity (Figure 6.15 and § 8.2.2).

⁷² Historically, Jaffa was a spatially heterogeneous geographic and social space, with a mix of Jews and Arabs, rich and poor (Monterescu & Hazan, 2018). In the present day, the urban interventions have led the city to become spatially homogenous and segregated is also visible in the social-economic levels of sub-quarters.



FIG. 6.15 **L:** The neighbourhood of Florentine, which is converted to an art and cultural district; **R:** Remnants of the historic city of Jaffa are seen and preserved, and often favoured by tourists when integrated in the urban design

One of the most striking examples of this clash occurred in 2020, when the Old Customs House in Jaffa, a historic building constructed by the Turkish authorities in 1886 to accommodate pilgrims arriving at the port, was demolished. It was marked for preservation as a historic building in 2003 in the National Outline Plan 2/13, and later in a detailed plan for Jaffa Port that went into effect in March 2007 (Globes & Mirovsky, 2019; Zeveloff, 2016). Going by the postmodernist ideology, the alterations were labelled as unaesthetic architecture, which formed the basis of a reversal in protection status and led to demolition. The municipality also justified the demolition for the purpose of expansion of the promenade, which eventually will lead to enhanced tourism and public access to Old Jaffa while still committing to preserving the archaeological layers beneath the site.

The former German community of the Lutheran movement of the Temple Society (*Tempelgesellschaft*) known as Sarona, is another significant example of the tensions and challenges between preservation and development. The urban renewal project was hailed as the largest conservation project ever undertaken in Tel Aviv-Yafo (§ 9.4.3.5 interview quote), where five historic buildings were relocated entirely, and 33 historic buildings after restoration now house modern boutique shops, cafes, and restaurants (Mager, 2017; Rozenholc & Tufano, 2018) (Figure 6.16). This project starkly highlighted the contrast between historical architecture and its requirements for conservation as per the ethics, and economic investments driving projects to construct high-rise buildings and alter the skyline of the city. Aimed to be residential towers, they failed to attract buyers and thus, in the current times, are being converted to office and commercial spaces. Also, the redeveloped market attracts more tourists than locals from the city, which reveals the less integrated design development of the project.



FIG. 6.16 View of the redeveloped Saroni Market, with the historic buildings of the German Temple colony repurposed as commercial spaces and the high-rise towers in the background. Source: Arik Mirovsky; Shutterstock

Today, Jaffa's fortifications, the physical markers of its urban memory, narrate its contrasting evolution: from magnificence to decline, from thriving culturally diverse neighbourhoods to segregated immigrant communities, from a town centre to a marginalised existence. This is reflected in the socioeconomic structure of Tel Aviv-Yafo today, where the Jaffa neighbourhoods house the city's lowest Socio-Economic Status (SES), and its average public area per capita, at 30.8 sq. m., is slightly lower than the municipal average. Jaffa's polarised space significantly influences design and planning decisions, reinforcing segregation between its communities, further intensified by urban gentrification and the gradual erosion of its historic urban fabric, driven not only by local dynamics but also by the rise in tourism and a rapidly growing real estate market.

Thus, the shifting dynamics, namely the market forces, architectural development trends, and the growing urban pressures to achieve sustainability, make it increasingly difficult to prioritise the physical and social fabric of historic areas in the interest of conserving the sense of place and cultural identity.

6.2.4 Challenge #3: Navigating Institutional Fragmentation and Competing Stakeholder Interests

Redevelopment and conservation processes in Jaffa are shaped by a complex institutional landscape involving several actors, including the Tel Aviv-Yafo Municipality, the Israel Antiquities Authority, planning committees, private developers, and community stakeholders. These competing objectives often generate tensions within planning processes, particularly when economic development initiatives intersect with heritage conservation and social equity concerns. Limited coordination between institutions can result in fragmented policies, inconsistent implementation, and the reinforcement of existing socio-economic disparities within the historic urban landscape (Brownill, 2013; Tel Aviv-Yafo Municipality, 2019b).

6.2.4.1 Case of Jaffa Port Redevelopment as a Public Space

The redevelopment of Jaffa Port has been a significant urban project aimed at revitalising one of the world's oldest ports. The initiative, led by the Tel Aviv-Yafo Municipality and Atarim⁷³, focused on transforming derelict warehouses into a vibrant hub for culture and leisure, with a total investment of approximately 150 million NIS (Approximately €40 million).

The port, marred by privatisation in the late 1990s, faced abandoned properties, decay, and increasing commercialisation. However, an anti-privatisation coalition, rallying under the slogan 'a port is not for sale', achieved a significant victory in 2001 when the mayor of Tel Aviv agreed to take municipal ownership of the port. Following a real estate transaction with the Israel Land Authority in 2007, the municipality officially gained control and initiated a new redevelopment plan to revitalise the area (Avni, 2017). This is a classic case of the popular culture of consuming beaches and waterfronts, underscoring conflicts and controversies over the beach, highlighting contradicting visions of the city as a seaside resort (Ayaryahu & Golan, 2017) (6.17).

⁷³ The Atarim Development Corporation, a joint state-municipal initiative established by the Tel Aviv-Yafo Municipality, was created to revitalize the coastline and promote tourism along the 4.3-kilometre stretch between Jaffa and the Yarkon River. Its strategy combined public infrastructure with private investment to balance tourism growth and local needs. (Atarim, 2018) While recent plans emphasise renewable energy, marina management, and marine ecosystem rehabilitation, the 2018 coastline assessment remains limited in addressing the broader cultural, social, and ecological dimensions required for a comprehensive Historic Urban Landscape (HUL) approach.



FIG. 6.17 Proposed redevelopment render of the historic port hangars at Old Jaffa Port, marketed as 'Jaffa Port Comes to Life'. The vision of a vibrant, leisure-oriented waterfront raises questions about whose version of the port's life is being imagined, and for whom. Source: Atarim Group



FIG. 6.18 Aerial view of the Jaffa Port redevelopment in progress, showing the skeletal remains of the historic port hangars during reconstruction. Source: Atarim Group

However, framing the port's redevelopment within this global context risks overlooking its distinctive identity and historical significance (Brownill, 2013, Desfor et al., 2011; Fisher & Benson, 2004)). Following the redevelopment and renewal of the three port hangars, the port's historic setting, though unique, has seen its sense of locality shift to being more symbolic than structural (Rosenberg, 2016) (Figure 6.18). Studies indicate that the interventions and redevelopment in the built environment are restrictive to the ability to secure the existence of cultural practices (Avni, 2017) such as traditional fishing activities, and cultural activities relating only to commercial intentions. Some community concerns about creating an integrated, shared space were addressed through various initiatives, including a Jewish-Arab children's theatre and a boutique that provides fashion industry training for disadvantaged young women. An in-depth analysis (beyond the scope of this research) of the redevelopment project at Jaffa may offer insights into the contested meaning of heritage, selective valorisation, interpretations and power relations.

6.3 Discussion

The analysis of Jaffa's planning frameworks, policies, and conservation practices suggests that the present spatial condition is deeply shaped by path-dependent planning processes and conflicting stakeholder interests. The socio-spatial configurations does not reflect the residual effects of a distant conflict, but its ongoing spatial expression, reproduced through planning decisions, governance structures, and institutional power. These interventions have not only transformed the physical environment but also reconfigured social relations, cultural representation, and spatial access within the city. The resulting spatial challenges, manifested through fragmentation, exclusion, and contested identities, are intensified by ambiguities surrounding plurality, shared values, and cultural representation. Consequently, these processes contribute to a growing sense of placelessness (Relph, 1976) and the gradual erasure of collective memory.

The examples of Old Jaffa, Neve Tzedek, and other parts of Jaffa are consistent with the concept that cultural hegemony is not static or symbolic alone; rather, it is continuously reproduced through planning decisions, heritage narratives, spatial hierarchies, and everyday urban practices (Miller, 2021). However, the local area plans governing Old Jaffa, Ajami, North Jaffa, Jaffa D and G remain insufficiently aligned with each other to preserve the historic urban landscape as an integrated

spatial system (Annex II). The lack of alignment between these frameworks reflects broader tensions between political ideologies, shifting socio-cultural values, migration patterns, and competing interpretations of heritage significance. As a result, selective valorisation of heritage assets often produces unintended consequences, including spatial segregation, uneven development, and socio-cultural displacement.

These findings demonstrate that fragmented planning approaches are inadequate for addressing the layered and contested nature of the urban environments. What is therefore required is not isolated conservation or development initiatives, but a strategic and integrative framework capable of linking spatial planning, cultural values, environmental systems, and community participation. The HUL approach offers such a framework by enabling incremental adaptation, interdisciplinary coordination, and context-sensitive planning mechanisms (Refer Figure 6.19).

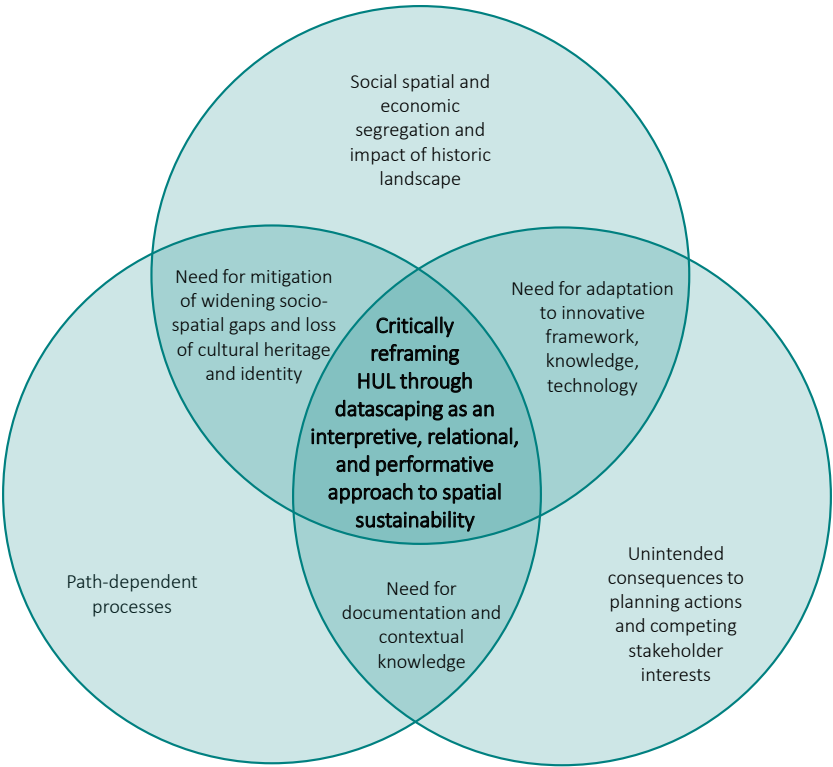


FIG. 6.19 Diagram illustrating the key challenges of Jaffa's contested urban heritage and landscape, and the proposed role of datascaping in reframing the HUL recommendation as a means for spatial sustainability by integration through an interpretive, relational and performative approach, through an iterative, process-oriented engagement with heterogeneous forms of knowledge.

As per Torsten Hägerstrand's (2000) theory on urban diffusion,

"History is embedded in a more conscious yet particular way, again through landscape. Landscape comes across as a carrier of the past, thus as a historical agent" (Sörlin, 2020).

This perspective reinforces the understanding that urban landscapes are not passive settings but active carriers of memory, identity, and socio-political relations. Consequently, conservation and planning cannot be limited to preserving isolated monuments or architectural forms; they must engage with the broader spatial, cultural, and social processes that shape urban life.

The case of Manshiyya illustrates these dynamics clearly. Karimi (1998) argues that the continuity of traditional urban structures sustains economic and social vitality, whereas their removal weakens spatial connectivity and collective experience (Karimi, 1998). In Manshiyya, redevelopment was driven by a profit-oriented and utilitarian planning model that prioritised modernisation, efficiency, and visual order over existing social networks and cultural continuity. The destruction of spatial relationships and urban fabric did not merely alter the physical environment; it fundamentally disrupted community identity, memory, and patterns of social interaction.

Similarly, developments in the port hangars, Jerusalem Boulevard, and Shuq HaPishpashim reveal how heritage has increasingly been commodified within tourism-oriented urban regeneration strategies. While these projects preserve selected heritage assets, they simultaneously market Jaffa as a consumable 'historic' and 'authentic' cultural district through museums, art galleries, ethnic restaurants, festivals, and curated public spaces. Such representations risk reducing heritage to an economic and aesthetic resource while marginalising the everyday socio-cultural narratives and lived experiences of local communities. The transformation of Jaffa into a place-product therefore raises critical questions regarding who defines heritage, whose identity is represented, and who benefits from urban regeneration.

At the same time, the activism surrounding Jerusalem Boulevard and the preservation of its environmental and cultural attributes demonstrates the importance of civil society participation in shaping urban futures. Community advocacy efforts surrounding the preservation of mature Ficus Sycamore trees highlighted the capacity of local actors to influence infrastructure projects and negotiate alternative development outcomes.

The review of preservation and planning policies in Tel Aviv-Yafo further demonstrates a paradoxical condition of institutional maturity and rigidity. While planning frameworks increasingly acknowledge sustainability, social identity, and

cultural continuity, implementation mechanisms remain fragmented and often constrained by conventional sectoral approaches. As Wheeler (2004) argues, sustainable urbanism requires an understanding of how historical processes continue to shape present urban conditions (Wheeler, 2004). In Jaffa, contemporary spatial inequalities and contested landscapes cannot be understood separately from their historical production through displacement, selective preservation, and uneven urban development.

The study of plans and policies reveals that sustainability agendas within Tel Aviv-Yafo frequently rely on broad and ambiguous concepts such as “shared space,” “shared culture,” and “quality of life” without clearly defining how these objectives address existing socio-spatial inequalities or contested heritage narratives. Without clearer spatial and cultural frameworks, such terminology risks becoming rhetorical rather than transformative.

The findings therefore highlight the need for innovative tools capable of documenting, analysing, and representing both tangible and intangible urban values across multiple scales. In this regard, datascaping and cultural mapping offer important methodological opportunities for reframing the HUL approach as an interpretive, relational, and process-oriented framework for spatial sustainability that can better inform planning decisions and reveal the spatial consequences of exclusion, contested narratives, and uneven urban development. By integrating spatial data with social, cultural, environmental, and historical layers, datascaping can expose otherwise invisible urban relationships and support more inclusive forms of knowledge production within planning processes. Unlike conventional heritage inventories limited to protected monuments or buffer zones, a Historic Urban Landscape database could enable a broader representation of urban heritage by incorporating everyday practices, collective memory, environmental systems, and community knowledge into urban decision-making.

Ultimately, the spatial implications of Jaffa’s contested historic urban landscape suggests that urban heritage is not merely a matter of preservation but also a question of spatial justice, representation, and access. Rather than functioning as a fixed solution, the reframed HUL approach offers a flexible framework through which these tensions can be interpreted, negotiated, and communicated within integrated and participatory planning processes. Achieving spatial sustainability in Jaffa therefore requires moving beyond fragmented conservation practices toward interdisciplinary, adaptive, and community-oriented strategies capable of addressing both historical continuity and contemporary urban transformation.

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PART D

Datascaping a Historic Urban Landscape: Jaffa

Part D adopts several methods to illustrate datascaping as an epistemic method. It examines Jaffa's historic urban landscape through data represented spatially and qualitatively, evidencing how heterogeneous forms of knowledge can be organised, related, and rendered actionable within planning processes. It is executed in alignment to the three-pronged approach of datascaping:

Chapter 7 illustrates datascaping as a generative method.

Chapter 8 illustrates datascaping as an informative and communicative method.

Chapter 9 illustrates datascaping as an operational method.

A photograph of a historic stone building with ornate balconies and shutters, next to a modern pink building. The stone building features arched windows with green shutters and decorative iron balconies. A modern pink building is visible in the background. The text is overlaid on the lower part of the image.

“Il faut cultiver notre jardin.”
(We must cultivate our garden)

Voltaire, *Candide* ou *l'Optimisme* (1759).

7 Datascaping as a Generative Process

Part of this chapter is based on a published article:

– Potdar, K., & Verbakel, E. (2022). Eidetic Mapping: An Exploration for Sustainability and Resilience of Historic Urban Landscapes. *Asian Studies*, 1, 547–559; <https://doi.org/10.5117/9789048557820/ICAS.2022.064>

In spatial analysis, the primary language of presenting data is visual rather than verbal. Attributes and characteristics are important components of spatial analysis since they enable delving deeper into the qualitative and quantitative aspects. This is also reflected in the evolution of technology and mapping with various software and systems, such as the Geographic Information System (GIS). This mapping system requires detailed attributes that respond to queries about location, coordinates, and other databases (Gregory & Ell, 2007). In this respect, the attributes identified through the HUL approach provide a basis for spatial analysis within GIS environments such as QGIS, where qualitative and quantitative information can be spatially referenced, layered, and analysed.

Datascaping, developed in this research as a ‘generative method’ (§ 4.2.2), builds on this capacity by extending spatial analysis beyond the representation of individual attributes towards the visual and interpretive integration of multiple forms of spatial knowledge. It brings together metadata (Scrivener et al., 2000), spatial attributes, and contextual information to generate new ways of understanding complex urban environments. This approach is informed by earlier understandings of mapping and spatial analysis as analytical rather than merely representational practices: King (1982), for example, highlights the use of maps to generate and test hypotheses; Hägerstrand’s work emphasises the importance of understanding landscapes through their historical development (Sörlin, 2020); and Wheeler (2004) stresses the importance of understanding the history and development of urban environments in shaping sustainable cities. These perspectives establish the importance of integrating spatial, temporal, and environmental dimensions within urban analysis. Building on this methodological lineage, the following section examines McHarg’s Scientific Systematic Method (1969) (§ 2.1.1 and § 4.4.3), alongside cartometric and geospatial approaches, as foundations for understanding how layered spatial information can inform planning and design.

7.1 Reading Jaffa Through Historic Cartography: Context, Fragmentation, and Method

Given the historical evolution of cities and their landscapes, and the importance of synchronicity, 'Eidetic mapping' is explored here to support the concept of 'generative datascaping'. The study demonstrates a method applied to the case of Jaffa for documenting the diachronic evolution of its complex historic urban landscape through Historical GIS⁷⁴ (Gregory & Ell, 2007). Using archival imagery, maps, and drawings, the method traces urban transformations shaped by the interconnected influence of spatial, geographical, economic, political, and social factors (Meyer & Turner, 1994). The main aim of this exercise is to expand the definition of generative datascaping through research by design, their application to the case of Jaffa, and the visual representation of knowledge through a series of datascaping that can inform decision-making and spatial planning processes. In this sense, datascaping can operate as a strategic and interpretive practice capable of revealing alternative spatial relationships, contested narratives, and new possibilities for understanding complex urban conditions. Consequently, the growing intersection between geographical methodologies and urban heritage management presents important opportunities for developing more integrated and context-sensitive approaches to spatial planning and conservation (Ripp & Rodwell, 2015).

Eidetic mapping differs from the quantitative maps of conventional planning and is visualised with two aims:

- to reveal spatial effects of elements that influence regulations, economic, and legal frameworks
- to document the space-time continuum and provide an evolving resource for interpreting and informing contemporary planning practices.

⁷⁴ Historical GIS (Geographic Information Systems) is the application of geographic information technologies to the spatial interpretation of historical processes, integrating archival materials, maps, and temporal geographic data to analyse patterns, changes, and transformations in the urban landscape over time.

Jaffa and its historical significance cannot be fully understood without acknowledging its cultural landscape and broader geographical and ecological context. The attributes of this landscape, such as the coastal geography, the dune formations, and the hydrological system, which constitute a unique ecosystem, have played a key role in shaping the social, cultural and economic development of the city and its surrounding region.

Jaffa's popularity in orange cultivation was central to its identity, with large areas reserved for orchards and agricultural fields. This formed the backbone of the local economy. It had many small villages (*Saknat*) scattered around the orchards and agricultural fields, connected by major roads functioning as arteries for trade (§ 5.1.2, Figure 5.5). Currently, Tel Aviv Metropolis' rapid urbanisation and demographic growth is significantly reshaping Jaffa's spatial configuration and surrounding landscape (§ 5.2). With the city of Tel Aviv growing in population, the contemporary built fabric, transportation network, and land use patterns have undergone densification and dramatic changes. This decline is measurable in today's socioeconomic structure of Tel Aviv-Yafo, where the Jaffa neighbourhoods register the city's lowest socioeconomic status (Figure 7.1, § 6.2.3.2). Jaffa's contested, historically layered landscape therefore warrants careful spatio-temporal documentation to inform design and planning responses to its ongoing segregation, gentrification, and erosion of its historic urban fabric.

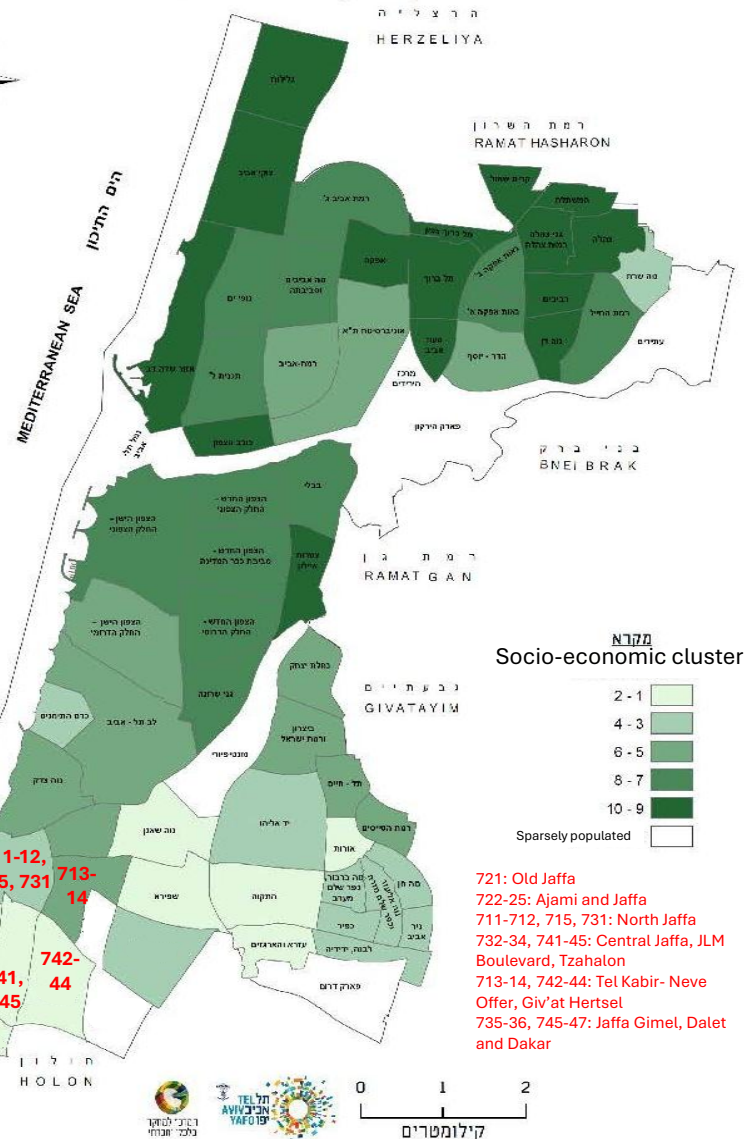


FIG. 7.1 The social-economic level of the Tel Aviv-Jaffa population and the city's neighbourhoods, the area of Jaffa highlighted in red dotted circle, with the lowest socio-economic levels of the city (Calculated by data from 2017) The population's socioeconomic index is a concluding index that underlies its calculations, including Economic, demographic, education and health characteristics, the standard of living, employment, and retirement. Source: Tel Aviv Municipality

7.2 Eidetic Mapping: Aims and Application as a Generative Datascaping

The method adopted aims to explore the potential of generative datascaping in understanding the historic and spatial structure of Jaffa without deterministic interpretations⁷⁵ (Vaughan, 2019). Eidetic mapping⁷⁶ is examined as a method that integrates archival information, such as historic maps, drawings, and photographs, using image analysis and advanced technological methods of geospatial analysis using QGIS to overlay past and present urban data. The goal is to produce generative datascapes and construct an eidetic argument (Corner, 1999) to capture the diachronic evolution of the city.

Intrinsic and extrinsic forces⁷⁷ have shaped Jaffa's spatial configuration and, in turn, its historical evolution. By visually representing these configurations, the research underlines the importance of contextualising physical attributes through Historical GIS. The method involves disaggregating the elements of the HUL approach and spatially illustrating the varying attributes and layers of information. The process supports a deeper understanding of specific physical and socio-spatial elements, including geological features, topography, hydrology, and other current datasets from municipal records relevant to the analysis. The chapter evaluates the potential of such overlay techniques to inform decision-making frameworks for spatial sustainability.

⁷⁵ Vaughan explains a deterministic interpretation as studies and theories with inevitable or predefined outcomes, with little or no room for variation of agency for alternatives. Various disciplines interpret the applicability and usefulness of maps for various mandates: Geographers see maps as research outcomes, while historians view them as reflections of social and cultural contexts. Social and political scientists often use maps to support arguments or depict specific moments (Vaughan, 2019)

⁷⁶ The word 'eidetic' is used in the context of 'memory.' 'Eidetic mapping' is explored to create a spatial representation and construct an eidetic argument in space-time geometry (Corner, 1999). It refers to creating highly detailed and vivid mental maps or representations of visual information. This term implies an extraordinary ability to recall and visualise detailed spatial information accurately, much like an eidetic memory for images. It could involve remembering and mentally visualising detailed layouts, locations, and spatial relationships as if seeing them again.

⁷⁷ Intrinsic factors: Similar to the definition of 'setting' as defined in the ICOMOS Xi'an Declaration on the conservation of the setting of heritage structures, sites and areas (ICOMOS, 2005). They include inherent elements that are fixed or less changeable elements, such as geography, demographics, urban form which shape the city and are its identity. Extrinsic factors: In terms of definition of 'context' as per the HUL Recommendations, that influence a city's development are the environmental factors (climate, rainfall) as well as social, political and economic impacts such as global trade, geo-political events, national policies.

Building on this analysis, the application of eidetic mapping tests how knowledge visualisation can communicate the layered complexity of Jaffa's historic urban environment and develops 'datascaping as a generative method' to examine the spatial implications of contested urban heritage and its potential to inform design and planning frameworks towards spatial sustainability (Sub-RQ 1.c, (§ 1.3.3).

7.3 Methodological and Conceptual Framework

Various studies indicate that it is crucial to understand the existing conditions of a site, or different sites, to prevent development from causing negative environmental, social, and economic impacts (Girod, 1999; LaGro Jr., 2007). While contemporary practice often generates an abundance of data, the greater challenge lies in identifying what information is truly significant and translating that understanding into meaningful action (Lawrence, 1997). Layered documentation of both visible and invisible forces, including factors above and below ground, can reveal essential insights into the composition of space and its critical relationship with the environment (McHarg, 1969) (Figure 7.2). Environmental history, as a relatively recent discipline, investigates the interconnected evolution of places, cultures, environments, and modes of production (Wheeler, 2004).

“The study of ecology helps to describe the limits and conditions of human intervention. It implies certain values, diversity, approximate stability, conservation, but these are neither ultimate nor comprehensive.” (Lynch & Hack, 1983a).

As this exploration is based on historical material, it is positioned within a qualitative, descriptive-analytic research framework. Throughout recorded history, cities have been studied, planned, and conceptualised through representational models such as maps, and spatial images (Batty, 2013). Building on this tradition, this study adopts a heuristic approach, combining archival cartographic sources with digital tools to enhance the spatial understanding of complex historic urban landscapes. The method involves the collection of primary sources, including historical maps, archival photographs, and spatial datasets, alongside an iterative process of georeferencing, layering, and visualisation. These processes enable the exploration of relationships across different urban layers and temporal conditions, supporting an interpretive, context-sensitive analysis consistent with the heuristic and process-driven logic of datascaping (§ 4.3.1 and 4.4.1).

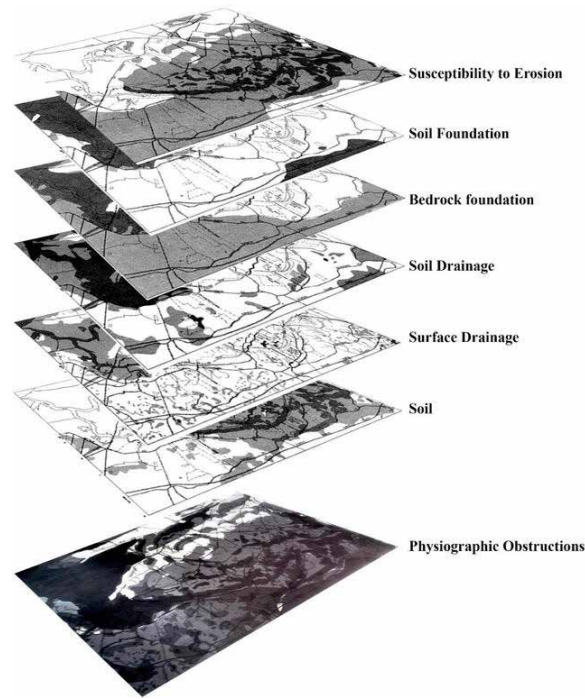


FIG. 7.2 This figure demonstrates how the Scientific Systematic Method categorises composite physiographic obstructions, revealing how multiple terrain constraints interact rather than operate independently; Source: (Dalgamoni, 2014; McHarg, 1969)

To develop generative datascares, the steps of grounding, which involve contextually embedding, and finding, which focuses on generating insights, form the core theory of the methodological analysis (Girrot, 1999), an approach that aligns with the post-representational⁷⁸, which reject the notion of maps as neutral representations of reality and instead conceive them as situated, embodied, and subjective constructions of knowledge (Dodge et al., 2011; Kraak & Ormeling, 2020a) (§ 4.1.1). The theoretical methodological approach is outlined in the following table (Table 7.1), and practical application is elaborated in explorations on generative datascaping (Table 7.2 and Figure 7.17).

Based on this theory, the datascaping exercise aimed to integrate with the HUL approach to understand the area's geology and geographical configuration, and to highlight current issues requiring further spatial analysis to highlight the challenges, as detailed in the conceptual framework. Dovetailing with aspects of Spatial Sustainability, SDG Target 11.5 emphasises substantially reducing direct economic losses from disasters, including water-related disasters, while protecting the poor and people in

⁷⁸ Post-representational cartography challenges the idea of maps as objective representations or exact copies of reality. Instead, it views mapping as an active, meaning-making process shaped by politics, culture, and the subjectivity of the mapmaker (Crampton, 2009; Kitchin & Dodge, 2007)

vulnerable situations. The NUA sustainable development goal focuses on reducing disaster risks by mitigating and adapting to climate change (UN Habitat, 2017), which makes this an essential challenge to consider. The significance of HUL in addressing the social, economic, and ecological configurations of a given city cannot be undermined. Urban planners and conservation professionals do not adequately integrate the urban landscape and its connection to the historical grain of the city (Whitehand & Gu, 2010).

TABLE 7.1 Outline of steps in grounding and finding for generative datascaping

Grounding	Finding
Lays the contextual foundation of identifying, documenting and spatially situating/localising the attributes of HUL.	Allows the transfer of grounded data to generative insights, revealing spatial relations, patterns, opportunities, and challenges
Focuses on what exists and why it exists the way it does	Focuses on what it means and how it can inform the decisions of planning
Steps may include, but are not limited to: 1. Contextual Framing: Identify the study area, spatial, temporal and thematic boundaries and extents 2. Data acquisition: Collection of information and datasets in the form of archival and contemporary information (e.g.: historical maps, planning documents, satellite imagery, archival texts, interviews) 3. Spatial anchoring, mapping and documentation 4. Synthesis of qualitative and quantitative data coherently 5. Verification and validation of spatially grounded	Steps may include, but are not limited to: 1. Analytical modelling: based on the type of data, application of methods (E.g: Geospatial Analysis Operation, Spatial Statistics and Modelling, Archival Photography Analysis, thematic analysis) 2. Interpretation of patterns to derive critical spatial narratives, opportunities and challenges. 3. Generative datascapes as a dynamic visualisation, integrating spatial, temporal and thematic information 4. Iterative reflections to refine the generated information to be contextually relevant 5. Process visualisations to actionable application

This mutual understanding can be facilitated by a common ground of mapping the complexity of spatial layers of the urban landscape. Despite recent years' increased exploration of methods for mapping, surveying, and documenting the diachronicity of urban morphology, there is a lacuna in the application of innovative tools for the graphical representation of knowledge and information to design and decision-making frameworks.

Drawing on the established role of maps as decision-making tools (§ 4.3 and 4.6), the generative datascape developed here extends mapping beyond the representation and analysis of existing spatial conditions. Geographers have traditionally treated such methods as precise, objective tools for capturing complex spatiality; yet, as argued above, they remain strategic enterprises, shaped by scale, pattern, and perspective, capable of unfolding new realities from existing constraints (Corner, 1999). It is this capacity of moving from documentation toward argument, eidetic mapping is mobilised for in the Jaffa case. This is carried out to test how its layered history can inform present and future planning decisions, a step beyond reiterating known information.

The processes of deductive analysis of the case study, as presented in Chapter 5, brought forth information that piqued the interest. Primarily, the historical setting of Jaffa and its landscape, hinterlands and related occupation, trade and economics thus shape the society. Vast swathes of orange orchards (Figures 5.3, 5.4 and 5.5) are of interest because the present-day spatial configuration narrates a completely different story. Drawing on scholarly research in environmental history, archival datasets were collected from various sources, and two experiments were derived from them.

7.3.1 Archival Photography Analysis

Scholars have highlighted the interplay between collective memory and the physical landscape of the cities, and archival materials give insights into the spatial narratives through the urban forms and architecture (Belanger, 2002; Boyer, 1992). James Bochart (Borchert, 1981) had argued for the sparing use of visual records by historians as a method in urban research, and not using them as a systematic method to develop an interpretive or analytical account in a comprehensive way. The use of archival imagery has evolved in urban discourses over the years, through studies, and photographs are consulted for analysing the spatial dimensions represented through photographic reality⁷⁹ (B. Christmann, 2008). They offer distinct advantages in capturing spatial and contextual information (V. D. Alexander, 2013). Carl Troll⁸⁰ stressed the use of aerial photos to document landscape ecology and its cause-and-effect network (Shane, 2006; Turner et al., 2001). Photographs not only function as a visual inventory but also document a point in time as a historical record and provide information on the environment and physical setting, whereas maps and atlases may limit broader information and connections to neighbourhoods.

⁷⁹ Author suggests that photographs are not objective; visual appresentation system of photography offers multi-layered meanings; Photographs are polysemic, meaning they can be interpreted in various ways by different viewers; *appresentation* is about how visual objects (like photographs) *bring forward* meanings that are understood, but these meanings can be *layered* and *multi-dimensional*, influenced by the viewer's cultural, social, and personal experiences (B. Christmann, 2008) (Also see § 8)

⁸⁰ Carl Troll was a German geographer who coined the term Landscape ecology (Troll, 1971) and stressed on interdisciplinary methods to go beyond the standards of natural and social sciences. He proposed to combine the horizontal-geographical-structural approach with the vertical-ecological-functional approach, primarily to map ecological information and expand this information and application from local sites to regional scales (Wu & Hobbs, 2007)

However, another strand of theory critiques the zenithal gaze⁸¹ as limiting, particularly when used to create atlases for planning purposes (Boeri, 2004, 2007). Boeri's suggests an effective alternative as a departure from the traditional zenithal paradigm by adopting a lateral or oblique gaze. The traditional zenithal paradigm is considered to be reinforcing a rigidity and hierarchy in the systems of representation of the urban order and limiting the potential outcomes that can be achieved through alternative approaches. With lateral thinking and a non-linear, temporal framework to integrate multiple viewpoints, including those of the inhabitants, observers, and experimental perspectives. This approach favours fluid forms to capture the depth of the urban space. Adhering to this theory, the zenithal approach of analysing space from a distance within a fixed frame is extrapolated by integrating temporal variations into the study of urban space and its nuances. The method of comparison is more effective and reliable if the images in time are taken and reproduced with the same technique or the same visual field and angle (Bosselmann, 1998). Materials such as aerial photographs⁸², townscape images, depicting both historical and contemporary life, are employed to test the hypothesis of how innovative and interdisciplinary approaches for knowledge visualisation aid in achieving spatial sustainability.

To generate datascares of the spatial narrative of Jaffa, archival photographs, maps and texts were selected. A total of 16 digitally sourced maps and images were studied and selected as per information legibility and relevance for experimenting with the iconographic-iconological image analysis method⁸³ developed by scholars (Imdahl, 1996; Panofsky, 2006) to further the urban heritage discourse. The three steps of the iconographic-iconological image analysis method adapted to this research are:

⁸¹ In cartography, urban planning and architecture, the zenithal gaze refers to a top-down, aerial perspective to analyse space. Zenith images are obtained from cameras placed in strategically high spots, and aerial, or drone photos (Donaire et al., 2020). This viewpoint may detach the outcome from the ground realities, which may overlook the lived experiences, social dynamics and cultural context of the place while only focusing on spatial order, structure and visibility.

⁸² The introduction of aerial photography in the early twentieth century revolutionised both warfare and the representation of landscapes. In interwar Palestine, it was primarily employed by the British for military purposes, including surveillance and counterinsurgency during the 1936 Great Revolt. Beyond military use, aerial photography also served scientific and administrative roles, such as topographic mapping, archaeological research, urban planning, and systematic landscape documentation. These applications enabled the British to measure, abstract, and interpret the territory in ways that supported colonial governance and imperial visions, extending the technology's role beyond purely strategic objectives (Abusaada, 2020a)

⁸³ This three-step method follows Erwin Panofsky's framework for interpreting visual materials: (1) Pre-iconographic Description, involving the objective noting of visual elements such as colours, forms, and composition; (2) Iconographic Analysis, where meaning is inferred through contextual references, including historical use and visual comparisons; and (3) Iconological interpretation, which aims to uncover the intrinsic or symbolic meaning of the image by synthesising both form and context (Imdahl, 1996; Mitchell, 2009; Panofsky, 2006; Sustainabilitymethods, 2024)

- i Pre-iconographic Description: Elements as per the HUL were identified in the historic photographs, without deep interpretation
- ii Iconographic Analysis: For analysis, present-day satellite imagery from the Official government satellite map website for Israel (www.govmap.gov.il) and Tel Aviv Municipality's Simplex3D model⁸⁴ which is promoted for urban management and planning were selected as the primary source for data.
- iii Iconological interpretation: To analyse and interpret the spatial narrative of evolution, changes, and identify challenges for the historic urban environment.

7.3.2 Geospatial Analysis Operation

Following the archival photo analysis and the identification of key challenges in the city, geospatial analysis is applied to explore the strengths of data integration in visualising spatial information for Jaffa. The exploration draws on Kraak and Ormeling (2020), who expand knowledge "on overlaying and combining several datasets regarding the same area to determine their possible geospatial relationship." (Kraak & Ormeling, 2020b).

Two core elements underpin this operation:

- i The integration of various levels of datasets and
- ii The interdisciplinary nature of the data and intended results.

Here, this method is applied to explore the unknown elements and impacts on the historic urban landscape of Jaffa and analyse the layers of geography, historic buildings, hydrology, open spaces, and transportation, as well as contemporary layers of the built fabric, hazard maps of flooding, and statistical data. The GIS datasets from the Tel Aviv-Yafo Municipality⁸⁵ and open-source ESRI Maps serve as the primary source for this analysis. Figure 7.17 illustrates the steps taken in the geospatial analysis operation adapted from theory.

Georeferencing historical aerial photographs requires assigning absolute ground coordinates to geographic features within a spatial reference system (Jensen, 2006; Zhang et al., 2022). For this purpose, GIS or remote sensing software programs such as ArcGIS (commercial GIS software) and QGIS (free and open-source software) are commonly used. These platforms integrate mathematical methods

⁸⁴ Simplex3D is an interactive three-dimensional urban modelling platform developed for the Tel Aviv Municipality, enabling visualisation of the city's built environment, zoning, and planning data

⁸⁵ The GIS layers are made publicly available by the Tel Aviv-Yafo Municipality, although with limited access and detailed datasets (E.g.: Attribute tables with coordinates are not open source), Website: www.gisn.tel-aviv.gov.il

for georeferencing, including bilinear interpolation and resampling/multiquadric interpolation⁸⁶, to assign geographical coordinates through Ground Control Points (GCPs) to individual pixels in historical maps and images, thereby enabling their precise positioning on the Earth's surface. GCPs primarily assist in aligning unreferenced raster or vector layers with known ground coordinate systems (QGIS, 2022). In this study, QGIS was used to georeferenced historical archival maps for spatial analysis. Open-source software was preferred over proprietary alternatives to ensure that the research remains transparent, reproducible, and accessible, while avoiding dependence on systems that may limit sharing or long-term use.

7.3.3 Methodological Limitations

In this experiment, the archival maps and imagery presented few challenges and limitations for overlay and geo-referencing in QGIS for multiple reasons, such as:

- Subjectivity of maps: Maps are socially constructed, and their validity as scientific objects is constrained by the precision with which they consider their scale and other measurable parameters (Vaughan, 2019c).
- Difference in the scale of maps, hence limited extent of overlap and missing information by comparison
- Archival cartography is primarily hand-drawn but to scale; however, geo-referencing presented with challenges: difficulty in locating 'nearest co-ordinates,' at times impossible. The cartometric method, suitable for this purpose, was not employed to correct the maps and images due to the limitations of time, resources and knowledge.
- Legibility of scanned or photographed versions of archival maps requires comparative analysis and interpretation through research, translation, which may lead to loss of information

However, it should be noted that these variations are expected in archival research and require in-depth data collection from various sources, interpretation and translation of texts, digitisation of records, and cleaning if required. As a generative data scape, the aim is to present information specific to context; hence, the method cannot be pre-planned and standardised (Mehaffy, 2008) and leaves room for varied results. Given the main objective of illustrating generative datascares, these limitations did not hinder progress.

⁸⁶ The process of georeferencing includes assigning absolute ground coordinates to geographic features within a spatial reference system (Jensen, 2006; Zhang et al., 2022)

7.4 Generative Datascaping: Exploration and Application

7.4.1 Interpretive Datascaping Through Archival Photography

To document a range of HUL attributes, a pre-iconographic description exercise using archival photographs was carried out. Following this, for iconographic analysis, a set of selected archival photographs along with a present-day 3d city is explored. The selection of images was without chronological or geographic preferences, but rather represents a constellation (Paez, 2019b) making it open-ended and generating dynamic interpretations without any hierarchy or structured frameworks. The following series of photographs represents this constellation of images at various points in time and their contemporary counterparts (Photographs taken between 2019 and 2025). Each image is then presented with an iconological interpretation of the area as a historic urban landscape.

The following series of paired images: archival photographs set against their present-day counterparts, enacts this interpretive process. Each pairing is not a straightforward before-and-after comparison, but rather a reading of spatial transformation: tracing how the historic urban landscape of Jaffa has been materially altered, selectively preserved, or strategically erased across time. Together, they build a layered iconological interpretation of Jaffa as a historic urban landscape in flux (Figures 7.3-7.15).



FIG. 7.3 Images showing the historic city of Old Jaffa (1936) within the fortifications before the demolition with the 'Anchor Operation' during the British Mandate, to create wide roads to enable the entry of armoured vehicles to enter the Old City and to improve the strategic control of the British over the settlement (Arbel, 2021). They were subsequently relocated to Arab villages on the city's outskirts. Source: Architectural Review (Abusaada, 2020b); Source: Library of Congress, picryl.com



FIG. 7.4 This present-day satellite image of Old Jaffa reveals the extent of demolished historic buildings, extending beyond those removed during 'Operation Anchor'. The cleared area, now reconstituted as an open plaza and park displaying archaeological remains, reflects a shift from lived urban fabric to curated heritage landscape. Its contemporary use for cultural tourism, through cafés, galleries, retail, and public space, reframes the site as a consumable environment, transforming historical traces into aesthetic and economic assets. Source: Ortho Photo from Israel Gov Map, www.govmap.gov.il (2023)



FIG. 7.5 The area of discussion is highlighted by a dotted yellow circle. A 1932 aerial photograph of Jaffa's extents reveals a spatial configuration in which the urban core is closely integrated with surrounding agricultural land, forming a continuous landscape rather than a densely built city. This image establishes a pre-urbanisation baseline against which later morphological transformations can be understood; Source: Library of Congress, PICRYL.com



FIG. 7.6 The area of discussion is highlighted within the dotted yellow circle in this present-day aerial view of North Jaffa, derived from the Tel Aviv Simplex 3D model. The image reveals a dense urban morphology that has entirely replaced earlier agricultural fields, marking a significant transformation of the landscape. The highlighted zone corresponds to the former Al-Bassa swamp, indicating how processes of urbanisation have overwritten prior ecological conditions. However, despite these morphological changes, underlying geographical configurations persist, subtly shaping spatial organisation and retaining traces of earlier environmental structures within the contemporary urban fabric. Source: Tel Aviv Simplex 3D model (2022)



FIG. 7.7 This archival postcard of Jaffa (c. 1950) frames the Al-Mahmudiyya Mosque within a dense cluster of historically layered structures. The yellow circle highlights the former Ottoman prison (Kishle), surrounded by buildings of Crusader-era origin. The fabrics represented a spatial configuration where religious, administrative, and defensive functions are closely intertwined. This proximity underscores the multi-functional character of the historic urban core, where different regimes and uses coexisted within a compact and integrated spatial framework; Source: www.archnet.org

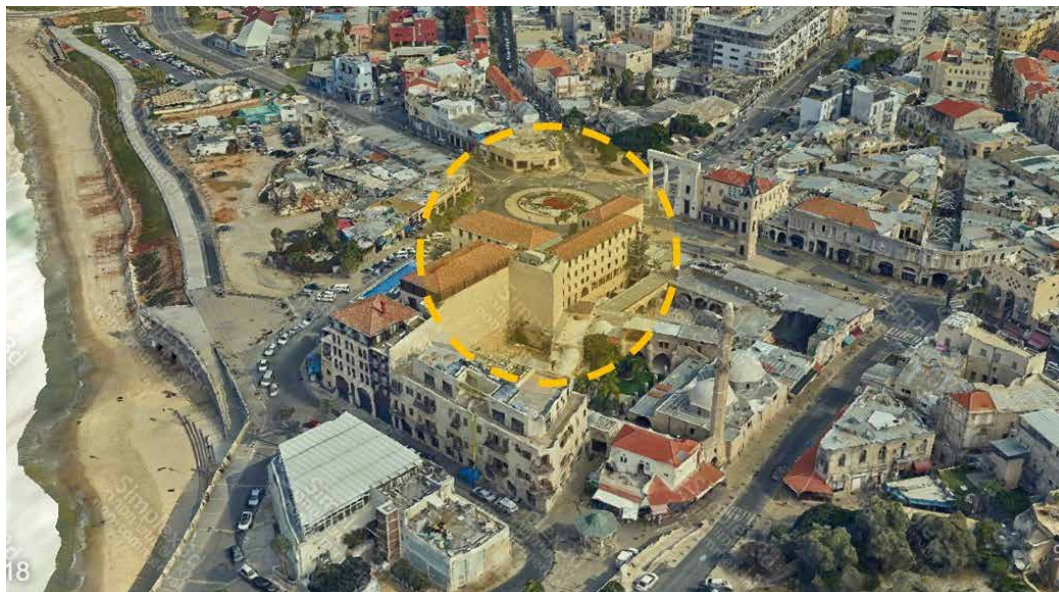


FIG. 7.8 The former Ottoman prison is redeveloped into a luxury hotel, integrating Crusader-era walls into basement-level spa and gym facilities, while upper-level guest rooms are adapted from the original prison structure. Although the Israel Antiquities Authority conducted the requisite inspections and archaeological excavations and preserved key historical elements, the transformation nonetheless reconfigures historic spaces into spaces of luxury consumption, marking a significant alteration to Jaffa's material fabric. Such interventions extend beyond physical modification, producing exclusive enclaves that restrict access and reframe heritage as a commodified asset, thereby reinforcing patterns of socio-spatial segregation. Source: Tel Aviv Simplex 3D model (2021)



FIG. 7.9 This 1937 aerial photograph of Jaffa and its breakwaters highlight the Old Custom House (yellow dotted circle in the foreground), rebuilt during the British Mandate over an earlier Ottoman structure. The historical strata of successive regimes within a single site reflects how coastal infrastructure was continuously reconfigured to consolidate administrative and maritime control. Despite its designation as a protected structure, the building was demolished in 2020, underscoring the selective nature of heritage preservation and revealing how contemporary redevelopment priorities can override formal protections, reshaping both the material fabric and historical as well as contemporary narrative of the coastline. Also note the absence of reclaimed land beyond the hangars at the port (Yellow dotted circle, background); Source: Library of Congress, PICRYL.com



FIG. 7.10 This figure juxtaposes the demolished site of the Old Custom House in the foreground with the constructed landscape of Jaffa Slope Park in the background, highlighting the transformation of Jaffa's coast through processes of demolition and land reclamation. The spatial strata of demolition and redevelopment foregrounds the erasure of historical infrastructure while simultaneously producing a curated public landscape. The work on hangars of the old Jaffa port, examined in subsequent images, further illustrate how existing structures are selectively modified to align with contemporary redevelopment narratives. Source: Tel Aviv Simplex 3D model (2021)



FIG. 7.11 This 1932 aerial view of Jaffa illustrates a spatial configuration in which the dense coastal settlement of Ajami is embedded within a broader agrarian landscape of orchards and farmhouses. Rather than a sharply divided urban-rural boundary, the image reveals a continuum between built and cultivated space, challenging later planning narratives that impose rigid separations between these domains. The yellow dotted circle identifies the coastal zone later subject to land reclamation for Jaffa Slope Park, marking a shift from agrarian use to state-mediated recreational space and pointing to the reconfiguration of social relations and access along the coastline. Source: Library of Congress, PICRYL.com



FIG. 7.12 This view from a similar vantage point positions the Jaffa Slope Park (yellow dotted circle) within the dense urban fabric of Jaffa, set against the high-rise buildings in Tel Aviv in the background. The stark contrast between low-rise historic structures and vertical urban expansion highlights uneven processes of development and spatial restructuring. The juxtaposition of Jaffa against Tel Aviv's skyline reflects the broader dynamics of urban transformation, densification, and landscape reconfiguration along the coast. Source: Tel Aviv Simplex 3D model (2021)



FIG. 7.13 This 1932 aerial view of Jaffa port foregrounds the hangars (highlighted in yellow) in close spatial relation to the residential fabric of the old city in the background. Rather than a separation between industrial and domestic zones, the image reveals a tightly integrated urban structure in which port infrastructure and everyday life coexist. This density underscores the centrality of maritime activity to the organisation of the city, embedding economic functions directly within the residential landscape. Source: Library of Congress, PICRYL.com



FIG. 7.14 This present-day aerial view of Jaffa port foregrounds a reconstructed waterfront now reoriented as a cultural visitor centre. The partial demolition of port hangars to accommodate parking reflects a shift away from productive maritime infrastructure toward visitor-oriented functions. In the background, the construction of the Andromeda complex (2005) marks a significant contemporary intervention illustrating how large-scale residential development and heritage-led revitalisation collectively reconfigure the spatial and functional character of the old city. Source: Atarim.il, Ron Uriel 2023



FIG. 7.15 L- The contemporary built fabric of the Giv'at Herzl neighbourhood, Source: Google Street View; R- Flooding and inundation in the area in 2020; Source: www.timesofisrael.com

The comparison of archival images reveals a multitude of information with respect to the HUL attributes: they document the geographical features of the city, including the coast, sand dunes, and reveal large swathes of open area, agricultural fields, and orange orchards. Besides these, they demonstrate the economic and social life through the streets, the shops (bazaars), the market squares, and fishing and trading ports that give a sense of place.

This interpretive exercise is not merely illustrative but it establishes an observational baseline that quantitative methods alone cannot produce, capturing the qualitative dimensions of urban transformation: the texture of everyday life, the logic of spatial organisation, and the layered coexistence of functions that once defined Jaffa's historic urban landscape. The comparison with the contemporary state of the same locations reveals an altered narrative. Some image analyses are limited only to archival documentation, since the morphology has crossed the point of reversibility (§ 9), such as the conversion of orange orchards and agricultural fields into dense urban built areas. However, the exercise brings to the fore observations towards the elements that take longer to transform (such as geography), along with fast-changing elements (demography, economics). Recognising this distinction between the persistent and the ephemeral is crucial to presenting a holistic narrative of place, and forms the analytical logic that underlies the datascaping approach developed in this research. This step can be further combined with the use of software, technology, and intermulti-disciplinary datasets to quantitatively document change in land use or spatial attributes at neighbourhood or city scales (UNESCO, 2020) and utilised for planning and decision-making. This is explored in the following experiment.

7.4.2 Eidetic Mapping: The Exploration

In January 2020, Israel was hit by heavy rainfall, breaking records of over 50 years and leading to large-scale economic, social, and physical damage. Among other parts of the city, the Giv'at Herzl neighbourhood, where the Bloomfield stadium was constructed on former marshland in 2005, was inundated with stormwater (Figure 7.16). Though the area has a well-planned stormwater drainage system, this area witnessed infrastructure failure in times of massive flooding and the lack of planning and resilient frameworks for extreme climate events.

To determine the possible geospatial relationship of the hydrological features, which were identified in the archival maps and photographs, several data sets were overlayed and combined through georeferencing analysis operation. The aim was to arrive at a generative datascape of Jaffa, while visualising the attributes of HUL, to stress its importance for contemporary design and planning, following the theoretical methodological approach for grounding and finding (Figure 4.8). The practical application for generative datascaping requires sources of data and types as follows (Table 7.2), and adopted a conceptual framework for Geospatial Analysis Operation (Figure 7.17).

TABLE 7.2 HUL Attribute Data Types and Layers Used in the Eidetic Mapping and Generative Datascaping Exploration

No.	HUL Attribute	HUL element	Source
1	Topography	Contours	Digital Elevation Model in QGIS, Google Earth
2	Geomorphology	Geology	Geological Map of Israel (Sheet 7-11), Survey of Israel
3	Hydrology and natural features	Rivers, streams, lakes	SRTM (Space shuttle-based radar interferometric data set) in QGIS
4	The built environment, both historical and contemporary	Well houses, villages	Tel Aviv GIS; Archival maps
5	Infrastructures above and below ground	Historic port town	Archival maps
6	Open spaces and gardens	Gardens, playgrounds, reserve nature parks	Tel Aviv GIS, Google OSM
7	Land use patterns	Historic land use of orchards, agriculture, villages, Fort, port. Contemporary land use of residential, commercial, public, and open space.	Topography maps, Survey of Israel. Archival maps, lithographs. Aerial images; Tel Aviv GIS
8	Intangible dimensions of heritage as related to diversity and identity	Community gardens	Tel Aviv GIS
9	GIS and UIS Layers by Tel-Aviv-Yafo Municipality		Storm water drainage GIS plan; Drainage hazard maps 2015-22; Density of storm water drainage for winter flooding; Source: Tel Aviv ArcGIS

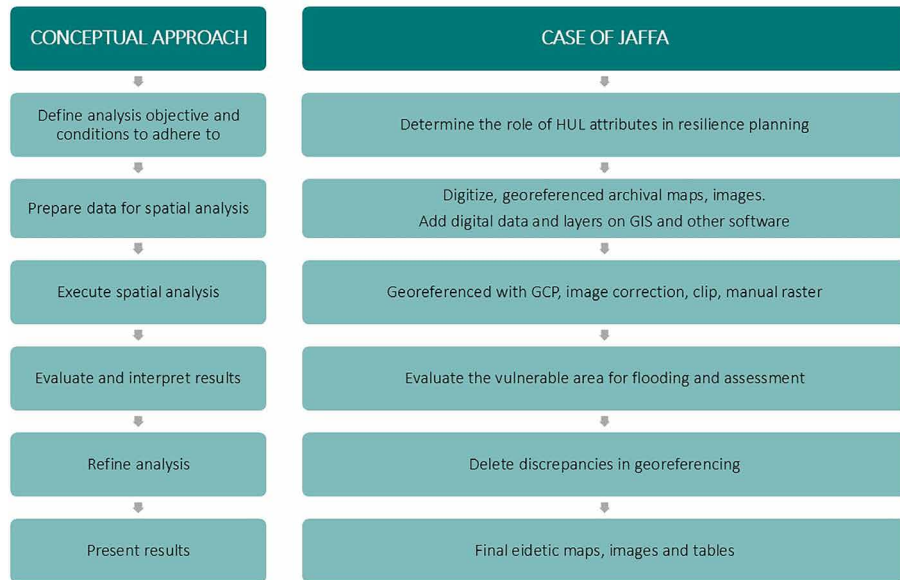


FIG. 7.16 Geospatial Analysis Operation: Conceptual framework adapted from Kraak & Ormeling (2020) and its application to the case of Jaffa, Israel.

- Second map of Jaffa and environs based on Jacotin, 1799. Service historique de l'armée de terre, Armées. France: LII 332-2. (Shacham, 2011) (Figure 7.20)
- 1930 of Survey of Palestine, Scale 1:10,000, highlighting the urban boundaries of Jaffa and Tel Aviv within the Jaffa Municipality. Image processing method: Geo-referenced with nearest neighbour in QGIS. Overlay and manual raster of georeferenced images and base images with Photoshop and Illustrator were used for the editing shapes and lines of the datascape (Figure 7.21)
- 1943 Survey of Palestine map, Scale 1:20,000, Sheet 12-16
- 1932 Low oblique grey scale aerial photographs and land use map derived from visual assessment (Source: (LOC, 1978))
- ArcGIS information maps: Master plan for storm water drainage (Figure 7.17)
- ArcGIS information maps: Drainage hazard maps 2015-22 (Figure 7.18)
- ArcGIS information maps: Density of storm water drainage for winter flooding 2015-22 (Figure 7.19)

The maps were studied and analysed in detail regarding the attribute list of the HUL recommendations. The following were the legible, mappable, and decipherable attributes, using various sources and software (QGIS, USGS Satellite datasets, Adobe Photoshop). The attributes were also selected based on the previous study and can be expanded further by the identification of other elements.

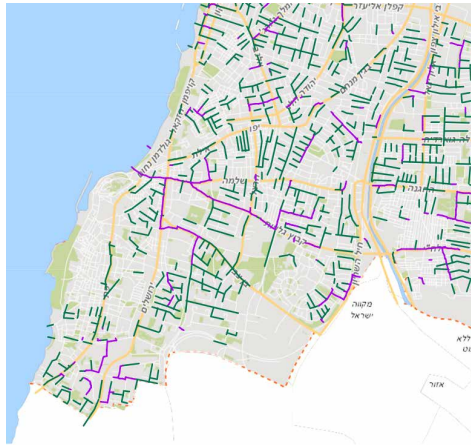


FIG. 7.17 The Master plan for storm water drainage; Source: Tel Aviv Municipality GIS

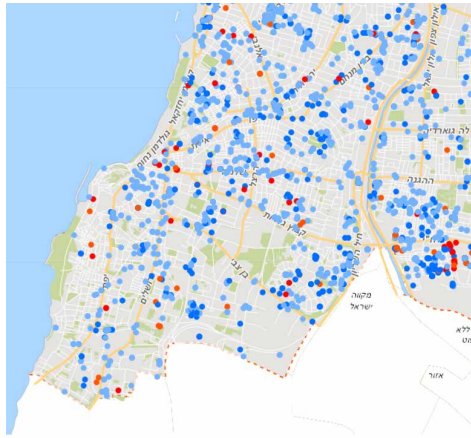


FIG. 7.18 Top: Drainage hazard maps 2015-22 in Tel Aviv-Yafo; Source: Tel Aviv Arc GIS

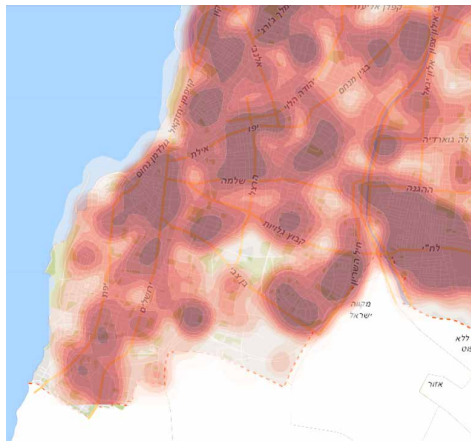


FIG. 7.19 Density of storm water drainage for winter flooding; Source: Tel Aviv Arc GIS



FIG. 7.20 Georeferenced maps on Photoshop and QGIS, overlaid with present-day Quarter 7 boundaries for analysis purposes. Year 1799

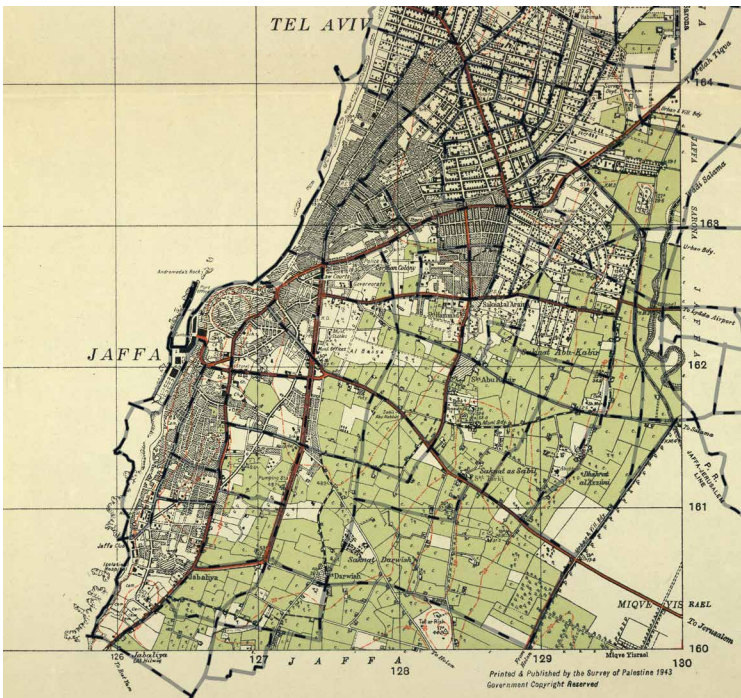


FIG. 7.21 Georeferenced maps on Photoshop and QGIS, overlaid with present-day Quarter 7 boundaries for analysis purposes. Year: 1930

For the geospatial analysis operation, the maps were overlaid through ground control points (GCPs). Three maps were compared in the QGIS environment through an overlay image processing operation and manual rasterization (Image 7.22). Also, the transformation could be easily identified and correlated to the georeferenced maps by comparing archival photographs. After this process, it was possible to identify the transformations in a study area over time, make comparisons, or seek answers to questions regarding the territory, as described in the steps for this process (Image 7.16)

7.4.2.1 Results and analysis

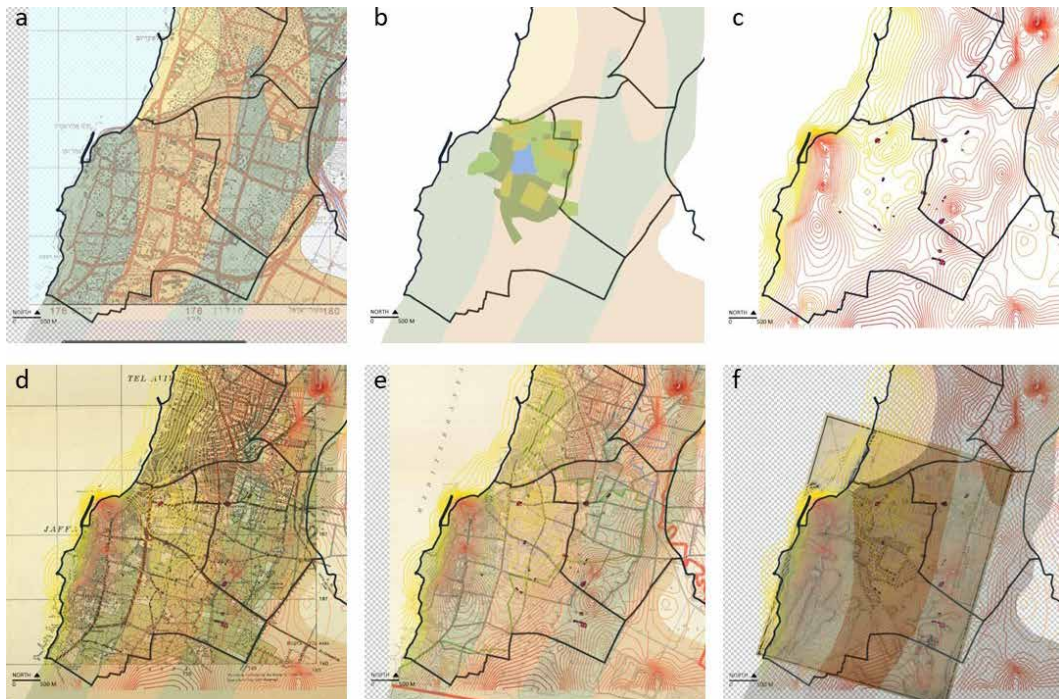


FIG. 7.22 Eidetic mapping sequence illustrating the progressive layering of spatial data for Jaffa: (a) Geological Survey of Israel map overlaid with Jaffa's political borders; (b) mapping of historical agricultural land uses, including orange orchards, agricultural land, fruit crops, villages, and farmhouses; (c) contours generated from GIS to study terrain formation and identify the Al-Bassa swamp as a natural catchment area; (d-f) successive overlays of georeferenced historic maps to consolidate and cross-reference the extent of historical landscape patterns and uses. Together, the sequence demonstrates the generative datascaping process built from individual datasets toward an integrated spatial reading of Jaffa's historic urban landscape. Prepared by Author.

The progressive layering of datasets demonstrated in the mapping sequence above reveals spatial relationships that would remain invisible through conventional planning analysis. The potential of this generative datascaping with overlay of various datasets spatially aligned, along with the archival photography analysis, provides the opportunity to analyse and document spatial relationships between attributes from several layers, e.g., coinciding layers of historic good houses and water bodies, which indicate the aquifers and geological qualities of the landform (Figure 7.23). On further evaluation and interpretation of results, the neighbourhood's flooding, residents' complaints to the municipality due to winter flooding, and its spatial density (Figures 7.17–19) reveal a correlation with the neighbourhood's socio-economic levels. This connection between environmental vulnerability and socio-economic marginalisation is not incidental, but it reflects entrenched patterns of spatial neglect that planning frameworks have consistently failed to address. Spatial segregation and marginalisation, closely tied to socio-economic disparities, can have significant implications for urban planning interventions. This reveals a constellation of insights into the existing gaps within contemporary urban design and planning approaches aimed at fostering urban resilience. Furthermore, the archival image analysis area's enduring historical patterns of neglect, and the persistence of “modernisation” efforts that fail to integrate the place's intrinsic attributes.

As seen on the archival map, the *Al-Bassa* swamp coincides with the present-day residential area⁸⁷, which is a condition rarely studied in depth during planning exercises, yet carries direct consequences for flooding vulnerability and infrastructure resilience. These considerations are crucial for cities in urban planning and for extending them toward resilient cities and well-planned infrastructure.

The compiled eidetic datascape (Figure 7.23) illustrates how the consolidation of these spatial strata: geology, hydrology, historic land use, and contemporary socio-economic conditions and produces a composite reading of the landscape that is greater than the sum of its individual layers; thus illustrates the potential of integrating HUL attributes through datascaping. This demonstrates the potential of integration of HUL attributes and approach through datascaping as a foundation for achieving spatial sustainability.

⁸⁷ Another research carried out under the Jaffa Cultural Heritage Project (JCHP) (Burke et al., 2017) suggests the presence of an ancient harbour to the north of Old Jaffa, before the Classical period, which fell out of use before the First Jewish Revolt (ca. 70 CE). Historical maps indicate that al-Bassa may have been a remnant of this ancient body of water, likely an estuary or lagoon formed by the original course of the Ayalon River north of Tel Yafo.

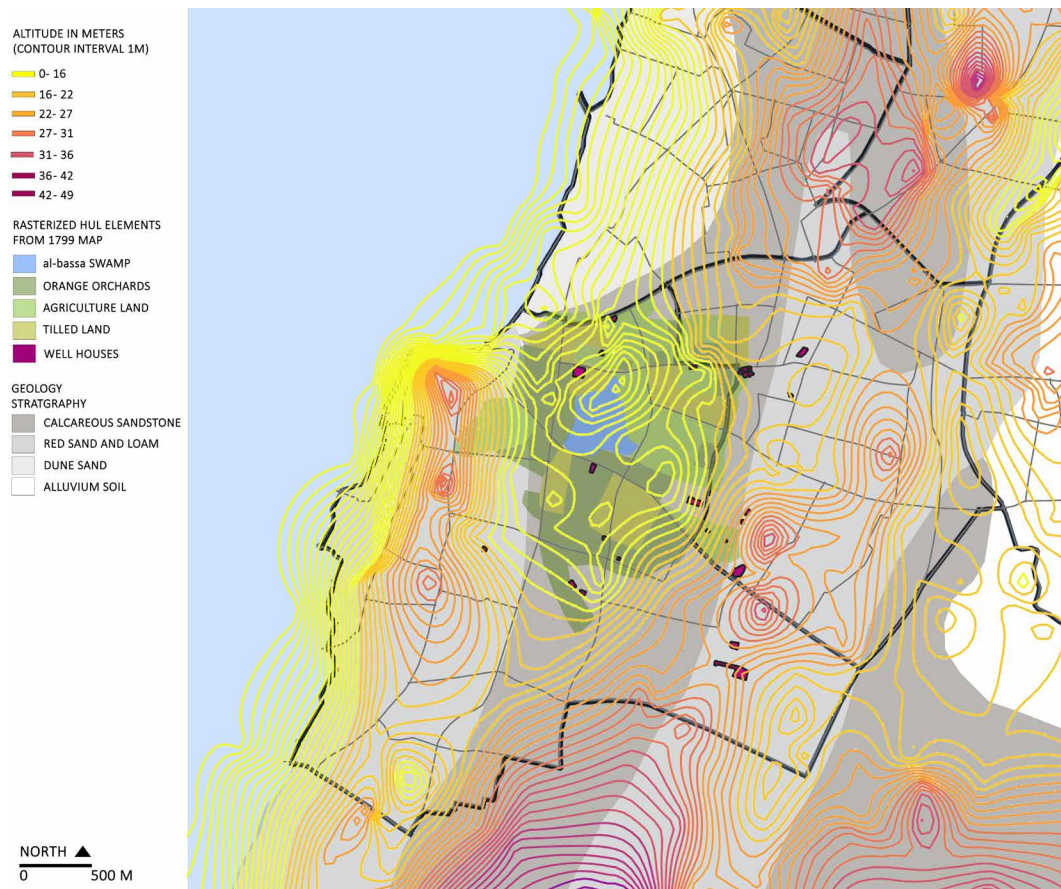


FIG. 7.23 Eidetic map of Jaffa integrating geological stratigraphy, topographic contours, and rasterised HUL elements derived from the 1799 historic map. The overlay reveals the spatial relationship between low-lying topography, the Al-Bassa swamp, and the concentration of agricultural land and orange orchards, illustrating how the geological substrate of calcareous sandstone (kurkar) supported aquifer formation and shaped the agrarian economy of the historic urban landscape; Source: (Potdar & Verbakel 2022) See NOTE I

NOTE I | EIDETIC DATASCAPING

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance

HUL Attributes Documented: Topography, geomorphology, hydrology, land use patterns, built environment (historic and contemporary), infrastructure

What this map reveals: The spatial overlay of geological stratigraphy, topographic contours, and historic land use patterns makes visible the relationship between the natural substrate which includes the kurkar aquifers, low-lying swamp land, and dune formations and the organisation of agricultural and urban life in historic Jaffa. This relationship is rarely legible in contemporary planning documents, yet remains consequential for understanding flooding vulnerability, land degradation, and spatial inequality.

Relevance to Spatial Sustainability: The map foregrounds the ecological and geographical foundations of the historic urban landscape, demonstrating how an understanding of natural systems is essential to sustainable planning. The coincidence of low-lying topography, former wetland, and present-day socio-economically marginalised residential areas point to unaddressed environmental vulnerabilities, thus underscoring the need for planning approaches that integrate heritage, ecology, and resilience rather than treating them as separate concerns.

Relevant SDG Targets:

- 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage
 - 11.5: Reduce vulnerability to disaster and climate-related risks, with focus on the poor and marginalised
 - 13.1: Strengthen resilience and adaptive capacity to climate-related hazards
 - 13.2: Integrate climate change measures into national policies, strategies and planning
 - 15.3: Combat land degradation and restore degraded land and soil
-

7.5 Discussions

Generative datascaping, as explored in this section, is positioned as a method with tangible potential to advance spatial sustainability in urban environments. The method of eidetic mapping, used to visually represent diachronic and socio-spatial configurations, is demonstrated through a series of experiments involving geospatial and archival photographic analysis, following the grounding, and finding methodological approach (Table 7.2, Figure 7.16 and Figure 4.8 in § 4.4.3). Adoption of such a method can potentially be valuable to gain quantifiable insights for an enhanced understanding of the historic landscape and its contemporary dynamics. This is particularly relevant in times when contemporary urban design poses a challenge to the continuity of the city's historical spatial configurations and is at risk of rendering them obsolete. This absence of a preservation policy and a symbolic approach further restrict the continuance of mnemonics and cultural memory (Potdar, 2021) thus challenging the historical continuity of the city.

Changes cannot often be observed directly; however, their traces are always there, denoting conflict of interests among those shaping the built environment (Akbar, 2021)

This quote attests to the need to identify historic urban strata and their significance or changed nature to incorporate in contemporary planning. The archival photography analysis brings forth insights about the geographical configuration and its role in shaping the social and economic value and activities that shaped the city in the past. However, the present-day challenges and relevant data, such as the spatial data on flooding, new developments in the areas where *al-bassa* or the swamp was located, and the current state of life and challenges that the residents face, highlight the inadequate representation of such useful information. The interpretation is limited to the available data and needs to be expanded to other disciplines of environmental engineering, water, and sanitation for in-depth examination, which is beyond the scope of this thesis.

The integration of historical GIS further strengthens the method of eidetic mapping as generative datascaping. With the additional information rooted in archival information and cartography, it offers intriguing avenues for studying the spatial dimensions of the past. By bringing together tools and methods from geography, digital humanities, and planning, it offers intriguing avenues for studying the spatial dimensions of the past along with their implications for the present. Historical GIS has the advantage of collaborative exploration within multiple disciplines and

does not depend on mastery of all domains by a single researcher. Although GIS can reveal hidden patterns and connections in historical spatial data, it must be used critically due to its limitations and risks of misinterpretation. When employed thoughtfully, however, Historical GIS serves as a powerful tool for enriching our understanding of historical processes and informing contemporary planning

These explorations reveal the potential of eidetic mapping for resilient and sustainable spatial planning. The multi-scalar geo-spatial analysis can document and reconstruct a palimpsest of information about the spatial configurations and their diachronic social and cultural evolution. Precision in mapping the geography, hydrology and other attributes of the HUL is thus important to capture all attributes of the landscape and to provide a base for assessment through datascares. It is crucial to note here that the different layers and attributes of landscape change at different paces, e.g., the geology changes over millennia, whereas the land uses change over decades (§ 9.4.1). The process of overlays and eidetic mapping enables the synthesis of undocumented and unperceived spatial attributes, which contain enormous potential for unfolding alternative forms of information to support design decisions.

With the availability of diverse digital tools for urban studies, innovation, documentation, and interdisciplinary collaboration are indispensable. From these explorations, it can be concluded that eidetic mapping as generative datascares enhances sustainable and resilient urban strategies and equips urban planners and designers with critical tools to approach complex urban environments with informed precision.

Generative datascaping offers potential to document, visualise and inform decisions and planning processes by revealing the underlying spatial, social, and temporal relationships embedded within the historic urban landscape. By translating interdisciplinary and complex data into interpretable visual narratives, generative datascaping enables planners and designers to engage critically with the city's evolving morphology while ensuring that interventions are grounded in its historical depth while remaining responsive to contemporary dynamics. Beyond its value for spatial planning, expanding the method through interdisciplinary collaboration can further address issues of spatial logic and spatial justice in historic urban environments. Mapping and assessing socioeconomics, demographics, and their spatial aspects can help identify vulnerable communities and promote a just spatial planning and design process. As illustrated earlier, the incoherence in local plans and path-dependent processes may lead to fragmented and localised measures (Figure 6.19, § 6.3). This underscores the need for enhanced coordination among national, regional, and local governments.

The method holds potential to inform and enhance planning processes directed at achieving SDG targets. For instance, social and basic services for all, especially in communities that are most vulnerable to disasters (NUA Article 29), can be supported by an evolved understanding of the landscape, its users and contextual complexities. For studies beyond the historic ensemble, use of horizontal-structural approach with the vertical-functional approach (Troll, 1971; Wu & Hobbs, 2007), this method can be expanded from the local area to the larger regions and subsequently from local area plans to regional and metropolitan plans. Embedding locally derived information and HUL attributes across regions provides critical advantages for building comprehensive urban and regional planning frameworks. While planners may challenge the limited role granted to heritage and culture, such innovation in frameworks may nudge cities towards achieving spatial sustainability.

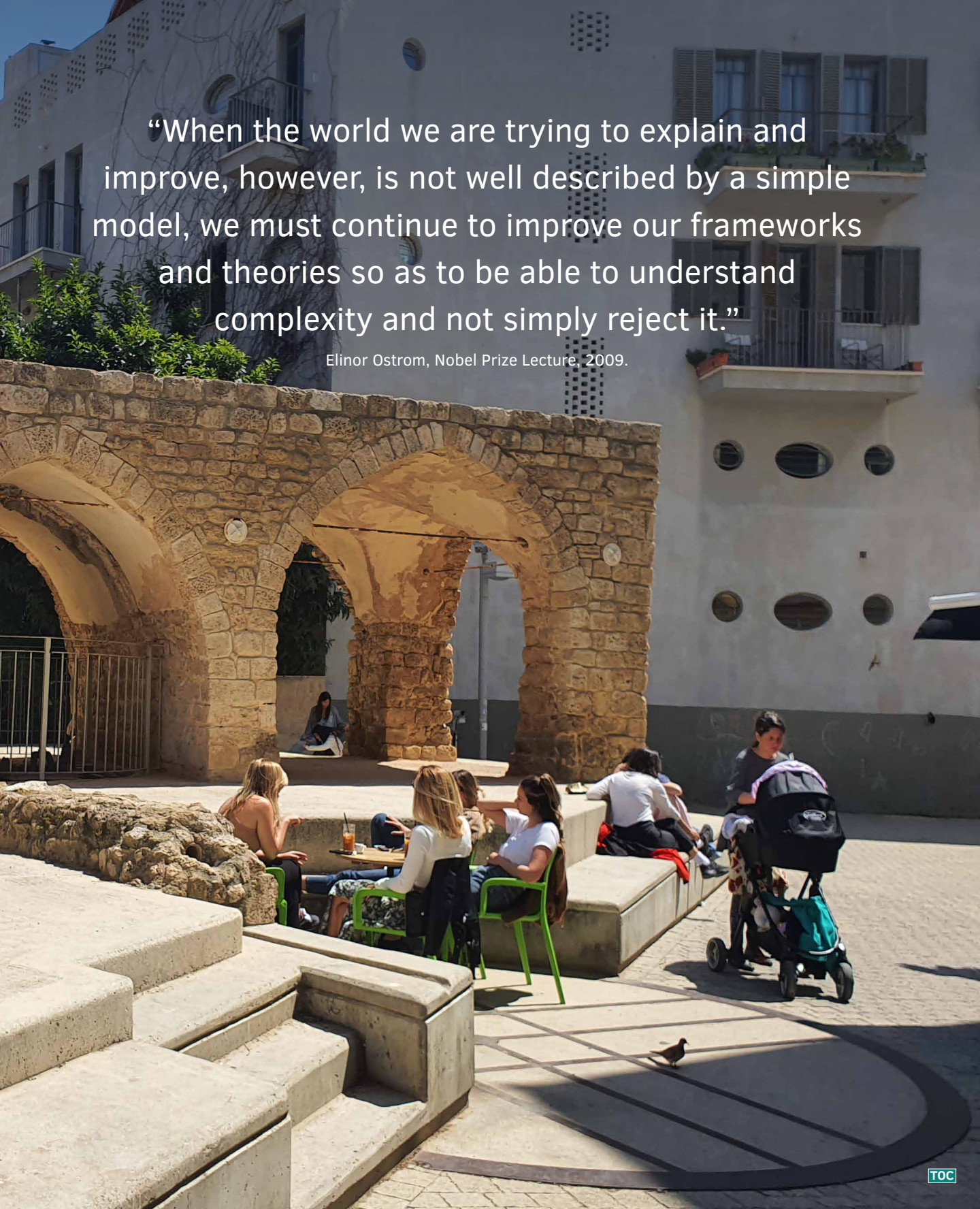
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“When the world we are trying to explain and improve, however, is not well described by a simple model, we must continue to improve our frameworks and theories so as to be able to understand complexity and not simply reject it.”

Elinor Ostrom, Nobel Prize Lecture, 2009.



8 Datasacaping as an Informative and Communicative Process

Part of this chapter is based on a published article:

– Potdar, K. (2022). Revisiting the design of cities for culture-based tourism in a spatial context of social and economic heterogeneity. In M. Marzo, V. Ferrario, & V. Bertini (Eds.), *Between Sense of Time and Sense of Place* (pp. 852–859). DHTL; <https://www.letteraventidue.com/en/prodotto/592/between-sense-of-time-and-sense-of-place>

8.1 Datascares as a Ground Truthing Instrument

This chapter explores the method of datascaping as an informative and communicative process (§ 4.2.3), translating layered spatial data into visual forms that render tangible and intangible urban conditions legible and negotiable (Ceccarelli, 2015). This is done by treating datascares as a ground-truthing instrument ⁸⁸(§ 4.4.3) with explorations by adapting different methods. These methods are based on the data type and the potential they hold for creating datascares, either through overlayed or temporal sets, both quantitative and qualitative datasets, by use of software and through machine learning.

⁸⁸ Ground truthing refers to the process of verifying remotely gathered or data-derived representations against direct, on-site observation, ensuring that mapped or visualised conditions correspond to the material and lived realities of a place (Yonto & Schuch, 2020). In this chapter, the term is extended to describe how Girot's (1999) stages of Grounding and Finding anchor datascares in the physical and historical specificities of a site, rather than in abstracted or assumed data.

The aim is not to promote a specific method or software, as there are multiple other ways to conduct such exercises. The aim is to highlight the potential of datascares as a communicative instrument which is capable of driving cognisance and action towards planning with urban heritage.

8.2 Problem statement

8.2.1 Heritage-led Tourism and Urban Regeneration

Cultural tourism is a powerful driver of development, generating city-wide social, economic, and environmental impacts, as it enhances urban attractiveness, creativity, sustainability and the value of heritage assets (UNESCO, 2016). These assets can strengthen local economies and communities, yet they are often treated as static resources whose primary role in contemporary development and management is to attract tourists (Hu & Wall, 2005). In this context, cultural tourism assets can be understood through three core attributes: the tourist, the site, and a marker or image (Richards, 2002) that popularise the site and convey narratives of the place, identity, history and collective memory. Globally, the concept of cultural tourism has evolved from its historical roots in pilgrimage and religious practices to become a widespread mass-market phenomenon (Alsayyad, 2001; G. J. Ashworth & Tunbridge, 2000; McKercher & Du Cros, 2002). Although cultural tourism studies have drawn concepts from disciplines of economics, geography and sociology, the critical insights from these fields have not been adequately integrated into practice (G. J. Ashworth, 2003; G. Ashworth & Page, 2011). Hence, this chapter focuses on cultural tourism and heritage-led urban regeneration in historic areas and their socio-spatial implications to expand on the discourse.

While culture and heritage-led tourism often act as catalysts for urban regeneration, they can also intensify the commodification of heritage and economic resources, leading to residential displacement and commercial gentrification, particularly in historic centres (Gotham, 2005; Russo, 2002). The valorisation of cultural tourism and its attributes seldom hinges on the development of spatial configurations or socio-economics, often resulting in the commodification of cultural assets (Loukaitou-Sideris & Soureli, 2012). This commodification is exacerbated in historic cities with contested landscapes, neo-liberal practices have rendered many cities increasingly polarised, spatially segregated, and socio-economically divided (Yacobi, 2009).

Historic urban regeneration initiatives are frequently criticised for lacking explicit social objectives, resulting in exclusionary practices which accelerate gentrification (Gunay, 2008; Tunbridge & Ashworth, 1996). Policymakers and local authorities often prioritise the short-term economic gains from tourism while undervaluing the potential of culture and heritage to strengthen long-term social and economic development (Gunay, 2008). Culture and heritage require recognition not merely as economic assets, but as living forms of cultural heritage for both residents and visitors which is capable of mitigating social fragmentation and the segregation of classes and cultural identities⁸⁹. The symbolic nature of investment in mass tourism can profoundly reshape the fabric of historic cities, as it brings capital flows and supporting infrastructure, including hotels, offices, cafes, restaurants and shopping arenas (Taylor, 2016; van der Hoeven, 2018). These dynamics at times also exacerbate the tensions between historic preservation and market-driven urban regeneration. This raises critical questions about spatial sustainability and the need to reassess the impacts of cultural tourism and heritage-led regeneration on both the urban environment and its communities, with the aim of informing a more inclusive and sustainable design process. Future policies and tourism-oriented design in historic cities require a deeper understanding of socio-spatial configurations and tourist resource dynamics to ensure socially equitable and environmentally balanced urban systems (Jansen-Verbeke, 1986). The method explored here for 'Datascaping HUL' offers an interpretive framework to examine how cultural tourism contributes to socio-spatial segregation in contested historic landscapes, reaffirming the need to reassess urban identity narratives through datascaping to support informed decision-making.

⁸⁹ The concept of cultural identities and preferences is in relation to the term 'Tourist Gaze' towards conservation sites and cultural heritage sites, which make them postcard places from the perspective of visitors, detaching them from the locals. It is argued that the tourist gaze, while bringing people together through common images, separates people by social class and cultural preferences (Gunay, 2008; Urry, 2011)

8.2.1.1 Jaffa: Culture-led Tourism, Gentrification, and the Limits of Planning

Today, Jaffa has become a culture-led tourism destination that is increasingly affected by gentrification and has become a typical characteristic of the dynamic and evolving nature of urban environments (Zancheti & Jokilehto, 1997). Along with this, the city faces intensifying spatial segregation, mounting economic pressures, and shifting demographic patterns (§ 5 and 6). The process of gentrification has deep spatial connections to economic, social, cultural and symbolic capital (Monterescu, 2015). As per the Tourism Master Plan 2030 of Tel Aviv-Yafo Municipality, Jaffa is one of the main areas for intervention (Tel Aviv-Yafo Municipality, 2019a). The plan aims to balance tourism growth with heritage preservation by creating mechanisms for prioritising and advancing tourism development while promoting cultural pluralism⁹⁰. The plan proposes to maximise the neighbourhood's assets cautiously and sensitively while involving the local population in accommodation-related and home hospitality initiatives and, at the same time, promoting sites of religious heritage. However, although the plan acknowledges the plurality of Jaffa's communities, the current impacts of tourism on social order, economics, and the urban fabric warrant critical re-evaluation. These impacts are explored through datascaping, a method used to translate complex social, economic, and spatial datasets into visual narratives that reveal how tourism influences the social and urban fabric of Jaffa.

8.2.2 Cultural Heterogeneity, Spatial Homogeneity, and Demographic Shifts

Jaffa presents a particularly consequential case of contested cultural narratives, where competing Arab and Jewish histories and identities shape cultural tourism, conservation practices, and planning policy. While historically, spatial heterogeneity once characterised the port town due to its layered history, market forces driven largely by economics are making the space homogenous. While historically, spatial heterogeneity once characterised the port town due to its layered history, market forces driven largely by economics are making the space homogenous. This shift toward homogeneity is compounded by Jaffa's status as a 'partitioned urban zone'⁹¹

⁹⁰ Cultural Pluralism describes a social or spatial condition in which multiple cultural groups coexist while maintaining and valuing their distinct identities rather than assimilation (G. J. Ashworth et al., 2007; Park, 2025)

⁹¹ Karlinsky attempted to delve deeper into the concept of the term mixed cities (ערים מעורבות) (arim me'oravot) in Israel and its various spheres of influence: pluralistic, racial, sovereign, and colonial. He

(Karlinsky, 2000): although administratively unified with Tel Aviv, its social fabric remains fragmented, and is increasingly reshaped by market forces (§ 6.2.3). The image of the cultural art district of Jaffa has been traded upon by the preservation of heritage assets to market as a place-product to make space for museums, art galleries, ethnic cuisine, street markets, and festivals, hereby exoticising the historic district while marginalising the Arab narrative. Market-led cultural tourism activities overshadow the Arab narrative of local identity in Jaffa and need to be acknowledged for the legitimacy of cultural values (M. Turner & Tomer, 2013). A survey by the State Comptroller found significant national and local indifference toward preservation, revealing that gruesome demolitions and the disappearance of cultural objects and cities were criticised for negligence (Mualam, 2014).

In the case of Jaffa, spatial homogeneity is observed as a byproduct of cultural tourism, as the neighbourhood has become popular⁹² as an area 'with more character'. This rebranding, while commercially successful, masks the displacement and erasure of the communities whose everyday life and cultural practice once defined that character. Jaffa's urban renewal and gentrification are increasingly transforming the urban fabric and are projected to become even more pronounced (Alsayyad, 2001; Tamari & Hammami, 1998).

8.2.3 The Living Landscape: Conceptualising Cultural Ecosystem Services (CES)

Cultural ecosystem services have been included in many other typologies of Ecosystem Services⁹³ and referred to variously as "cultural services" (Constanza, 1997), "cultural and amenity services" (De Groot et al., 2010) and

identifies Tel Aviv-Yafo and other mixed cities in Israel under the influence of sovereign and colonial spheres, leading to divided, segmented, polarised, or partitioned cities. Tel Aviv-Yafo is a partitioned zone, owing to the annexation of the municipal boundaries of the two municipalities in 1936. In partitioned cities, unresolved national conflict, centered on issues like sovereignty, identity, recognition, belonging, and security, leads to the physical division of urban space. This division can take various forms, including forced removal of populations (ethnic cleansing) or, more commonly, the separation of communities into distinct, often segregated, urban areas. Such cities are shaped by deep-rooted tensions and are marked by visible boundaries within the urban fabric. (Karlinsky, 2021)

⁹² Rising real estate projects and luxury housing and hotel industry promote marketing slogans like 'living in Jaffa as a matter of style, investing in Jaffa as a matter of wisdom' (Monterescu, 2015b)

⁹³ Ecosystems services offer benefits such as the pollination of crops, clean air, a reduction in extreme weather, human mental and physical well-being, wood for construction, fossil fuels, fresh water, tourism, science, education, recycling, fertilizer, carbon capture, outdoor sports, lakes, flood protection, hydroelectric power, and decomposition of wastes ((Grigoriadis et al., 2023, EIB.Org).

“socio-cultural fulfilment” (Wallace, 2007) reflecting the diverse ways in which human wellbeing and cultural values are connected to ecosystems (Milcu et al., 2013). These services encompass the non-material and intangible values people derive from ecosystems, including cultural, spiritual, and recreational aspects. Cultural ecosystem services are a result of outdoor recreation activities, scenic and aesthetic pleasures such as the coast, cultural practices, and the sense of place and identity people associate with their natural surroundings. These services significantly foster community cohesion, promote mental and emotional well-being, and connect individuals to their environment. By recognising and preserving attributes which constitute the cultural ecosystem services, societies can enhance the quality of life and strengthen the bond between people and the natural world, creating a deeper appreciation towards environmental conservation and sustainable practices.

Cultural ecosystem services (CES) are projected to decline significantly by 2050 unless substantial changes are made to existing policies, institutional practices, and governance frameworks (Millennium Ecosystem Assessment, 2005). Despite their importance, CES often remain underrepresented in policy-making and landscape management due to limited data availability and insufficient analytical approaches (Chan et al., 2012; Kosanic & Petzold, 2020). The exploration aims to examine how the integration of CES into the HUL approach can contribute to spatial sustainability.

8.3 Conceptual Approach and Methods

The following paragraphs outline the conceptual framework and methodological approach adopted to examine the spatial, social, and environmental dynamics of Tel Aviv-Yafo through an integrated, data-driven lens. The research employs a multi-scalar methodology combining **spatial statistics and modelling**, **crowdsourced and volunteered geographic information (VGI)**, **land surface temperature analysis using QGIS**, and **machine learning techniques based on Vision Transformer (ViT) image classification**. Each method outlines the staged approach in detail while outlining its conceptual rationale, analytical techniques, and relevance to the broader goals to explore datascaping and a communicative process.

8.3.1 Spatial Statistics and Modelling

Spatial statistics and modelling (Anselin, 1995) involve the application of statistical methods to spatial data to uncover patterns, relationships, and trends across geographic areas. This method is beneficial for mapping spatial distribution to support the analysis of urban phenomena, performing hotspot analysis, and understanding spatial autocorrelation. In the context of urban planning and heritage studies, these methods can be applied as a predictive approach to map quantitatively the distribution of physical attributes such as cultural heritage sites and qualitatively gauge the impacts of interventions and urban expansion, their potential impact, and evaluate the effectiveness of planning interventions. These insights can aid in informing strategic decisions and policies. Through leveraging methods for visualisation techniques, planners can better understand complex spatial dynamics for more informed, inclusive and integrated interventions.

8.3.2 Crowdsourcing and Volunteered Geographic Information (VGI)

While the local municipality collects data on visitor numbers, user profiles, and economic trends, it lacks detailed insight into socio-spatial segregation, diverse cultural narratives, and related economic effects due to the absence of standardised data attributes. This gap highlights the need to integrate mixed method approaches and crowdsourcing for using a more comprehensive and inclusive datasets. Crowdsourcing, particularly through Volunteered Geographic Information (VGI), involves gathering spatial data directly from the public, often via digital platforms. This approach can be used to update urban maps, record overlooked heritage sites and encourage public engagement in the planning process. Tools that support this method include OpenStreetMap and customised VGI platforms.

8.3.3 Machine Learning: Vision Transformer (ViT) Based Image Classification Architecture

In recent times, Machine Learning, especially deep learning⁹⁴ have demonstrated its capacity to document cultural heritage and aid in preservation and conservation practices (Llamas et al., 2017; Maltezos et al., 2018). The mapping of Cultural Ecosystem Services (CES) aims to explore innovative methods of mapping and data collection methods that utilise crowdsourcing and spatial representation to gather comprehensive, community-based insights. The Vision Transformer (ViT) is an image classification architecture that applies the Transformer model, originally developed for natural language processing (NLP), to visual data, offering a novel alternative to convolutional neural networks (CNNs). (Refer Annex III for detailed concept and method of execution)

8.3.4 Limitations

As the datasets are retrieved from online open sources of user feedback, this interpretive method has limitations, as the data may not be fully accurate or authentic. However, this method is critical for interpreting and understanding information, and can be expanded with a larger database and multiple variables to produce much more nuanced datascares. There may be studies and research carried out at a larger city level, using statistical data (Census data). However, this research is limited to the extent of the case study and the objectives, which focus on HUL and spatial sustainability in Jaffa.

⁹⁴ Machine learning (ML) and deep learning focus on improving a system's ability to learn and acquire new knowledge through pattern recognition. Unlike traditional programming, where rules are predefined, ML relies on training models with large datasets. With enough data and computing power, results become more accurate, and today, deep neural networks supported by big data and cloud computing provide the main framework for such intelligent operations (Mukhamediev et al., 2022; Yan et al., 2023)

8.4 Exploration, Results and Analysis

The following are the results of datascaping carried out with the various sources of information and using different methods of visualisation. These individual datascapes are communicative independently, as well as the collated and correlated, which also have the potential to reveal deeper insights and information.

8.4.1 Building Jaffa: A Century of Construction, Erasure, and Renewal

The spatio-temporal datascapes across years 1930 to 2013 document construction growth, new developments, reconstructions, and urban renewal projects in Quarter 7 of Jaffa (Figure 8.1).

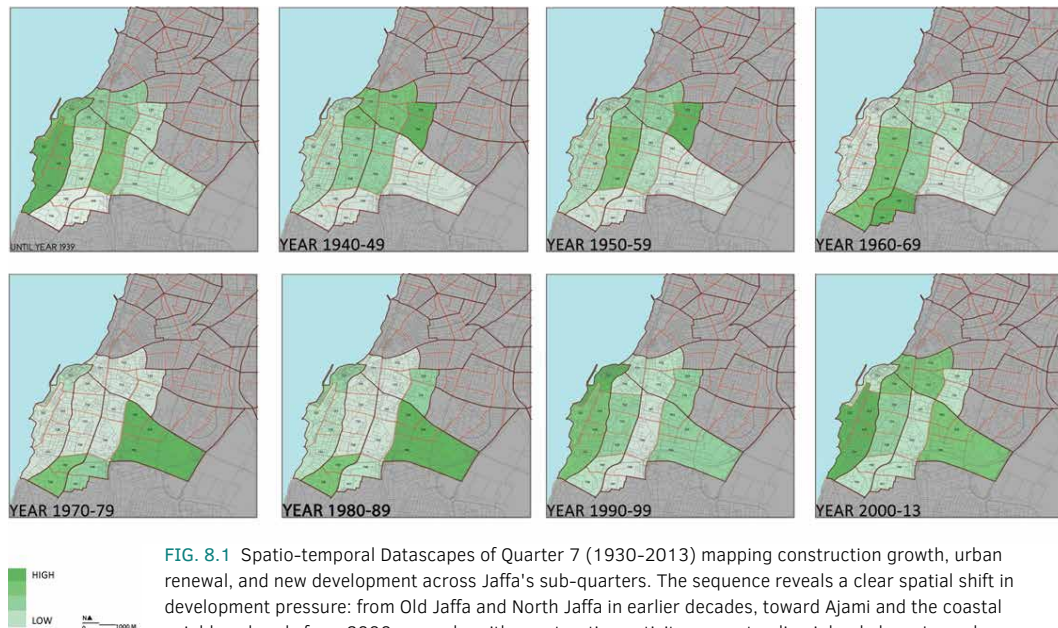


FIG. 8.1 Spatio-temporal Datascapes of Quarter 7 (1930-2013) mapping construction growth, urban renewal, and new development across Jaffa's sub-quarters. The sequence reveals a clear spatial shift in development pressure: from Old Jaffa and North Jaffa in earlier decades, toward Ajami and the coastal neighbourhoods from 2000 onwards, with construction activity now extending inland along Jerusalem Boulevard which is a trend projected to intensify with the activation of the Light Rail Transit. Data source: Central Bureau of Statistics, Israel and Tel Aviv-Yafo Municipality. Maps by Author. See NOTE II

This period of time, spanning over eight decades, captures the extrinsic influence of events that shaped the political, social, and economic structure of Israel and Tel Aviv-Yafo. It also represents the shifts in the philosophy and objectives of urban heritage conservation practices in Jaffa. It represents the rampant demolition in the 1950s and 1960s, to selective preservation and heritage-led regeneration from the 1990s onwards and reveals how political and economic priorities have shaped decisions about what is retained, reconstructed, or erased.

The analysis is important for areas: Old Jaffa (721), Ajami area (722-25), North Jaffa (711, 712,715, 731), Central Jaffa along Jerusalem Boulevard, Tzahalón (732, 733,734, 741, 745), Tel Kabir-Neve Offer and Giv'at Hertsel (713,714, 742,73,744), Jaffa Dalet, Gimel and Dakar (735,736, 745, 747) (Figure 7.1 for extents of Quarter 7). Focussing on each of these areas and their characteristics which have emerged over the years, the trend in construction, economic investment or disinvestment and the future course of the spatial characteristics becomes evident, as follows:

- **Old Jaffa (721):** This area witnessed a surge in building activity, right from demolition to reconstruction and is currently a designated archaeological reserve with minimal intervention. The period of 2000-13 shows the least construction activity. Any construction or development work (e.g.: The museum, Port redevelopment) is undertaken exclusively by public authorities.
- **North Jaffa (711, 712,715, 731):** This area is the centre of cultural tourism and also the closest area to the North of the Tel Aviv city. It houses the Flea market, hotels and restaurants, cafes, shops and other recreational activities. The year 2000.13 shows a surge in construction permits and activities, since many buildings (abandoned and in use) are being converted to hotels and along with new construction of residential buildings.
- **Ajami (722-25):** This area is closest to the coast and highest in real estate value. It also has a very high number of Absentee Properties. In contrast to earlier decades of minimal activity, the period 2000-13 has witnessed a rise in private investment in housing.
- **Central Jaffa along Jerusalem Boulevard, Tzahalón (732, 733,734, 741, 745):** This area also presents intriguing information by showing a rise in construction activities along the Jerusalem Boulevard and connecting neighbourhoods in the last couple of decades. It has also undergone an infrastructure change with the construction of the Light Rail Transit in the 2020s. A dramatic increase in construction is anticipated once it becomes operational.

- **Tel Kabir-Neve Offer and Giv'at Hertsel** (713,714, 742,73,744): These areas are important in the storyline, as they were part of the historical landscape of Jaffa; however, they have received varying treatments. For instance: Social housing during the 1960s, demolition in the 2000s of historic villages and new residential and social housing schemes. The maps also show a rise in construction activities in these areas over the past decades **Jaffa Dalet, Gimel and Dakar** (735,736, 745, 747): Scoring lowest on socio-economic scales, these areas face compounded challenges of housing, unemployment, health, and social safety. Despite rising construction activity in recent decades, investment here has not translated into improved living conditions and marks a stark contrast to the market-driven growth observed in Ajami and North Jaffa.

This set of temporal datascares communicates information from statistics, which are generally not visualised, and reveals information about the construction growth over decades. They offer a basis for anticipating future spatial expansion linked to infrastructural investment and developments. These visualisations can be useful at multiple scales: block, city, district and national level, and can support informed design and planning decisions.

In a comparison with real estate prices in this area (as of year 2022), the shift and dramatic growth in construction in Ajami, North Jaffa and Jaffa centre, is illustrative of the trend in construction (Figure 8.2). Real estate prices along Jerusalem Boulevard are projected to rise dramatically following the light rail activation.

REAL ESTATE VALUES

COST PER SQ.M IN NIS

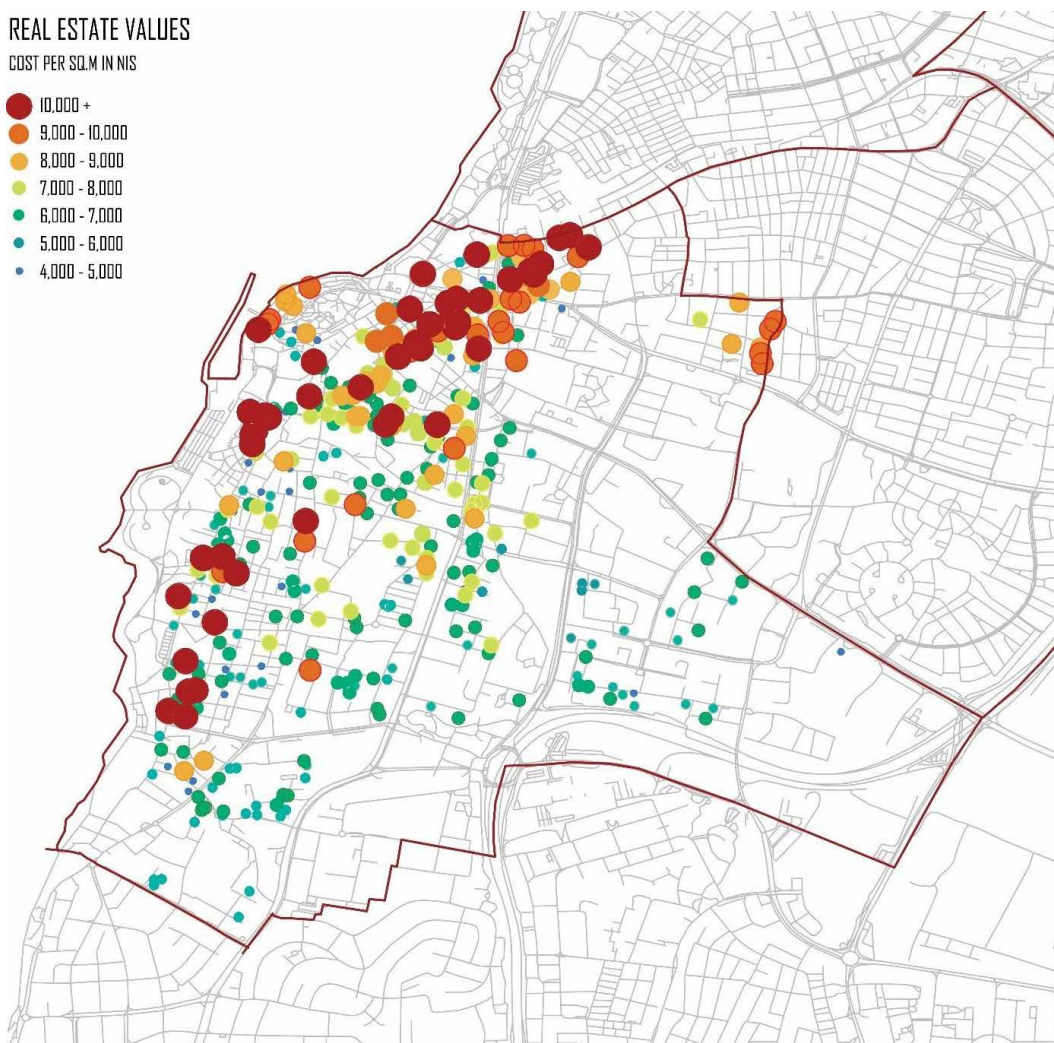


FIG. 8.2 Spatial distribution of real estate values across Quarter 7, Jaffa (2022), measured in NIS per sq.m. The map reveals a clear spatial gradient in which high-value zones, historically concentrated in Ajami and North Jaffa, are extending inland toward Jerusalem Boulevard. It indicates the rising property values along with the outward diffusion of market pressure and ongoing gentrification. The expansion of these high-cost areas points to a restructuring of socio-economic geographies, with direct implications for displacement and access to housing. Data source: Madlan.com (www.madlan.co.il); Maps by Author. See NOTE II

NOTE II | SPATIO-TEMPORAL DATASCAPE: URBAN HERITAGE, MEMORY, COMMODIFICATION AND GENTRIFICATION

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance

HUL Attributes Documented: Built environment (historic and contemporary), land use patterns, infrastructure, socio-economic dimensions of heritage and diversity

What this map reveals: The temporal sequence maps construction growth across Jaffa's sub-quarters from the 1930s to 2013, tracing the spatial logic of development and disinvestment over eight decades. The progression reveals how construction activity shifted from Old Jaffa and North Jaffa in earlier periods toward Ajami and the coastal neighbourhoods from 2000 onwards and reflects the influence of political events, planning decisions, real estate pressures, and changing attitudes toward heritage conservation. Areas of sustained disinvestment, particularly in Jaffa Dalet, Gimel, and Dakar, are rendered spatially legible alongside zones of intensifying private development which illustrates the uneven geography of urban renewal. The spatial distribution of real estate values further confirms this pattern: the highest property prices concentrate along the coastline and cultural tourism zones of Old and North Jaffa, with the gradient shifting inland, and Jerusalem Boulevard emerging as the next zone of transformation and value increase due to the introduction of the light rail.

Relevance to Spatial Sustainability: The datascares make visible the relationship between construction patterns, socio-economic marginalisation, and heritage erosion. It illustrates how development pressure and neglect appears spatially structured rather than random, however, this visual pattern requires further validation. The shift of investment toward Ajami and North Jaffa, driven by real estate and tourism, points to the displacement of existing communities and the commodification of heritage, underscoring the need for planning frameworks that integrate social equity with conservation objectives.

Relevant SDG Targets:

- 11.1: Ensure access to adequate, safe, and affordable housing for all
 - 11.2: Provide access to safe and affordable transport, with attention to vulnerable groups
 - 11.3: Enhance inclusive and sustainable urbanisation and participatory planning
 - 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage
 - 10.2: Promote social, economic, and political inclusion of all, irrespective of background
 - 16.b: Promote non-discriminatory laws and policies (relevant to absentee property and unequal resource allocation in planning)
 - 1.4: Ensure equal rights to economic resources, property ownership, and access to basic services
-

8.4.2.1 Cultural Tourism, Real Estate, and the Dynamics of Gentrification

To document the impact of cultural tourism on the spatial aspects of local socio-economic structures, data is collected from:

- 1 Tel Aviv Municipality GIS layers
- 2 Open-source data from tourist websites such as TripAdvisor.com
- 1 Real estate information from the commercial platform Madlan.com, a real estate website in Israel⁹⁵.

In QGIS, heat maps⁹⁶ are created to understand the behaviour of tourists and map their spatial activity to indicate highly visited areas. These are overlaid with listed historic buildings and georeferenced building permit applications for modifications. The resulting heat maps for tourist footfall in restaurants and real estate values are overlaid for comparative analysis (Figure 8.3). The map reveals the concentration of tourist activity in Old Jaffa, and when overlaid with building permit applications for modifications, suggests a spatial correlation between areas of high tourist footfall and intensifying construction activity. The concentration of building permit applications in areas of high tourist footfall, alongside rising real estate values, points to a spatial correlation between tourism pressure and construction activity in these neighbourhoods. As investment in historic buildings and urban renewal projects and consequently real estate prices are projected to rise significantly in the coming years, thus extending the geography of gentrification further inland.

⁹⁵ As the datasets are retrieved from online open sources based on user feedback, this interpretive method has limitations, as the data may not be fully accurate or authentic. However, it is critical for interpretation and perceived information.

⁹⁶ Heat maps in QGIS visualise the spatial density of point data using kernel density estimation, aiding in pattern recognition and hotspot analysis (QGIS Development Team, 2022)

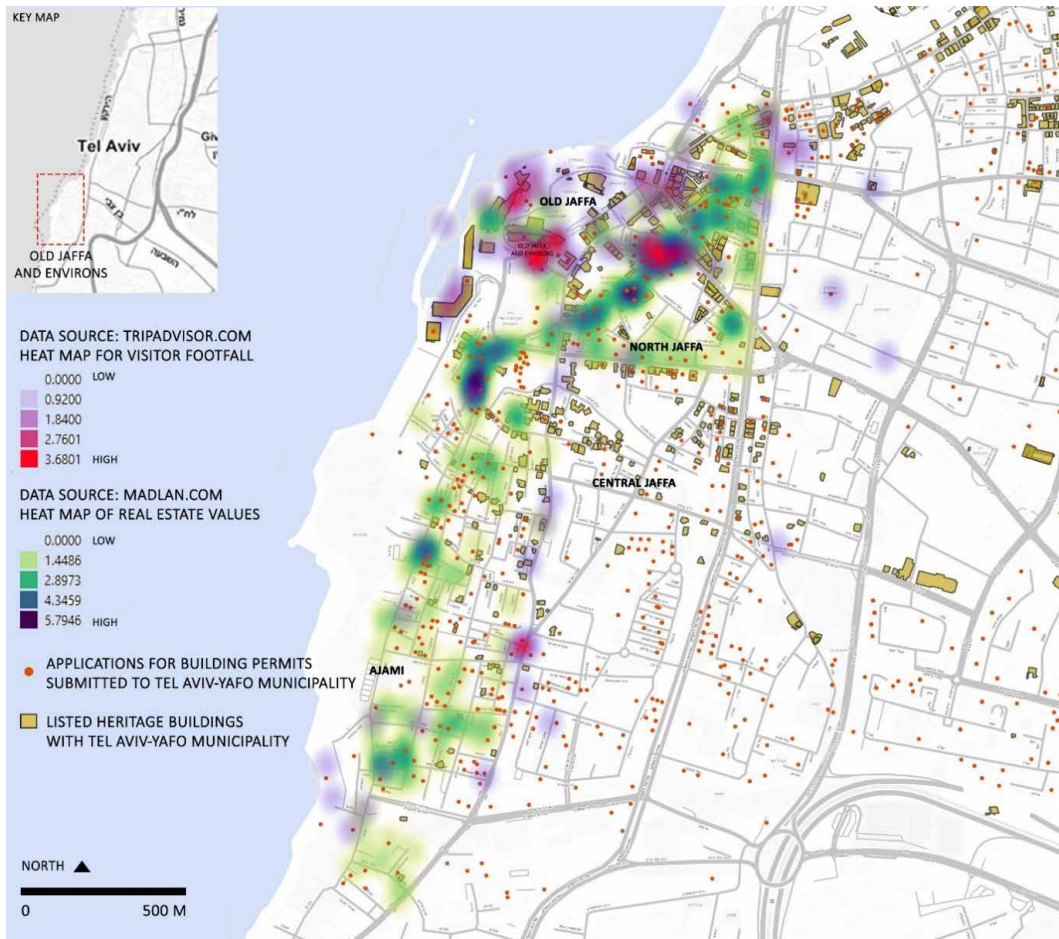


FIG. 8.3 An informative datascape overlaying tourist footfall with patterns of modification to the existing urban fabric and listed historic buildings, revealing the intersection of cultural tourism with processes of spatial transformation. The visualisation shows the spatial co-occurrence of high visitor activity, increased alterations to heritage structures (mapped through building permit applications), and rising real estate values, suggesting the increasing reconfiguration of heritage as an economic asset within a tourism-driven urban landscape. See NOTE III

NOTE III | INTERPRETIVE DATASCAPE: CULTURAL TOURISM AND CONTESTED NARRATIVES

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance

HUL Attributes Documented: Intangible dimensions of heritage, diversity and identity, land use patterns, built environment (historic and contemporary), open spaces and cultural landscapes

What this map reveals: The overlay of three datasets, spanning 1917 to 2030, exposes the gap between Jaffa's layered multicultural heritage and its official tourism representation. Current tourism infrastructure is spatially confined to Old Jaffa, selectively promoting Jewish and Christian heritage sites. The Arabic urban fabric, which includes mosques, cemeteries, demolished cultural institutions, orange orchards, and the Ajami ghetto boundary of 1948, remains largely absent from official tourism narratives. The proposed Jaffa 2030 map begins to address this absence, documenting the Arabic-Jaffa architecture, the orange industry landscape, and Bauhaus heritage as tourism assets and points toward a more plural reading of the city's cultural landscape

Relevance to Spatial Sustainability: The selective representation of heritage in tourism planning reinforces the socio-spatial marginalisation of Jaffa's Arab community, reducing a plural cultural landscape to a sanitised and consumable product. Acknowledging the full spectrum of Jaffa's heritage, including its contested layers, is a necessary condition for culturally inclusive planning. Cultural tourism, reoriented toward plurality and social inclusion, can serve as an instrument for identity recognition rather than displacement.

Relevant SDG Targets:

- 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage
 - 10.2: Promote social, economic, and political inclusion of all, irrespective of background
 - 16.b: Promote non-discriminatory laws and policies for sustainable development
 - 11.3: Enhance inclusive and sustainable urbanisation and participatory planning
 - 8.9: Promote sustainable tourism that creates jobs and promotes local culture and products
 - 8.3: Promote development-oriented policies that support productive activities and decent work
-

8.4.2.2 Cultural Tourism and the Politics of Narrative

To communicate the presence of multiple narratives and the need for valorisation of cultural tourism for social inclusion, the analysis draws on three datasets:

- 1 An archival atlas mapping the diminishing cultural built heritage (Dataset: Atlas of Palestine 1917-66 by Palestine Land Society);
- 2 The present-day tourism map of Jaffa (Dataset: Self-guided tour of Jaffa- Ajami, Tel Aviv -Yafo Municipality);
- 3 A vision plan for tourism in Jaffa as an inclusionary and identity revival project to strengthen the Arab identity (Dataset: Map of Jaffa2030 by the Jaffaproject.org)

This overlay (Figure 8.4). indicates the contradicting state of contemporary infrastructures and narratives of cultural tourism, which is limited only to the Old City and Jewish and Christian heritage. In contrast, the Arabic landscape of historic neighbourhoods, orange orchards, and modern city architecture in Jaffa is hardly documented and promoted for tourism purposes. This exercise aims to portray the urban partitioned zone and highlight conflicting narratives of this multicultural city and devise a method to document and promote the shared cultural heritage, taking the Historic Urban Landscape approach.

This exercise aims to make the urban partitioned zone legible spatially and highlight its conflicting narratives by analysing various sources. It shows how this mixed city is marked with selective preservation and aims to promote the image of an inclusive reading of Jaffa's cultural landscape might look like through the HUL approach. This is especially critical and useful for the inclusive work and policies being planned as per the City Vision Plan for Tel Aviv-Yafo (§

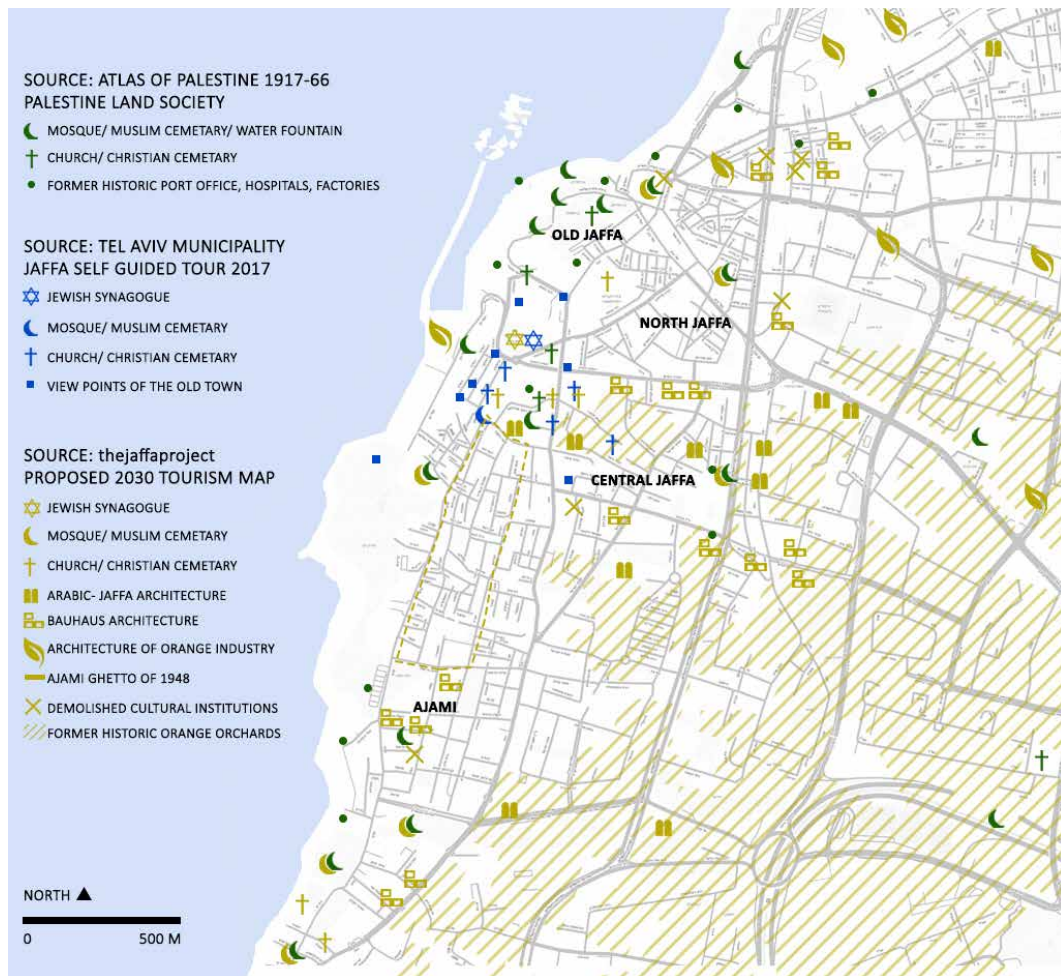


FIG. 8.4 This interpretive datascape illustrates the exclusionary narratives embedded within cultural tourism in Jaffa. The present-day spatial extent of tourism remains largely confined to Old Jaffa and a limited number of designated sites, reflecting a selective representation of heritage. While much of the Arabic urban fabric has been lost due to war, its presence endures through vestiges in the landscape and historical memory. The datascape makes spatially legible whose heritage is promoted, whose is overlooked, and what a more inclusive reading of Jaffa's cultural landscape might look like. Source: (Potdar, 2022) See NOTE III

In an attempt to highlight and document the lost narrative of Ajami and Jaffa area as a whole, sites were plotted and compared from:

- Survey of Israel 1932 map
- TABA 2660 (Local Area plan for Ajami)
- Present-day satellite map

This revealed several spots, which are either demolished or vacant as a result of the past events (Figure 8.5). As per the land use from the TABA, these sites fall under various land use designations between public use, open space and residential use. The Israel Lands Authority⁹⁷ maintains the ownership records of these land parcels and restricts public access to them. However, some of these sites were documented and photographically recorded to show their current status and/ or use (Figure 8.6). These lands are either converted to a public space with plantations and some vegetation, some are paved, and some are being used as parking lots. Comparing these plots to the TA 5000 plan and land use, the question here is, although these sites must have lost their physical markers of history, can the intangible narrative of the past be commemorated in an attempt at tactical urbanism⁹⁸.

⁹⁷ As this exercise was limited in its aims, the ILA was not approached in request of data for land records and ownership. Given the contested nature of the country and its administration, the Absentee Property Law, this information is highly classified and may not have been made available for academic research. However, the exercise aims to communicate information, which can be addressed at the municipal and official level for which the data can be acquired and processed. There is also information with local activism platforms such as palestineremembered.com, a public project to document the Palestinian-Israeli conflict, through archives and oral histories. However, given the scope of the project, this information was not sought out.

⁹⁸ Tactical urbanism refers to low-cost, community-driven, and often temporary interventions in the built environment aimed at improving neighbourhoods and public urban spaces (Lydon & Garcia, 2015). The example of Stolpersteine (stumbling stones), small brass-plated cobblestones placed in sidewalks to commemorate victims of the Holocaust, is a poignant example of a public memorial project with urban and social impact. This intervention can be seen as a form of grassroots, site-specific urban memory intervention.

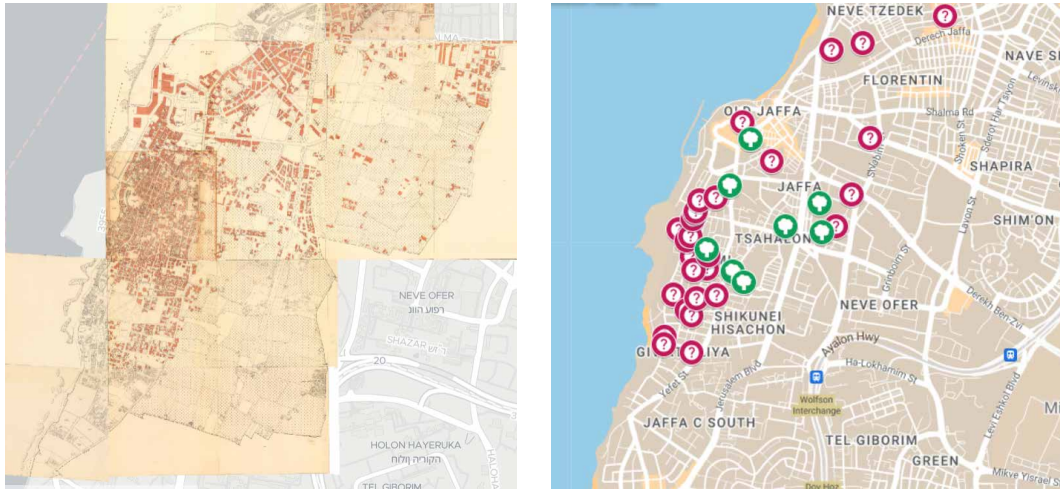


FIG. 8.5 L- 1932 map from the Survey of Israel. R- Present-day OpenStreetMap (OSM) with sites of demolition and vacant plots identified. Read together, the maps reveal the extent to which the historic urban fabric has been fragmented through processes of demolition, resulting in discontinuities and the emergence of vacant spaces within the contemporary city; Source: Library of Congress; Site pictures by author (2022)



FIG. 8.6 These site photographs, corresponding to vacant plots identified through comparison with the 1932 map, illustrate how sites of demolition have been transformed into residual and loosely programmed spaces. Frequently paved or adapted for parking, with occasional planting or pathways, these plots lack deliberate integration within the streetscape. This absence of tactical urban design reveals how urban voids are not actively reimagined but instead persist as fragmented spaces, underscoring the incomplete and uneven nature of urban redevelopment. Source: Author (2022)

8.4.3 Mapping Demographic Shifts

To map the demographic shifts (§ 5 and 6), the census data on migration (Including immigration and emigration)⁹⁹ was converted to visualisations. This is a special case of data availability, since the categories of information were classified as per religion, which aided in creating these communicative datascares. The temporal datascares over the years 2014, 2019 and 2020 for persons of Jewish and Arabic religious background are mapped with information on movement from one sub-quarter to another, as documented in the Census information of the Tel Aviv-Yafo municipality.

To note here: The migration records are objective and do not give reasons or the nature of migration. However, the purpose of this datascares is primarily to communicate the extent of migration and hypothesise the correlation of intrinsic or extrinsic factors leading to this migration.

A high movement of Arab persons from areas of Ajami towards Jaffa Gimel, Dalet and Dakar is observed (Figure 8.8), while a comparable movement of Jewish persons is recorded from Tel Kabir-Neve Offer and Giv'at Hertzal towards North Jaffa, Ajami and Central Jaffa along Jerusalem Boulevard and Tzahalon (Figure 8.7). Read together, these paired datascares suggest an inverse relationship rather than two unrelated trends: zones registering Arab out-migration between 2014 and 2020 largely coincide with zones of growing Jewish in-migration over the same period, pointing towards a gradual demographic shift in these central Jaffa quarters.

Scholarly research also suggests that the demographic shifts are so high that people with an Arab religious background also tend to completely move away from Tel Aviv-Yafo city to other mixed cities such as Ramla, Lydd, Nazareth Illit, Haifa and Maalot-Tarshiha. This out-migration, read alongside the inward movement of Jewish residents into the same central Jaffa zones, reinforces the demographic dimension of the gentrification process, attributed to rising real estate prices, luxury investments, issues regarding Absentee Land Properties, as well as politically charged gentrification (Shmaryahu-Yeshurun & Monterescu, 2024). These demographic datascares thus provide a spatial counterpart to the socio-economic drivers of gentrification discussed before, grounding the abstract dynamics of displacement in observable, tangible and place-specific patterns of demographic shifts.

⁹⁹ Migration refers to the movement of people from one place to another, it can be internal, international, voluntary or forced, temporary or permanent. The type of migrations: Emigration is to leave, Immigration is to enter.

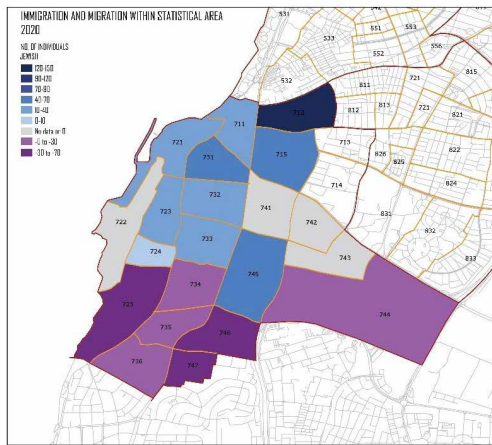
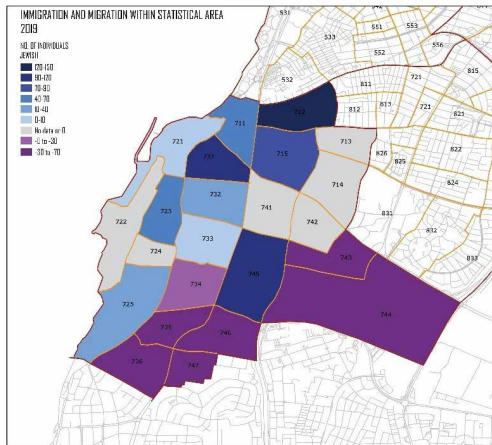
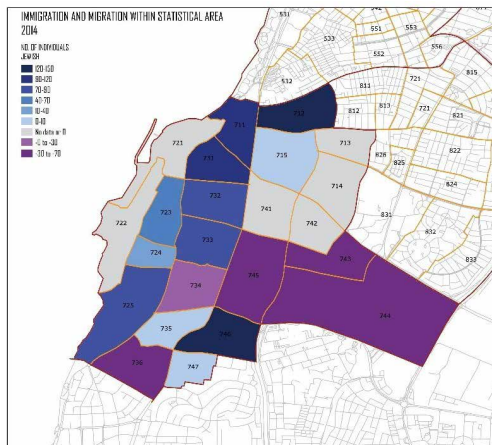
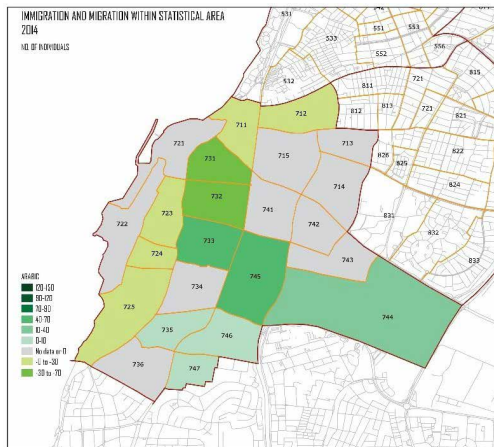


FIG. 8.7 Out migration patterns of residents with a Jewish religious background. It reveals shifting demographic concentrations over a decade. The sequence highlights areas of increasing in-migration, indicating a reconfiguration of population distribution that aligns with broader processes of urban change and redevelopment. (Top to Bottom: Year 2014, 2019, 2020); Data source: CBS, Israel and Tel Aviv-Yafo Municipality; Map created by author (2021) See NOTE IV



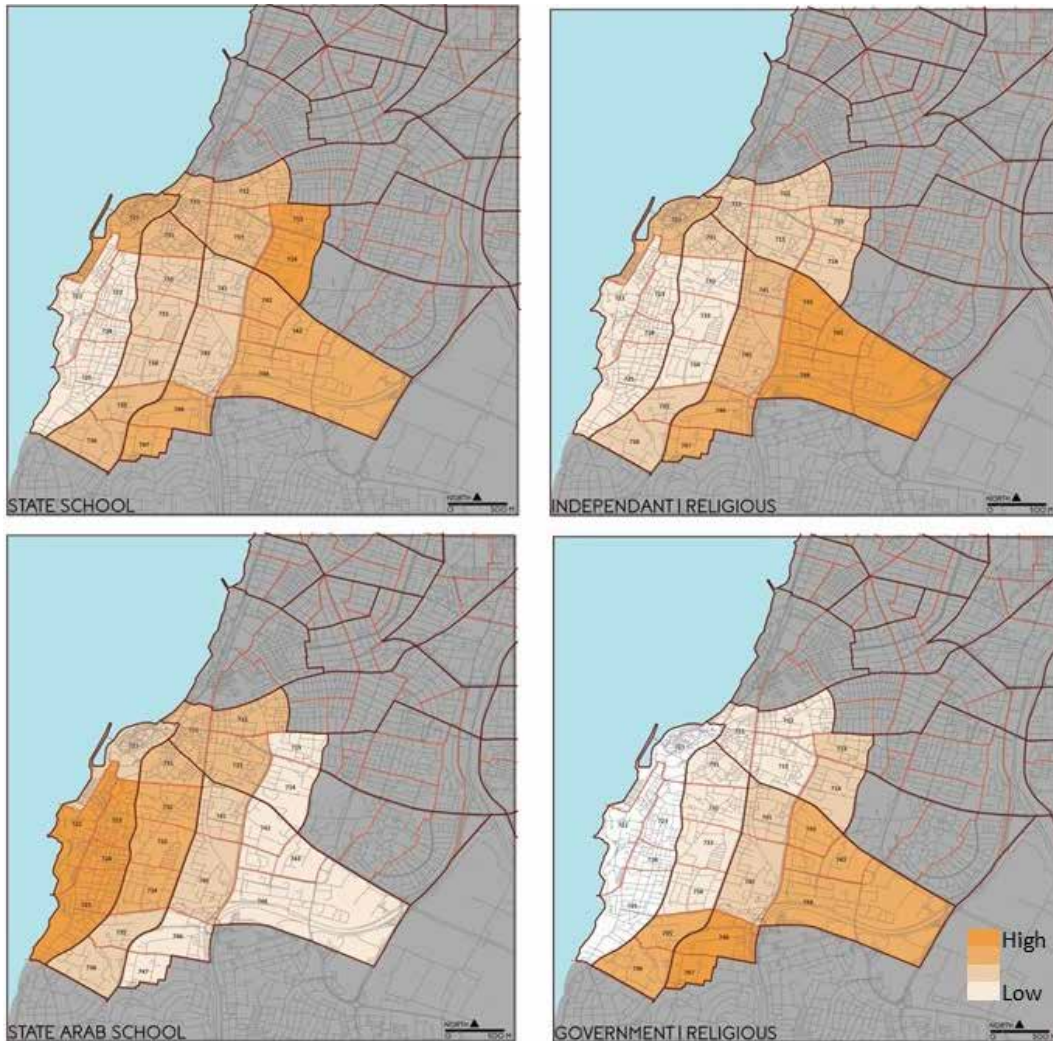


FIG. 8.9 Spatial distribution of school types across Jaffa's sub-quarters: government religious, independent religious, state Arab, and State schools. State Arab schools remain concentrated in the sub-quarters of Ajami and Central Jaffa. The same areas register the sharpest Arab out-migration. State and religious schools primarily serving Jewish communities are distributed across North Jaffa and these areas have registered high Jewish in-migration (see Figures 8.7-8.8). This correlation suggests educational infrastructure has not kept pace with demographic change. This correlation, and its underlying causation, merits further study to understand the broader impact of demographic shifts on economic, educational, and health outcomes in Jaffa. Data source: Tel Aviv-Yafo Municipality; Maps by Author; See NOTE IV

NOTE IV | SOCIO-DEMOGRAPHIC DATASCAPES: MIGRATION, DEMOGRAPHIC SHIFTS, AND EDUCATIONAL INFRASTRUCTURE

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance

HUL Attributes Documented: Socio-cultural practices and values, intangible dimensions of memory, diversity and identity, infrastructure, land use patterns, economic processes

What this map reveals: What these maps reveal: Together, the maps document two interrelated dimensions of Jaffa's socio-spatial condition. Arab population movement is concentrated in the west, central and southern sub-quarters, particularly Ajami and Central Jaffa, while Jewish migration is most pronounced in North Jaffa and sub-quarters bordering Tel Aviv. Negative migration trends in Arab population in several sub-quarters point to displacement driven by gentrification and rising housing costs. By 2020, Jewish migration shows a southward extension into the mixed city, indicating an accelerating reconfiguration of Jaffa's demographic geography. The educational infrastructure maps reinforce this picture. State Arab schools are concentrated in the Ajami and Central Jaffa, which corresponds to Arab majority residential areas, while state and religious schools serving Jewish communities are distributed across North Jaffa. When compared with the demographic movements, the maps reveal a correlation and causation of migration and lacking supporting infrastructure of education.

Relevance to Spatial Sustainability: These datascares collectively make visible the structural gap between the municipality's stated vision of Arab- Jewish shared co-existence and the spatial realities of everyday life in Jaffa. Demographic displacement and ethnically segregated educational infrastructure are not incidental, they are spatially structured by planning decisions, real estate pressures, and the uneven distribution of investment documented throughout this research. Access to education is not only an infrastructural question but a cultural one: the language of instruction, spatial location, and community character of schools shape identity, belonging, and intergenerational continuity. The absence of shared educational spaces across most sub-quarters reflects the broader challenge of translating co-existence from a planning objective into the lived spatial organisation of the city.

Relevant SDG Targets:

- 4.1: Ensure inclusive and equitable quality education for all
 - 4.5: Eliminate disparities in education and ensure equal access for vulnerable groups
 - 10.2: Promote social, economic, and political inclusion of all, irrespective of background
 - 11.1: Ensure access to adequate, safe, and affordable housing for all
 - 11.3: Enhance inclusive and sustainable urbanisation and participatory planning
 - 16.b: Promote non-discriminatory laws and policies for sustainable development
-

8.4.4 Mapping Cultural Ecosystem Services

As highlighted in previous discussions on the role of cultural ecosystem services (CES) in sustainable heritage planning, mapping these values enables us to capture the socio-cultural, economic, cultural, and ecological dimensions of urban life (Figure 8.9). This reflects the broader need, emphasised in UNESCO’s Historic Urban Landscape approach, to view cities as dynamic entities shaped by both tangible and intangible values. Digital tools such as machine learning and big data offer innovative pathways to document, classify, and visualise these attributes, bridging conceptual frameworks of sustainability with operational methods of analysis.

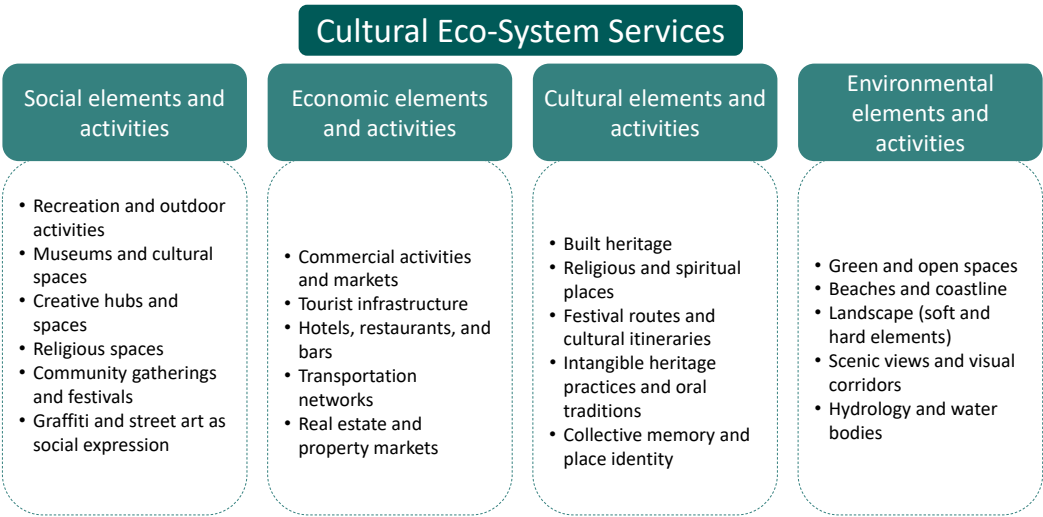


FIG. 8.10 The Cultural Ecosystem Services are classified along four main categories: social, economic, cultural, and ecological, forming the basis for training the machine learning model.

In order to label multiple categories for each image, the work was formulated as multilabel classification. In this study, images from the popular social media service Flickr were employed. A location filter representing the study area, with a designated bounding box with coordinates to cover the desired area of historic Jaffa, was utilised to gather all images taken in this study area until February 2021, resulting in 3738 photos. Supplementary information provided by Flickr, including geographical coordinates, photo titles, descriptions, capture dates, and associated tags, was extracted. The study’s emphasis is placed on the photos themselves, photo coordinates, and the dates when the photos were taken.

The attributes of CES, as framed in this research, build on the recognition that heritage values are simultaneously tangible and intangible. Elements of landscapes embody ecological services, economic uses, socio-cultural significance, and cultural symbolism. These layers are not static but represent plural values expressed through people's behaviours, perceptions, and activities, which can be captured through Volunteered Geographic Information such as Flickr imagery. By grounding the classification task in these four CES categories, the study connects technical modelling with the broader conceptual goal of sustaining urban heritage landscapes.

In order to create heatmaps, the ViT model was applied to all images, including those used for model training and evaluation. This model generated likelihood estimates for each image's association with the various categories of CES (cultural, ecological, economic, and socio-cultural values). Subsequently, these model-predicted likelihood values were used in QGIS to generate heatmaps (Figure 8.11 and 8.12).

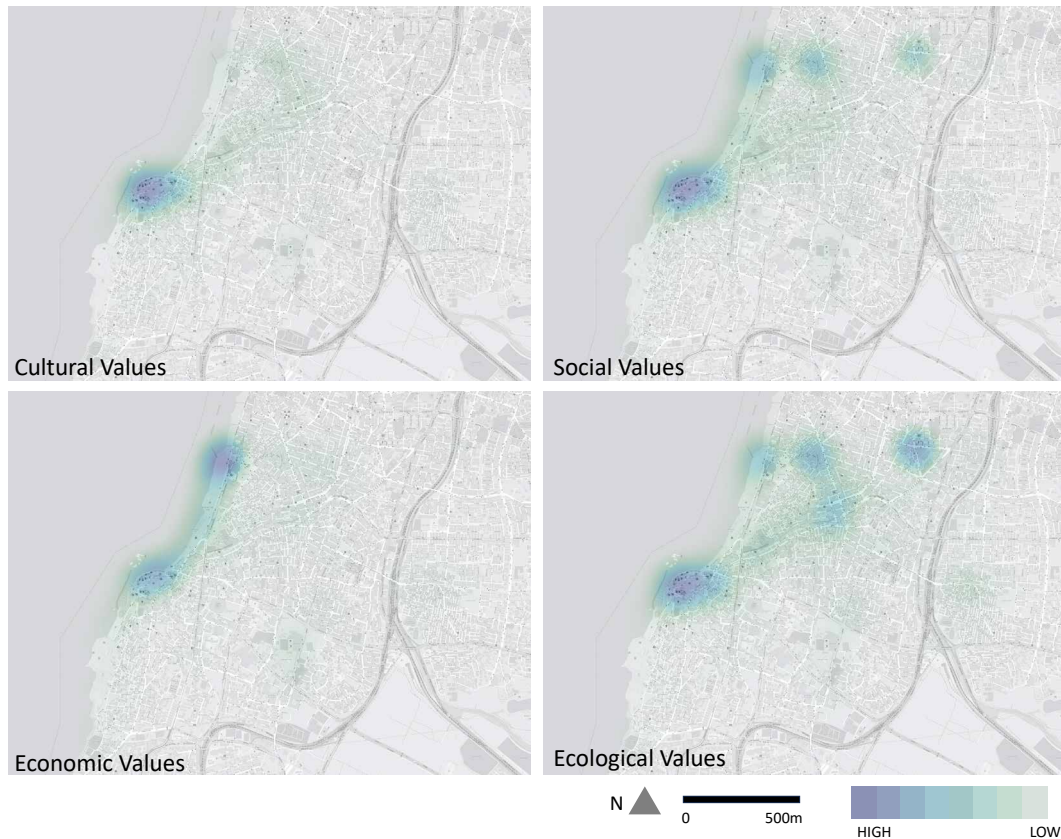


FIG. 8.11 Heat maps of Cultural Ecosystem Service values across Jaffa and Tel Aviv, derived from machine learning classification of Flickr imagery. Read collectively, the four maps reveal areas of convergence and divergence across value systems, showing how urban space is shaped by overlapping and competing priorities. Read separately:

- (i) Cultural values are concentrated in Old Jaffa, reflecting the alignment of contemporary activity with sites of historical significance, though this concentration also points to the uneven and selective embedding of cultural value across the wider urban landscape.
- (ii) Social values show a more dispersed pattern, extending northward along the coastline and into North Jaffa and Neve Tsedek, revealing networks of community activity and public engagement within accessible shared spaces.
- (iii) Economic values cluster around Old Jaffa, Saron, and Ha Carmel and Levinski markets, sites of heritage-led urban regeneration that have contributed to rising real estate investment, densification, and shifting demographic patterns.
- (iv) Ecological values are distributed primarily along the coastline between Jaffa and Tel Aviv, foregrounding the role of natural systems as among the few spatially accessible and inclusive landscapes within an otherwise intensifying urban environment.

Source: K. Potdar and K. Dabhadkar (2021); Base map: OpenStreetMap. See NOTE V

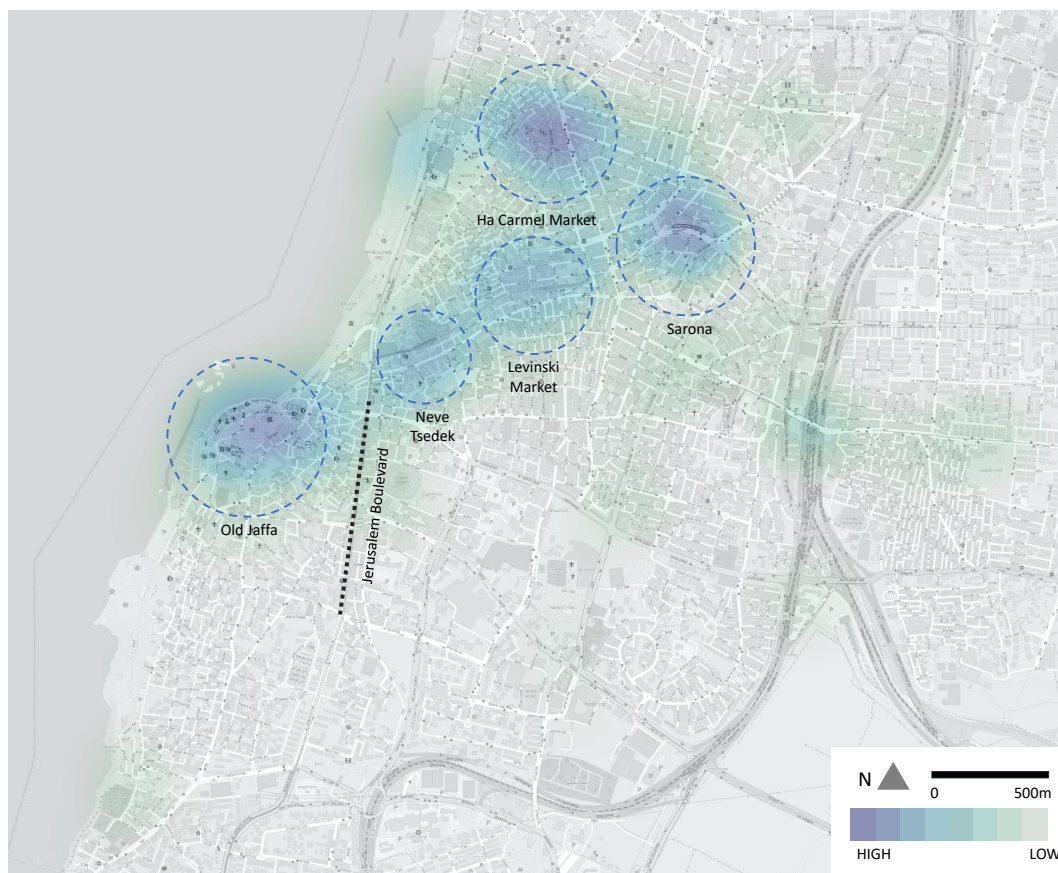


FIG. 8.12 The combined Cultural Ecosystem Services heat map derived from machine learning classification of Flickr imagery, showing the spatial distribution and intensity of all CES values across Jaffa and the adjacent Tel Aviv neighbourhoods. The highest concentrations cluster around Old Jaffa, Ha Carmel Market, Levinski Market, Neve Tsedek, and Sarona: all sites of heritage-led commercial transformation situated along or near Jerusalem Boulevard. The spatial footprint of these converging values is extending toward Jerusalem Boulevard, signalling an ongoing reconfiguration of socio-cultural and economic dynamics as a transition evidenced by demographic shifts, rising real estate values, and the construction of the light rail. The dotted line marks Jerusalem Boulevard as the emerging zone of value extension and planning pressure. Source: K. Potdar and K. Dabhadkar (2021); Base map: OpenStreetMap. See NOTE V

NOTE V | MACHINE LEARNING DATASCAPE: CULTURAL ECOSYSTEM SERVICES

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance

HUL Attributes Documented: Cultural and social practices, economic processes, open spaces and natural environment, intangible dimensions of heritage, diversity and identity

What this map reveals: The combined heat map of all Cultural Ecosystem Service values: cultural, social, economic, and ecological that are derived from machine learning classification of 3,738 Flickr images, reveals a clear spatial concentration of activity in Old Jaffa, North Jaffa, and along the coastline, with secondary clusters extending toward Neve Tzedek and the market areas. The intensity of overlap in these zones indicates sites where multiple value systems converge, heritage, social activity, economic use, and ecological presence that points to areas of heightened spatial significance. Notably, the southern neighbourhoods of Ajami and Jaffa Dalet register significantly lower CES intensity, reflecting the uneven distribution of heritage recognition, tourism investment, and urban attention across the historic landscape.

Relevance to Spatial Sustainability: The spatial distribution of CES values reflects the socio-economic and heritage inequalities documented throughout this research. The zones of highest intensity align with historic markets and public spaces that have been converted into commercial and tourist venues; a process that has commodified cultural and social value while pushing out the communities that shaped these places. The near absence of CES intensity in southern Jaffa points to neighbourhoods whose cultural and ecological assets go largely unrecognised in planning practice. The extension of activity toward Jerusalem Boulevard signals the outward spread of these economic pressures, with consequences for social cohesion, cultural identity, housing affordability, and the everyday heritage practices of communities in its path. Integrating CES mapping into planning and heritage governance offers a more grounded basis for directing attention and resources where they are most needed

Relevant SDG Targets:

- 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage
 - 11.3: Enhance inclusive and sustainable urbanisation and participatory planning
 - 10.2: Promote social, economic, and political inclusion of all, irrespective of background
 - 8.9: Promote sustainable tourism that creates jobs and promotes local culture and products
 - 15.9: Integrate ecosystem values into planning and development processes
 - 4.7: Ensure education for sustainable development and appreciation of cultural diversity
-

The heat maps confirm the concentration of CES in Old Jaffa, North Jaffa, Neve Tzedek, and along the coastline, reflecting a spatial alignment between cultural tourism activity, heritage sites, and user-generated footfall. This concentration is not incidental but mirrors the uneven distribution of heritage investment and planning attention across the city. These mapped distributions resonate with the broader socio-spatial heterogeneity of Jaffa highlighted earlier. The gentrification processes, shifting demographics, and spatial conflicts in the historic core intersect with the mapped CES values, showing how user-generated content mirrors lived realities of change. By visualising these plural datasets, the research makes visible the cultural ecosystem services embedded in the historic urban landscape, offering new ways to evaluate sustainability and inform heritage-sensitive planning.

8.4.4.1 Limitations and Scope of the Exercise

The Flickr image dataset is likely skewed toward users with internet access and mobile devices, with a significant proportion of images contributed by tourists rather than residents. This limitation may affect the representativeness of the data. This exercise nonetheless aims to initiate a conversation around CES in Jaffa and its historic urban landscape, and to identify the components that constitute these services. To capture values directly from residents at a micro level, a community mapping workshop was conducted (§ 9 and Annex V)

One of the primary advantages of training machine learning models is the capacity to automate the labelling process, facilitating rapid quantification of CES value distribution at scale. A random sample of 1,000 images from the total pool of 3,738 was selected for expert labelling. Unlike conventional image classification models that make discrete determinations regarding the presence or absence of entities, this approach recognises that a given image can encompass one or more CES values, each with independent probabilities. Thus, it frames the problem as a multilabel classification challenge that more accurately reflects the complexity of urban heritage values.

8.5 Discussion

A significant gap persists in the way Arab and Jewish heritage are perceived, represented, and preserved today, largely as a result of historical and political processes. While the Tel Aviv-Yafo municipality is among the few institutions in Israel actively attempting to address this imbalance, these efforts remain limited without more comprehensive documentation, recognition of diverse heritage attributes, and stronger integration within planning and preservation frameworks. It is critical for historic cities with partitioned urban zones and contested landscapes, where poorly informed interventions risk intensifying socio-spatial segregation and reinforcing spatial homogeneity. The explorations for interpreting the spatial impacts of cultural tourism within heterogeneous and contested landscapes, points to the potential for facilitating more informed urban design and planning decisions that promote social inclusion and sustainable economic growth.

The datascares produced in this study make these dynamics measurable. Since 2020, the municipality has approved 13 urban renewal plans in the city (adding roughly 3,020 housing units, with a further 4,500 units in the pipeline), underscoring the scale of redevelopment pressure converging on the historic core. Consequently, real estate appreciation of 10–20% is projected over the next three to five years as transit and municipal investment continue. Machine-learning classification of 3,738 Flickr images revealed a marked spatial concentration of cultural and economic ecosystem service values in Old Jaffa and the adjacent market areas, while Ajami and Jaffa Dalet, Gimel, and Dakar registered significantly lower CES intensity, indicating an uneven distribution of heritage recognition rather than a uniform city-wide pattern. This spatial imbalance correlates with the demographic datascares: sub-quarters showing the sharpest Arab out-migration between 2014 and 2020 were also those with the lowest CES intensity. Together, these findings indicate that the city functions as a highly interconnected system, in which the absence of systems thinking in planning and design interventions risks compounding, rather than resolving, existing socio-spatial inequities.

Datascaping can further support advanced spatial analysis through the development of indices and interpretive frameworks. Examples from practice include the mapping of gentrification through a Gentrification Index to inform planning and policy (Yonto & Schuch, 2020), a study for the classification of Urban Shade Index (Aleksandrowicz, 2022) or the Urban Heat Island- heat vulnerability index (Tel Aviv-Yafo Municipality, 2019b). Such approaches demonstrate the value of statistical mapping and visualisation in understanding complex urban conditions.

The integration of machine learning, crowdsourcing, and Volunteered Geographic Information (VGI) further expands the potential of datascaping methodologies. In this study, deep learning techniques were applied to classify and analyse open-source urban photographs, generating spatial datascapes that reveal Cultural Ecosystem Service (CES) values in Jaffa. This approach enables the interpretation of both shared and contested narratives of place, while uncovering socio-cultural and economic dynamics embedded within the urban landscape.

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“I would suggest that
sampling strategies involving people [...]
are more akin to opening a Pandora’s box.”

(Curtis et al., 2000, p. 1008)

9 Datascaping as an Operative Method

This chapter is based on a published article:

– Potdar, K. (2023). Qualitative datascaping for historic cities in conflict: A grounded theory analysis for spatial sustainability. Case of Jaffa, Israel. 10th International U&U PhD Seminar, 185–196. https://orbi.uliege.be/bitstream/2268/304771/1/UU_Proceedings_FINAL_compressed.pdf

9.1 Datascaping as an Operative Method for Informed Decision-Making

While theories, international guidelines and research stress the significance of integrating heritage and cultural dimensions within decision-making frameworks (§ 2), the analysis of multi-level governance processes involving stakeholders across disciplinary fields and urban scales reveals a persistent challenge of translating these principles into effective planning practice (Labadi & Logan, 2016). Although stakeholder engagement is recognised as a crucial factor in implementing sustainability practices, divergent mandates, agendas, priorities, and expectations among actors often hinder achieving these goals. This may stem from entrenched path-dependent frameworks and neo-functional practices as well as limitations in institutional resources and expertise (§ 6). It's further compounded by political aspirations, leading to a growing need for epistemic methods that support informed decision-making. Such methods are necessary to structure complexity, mediate between competing forms of knowledge, and render decision-making processes more transparent and accountable across scales.

While exploratory datascaping has been examined before (§ 7 and 8), the challenge lies in enabling datascares to move beyond representation and actively inform design reasoning and planning priorities, thereby functioning as an operative method (Shane, 2006). Operative aspect is defined here not as the mere capacity to produce analysis, identify priorities, and support decisions in the abstract, but

as the capacity to translate HUL knowledge into structured evidence capable of shaping planning priorities, evaluation, and decision-making in practice. This chapter operationalises systems thinking through content analysis and presents **datascaping as a relational analytic method** (§ 4.1.1), synthesising heterogeneous cultural, spatial, and socio-economic data into structured patterns, both spatial and non-spatial, that have the potential to support more informed urban design and planning strategies. In doing so, this chapter extends datascaping from an interdisciplinary method into a transdisciplinary one: through in-depth interviews and community mapping, stakeholders and residents contribute not only as sources of data but as co-producers of the knowledge structured and visualised through datascaping

9.2 Problem statement: Jaffa's Contested Spatial Complexity

This exploration builds on the analysis and evaluation of the current urban planning frameworks and implications on the historic urban environment in Jaffa and Tel Aviv-Yafo as a whole. Path-dependent institutional mandates in Tel Aviv-Yafo reinforce institutionalised and routine heuristic practices which rely on established categories and precedents (§ 4.3.1, § 6.2.2,). In this form, heuristics are constraining rather than enabling innovation, thus limiting the adoption of process-driven and adaptive planning approaches that move beyond conventional frameworks.

Similarly, analyses of the city's past and current local plans (Annex II) reveal a persistent disciplinary fragmentation, in which cultural sustainability remains weakly integrated into spatial planning, thus perpetuating practices where urban heritage is either pitched against development or reduced to an economic instrument.

For instance, the redevelopment of the Jaffa port area and the hangars into commercial and tourist venues¹⁰⁰ raises questions about the balance between economic priorities and the ethics of historic building conservation¹⁰¹. In turn, such interventions have ripple effects on other aspects, such as increasing real estate prices, gentrification, and spatial segregation, and privileging economic agendas over social and cultural sustainability¹⁰².

Understanding heritage thus requires situating attributes and their values within their specific urban context, rather than applying generic guidance across vastly different institutional and governance settings (Erkan, 2018). Given the intergovernmental and cross-sectoral nature of heritage conservation (Rey-Pérez & Pereira Roders, 2020; UNESCO WHC, ICCROM, IUCN, 2020), documenting how these attributes and values are understood by different stakeholders across urban scales becomes essential for translating the HUL approach into context-specific, actionable strategies. While existing literature focuses on the actual attributes and elements of values beyond the built and protected heritage and including the urban landscape, there is limited research that documents and assesses how these attributes are evaluated by different stakeholders across multiple urban scales, and what is the potential relevance towards contributing to spatial sustainability.

In addition, critiques of the HUL recommendations (§ 3.2.2) point to the risks associated with AHD, which may risk perpetuating power relations among experts, institutions, and inter-governmental frameworks, thereby constraining their capacity to act as agents of change (Aronsson, 2014; Kisić, 2013).

¹⁰⁰ The redevelopment of Jaffa Port's historic warehouses into a commercial and leisure complex, costing 150 million NIS, drew criticism from local residents and the Heritage Conservation Council, raising questions about the demolition of pre-state structures and the prioritisation of commercial interests over heritage conservation (Riba, 2023). One specific concern regarding an elevated walkway obstructing residential sea views was raised during the public planning process and reported in local media

¹⁰¹ The ethics of Historic Building Conservation are guided by the principles of authenticity and integrity and incorporated into the UNESCO Operational Guidelines (UNESCO, 2025). Authenticity, as redefined in the 1994 Nara meetings, refers to "...the truthful and credible expression of a property's cultural values through diverse attributes, including form, materials, traditions, techniques, language, and intangible dimensions such as spirit and feeling". Integrity denotes "...the wholeness and intactness of a property and its attributes, requiring that it contain all elements necessary to express its value, be of adequate size, remain free from adverse effects, and maintain the spatial, functional, and visual coherence through which its historical processes and territorial context are legible" (ICCROM & Jokilehto, 2016)

¹⁰² The proposed municipal plan for Kedem Street in Ajami, a residential street running parallel to the coastline between Jaffa Port and Bat Yam, drew rare joint Arab-Jewish community opposition in 2012. The plan proposed widening Kedem Street into a 15-metre multi-lane road, prioritising hotel and high-end residential construction while effectively severing the existing residential neighbourhood from beach access. Around 100 residents organised a petition and public protest, with community representatives describing the plan as "a tragedy for the residents of Jaffa, Jews and Arabs" and "an economic transfer", highlighting how infrastructure and development decisions in Jaffa consistently serve market interests over the needs of existing communities (Zonszein, 2012)

This chapter, therefore, evaluates HUL attributes through in-depth interviews (Hereafter IDI) with stakeholders at local, district, and national levels of urban planning and heritage management. Adopting a heuristic and knowledge-driven approach (§ 4.3.1), the research examines how stakeholder knowledge can be documented and visualised through datascaping to reveal the spatial implications of contested urban heritage in Jaffa and inform sustainable spatial planning and design frameworks (Sub RQ 1.b and 1.c, § 1.3.3).

9.3 Methodological and Conceptual Framework

9.3.1 Systems Thinking and the Speed of Urban Change

The practical application of systems thinking within urban planning and heritage studies is emphasised in research for managing complex relations, while supporting resilience, adaptability, and inclusive approaches capable of responding to urban dynamism (Orr, 2014). The value of understanding the city not merely as its individual components but as a complete system that performs and evolves across multiple spatial and temporal scales. Along with this theory, the impacts of exogenous life-cycles and endogenous drives align with the temporal dimension and the institutional capacities (§ 3.2.1.1). Together, these perspectives establish the basis for understanding urban heritage as an interconnected and evolving system shaped by multiple interacting temporal processes.

This brings forth the concepts of speed of change and pace layering (Brand, 2018; Orr, 2014; Snickars et al., 1982; Von Bertalanffy, 1969). Studies show how the consideration of spatial and temporal scales in urban studies has evolved over time (Batten et al., 1984; Wegener, 1986), while related theories demonstrate how urban processes, interventions and implementation of plans and policies are relative to the slow-, medium-, and fast-changing processes, thereby highlighting the spatio-temporal dynamics of cities. The research aims to contribute to identifying the relation between the speeds of change and the attributes of HUL, in an attempt to bridge the gap between documentation, value assessment and their integration into planning process.

The concepts of speed of change and pace layering carry various interpretations in relation to space, time, and urban attributes. Speed can be understood either through the inherent capacity of attributes or urban components to evolve, absorb, or accommodate change over time within the pace layer model (Brand, 2018) or through the impacts generated by interventions within the physical structure of cities across time, as described through urban change processes, stimulus-response relationships, and reversibility schemes (Batten et al., 1984). Together, these perspectives provide a framework for understanding how different urban attributes respond unevenly to transformation, intervention, and external pressures across time.

The pace layering model distinguishes between very slow- and very fast-evolving elements, along with their relationship to scales of size and their capacity to absorb or respond to shocks and transformations (Figure 9.1). Some components possess the capacity to absorb disturbances and maintain continuity, while others may undergo rapid transformation or disappear altogether. However, each layer remains interconnected with the next, reinforcing the principles of systems theory and highlighting the integrated nature of urban systems. The model therefore emphasises that urban resilience depends not only on recognising individual layers, but also on understanding the relationships, dependencies, and varying temporalities between them.

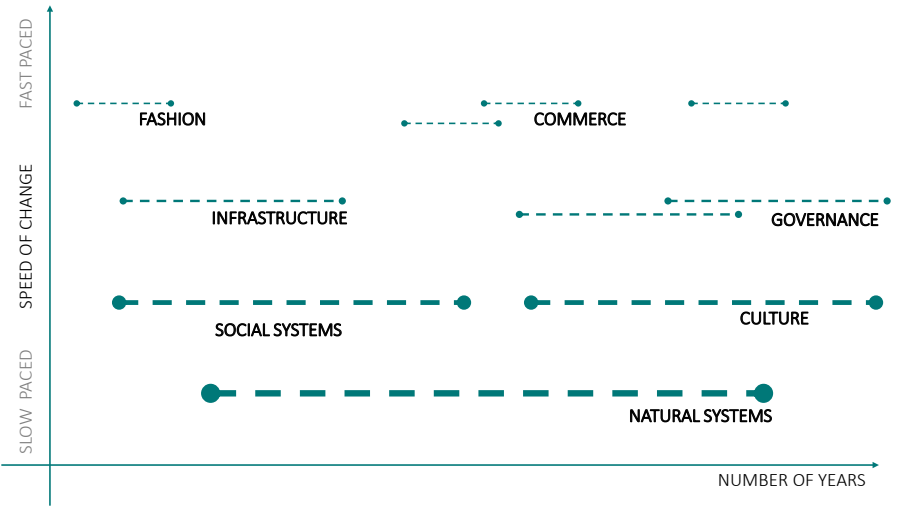


FIG. 9.1 Adopting Freeman Dyson’s theory (Dyson, 1992), a representation of the concept of speed of change within time scales: Nature that evolves over the time scale of millennia, culture over centuries, governance and infrastructure over decades, commerce over years and fashion less than a year. This shows how various attributes of our city’s ecosystem have varying speeds of change, from extremely slow to a very quick pace. Source: (Brand, 2018)

Theories of urban change processes conceptualise urban transformations and interventions through differing temporal speeds and capacities for adaptation. These approaches distinguish between slower-changing structural and infrastructural systems, medium-speed economic, social, and technological transformations, and faster-changing processes associated with mobility, circulation, and everyday urban activity. Such frameworks also incorporate stimulus response and reversibility relationships, where interventions (e.g., residential construction, economic shifts, or mobility patterns) act as stimuli affecting the stock or components of the urban system, including buildings, employment structures, and labour mobility. Economic vitality is essential to sustainability, but it becomes a problem when its effects on slower-changing social, cultural, and environmental systems go unnoticed or unevaluated. In general, slower-changing processes tend to exhibit greater irreversibility due to their long-term spatial and structural impacts, whereas faster-changing processes may remain comparatively more adaptable or reversible over time.

Fast gets all our attention, slow has all the power. Fast learns, slow remembers. Fast proposes, slow disposes. Fast is discontinuous, slow is continuous (Brand, 2018)

Applied to HUL attributes and urban interventions, this framework helps reveal which heritage values and urban characteristics are most susceptible to rapid transformation and which remain deeply embedded and resistant to change. Such an understanding offers important insights for prioritising conservation strategies and managing urban transformation across different temporal scales. While the research does not seek to quantitatively model these temporal processes, the concepts provide an important interpretive framework for understanding the varying speeds, impacts, and need to balancing different temporalities of urban change and preventing short-term interventions from producing irreversible consequences for slower-changing systems.

Figure 9.2 shows that short-term plans tend to capture fast-changing attributes like fashion and commerce, while long-term plans capture slower ones like infrastructure and natural systems, however, neither on its own covers the full picture. Only when short-, medium-, and long-term planning are integrated together does the full range of urban attributes get addressed, from the fastest to the slowest. This links back to the pace-layering idea introduced earlier: it shows how planning that works on just one time horizon risks overlooking attributes that don't fit that horizon, and why bringing all three together matters. In short, economic vitality is essential to sustainability, but it becomes a problem when its effects on slower-changing social, cultural, and environmental systems go unnoticed or unevaluated.

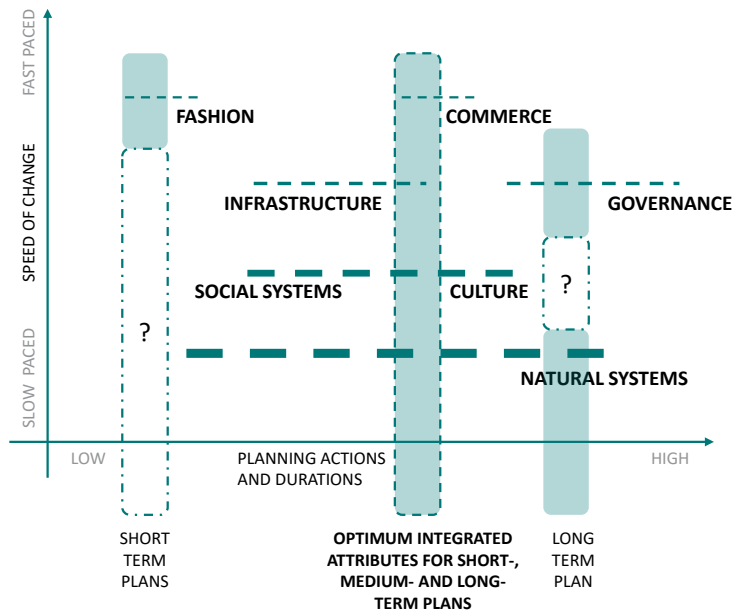


FIG. 9.2 Diagram illustrating the relationship between speed of change, HUL attributes, and planning horizons. The vertical axis maps attributes from slow-paced natural systems to fast-paced fashion and commerce, while the horizontal axis indicates planning actions and durations from short- to long-term. The optimum integration of attributes across all three planning horizons: immediate actions, strategic interventions, and structural transformations is essential for temporally responsive and spatially sustainable planning. Adapted from Brand (2018); Figure by Author

Planning actions and durations:

- **Short-term (1–5 years):** policy interventions, community programmes, conservation guidelines
- **Medium-term (5–15 years):** local area plans, urban renewal frameworks, infrastructure investment
- **Long-term (15–30 years):** metropolitan strategies, regional planning, territorial governance

9.3.2 Content Analysis

Content analysis is a qualitative research method aiming at the evaluation of collected datasets in various formats and coding recurring themes, classifications, and patterns. As elaborated by Krippendorff, the method provides a rigorous and structured framework to analyse information and enable the researchers to interpret large volumes of data in a systematic manner (Krippendorff, 2004a, 2004b). It allows content to be examined within predefined classifications using coherent concepts, often involving information from interviews, transcripts, maps, drawings, and archival materials. In this study, content analysis was applied to interview transcripts using open, axial, and selective coding; this enables retrieval of texts based on labels created for further analysis (Hennink et al., 2020).

9.3.3 In-depth Interviews

The in-depth interview method adopted for this exploration is a qualitative approach used to collect data, gather reflections, and generate empirical knowledge through questions focused on specific themes (Porta, 2014). It demands significant resources and requires the researcher to develop an ethical and carefully structured interview framework, as well as interpret nuanced and at times disorganised qualitative data (Osborne & Grant-Smith, 2021). These are often described as “conversations with a purpose” (Ritchie et al., 2013; Rubin & Rubin, 1995), as knowledge is constructed through interaction between the interviewer and interviewee. A key strength of this method lies in its balance between structure and flexibility: while guided by a topic framework, interviews can follow participants’ responses and emerging themes. The method is also interactive in nature, with follow-up questions and probes used to explore participants’ underlying reasons, feelings, and beliefs in greater depth (Legard et al., 2003).

9.3.3.1 Design and Execution

The interviews were designed to facilitate discussion between the interviewer and respondents while still allowing flexibility for deeper exploration of insights and experiences (Weiss, 1994). It included ground-mapping questions to initiate conversation, explanatory probes to explore reasons behind actions or beliefs, narrative and reflective probes to understand participants’ relationships to the subject, and clarificatory probes to obtain detailed and assumption-free responses (Ritchie et al., 2013).

Literature suggests that the minimum number of participants required for in-depth interviews (IDIs) should correspond to the number of criteria used to characterise the study sample (e.g., designation, level of operation at the city scale, expertise, age, and gender), with each variable multiplied by three (Babbie, 2004). The three main variables for this study were designation, level of operation at the city scale, and expertise, whereas age and sex did not directly influence respondent selection. Interviews (n=27) were conducted with individuals who voluntarily agreed to participate in the study. Hence, the number of interviews conducted was sufficient for this qualitative research.

The snowball sampling method¹⁰³ based on research objectives allowed the list of interviewees to expand organically, as most interviews led to suggestions of additional persons relevant to the research and its objectives.

Participants of this study were selected among local and international public sector/provincial authorities, private sector/entrepreneurs, academicians, residents, and tourists. Each participant was given complete information about the project, ethics and consent requirements, which were obtained prior to conducting the interview, including permission to record, transcribe, and analyse the data for academic purposes. It also included an option to opt out to allow participants to exercise their rights and freedom to withdraw without providing any reason. Personal data, such as gender, age, type of mobility impairment, and employment status, was anonymised and used solely for reporting purposes. As the study involved no invasive procedures, formal ethical approval was not required.

A total of 27 interviews were carried out between 2019 and 2023¹⁰⁴, and the ongoing explorations at various stages were shared with the participants (Table 9.1). Twenty-five interviews were carried out in person with the interviewees at various locations such as homes, offices (private and public), university, institutions, cafés and book stores, shisha café, hummus joints and on field. Two interviews were carried out via an online communication platform (Zoom) due to the physical unavailability of the interviewee, as well as due to limitations imposed by the COVID-19 lockdown and inaccessibility. The average duration of each interview ranged from 60 minutes to 120 minutes. There were several factors influencing the time required for these interviews: Language, combined activity of mapping, site visits or walking interviews around Jaffa, level of interest (Professional), level of interest (Personal). Interviews were conducted in English, although many terms, names of institutes that participants shared were in Hebrew and translated.

¹⁰³ Snowball sampling is a method in which initial participants recommend further respondents, making it useful for reaching populations that are difficult to access (Atkinson & Flint, 2003). It was adopted here given the challenges of recruiting stakeholders in Jaffa's planning and heritage sectors, where access was limited, availability varied, and willingness to participate could not always be assumed.

¹⁰⁴ Interviews and their specific date of being carried out: 2019 ($n=1$), 2021 ($n=1$), 2022 ($n=25$)

TABLE 9.1 List of interview respondents, designations, expertise and affiliation/ role. Detailed list in Annex IV.

Urban Actors			Experts	Civil Society	Community
National	District	Local			
Israeli Planning Administration	Tel Aviv District Committee	Strategic Planning Department (Yaffo section), TLV Municipality	Urban Planners	Ecologist, Landscape Architect, Society for the Protection of Nature, Israel	Local community (Residents of Jaffa)
	Israel Antiquities Authority	Historic Preservation Department, TLV Municipality	Urban designers	Architect and planner, Jaffa Islamic WAQF	Local community (Tourist Guide)
		VP Tourism, Tel Aviv Global	Geographer	Israeli Council for Preservation	
			Conservation architects		
			International Experts at ICCROM, Rome, Italy		

The interview questions were formulated following the first research phase, where a set of all concepts emerging from the key research questions' related literature review and datascaping carried out on the case study was shared with the respondents (Datascaping in § 7 and 8). Narrative data was collected via in-depth interviews, where the participants could assess the method of generating information through datascaping and its applicability, limitations, or challenges from an individual perspective.

The interviews were conducted in two steps:

- First part focused on the background of the research, the aims of the project, the interviews and the sharing of the work carried out by the researcher. The aim was to receive an impression of the generated datascares and their success rate in conveying information.
- Second part focused on the interviewee, their role and designation, and a discussion on the datascares along with a set of questions towards understanding their professional/individual attitude towards the historic urban landscape of Jaffa and the need for spatial sustainability. This step was supported with printed maps of Jaffa on A3 paper, where the interviewees were encouraged to draw, highlight or mark areas that were most relevant in the discussion.

The recorded transcripts were converted from audio recordings through an automatic online transcription software: Amberscript.com, and then further edited and cleaned manually of any language discrepancies. After the editing of final interview transcripts, the complete responses of the interviews were analysed through open coding software: Atlas.ti. The coding was carried out primarily to document each stakeholder's perception of the significance, relevance, and applicability of HUL Attributes (Articles 9 and 10) in the design, planning, and decision-making process. A detailed coding reference sheet was developed based on the attributes. These attributes were further analysed into sub-categories to capture the nuanced perspectives of each interviewee, which was classified under Jaffa's perception and cognition (§ 9.4.3). The sub-categories and detailed coding were informed by, but not limited to, the Heritage in Urban Context report (UNESCO, 2020). Based on the responses and coding, a structured output was created based on one and/or more parameters as follows:

- 1 Mentions and focused conversations around the attributes of the HUL approach
- 2 Mentions and focused conversations during physical mapping and explanation of their professional/ personal connections
- 3 Mentions and focused conversations on the attributes of the HUL approach based on the datascares shared and further recommendations given.

A non-spatial datascape was created based on the content analysis and the derived variables. The aim was to bring forth the epistemic knowledge as it exists and is envisaged currently in the Israeli and Tel-Aviv-Yafo planning systems, and highlight the gaps based on stakeholder perceptions. The physical mapping carried out is also collated as structured content analysis to highlight attributes of value in Jaffa and the extents of Jaffa as perceived by each respondent (§ 9.4.1).

9.3.4 Participatory Mapping and Community Knowledge

Since relational spatiality in a socially diverse urban context is discursive, it needs to be documented through the collective imaginations of its users as well. This includes the socio-economic and cultural aspects and their consequences on the spatial phenomenon and the representational spaces (Lefebvre, 1974; Soja, 1996). According to Lynch and Hack, even drawings that seem simple or lacking professional quality can provide meaningful insights into spatial and social realities (Lynch & Hack, 1983). Consequently, participatory drawings are useful for exploring how urban users perceive, experience, and make sense of space.

Cartography and methods of mapping have increasingly been democratised (Rød et al., 2001; Wood, 2001) with critical approaches to the communication of spatial information and in its representation. This democratisation, dovetailed with technology, offers innovative potential to articulate social, economic, political or aesthetic arguments (Perkins, 2007) while giving a voice to less-represented communities or matters in discipline and practice. The deployment of this method was mainly to generate knowledge systems and well-informed accounts and their meaningful association to history, culture, society, economics and future development through the lives of its residents. In this sense, the exercise seeks to externalise tacit knowledge by translating lived experiences and implicit understandings to spatial forms for analysis. By establishing a local anchor and sense of rootedness as a means to mitigate the effects of neo-liberal and neo-functional practices and socio-spatial segregation (Cauchi-Santoro, 2016), exercise seeks to document local knowledge systems and make their spatial, social, and experiential dimensions visible.

A community mapping exercise was carried out in a controlled private environment, with participants of various social backgrounds invited. Each participant was given a preliminary survey to answer questions on the case study and to document their background open the floor for discussion. For maintaining uniformity, the same presentation was shared with the participants. This was followed by the main exercise comprised two activities:

- a memory map of their place of residence, and
- a 'Typical Day in My Life' mapping activity carried out on a printed open-source street map of Jaffa, using stickers to denote various daily activities.

The intention was to visually document residents' attitudes toward the socio-spatial configuration of Jaffa (Figure 9.5), capturing the less-represented sense of place¹⁰⁵ and its attributes alongside the lived experience of participants (Annex V). Conversations with participants were transcribed and incorporated into the content analysis and datascaping (Annex IV).

¹⁰⁵ In a study presented by (Hu & Chen, 2018), it outlines the multitudes of variations and extensions of 'sense of place' which include but not limited to: "Imageability, Visual enclosure, Human scale, Transparency, Complexity" (Ewing et al., 2006); "Permeability, Variety, Legibility, Robustness, Visual appropriateness" (Bentley, 1985); The self, The environment, Social interaction, Time (Beidler & Morrison, 2016); "Beach, Lighthouse, Ocean, Restaurants, Shops, Rainforest area, Pub" (Green, 1999)

9.3.5 Limitations

Accessibility, language, and time constraints were the main limiting factors during the interview. While most of the interviewees spoke in English, the main mode of communication, they also preferred to speak in Hebrew and/or Arabic and translate their sentences, which may result in loss of information in translation, as well as the original thought or comment intended to be made. The list of interviewees was constantly updated and restricted to meet the basic needs of the study. Similarly, for the community mapping exercise was carried out with a small set of participants. With the opportunity of more time, resources (Hebrew and Arabic speaking assistants) and safe public or private space to conduct the interviews and mapping exercises¹⁰⁶, the exercise can be scaled up for a more in-depth data collection. Owing to the tensions between communities and the conflict that emerged in May 2021, it may have had an impact on getting full participation of community members.

9.4 Policy, Practice, and Stakeholder Perception in Jaffa

9.4.1 HUL Attributes, Values, and the Speed of Change Across Urban Scales

After carrying out the content analysis for interviews and responses and coding, the following non-spatial datascares depicting perceptions and significance of attributes to each stakeholder at different urban scales were generated (Figure 9.3). It is important to note that each attribute is colour-coded as per the 'speed of change'. Along with this, a collation of the extents of Jaffa was mapped, to demonstrate how Jaffa is viewed differently for its various attributes (Figure 9.4).

¹⁰⁶ The community mapping exercise requires a safe space to be conducive to information and knowledge exchange. In the absence of such a safe public or private space, it may result either in low participation and representation of individuals with various backgrounds or limited information sharing especially in case of contested historic cities.

In the mapping exercise with the communities, the exercise aimed to document the limited spatial extents as perceived by the residents (Figure 9.5). In a city where boundaries have been historically imposed, contested, and redrawn, understanding how residents perceive and define Jaffa's spatial extents is itself an act of heritage documentation. The conversations revealed the current state of affairs and made it possible to document Jaffa on Paper (through policies), through ongoing practices and through the perception of the people engaged at various levels in the city.

As for the objective comparison of values given to attributes during the discussion of Jaffa as an HUL and datascaping methods, stark differences are observed for each attribute at different operational urban levels. The additional information for each attribute and its speed of change is very relevant in this analysis, as observed, the fast-changing attributes of economics are given more importance at all levels, making it evident the role of economics in the life of the residents and the city's functioning. The attribute of infrastructure above ground is more important at the national and district levels, since most of the railroad and network plans and decisions are taken top-down, and city officials are consulted during the process. The attributes of geography, geo-morphology and hydrology are granted less immediate relevance, since the speed of change is not noticeably fast; this is also applicable to the impacts of interventions on these attributes, which are slow. What emerges is a hierarchy of value shaped as much by governance scale and speed of change as by intrinsic significance, with slow-changing natural attributes consistently at risk of being deprioritised.

This relationship between the speed of change of HUL attributes and their relevance across planning horizons is illustrated in Figure 9.3, which maps attributes from slow-paced natural systems to fast-paced commerce and fashion against short-, medium-, and long-term planning actions. This framing suggests that while fast-changing attributes dominate planning priorities, the slower-changing ecological, geographical, and cultural layers should inform practice. Similar values are applied towards land-use and spatial organisation at the national and regional level, which are also part of top-down planning frameworks. Such interventions and planning decisions, however crucial and beneficial, may create borders and fringe issues in cities if not dealt with in a holistic manner. The attributes of the built environment (historic) are more important at the local level, as local area plans are envisaged at the municipality level and approved by higher authorities. The starkest difference appears to be the attributes of social and cultural values, which are encompassed in the 'sense of place', and it is evidently more important for the local communities and the civil society organisations as opposed to the planning authorities. This also highlights the lacuna in information documentation and integration.

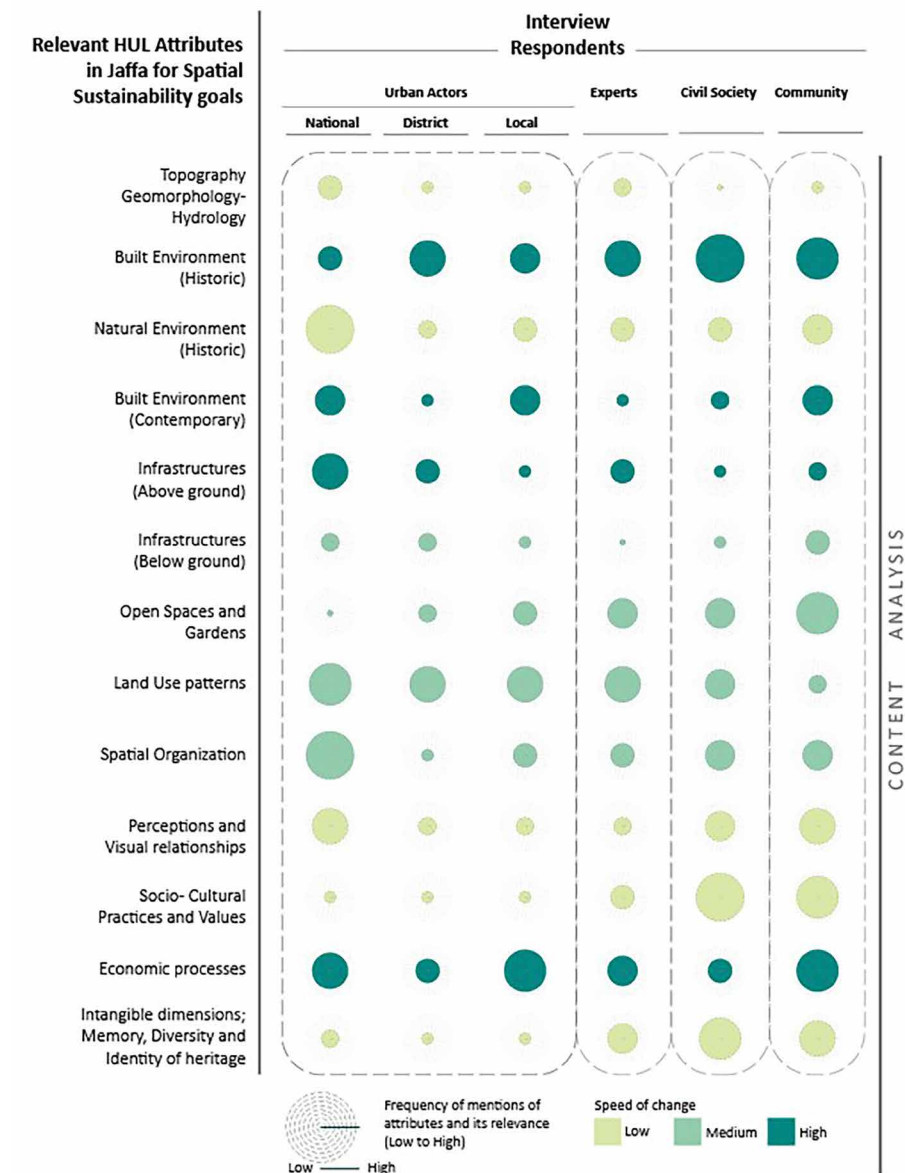


FIG. 9.3 A non-spatial datascape derived from content analysis, which maps the perceived relevance of HUL attributes in Jaffa across stakeholder groups: national, district, and local urban actors, experts, civil society, and community; alongside their assessed speed of change. Circle size indicates frequency of mention and perceived relevance; colour denotes speed of change, from low to high. It reveals that value assigned to attributes varies not only by speed of change but by stakeholder scale, with fast-changing, economically visible attributes prioritised across most levels and slower-changing attributes such as geography and hydrology at risk of being overlooked. This offers an evidence base for prioritising interventions across planning horizons; Figure by Author (2023), See NOTE VI

NOTE VI | CONTENT ANALYSIS DATASCAPE: HUL ATTRIBUTES, STAKEHOLDER PERCEPTIONS, AND SPEED OF CHANGE

Reading the Datascape: HUL Attributes, Spatial Sustainability, and SDG Relevance:

HUL Attributes Documented: All HUL attributes across topography, geomorphology and hydrology, built environment (historic and contemporary), natural environment, infrastructures, open spaces, land use patterns, spatial organisation, socio-cultural practices, economic processes, and intangible dimensions of memory, diversity, and identity

What this map reveals: The datascape documents the perceived relevance of HUL attributes across six stakeholder groups: national, district, and local urban actors, experts, civil society, and community with circle size indicating frequency of mention and colour denoting speed of change. Economic processes, the historic built environment, and above-ground infrastructure are consistently identified as high- priority attributes with high speeds of change across most stakeholder groups, pointing to their immediate vulnerability to urban transformation. In contrast, topography, hydrology, below-ground infrastructure, and intangible dimensions of memory and identity receive lower frequency of mention, particularly among institutional actors, revealing a systemic gap in how slower-changing but foundational attributes are recognised in planning practice. Civil society and community respondents show a broader and more distributed recognition of HUL attributes, suggesting that lived experience generates a more holistic reading of the historic urban landscape than institutional frameworks currently reflect.

Relevance to Spatial Sustainability: Economic processes, the historic built environment, and above-ground infrastructure are consistently identified as high-priority attributes with high speeds of change across most stakeholder groups, pointing to their immediate vulnerability to urban transformation. In contrast, topography, hydrology, below-ground infrastructure, and intangible dimensions of memory and identity receive lower frequency of mention, particularly among institutional actors, revealing a systemic gap in how slower-changing but foundational attributes are recognised in planning practice. Civil society and community respondents show a broader and distributed recognition of HUL attributes, suggests lived experiences reflect a more holistic reading of the historic urban landscape than institutional frameworks currently reflect.

Relevant SDG Targets:

- 11.4: Strengthen efforts to protect and safeguard cultural and natural heritage
 - 11.3: Enhance inclusive and sustainable urbanisation and participatory planning
 - 10.2: Promote social, economic, and political inclusion of all, irrespective of background
 - 16.7: Ensure responsive, inclusive, and representative decision-making at all levels
 - 8.9: Promote sustainable tourism that creates jobs and promotes local culture and products
 - 1.4: Ensure equal rights to economic resources, property ownership, and access to basic services
 - 4.7: Ensure education for sustainable development and appreciation of cultural diversity
-

9.4.2 Jaffa's Spatial Extents: Perceived versus Planned

During the conversations with the stakeholders, the extents of Jaffa were mapped (Figure 9.4). These extents differ in their conception, for example:

- related to the institutional mandate and political borders for administrative operation, the Historic Preservation Department, the Planning Department, Jaffa section)
- notified archaeological zones under some institutions that are backed by law (IAA archaeological zones)
- documented and surveyed information which may not be contained within the borders of a single city (Geological Survey of Israel, information on *kurkars*)
- civil society actions and historical research to support the projects and actions (Council for Conservation of Heritage Sites in Israel, consulting projects undertaken with the Municipality)

This datascape illustrates the perceived and practised borders of the Jaffa. It gives an indication of how historic urban landscapes cannot be contained within political borders and need to be addressed and integrated within practice at different urban levels, namely local, regional and national. Without this integration, the HUL and its attributes disaggregate and operate in silos with a risk of being excluded from the larger picture.

On the contrary, the community mapping revealed the socio-spatial segregation in Jaffa (Figure 9.5). Apart from mapping the elements which are significant to the community and their daily life, the datascape depicts the restricted movement and interaction between the North and the South of Tel Aviv-Yafo. This may be a result of various intrinsic and extrinsic factors; the restricted 'representative space' and 'used space' are limited to the extent of historic Jaffa. Given the construction of the Light Rail Transit and the opportunity to literally connect, this may enhance the physical connection. However, it is important to extend this exercise to other members of the community and document the treatment and uses of the various attributes which make up the social and cultural values to be integrated in planning, decision-making and policy.

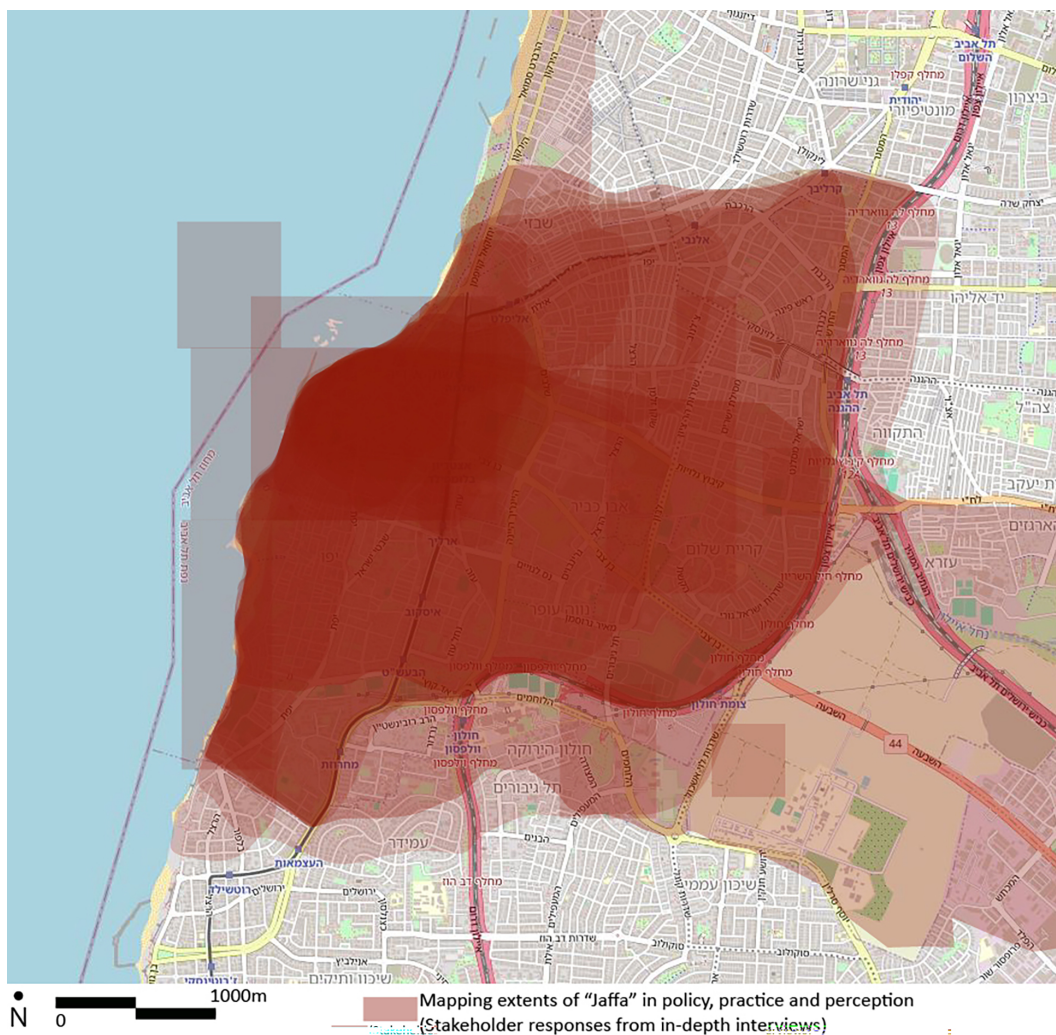


FIG. 9.4 Mapping the extents of Jaffa and its significant attributes as mentioned by each stakeholder, which is indicative of their professional mandate, designation and expertise. Important to note, the extents are going beyond the borders of the districts 7 and 8 (Figure 7.1) to other districts within the municipal borders of Tel Aviv-Yafo and extending to Bat-Yam and Holon, cities to the south of Tel Aviv-Yafo and within the Tel Aviv Metropolis. This is significant: it indicates that the historic urban landscape of Jaffa extends beyond administrative boundaries, reinforcing the relevance of the HUL approach and the need to address its challenges at the scale of the landscape as a whole rather than the district or municipality alone; Source: Base map from OpenStreetMap.com, Map prepared by Author (2023)

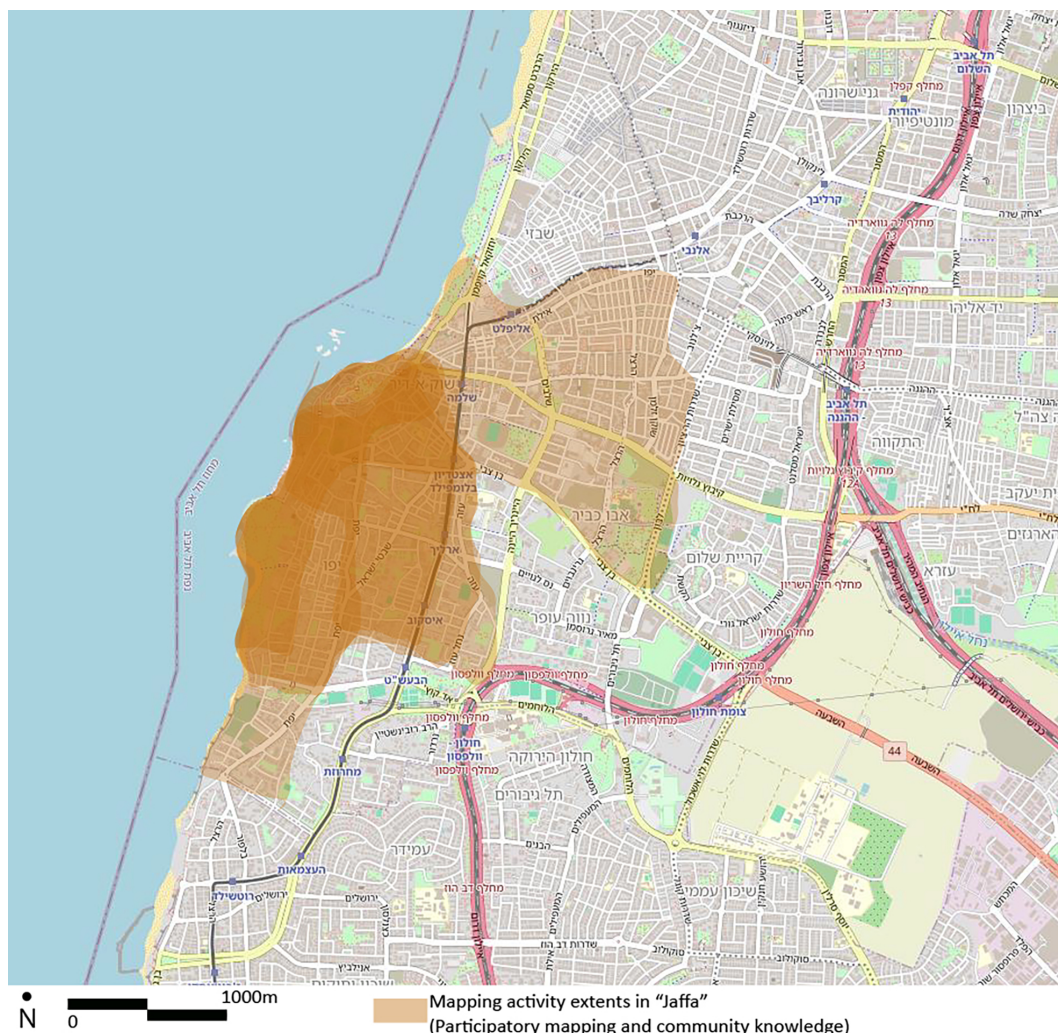


FIG. 9.5 Result of the community mapping exercise, overlaying all participant activity patterns and perceived cognitive boundaries. The map reveals the limited spatial extents within which Jaffa's residents navigate their daily lives with minimal interaction extending into Tel Aviv-Yafo as a whole, reflecting the lived experience of a spatially bounded and socially distinct community within the wider city. In a city where boundaries have been historically imposed and contested, these perceived limits are themselves significant heritage data. Results are indicative and may vary with sample size, religion, age, gender, education, and occupation; further research is recommended. Base map: OpenStreetMap.com; Map by Author (2023)

9.4.3 Jaffa's Perception, Cognition, and the Need for Action

The following section provides an overview of the conversations, offering insights into perceptions of various urban attributes, their relevance to the Historic Urban Landscape (HUL) approach, and their implications for spatial sustainability. The discussions reveal how different actors, institutions, and communities perceive, interpret, prioritise, and respond to the social, cultural, ecological, economic, and spatial dimensions of Jaffa across different urban scales. In doing so, the section examines the relationships between heritage values, planning practices, governance structures, and everyday lived experiences, while highlighting tensions and asymmetries in the ways different attributes are recognised and incorporated into planning and conservation processes. Particular attention is given to the interaction between fast-changing development pressures and slower-changing historical, ecological, and socio-cultural strata that shape the continuity and identity of the historic urban landscape. The findings further demonstrate how interventions, planning decisions, and at times institutional inactions are influenced by differing interpretations of value, authenticity, memory, and urban development within the contested landscape of Jaffa.

While each subsection addresses a distinct dimension of Jaffa's historic urban landscape, together they reveal the interconnected nature of urban heritage, governance, ecology, economy, and socio-spatial transformation. The themes point to challenges of documentation, contested histories, urban nature, commodification, land use change, and governance do not operate in isolation, but continuously shape and reinforce one another. Collectively, these dynamics highlight the need for more integrated, interdisciplinary, and context-sensitive approaches to urban heritage planning that can address the multi-scalar relationship between heritage, development, and spatial sustainability in Jaffa (Annex IV and V).

9.4.3.1 Jaffa as a Place with Limited Documentation as a HUL

The conversations revealed the ongoing state of conservation, preservation, and informed urban actors. There are many ongoing projects undertaken at the Municipality level to document elements and components of the built environment, which shows the level of awareness and being in line with the developing paradigm. This special project with the municipality focuses on intangible heritage, like local traditions, culture, and community life, to better understand Jaffa's identity. It helps protect and bring attention to important cultural practices that are part of the city's history and still matter today. However, a few points mentioned below show the lack of interdisciplinarity as well lack of political will and support:

“There are still agricultural families living in enclaves, in Yaffo Gimel and Yaffo Dalet, they represent a way of life, which was historically part of Jaffa’s identity.”

“What is lacking here is a kind of Palestinian perspective, rather than the historical Zionist narrative, which is dominating. To show this extinct form of urbanism and to bring it back to life somehow.”

It also revealed the disparities present at levels of ethnography, sociology, anthropology, ecology, thus highlighting the need to expand the practices of interdisciplinary research, such as behavioural datasets.

Architects, city planners, and landscape architects do not work with behavioural datasets. Behavioural mapping is a powerful tool, and can actually lead to innovating the project, which is design thinking. In one student project, mapping how students moved around a school area showed they gathered at bus stops after school, because the school had no yard. This insight turned the bus stop into a key design site, showing how behaviour mapping can drive smart, people-focused design. This is how behavioural mapping is powerful. If you use mapping in this way, you’re actually innovating the project; this is design thinking. In 2020, the Planning and Strategy Departments of the Tel Aviv-Yafo Municipality held the Behavioural City workshop¹⁰⁷ as part of the Urban Salons to promote urban innovation in housing, work, public space, and the community. The result was an interactive exposure map in the city; however, this was limited to an experiment.”

In the discussions of various conservation-preservation projects, many insights about the treatment of the historic built environment and its attributes were mentioned. Projects of adaptive reuse suggested the conservation of various attributes of elements and their different cultural and functional zones¹⁰⁸. However, at a broader scale for Jaffa, there existed critiques on the still limited integration of historical layering, stylistic and selective conservation, projects prioritising contemporary needs over authentic conservation, often resulting in stylistic, theatrical restorations that distort historical integrity. Plans at the district level may also disregard the historical value of infrastructure and lead to erasure during infrastructure projects.

¹⁰⁷ Data of behaviours such as calls for information, self-reporting, asking for help were mapping along with socio-economic information. One exercise of connecting restrictions of movements from callers asking for information to availability of open spaces within the permitted radius revealed inequality when it came to access to open spaces. Source: The Behavioral City: Exposure (Strategic Planning Unit, Tel Aviv-Yafo Municipality et al., 2020)

¹⁰⁸ The Jaffa port redevelopment project for reusing historic structures and materials, attempted to preserve the original architecture while adding clear, modern elements to define different cultural and functional zones such as historic gateway to Tel Aviv, food and scout hangar, cultural and fishing harbour, container city, piers, and boats.

“For Jaffa, the word which comes to mind is layering. It’s layer on top of layer. If you want to compare it to Tel Aviv, to the UNESCO World Heritage, you cannot do it because it’s not the same at all. All Jaffa is a caricature of history, of layers eliminated and forgotten and built on top of another historical layer. but the roots are still there. So, if you look at the map of Jaffa, you will see that some of the original plots and divisions between neighbourhoods from the Ottoman times are still there. There are historical streets like the Gaza Street and Yefet Street leading to Gaza; The Ben Zvi Street has been renamed many times, Salameh Street goes to Salameh village, and the Kibbutz Galayot Street. There are the layers of Ottoman history. The Gaza Street is being replanned, and it will eliminate the historical layers.”¹⁰⁹

The city should evolve, but when conservation focuses on superficial details while allowing major changes like underground parking beneath historic buildings, it results in selective, quasi-historic restoration that distorts both the building’s integrity and the urban context. New infrastructures, such as the light rail¹¹⁰, are beneficial and necessary. However, they require a deeper analysis of the attributes of the built environment, including economics and changing land use patterns.

The significance of attributes at the ecological level, as well as the traditional planning practices of the Ottoman period¹¹¹ were highlighted, which are key elements essential to address issues of urban heritage for posterity. Environmental planning in Jaffa requires a comprehensive approach that combines multiple mapping exercises across different disciplines. The documentation efforts require adding ecological surveys with hydrology, geology and climatic studies to comprehend the natural systems in their context. Mapping of historical attributes through analysis of archival maps, such as the Ottoman and Mandate periods, to identify features like well houses, fountains, and river courses, combined with the present-day planning documents, can reveal the complex interactions between natural and human environments.

¹⁰⁹ The Gaza Street houses the Barakat bayara (well house) is unique among the well houses in Israel known to date. Its location, design and scale, artistic motifs employed within it, and size of the inscription itself, in addition to the identification of its owner in particular, make it a unique example (Sasson & Amitai-Preiss, 2017)

¹¹⁰ Like the case of Emek Refaim light rail construction in Jerusalem, the light rail construction in Tel Aviv is different and less conflicting, as parts of it are underground and are very much required public transportation. The plan to run the Blue Line of the light rail through Emek Refaim, the main street of the German Colony, Jerusalem, faced strong opposition from a large number of local residents, some estimate over 5,000 households, who argued that the street is too narrow, that its unique and historic character would be compromised, and that several better alternatives exist nearby (Cidor, 2023)

¹¹¹ In Crisis in the Built Environment (Akbar, 2021), the author argues that traditional patterns of responsibility in a Muslim city differ from today’s capitalist or socialist models, influencing every aspect of the built environment, which is reflected in the blanket approach.

Projects like the *Bayarat* initiative, which preserves historic well houses, demonstrate how diverse mapping efforts, through historic maps and GIS, documentation, are essential to protect and manage Jaffa's rich agricultural and environmental heritage.

For a place like Jaffa, effective urban heritage planning depends on detailed documentation of demographics, historic fabric, and social dynamics. Mapping the historic structures above ground, alongside archaeological remains, reveals the city's complex layers. Sharing this documentation and archival material with local residents can help rebuild a sense of belonging that is often missing. This composite, transdisciplinary approach keeps evolving, bringing together geography, ecology, water systems, and social narratives to support sustainable, well-informed urban development.

9.4.3.2 Socio-Spatial Impacts of Interventions

Speaking of infrastructure and evolving spatial configurations, since the Tel Aviv LRT aims to connect north and south, but without safeguards in place, without detailed planning to address challenges, it exposes the southern area of Jaffa to economic and socio-cultural pressures, increasing vulnerability and threatening the socio-spatial, socio-economic configurations. Issues of education, schools, and markets were flagged, highlighting the key role social infrastructure plays. Projects and interventions may exacerbate the already existing socio-spatial segregations.

“Old Jaffa is not a living fabric”

“So, a city without a centre, a city without a market, a city without a stable political space for expression. It's not a city. It's a suburb. And no one is taking this structural issue seriously. They might not have tools or imagination.”

“My father lived in Ajami and studied in the school next to the French hospital, and visited it often, now, after it became the SOHO hotel, no one can think of going near that building.”

For nearly 20 years, Jaffa has been a major focus of public investment, with significant work done on the Flea Market, Jerusalem Boulevard, and the port, addressing years of neglect as part of a long-term city agenda. The North Jaffa retains the character of a commercial street as well as a residential area. However, arrival of the light rail are changing the dynamics, adding to challenges of urban conservation, to retain the historic fabric (§ 8.4.1). The area attracts residents;

however, they face issues of noise, overcrowding and rising crime. As per residents of Jaffa, the municipality maintains the infrastructure well around the flea market tourist area, but other parts of Jaffa receive less attention and are in poorer condition. Meanwhile, hotel demand keeps rising, and the Tel Aviv Tourism Department is aiming to increase the number of hotel beds¹¹². These observations shed light on the indirect implications of new developments on the socio-spatial configurations and the need for inclusion and integration of social attributes during the planning of interventions.

9.4.3.3 Jaffa as a Contested Space and its Political Influence

As elaborated in other chapters, the contested landscape of Jaffa is layered with its complex social, political and historical tensions, which are evident through the segregation, housing crisis and urban planning influenced by political influences. Part of the standard planning practice, as highlighted in the previous section, as opposed to traditional planning systems, even though political intentions are not given priority, they are for an instrumental reason, camouflaging real intentions in contested cities requires historical consciousness through constructive dialogue.

“Jaffa is a very strong example, though it’s a mixed city, the different communities, a lot of time, don’t mix.”

“One of the main issues in Jaffa is the lack of trust.”

Respondents emphasised the importance of both historic and contemporary buildings and how there is a need to protect and promote the city’s historical consciousness, its symbolic space or sense of place. This ‘spirit of the city’ helps reduce exclusion and allows people to feel connected, even when there are tensions between symbolic meanings and everyday lived experiences. This is seen in grassroots activism, such as efforts to restore historic Arabic names to Jewish Street, reflecting a struggle to reclaim lost identity. Changes to the landscape also affect social ties and the spirit of the place. In some cases, these changes can be permanent and increase tensions around identity and safety. Despite this, Jaffa’s vibrant social fabric, its diversity, and its ‘messy’ coexistence remain unique and deeply valued by its residents.

¹¹² As per the Tel Aviv-Yafo Tourism Vision Plan, the goal is to reach 20,000 bedrooms by 2030 in the whole city (Tel Aviv-Yafo Municipality, 2019b). Before 2020, Tel Aviv-Yafo had 13,000–15,000 Airbnb rentals monthly, with 40% being apartments, including many in Jaffa neighbourhoods like Kikar Ha Adumim and Shapira. This caused rising prices and disrupted community life, conflicting with city planning. To address this, regulations now limit commercial rentals to 90 days per year, helping return more apartments to the regular rental market.

“Jaffa is magical, I wish to keep it like that. The new buildings in Jaffa make me angry. Like in Ramat Gan, Rishon, you can build and demolish and build and demolish, nothing will change. In Jaffa, some areas are untouched, and once they change, it's gone forever. If you look at 1970 maps of Jafa, there were many empty spots; now everything is built, and it is sad to see that nothing can be done to stop this. You will need to do another mental mapping exercise again”

“Reinforcements are an issue in Jaffa, and it is partly owing to the religion, politics and the historically contested past. Due to this, the fabric of the city changes drastically, and the local governments have to take a stand on what to let go of to prevent further escalation of conflicts. And because of this, the old cities, such as Akko, Jerusalem and a few parts in Jaffa destroyed”

“The district committee make their plans for regions and cities in the country, but in most cases, they do not want to deal with the historic city, as it is a complicated area in Israel. Maybe reasons of religion, politics, economics or even crime.”

These also led to statements on whether markers of memory should always be physical and probe these questions of how to preserve the intangible in a contested landscape. Issues in the contested landscape at various urban scales may not be dealt with to prevent complications and exacerbation of already existing challenges. This may be a lost opportunity for dialogue and collaboration between the levels of actors to create a strong approach to acknowledge the attributes and integration in planning and policy.

9.4.3.4 Urban Nature as an Overlooked Dimension

Few respondents focused on the natural (historic and contemporary) attributes that constituted Jaffa and its current state. Surveys and analyses of historic maps formed the core basis of documenting this information, projects and activities being undertaken at local and district urban scales for the incorporation of information, such as the mapping of *kurkar*¹¹³ in Tel Aviv-Yafo city, mapping of the bird species to feed into the ecological corridor planning at the district level, as well as the

¹¹³ A detailed study undertaken by the Deshe Institute (DESHE, 2001)(www.deshe.org.il) on mapping the kurkar system stressed that the kurkar hills along the south coast of Israel are also of great importance as natural areas within a densely built-up area, which can be used for research, education, study and recreation in nature. It is therefore important to prepare a focused, multidisciplinary plan for the conservation of the small and fragmented kurkar areas in the densely populated area between Ashkelon and Tel Aviv (Romem & Ramon, 2001)

historical hydrology maps to identify well houses and remnants of trees of historic neighbourhoods, such as the American colony. Information on urban nature could be a source of inspiration for new projects as well as a source of contention and a source of citizen activism, such as the case for the 'Save Ficus Trees on Jerusalem Boulevard' movement; in these cases, the first step of mapping and documentation plays a crucial role in driving initiatives or being the source of one.

"An example of rural life in Jaffa is the issue of 'wild' roosters¹¹⁴, which the neighbours want to be silenced. The rooster is not considered part of urban life and gives an impression of rural life, which is Jaffa. The municipality is now trying to reduce the number of roosters. However, we are trying to map them in our project, to map the socio-ecological layers."

"In my theory, when the consciousness of heritage is higher, civil activism is much stronger. There is a very strong connection between civil resistance and heritage. Take the case of the Jerusalem Boulevard, the trees of Jaffa activism or the street names activism."

Along with this, acknowledging the connection of social and cultural factors towards urban nature and ecology is also important for cultural landscape approach as well as mapping the ecosystem services and linking attributes that are important in this connection. This is applicable not only to Tel Aviv-Yafo but also to the metropolitan and rural hinterland in the district as a whole landscape.

"Even while surveying urban ecology, we made sure to capture the social aspect, the people's aspect, not just green, green, green. In the Ecological Service Project for the Mavat (Planning Department), we realised we cannot evaluate only the ecology; we need to explore hydrology, geology, water, climate, human, trees, everything together, along with the social and planning aspects. That's why it was important to develop a mapping and evaluation framework for the project."

"This is a small hill and a tree near the historical American colony (On HaMasger street 7). It was a very fertile region, though you don't see the remains of the colony. These extents belong to agricultural Jaffa, near Ayalon and in the north were the dunes of Tel Aviv. In the south, it continues to the present Bat Yam, and there you also have similar well house structures."

¹¹⁴ 'Wild' in urban lexicon means untamed. In the mixed city of Jaffa, it serves as a mediator between languages, historical periods, and political identities, and sheds light on the strained relationships between Arabs and Jews, Muslims and Christians, rich and poor, Ashkenazim and Mizrahim, city life and nature, as well as on Tel Aviv and Jaffa (Monterescu & Sadetzki, 2022)

9.4.3.5 Commodification and its Socio-Spatial Implications

Many discussions examined the anticipated benefits and drawbacks of the LRT from historical and spatial perspectives. Since North Jaffa is the centre of commerce and the real estate and is already changing rapidly, the lack of detailed knowledge of cultural heritage and landscape components may pose a challenge for conforming to the historic quarter's planning and design. Similarly, since demographics and commerce will evolve, the small-scale industries are expected to face the imminent influence of real estate prices and changing demographics.

“The small-time manufacturers where the Flea market is today, to the west of Shlabim street, what we call historic Jaffa (מאבות יפו me'avot yafo). However, the east of Shlabim street is modern small craft industries (Ha Milacha הילאכה) and hardware ecosystem stores, which came into existence after the establishment of the State of Israel. It becomes harder and harder for them to survive due to the growing housing market; we're trying to intervene because we believe it's important that those users exist in a city, not outside of the city.”

Since economics is seen as the highest priority, it also encourages commodification. Projects like the Sarona and Hangar redevelopments prioritise commercial interests over authenticity and community value, often ignoring principles of conservation and historic use. This process erases memory and detaches the landscape from its lived and symbolic meanings, turning spaces of everyday life into tourist attractions or high-value real estate. Strategic plans lack attention to local behaviour, narrative continuity, and affordable housing, further distancing long-time residents.

“One of the problems in Jaffa is the commodification of memories. For example, the Jaffa oranges, which are now taken over and made into a Geographical Indication, it's bizarre, because oranges grown in South Africa and sold under the tag to England, for example. Icons are used to manipulate intentions. For example, the Manshiya area has a huge potential to showcase life that was before destruction, maybe develop as a contact point between Tel Aviv and Jaffa; however, right now it is just a park with no memories”

And since Jaffa is the third most touristic place in Israel, there is a growing demand and focus on tourism-related activities. Hyper tourism, luxury hotels, redevelopment and urban regeneration projects displace existing communities and economic systems, replacing them with idealised or profit-oriented visions, often without regard to sustainability or inclusivity. The challenge is to balance the social needs of the residents while creating economic opportunities to become part of the process and not be excluded from it.

“We have a beautiful project of community tourism with a diverse group. Because of over-tourism, the residents sometimes don't feel like part of the story. We identified ten families in Jaffa and eight in HaTikva. We trained them on storytelling, how to open a business, taxes and other things, how to build and present your story, and how to host a group. And we're bringing groups over to their houses.”

9.4.3.6 Shifting Land Use and the Transformation of Spatial Character

Historical legacies, administrative and planning limitations and capacities continue to influence and shape the land use and spatial characteristics in Jaffa. Housing issues have an unresolved history of trauma and displacement, and generational disputes over protected tenancy, especially in Ajami, remain contentious. Contemporary planning and urban design are changing the urban identity, socially and economically as well, and require detailed attention to harness their larger potential.

“The real Jaffa is me is not the Old Jaffa, because it is Disneyfied. It is not part of the livelihood of the residents of the city, but only tourism. The backbone of Jaffa is the Jerusalem Boulevard, which is the backbone connecting the north and the south, and also the neighbourhoods. The opening of the light rail will enhance these neighbourhoods in Jaffa.”

Spatial planning is a larger issue dealt with at the district and national level of administration and demands high levels of coordinated efforts between various departments. Insular processes create spatially disintegrated planning, as each city and district, within its limited capacity, can focus only on its extent. Hence, regulatory frameworks require more attention.

“Administrative borders create physical borders, and that is reflected in the local-level municipal plans, which leads to fragmentation”

9.4.3.7 Institutional Fragmentation and Administrative Constraints

Each city in Israel has a different structure; sometimes, landscape is managed with urban planning, other times under the Sustainability department, depending on the city's resources and political forces. Many organisations also face major communication problems internally. Urban heritage and planning in Jaffa face structural challenges requiring flexible approaches across behavioural, physical, historic, and ecological layers, with a need to prioritise attributes based on project context.

“The historic fabric will evolve eventually and is for the good, though there is a policy in place for this, but the new development needs more refining/ designing/ planning guidelines.”

“We don’t have a conservation plan at all at the district level. Heritage that is protected in Tel Aviv may not be protected in another city.”

“Jaffa is not included explicitly in the conservation plan of Tel Aviv, in the 5000-master plan. It has its conservation plans, perhaps because Jaffa is very complex owing to the contested landscape and the socio-cultural, socio-economic, and perhaps because of this, very superficial and cosmetic preservation and conservation efforts are seen, to avoid dealing with deeper issues.”

There is this antagonism between North and South, and how it gets represented in urban planning, and the paradigm needs to be changed. Although the local municipality is taking efforts towards it, it is limited and may not yield the desired results of social justice and inclusion, but may give way to capitalistic approaches, leading to the displacement of local Palestinian residents. Respondents also highlight the need for multi-level collaborative work between urban scales, at the local and district level, which is also the core of the HUL guidelines, promoting the view of the system not as parts but as a whole.

“Planning-wise, the district and the municipal borders are meaningless because it’s a continuous fabric. This may not work for cities with stark differences, as each city has its own characteristics. Example Bnie Brak¹¹⁵ has an SES of 2, and it’s different from Ramat Hasharon, which is 2 km away from it. However, characteristics which are comparable should be looked at together: transportation, transit, ecological corridors, etc.”

“If you think that with planning, you can prevent things, that is a myth. When the projects of Jaffa slope park, refurbishing of the port of the Flea market were being planned, it was clear that this would bring gentrification. But can you stop development? No, you can’t. What you can do with good planning is give answers for needs, have a vision for the current and the future population”

¹¹⁵ Bnie Brak is fundamentally different city as it is a centre of Haredi Judaism. It is one of the poorest and most densely populated cities the Tel Aviv metropolitan area but its housing prices are among the highest in Israel (Tsur, 2010)

Alongside these structural limitations and lack of coordinated efforts, the question also arises of how to anticipate and manage future challenges that are bound to emerge from the changing dynamics and interventions. If projects and planning can make it evident the challenges that can emerge in future, it also provides opportunities to focus attention on mitigation in the current regimes.

9.4.3.8 Socio-Economic Challenges

The community mapping exercise opened up many personal versions of impressions on the management, planning and general socio-politics in Israel. It cast light on issues with education, partitioned society, opportunities and the lack thereof. Although these are important caveats in the conversations of planning for contested landscapes and cities, it is beyond the scope of this research. However, it highlights the important attributes of sense of place, sense of identity and personal heritage, national and personal narratives, along with infrastructure and interventions which intensify partitioned societies.

“Take Jerusalem Boulevard during the light rail construction, the entire street, including businesses, was shut down. Now that it’s reopened, the landscape looks beautiful. But why is no one in the city department tracking how long it takes for these businesses to recover?”

However, professionals who are individual, independent and in-house consultants to various departments at the Municipality, District and Planning Commission emphasise the need for regulatory provisions to manage challenges which heritage conservation and planning are projected to:

“One of the main challenges of policy is to mitigate and prevent gentrification and its impacts, along with finding tools to include the local identity and social values, especially at an economic level, to support local commerce”

Through these multitude of interviews and interactions with actors, practitioners and professionals, it was observed that collaboration, communication and interdisciplinary methods were highlighted as the need to address the complex issues to plan and design the historic city of Jaffa.

9.4.3.9 Emerging Opportunities for Integrated Planning

Jaffa is looked at as a living lab, presenting a multifaceted list and layers of challenges. Although there are some programs and innovative funding schemes for research and action projects, such as the *Kor Korem* of the Environment Ministry, which can be extended and adapted to other disciplines as well to address issues of housing, real estate prices, tactical urbanism, hyper tourism and so on. Urban planning requires a comprehensive vision, balancing broad master plans with detailed local plans.

“We’re talking about a city that’s going to exist only in the next 15 years. And it’s only going to exist after you decimate what’s working now. Here you have a living lab. Let’s monitor it”

9.5 Discussion

The findings from Jaffa, as a proof of concept, suggest that datascaping has potential to function not merely as a descriptive device, but as an operative method by structuring heterogeneous forms of knowledge, including stakeholder perceptions, spatial practices, cultural values, ecological systems, and socio-economic transformations, into a relational framework capable of supporting more transparent, inclusive and context-sensitive decision-making. This positions the chapter's application of datascaping as transdisciplinary rather than purely interdisciplinary: co-production of knowledge and outputs with societal actors.

A key contribution of this chapter is the illustrating that Jaffa cannot be understood through fixed administrative borders or through isolated heritage objects alone. The interviews and mapping exercises reveal that Jaffa is perceived differently with multiple interpretations of the layers by different stakeholders at different scales and temporalities. This moves the arguments from mapping the landscape to mapping the politics of landscape knowledge and hermeneutics. In this sense, datascaping does not merely record what Jaffa contains, but makes visible who gets to define it, thus repositioning heritage documentation as an act of epistemic negotiation rather than neutral representation. National and district actors tend to prioritise infrastructure, land use, and economic development, while local communities and civil society attach greater significance to social and cultural values, lived space, and sense of place.

This divergence is critical, because it demonstrates that what is most vulnerable in Jaffa is not only the historic built fabric, but also the intangible and relational dimensions of the urban landscape that remain least visible within formal planning systems. Datascaping can make these asymmetries legible by documenting which attributes are valued, by whom, and at what scale, thereby exposing the epistemic gaps through which certain forms of urban heritage are excluded, marginalised, or deprioritised within decision-making processes. This is precisely the role spatial sustainability must play: to reconcile these different temporalities of urban change, rather than privileging attributes tied to economic or political urgency, by asking not only what is changing, but how quickly, and for whom.

The findings further suggest that the concept of speed of change offers an important interpretive lens for understanding the pressures acting upon Jaffa. Fast-changing attributes, especially those linked to economics, tourism, mobility, and redevelopment, exert a strong influence over planning priorities, whereas slower-changing attributes such as geomorphology, hydrology, cultural memory, and sense of place are often treated as passive background conditions rather than as foundational structuring systems. Yet these slow-paced layers are central to the identity, continuity, and resilience of the historic city. Their neglect contributes to the production of irreversible socio-spatial consequences, including gentrification, commodification of memory, rising property values, displacement and increasing segregation between communities. In this regard, datascaping is valuable as it enables differentiation between attributes according to their temporal behaviour, their perceived significance, and their susceptibility to transformation, enabling interventions to be evaluated not only in terms of immediate gains but also in relation to long-term cultural and spatial consequences.

Jaffa also illustrates how contested landscapes require documentation methods capable of capturing plural, layered, and conflicting narratives. The interviews reveal recurring concerns around distrust, unequal representation, erasure of histories, superficial and selective conservation of marketable heritage. Such findings point to the limitations of conventional expert-led planning and raise a more fundamental question: who holds the authority to define Jaffa's narratives, and by extension, its future. At present, this authority remains concentrated in municipal and tourism bodies whose selections determine which heritage is documented, funded, and made visible. which risks reproducing dominant power relations when it fails to engage lived experience, local narratives, and tacit forms of knowledge. By externalising everyday routines, locally significant places, spatial memories, cognitive borders and patterns of movement, the exercise reveals socially produced divisions and forms of exclusion that remain largely invisible within statutory plans. This reinforces the argument that spatial sustainability in Jaffa depends not only on conserving monuments or regulating land use, but also on understanding how residents inhabit, negotiate, remember, and attach meaning to the city in everyday life.

Concurrently, the chapter substantiates how datascaping can move beyond critique towards practical application. It can function as a bridge between documentation and intervention by translating complex urban conditions into structured evidence for prioritisation and decision-making; relevant for Jaffa, where large-scale projects such as the port redevelopment, tourism expansion, and light rail infrastructure are reshaping land use, accessibility, and economic activity. These interventions are not inherently negative; indeed, several respondents acknowledged their benefits. However, without frameworks that systematically incorporate cultural, social, ecological, and historical attributes, such projects risk intensifying exclusion and weakening the very urban landscape they seek to revitalise. It can offer means of anticipating these ripple effects by foregrounding the interdependencies between heritage, everyday life, and future development. The analysis further suggests that divergent and often non-overlapping planning frameworks operating across different institutional levels can intensify segregation and partitioned urban zones, even when strategic plans formally invoke goals such as co-existence or the preservation of Jaffa's distinctive social and physical fabric.

Datascaping, therefore, point to illustrations of a critical method for converting the complexity of Jaffa's contested urban heritage and urban landscape into actionable planning knowledge, revealing contested values to inform alternative planning scenarios. More importantly, it provides a means of transforming diverse and contested narratives into an operative basis for negotiating urban change.

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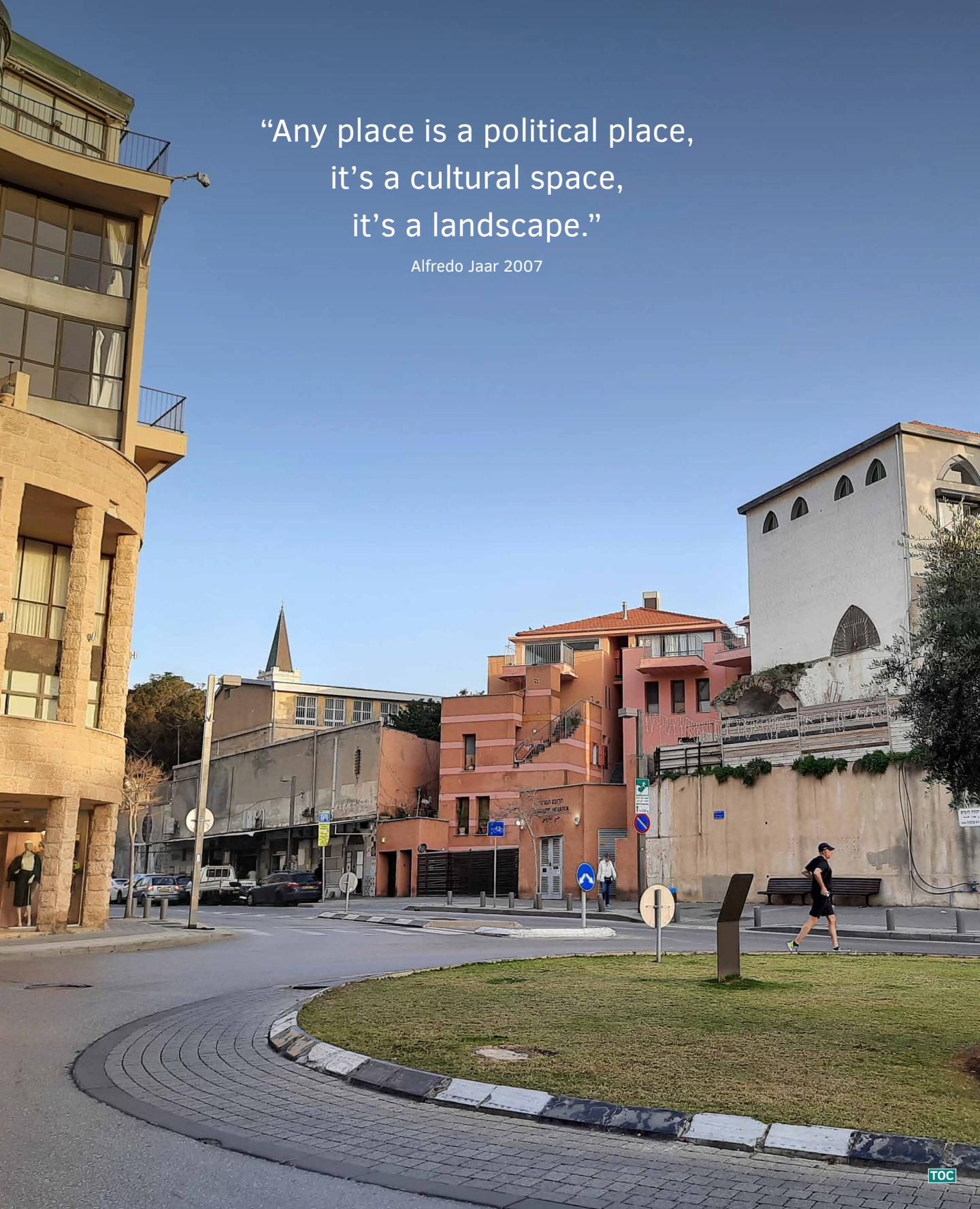


Discussion and Conclusion

Chapter 10 concludes the dissertation by synthesising the main findings of the research and reflecting on how the research questions have been addressed, theoretically and methodologically. It further discusses the study's scientific and societal relevance, outlines its limitations, and proposes directions for future research.

“Any place is a political place,
it’s a cultural space,
it’s a landscape.”

Alfredo Jaar 2007



10 Discussion and Conclusions

On Integration Of Datascaping Historic Urban Landscapes to Achieve Spatial Sustainability

10.1 Research Statement

'Datascaping HUL' is positioned at the intersection of three areas of contribution. It provides a theoretical contribution to Critical Heritage Studies by examining the Historic Urban Landscape (HUL) Recommendation as a framework for achieving spatial sustainability. It also makes an empirical contribution by analysing the contested urban heritage and landscape of Jaffa, exploring its historical layers, current development pressures, and the socio-spatial challenges and opportunities shaping the area. In addition, the research advances a methodological contribution by positioning datascaping as a method for knowledge visualisation, capable of documenting and communicating complex socio-spatial dynamics within historic urban environments. This positions the research as critical-reformist: it does not set out to reject HUL or global sustainability frameworks, but to critically scrutinise and reconstruct their normative ambitions for contested urban contexts. Grounded in the theoretical framework of General Systems Theory (GST), the research explores the added value of datascaping as a methodological innovation for contextual embedding, particularly within historic cities characterised by contested landscapes.

Beyond its methodological contribution, the research also illustrates how datascaping can spatial data as interpretive, relational, and performative knowledge. Through an iterative, process-oriented engagement and visualising socio-economic pressures, spatial displacement, and contested interpretations of heritage attributes, datascaping moves beyond neutral representation and functions as a diagnostic instrument within planning processes. In doing so, it enables planners and stakeholders to recognise how development pressures, governance structures, and cultural values interact within historic urban landscapes. This capacity to expose otherwise overlooked dynamics is particularly important in contested historic cities where planning decisions can profoundly reshape the social fabric and cultural continuity of place. While these findings are grounded in the specific case of Jaffa, they are discussed with an eye toward their broader relevance, offering insights that may extend to other historic urban contexts facing similar forms of contestation.

10.2 Conclusions: Synthesis of Research Questions

The following section provides an overview of the findings and inferences drawn from the literature review, empirical investigations, and analysis of datascares created.

Main Research Question 1.0

What is the added value of datascaping in reframing and operationalising the Historic Urban Landscape (HUL) approach for spatial sustainability, and to inform planning and decision-making in the context of Jaffa's contested urban heritage?

The governance of historic urban landscapes increasingly requires approaches that can create the conditions for negotiating heritage conservation with contemporary urban development pressures. Studies reveal a persistent disconnect between normative heritage frameworks and their practical implementation within complex urban environments (§ 3.2.2). It becomes especially apparent when these high-level frameworks are confronted with the realities of diverse urban contexts, where competing priorities impede their implementation. The concepts appear theoretically framed rather than practice-oriented, which makes their implementation difficult, yet

they hold significant potential to inform integrated, adaptive, and context-sensitive approaches to spatial planning and decision-making. The potential, however, depends on the capacity to interpret these concepts in ways that respond to local social, political, and spatial conditions.

Here, datascaping is explored as a visualisation technique as well as an analytical and diagnostic framework capable of revealing the relational dynamics between heritage values, development pressures, and governance structures within historic urban landscapes. Such insights support incremental policy refinement, the adoption of innovative analytical methods, context-sensitive planning practices, and coordinated cross-sectoral governance mechanisms. Together, these capacities provide a foundation for operationalising broader international guidelines in ways that remain sensitive to local complexities.

Theoretically, the research advances understanding of heritage as an active and relational vector within spatial planning for sustainability by linking HUL principles to the broader discourse on spatial sustainability and contested urban landscapes. Methodologically, it illustrates the potential of datascaping as an integrative and dynamic analytical framework capable of visualising layered heritage values, socio-spatial transformations, and the temporal evolution of historic urban landscapes. By bridging the gap between normative heritage doctrines and practical spatial planning tools, the research offers a pathway for translating international guidelines into context-sensitive, data-informed, and multi-scalar planning strategies.

Maximum potential of the HUL Recommendation can thus be achieved by:

- Engaging with the social, cultural, economic, and environmental dimensions of heritage, rather than reducing conservation to technical or category-driven approaches
- Acknowledging heritage and culture as key vectors in spatial planning for sustainability and actively integrating them into practice
- Operationalising spatial sustainability through a systems approach that balances universality and replicability with sensitivity to local context
- Clearly identifying and documenting HUL attributes and the historic layers at multiple urban scales, through interdisciplinary, cross-sectoral collaboration. Ensuring that plans, policies, and programs explicitly acknowledge these and include them in their complete definitions, thereby minimising the level of vagueness and ambiguity
- Link local HUL attributes to regional and metropolitan planning to support SDGs
- Collating datasets across social, economic, cultural, and ecological dimensions to strengthen evidence-based planning

- Making the process inclusive and enabling a model of urban governance that is accessible to all

For the successful implementation of datascaping methods, the urban actors may:

- Create a comprehensive archival documentation (maps, photographs, records) and apply historical GIS
- Facilitate interdisciplinary and transdisciplinary collaboration through the integration of digital tools (GIS, machine learning, AI, VGI), bringing together geography, digital humanities, urban heritage management, and spatial planning
- Translate quantitative data into spatially referenced datasets, integrated within Urban Information Systems (UIS), that reveals patterns, relationships, and dynamics across time and space, thereby more robust analysis, interpretation, and planning decisions.
- Include multi-scalar and cross-sectoral information stakeholders perspectives, especially conflicting community interests, identifying local anchors and sense-of-place attributes. thereby enabling the synthesis of undocumented and intangible spatial values
- Build capacity and technological resources (e.g. QGIS, ArcGIS, ML-VGI, AI image recognition) for improved datascaping and visualisations

The findings point to broader acknowledgements for contested historic urban landscapes generally:

- That the multiplicity of values and attributes of the heritage components and their associated landscape vary for each user and decision makers
- These multiple values and attributes must be systematically documented, both spatially and non-spatially, or they risk becoming invisible within planning frameworks and eventually obscured
- That spatial and cultural contestation, with its direct impacts of segregation and migration, actively and continuously shapes historic urban landscapes through social, political, and economic dynamics

Insights Specific to Jaffa

In the case of Jaffa, datascaping's added value appears to lie in enabling the systematic documentation and visualisation of layered heritage values, spatial transformations, and governance dynamics, thereby supporting more informed and context-sensitive spatial planning decisions (Details in Sub RQ 1.c)

Sub RQ 1.a

How can the HUL Recommendation be reframed as a localised, context-specific, and integrated territorial approach to spatial sustainability in contested urban heritage contexts?

The HUL Recommendation and the concept of spatial sustainability share a common objective: achieving sustainable urban development through integrated and multi-scalar spatial planning approaches. Analysis of World Heritage SoC and case studies from the UNESCO's World Heritage Canopy demonstrate a strong conceptual alignment between heritage governance and sustainability agendas and reiterates that urban heritage as embedded within broader socio-cultural, economic, and ecological processes, thereby positioning heritage within spatial planning rather than as a separate conservation sector (§ 3).

Beyond being a set of conservation guidelines, HUL can be understood as a governance model for managing urban change, one that moves decision-making beyond experts alone by involving communities, planners, and policymakers together — a shift that aligns with broader developments in Critical Heritage Studies toward more inclusive, less top-down heritage thinking. However, this conceptual strength does not guarantee real-world impact: HUL's effectiveness depends less on its framework and more on whether planning systems are actually capable and willing to act on the knowledge it generates. Making heritage knowledge visible, in other words, does not automatically translate into change as it depends on institutional uptake and governance capacity. This is where datascaping becomes relevant, as it helps bridge that implementation gap by turning complex heritage information into visual, decision-ready knowledge that planners and policymakers can practically apply, rather than merely reference in principle. Taken together, this suggests that HUL holds real but conditional potential as a framework for spatial sustainability: it provides the conceptual foundation, but its actual effectiveness relies on analytical tools like datascaping and supportive governance mechanisms to operationalise its principles in specific local contexts.

Findings from the Secondary Data Analysis

The HUL approach is conceptually robust, it remains insufficiently institutionalised within planning systems capable of managing complex urban change. Findings from the State of Conservation (SoC) indicate that the primary challenge lies not in the absence of integrative frameworks but in the institutional and governance mechanisms required to operationalise them. A similar pattern emerges in the analysis of initiatives on Canopy platform as the cases frequently operate at the scale of individual projects rather than as coordinated territorial strategies. Heritage is therefore recognised within the sustainability discourse but rarely systematically embedded within spatial planning frameworks.

The case study analysis further shows that heritage attributes frequently correspond to multiple environmental, social, and economic dimensions reflected in the SDGs, yet these attributes remain disconnected from integrated planning frameworks. Without systematic documentation and interpretation of these attributes, planning decisions risk overlooking the socio-cultural and spatial relationships that shape historic urban landscapes.

Sub RQ 1.b

How does **datascaping** inform sustainable spatial planning in historic urban landscapes, as a dynamic method of knowledge documentation and visualisation?

Datascaping represents a methodological and epistemic shift in how spatial knowledge in historic cities and landscapes is produced, interpreted, and applied within planning processes. Rather than replacing traditional cartography, datascaping builds upon conventional spatial analysis by integrating diverse datasets, analytical methods, and disciplinary perspectives. It structures complex and heterogeneous information into decision-relevant spatial knowledge that can support spatial sustainability. Conventional planning tools often struggle to capture relationships simultaneously across social, cultural, spatial, economic, and temporal processes. Datascaping addresses these limitations by integrating several sources of information, including historical records, spatial data, cultural mapping, socio-economic datasets, archival materials, and stakeholder narratives, into multi-scalar spatial representations capable of informing planning and governance decisions.

Findings present an initial indication how datascaping can contribute to spatial sustainability by operationalising the nexus between heritage conservation, spatial planning, and sustainability objectives. In particular, it enables heritage knowledge to be integrated within planning systems through three interrelated functions:

Findings from the Case Study

The application of datascaping in Jaffa illustrates how this approach can reveal previously obscured socio-spatial dynamics within contested historic urban landscapes. By integrating diverse datasets, including archival records, spatial mapping, stakeholder interviews, cultural ecosystem services analysis, and socio-economic indicators, the datascaping exercises documented the layered heritage attributes and relational spatial structures of the city. The analysis showed that different actors, including planners, heritage experts, and local communities, interpret and prioritise heritage attributes in different ways, reflecting competing values and narratives within the urban landscape. Datascaping also revealed the fuzzy and contested spatial boundaries of Jaffa, demonstrating that urban territories

are shaped not only by administrative borders but also by social, cultural, and experiential relationships with space. By visualising these interconnected processes, datascaping made visible the relationships between heritage values, development pressures, and spatial change, thereby providing a more comprehensive and relational understanding of the historic urban landscape.

Toward a Replicable Datascaping Protocol

The explorations in Parts C and D followed the same underlying single iteration in the sequence (Landing-Grounding-Finding-Founding) nested within the multiple iteration loop (Research-Analysis-Synthesis-Presentation) (§ 4.4.3) and through the applications of process and spatio-temporal datascaping (§ 4.4.2). The specific method used at each step varies as per the objective and the selected dataset to analyse the problem. However, the sequencing and iterations were constant was the sequence itself. Table 10.1 sets out this sequence as a standalone protocol, so it can be adapted and applied to other cases.

TABLE 10.1 The replicable Datascaping protocol

Single iteration	Cyclical iterations	Action type	Operation)
Landing	Research	Framing	Formulate research question and HUL attributes
		Framing	Define spatial, temporal and thematic boundaries
		Framing	Assess data sources and requirements
Grounding	Analysis	Data handling	Acquire archival and contemporary data
		Data handling	Spatially anchor, map and document
		Data handling	Synthesise qualitative and quantitative data
		Validation and Output	Verify and validate grounded data
Finding	Synthesis	Analysis	Apply analytical visualisation method
		Analysis	Interpret patterns into spatial narratives
		Production	Produce the datascape
		Validation and Output	Refine iteratively
Founding	Presentation	Analysis	Ground-truth with stakeholders
		Analysis	Interpret against planning objectives
		Validation and Output	Translate into actionable output
		Validation and Output	Iterate if required

Sub RQ 1.c

What are the spatial implications of contested urban heritage in Jaffa, and how can datascaping inform design and planning frameworks towards spatial sustainability?

Analysis illustrates the interdependence of heritage valorisation, economic regeneration, and spatial restructuring, thus providing empirical evidence for GST. Adaptive reuse in the historic port and surrounding neighbourhoods illustrates how heritage recognition coincides with rising property values and displacement pressures, with socio-spatial marginalisation emerging as an unintended consequence of heritage-led redevelopment (§ 8). This disjunction between representational narratives and lived experience is echoed through the challenges emerging from infrastructure interventions that are framed around connectivity and urban development. Further datascaping analyses highlight territorial implications of redevelopment. Spatio-temporal patterns of property values, demographic change, and cultural ecosystem services show that economic regeneration is closely linked to rising real estate values and intensifying socio-spatial segregation. The replacement of neighbourhood-oriented services with higher-end commercial uses reflects broader restructuring of urban functions, often reducing accessibility for existing communities (§ 8).

The contribution of datascaping lies in making visible latent socio-spatial dynamics often overlooked in conventional planning, revealing patterns of vulnerability, displacement, and uneven development through both synchronic and diachronic analysis. The datascares generated across this research, spanning eidetic mapping, spatio-temporal analysis, cultural tourism narratives, socio-demographic patterns, machine learning classification, and stakeholder content analysis, collectively document Jaffa's HUL attributes and their spatial sustainability implications (Table 10.2). Datascaping's effectiveness lies in representing complexity and in interrogating whose knowledge, values, and priorities shape planning decisions, thus offering the opportunity for greater epistemic accountability in heritage governance.

Forms of contestation in Jaffa

The datascares on Jaffa point to several distinct forms of contestation have surfaced for the case of Jaffa, outlined below as how each manifests in planning and everyday practice:

- Narrative/ historical contestation: Competing claims over whose history is included or marginalized, particularly the dominance of the Zionist historical narrative and the marginalisation of Palestinian perspectives

- Toponymic/ symbolic contestation: Struggles over symbolic and associational reclamation, such as grassroots efforts to restore historic Arabic street names
- Memory and associational contestation: Tension between lived, personal or collective memory and its commodification through re-branding, tourism, or adaptive reuse. Such as the Jaffa orange trademark, or sites of personal historical value repurposed as luxury hotels
- Spatial/ territorial contestation: Physical and cognitive boundaries produced through zoning, circulation, and infrastructure, reinforcing divisions such as the North–South divide, commodification and high-end enclaves
- Socio-economic contestation: Conflict between development and tourism-driven value creation and the needs of socio-economically weak communities, both Jewish and Arab residents and other groups, manifesting as gentrification, displacement, and pressure on small-scale industry
- Ethnic/ communal contestation: Limited social mixing and low trust between Jaffa's Arab and Jewish-Israeli communities manifesting through cognitive boundaries and spatial segregation despite shared urban space
- Authenticity contestation: Disputes over what constitutes authentic and un-altered and lived Jaffa, as opposed to a curated, touristic representation of the city
- Institutional/ administrative contestation: Fragmented heritage governance and practices

TABLE 10.2 Summary of HUL Attributes, Datascape Type, and Corresponding SDG Targets

Note	HUL Attributes	HUL attributes	Jaffa-specific urban heritage components (Annex IV)	Key Planning Issue	Relevant SDG Targets
1	Eidetic Datascape	Topography, Geomorphology, Hydrology, Historic land use, Built environment, Infrastructure	Ayalon River, sand dunes, kurkar ridges, well houses (bayarot), orange groves, banana trees, fertile agricultural region, al-Bassa swamp, water systems and geology, indigenous trees, shade maps	Ecological foundations of the historic urban landscape; flooding vulnerability; unaddressed environmental and socio-economic inequalities in marginalised neighbourhoods	11.4, 11.5, 13.1, 13.2, 15.3
2	Spatio-Temporal Datascape	Built environment (historic and contemporary), Land use patterns, Infrastructure, Socio-economic dimensions of heritage and diversity	Me'avot yaffo (historic Jaffa), Ha Milacha (small craft industries), Flea market zone (Shlabim St), Jerusalem Boulevard, Yefet Street, Ajami ghetto (1948), Greek market redevelopment, Jaffa slope park, port hangars, Amidar-ILA land vacant plots	Construction growth and spatial logic of development and disinvestment; gentrification; real estate pressures; displacement of communities	11.1, 11.2, 11.3, 11.4, 10.2, 16.b, 1.4

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TABLE 10.2 Summary of HUL Attributes, Datascape Type, and Corresponding SDG Targets

Note	HUL Attributes	HUL attributes	Jaffa-specific urban heritage components (Annex IV)	Key Planning Issue	Relevant SDG Targets
3	Interpretive Datascape for cultural tourism	Intangible dimensions of heritage, Diversity and identity, Land use patterns, Built environment, Open spaces and cultural landscapes	Shuq Ha Peshpashim, clock tower, Manshiya (park with no memory), Jaffa oranges as Geographic Indicator GI, Palestinian narrative (absent), Ajami market (demolished 2008), Orange orchards as connective heritage, bicultural planning (absent) religious sites (all narratives)	Selective representation of heritage in cultural tourism; erasure of Arab narrative; need for plural and inclusive heritage governance	11.4, 11.3, 10.2, 16.b, 8.9, 8.3
4	Socio-Demographic Datascape	Socio-cultural practices and values, Memory, Diversity and identity, Infrastructure, Land use patterns, Economic processes	Mixed city, housing, informal Arab urban development Tel Kabir (razed for train station), Arabic schools, Jaffa Gimel-Dalet (poor and rich divide), North African and Eastern European immigrants, Hagar Centre	Population movement and demographic reconfiguration; ethnically segregated educational infrastructure; gap between co-existence policy and spatial reality	4.1, 4.5, 10.2, 11.1, 11.3, 16.b
5	Machine Learning Datascape	Cultural and social practices, Economic processes, Open spaces and natural environment, Intangible dimensions of heritage, Diversity and identity	Ha Carmel Market, Levinski Market Sarona (commercialised historic village), Ha Tahana (train station), Airbnb in Jaffa and Kikar ha Adumim, coastline and beach as public space, community tourism with 10 families, food sovereignty (Tulkarem market), Jerusalem Boulevard hyper-tourism risk	Spatial distribution of Cultural Ecosystem Service values; commodification of heritage; uneven distribution of planning attention and resources	11.4, 11.3, 10.2, 8.9, 15.9, 4.7
6	Non-spatial Datascape based on content analysis	All HUL attributes: topography, geomorphology, hydrology, built environment, natural environment, infrastructures, open spaces, land use, spatial organisation, socio-cultural practices, economic processes, intangible dimensions	No cultural survey for Jaffa, cosmetic preservation, behavioural layers axes of Jaffa, intangible heritage project (municipality), spirit of the city, open wounds, North-South antagonism, metal workers and artists ecosystem, Belad-al-sham context, WAQF cultural centre, wild roosters (rural character)	Differential stakeholder perceptions of HUL attributes; gap between institutional and community knowledge; fast vs slow-changing attributes and planning priorities	11.4, 11.3, 10.2, 16.7, 8.9, 1.4, 4.7

10.3 Research limitations

This research encountered several challenges due to contextual, methodological, and positional factors that shaped the study's scope, data collection, and the interpretation of findings.

Two major external events significantly affected the research trajectory. The COVID-19 pandemic (2020-2022) disrupted fieldwork, as travel restrictions prevented visits to the case study site and limited on-site excursions, meetings, and stakeholder interviews for over 20 months. Consequently, the research relied more heavily on secondary data and remote interviews. The escalation of the Israel-Palestine conflict in 2021 further constrained engagement with practitioners and communities. Together, these conditions limited the timing, depth, and continuity of field engagement with local stakeholders.

Data availability posed an additional constraint. National regulations on data sharing restricted access to publicly available datasets, including planning documents, GIS data, census records, and archival materials. This limitation influenced the datascaping explorations, leading the research to emphasise the methodological potential of datascaping rather than producing a comprehensive mapping atlas of Jaffa. Furthermore, Jaffa does not hold a distinct conservation designation comparable to Tel Aviv's UNESCO-listed White City. As a result, site management plans and detailed heritage documentation are largely focused on the designated World Heritage site rather than Jaffa, making conservation-related information more difficult to obtain.

The methodological approach of datascaping also presents certain limitations. While datascaping enables the integration of diverse spatial, visual, and socio-economic datasets, its outputs remain dependent on the availability, scale, and representativeness of underlying data. Everyday social practices, informal spatial uses, and lived experiences of place are therefore difficult to capture through spatial datasets or digital visualisations alone. Consequently, the datascares produced in this research should be interpreted as analytical and exploratory representations rather than comprehensive depictions of the historic urban landscape. In addition, some datasets used in the analysis, particularly crowdsourced imagery and volunteered geographic information, may reflect the perspectives of tourists or digitally active residents, potentially underrepresenting certain communities or everyday spatial practices.

The datascaping approach adopted in this research follows an exploratory and iterative methodological framework that combines multiple datasets, analytical techniques, and visualisation methods. While this may appear non-linear, the plural use of methods reflects the interdisciplinary nature of Historic Urban Landscape research and the complexity of contested urban environments. As a result, the datascapes generated through different datasets and analytical exercises may vary in form, scale, and visual representation. This variation reflects the method's cross-disciplinary nature and the involvement of urban actors at different analytical levels. Uniformity would only become necessary if these outputs were to be consolidated within a single operational platform for planning and decision-making.

Language barriers also narrowed the scope of available materials. Most public records and datasets relevant to planning and governance are available primarily in Hebrew, Israel's official language. While some documents were translated with the assistance of colleagues, a research assistant, and AI-based tools, time and resource constraints limited the depth of analysis of additional materials. As a result, the research was unable to undertake a systematic review of municipal master plans, economic development strategies, or environmental planning frameworks. A more comprehensive analysis of these planning instruments could provide further insight into how policy decisions shape spatial configurations, development pressures, and socio-spatial disparities within Jaffa.

Terminological variation is also present in the research. Terms such as 'datascaping tools' and 'datascaping methods' are used interchangeably in reference to international guidelines and policy frameworks, and should therefore be understood within the conceptual context of the study rather than as strict theoretical distinctions.

Finally, the researcher's positionality influenced the research process. Conducting the study as a researcher from a different cultural and ethnic background shaped the experiences of access, communication, and interpretation. While many practitioners were generous with their time and insights, enabling a network for interviews, the experience of working as a non-native resident also involved moments of cultural distance and occasional prejudice. From a reflexive standpoint, the researcher's position as an external observer in a politically contested urban context may influence interpretations of heritage narratives and socio-spatial dynamics. While this perspective provided analytical distance, it may also shape how local power relations and cultural meanings are understood. Recognising these positional dynamics is therefore important for interpreting the findings presented in this research.

10.4 Research Impact

10.4.1 Scientific Relevance

'Datascaping HUL' is primarily grounded in Target 11.4 (Strengthening efforts to protect and safeguard cultural and natural heritage). Its exploration of the potential to localise HUL recommendations through datascaping and its connection to achieving spatial sustainability builds on international doctrines and expands the existing body of research.

The central scholarly contribution of this research lies in bridging three domains that are often addressed separately: Critical Heritage Studies, spatial planning for sustainability, and data-driven urban analysis. It contributes theoretically by advancing the understanding of heritage as an active vector within spatial sustainability, rather than as a sectoral conservation concern. It indicates that heritage governance frameworks, such as the HUL Recommendation, remain only weakly integrated into spatial planning systems, limiting their effectiveness in addressing contemporary urban challenges.

Methodologically, the research theorises and operationalises 'datascaping' as an integrative analytical and epistemic method that combines spatial, social, and cultural datasets to interpret contested historic urban landscapes. Rather than replacing existing heritage governance frameworks, the research critically examines their limitations and proposes datascaping as a methodological pathway for contextual embedding of international heritage frameworks within local planning processes through interpretive, relational, and performative knowledge.

The findings illustrate how the lack of integration between heritage frameworks and spatial planning systems is a critical barrier to achieving spatial sustainability. The findings provide planners and policymakers with a practical approach to visualise by exposing epistemic gaps, competing values, institutional fragmentation, temporal conflicts and spatial inequalities.

Although the empirical illustrations are exploratory, they demonstrate the analytical value of datascaping for linking heritage knowledge systems with spatial planning decision-making. In practical terms, the research recommends incorporating datascaping into planning processes as a diagnostic and decision-support tool to enable more informed, inclusive, and context-sensitive heritage governance.

The main scientific outcomes can be outlined as below:

- 1 **Addressing gaps between international frameworks and local planning practice:** Secondary analysis identifies they (HUL, NUA, SDGs) remain weakly integrated within local planning systems and risk being normative and ambiguous. The findings show that this gap often results in fragmented heritage governance and planning decisions that overlook socio-spatial dynamics and local heritage values. The research, therefore, contributes conceptually by demonstrating how datascaping can serve as a mediating interface between international heritage frameworks and local spatial planning practices.
- 2 **Advancing interdisciplinary integration between heritage and spatial planning:** As the research highlights the cross-sectoral and interdisciplinary nature of historic urban landscape governance, it emphasises the need to integrate heritage knowledge within spatial planning frameworks. This requires improved data aggregation, policy monitoring and evaluation, and stronger theoretical and methodological linkages between heritage governance and spatial sustainability. The study, therefore, contributes to spatial planning scholarship by framing heritage not merely as a conservation object but as an operational component of spatial sustainability strategies.
- 3 **Extending methodological approaches through datascaping:** The explorations of datascaping indicate its added value as an interdisciplinary analytical approach that brings together qualitative and quantitative methods, including GIS analysis, machine learning, cultural mapping, and content analysis. These methods enable the spatial documentation and visualisation of historic urban landscape attributes and socio-spatial dynamics. The methodological contribution of the thesis lies in demonstrating how datascaping can function as a diagnostic, communicative, and analytical tool for interpreting contested urban heritage landscapes. By integrating digital spatial analysis with participatory and qualitative methods, the research expands the methodological toolkit available for heritage planning and urban sustainability research.

10.4.2 Societal Relevance

The research contributes to society in several important ways:

- **Empowering communities:** Highlighting the importance of participatory mapping and stakeholder engagement in recognising diverse identities, social values, and cultural practices within historic urban landscapes.

- **Addressing socio-spatial inequalities:** Revealing vulnerabilities and disparities across neighbourhoods and providing evidence that can support more equitable planning and policy interventions.
- **Promoting inclusive governance:** Encouraging collaboration between government agencies, experts, and civil society actors in heritage and spatial planning processes.
- **Supporting policy innovation:** Demonstrating how adaptable datascaping methods can assist local and national governments in embedding cultural heritage within urban sustainability agendas.

10.5 Reflection and Future Perspectives

Building on the research impact, advances in knowledge, and the limitations identified in this study, several directions for future research emerge. These directions aim to further develop and operationalise the objectives of Datascaping HUL within spatial planning and heritage governance frameworks. Taken together, these directions also point toward a broader research agenda of repositioning datascaping from a case-specific method into a sustained programme of inquiry.

- 1 **Operationalising Historic Urban Landscape attributes in planning practice:** The findings of this research highlight the difficulty of systematically identifying and documenting HUL attributes within planning practice. While the HUL approach promotes an integrated understanding of cultural landscapes, translating this perspective into operational planning tools remains challenging. A key step is therefore to focus on systematising the identification and classification of HUL attributes in relation to spatial sustainability. This could support the development of a structured meta-repository for datascaping, enabling improved data collection, disaggregation, and representation, while facilitating the integration of heritage attributes within urban design and spatial planning processes. Building such a repository also raises a question of knowledge politics that warrants dedicated research in its own right: who controls the datasets, classifications, and visualisations that constitute a datascape, and what forms of authority or exclusion are embedded in those choices. This is important as present definitions and attribute documentation may need to be broadened to capture asymmetries in recognition, narratives, and the uneven agency of affected communities.

- 2 **Linking datascaping to broader spatial sustainability agendas:** The datascaping analysis presented in this study reveals interconnections between heritage attributes, socio-spatial dynamics, and sustainability challenges. Building on these findings, future research could explore how such attributes and relevant datasets may be systematically structured, visualised, and analysed to address broader sustainability agendas. These may include issues such as cultural resilience, climate change adaptation, and social justice. This fast and slow pace model distinction was developed here as an interpretive lens rather than a tested model; future research should subject it to more systematic, and where possible quantitative, temporal modelling across other urban systems
- 3 **Strengthening institutional and technical capacity for implementation:** The methodological application of datascaping also exposed several practical limits. These include gaps in technical capacity, uneven data availability, and weak institutional integration. These constraints highlight the need to strengthen the practical implementation of such approaches within planning practice. future work should design governance experiments testing whether datascaping actually changes planning decisions and outcomes, coupled with longitudinal evaluation tracking its use over successive planning cycles to assess whether it produces better, more inclusive outcomes over time. Since datascaping functions as an ongoing process rather than a fixed output, future work should also distinguish what is expected of its different users: from community-level contribution to policy application to technical integration by planners.
- 4 **Expanding the approach through comparative research:** Finally, since this study focused on a single contested historic urban landscape, the transferability of the proposed approach remains an open question. Comparative research across different historic urban contexts would therefore be valuable in evaluating the adaptability of datascaping methodologies under varying governance systems, heritage regimes, and socio-political conditions. This comparison should also extend beyond heritage-specific contestation to other forms of politically contested urban space. Such studies could contribute to refining the conceptual and methodological framework proposed in this research while also consolidating the broader relevance of spatial sustainability. This also points to a deeper question of whether established heritage and planning institutions can absorb critical heritage perspectives without a more fundamental shift in existing power relations.

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Annexes



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ברח' אחווה 23, ת"א
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Annex I

TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
1	Town of Bamberg, Germany	ii, iv	Medieval urban fabric; bridges and islands; Baroque residences; Romanesque cathedral; river landscape setting; agricultural character of the surrounding region	
2	Trogir, Croatia	ii, iv	Remarkable example of urban continuity. Orthogonal street plan of this island town; Romanesque churches; Renaissance and Baroque buildings	
3	City of Luxembourg	iv	The fortifications were a fine example of military architecture spanning several centuries; residual valley landscapes; urban setting	
4	City of Bologna, Italy	iv	Twelve component parts consisting of ensembles of porticoes; medieval urban fabric; civic architecture	
5	Asante Traditional Buildings, Ghana	v	Group of traditional buildings representing the last remaining testimony of the great Asante civilisation; vernacular construction techniques	
6	Kyiv: Saint-Sophia Cathedral & Kyiv-Pechersk Lavra	i, ii, iii, iv	Byzantine and Baroque architecture; monastic complexes; urban silhouette and river setting of the Dnieper; visual corridors and buffer zone integrity	
7	Historic City of Vigan, Philippines	ii, iv	Unique for having preserved much of its Hispanic colonial character; Mestizo and Filipino architecture; cobblestone streets	
8	Brimstone Hill Fortress, St Kitts	iii, iv	Well-preserved 17 th –18 th century military architecture in a Caribbean landscape; natural setting and volcanic topography	
9	Historic Centre of Florence, Italy	i, ii, iii, iv, vi	Built on an Etruscan settlement; symbol of the Renaissance; extraordinary artistic achievements; historic urban fabric; river Arno setting	
10	University of Coimbra, Portugal	ii, iv, vi	Situated on a hill overlooking the city; historic university buildings; Alta and Sofia districts; spatial relationship between university and urban fabric	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	11.4, 11.6, 13.2, 17.17, 7.1, 7.2	–	–	•	•	Increasing temperatures; reducing precipitations; damages to buildings (cracks, shifting foundations)	Historic built environment, Natural environment, Hydrology.
	8.9, 11.4	•	•	–	–	New heritage-based city branding strategy built on cultural values and community participation, to enhance Trogir's attractiveness for cultural tourism	Historic built environment, Land use patterns, Social and cultural practices.
	8.9, 11.4	–	•	–	–	New accessible tours launched on the 25 th anniversary of inscription, opening the site to citizens with special needs	Historic built environment, Open spaces, Cultural and social practices.
	8.3, 11.3, 11.4, 17.17	•	•	•	–	Establishing a methodology for urban regeneration of historic centres; recognising living heritage communities	Historic built environment, Cultural and social practices, Open spaces.
	8.9, 11.4	•	–	–	–	Documenting tangible and intangible aspects of urban cultural heritage	Historic built environment, Cultural and social practices, Diversity and identity.
	11.4	•	•	–	–	Proposal for a unified buffer zone to preserve the relationship between monuments and their urban setting	Historic built environment, Visual integrity and setting, Open spaces.
	1.2, 4.4, 4.7, 8.5, 11.1, 11.4, 11.b	•	•	•	•	Implementation of the Historic Urban Landscape approach at neighbourhood scale	Historic built environment, Cultural and social practices, Land use patterns, Economic processes.
	11.4, 17.9, 17.16, 17.17	•	–	–	•	Conservation works and capacity building assistance	Historic built environment, Natural environment, Cultural and social practices.
	11.4.1	•	–	•	•	Incorporating urban heritage in plans for sustainable urban development; developing conservation tools	Transport infrastructure, Open spaces and gardens.
	4.7, 8.9, 11.4, 17.17	•	•	–	•	"Lettered" project: literature, territory, tourism and education	Historic built environment, Cultural and social practices, Diversity and identity.

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TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
11	Historic Monuments Zone of Querétaro, Mexico	ii, iv	Colonial town notable for ornate civil and religious architecture; urban fabric integrating indigenous and European elements; aqueduct	
12	World Heritage Sites in Iraq	Multiple	Conservation affected by unstable conflict situation; archaeological sites; traditional urban fabric; intangible cultural heritage under threat	
13	Rubem Braga Elevator Complex, Rio de Janeiro	v, vi	Exceptional urban setting encompassing favelas and formal city; cultural landscape connecting low-income communities with the broader urban fabric	
14	Ancient City of Ping Yao, China	ii, iii, iv	Evolution of architectural styles and town planning in imperial China; complete city walls; historic commercial street; Ming and Qing dynasty-built fabric	
15	Cidade Velha, Ribeira Grande, Cape Verde	ii, iii, vi	Original street layout and impressive remains including the Pillory, Fort Real de São Filipe and the ruins of the Cathedral; first European colonial settlement in sub-Saharan Africa	
16	San Gimignano, Italy	i, iii, iv	Iconic skyline defined by medieval towers; surrounded by vine-filled agricultural landscape; Romanesque and Gothic architecture; intact medieval street layout	
17	Historic Centre of Salzburg, Austria	ii, iv, vi	Extraordinarily rich urban fabric developed over 12 centuries; Baroque architecture; relationship between built city and natural mountain setting; birthplace of Mozart	
18	Royal Exhibition Building & Carlton Gardens, Australia	ii	Building constructed of brick, timber, steel and slate; combines elements from Byzantine, Romanesque, Lombardic and Italian Renaissance architecture; surrounding historic gardens	
19	World Heritage Cities in Mexico	Multiple	Colonial urban fabric; Spanish Baroque architecture; indigenous cultural landscapes; historic market systems; intangible heritage of living traditions	
20	Saint Petersburg, Russia	i, ii, iv, vi	*Baroque and neoclassical architecture; historic urban ensemble; Neva River waterfront; historic squares and palaces; ensemble of islands and canals	
21	Timbuktu Mausoleums, Mali	ii, iv, v	Earthen architecture mausoleums; mosque typologies; traditional urban layout; intangible heritage of Islamic scholarship; desert landscape setting	
22	Stone Town of Zanzibar	ii, iii, vi	Outstanding example of Swahili coastal trading town; narrow lanes; coral stone buildings; carved wooden doors; Indian Ocean trade heritage; multicultural urban identity	
23	Valongo Wharf Archaeological Site, Brazil	vi	Archaeological remains of the largest port of entry for enslaved Africans in the Americas; layers of memory, trauma, and cultural resistance embedded in the urban fabric	
24	City of Turin, Italy	i, ii, iv, v	*Baroque urban layout; Savoy royal residences; grid street plan; Po River landscape; historic piazzas and arcaded streets	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	11.1, 11.3, 11.4, 11.7	–	•	•	•	Creation of urban rehabilitation and renovation programmes	Historic built environment, Infrastructure, Cultural and social practices, Open spaces.
	11.4	•	–	–	–	Collect documents and photographs; capacity building for conservation post-conflict	Historic built environment
	10.2, 11.2, 11.a	•	–	•	•	Since 2010, residents of Cantagalo and Pavao communities connected to city via elevator infrastructure	Transport infrastructure, Cultural and social practices.
	11.3, 11.4	•	•	•	•	Innovative management and financing models combining tangible and intangible heritage conservation, aiming to secure long-term revitalisation	Historic built environment
	1.2, 4.4, 8.3, 8.9, 11.4	•	•	–	•	Support local entrepreneurship; enhance cultural heritage as economic asset	Economic processes, Diversity and identity.
	8.9, 11.4	•	•	–	–	Implementation of the Historic Urban Landscape approach	Historic built environment, Land use patterns, Social and cultural practices.
	11.3, 11.4	–	•	–	–	Community engagement programme providing key data and inputs for sustainable development of the World Heritage site	Diversity and identity, Social and cultural practices.
	11.3, 11.4	–	•	–	–	506 community contributions received from participants across consultation	Historic built environment, Diversity and identity, Social and cultural practices.
	8.3, 8.9	–	–	–	•	Online platform connecting and supporting small and medium enterprises in World Heritage Cities, boosting tourism and digital presence	Historic built environment, Cultural and social practices, Economic processes.
	4.7, 11.4	–	•	–	–	"Mission: Preserve" competition involving schools in heritage documentation	Historic built environment, Cultural and social practices, Diversity and identity.
	4.4, 11.4, 17.3, 17.16, 17.17	–	•	•	•	*Reconstruction of destroyed mausoleums using traditional knowledge systems, as part of an international cooperation campaign after armed conflict	Historic built environment, Cultural and social practices.
	10.2, 11.2, 11.3, 11.4, 11.6, 11.7, 11.a, 16.7, 17.9	•	•	•	–	*Multi-level, heritage-based development and spatial plan linking the site and buffer zone with the wider city context	Historic built environment, Infrastructure (transport), Open spaces.
	10.2, 11.4	–	•	–	–	Symbolic ritual of washing and purification honouring African ancestors who arrived at the wharf in captivity	Cultural and social practices
	4.7, 4.a, 5.5, 8.5, 8.8, 10.2, 11.4, 13.3, 17.17	•	•	•	•	Polo del '900 cultural centre model promoting institutional collaboration and community-centred creative ecosystems	Historic built environment, Infrastructure (social), Open spaces, Cultural and social practices.

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TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
25	City of Florence	i, ii, iii, iv, vi	Historic urban fabric; Arno River landscape; Renaissance monuments; transport and mobility pressures on the historic core	
26	Djémila, Algeria	iii, iv	Roman ruins in a mountain setting; exceptional state of preservation; archaeological landscape; intangible heritage of ancient urban planning traditions	
27	City of Cuzco, Peru	iii, iv	Inca urban planning superimposed by Spanish colonial grid; Andean landscape setting; living indigenous heritage; archaeological fabric beneath the contemporary city	
28	Grand-Bassam, Côte d'Ivoire	iii, iv	First colonial capital; French colonial architecture; N'zima Quarter (living indigenous community); coastal landscape and lagoon system; layered colonial and indigenous heritage	
29	City of Graz, Austria	ii, iv	Urban heat island effect; historic urban fabric; Schlossberg hill; river Mur setting; medieval and Baroque architecture	
30	Historic Site of Lyon, France	ii, iv	Urban heat island effect; two millennia of urban fabric; traboules (covered passageways); Renaissance quarter; confluence of Rhône and Saône rivers	
31	Historic Town of Guanajuato, Mexico	i, ii, iv, vi	Silver mining town; Baroque architecture; underground street system (subterranean roads); dramatic topography; historic plazas and market spaces	
32	Belize Barrier Reef Reserve System	vii, ix, x	World's second largest barrier reef; mangrove forests; lagoons; coral atolls; endemic marine species; coastal cultural landscape of fishing communities	
33	Atlas World Heritage	Multiple	Multiple Atlas Mountain heritage sites; Berber and Islamic urban heritage; traditional kasbahs and ksour; mountain landscape settings; vernacular agricultural systems	
34	M'Zab Valley, Algeria	ii, iii, v	Floods and water management; traditional Mozabite architecture; five pentapolis towns; oasis gardens; traditional water harvesting systems	
35	Chan Chan Archaeological Zone, Peru	i, iii	Largest pre-Columbian city in South America; adobe architecture; nine citadels; coastal desert landscape; water management systems	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	11.2, 11.4, 17.17	●	—	—	—	Analysis of mobile phone usage data to inform infrastructure design and tourism management	Historic built environment, Infrastructure (transport), Open spaces.
	4.7, 8.5, 11.4	●	●	—	—	Ongoing workshops and activities connecting local young residents with the archaeological site	Cultural and social practices
	4.7, 8.5, 11.4	●	●	●	—	Projects protecting cultural heritage, promoting social development through crafts, and strengthening traditional knowledge	Historic built environment, Cultural and social practices.
	1.5, 4.5, 4.7, 6.2, 8.3, 8.9, 11.3, 11.4, 11.5, 11.b, 13.2, 13.3, 17.16	●	●	●	●	Creation of a local World Heritage committee; recovery works after the October 2019 floods; new opportunities for sustainable development	Historic built environment, Cultural and social practices.
	11.6, 11.7, 13.1	●	—	●	—	Ambitious pedestrianisation programme redesigning historic streets and public spaces with high-quality materials	Historic built environment, Infrastructure (transport), Open spaces.
	11.3, 11.4	●	—	—	●	2019 urban plan protecting cultural and natural heritage values through green and blue infrastructure planning tools	Historic built environment, Open spaces, Cultural and social practices.
	11.3, 11.4	—	●	●	—	New local coordination office dedicated to conservation and sustainable development of the historic centre	Historic built environment, Open spaces, Cultural and social practices.
	13.2, 14.2, 14.3	—	●	—	●	Resilient Reefs Initiative building climate resilience against coral bleaching, more severe storms and sea-level rise	Natural environment, Cultural and social practices.
	11.3, 11.4, 17.17	●	—	—	—	Network of European World Heritage cities (Florence, Santiago de Compostela, Edinburgh, Oporto, Bordeaux) sharing strategies to safeguard OUV	Historic built environment, Open spaces, Land use patterns, Cultural and social practices.
	6.b, 11.4, 11.b, 13.1	●	●	—	—	Traditional water infrastructure and flood-adaptive settlement knowledge documented and promoted as a climate change resource	Historic built environment, Natural environment, Hydrology, Cultural and social practices.
	11.3, 13.1	●	●	●	●	Disaster risk reduction plan developed after Danger-listing and integrated with heritage management mechanisms	Historic built environment, Natural environment, Cultural and social practices.

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TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
36	Røros Mining Town, Norway	iii, iv, v	Industrial mining town; wooden architecture; historic smelting works; cultural landscape of farms and mining infrastructure; Sami cultural heritage	
37	Melaka and George Town, Malaysia	ii, iii, iv	Exceptional multicultural heritage; shophouse typologies; living heritage of Baba Nyonya, Chinese, Indian and Malay communities; street food culture; colonial administrative buildings	
38	Cities of Mantua and Sabbioneta, Italy	ii, iii	Renaissance planned city (Sabbioneta); Gonzaga ducal palace complex (Mantua); Po River landscape; fortification walls; urban planning theory embodied in built form	
39	Historic Centre of Urbino, Italy	ii, iv	Renaissance ideal city; Ducal Palace; hill town morphology; agricultural hinterland; water systems and historic gardens	
40	Bengaluru, India	—	Historic tanks (water bodies); urban lakes system; colonial-era parks and gardens; Dravidian and colonial built fabric; rapid urban transformation pressures	
41	City of Strasbourg, France	ii, iv	Grande Île; Neustadt (German imperial district); Rhine riverscape; historic markets and public spaces; climate adaptation pressures	
42	Bamberg (2nd entry)	ii, iv	Medieval town plan; rivers Regnitz and Main; market gardens (Gärtnerstadt); Baroque episcopal quarter; climate and flooding vulnerability	
43	City of L'Aquila, Italy	—	Medieval city severely damaged by 2009 earthquake; historic urban fabric under post-disaster reconstruction; public spaces and civic buildings; mountain landscape setting	
44	City of Saint-Louis, Senegal	ii, iv	French colonial urban layout on a narrow island; Langue de Barbarie coastal barrier; flooding and sea-level rise vulnerability; mixed Senegalese-French heritage; fishing community heritage	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	8.2, 8.4, 8.9, 10.2, 11.4, 12.2, 12.3	•	•	–	–	Farming cooperative system conserving the surrounding agricultural landscape and promoting sustainable tourism	Historic built environment, Economic processes, Cultural and social practices, Diversity and identity.
	8.3, 8.9, 11.3, 11.4, 11.7, 17.16, 17.17	•	•	•	•	Strategy building on multicultural heritage as a resource for local development and livelihoods after loss of free-trade port status	Historic built environment, Open spaces, Land use patterns, Cultural and social practices.
	8.9, 11.3, 11.4	•	•	•	•	Central management office created to coordinate conservation across the two component cities of the serial property	Historic built environment, Economic processes, Open spaces, Cultural and social practices.
	2.4, 8.9, 11.3, 11.4, 11.6, 13.1, 17.17	•	•	–	•	Strategic actions and a management plan update to improve environmental sustainability and climate mitigation/adaptation	Historic built environment, Hydrology and natural environment, Open spaces, Land use patterns.
	6.1, 6.3, 6.4, 6.b, 8.2, 10.1, 10.2, 11.4, 11.5, 13.1, 15.9, 17.17	•	•	–	•	“Million Wells” campaign reviving traditional well-digging techniques to improve water availability and sustainability	Historic built environment, Hydrology and natural, environment Open spaces, Land use patterns.
	11.4, 11.6, 11.7, 13.1	•	–	•	–	Management plan and urban planning tools updated to integrate cultural and natural heritage values and improve liveability	Historic built environment, Natural environment, Open spaces, Land use patterns, Economic processes.
	8.9, 11.4, 11.7, 12.3, 13.1	–	•	–	•	New water turbine reintroducing hydropower while respecting OUV; COVID-19 pandemic strengthened residents' connection to gardening heritage (Gärtnerstadt)	Historic built environment, Natural environment, Open spaces, Land use patterns, Cultural and social practices.
	3.4, 9.1, 9.4, 11.2, 11.4, 11.6, 13.3	•	•	•	•	Sustainable Urban Mobility Plan to reduce emissions and pollution and enhance liveability through expanded cycling infrastructure	Historic built environment, Natural environment, Open spaces, Geography, Infrastructure.
	8.9, 9.1, 11.1, 11.4, 17.16, 17.17	•	•	•	•	Local, national and international actions mobilised after the 2016 Committee warning of possible Danger-listing over poor conservation state	Historic built environment, Natural environment, Open spaces, Infrastructure (sewage).

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TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
45	Sites in Yemen	Multiple	Old City of Sana'a; Old Walled City of Shibam; historic town of Zabid; tower houses; traditional mud-brick architecture; conflict-related destruction	
46	Historic Cairo, Egypt	i, v, vi	One of the world's oldest Islamic cities; minarets and mosques; medieval urban fabric; Khan el-Khalili market; Nile-adjacent landscape; Fatimid, Mamluk and Ottoman layers	
47	Cities of Orchha and Gwalior, India	—	Bundela Rajput palaces and temples (Orchha); Gwalior Fort complex; riverine landscapes; living heritage of pilgrimage and religious practice; traditional urban fabric	
48	Historic City of Santiago de Compostela, Spain	i, ii, vi	Pilgrimage routes and camino heritage; Romanesque cathedral; medieval urban fabric; historic plazas; living pilgrimage tradition as intangible heritage	
49	Cartagena de Indias, Colombia	iv, vi	Spanish colonial fortifications; historic walled city; Caribbean coastal landscape; Afro-Colombian cultural heritage; living heritage communities within walls	
50	City of Durham, UK	ii, iv, vi	Norman cathedral and castle on a river peninsula; Wear River gorge landscape; historic market place; university and ecclesiastical urban identity; medieval street pattern	
51	Indonesia: Diverse Heritage	Multiple	Multiple heritage typologies across Indonesian archipelago; living traditions; intangible heritage of diverse ethnic communities; traditional urban settlements	
52	City of Puebla, Mexico	ii, iv	Colonial Baroque architecture; Talavera ceramic tradition (intangible heritage); historic centre; pre-Hispanic archaeological layers beneath colonial city	
53	George Town Heritage, Malaysia	ii, iii, iv	Living multicultural heritage city; shophouse typologies; clan jetties; street art as contemporary intangible heritage; Chinese, Indian, Malay and Peranakan communities; colonial street grid	
54	Cidade Velha, Ribeira Grande (2nd entry)	ii, iii, vi	First European colonial outpost in sub-Saharan Africa; slave trade heritage; Pillory; Fort Real de São Filipe; coastal landscape; original street layout	
55	City of Tunis, Tunisia	ii, iii, v	Medina with mosques, palaces and historic souks; Hafsid and Ottoman urban layers; traditional suq system; Andalusian community heritage	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	1.2, 8.5, 8.6, 11.4	–	•	–	•	Cash-for-work scheme providing youth employment while conserving urban heritage across four historic cities amid long-standing conflict	Historic built environment, Open spaces, Economic practices, Cultural and social practices.
	4.4, 4.7, 8.5, 10.2, 11.4, 17.9, 17.16, 17.17	•	•	–	•	Long-standing project revitalising the Souq al-Silah commercial street and reconnecting the community with its heritage	Historic built environment, Open spaces, Economic practices, Cultural and social practices.
	11.3, 11.4, 17.16	•	•	–	–	Pilot implementation of the HUL Recommendation approach through an India-UNESCO collaboration for heritage-based urban planning	Historic built environment, Open spaces, Economic practices, Infrastructure, Land use patterns.
	11.3, 11.4, 11.7	•	–	•	–	Comprehensive heritage protection framework addressing urban gentrification, historic-centre abandonment and tourism pressures	Historic built environment, Open spaces, Economic practices, Infrastructure, Land use patterns.
	4.7, 11.4	–	•	–	–	University of Pennsylvania field research seminar (2020) studying the city's cultural heritage as an educational exercise	Historic built environment, Open spaces, Economic practices, Infrastructure, Land use patterns.
	11.3, 11.4, 11.7, 16.7, 17.17	•	•	•	–	Neighbourhood Plan (2014-2021) developed through a Neighbourhood Forum, extensive consultations and a public referendum	Historic built environment, Open spaces, Economic practices, Infrastructure, Land use patterns.
	8.3, 8.6, 11.4	–	•	–	•	Youth entrepreneurship programme (UNESCO Jakarta/Citi Foundation) linking local livelihoods with heritage sites	Economic practices, Cultural and social practices, Diversity and identity.
	4.4, 4.7, 11.4	•	•	–	–	Comprehensive Heritage Education Programme raising awareness of cultural heritage and supporting its conservation	Economic practices, Cultural and social practices, Diversity and identity.
	4.7, 5.5, 10.2, 11.4, 11.7, 16.7, 17.17	•	•	–	•	Annual Heritage Celebrations featuring community workshops and street performances engaging residents in living heritage	Economic practices, Cultural and social practices, Diversity and identity.
	11.4	–	•	–	•	Guidebook making urban and architectural regulations accessible, raising public awareness of planning rules	Historic built environment
	8.9, 11.3, 11.4	•	–	•	–	Actions addressing preservation and promotion of cultural heritage in a historic centre at the heart of a bustling metropolis	Historic built environment, Open spaces, Economic practices.

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TABLE A.A.1 Analysis of case studies from UNESCO's World Heritage Canopy Platform to document the actions and recommended tool to address relevant HUL attribute and SDG targets

No.	Site/ City	Criteria	Attributes/ OUV	
56	City of Mtskheta, Georgia	iii, iv	Change in land use patterns; economic interests; ancient capital of Georgia; early Christian churches and monasteries; confluence of Mtkvari and Aragvi rivers	
57	Historic City of Trogir (2nd entry)	ii, iv	Neighbourhood-level interventions; compact island town; Roman street grid; Romanesque and Renaissance monuments	
58	Stonehenge, Avebury and Associated Sites, UK	i, ii, iii	Proximity to residential area creates management challenges; prehistoric monuments; ceremonial landscape; visual integrity under pressure from development	
59	Baekje Historic Areas, South Korea	ii, iii	Dispersion and distance between archaeological sites create management challenges; ancient Korean kingdom; Buddhist temples and royal tombs; agricultural landscape	

	SDGs and Related Targets	HUL tools applied				Impact/ Actions	KEY HUL attribute
		Knowledge and planning	Civic Engagement	Regulatory frameworks	Financial tools		
	11.3, 11.4	–	–	•	–	Georgian World Heritage Protection Council established to review development proposals within the property and buffer zones	Historic built environment, Open spaces, Economic practices, Land use patterns.
	11.3, 11.4, 16.7	–	•	–	•	Participatory budgeting model enabling residents to decide on the allocation of part of the city's budget for local initiatives	Historic built environment, Open spaces, Economic practices, Land use patterns.
	11.3, 11.4	–	•	–	–	Avebury Residents' Pack (2006-2008) reconnecting local communities with the archaeological sites of the property	Historic built environment, Open spaces, Economic practices, Land use patterns, Diversity and identity.
	8.5, 11.4	–	–	•	–	Daily monitoring system carried out by local residents trained as heritage inspectors by the managing authority	Historic built environment, Economic practices.

TABLE A.A.2 An overview of the SDG targets covered across 59 World Heritage projects, showing the number and serial numbers of projects addressing each target.

SDG No.	SDG Name	Target	No. of Projects	Sr. No. of Projects
SDG 1	No Poverty	1.2	3	7, 15, 45
		1.5	1	28
SDG 2	Zero Hunger	2.4	1	39
SDG 3	Good Health & Well-Being	3.4	1	43
SDG 4	Quality Education	4.4	5	7, 15, 21, 46, 52
		4.5	1	28
		4.7	11	7, 10, 20, 24, 26, 27, 28, 46, 49, 52, 53
		4.a	1	24
SDG 5	Gender Equality	5.5	2	24, 53
SDG 6	Clean Water & Sanitation	6.1	1	40
		6.2	1	28
		6.3	1	40
		6.4	1	40
		6.b	2	34, 40
SDG 7	Affordable & Clean Energy	7.1	1	1
		7.2	1	1
SDG 8	Decent Work & Economic Growth	8.2	2	36, 40
		8.3	6	4, 15, 19, 28, 37, 51
		8.4	1	36
		8.5	7	7, 24, 26, 27, 45, 46, 59
		8.6	2	45, 51
		8.8	1	24
		8.9	15	2, 3, 5, 10, 15, 16, 19, 28, 36, 37, 38, 39, 42, 44, 55
SDG 9	Industry, Innovation & Infrastructure	9.1	2	43, 44
		9.4	1	43
SDG 10	Reduced Inequalities	10.1	1	40
		10.2	8	13, 22, 23, 24, 36, 40, 46, 53

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TABLE A.A.2 An overview of the SDG targets covered across 59 World Heritage projects, showing the number and serial numbers of projects addressing each target.

SDG No.	SDG Name	Target	No. of Projects	Sr. No. of Projects
SDG 11	Sustainable Cities & Communities	11.1	3	7, 11, 44
		11.2	4	13, 22, 25, 43
		11.3	21	4, 11, 14, 17, 18, 22, 28, 30, 31, 33, 35, 37, 38, 39, 47, 48, 50, 55, 56, 57, 58
		11.4	53	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59
		11.4.1	1	9
		11.5	2	28, 40
		11.6	6	1, 22, 29, 39, 41, 43
		11.7	9	11, 22, 29, 37, 41, 42, 48, 50, 53
		11.a	2	13, 22
		11.b	3	7, 28, 34
SDG 12	Responsible Consumption & Production	12.2	1	36
		12.3	2	36, 42
SDG 13	Climate Action	13.1	7	29, 34, 35, 39, 40, 41, 42
		13.2	3	1, 28, 32
		13.3	3	24, 28, 43
SDG 14	Life Below Water	14.2	1	32
		14.3	1	32
SDG 15	Life on Land	15.9	1	40
SDG 16	Peace, Justice & Strong Institutions	16.7	4	22, 50, 53, 57
SDG 17	Partnerships for the Goals	17.3	1	21
		17.9	3	8, 22, 46
		17.16	7	8, 21, 28, 37, 44, 46, 47
		17.17	16	1, 4, 7, 8, 10, 21, 24, 25, 33, 37, 39, 40, 44, 46, 50, 53

Annex II

TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
606	06/22/1967	Jaffa Outline Plan	Marking new roads, widening existing roads, determining regulations for public lots, open areas, parking, archaeological excavations, architectural reserves, commercial areas, entertainment and arts zones.	Strong alignment Layering of values, recognises archaeological, architectural and intangible heritage of Old Jaffa (HUL §9, §11) Adaptive reuse as heritage tool, promotes compatible new uses (studios, galleries, craft factories, souvenir shops) within historic fabric, Visual integrity, no excavation without permit; building interventions require municipal approval, NUA §97: Promotes cultural heritage as driver of sustainable urban development
2236	10/04/1995	Jaffa Slope Area (Midron Yaffo): To change the Jaffa Slope area for the benefit of its current population	Rehabilitate the Jaffa Slope area for the benefit of its current and future population. Includes instructions for ten residential buildings, three coastal area buildings for detailed planning, coastal development, sea wall, beach, and recreational uses.	Moderate alignment Social sustainability layer, rehabilitation for existing/future population acknowledges living heritage community, Coastal/natural landscape, sea wall and beach development touch on landscape setting (HUL §11), NUA §97: Mixed-use and density provisions support compact, inclusive urban form, NUA §67: Coastal development and public park provision relate to sustainable land management, Limited: no explicit documentation or heritage assessment provisions

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2378	25/02/2007	Old Jaffa Port	Revitalising the Old Jaffa Port as a historic Mediterranean port; tourism, recreation and water sports area while maintaining fishing port activity; coastal promenade; public open passage; hospitality and commercial facilities.	Strong alignment Historic port as layered landscape, explicitly preserves Mediterranean maritime heritage character (HUL §9), Adaptive reuse: fishing port continuity alongside tourism/ recreation reflects dynamic heritage management, Visual integrity and setting: continuous coastal promenade and open public passage protect urban-maritime interface, NUA §97: Cultural heritage leveraged for economic revitalisation while maintaining access and public benefit
2385	13/10/1994	Heart of Tel Aviv Area C	Encourage additional residential areas for a diverse population; improve quality of living; allow building additions up to 5 residential floors; strengthen level of services and living conditions.	Weak alignment Encourages diverse residential population, supporting social stratification of historic urban area, NUA §31: Affordable housing and mixed-use zoning in city centre supports social equity, NUA §97: Quality-of-life improvements in historic urban areas indirectly support heritage stewardship, No explicit conservation provisions; density additions risk undermining urban character
2268	26/11/1990	Zoning change from residential and commercial area to "special residential Area"	Encourage additional residential space; building additions up to 5–6 floors; preservation of architecturally valued buildings.	Weak alignment Preservation of architecturally valued buildings acknowledged, NUA §97: Ensures built heritage survives densification processes, Conservation is secondary to residential upzoning; no landscape character or community heritage tools

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2510	11/11/1993	Rehabilitation and development of the Kerem Hatiamanim neighborhood	Rehabilitate and develop Kerem HaTeimanim neighbourhood, emphasising urban fabric and setting; create urban activity continuum between Nahalat Binyamin and the seafront promenade	Moderate alignment Urban fabric emphasis: explicitly highlights the distinctive urban setting of Kerem HaTeimanim, Continuity of urban activity reflects intangible/social heritage values of the neighbourhood, NUA §37–38: Pedestrian connectivity and promenade integration support sustainable mobility and public space, Recognises identity and character but lacks formal conservation/ documentation requirements
2570	04/20/1995	"Dante" area	Improve quality of living; determine maximum number of units; allow expansion of existing units and addition of approximately 260 new units.	Weak alignment Residential expansion plan with no explicit heritage or landscape provisions, NUA §31: Improves housing conditions in existing urban fabric, Does not address heritage attributes or spatial sustainability beyond housing quantity
2563	06/02/1994	Tzahalon	Improve quality of residences; determine maximum units; add approximately 900 new units; strengthen services and living conditions; designate conservation areas and buildings; maintain architectural quality of courtyards and public spaces; design guidelines for building permits.	Moderate alignment Conservation areas and buildings for conservation explicitly designated, Urban character preservation: maintains architectural quality of courtyards and public spaces, Design guidelines for building permits reflect landscape character management, NUA §97: Conservation-led renewal integrates heritage into residential upgrading, NUA §37: Public space quality and commercial frontage conditions

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2572	05/25/1995	Jaffa Clock Square Complex	Revitalise Clock Square as a mixed residential and utility complex, maintaining existing urban fabric character; create urban continuity between Old Jaffa (west) and Jerusalem Boulevard (east).	Moderate alignment Urban fabric continuity: maintains historic character while enabling mixed-use revitalisation, Interface between historic Jaffa and modern city corridor: manages urban setting, NUA §97: Cultural identity of Clock Square area used as lever for urban renewal, NUA §37: Mixed-use activation and public space integration, Character-sensitive approach but no explicit conservation documentation requirements
2606	11/16/1997	Jerusalem Boulevard Complex	Revitalise Jerusalem Boulevard as a mixed-use residential and commercial artery, preserving the character of the existing urban fabric; create urban continuity between ancient Jaffa and the modern boulevard.	Moderate alignment Preservation of existing urban fabric character explicitly stated, Urban continuity between ancient Jaffa and modern boulevard: setting and buffer management (HUL §11), NUA §97: Jerusalem Boulevard identity as unique artery supports place-based heritage-led development, NUA §38: Mixed-use zoning balances residential, commercial and heritage functions, Recognises layered urban character but lacks systematic heritage documentation tools

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2650	28/07/2008	Preservation of buildings and sites in Tel Aviv	Implement conservation as a lever for revealing architectural values; preserve built heritage; improve architecture quality; urban revitalisation through conservation listings; financial incentives; transfer of development rights; graded conservation classification.	Strong alignment Comprehensive built heritage conservation plan for Tel Aviv, Documentation requirements align with HUL knowledge and planning tools, Graded conservation classification reflects attribute-based heritage assessment, Restoration, maintenance and permit conditions operationalise HUL heritage management, Financial incentives and transfer of development rights: HUL governance and financial tools, NUA §97: Most direct alignment with cultural heritage as driver of sustainable urban development, Limitation: focused on architectural aesthetics; limited provisions for intangible heritage, social fabric, or non-listed structures
2660	10/09/2001	Ajami Neighbourhood	Rehabilitate Ajami neighbourhood for existing and future population; improve housing quality; expand residential units; preserve architectural and urban heritage; improve public infrastructure and services.	Moderate alignment Rehabilitation for existing community: Ajami as contested historic neighbourhood with living heritage (HUL §11), Social dimension of heritage: prioritises current population's needs alongside physical renewal, NUA §31: Inclusive housing in historic urban area supports equity and social sustainability, NUA §97: Neighbourhood identity maintained through community-oriented rehabilitation, Critical gap: plan attracted wealthier developers and tenants, undermining stated social objectives and accelerating gentrification

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2720	01/12/1998	Unifying and improving the provisions of the city centre plans	Unify and improve provisions regarding building heights, building lines, balconies in residential buildings; clarifications on residential and commercial zoning across city centre plans.	Weak alignment RRegulatory harmonisation: unifying building height and setback provisions affects urban landscape character, NUA §38: Standardised planning regulations support coherent spatial governance across the historic centre, Technical planning consolidation with indirect heritage implications; no conservation provisions
3000	08/28/2006	Sarona-Southern Kirya	Establish new business district including residential condominiums; integrate public open space; list buildings for preservation; tree preservation.	Moderate alignment Tree preservation and heritage buildings listed for conservation within new business district (HUL §11), Integration of open public space with preserved heritage structures, NUA §65: Green infrastructure and open space provision within mixed-use development, NUA §97: Conservation listings within regeneration project acknowledge built heritage in urban transformation, Outcome concern: Sarona heavily commercialised; historic village character eroded despite conservation listings

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TABLE A.B.1 Documenting Tel Aviv's preservation plans and its provisions

Name of Action plan/ Town planning scheme	Date of approval	Name of the Scheme (Area)	Rationales and Aims in Relation to Preservation/ Other features relevant to preservation and conservation	Relevance to HUL Recommendations and its attributes and/or Spatial Sustainability
2509	1992	The Maronite neighbourhood	Improve housing quality; increase units; expand existing units; strengthen services and living conditions; designate conservation areas and buildings for conservation; encourage commercial development in ground floors.	Moderate alignment Conservation areas and buildings for conservation formally designated, Architectural and urban character preservation of the Maronite neighbourhood, a minority community heritage, Design conditions for building permits reflect landscape character management, NUA §97: Community identity and cultural heritage of minority neighbourhood acknowledged in planning, NUA §31: Inclusive housing and service provision in minority heritage neighbourhood

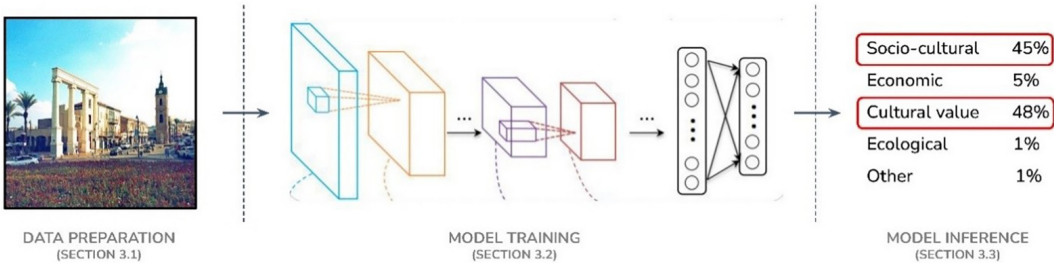
Source: Israel Planning Administration, Mavat Platform (mavat.iplan.gov.il) ; HUL and NUA analysis by Author.

Annex III

All model architectures assessed in this study and the outcomes of the Transfer Learning Method were employed to train deep learning-based image classification models, where the results of ViT outperformed other models.

Deep Learning with transfer learning allowed automatic quantification of these elements into four value buckets: Socio-cultural, economic, cultural, ecological, and other (Figure 8.9). Supervised deep learning is a discriminative method where the goal is to approximate the probability distribution:

$y \in f(X, \Theta),$
where
 y is the decision,
 X is the input data and
 Θ are the set of model parameters.

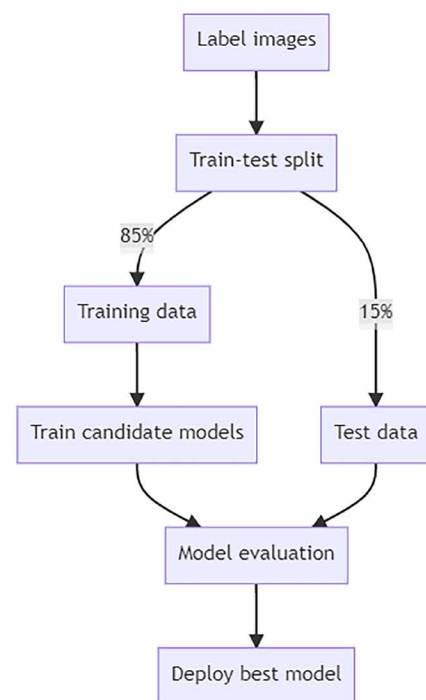


The methodology and workflow adopted for this Deep Learning exercise with Transfer learning method

Model	Layers	F1 Score	AUROC	Precision	Recall	Accuracy
ViT Large	303	0.717	0.856	0.714	0.726	0.823
Swin Large	355	0.696	0.853	0.717	0.688	0.819
Swin Base	355	0.687	0.853	0.675	0.705	0.804
ConvNeXt Large	350	0.681	0.83	0.652	0.748	0.78
ConvNeXt Small	360	0.665	0.795	0.672	0.66	0.787
SWIN Small	365	0.656	0.824	0.685	0.67	0.797
ConvNeXt Base	350	0.651	0.834	0.709	0.623	0.799
ViT Small	159	0.648	0.831	0.653	0.664	0.785
SWIN Tiny	187	0.642	0.805	0.655	0.638	0.784
EfficientNet ES	160	0.639	0.788	0.643	0.645	0.767
DenseNet 169	692	0.628	0.786	0.642	0.621	0.765
DenseNet 201	820	0.623	0.807	0.676	0.594	0.78
DenseNet 121	500	0.62	0.784	0.635	0.617	0.765
ConvNeXt Tiny	188	0.615	0.777	0.637	0.603	0.753
ResNet 101	322	0.612	0.78	0.611	0.615	0.753
EfficientNet B4	399	0.608	0.788	0.633	0.595	0.759
ResNet 34	119	0.601	0.753	0.609	0.602	0.737
EfficientNet B0	209	0.582	0.752	0.587	0.588	0.743
ResNet 50	169	0.581	0.776	0.607	0.566	0.761
BEiT Base	218	0.496	0.657	0.494	0.504	0.664

The Transfer Learning method was used to train deep learning-based image classification models to quantify each of the four CES value categories per image (Figure 8.9). A random sample of 1,000 photos was manually labelled, with 85% (850 images) used for training models. The task was framed as multilabel classification, allowing each image to hold multiple labels. From the pool of 850 images, 128 images were randomly selected for validation. Subsequently, various model architectures were tested, and performance was evaluated on the remaining 15% (150 images), focusing primarily on the F1 score¹. Additional metrics, including Area under ROC (AUROC), precision, recall, and classification accuracy, were also recorded (see model performance comparison table). The Vision Transformer (ViT) outperformed other models and was selected for further analysis (Table AE 01).

¹ The F1 score shows how well a model balances being correct when it makes a prediction (precision) and catching all the right answers (recall), making it useful when each item can have more than one label.

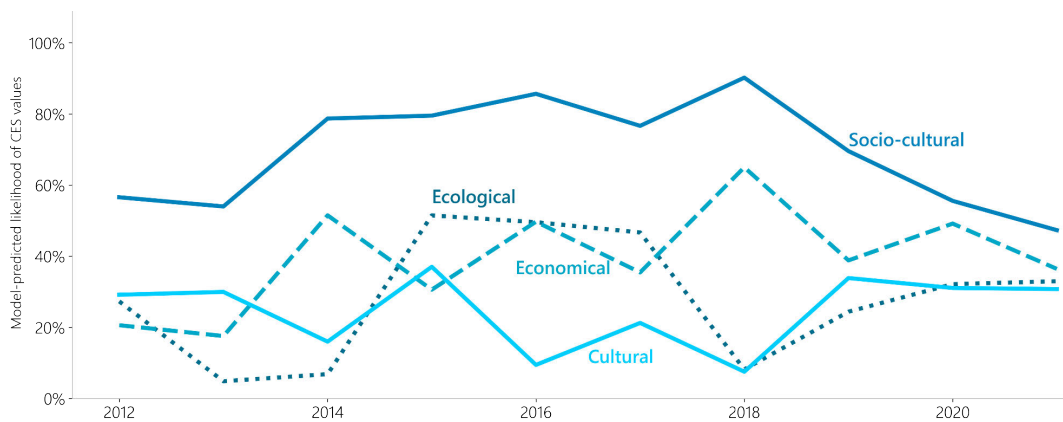


Methodology and workflow of the Transfer Learning Method was employed to train deep learning-based image classification models

In this model training procedure, a batch size of 32 was employed, and all images within a batch were resized to the dimensions 224 x 224. Data augmentation techniques, such as random cropping and squishing, were applied during training. For the loss function, transfer learning was utilised to fine-tune image classification models that had been pretrained on the ImageNet dataset. A three-step training regimen was implemented for each model architecture, with the use of binary cross-entropy and logit loss over 75 epochs. Notably, this concise training approach yielded highly efficient models.

In the first step, the model underwent fine-tuning for 15 epochs, keeping the final layer frozen, and a base learning rate of 0.002 was applied. This strategy, originally introduced by (Brock et al., 2017) was followed. In the second step, all model layers were fully unfrozen, and the network was trained for 30 epochs with a base learning rate of 0.001, incorporating discriminative learning rates. In the final stage, the entire network was trained for an additional 30 epochs with a base learning rate of 1e-4. The learning rate was decreased by a factor of 10 each time the error decreased, with a patience value of 4. To determine class thresholds, it was chosen to evaluate the optimal threshold for each class using the validation dataset instead of relying on a default threshold value of 0.5.

The expert labelling distribution mirrors the patterns depicted in the accompanying figure, which is followed by a subsequent discussion of the insights gained. We conducted a single-split train-test strategy to partition the dataset into a training dataset (850 images, 85%) and a test dataset (150 images, 15%). Subsequently, we leveraged the model training procedure delineated in section 4.2 to train models using the training dataset, utilising transfer learning. To accomplish this, we employed the FastAI library designed for the Python programming language. Following the completion of all experiments, we proceeded to compare the trained models using the reserved test dataset. Performance metrics, such as the F1 score, area under the ROC curve (AUROC), classification accuracy, precision, and recall, were recorded for each model. Our selection of the best model was based on the F1 score. The selected model, the Vision Transformer (ViT) model, was developed by (Dosovitskiy et al., 2021), which is a Transformer-based architecture, achieved the highest F1 score of 0.72, an AUROC of 0.86, and an accurate classification rate of 83% for all images.



Time trends: Plotting model-predicted probabilities of CES values over time

Annex IV

List of interview participants and their designations

Stakeholder group	Urban scale	Respondent ID	Gender	Age	Institution/ Affiliations
Public sector organisation	National	R1	F	43	Israeli Planning Administration
	Regional/ District	R2	F	60	Tel Aviv District Committee
		R3	M	50	Israel Antiquities Authority
	City	R4	M	42	Strategic Planning Department (Yaffo section), TLV Municipality
		R5	F	40	Historic Preservation Department, TLV Municipality
		R6	F	40	VP Tourism, Tel Aviv Global
Consultant professionals and experts	Mixed involvement	R7	M	65	Urban Planner
		R8	F	45	Urban designer
		R9	M	65	Geographer
		R10	M	55	Conservation architect
		R11	F	48	Conservation architect
		R12	M	45	Anthropologist
		R13	F	45	Project architect, Jaffa port redevelopment and strategic plan
		R14	F	38	Ecologist, Landscape Architect, Society for the Protection of Nature, Israel
		R15	M	55	Architect and planner, Jaffa Islamic WAQF
Local community	Local area	R17	M	55	Local community living in Jaffa (Diverse ethnic background group)
		R18	F	49	
		R19	M	35	
		R20	M	28	
		R21	F	24	
		R22	F	48	
		R23	F	30	
					Tourist Guide
International Experts	Inter-national / Supra-national	R24	M	78	Experts at ICCROM
		R25	M	55	
		R26	F	46	
		R27	M	63	

Selected quotes from in-depth interviews

1 Jaffa as a place with limited documentation of HUL or the lack thereof

ID	Quote
R12	With the municipality, we are doing a special project on Intangible Heritage, which is different from the established notion of tangible heritage, to look at culture, traditions, and what constitutes urban identity in the city. So, we're mapping the cultural institutions, traditions, and practices that were part of the community, which were part of the city's history. And some of them are still living today. We're trying to make the historical connections and to see what deserves preservation and encouragement, and what can be framed as a historic city. Because, you know, Jaffa is also going through some form of an identity crisis, a cultural crisis. The point is to try to reclaim some of these lost traditions. There is ethnographic research as well as local history, the trauma, and agricultural-economic studies
R12	There are still agricultural families living in enclaves, in Yaffo Gimel and Yaffo Dalet, they represent a way of life, which was historically part of Jaffa's identity
R8	In general, architects, city planners, and landscape architects do not work with behavioural datasets. However, in 2020, the Planning and Strategy Departments of the Tel Aviv-Yafo Municipality held the Behavioural City workshop as part of the Urban Salons to promote urban innovation in housing, work, public space, and the community. The result was an interactive exposure map of the city. Behavioural mapping is a powerful tool, and can actually lead to innovating the project, this is design thinking
	But if you're talking about a data scape, it has to move from functional data to behavioural data
R15	Like in the book 'Crisis in the built environment', the author argues that patterns of responsibility in the traditional environment were different from those today, which were either socialist or capitalist and affected all aspects of the built environment
R14	Did you look at the layer from old maps about trees that were there? There were a lot of mandarin (oranges), but we found out in our research that there were banana trees as well
R14	In an Ecological Service Project for the Mavat (Planning department), we realised that we cannot only evaluate the ecology. We need to explore the hydrology, geology, water and climate and human and trees and everything together, along with the social and planning aspects too
R9	You see, the first geographers of Israel have mapped the Ayalon River in the Holocene period, which was between Yarkon and Jaffa and sand dunes around. Other rivers: Yarkon, Ayalon, Sorekh, Lachish
R9	We did a mapping of the well houses in Jaffa, first we mapped the fountains, did some private surveys, and also referred to the historical maps from the mandate period. It's a very beautiful, very important map of 1926. You see all the streets, all the building blocks, also older maps from the 1800s, we found 15 well houses, and in total, now there are 100 sites. This was made into the Bayarot project, for preservation of well houses
R9	This is a small hill and a tree near the historical American colony (On HaMasger street 7). It was a very fertile region, though you don't see the remains of the colony. These extents belong to agricultural Jaffa, near Ayalon and in the north were the dunes of Tel Aviv. In the south, it continues to the present Bat Yam, and there you also have similar well house structures
R11	You will be amazed to see how the boundaries are made because it's like a relic of the urban fabric that we made after everything that was demolished. But you know that they can never be so strongly defined because we will always find remains
R_C	Historically, Jaffa and its extents were large. It has a satellite town, so in total, Jaffa was a huge city. It went from the current area of Azor to the East, till Kikar Atarim (Atarim square in the North of Tel Aviv) and beyond Bat Yam and Holon in the south

ID	Quote
R4	the historic plans along Yefet street, Jerusalem Boulevard, Shlabim street, consider the fabric of each section, they have a logic and their own mechanism, an economical mechanism. They declared a lot of buildings for preservation, but a lot of important ones were forgotten. Now, since so much has changed, we need to look at the Jerusalem Boulevard as a whole space and make a preservation policy, add buildings, and social aspects in the policy
R13	For the Jafa port, we worked with a management group and suggested connecting it with other places, like the flea market in Jaffa (Rabbi Hanina Street), the clock tower, and the Greek Market. We wanted to connect it to the city, unlike the HA Tahana and Sarona Market, which are failing, because they are not connected to the city. We acknowledge that there are stories inside the historical parts of the harbour which are important, like it was the entrance gate to the holy city or to commerce. And like the orange of Yaffa, the active fishermen and all of these need to be accounted for
R13	We wanted to connect the harbour in many ways, but no one does it, and there are a few more options which are now blocked. So, we wanted to open all four entrances from old Jaffa, and then there are six entrances from Ajami and like a sequence from Yeffet street also. Given the topography, we also thought of the need to make it more accessible
R5	There are few plans that are policies which are being promoted in the planning department, to say that, okay, we want to have a few, some percentage, you have to look at it to talk about it too. We have to have this kind of percentage for local people, but who are the local people? So, they're also doing this kind of research of mapping the locals and mapping the population of Jaffa. And so when we are talking about preservation, we're not necessarily talking about all these aspects
R15	In order to understand the history of Jaffa, I recommend the study of concepts of social, economic and political systems. Jaffa is part of the Belad-al-sham, not just Palestine. So, it was a kind of very important city before 1948. They were compared with Beirut, Cairo, and so on. There was no centralised planning system in the Ottoman period. It's very important to read about the Islamic planning systems, because I would say I can claim this is one of the most sustainable economic-ecological systems in all history. The Waqf organisation is planning a cultural center. Scholars have proclaimed Islamic State cannot be part of modernity
R3	Old Jaffa and its buffer area suggests reference to the whole of Jaffa Quarter 7 and beyond, mainly in terms of its archaeological value
R3	Mapping the historic fabric, which includes remnants and demolished spaces, is important since it helps us to understand the layers and know the place in depth and the connection to the whole fabric. If we don't know this, how can we start making plans and development plans without acknowledging what was there and how to make the connection to the built fabric? We may not want to 'build an old city', but we can borrow the language, the architectural vocabulary of what was. We created a superimposition from an archival map of 1700 and created a tour for people to inform them of what it was, which was very well received
R3	The large fabric of the old city is difficult and facing a dilemma in making a policy, because most of the old city and its elements and layers, the Canaanite, the Crusader, the medieval city, the Ottoman city, the 20 th century, but in Jaffa it is very complicated do not exist in entirety, and the challenge and complication is in showing and documenting these layers
R16	20 years ago, the phenomena of geography, history, culture, water systems, ecology specific to historic plants, were not even part of the discussion around heritage conservation. The process is constantly being refined
R16	Every component is telling the story of the landscape. Tel Aviv-Yafo needs a detailed historical and cultural documentation, every place like Jaffa Dalet, Gimel or Abu Kabir of Ajami neighbourhoods has its own values and heritage components
R_C	There is a living phenomenon different from any other place in the world, and I am not talking about the history of Jaffa in the books. People say 'heritage' or 'landscape', sure, we all use the same words and meaning in a language (discipline). It's not the language that makes it different. Because of history and the situation, we are currently living

ID	Quote
R_C	I must say that as a Jaffa person who grew up here, we don't get a lot of historical information growing up, nobody teaches us. Information about where we are or what the buildings were. Or what I know about Jaffa is only a few years ago, nobody taught me, I am 30. Not all Jaffa people are Jaffa. In my family, we hear stories outside of Jaffa, like from my grandfather, who came to Jaffa after 1948
R10	In the vision plan, we are looking at Jaffa through its axes, and not through the horizontal planning slices

2 Socio-spatial impacts of interventions

ID	Quote
R4	We believe the character of North Jaffa is commercial-active street life, and the typology is of an active street, so commerce is a very important feature. It is changing rapidly because of the light rail, gentrification, preservation is hard, we cannot control it fully, but we can give directions on how to preserve the main attributes
R8	A friend of mine moved to Jaffa three years ago as she could afford to buy a house there on Jerusalem Boulevard. And she is not the happiest living there. Although culturally it is good, it's noisy, it's dirty, it's violent
R6	We're dealing with hotel development. It's also a chapter in our tourism vision plan for Tel Aviv-Yafo. So, we have a goal to reach 20,000 bedrooms by 2030
R6	We created a tourist information center near the clock tower, we put a 3D model of all Jaffa in the walls and then the map of Jaffa today. So, we did very big research to make sure we're covering all religious sites in Jaffa, and it goes all the way. It's not just like tourist Jaffa. The map covers most of the neighbourhood. We consulted Ha Mishlama, which gathered for us a few local residents from Jaffa to make sure that we are not taking one narrative and leaving out other sides of the story. We brought this information to experts for evaluation and to be sure to represent all narratives of Old Jaffa
R6	Before 2020, there were around 13-15000 Airbnb rentals every month in Tel Aviv-Yafo, out of which 40% were rented apartments, including in Jaffa. The effects on neighbourhoods of Jaffa, Kikar ha Adumim, and Shapira, which had many Airbnb apartments, were visible. It raises the prices, disturbs the community vibe of the neighbourhood, and goes against city planning. We are trying to regulate this, towards a common economy or shared economy, and regulate 90 days of renting out per year for commercial use. That way, we allow for more apartments to go back to the rental market in the city
R_C	In terms of infrastructure, the municipality is taking good care of the tourist area of the flea market, but the other areas in Jaffa are not that good
R2	In the existing conservation statutory conservation plan of TLV, the main focus is on the buildings of the White City centre and the eclectic styles of the beginning of the century. So, it was very concentrated on a certain chapter in the timeline of Tel Aviv, in which Jaffa did not actually play a role. Why? Because it dealt with the national style of pre-World War II, identified with the Bauhaus school, from which a few prominent architects fled from Europe, fled from the Holocaust, and came to Israel, bringing this knowledge at the same time. So, it is a specific chapter which tells a specific story of immigration, of an architectural time, of a social time. When you look at the statutory conservation plan of other cities, you see that they have followed the plan of Tel Aviv. We see that it has become the ongoing narrative of what should be conserved, whether it's in Haifa in Jerusalem or in a small town like Tel Mond. Because UNESCO recognised the Bauhaus architecture as World Heritage, there were also many sentiments of the Holocaust attached to it. However, because of this inscription, it changed many things, including tourism, gentrification, and even the inscribed site. And that brought attention to Jaffa, because many residents from Tel Aviv started to move to Jaffa

3 Jaffa as a contested space and its political influence

ID	Quote
R4	Jaffa is very strong because though it's a mixed city, the different communities, a lot of time, don't mix.
R4	Jaffa has a very noticeable attribute of a mixed space city. So, when we speak of the housing crisis because of the prices, we know the crisis is severe for the Arab community, and there are several reasons. The Tel Aviv municipality is trying to solve some of them with the state because a lot of the lands are owned by the State. We are doing a survey at Hagar Centre (Tel Aviv University) to understand how every community has different needs.
R5	For Jaffa, the word which comes to mind is layering. It's layer on top of layer. If you want to compare it to Tel Aviv, to the UNESCO World Heritage, you cannot do it because it's not the same at all. All Jaffa is a caricature of history, of layers eliminated and forgotten and built on top of another historical layer. but the roots are still there. So, if you look at the map of Jaffa, you will see that some of the original plots and divisions between neighbourhoods from the Ottoman times are still there. There are historical streets like the Gaza Street and Yefet Street leading to Gaza; The Benzvi has been renamed many times, Salameh Street going to Salameh village, and the Kibbutz Galayot Street. There are the layers of Ottoman history. The Gaza Street is being replanned, and it will eliminate the historical layers.
R12	Part of the problem with standard planning is it makes you put aside politics for some form of instrumental reason. And in contested cities like Jaffa, Lydd, Ramle, or Akko, it doesn't work as it camouflages sound intentions. We are trying, with the Municipality, to navigate these waters to try to bring some form of historical consciousness beyond the buildings, ask questions about what it means to plan a region to revive some form of healthier engagement from the past.
R12	Of course, the buildings are important, but we are trying to bring historical consciousness to the symbolic-historic space, which they call the spirit of the city. I think it is a very important way to use planning in some form as a tool for people to be at ease with their built environment. So, you know, if you look at the street names, there is this incompatibility between actual symbolic space and the actual lived space. This is an ongoing bone of contention, elements that are repressed.
R15	Socio-politics has a direct influence on urban planning: They try to limit the growth of Arab neighbourhoods into urban ones, and they consider the Arab part a rural one.
	In my teaching program at the University for a couple of years, I realised the program does not contain anything, quite nothing about the Arab population or society or what we call the mixed cities. And here starts this, and a question for me, why are there no places where we can maybe do some research about? And quite quickly, I found that most of the Arab spaces that Israel has developed in an informal way. Informal because it is a kind of resistance to what the Israeli forces forced our Palestinian enemy. And although we are considered to be citizens of the state of Israel. But we still consider and are even defined as an enemy and not part of this nation state. There is no nation state for the Israeli, Jewish and Arab, as they do not belong to it. So, this is why it's started to be a big question for me as an architect to learn under these circumstances, just to work with Rules and planning laws, and so that they are not serving our society equally.
R12	There's a lack of trust. That's one of the main issues here.
R12	Here's a paradox: the cultural centre of the city, which is a place which is increasingly unavailable to people because they cannot afford to live there. There's a sense of anxiety about always being moved out. Even when there are weak steps (Such as social housing for Araba, which was objected to by the Jewish community as discrimination) made to ensure some form of security, they are legally undermined.

ID	Quote
R_C	Neighbourhood of Tel Kabir (Jaffa B) ² was razed, there were historic villages, now space is made to accommodate the train station.
R13	Since the port is not deserted or like Haifa port, we have fishermen, scout groups, artists, etc. The vision of the redevelopment was to keep the local sense, unlike the Tel Aviv harbour, made for the community here, and not to add outside elements.
R5	When we change between one meeting to another, we have to change our whole scale of values, also between the departments same people. The completely different issue at hand will change the whole perspective of values like economic questions or sustainability-related issues, for example. The only constant that will always be high on our agenda in the preservation-conservation agenda is that it is our main goal.
R_C	There is systematic racism, many people living in Israel say we don't sell or buy things from Arabs. Also, the Arabs may refrain from selling to the Arabs, as there is a lot of crime associated with a section of the community.
R10	One of the main challenges of policy is to mitigate and prevent gentrification and its impacts, along with finding tools to include the local identity and social values, especially at an economic level, to support local commerce
R3	The conflict in Jaffa exists and it is very recent (over 100 years old), and there is a connection between the narrative, conservation issues, and it influences the actions of the decision makers
R_C	I suspect the people. Jaffa is magical, I wish to keep it like that. The new buildings in Jaffa make me angry. Like in Ramat Gan, Rishon, you can build and demolish and build and demolish, nothing will change. In Jaffa, some areas are untouched, and once they change, it's gone forever. If you look at 1970 maps of Jafa, there were many empty spots; now everything is built, and it is sad to see that nothing can be done to stop this. You will need to do another mental mapping exercise again
R_C	There are many problems in Jaffa, depending on which expert you are talking to. I think the main problem is Education. I remember when I was a kid, I used to be shy to say I'm from Jaffa. It is the model that families (aunts and uncles and fathers have been doing, and it continues
R_C	Everything is divided. Every aspect of what we talk about is divided, especially with the minorities., Minorities- especially Arabs, with Arabs especially to ones from Palestine. deny their heritage and natural identity
R_C	There is a problem of education, a nationwide issue, not only for Arab-Palestinians. The burden of education is wide nationally. The people are educated here, but not all Israelis are educated. Most of them don't know about evolution. You talk about evolution. You know what I believe in: Evolution. The primary reason to be here is Judaism. And I know Jewish people who I know much more than they do about Judaism. I do believe that they do know each other a little bit, like your Jewish people that don't know each other, which is a huge gap. And this is also an educational problem, not only for us. But the problem in this plane is the occupation, the lies, the apartheid, the stress that holds everything, we are all in stress. We are not free to dream of something bigger than what we know. We are still living in this bubble of stress, fears, and. I'll just say that and not to the problems that happen, but it is much bigger
R_C	Jaffa has issues of Arabs and Jews, but it also has issues of the rich and the poor. In Jaffa Gimel, Jaffa Dalet, there are Jewish immigrants coming from North Africa, Eastern Europe, who live there as well. In Israel, the rich are white, poor are black. 20 years ago, the Jewish immigrants were given the opportunity to settle in areas like Rishon, Bat Yam, and Holon, but the Arabs did not have this opportunity. It is a classic 'us and them' mentality
R_C	When I was 13, I understood I'm Arab because I went to high school and all the children started to call me Arab, dirty Arab, in the neighbourhood, in the primary school, everybody or even the kids

² Although officially included in Quarter 7 (Jaffa) by the Tel Aviv-Yafo Municipality, the neighbourhood is often seen as the southern edge of South Tel Aviv rather than a part of Jaffa.

ID	Quote
R_C	And the thing I really enjoyed most here is... not being. I felt like I am alive. Other people are here, like Arabs and older people, which I didn't really have as part of my daily life in Ramat Hasharon. Suddenly, here, I felt normal, because I was surrounded by all kinds of people. Old, young, with the car, without a car, with dogs, without dogs. Arabs. Jews. A mixture. In Ramat Hasharon, if you're even a little bit off, you feel like something's wrong with you. Like, something in you is wrong. Everybody's the same age. Everybody looks the same. Everybody has two cars. That suburban, aristocratic life, you know? Two cars, three children, one dog. They go to the same places. They dress the same. Same standard. Plastic. Plastic life. Here, it's different. You have everything: people living alone, gays, broken families, young people, old people. A mixture. Different kinds of food, smells, and sounds. Balagan. You know the word? It's a mess, but a beautiful mess. And I love the mess. Because in that mess, I felt normal. Regular.
R_C	The city fabric was basically demolished by the anchor project. When you ruin something, you ruin something, it immediately ruins what is adjacent to it. So, this is basically what happened here, too and will continue to happen
R10	133 "In my theory, when the conscience of heritage is higher, civil activism is much stronger. There is a very strong connection between civil resistance and heritage. Take the case of the Jerusalem Boulevard, the trees of Jaffa activism or the Street names activism." R10
R2	146 "Should all memories, should all narratives have a physical attribute?"
R16	119 "Doing conservation by the book is very expensive. In a place like Jaffa, it is complicated due to the ownership issues." R16
R3	108 "The district committee make their plans for regions and cities in the country, but in most cases, they do not want to deal with the historic city, as it is a complicated area in Israel. Maybe reasons of religion, politics, economics or even crime." R3
R3	105 "Reinforcements are an issue in Jaffa, and it is partly owing to the religion, politics and the historically contested past. Due to this, the fabric of the city changes drastically, and the local governments have to take a stand on what to let go of to prevent further escalation of conflicts. And because of this, the old cities, such as Akko, Jerusalem and a few parts in Jaffa (Ajami) are (visually and/or aesthetically) destroyed" R3

4 Urban nature and environment, ecology

ID	Quote
R5	We do try to preserve the historic landscape, but our jurisdiction is within preservation plots and plans. We have very specific instructions for landscape using indigenous trees, which suit the specific climate of Israel and Tel Aviv. Ficus trees are problematic, although they are shady.
R5	There are interesting studies about tree covers, shade maps of the city that are included in the resilience plan for the city. It is not necessarily the plan of the Historic Preservation department, because we deal less with the design of streets and more with the design of the plot itself: the building and its surroundings. Although we are involved in the redesigning of streets, we give our points and pointers, our opinion is less strong than the planning department, the Roads Department, and the Transportation Department. For example, the decision on the light rail was already taken, with less involvement of the preservation department.
R15	An example of rural life in Jaffa is the issue of 'wild' roosters, which the neighbours want to be silenced. The rooster is not considered part of urban life and gives an impression of rural life, which is Jaffa. The municipality is now trying to reduce the number of roosters. However, we are trying to map them in our project, to map the socio-ecological layers.

ID	Quote
R1	We are doing an interesting study to understand all ecological connections, specifically for a number of varieties of birds as an indicator for sound ecology. We divided the whole district into a 100x100m grid and invited bird watchers to help in this research and count birds. The mapping exercise is nothing but a planning document, and it will help in the strategic plan as we want to make green corridors.

5 Commodification and its socio-spatial implications

ID	Quote
R4	The small-time manufacturers where the Flea market is today, to the west of Shlabim street, what we call historic Jaffa (מֵאֲבוֹת יָפוֹ me'avot yaffo). However, the east of Shlabim street is modern small craft industries (Ha Milacha מִלָּאכָה) and hardware ecosystem stores which came into existence after the establishment of the State of Israel. It becomes harder and harder for them to survive due to the growing housing market; we're trying to intervene because we believe it's important that those users exist in a city, not outside of the city. We are working with the preservation department, taking a survey of the needs and types and skills. We are also considering the modernist brutalist architecture if it is worthy of preservation
R_C	My father lived in Ajami and studied in the school next to the French hospital, and visited it often, now, after it became the SOHO hotel, no one can think of going near that building.
R8	Jerusalem Boulevard will face hyper tourism, similar to the Old City streets, unless the Municipality has a vision for it: what is the future of commerce there? Is it local? Is it of a certain kind? Why did the shops survive for so long? Because they had a customer market. Also, the second part of it is if you assume that people can move from place to place more easily with the light rail, isn't it important that you support the local view? Can you integrate local and something new as well? That one means I want to go there to get an experience of the place. All these new layers with their behavioural
R8	Tel Aviv invested a lot of money to preserve the Sarona historic area, converted it to shopping, restaurants, renovated historic buildings and preserved all that. But mobility data was not studied, it was far from the train station, and locals don't go to a tourist place to shop. And in two years, it died, and they had to change the places to offices. If you don't look at how people behave, it's not going to last.
R12	One of the problems in Jaffa is the commodification of memories. For example, the Jaffa oranges, which are now taken over and made into a Geographical Indication, are bizarre, because oranges grown in South Africa and sold under the tag to England, for example. Icons are used to manipulate intentions. For example, the Manshiya area has a huge potential to showcase life that was before destruction, maybe develop as a contact point between Tel Aviv and Jaffa; however, right now it is just a park with no memories
R12	There is still a story to be told, and that story is usually either obfuscated or erased. Palestinians in Jaffa are alienated from the living space. And that's a tragedy, because if you have citizens who are completely alienated, you know, it also encourages different forms of violence and different of unease
R6	There is a phenomenon we've seen in recent years of turning office buildings into hotels. This is something that is happening a lot in the city, which is good for us because it's quicker, it's cheaper. It also allows to sell cheaper rooms because we do have a problem of Tel Aviv being a very expensive city
R12	The Slope park in actuality is not a bad project as a spatial fact, but the method and the erasure of memory and narrative are questionable.
R12	It is not only the culture of the buildings that changes, even markets. Like there was a market in Jaffa, in Ajami, which is basically closed down around 2008 as part of the planning of Ajami, and instead a housing complex was built for the Nationalist religious community. There are these utopias, like these blind spots, that need to be addressed.

ID	Quote
R4	The Greek market redevelopment plan was approved by the district against the recommendation of the Preservation Dept. People will see a very big change, it will change its character and turn into a housing project, a lot like all housing projects in Jaffa. Although the change (deviation from the policy on height) is not very big. Although historically there were houses in the Greek market, it was a different type historically. The new additional housing is not going to improve the housing crisis. So, we have the strategic department made like a strategic plan for housing. And we hope that every new TABA will have a part in affordable housing, also the ones in Jaffa.
R1	My father has stories of the German market from 1938 and how the family would send him across the orange groves from one side of Tel Aviv to the German village (Now Sarona market) to buy something special. And now, this connection cannot be understood at all. Before it was part of the Army camp, it was more connected to history, not anymore.
R3	Old Jaffa is not a living fabric
R16	The very thin line that we have between a real conservation and restoration is because not all the restoration is really like preservation, or even part of, you know, to uplift the values of the landscape. The Hangar redevelopment project is far from conservation, as it is not based on the principles of authenticity and integrity, specifically the materials and the uses"
	The Hangar redevelopment project is far from conservation, as it is not based on the principles of authenticity and integrity, specifically the materials and the uses" R16
	117 "If preservation is being adopted by the book, considering the historic houses, the paintings, floors, wooden materials, even the historic use needs to be considered and made part of the community use and not memorialised. If the old building was the main house in the neighbourhood, convert it to a community space, or if it was an administrative building, convert it to a similar use. Converting old buildings to boutique hotels does not do any justice to the landscape and the communities" R16

6 Changing Land use and spatial characteristics

ID	Quote
R1	The third generation now is facing huge issues of housing and right because of what happened in the Ajami ghetto, in 1948, where Jews were place in houses that didn't belong to them in Jaffa, and they became protected tenants, however, by law it was supposed to end in the 3 rd Generation. This is the issue with the Ministry of Law.
	Administrative borders create physical borders, and that is reflected in the local-level municipal plans, which leads to fragmentation
R2	In Israel, the role of the committee is very wide. Detailed plans need to be approved by the district committee, certainly all statutory master plans. Non-statutory plans, such as the strategic plans, which are non-mandatory, can give guidelines. Also, the district committee can give guidelines for enhancing development and so on. Since Tel Aviv-Yafo has more resources, it can approve some local-level plans and make decisions. It is beneficial, as the local municipality will know best what its citizens need. Tel Aviv is outstanding because it has resources (economic and technical) which is not the same for the cities in the country and not even in the same district. Having said that, there is a thick layer of statutory planning where the municipality has to refer to the district committee, for instance, to change certain sections of town plans or remove or add buildings for conservation, for instance.
R2	Administrative borders are creative physical borders. In the mind of local government, dealing with their city borders, they are not interested in what happens outside their borders, but the outside is inside another city. Look at Tel Aviv, the real estate and the maximum demand, it is always away from the borders
R2	The real Jaffa is me is not the Old Jaffa, because it is Disneyfied. It is not part of the livelihood of the city. The backbone of Jaffa is the Jerusalem Boulevard, which is the backbone connecting the north and the south, and also the neighbourhoods. The opening of the light rail will enhance these neighbourhoods in Jaffa.

7 Structural issues

ID	Quote
R8	Heritage planning is not about a certain way, it's about being able to be flexible through behavioural layers, physical layers, historic layers, ecological layers, because every discipline is using them differently
R8	Heritage is multifaceted, and given the context and agenda of the project, it requires prioritising specific attributes.
R1	The projects react to contemporary needs rather than to more honest conservation. The approach here is not conservation but more restoration and renovation. For me, the architectural values are very much manipulated. If there is no knowledge, they do it very stylistically, period-based restoration, which doesn't respect the fabric or use. It is a quasi-historical and theatre production. You can just put concrete pavement, and you will know it's new. Don't try to make something that wasn't there in history.
R5	It's not one way or the other. It has to be a compromise. You cannot reach all of it. I mean, you can preserve the building, and then in order to preserve it, you have to change its use, because only people with a lot of money can preserve it. So, you come and say, "Okay, he's preserving," and we have to react to it. We cannot all the time be the ones making the decision. A lot of times, we are reacting to the existing situation. So, we can do good preservation plans, but not necessarily they'll be implemented.
R12	What is lacking here is a kind of Palestinian perspective, rather than the historical Zionist narrative, which is dominating. To show this extinct form of urbanism and to bring it back to life somehow
R1	The city is dynamic, and I am not saying it shouldn't change. Like the case of Emek Rafaim light rail construction in Jerusalem, the light rail construction in Tel Aviv is different and less conflicting, as parts of it are underground and are very much required public transportation. But for conservation works, focusing on details such as windowsills and materials and then there are parking lots constructed below historic buildings, then it does not do justice to the building fabric, and there is selective conservation; a quasi-historic method is adopted. It changes the whole perspective of how the building works and also changes the urban setting.
R8	Architects, city planners, and landscape architects do not work with behavioural datasets. An interesting example of behaviour mapping came through a project where our students mapped the behaviours of stakeholders. For the educational campus theme, the movement of students was mapped, and our group found out that the schools did not have a yard, and students after school were hanging out around the bus stops. And so, the bus stops became a place of design intervention. This is how behavioural mapping is powerful. If you use mapping in this way, you're actually innovating the project, this is design thinking.
R13	We wanted a fluent area to walk through, as you have these spots using stop signs, and then it's flexible, dynamic, and uses the materials in the harbour and preservation. But we add something that talks a different language to make it very clear what's going on. So, the different areas are: The first one is the northern part. It was the Gate to Israel. It's the connection to Tel Aviv. Then you have the second spot, which is actually the hangar for food and scouts. And then you have the third one, which is the big second harbour, which we saw as a place for culture and fishermen. And then the fourth one is Hangar Number Three, which is the container city. And then the fifth one is the piers and the sixth is the boats.
R13	The whole original construction was all preserved. Some of them had to be, and all of them had to be, really taken care of because it was so close to the sea. And then my foundation is in water. We dealt with the facades a lot, with the renovation and with their very delicate aspects of what we can do and what we can't do. But it was all very much a reuse of an old building. It was much more expensive to really preserve the beams and the columns than just to create new ones. Then the facade itself, we had to protect it from the water and the source. So, the material we used was very delicate, see-through. We didn't do anything. You see that the outside very much shows the inside.

ID	Quote
R1	In case of the Jaffa port redevelopment project, new needs necessarily may not undermine the historic building, but if you compare it to the Ha Tahana train station, which has changed in recent years and after the opening of the red line, it will change more. The Sarona market, the buildings and their value were not preserved if followed by the books, and it was highly commercialised and changed the whole landscape of the historic village. Historically, each fence was different; now they are all the same and the so-called historic light poles installed never existed before.
R12	In Jaffa, tourism is all about an Orientalist experience of the city; it includes: Shuq Ha Peshpashim, the clocktower, overlooking the history of destruction, the destruction also of the Jewish communities, but also mainly of the Palestinian way of life. As compared to the other European cities, the memories of war and destruction are part of the heritage tourism. There is a need for more bilinguals. bicultural or multicultural perspective into planning in Tel Aviv-Yafo and Israel in general.
R12	Physical locations of the Holocaust or Jewish neighbourhoods are marked and part of some form of heritage tourism. And here, tourism is all about some form of Orientalist experience of the city. From Shuq Ha Peshpashim, especially to the clocktower, overlooking the history of destruction, the destruction also of the Jewish communities, but mainly of the Palestinian way of life. And the traumas that we are trying to bring them back and encourage, you know, for more of a bilingual. A bicultural or multicultural perspective on planning.
R1	97"Preservation policies should not only focus on preservation of the architectural styles of the historic districts but also aim at preserving the quality and the structure of the urban fabric. If only stylistic preservation is carried out, it does not do justice to the setting and the urban environment.
R3	107" In each city that we want to conserve, we must keep a buffer zone.
R2	148" The real question we are dealing with in this context is, should memory be physical? Certainly today, when we are living in. Times when a huge part of our reality.

8 Challenges in planning and coordination

ID	Quote
R4	We are now working on preservation documentation with all the parts of historical Jaffa. It's like GIS mapping, but for separate buildings like parts or every building, but also with some of the information is the intangible aspects of the places"
R16	The plan 2378 for Jaffa old port was an excellent plan for conservation and restoration in coordination with the Municipality, IAA, Council, and the Tel Aviv District Planning committee. The plan aimed to develop the port in an inclusive way, catering to the needs of its users (residents, fishermen, scout groups, restaurant owners, artists and businesspersons, etc), to create a public and cultural-social space since the area was lacking in it and to build the reputation for the city as a tourist centre. However, the plan was not implemented in totality and drastic alterations were made: the customs building, which was marked for conservation and adaptive reuse to a museum, was demolished (It was justified that it is not the original Ottoman Custom house and a British Mandate reconstruction on the same location). The hangars were not maintained and hence deteriorated, and were reconstructed in new materials and design. High-end properties along the port influenced these decisions and changes. One good result of the high-end residents' protest against the addition of a bridge atop the hangars was objected to, since it altered the clear view of the ocean
R14	Each city in Israel is very different. Even the structure of the city hall is different. For instance, sometimes the person who is responsible for the landscape is working with the Urban Planner, and in some cities, it is under the Sustainability department (קיימות). It depends on whether it's a rich city or not, and what the political forces are that influence the importance they give to ecological issues.

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ID	Quote
R5	The decision of the light rail to be on the ground was top-down; the preservation department had no say in it. It has both sides, the technical aspects, of the physical impact on historic buildings, but also the permissions from the IAA were an important factor
R15	We can't think about planning without a political agenda or ideology. In the case of Israel, which was translated into the political agenda, the ideology itself, as an example, just very, very little, but really, the strongest thing is demographic balance. Yes. Which is the main one? The main, I would say, reason why Jaffa was defined as a neighbourhood of Tel Aviv and not a separate core or city or urban area. So, I do always wonder when architects or planners think about space without political Understanding or tools of thinking and so on
R12	There is this antagonism between North and South, and how it gets represented in urban planning, and the paradigm needs to be changed. I think the municipality is trying to change that. But it's doing it with capitalist and neo-liberal means, which means that basically what it does is bringing wealthy people from the north to settle here, rather than give a sense of sovereignty and security to residents in Jaffa
R12	We are surrounded by open wounds here. And in order to for this wound to heal, these wounds first need to be identified and acknowledged. And they're not because either planner doesn't know or they refuse to know, or even if they do know and they want to do, they don't. There is either a lack of political will or a weak one to withstand the power of the state
R5	people are coming to me and they're saying, okay, we've been living here for 40, 50, 60 years. And now you're telling us our building is not original, and you know, and we have to change it. Where do you come from? I mean, you know, because of preservation rules, uh, so regarding the changing of the original post office that was planned in the mandate area and that period and changing it into a hotel, it's a big question. Is it good or is it bad? The municipality rented the buildings from the post office and from the original owners, and came to us and just said Where, because it's a special plot, we can only do a hotel here. We cannot do residential
R4	In the historic Jaffa, we also worked on the urban renewal policy around the areas of Jerusalem Boulevard and Yefet Street. It will react to the aspect of the light rail and the impact of new buildings and preservation buildings. The areas of Jaffa Gimel-Dalet also face urban renewal, but they have modernistic buildings. Urban renewal has its own systems, a very economical system, it has to be profitable. We are calculating how much like open public spaces we have to add, and it's becoming like a very hard negotiation. Also, for renewal, we need to do social research. This is being done by the planning department, the Yaffo section, and the Preservation department will review it
R1	Planning-wise, the district and the municipal borders are meaningless because it's a continuous fabric. This may not work for cities with stark differences, as each city has its own characteristics. Example Bnie Brak ³ has an SES of 2, and it's different from Ramat Hasharon, which is 2 km away from it. However, characteristics which are comparable should be looked at together- transportation, transit, ecological corridors, etc.
R1	The Planning Law of 1961 defines what planning decisions need to be made at the city, district and national level. Heritage-related sanctions, like approving conservation plans, are done by us at the district level. Almost always, the plans are done locally and approved by us. Some cities may not have a department, but a city official in charge of preservation
R14	You know, many organisations in Israel, even within the organisation, there is a huge problem of communication
R5	The historic fabric will evolve eventually and is for the good, though there is a policy in place for this, but the new development needs more refining/ designing/ planning guidelines

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³ Bnie Brak is fundamentally different city as it is a centre of Haredi Judaism. It is one of the poorest and most densely populated cities the Tel Aviv metropolitan area but its housing prices are among the highest in Israel (Tsur, 2010)

ID	Quote
R11	We don't have a conservation plan at all at the district level. Heritage that is protected in Tel Aviv may not be protected in another city
R3	Archaeological structure, archaeological areas include larger areas, and it falls within the Israel Antiquities Law. The first sentence in the law focuses on protecting and conserving not only the archaeological structure but also the archaeological historical fabric of the old cities. In Tel Aviv-Yafo, IAA doesn't deal with the White City at all, but the archaeological area and buffer zone in Jaffa. However, the buffer area is still not very clear as compared to other cities like Jerusalem or Akko, where it is part of the planning framework
R16	Although all departments (Municipality, IAA, Council) bring knowledge to the table individually, connecting it to the historical urban landscape approach and methods, there is no historical, geographical, or cultural survey for Jaffa and the city as a whole. For any new project, to support it as a research background and components, a coherent document is missing
R16	Jaffa is not included explicitly in the conservation plan of Tel Aviv, in the 5000-master plan. It has its conservation plans, perhaps because Jaffa is very complex owing to the contested landscape and the socio-cultural, socio-economic, and perhaps because of this, very superficial and cosmetic preservation and conservation efforts are seen, to avoid dealing with deeper issues
R16	After the demolition of Gymnasium Herzilygarnered attention and public protest (for heritage not protected by Israel Antiquities Law (Built after 1700s), the government established the Council for Conservation of Heritage sites in Israel (Also known as Society for Preservation of Israel Heritage Sites) in 1984, supported by the cultural and Education ministries. It is mandated by the Fourth Amendment by law to be part of the committee as an NGO to assess any new projects
R16	Not every city has a conservation committee, and that creates different modes of treatment towards heritage. Tel Aviv municipality is strong; it has its resources and vision, but the same may not be the case with other cities in the metropolis. It will be a good case to study the DNA of the whole cultural landscape, like the south of Tel Aviv-Yafo, Jaffa, Holon, Bat Yam, to link the systems of agriculture, the well houses. But the absence of conservation committees in other cities makes it difficult.
R_C	A city needs a vision to be looked at as a city as a whole and not only its parts. When an emperor plans a city, he plans an avenue; he doesn't focus on a small bicycle path (although that is important as well).
R_C	There is certainly a need for good schools in Jaffa, my kids need to take the bus to go to a school in the North of Jaffa, they cannot go to Arabic schools, because they cannot speak Arabic.
R10	13The Jerusalem Boulevard policy along the light rail intervention, we are focusing on housing to stop the gentrification, its harsh phenomenon, and find tools to have the local identity of commerce protected, to support local commerce, the land use changes need to be controlled, however not all buildings are included in the conservation plan, only those which are listed, primarily listed for aesthetics, but the street has much more historical buildings which require conservation efforts. Like the Post office building or the one next to it, were changed and leased to private investors to convert to a hotel. In the policy, we are trying to keep almost all the buildings; the challenge is how to have additions to the buildings without changing the fabric of the boulevard.
R2	In Israel, the role of the committee is very wide. Detailed plans need to be approved by the district committee, certainly all statutory master plans. Non-statutory plans, such as the strategic plans, which are non-mandatory, can give guidelines. Also, the district committee can give guidelines for enhancing development and so on. Since Tel Aviv-Yafo has more resources, it can approve some local-level plans and make decisions. It is beneficial, as the local municipality will know best what its citizens need. Tel Aviv is outstanding because it has resources (economic and technical) which is not the same for the cities in the country and not even in the same district. Having said that, there is a thick layer of statutory planning where the municipality has to refer to the district committee, for instance, to change certain sections of town plans or remove or add buildings for conservation, for instance.

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ID	Quote
R2	For the case of the Geek market redevelopment, although the TLV Municipality was not against the plan and addition of extra floor space as a hotel, it proposed the transfer of rights through preservation of other buildings in the district. However, the planning committee doesn't see the plan as a tool to benefit other areas or other buildings which don't have anything to do with the plan itself. We assess the architecture, the environment, and the public benefits when we approve plans for a municipality. The district planning committee is backed by the law and by the Ministry of Justice in this aspect.
R2	The district committee is actually the, let's say, the middle statutory committee. So, it's it is under the national committees and above the local committees. Right. So, it has all the perspective, right? It has a national perspective. It has the metropolitan perspective. And in that sense, the metropolis of a is made out of two districts. It's the Tel Aviv district and the central district together. You look at the different neighbourhoods in the city or the different parts of the city. And you look at the same time at the relation of the city to its neighbouring cities. We have the view of many cities in the north, south and the East in Tel Aviv and the central district, so we are aware of the variations, the complications, as we've got all perspectives at all scales.
R2	Societies change, but the structure is there. The old fort of Jaffa was built by the Ottomans by taking over the fort in Apollonia in Herzilya built by the Crusaders. So, during conservation, there was a big discussion on values and layers and what to preserve, the Ottoman layer or the Crusader layer. And you see in the old port now, two different levels and materials, which denote these two layers of history
R2	If you think that with planning, you can prevent things, that is a myth. When the projects of Jaffa slope park, refurbishing of the port of the Flea market were being planned, it was clear that this would bring gentrification. But can you stop development? No, you can't. What you can do with good planning is give answers for needs, have a vision for the current and the future population
R_C	I am concerned with the education and future of my child; the municipality should aim at the provision of more schools and education system improvement in Jaffa

9 Socio-economic challenges

ID	Quote
R12	Light rail is part of the strategic plan of Tel Aviv to connect the south and the north. The plans for thoroughfare designs may work well in theory, but such connectivity exposes the South to different kinds of forces (economic, socio-cultural) and increases vulnerability. And without any protective shields, this will only create more problems, and people can't secure their basic lives in the region.
R12	So, a city without a centre, a city without a market, a city without a stable political space for expression. It's not a city. It's a suburb. And no one is taking this structural issue seriously. They might not have tools or imagination.
R8	Take the car services on Jerusalem Boulevard, during the light rail construction, the whole street was shut, including businesses. Now that it is open to the public, landscape-wise, it is beautiful. But why is no one in the city department measuring from now how long it takes for these businesses to resurface?
R13	I think for almost 20 years, there's been a lot of focus on Jaffa. There was a lot of work done here, a lot of public money, the flea markets, the Jerusalem Boulevard, the Jaffa port. It was about time because it was very neglected for many, many years. So, I think it's like an agenda by the city for a long time before
R13	The city came up with a competition to look at the Jaffa port as a whole. The harbour has three hangars, the first of which was renovated years before. And then they concluded that something is not working well, with businesses changing continuously, fewer people visiting, and the two other hangars crumbling. They wanted the whole strategic plan for the harbour, which looks at the whole area to understand how the connections should be

ID	Quote
R4	The area around historic Jaffa has an ecosystem of small industries, which are dependent on each other. For example, Metal workers and artists. It is becoming harder and harder for them to survive because there are more new housing projects that don't go well with these kinds of users. So, this is a trend we are observing, and we're trying to intervene because we believe it's important that those users should exist in a city and not outside of the city. It's very important for certain activities, creativity that we think should exist.

10 Opportunities

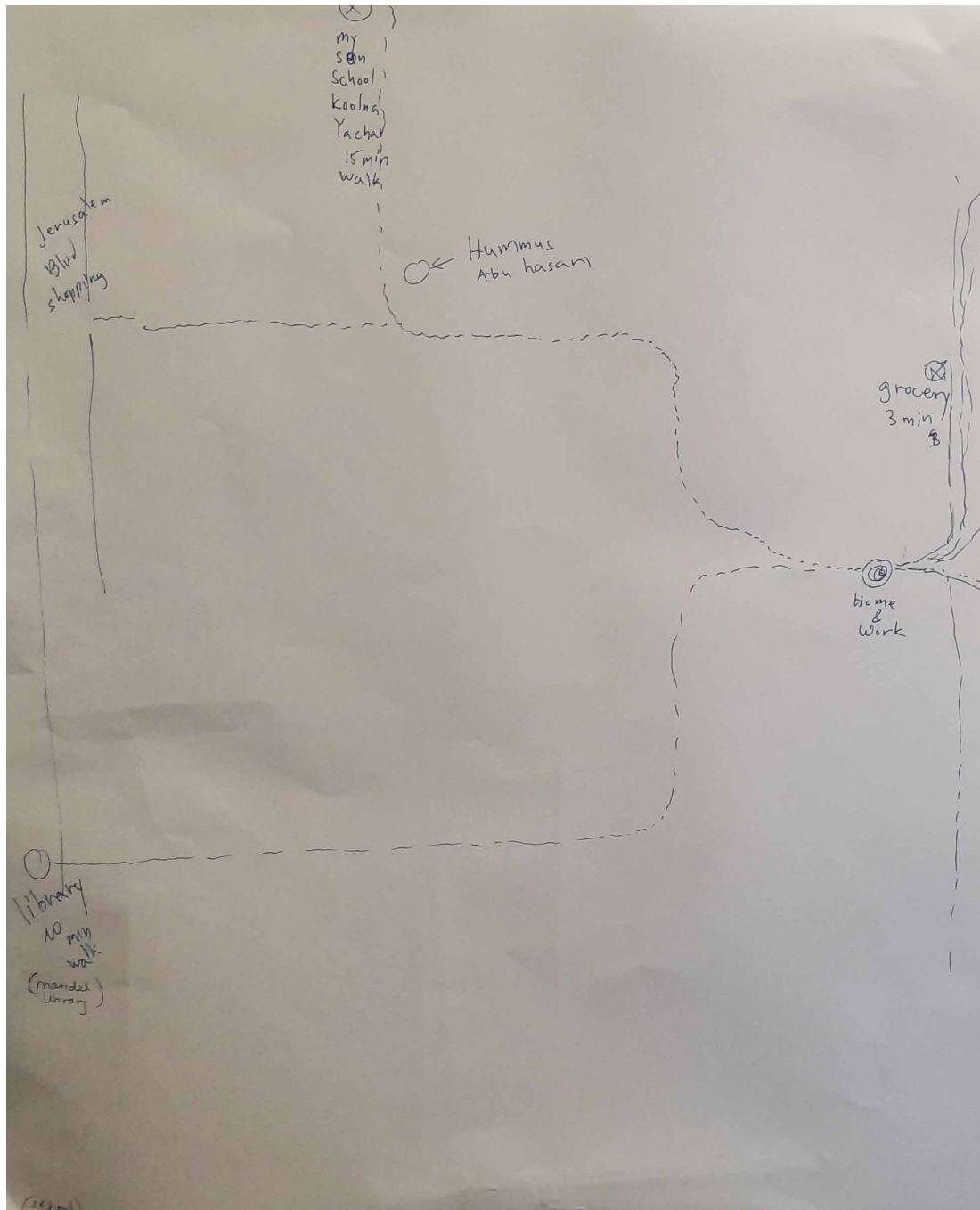
ID	Quote
R14	The Environment ministry grants funding through a competition (kor korem), which needs to pitch with the city, and then the proposals are selected and given grants. Along with SPNI, there are other private companies and NGOs also involved in the calls. Like the National Parks Authority works in declared and protected areas, SPNI works especially in non-declared areas, urban as well
R8	We're talking about a city that's going to exist only in the next 15 years. And it's only going to exist after you decimate what's working now. Here you have a living lab. Let's monitor it
R13	And we worked in a really collaborative way with all Jaffa, the Mishlama, the planning departments, the Jaffa team, and all the different departments of the city planning. But infrastructure as well, we worked with many, many different collaborations. We have an excellent landscape assistant firm that works with us. And it was a very long process that went through many different phases, and we took on a role for the programmatic aspect as well, because it was very important to us to keep the planning connected to the strategic vision, which was very hard, because when money is involved, and the opportunities to make a lot of money, it's hard.
R12	The Municipality is progressive, but the decision makers, policy people at the top are conservative and are willing to take any project head on, deal with the past trauma (For example: The ghetto-Ajami project), thinking it is too early to open the wounds and deal with the challenges
R14	We are mapping kurkars and their remains in the whole of Tel Aviv city, you can see in some neighbourhoods where they didn't build on it. And you see some places it's filled with a plant, so you can't really see it. But we know it because we see the ground and we know the colour of kurkar. The Preservation Department of Tel Aviv is different from the usual mapping projects undertaken with them.
R14	Even while surveying urban ecology, we made sure that we also capture the social aspect, the people's aspect, and not just green, green, green. That is why it was important to make a framework, a mapping and evaluation framework for the project
R6	We have a beautiful project of community tourism. Because of over-tourism, the residents sometimes don't feel like part of the story. We identified ten families in Jaffa and eight in HaTikva. We trained them on storytelling, how to stand in front of an audience, how to open a business, taxes and other things, how to build your story, how to present your story, and how to host a group. And we're bringing groups over to their houses. It is a diverse group of hosts
R6	Jaffa is the third most touristic place in Israel and the first in Tel Aviv. So obviously there is like a special focus on tourism planning and vision (Tel Aviv Global tourism department), along with the works carried out for the port (Atarim), the old city and neighbourhood (Ha Mishlama)
R12	We are talking of food sovereignty and connecting the Jaffa to the hinterland and the Palestinian farmers. The people from Jaffa end up going to Tulkarem in the West Bank for shopping for vegetables, as there is no market in Jaffa, but they will never go to markets in Tel Aviv (Florentine, Ha Carmel markets)

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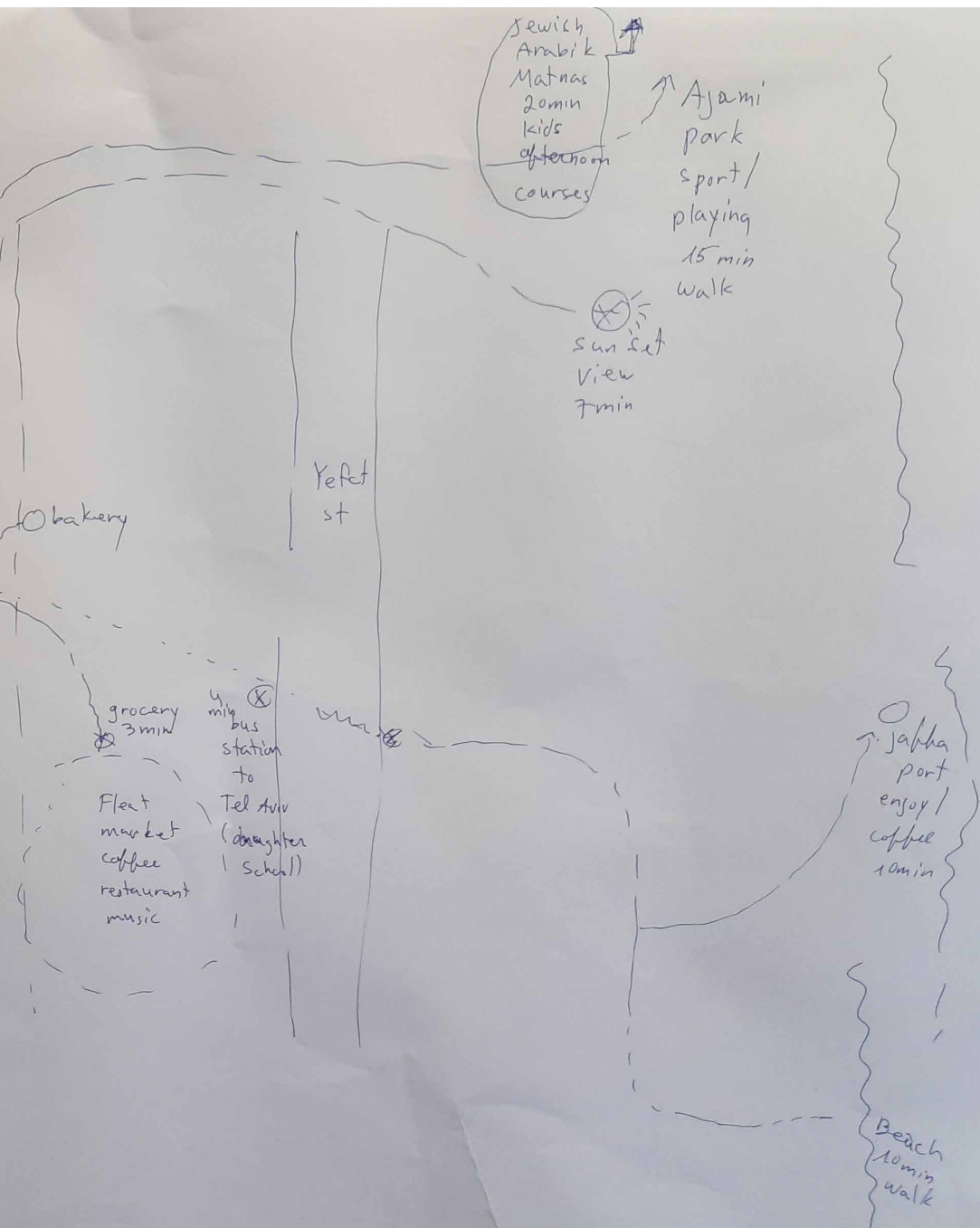
ID	Quote
R1	Our role as the Metropolitan Planning Institution is to see the metropolis and its continuity across borders, either geographically or programmatically. Like the transit hub between Tel Aviv and Giv'atayim, the planning is in pieces, as Tel Aviv is focusing on a bridge only till its borders. So, in such cases, we intervene as a district for planning with a strategic view and have statutory power, and the cities have more restricted responsibility. Tel Aviv is an independent city and a regular city, having a city-wide plan approved here
R_C	A city needs a vision to be looked at as a city as a whole and not only its parts. When an emperor plans a city, he plans an avenue; he doesn't focus on a small bicycle path (although that is important as well)
R2	It's always a question of scale that you are working on while approving plans. So, when you're working on the master plan of the city, you look at the city as a whole. While making a conservation plan for an area, we look at this aspect in a certain area, but when we are dealing with a detailed plan of a very small scale, maybe two or three Streets
R2	The mapping of vacant plots in Jaffa needs to have a purpose, because it has many different complicated layers to it. Some plots are private or with the Amidar-ILA. Some have been vacant for a long time, and some have not been able to develop because of complicated ownership. In the past, the municipality planted a few trees on these vacant plots as a temporary measure. In current times, if the municipality wants to develop this plot, the community around it resists and objects because the plot has now become a park. The mapping of these vacant plots has to come with a level of details of ownership and the purpose of mapping, perhaps you could say to promote tactical urbanism, otherwise, without a purpose of mapping, it is only telling a story

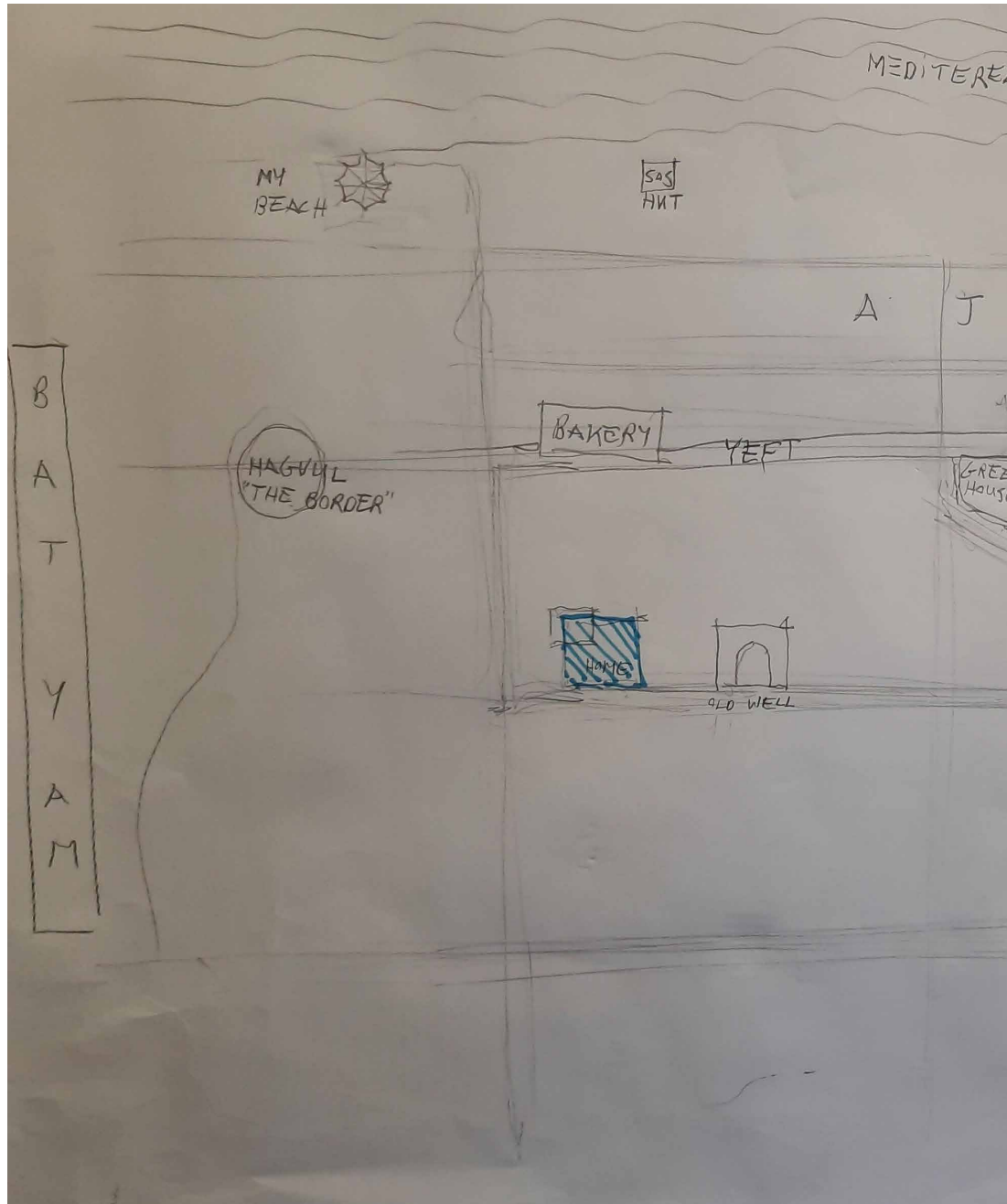
Annex V

Documentation of Participatory Mapping Exercise

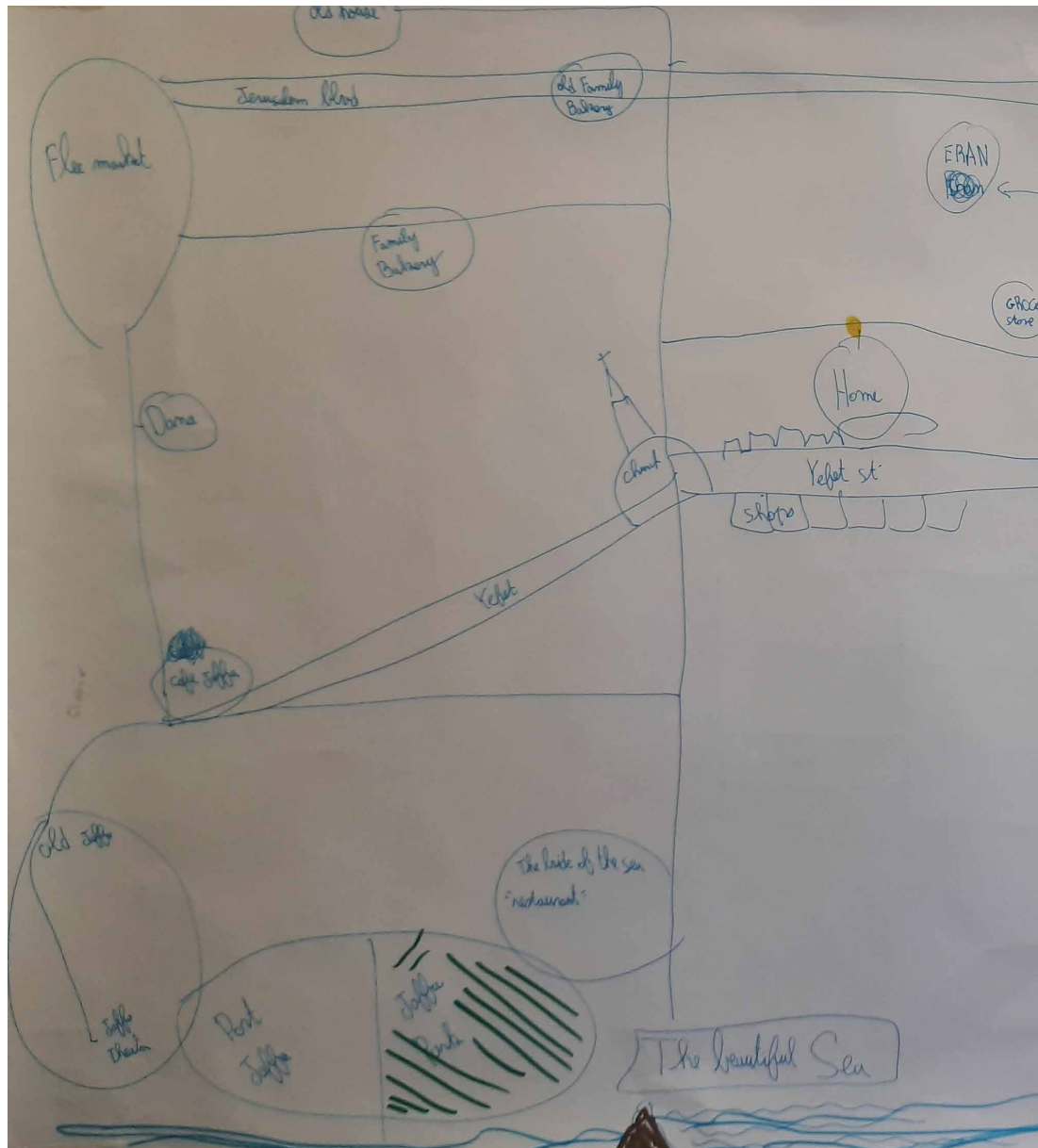


Map 1

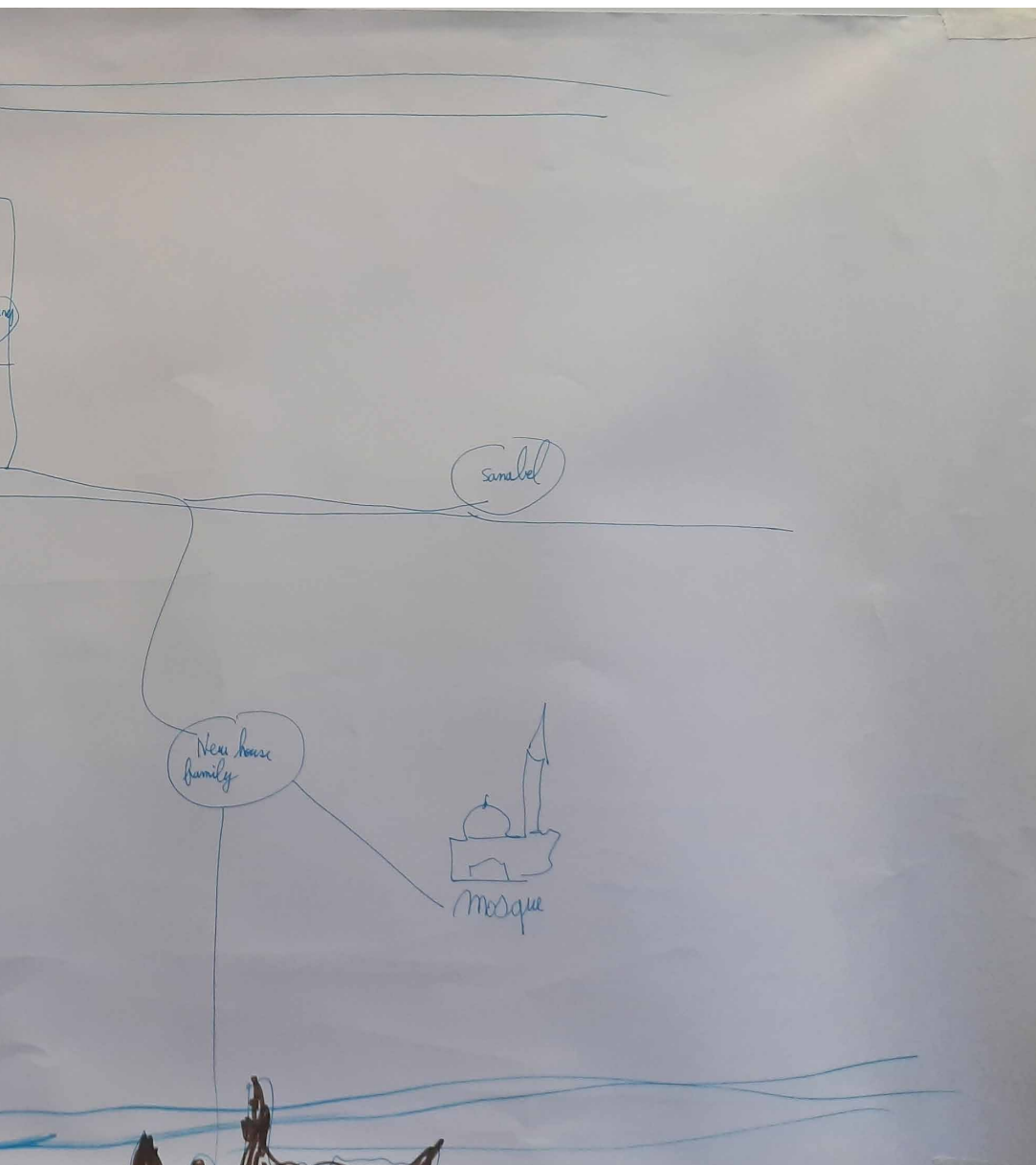


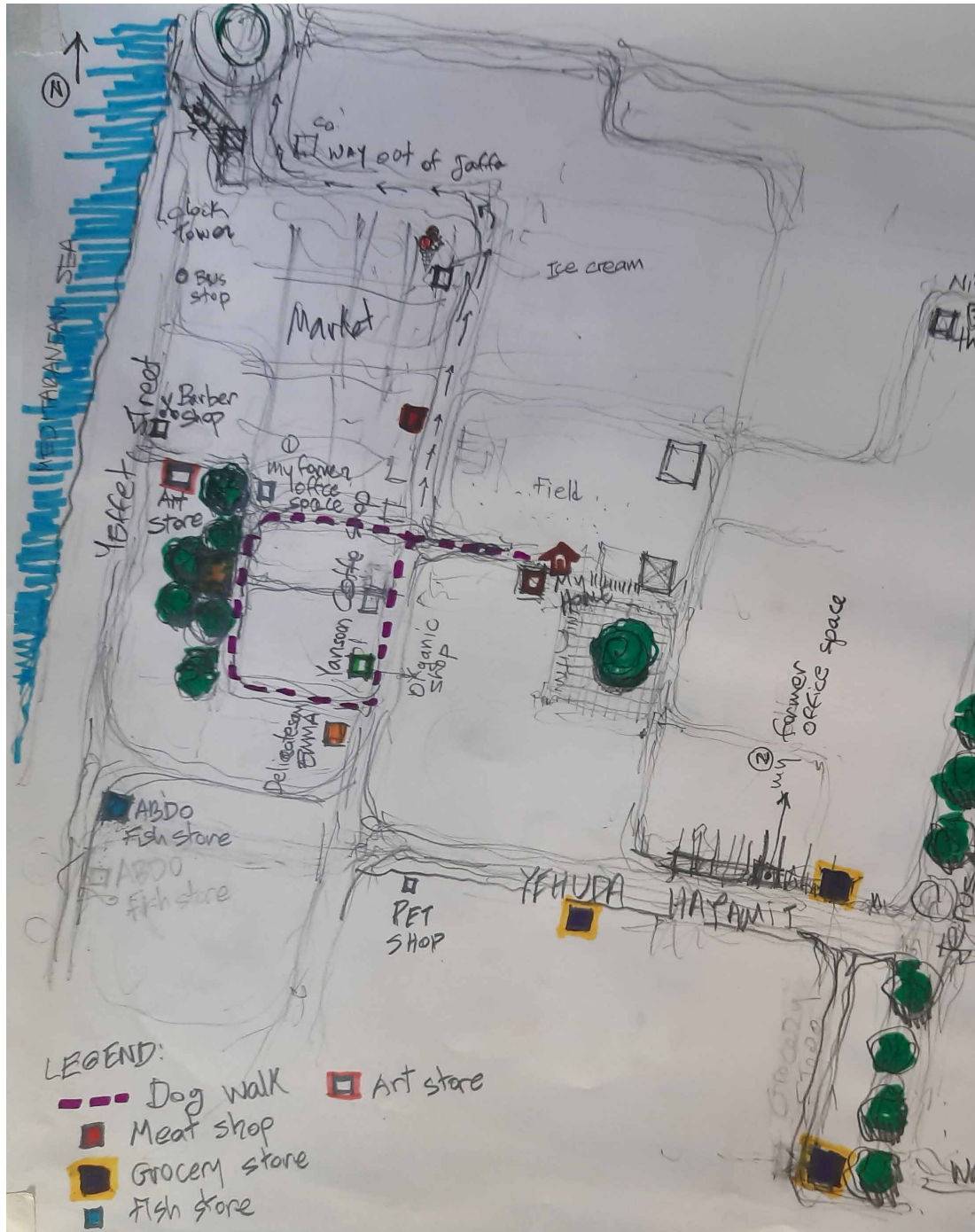


Map 2



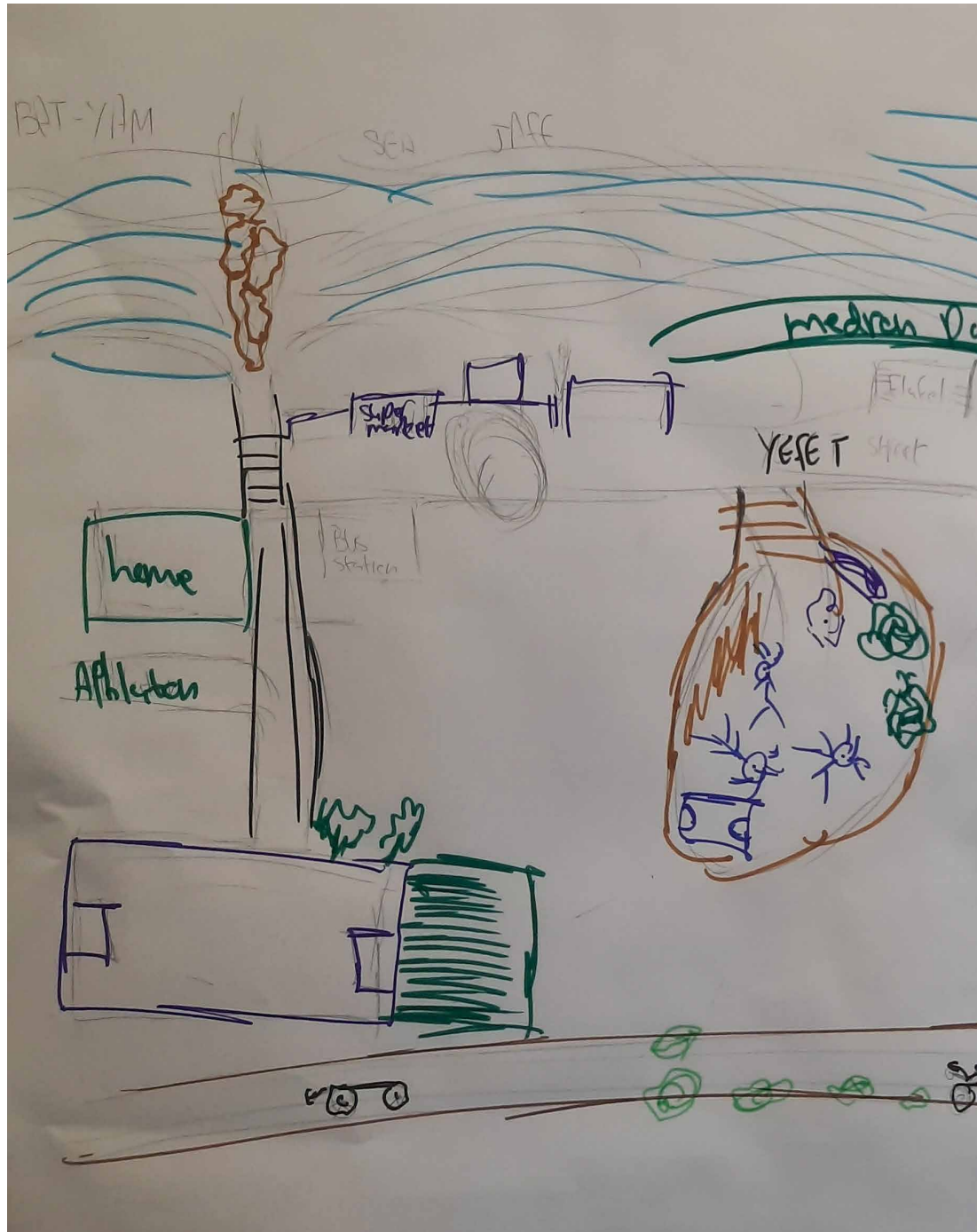
Map 3



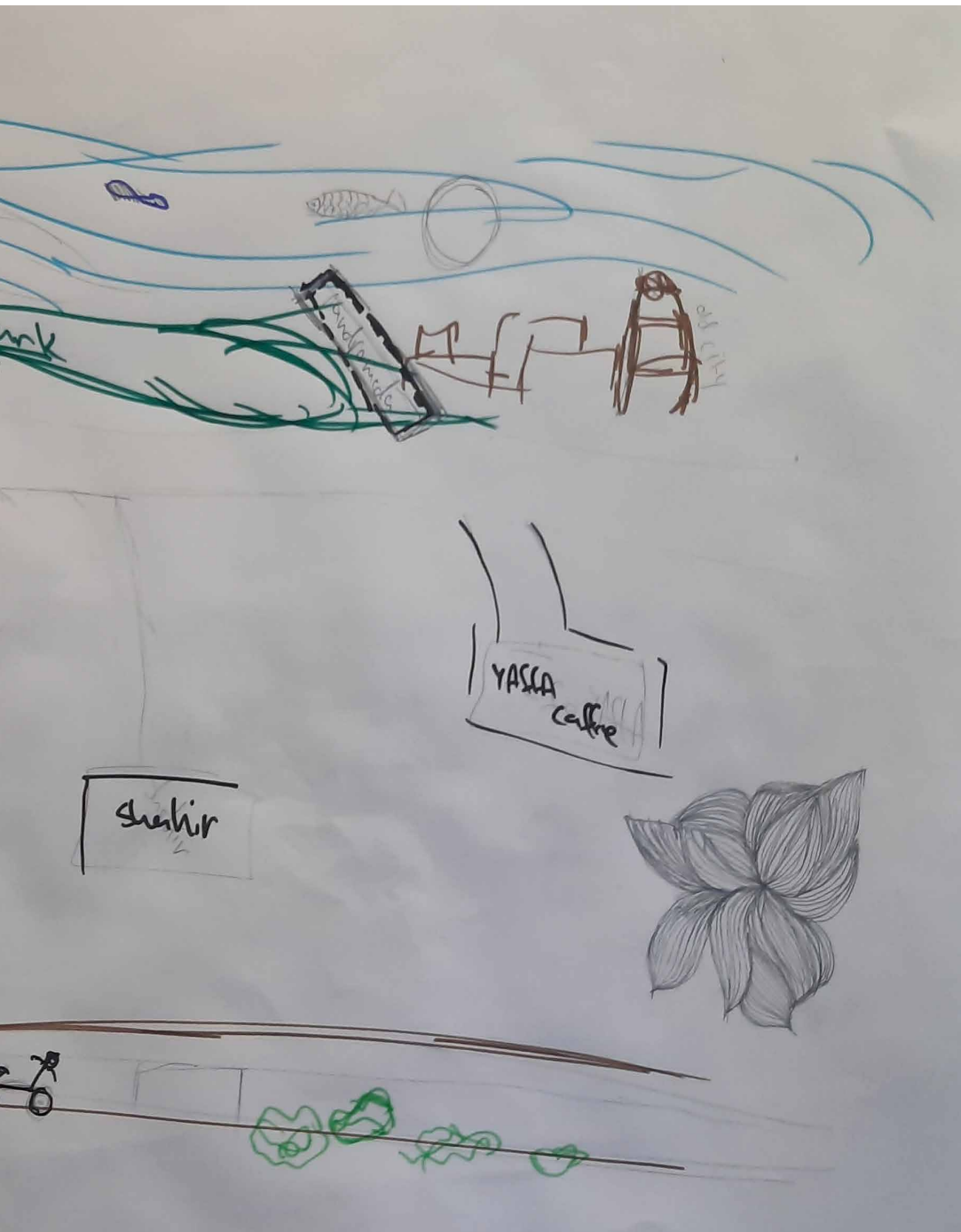


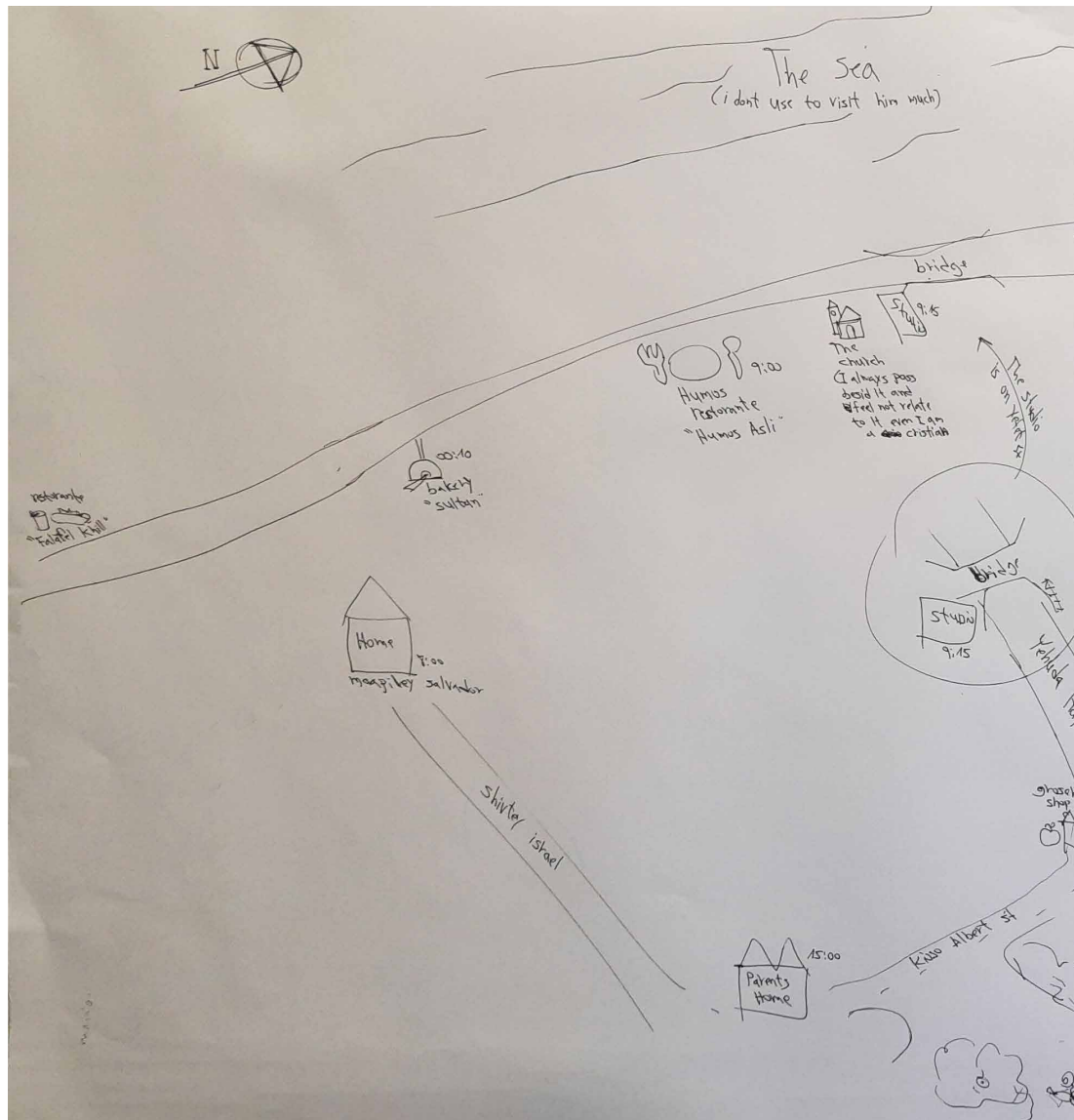
Map 4



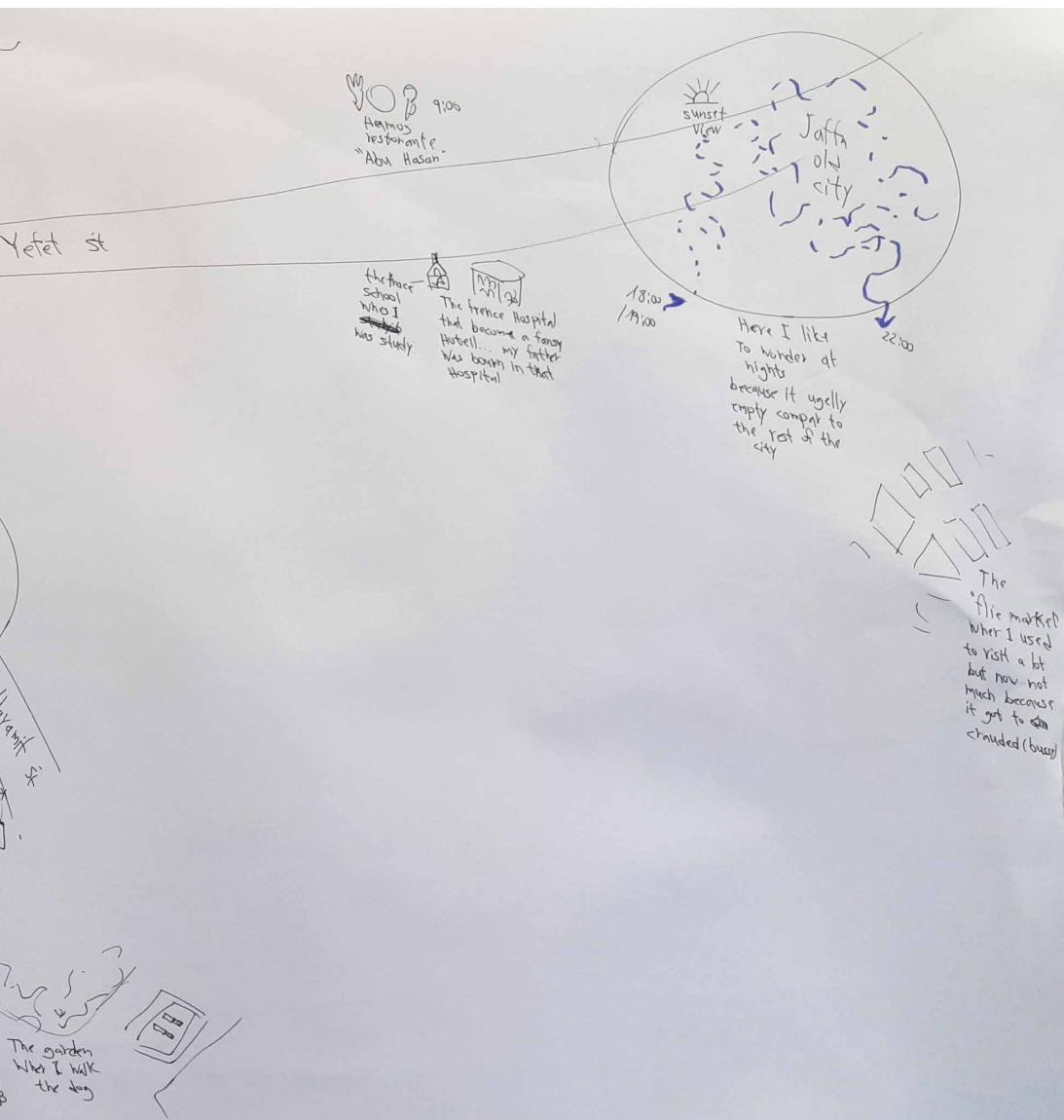


Map 5





Map 6



Research Output

List of publications

Journal Articles

- Potdar, K. (2021). Jaffa Port, Israel: From a thriving port town to a socio-ethnic enclave. *SPOOL*, 8(2), Article 2. <https://doi.org/10.7480/spool.2021.1.5902>
- Turner, M., & Potdar, K. (2021). Metaheritage: Beyond the historic centre and ensemble. In *Attributes: A way of understanding OUV*. Japan Centre for International Cooperation in Conservation, Tokyo National Research Institute for Cultural Properties. <http://id.nii.ac.jp/1440/00009005/>
- Potdar, K., & Verbakel, E. (2022). Eidetic Mapping: An Exploration for Sustainability and Resilience of Historic Urban Landscapes. *Asian Studies*, 1, 547–559. <https://doi.org/10.5117/9789048557820/ICAS.2022.064>

Conference proceedings

- Potdar, K. (2022). Revisiting the design of cities for culture-based tourism in a spatial context of social and economic heterogeneity. In M. Marzo, V. Ferrario, & V. Bertini (Eds.), *Between Sense of Time and Sense of Place* (pp. 852–859). DHTL. <https://www.letteraventidue.com/en/prodotto/592/between-sense-of-time-and-sense-of-place>
- Potdar, K. (2023). Qualitative datascaping for historic cities in conflict: A grounded theory analysis for Spatial Sustainability. Case of Jaffa, Israel. 10th International U&U PhD Seminar, 185–196. https://orbi.uliege.be/bitstream/2268/304771/1/UU_Proceedings_FINAL_compressed.pdf

Book Contribution

- Burgers and Van Manen (eds) (2025): *The Heriland Handbook: Training the next generation of Heritage and Landscape professionals: ICCROM AND Heriland-VUA*, ISBN: 978-92-9077-348-1; https://www.iccrom.org/sites/default/files/publications/2026-02/en_heriland_handbook_2025_iccrom_2026.pdf

Presentations at Conferences, Seminars and Symposia

- VIII AACCP (Architecture, Archaeology and Contemporary City Planning) Symposium; 'Citire In evolution- Diachronic Transformations of Urban and Rural Settlements', Organised by the Dynamic Research on Urban Morphology-DRUM Laboratory, Özyeğin University, Istanbul, Turkey; Presentation of ongoing PhD research 'Eidetic mapping for design of historic urban landscapes in spatially heterogeneous city: Case of Jaffa, Israel'; 26 April- 2 May 2021 (Online)
- The 12th International Convention of Asia Scholars - Crafting a Global; Presentation of ongoing PhD research 'Datascaping of historic urban landscapes in a spatially complex multicultural city: Case of Jaffa, Israel'; July 2021 (Online)
- Conference: Sense of past and sense of place: Designing Heritage Tourism, organised by Università Iuav di Venezia, Dipartimento di Culture del progetto (Dcp); 14-16 September 2021; Presentation of ongoing PhD research 'Revisiting the design of cities for culture-based tourism in a spatial context of social and economic heterogeneity: A case study of Jaffa, Israel'
- International Conference on 'Digitising Jerusalem's Archives: Urban Heritage in the age of Digital Culture', organised by Bezalel Academy of Architecture; Presentation of ongoing PhD research 'Datascaping: an operative tool for planning for the sustainability of historic urban environments'; January 2022 (Online)
- Dissemination event organised by Bezalel Academy and Liebling Haus-The white City Center, Tel Aviv on 'New Approaches to Urban Heritage Future: The Case of Tel Aviv-Yafo'; Presentation of ongoing PhD research 'Datascaping historic urban landscapes for spatial sustainability in Jaffa'; 18 Sept 2022 (In person)
- UN-HABITAT World Urban Forum, Katowice, Poland CHNT; 26-30 June 2022, supported HERITOPOLIS Delegation for publication of the report 'HUL in metropolis' (In person)
- 27th International Conference on Cultural Heritage and New Technologies CHNT, Vienna, Austria, Presentation of ongoing PhD research 'Machine learning as a tool for analysis of cultural ecosystem services in historic urban landscapes' with ML support from Kedar Dabhadkar; November 10-12, 2022 (Online)
- TU Delft, Architecture Department, A+ET Bites lunch seminar, Presentation of ongoing PhD research 'Datascaping historic urban landscapes for spatial sustainability: Case of Jaffa and its contested urban heritage'; September 2023 (In person)
- Research Forum: Historic Urban Landscape_Metropolis, Presentation of ongoing PhD research 'Datascaping historic urban landscapes for spatial sustainability: Case of Jaffa and its contested urban heritage'; 25 Feb 2025 (Online)

Activities

HERILAND Training and activities

- Kick-Off meeting at Hansen House, Jerusalem, organised by Bezalel Academy of Arts and Architecture; 23 Oct 2019 (In person)
- Kick-Off Meeting and HERILAN Masterclass #1, Theme: Democratisation, organised by VUA, TU Delft, Amsterdam; 3rd- 10th November 2019 (In person)
- HERILAND Masterclass #2, Theme: Changing Environment, organised by the University of Goteborg, Sweden; 11-14th May 2020 (Online)
- HERILAND Masterclass #3, Theme Spatial Turn, organised by Newcastle University, UK; 5th to 10th October 2020 (Online)
- HERILAND Conference on Environmental, Cultural, Economic and Social sustainability by Institute of Sustainable Studies, Vrije Universiteit Amsterdam, Netherlands (24-26 February 2021) Online
- HERILAND Masterclass #4, Theme: Shifting demographics and contested identities, organised by Bezalel Academy of Architecture, Jerusalem; 14th to 18th June 2021 (Online)
- HERILAND Masterclass #4, Theme: Digital Transformations and Heritage Planning, organised by VUA, Netherlands; 28 June-02 July 2021. (Online)
- HERILAND Living Lab, organised by RomaTRE, Italy, 22 Nov-3 Dec 2021. (Part online attendance)
- HERILAND Writing retreat, hosted by Tjärnö Marine Laboratory, University of Gothenburg; 22-25 May 2022 (In person)
- HERILAND Study tour to Israel, hosted by Bezalel Academy of Arts and Architecture; Location: Jerusalem, Tel Aviv, Acre, Haifa; 14th to 19th September 2022 (In person)
- HERILAND International Conference on Cultural Heritage and Spatial Planning; 12th-14th October 2022. Supported the 'Training sessions on Historic Urban Landscape' with TU Delft, Bezalel Academy and RCE, The Netherlands
- HERILAND Podcast supported by the Creative Industries Fund Netherlands and the Vrije Universiteit Amsterdam; 'Threatened Urban Heritage Narratives | Future Making In The Anthropocene Podcast', Presentation of ongoing PhD research and findings in Jaffa, Israel (Online)

Secondments and Fellowships

- Liebling Haus-The White City Center, Tel Aviv- Yafo Municipality, March-Sept 2022 (In Person)
- ICCROM, Rome, Italy, March-July 2023 (Hybrid)

Volunteering work for Research projects and Working Groups

- Part of Working Group on Information Technology with OurWorldHeritage Initiative: A civil society movement to mobilise, to renew and reinforce heritage protection for the next 50 years. November 2020– March 2022. Contributed to Report

Teaching activities

- Graduate Elective Seminar at Bezalel Academy on 'Cultural mapping as a tool for designing historic urban landscapes'; Conducted by: Komal Potdar and Ana Jayone Yerza Perez; March–June 2021
- 1-week intensive workshop with students of Bezalel Academy, Department of Architecture on 'Critical inquiry of urban heritage and Digital Humanities- A Spatial Humanities Approach to Architectural Historiography', with Elad Horn and Ariel Peremen; 18th –22nd September 2022
- Heriland lecture in the World Heritage course, VUA; May 2021

Curriculum Vitae

Komal Potdar

Komal Potdar is Conservation Architect and Project Manager, bringing together over six years coordinating European research, innovation and action programmes on climate resilience, urban sustainability, and cultural landscapes, alongside more than a decade of experience as a conservation architect. Her interdisciplinary work spans internationally and cuts across architecture, conservation, urban policy, and climate adaptation: from managing multi-partner Horizon Europe consortia, to doctoral research on historic urban landscapes, to on-the-ground heritage documentation in India that fed into a UNESCO World Heritage inscription.

Since January 2026, she is establishing herself as a Freelance Conservation Architect and Project Management Professional in the Netherlands to advising municipalities, research consortia, and cultural institutions on programme coordination, stakeholder engagement, and heritage-led climate adaptation.

She Early-Stage Researcher under the HERILAND Marie Skłodowska-Curie Actions programme, based between Bezalel Academy in Jerusalem and TU Delft, with a secondment at Tel Aviv Municipality's Historic Preservation Department (Oct 2019–Sept 2023) and is continuing her doctoral journey till the end of 2026.

As an Expert, Socio-Cultural Transformations at the ICLEI European Secretariat in Freiburg im Breisgau, she led resilience policy work on cultural landscapes (RescueME), culture-driven climate action in Montenegro, and Horizon Europe/LIFE projects on climate-resilient heritage buildings (Climres, INHERIT) and organised a high-level EU conference on cultural heritage along the way (February 2024–January 2026)

Alongside she had the opportunity to serve as Editorial Assistant for the Journal of Cultural Heritage Management and Sustainable Development, managing manuscript screening, peer review coordination, and editorial communications (2023–2025).

Her roots are in India, where, as a Freelance Conservation Architect from 2017 to 2024, she contributed research and documentation that helped secure the UNESCO World Heritage inscription of the Maratha Military Landscapes of India (2024).

She has vast experience working across National and State Government projects on heritage and cultural conservation. She was a as Consultant Conservation Architect at the Archaeological Survey of India, Ministry of Culture (April 2018–September 2019), she contributed to the UNESCO nomination dossier for Dholavira and monitored conservation and management work at the Taj Mahal, Red Fort, and Qutb Minar. She has been a visiting Assistant Professor in Architectural Conservation at Sinhgad College of Architecture, Pune (September 2017–March 2018), teaching conservation planning studios, and awarded the international internship at the Preservation Institute Nantucket, University of Florida (April–August 2017) through the US/ ICOMOS International Exchange Program, where she developed an inventory of 100 historic interiors. She has worked with Cultural Resource Conservation Initiative in New Delhi (September 2015–March 2017), delivering heritage planning projects across Rajasthan and Punjab, and in 2015, as a Research Associate with ICOMOS India for ICOMOS Norway, supporting capacity-building on Rights-Based Approaches to the World Heritage Convention. She has a number of publications and has been awarded several grants and scholarships for continuing professional development.

Being a creative and adventurous person at heart, her personal time is spent travelling, learning yoga and Indian basuri and recently catering to plants and garden in Delft.

Awards, Grants and Fellowships reviewed

- ICCROM Research Fellowship, Rome, Italy (2023)
- AE+T Department Funding, TU Delft, Netherlands (2023)
- Marie Skłodowska-Curie Actions – HERILAND, EU Horizon 2020 (2019–2022)
- Charles Wallace India Trust Award, United Kingdom (2019)
- US-ICOMOS International Exchange Programme, USA (2017)
- INTACH Heritage Academy Research Grant, India (2016–2017)
- GATE Scholarship, India (2013–2015)

Datascaping Historic Urban Landscapes towards Spatial Sustainability

The Case of Jaffa's Contested Urban Heritage

Komal Mohan Neeta Potdar

Historic cities increasingly face shared challenges where development pressures intersect with heritage conservation and sustainable urban development, issues that conventional planning approaches struggle to address alone. While international frameworks such as the Historic Urban Landscape Recommendation (HUL) and the New Urban Agenda (NUA) acknowledge these tensions, their conceptualisation often remains normative, limiting contextual applicability. Accordingly, this study positions itself as critical-reformist, aiming to interrogate HUL's normative ambitions and the broader sustainability agenda, and to reveal the contextual and institutional conditions under which they can be meaningfully operationalised in contested urban environments. Grounded in General Systems Theory, which frames cities as interconnected, evolving systems, the research is complemented by Critical Heritage Studies, which reads heritage as a politically produced, dynamic process. Together these frameworks inform a mixed-method, critical case study, it explores datascaping: an epistemic approach and an interpretive, relational, and performative method for visualising and integrating heterogeneous spatial, cultural, and socio-economic knowledge. Jaffa, a historic and mixed district within Tel Aviv-Yafo, serves as the critical case study, illustrating how ethno-national and socio-economic contestation shape heritage-led gentrification, spatial segregation, and the displacement of long-standing Arab communities. The datascaping exercises reveal socio-spatial patterns typically overlooked in conventional planning, showing how conservation, tourism, and redevelopment intensify spatial homogeneity, segregation and socio-economic pressures. By surfacing knowledge often excluded from formal planning processes, the method offers critical evidence to inform more inclusive, reflective planning practices. The study concludes that datascaping repositions heritage knowledge within the negotiation of urban futures, and that understanding Jaffa's dynamics through this lens offers analytical transferability to other historic cities confronting similar tensions between heritage, equity, and sustainable development.

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