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Name: Syed Zayed Ahmad

Supervisor: Dr. Oliver Lah

Specialization: Strategic Urban Planning and Policy

Country: Pakistan

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Institute for Housing and Urban Development Studies of Erasmus University Rotterdam

Summary

The defining of “legacies” under mega events have evolved over the years, perceived via a multitude of visual matrixes and indicators. Research focused on the venues created due to the event or reutilization of sites, as well as critical overviews on the aftermaths spanning over several years after the execution stage of an event; from socio-political imbalances to environmental externalities. The purpose of this thesis is to take a similar approach but change the urban focus to short term, rapidly induced ambitious “mobility projects”. All finished in time for the 2010& 2015 Expo along with current 2022 World Cup and see how the overall spatial surroundings changed from prior to the construction, during the construction and operation stage. Logically all these changes and transformations can very well be considered “legacies”, and rather than just “transport”, it can be interpreted as mobility. As it focuses on not just the infrastructure but the dynamic environment which constitutes all sorts of changes that influence a citizen’s or tourists’ daily mobility. By observing these changes, the potential is to understand the planning complexities and priorities amongst the chosen cities and see the focalizing themes as well as its degree of importance when looking at overall resiliency of a city. Method of analysis was cyclically implemented through spatial and informational analysis. Spatial collection was observed through satellite accurate maps in specific points in time using google earth pro and google maps street view around metro station entry points for lines developed explicitly after winning the bid for the mega event type to create a framework construction. Informational processing will involve document analysis extrapolated from relevant and highly representative documents with specific codes to find patterns and significant thematic. The main findings showed Shanghai great urban restructuring at a time of great development, whereas Milan was more geared towards revitalization and city branding, including overlaps of goals and agendas between the two cities. Doha is still undergoing changes and showed to incorporate the other two cities’ complexities but remaining ambiguous in its urban output. Conclusively mobility projects under mega event contexts, show untapped potential for research under assessing resiliency, how spaces and services undergo changes as well as the general impacts that stem from it. As an urban planner this can be considered an effective way of observing policies and planning from short term rapid based development with long term implications via adaptive analysis.

Keywords

Mobility legacies, urban restructuring, revitalization, mega event framework, planning complexities.

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The rest of my gratitude would have to go to the SUPP coordinate team as well as the IHS team, that contributed great unseen effort to improving class life, which was exceptionally hard, as we were the first cohort right after the pandemic died down and the world opened.

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Abbreviations

ME(s)	**Mega Event(s)**
IHS	**Institute for Housing and Urban Development Studies**
GCC	**Gulf Cooperation Council**
AC	**Adaptive Complexity**
SU	**Spatial Understanding**
IP	**Information Processing**

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Chapter 1: Introduction

1.1 Background

"Mega events" as a conceptual model represents a plethora of inter/multi-disciplinary evolved paradigms. Logically a mega event, is named as such based on its sheer size, hence the term "mega". However, literature dating back from its first "traced use" in the 37th Congress of scientific experts of Tourism in Calgary 1987 till current times, shows an evolving framework of indicators conceived by experts hailing from different backgrounds with different ideologies behind the underlying specificities of a mega event criteria (Martin Müller 2015). Some experts define a mega event based on its "visitor numbers" (Jafari 1988) or a variation of that criteria by setting a minimum 1 million requirement of visitors (Marris 1987). Other perspectives correspond with the spatial geo-physical scale of the event (the area it occupies) / transformative effect (Kassens-Noor et al 2015), or a less tangible variable such as media coverage of the event globally.

Defining indicators aside, all mega events seemingly share one characteristic in common; a proportionally gigantesque input and output of visioning, planning and execution processes. Due to this fundamental commonality, various adapted models for these events can be adequately labelled as a "mega event post bid urban framework". Additionally, this planning framework consequentially constitutes to large scale transformations within the fabric of a city, post event (Kassens-Noor et al 2015). These left behind transformations are known as **"legacies"**, which can be described as short-term hyperbolic projects constructed for a mega event, later crystallizing into a structural change with long lasting impacts on the city and its inhabitants (Manzenreiter, 2008). Interpretatively in urban theory, it could be considered a composition of both spatial and temporal inter-relational elements.

Due to this large encompassing network of urban planning components, mega events are seen as a catalyst for development or revitalization. Whether it's economic augmentation. spatial re-organization or reactivation of urban stagnancies, the strategic urban planning and policy element heavily coincides at all levels of the planning structure (Kassens Noor 2012). Furthermore, like any element that carries major transformative impact, the flaws, motivations as well as potential overall objective gains have constantly been critiqued and analyzed in both a positive light such as the Olympic games in the city of Barcelona in 1992 integrated into the spatial and environmental planning of the city to achieve urban objectives (Qu, L et al 2011), or a negative critique of the Rio Di Janeiro Olympic games researched from an ethnographic study post event, shedding light on situations such as gentrification or superficial aesthetics hiding the slums during the event (Adam Talbot 2019, Arturo Di Bella 2019). Negative and positive externalities differ based on host countries, naturally as all cities possess differing dimensions of urban spectrums.

Preliminary Reflection

Milan, Shanghai and Qatar, three globally competitive cities, but exceptionally different in their urban genealogy. In terms of mega events, all three cities have hosted one shape or form of an event, World fair 2010 Shanghai, World fair 2015 Milan and World Cup 2022 Qatar, by the end of this year. Whilst Qatar is debated in terms of really having hosting a "mega event" prior to the oncoming world cup, it has hosted numerous comparably sized and internationally renowned "sporting mega events". One of the principal rules of mega events is that it brings a sizeable

temporary population to the city from abroad and there are several urban transformations occurring due to it, such as developing existing infrastructure projects in "mobility" to accommodate the oncoming tourist population. Which creates the basis for this thesis, each city specifically has constructed and expanded metro lines right after winning the bid for the ME, which in turn causes a domino effect of changes on the surrounding spatial urban environment through the creation of stations. Logically all these changes in turn could be classified as "mobility legacies", not just the venue but metro development as well as their bubbles of urban impact that remain till present date. By observing these time-based transformations or modifications, it is also possible to analyze the planning/execution complexities for each city to understand the resiliency aspect as well as commonalities.

1.2 Problem Statement

Based on existing academic literature, there is already plenty of theoretical research and observed urban transformations for the thematic complexities behind mega event planning and their respective timelines. It is difficult to state conclusively what the exact ratio of positive to negative critiques for mega events are, but the general consensus visibly underlines more so the flaws and disparities between intention and reality of post event spillover effects, as an example in Rio di Janeiro (Arturo Di Bella 2019). The first component of this thesis is to compile, construct and compare "what urban frameworks exist or have been utilized in terms of **planning, vision and execution** for legacies as well as mobility frameworks for mega events across Milan & Shanghai, rather than strictly critique the outright negative or positive consequences to occur or future implications, "post event". The notion of "transport legacies" or mobility legacies has always been a variable that has had low end limited research exposure and occurrence before the 21st century under the event lens with a resident impact perspective. However, over the past decade and recent literature shows a perspective of analysis for models to analyze the challenges behind planning for transport for the Olympic games (Gustavo Lopes dos Santos et al 2022). Whilst the challenges are important, it's possible that critically viewing transport legacies through a different lens could yield other conclusions, which is why "contextualization" is important. Furthermore, the aim is to stitch together and understand the relations between the three primary components; mega events (focusing more on world fairs) and urban framework creation for mobility legacies, to see then if it could "potentially" resemble / contribute to the resiliency index framework in in the long run or is it already occurring in Milan and Shanghai due to considerable time having passed since the world fairs. Mega events are presented in various literatures as a short-term catalyst for furthering development, the aim is to explore whether there are common elements that encompass a generalizing phenomenon in a framework format. This type of approach is usually aimed at the event itself, such as the venue, stakeholders involved, future of the area and legacies overall, but there's been limited research into transport legacies itself and an overall comparative study on planning "mobility" frameworks. Additionally, it hasn't been applied to the GCC environment (unconventional urban fabric and development involved), Any framework creation will all be based on pre-existing latest planning models (2010-2022) for mobility framework and mega event legacy planning frameworks.

To add another layer to the problem statement, resiliency is often defined in literature through a multitude of perspectives, ranging from *"cities abilities to withstand shocks"* (Leichenko 2011) or "to adapt" or "return**"** to the optimal state in all socio-technical and socio-ecological networks (Sara Meerow 2015). These conceptualizations of resilience are often entangled with wicked

problems. The scope is to explore is whether it could be incrementally adjusted and regulated via micro-scale short term developments by first understanding the level of impacts in varied approaches in mega event development across various cities by assessing the overall spillier to other urban areas. For instance, focalized mobility projects rapidly developed post-bid for a mega event and their processes. Exploring elements within the planning, execution and visioning stages within the confines of mobility development, and trying to gage whether long term resiliency is addressed or not? The concept of resiliency differs contextually due to different facets of thematic priorities and properties, however is there a principle underlying foundation behind these ideologies? Examples of differing societal governing factors could yield similar foundations in motivations and goals. Milan being renowned for prioritizing protection of their Heritage (Stefano Della Torre 2020), or Shanghai wanting to be globally competitive and expressing their implicit desire to have a strong soft power representation, such as developing three lines of metro after winning bid for World Fair 2010. Despite prior to the bid, development was extremely stagnant for the three lines (Lingyue Li 2018). Shocks to a city can come in the form of natural disasters, through digital collapse of economic crashes or as recent events have shown us, a world halting pandemic. Multitude of large sized events were delayed such as the World Expo 2020 in Dubai, however continued at the end of 2021 as soon as vaccinations became abundant. In retrospect, legacies are shown to combine spatial and temporal elements, resiliency incorporates these same elements within its own complex multi-disciplinary dimension and mega event planning frameworks also aim to try and organize under these two urban scales. The explanatory aspect is to compile and explain what processes are occurring or being looked at amongst these three components and try and observe whether there is a polarizing by-product that can be better adjusted for future models used in mega events.

1.3 Relevance of Research Topic (Motivation)

Mega events are an evolving and complex globalizing urban concept. Every event despite having the same goal and purpose for the venue, contextually differs from its predecessors, for instance, comparing the Olympic games in Tokyo compared to Rio di Janeiro Olympics carries vastly dissimilar implications in each of the respective cities. Both mega events as well as resilience, despite being heavily debated in both definitions and frameworks, are a constant everchanging paradigm in urban theory. Definitive paradigms aside, the thematic subcategories under a mega event planning framework are known to influence and impact all manners of urban sectors in all cities that host such an event. The external and internal factors that shift agendas and processes are in constant flux in every following iteration of a mega event category.

This brings the importance of the topic, hypothesis aside, as a consequence of this specialized ME framework, changes occur as a natural logical result within any urban environment. By analyzing the sub planning processes amongst three cities that are extremely different in their spatial dimension, as well as operating in different temporal situations will perhaps yield substantive new perspectives in the similarity dimensions as well as defining principles.

Under an even more focused lens specific GCC countries having hosted one expo as well as an oncoming world cup, less than a year or so after the pandemic, which is an extremely new specialized research sphere and less explored or explained under mega events. GCC countries have always been in a dire need for diversification of economy ever since the recession at the

start of 2008. Thus, understanding that, mega events are somewhat strategic tools with the intention to augment the city itself through short term urban planning, in light of somewhat repairing or reducing the existing urban issues, approaching the research through another facet of focalized type of infrastructure type such as “mobility legacies” could provoke a new thread of analysis in urban development.

Mega event is a form of urban transformation that will most likely continue to exist for a very long time, as such its implications and processes will continue to evolve as well, thus the explanatory aspect will always remain adaptive in nature.

1.4 Research Objectives

To empirically outline and combine the existing mega event mobility framework and other framework concepts as well as analyze mobility or transport legacies across the three cities. Shanghai and Milan will be more retrospective analysis and the compiled and the tailored/adapted model will then be used as a contemplative application chapter for Qatar moving forward within the perspective of mega events. Furthermore, whilst resiliency is important in this thesis, it is by no means the core of the research, primary purpose remains to explain the structural formations amongst the three highlighted components (planning, vision and execution) in the problem statement / research question and try to analyze what the main fundamental principles are, as well as the interlocking relationships, focusing more on the process of events rather than critique them. Urban framework mobility models as well as the three components for mega events would be defined as an independent variable, whilst the legacies that stem from it will be the dependent variable. However, by adding an additional layer of resiliency to the dependent variable, the aim is to incorporate the findings and question its relevance to a holistic resiliency framework. To observe whether it could potentially be added as a form of an indicator/or used a strategic urban planning tool under the resiliency index by way of “threads of influence” they impact (further explained in the literature review). Explanatory analysis combined with contemplative theoretical contribution under the form of recommendations for potential mega events in the future, such as Qatar oncoming world cup this year.

1.4 Main Research Question

How does urban framework creation tailored for mega-events, structurally correspond with "mobility legacy projects" across 3 varying contexts for the sake of achieving potentially higher resiliency? - *Cases of Milan & Shanghai and the future of Qatar?*

1.4.1 Sub Research Questions – For thesis results

- What were the similarities and differences in planning, execution and visioning under the mobility framework models between Milan and Shanghai for mega events? What goals were met?

- Could past or present mobility legacies stitched planning framework be integrated into the resiliency index criteria for a city such as Shanghai, Milan or Qatar? Concept of knowledge sharing.

Sub Research Questions – For literature groundwork

- What were the past monitoring tools created for the mega event planning framework?

- How do we define and measure legacies?

- What are the current adaptive planning systems for mega events explored so far or in debate?

1.5 Scope and Limitations

To keep the research focused and to adapt to the time constraint, the best possible approach was to focus on one mobility project extension/development per city and the general impacts per chosen dimensions of focus through various data, for a mega event in each city context and applying the framework analysis principle to this lens (more explained in the literature review). That way the scope won't be arbitrary, and the operationalization will be to the point in terms of data collection. Realistically this would mean the thesis will follow an extensive analysis format rather than intensive (time constraint), and limitations and scope will be defined by the level of quality of secondary qualitative data points and routes available to obtain as well as the tailored focus, by choosing dimension, neglection of other areas are a by-product (however it is to increase focus rather than dilute it arbitrarily). Primary data collection would coincide with interviewing mostly mobility specialists through semi structured interviews in a more holistic manner, to further validate the data. This diagnosis remains non-defined as it is still too early to tell how rich the data is, and a deeper dive into the methods of research will be explained in the third chapter of the thesis.

Chapter 2 Literature Review:

2.1 State of the art literature

As stated in the sub-chapters, the literature surrounding mega events comes in variety of study forms and specialized lenses. The purpose of this chapter is to create a compiled-stitched structure that will later help conceptualize/operationalize the required independent and dependent variables. Each sub-component of this chapter will also contribute to understanding the current revolving notions, models and criteria surrounding the sub questions given in the very first chapter. A conceptual framework will be created from selecting certain elements as a byproduct of the following sub chapters. Research Gaps will be constantly re-iterated throughout the sub chapters in brief to highlight the importance and relevance of the thesis area.

2.1.1 Mega event frameworks – Adaptive Complexities (AC)

Prominently, the models represented in literature around the overall three primary stages leading up to a mega event: visioning, planning and execution. Amongst most cited literature this is known as the "preserved structure" for an event (Chris Gratton et al. 2008) or it is conventionally staged in three designations, bidding, pre-event and event, which still applies today, World Cup 2022 (Meza Talavera A et al 2019). However there exists an adaptive element despite the standardization / formalization behind the process of mega event management and planning. These adapted frameworks revolve around critically analyzing the three stages and the overall impact of mega events but via a specialized lens, in achieving a goal or understanding a frame of consequence. Each framework is rooted in deciphering a thread of influence between a "sporting" mega event and a form of dependent variable. Figure 1 below is a compilation of somewhat recent literature found with brief explanations of the threads of influence. This figure could potentially be used to contribute to creating this thesis's transport legacy framework with an eye on resilience, as well as re-utilizing the most relevant major dimensional approaches/opportunities of analysis found within literature. The similar themes will be addressed under several categories of urban dimensions in the following explanatory section. To add further, almost all the literatures found so far, covered mostly sporting events rather than world fairs, as a preliminary observation showing a minor research gap.

Each dimension will be numbered as a type-form otherwise known in literature as "complex adaptive systems" CAS. The relevance of this concept is its properties, which coincides with the structure of the below dimensions explored. According to a research scan done by the Health Foundation in UK 2010, a CAS system recognizes the complexities, paradigms, and dynamic relationships rather than strictly focusing on the causal to consequential methods of analysis. By adding the additional layer of CAS to each dimension, it portrays whilst each framework shares similar contextual parameters, the problems and interactions are vastly different and non-unilateral. To re-iterate, the following dimensions then will be used to create a stitched framework for mobility projects developed for mega events and their possible contributions (hypothesis) to resiliency in the long run.

Figure 1: Author 2022, a way of combining ME existing research. (Compilation of other authors/papers): Threads of analysis between various recent dependent variables and mega events.

Dependent Variable – Type of framework	Context and Type of Mega event (ME)	Author
Simple Holistic Sustainability – socio-environmental, economic, infrastructure & organization	World Cup 2022 Qatar	Meza Talavera A et al 2019
Citizens Attitude (Concept of Social Exchange Theory)	MEs in general	Smith, A et al 2019
Socio-Economic Impacts – Debt, better alternatives, lost alternatives	Olympic games and Commonwealth games	Gabriel Silvestre 2008
Governance –Goal / outcome-oriented framework system for stakeholders.	Rio Lisbon and Rio Di Janeiro Mega events	F.S.O. Santos et al 2022
Delivery of troubled urban infrastructure	2014 Commonwealth Games Glasgow	David, G. 2021
Employment creation: Volunteers for mega events	Glasgow Commonwealth Games	Baum, T. G., & Lockstone, L. (2007)
Quantitative Evaluation for Environmental Impacts – Greenhouse gases emissions	London Olympic Park	Parkes, O et al 2016
Strategic Tourism Marketing Perspective	Athens Authentic Marathon	Zouni G et al 2021
City Greening – reactivation of environmental initiatives	International Horticultural Exposition in Xi'an	Wang, F 2019
Counter Terrorism and global security	MEs in general	Fussey, P., & Coaffee, J. (2012)

“Holistic” Sustainable Dimension (AC 0 - All Encompassing)

This dimension can be inputted into a “perpetual sustainability pyramid model”, three focal nodes encompassing, institutional, environmental and economical (Wang, J 2018), MEs have been explored under the premise of the impacts on socio-economic imbalances, heterogenous distribution of amenities and indirect debt shouldered by society as a result of a mega event developments (Gabriel Silvestre 2008). Emphasis on “holistic” emphasizes the notion of less intensive criteria, with a focus on more extensive agendas and consequences such as in World cup Qatar 2022 paper. Mobility as a whole fall under sustainability agendas in most city-based contexts, so the relevancy of this dimension is indispensable, in terms of the thesis itself, a contemplative-tailored framework analysis would be ideal for the World Cup 2022 in Qatar.

Ecological Dimension (AC 2)

A similar resonance is found in the ecological impacts on a city under the ME perspective. One paper explores and creates a quantifying mathematical model for ascertaining the levels of greenhouse gases used at all stages of an event (Parks O et al 2016), London Olympic Park. On the other hand, a more positive connotation (despite highlighting the negative factors as well) is formed around the possibilities of several city greening agendas being achieved via a horticultural exposition in Xi’an (Wang F.2019). Despite being an overly specialized perspective, both papers cover intensive research into the impacts and dynamics between transport, construction, procurement, solid waste management and other similar components. Whilst one framework addresses atmospheric pollution outcomes, the other observes geological biodiversity achievements as a potential byproduct of MEs, showing for an implicit representation of endless scenarios to explore, especially when considering transport legacies as well as resilience.

Social – Human Dimension (AC 3)

Social representation as a direct source of research is quite prevalent in ME frameworks, naturally as all levels of a mega event revolve around visitation tourist numbers as well as citizen characteristics and attitudes to the event itself. One of the prominent research methods coined for this aspect of MEs is referred to as “social exchange theory”, a simple profit and loss-based model applied to residents where if an event’s positives outweigh the negatives, the support from the residents will indubitably be obtained (Smith A. et al 2019; Waitt,2003). The paper explores the different facets of social dilemmas or “social fences” (Kollock, 1998), collective benefit versus individual sacrifice, usually in the public sector. Furthermore, whilst a ME might have positive outcomes despite individual losses, the overall outcome remains at a theoretical net positive. The paper ascertains the quality and revolving ideology of actors, warping community level benefits vs personal benefits. This aspect is a lot less tangible to explore under the thesis’ purpose, it’s necessary nonetheless to understand the importance of the citizen collective in both private and public sectors surrounding projects that could impact their lives, for instance mobility legacy projects.

Infrastructure and Governance Dimension (AC 4)

The most relevant in ascertaining what a mobility mega event framework would perhaps entail or potentially resemble. One such paper (David G. 2021) is based on the controversial development of a motorway extension in Glasgow for the Commonwealth games in 2014. Based on a qualitative study-based timeline, results showed development for the motorway extension M74 coinciding around the same time frame of Glasgow winning the bid for the games. Prior to the bid, procedural blockades and multiple public inquiries went against the project. The pertinence of this paper is how it correlates with the research topic, identifying short term mobility projects that have allegedly stagnated in all areas of policy and governance in the overall timeline of the project, but somehow regaining traction and approval for the sake of the mega event. In greater detail this dimension of framework explores infrastructure delivery under special circumstances that have sped up its development (ME) as well as other implications of the development itself once in the utilization stage. It is for this reason governance paper is combined with infrastructure here rather than separate dimensions, both facets represent the core of the thesis framework analysis, mobility. Both dimensions are converging in interactions, and any action taken by either dimension has a direct impact on the opposing dimension as well as the subcomponents, as shown by the M74 controversial development, policy and delivery. The governance framework (F.S.O Santos et al 2022) also debates the interorganizational and organizational governance content behind mega events and seeks to create an adapted criteria system to replicate and apply to future mega events, specificities aside the approach of research is quite similar to the majority of the frameworks explored in terms of framework analysis and theorem construction.

Other acknowledged sub dimensions (AC#)

Addresses a multitude of specialized areas that didn't hold much relevance for contributing to the conceptual framework of the thesis, hence the non-defined hashtag. The sheer level of variety in complexity within the mega event frameworks is the purpose of this dimension, a creative node that portrays an unquantifiable set of paths to latch on to. An additional layering for analysis, this hashtag could represent "special cases", in the conceptual framework.

Knowledge sharing systems (KS) (Adaptive- "Binding" Element)

Based on compilations so far, it is certain that the creative/adaptive element stems from the diversity in the background of disciplines at the root of each paper. Whilst knowledge sharing might commonly be utilized for organizations and businesses, the principle meaning behind the notion remains relevant. KS can be interpreted as a large collective exchange of ideas, disciplinary approaches and data transfer, for the sake of creating new solutions and innovative implementation of policies (Liu and Li, 2018, p.1331). These elements are common amongst the frameworks, not just in their specialized dimensions, hence be used to bridge dimensions explored so far as well. For example, the paper on greening of spaces being achieved under a mega event perspective, "binds" two separate disciplines, environmental planning being one side and the other being tourism planning and construction for instance. Another example but in

terms of bridging entire dimensions, would be governance and infrastructure hence, infrastructure delivery.

Each framework interpretively can be considered as exploring and constructing theories via knowledge sharing systems to see what the net threads of influence could be obtained, by revisiting and re-focalizing around a central node, in this case MEs. Furthermore, the idea is to adopt this same principle in the research topic to approach mobility and MEs by combining it with different disciplines, then observe the processes categorically under each dimensional framework and seeing its contribution or lack of, to resilience, hence the innovative element.

2.1.3 Monitoring Analytical tools for a "mega event"

The previous frameworks, showed different approaches to "analyzing" the visioning, planning and execution stages within a mega event. Monitoring component presents literature that highlights different commonalities in gaps within the development stages of a ME, so a type of "assessment" of MEs. This is a heavily specialized form of framework in literature, so the model has limited exposure in theorems and is models for assessment perspective. Take for instance figure 2, monitoring 2009 Kaohsiung World games by (Ma Shang-Chun et al. 2010). The purpose behind it was to hold mega events accountable for being one dimensional in their profit and loss perspective, and the importance of justifying the ends by holding onto only the economic benefits that come with such a development. Thus, the creation of a possible new framework in figure 2, for creating a more sustainable approach criteria in the development stages was proposed. However as shown previously, over the past decade, the dimensions have branched out substantially within the proposed dimensions and specialized, with focus on an amalgamation of different disciplines and outcomes assessment. In a way each framework mentioned previously, portrays its own scale of what should be explored and emphasized. This shows the exceptional analytical nature of these frameworks, how monitoring has changed over both spatial and temporal scales in different contexts, leading to divergent pathways to observing the same contextual implementation but through different outcomes assessment. An example of an evolved direct monitoring process is shown by a paper on opinion and sentiment analysis through twitter on the Milan world fair 2015 (Anna Calissano et al. 2019). Whilst the paper is a statistical classification, it shows shifts in technology and the growing usage for digital social space and using it for ME data. Now the focus of frameworks is more geared towards community reactions and implications, emphasizing the dissonance between the event and the citizens. A method that monitors stakeholder opinions collected completely online. The varying levels of observation and accountability show the evolution of the criteria mix/focus and the innovative assessment techniques, economic dimension has fallen back whilst there is more of a focus on social aspects. Next chapter could be considered as an assessment framework but intertwined with other critical urban elements.

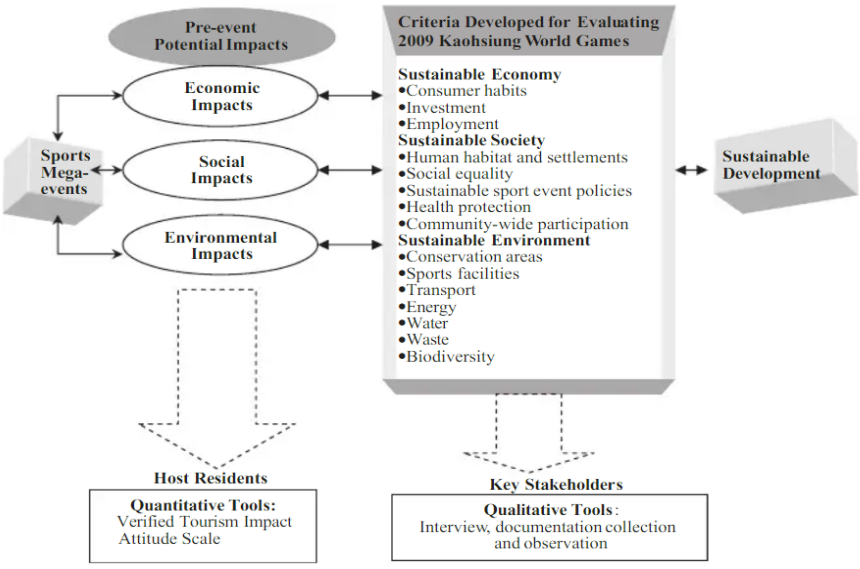


Figure 2 Framework for monitoring during the planning stage for the 2009 Kaohsiung World Games.

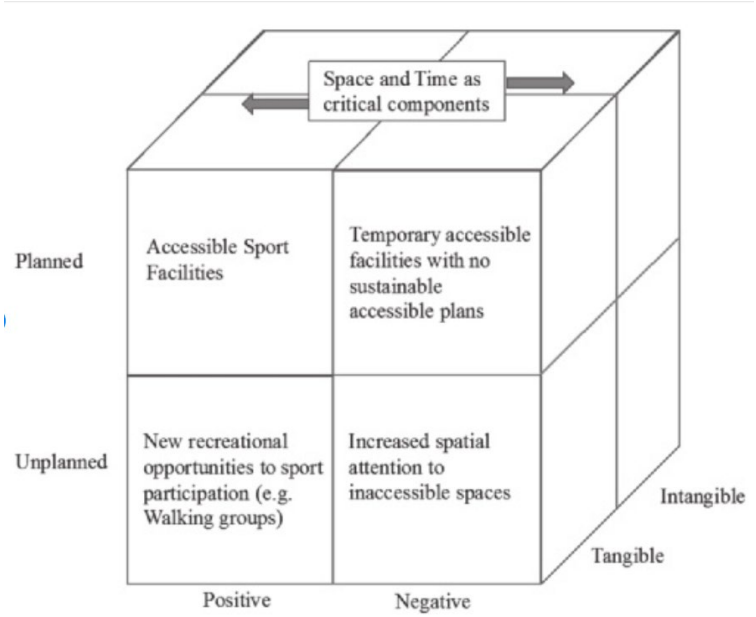
Figure 2: Example of a framework for assessment in MEs, Ma Shang-Chun et al. 2010

2.1.4 How do we define or measure legacies? – Legacy Delivery

Defining legacy since the early 2000s and late 90s, has taken multiple forms of conceptualizing, as portrayed in the introduction chapter. But throughout literature the most prominent legacy defined models were initially proposed as a conceptual "cube" (Preuss 2007) and as a "legacy radar" later on (Dickson et al. 2011). While monitoring tools fall under the development aspect of a mega event, the legacy cube and radar models focuses more on the impacts of execution and post-execution stages of a ME. The legacy cube essentially observes three focal nodes in legacy, "planned/unplanned, positive/negative and tangible/intangible, as well as time and space (Preuss 2007, Figure 3). Additionally, legacies usually mean creating "structures" or "processes" for future benefit long after the event has already occurred (Petros I. 2010), these can be classified further by the legacy models. Since theorems constantly evolve with time, this proposed model went through further debate and modifications with the addition of a new dimension and scale in the Dickson, Benson and Blackman 2011 paper on evaluating Olympic and paralympic legacies, which involved the following scales: types of costs, ranging from financial to opportunity. In 2012 another extremely cited paper Leopkey and Parent's (2012) was done on the debate of economical legacies but with an emphasis on adding more inclusive disciplines to the model some examples ranging from political to psychological to cultural. According to a 2016 PhD paper done by Jordan Dawson, on understanding the outcomes of mega events, the sixth-dimension aka "cost" presented in the Dickson 2011 paper should be considered as a "theme" rather than a "dimension". Moving past older papers, a recent paper (Byers T & Hayday E 2020) that holds substantial relevance especially under the premise of "legacy delivery" under MEs, defines the concept as a "wicked problem". Such categorization is extremely pertinent when exploring resiliency and legacies, as there is a transformability element to legacies in general, as

transformations often have unpredictable / undesirable outcomes, a non-linear cause and effect (Sediri S et al 2019). The Byers paper critiques the legacy cube for being overly focused on classification and typologies rather than explaining the process, such as why the outcome resulted in a negative or positive, these models are purely indicative. That is the purpose of re-conceptualizing the cube, but rather than focusing on definition, phenomenon analysis by underpinning a wicked framework on legacy delivery. Furthermore, the paper as well as other credited literature, highlights the motivations behind such legacies (in sporting mega events) within five areas; economic benefit, urban revitalization, nationalist pride, higher levels of participation within the sports sphere and global competitiveness / soft power (Byer et al. 2019; Grix et al. 2018). Additionally, it is indicated that most cases for planned legacies, are set in motion by a "coalition of beneficiaries" behind the five agendas.

Figure 3: Preuss 2007 Model and Dimension of "Legacy cube"



These agendas show that there is somewhat of a commonality between different host cities under legacies and their developments despite the vast complex implications that may follow, the same principle could possibly apply to Milan 2015 & Shanghai 2010. Coming back to the research topic of mobility legacies, the Byers paper offers suggestions to researchers about the process of methodology and thinking that should follow. Whilst the focus of this thesis is less on transport specificities, the suggestions given by Byers 2019, is a developed "explanatory" indication of what to research for within mobility projects for ME. Applying similar approaches in stages across Milan and Shanghai in secondary data as well as other cities that have hosted events. This will allow for better operationalization, but also incorporate better relevancy of results when stitching wicked based components to what to include in the mobility legacy framework structure.

2.1.5 Mobility / Transport legacies - Existing frameworks

The final crux of the literature groundwork; the type of legacy being explored. Through trial-and-error scholarly research (specifically current research on mobility legacies) for just the theory itself, preliminary observation shows, most literature refers to this concept as "transport legacies" and not "mobility legacies", thus substantial amount of literature was not presented in repositories until changing the "label type". This is important, as the scope changes based on whether one explores "transport delivery logistics" versus overall mobility which according to UN Habitant is a "*key dynamic of urbanization, and the associated infrastructure invariably shapes the urban form.* There is the gray area of underground papers that might analyze their frameworks with the same perspective but may not be available to the public, however it is indicative that the current shared information on this specialized "difference in classification" under mega events is limited in nature, as most papers underline their framework analysis under "transport legacies". This corresponds to "infrastructure delivery", a lot more specialized, and the impacts explored are specifically communal benefits, harsh realities, economical burdens / investment models for the transport, an example of this is covered in one paper by "Pereira, R. H. M. (2018) on transport legacies and the redistribution of accessibility to urban destinations for Brazil"**.** To further add, the concept of transport legacies is also limited in research, and most analysis is applied to Rio Olympics or Olympics in general with critical feedback (Malhado A, Araujo L 2017).

Mobility legacies interpretively is to imagine an overarching framework that denotes multiple dimensions extensively rather than intensively, such as a few from the adaptive complexities under mega events explored in the earlier chapters, this way the combinations and scope utility that can explored are vast, whilst existing literature shows a methodological creativeness implemented in their research, of which can be perhaps be applied/utilized to the scope of the thesis for understanding the mobility legacies in different cities.

Transport legacy framework models – 2012 & 2016 Olympics

A statistical model on transport legacies "logical and observant" - 2021

The focus of the research paper was on a case study for transportation issues based on the 2016 Rio Olympics, discussing the negative implications on transportation issues for host city by Ribeiro, T. and Cunha de Almeida, V.M. (2021). The framework was focalized around "public transportation issues" connected to 5 dimensions; planning, infrastructures, information, insecurity and mobility. As mentioned prior, mobility can be perceived in a variety of different combinations, in this case it was "urban mobility" and as a sub component, so difficulties, service quality on transports and system complexities (Ribeiro T et al 2021). The focus of the research is between these dimensions and the "citizens", debating the relationship coefficients between not just developed infrastructure but on existing transportation flaws having a greater impact on residents during a mega event.

A speculative model on transport legacies “visioning and adaptive” - 2010

The research paper addresses the previously iterated importance of the adaptiveness, processes and cultural shifts of time arounds legacies, and the necessity to integrate a more holistic perspective to achieve a more sustainable society through transport legacies by predicting impacts for the London 2012 Olympics (Ieromonachou Warren and Potter, 2010). The most important dimensions of the legacy and intended impacts were for the social regeneration of East London. The framework itself is modeled more around local communities and job creation with a strong outcome perspective on economic, social, and environmental growth underlined with a 50-year timeline segregating different focuses.

2.1.6 Conceptual Research Framework

Based on the components collected so far in the literature review, the goal is to use areas of the major interests discovered in literature and conceptualize it, stitched together under mobility legacies. Thus, using that obtained knowledge create a, “hypothetical observer framework”, an interpretative model created based from the most relevant literature areas explored and logically adapt it to the scope of the thesis. Naturally, this is not definitive, it’s a manner of observing the planning processes, and for it to perhaps evolve into a more accurate framework towards the end, based on data collected (abundancy of information under each dimension), hence hypothetical, or finding similar dimensions but not mentioned it in the starting framework. The dimensions (ACs) chosen are indicatively “generalizing”, but the sub indicators measured will be a lot more specific (focus), remaining explanatory but with hints of experimenting in data collection focus. The independent variables will be the framework dimensions and mega event, whilst the dependent variable will be mobility legacies and resiliency.

Contextualization / Validation: - The purpose of choosing the cities to explore under the framework scope

Based on surface level literature and knowledge, all three cities have been observed to have significant public transformative mobility leading up to a mega event, especially in Milan and Shanghai, making them viable choices. However, it is also necessary to consider the political systems (Byers 2019) behind mega events, by viewing these transformative changes with specific focuses, it could perhaps be possible to understand polarizing political agendas amongst these three examples as well, which could also represent the wicked problem component. By integrating this component into the framework, the results would be a lot more meaningful as national agendas are major drivers in the ME planning processes, in transport and infrastructure legacy context, the observations would be “territorial and tangible”.

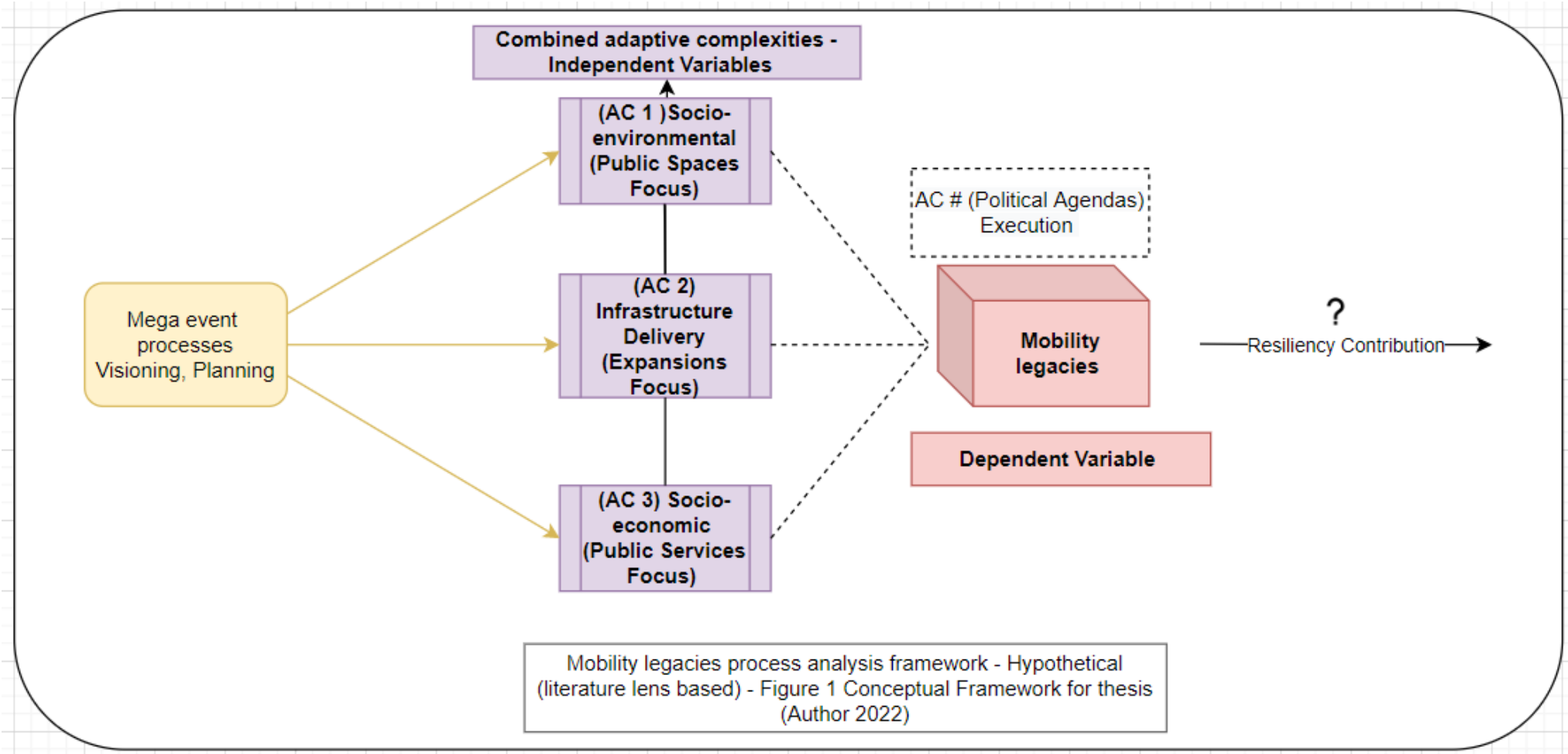


Figure 4, Adapted / Inspired stitched structural model from papers; (Ribeiro T et al 2021); (Ieromonachou Warren and Potter, 2010)

Chapter 3 – Research Design

3.1 Description of the research design

3.1.1 Qualitative Data Collection – Strategy Overview

As explained in the prior chapters, mega events hold significant transformative power, of which many have been analyzed and critiqued across a multitude of cities. Transport and Mobility legacies have however received less exposure, and the focus revolved around the challenges involved rather than specifically the processes. Thus, based on these notions; a.) a significant amount of time has passed in analyzing MEs, b.) MEs have a plethora of secondary information c.) transformative potential that impacts the urban fabric and its citizens. The core relevancy of the thesis will be based off secondary research and utilize extrapolated information via two research method components: framework and document "extensive" analysis. The secondary data will be a lot more ambitious in scope and collection as the goal is to be as thorough as possible through innovative secondary extrapolation.

3.1.2 Secondary Cyclical Data Extrapolation

Framework Analysis

The basis of the literature review revolved around identifying previously analyzed frameworks to conceptualizing a stitched dimensional framework with the purpose of identifying certain processes through qualitative understanding. With this intention, this method of analysis is extremely pertinent, the paper by Laurie J. Goldman 2021, pg 2061 and a range of other credited sources in the paper, "*The Qualitative Report"* elaborates that the goal of this form of analysis is to *"identify, describe, and interpret key patterns within and across cases of and themes within the phenomenon of interest."* This allows for a more flexible analysis in terms of range of areas explored and combinations. All steps involved, coincide with the operationalization as well as employing this method across different cases which are the cities and comparing the different approaches of planning processes via dimensional understanding.

Document Analysis

A method of collection that still remains to this day, underutilized in qualitative research, as well as the literature surrounding it remains to have limited exposure based on an extremely recent study (Morgan Hani. 2022 pg 64). Consists of collecting pre-existing data in the form of books, articles, and other documents, which can also be considered equivalently adequate when compared to a researcher collecting data from interviews. Furthermore, the data through documents allows for higher stability of information, as researchers can un-intentionally influence participants (Merriam & Tisdell, 2016). Interviews also are difficult when trying to understand specific phenomenon's being investigated since the questions may not be adequate, this flaw can be correlated with the experience of the researcher, which as the author of this thesis, is undeniable.

Thus, this argument was necessary to include in the research building. Access and time are extremely important for the timeline of this thesis, for which document analysis is undoubtedly an effective option, as there is a wide array of qualitative data on the dimensions chosen. There are also four factors that need to be considered when conducting this form of analysis in choosing documents (Flick 2018); a.) authenticity, b.) credibility, c.) representativeness d.) meaning. This will be the outlook employed when searching for any documents relating to mega event planning amongst the cities chosen to increase validity and reliability. These documents could be master plans, key notes, heritage plans, urban plans, etc. Documents published under 3-4 years before the mega event taking place, in the event year and as well as further triangulation of observing scholarly literature conducting outcomes assessment a few years after the mega event.

3.2 Data analysis (Use of ARC GIS and other mapping software)

Information processing (IP) (theory triangulation) and Spatial understanding (data triangulation) (SU); these represent the ideal chosen cyclical method of combining document and framework analysis as well as map analysis, the 3 fundamental components/methods for research extrapolation. For compiling data, either Atlas Ti or manual coding will be utilized to collect relevant indicative information (metro constructions, public transformations etc). Chapters will be segregated by city, with extensive analysis on spatial transformations around the major points of metro extensions (km). The focus will remain strictly around most prominent metro developments at the time for the mega event to adapt to the time constraints of the thesis. Table 1 explains the data analysis process, as well as choice of information and Table 2 is the classification of variables. Since the data is qualitative, a table will be presented for each case study, google earth historical view option will be used to conduct time based spatial analysis to generate more field-based spatial understanding of the three independent variables. Deeper information to the lines and spatial transformations will then be fulfilled with document analysis through IP. Other websites such as google maps, major tourist guide sites with the most internet traffic and forums will be used for more accurate results.

Research Component	Execution of Research
1.) Investigating the most prominent transport related development under key words "metro or tram" developments.	This entails - Master Plan (prior to event) - Mega event plans - Literature analytics (Mendeley & Google Scholar) ranging from past to present if relevant - Other publications by organizations involved - Articles (most archived form of accessible information) – Dating around the event - Interview transcripts (extrapolated) ***(General application for document & framework analysis)***
2.) Diving Deep into the planning process/ timeline for the metro or tram identified to have been completed	- Finding maps of the network, before and after. Km coverage, extensively showcase and spatially observe & explain the major "stops" on the line - Construct a basic timeline for the development - **Obtain information of "planning integration frameworks" of steps involved in metro or tram construction** - Explore challenges involved, e.g., stagnated development
3.) Understanding public space typology in relatively "close proximity" to the metro or tram development "prominent or large-scale changes"	- Usage of maps, see google maps or maps made by organizations / specialists - Photos of the line (if available), and around it - See public space connections with chosen metro or tram development in MEs in scholarly literature - Explore challenges involved
4.) Understanding public service typology around the metro or tram development "prominent or large-scale changes"	The same parameters as public spaces - See public service connections with chosen MEs in scholarly literature

Table 1: Research Matrix for validity (Author, 2022)

Table 2: Operationalization Table – Extensive Analysis

Concept	Stitched Dimensions + Focus	Indicator Names	Indicator Description	Sources	Gathering method (Qualitative)
Mega event Mobility (Built-environment) Processes – Visioning Planning Execution (Independent Variable) **Milan + Shanghai Focus, for added diversity and validity general findings for other cities within these dimensions as well.**	1-Socio-environmental (Public - Private Spaces)	1.1 Major Public Spaces (PS) created / development 1.2 Major Semi Private Spaces created (SPS) 1.3 Major Private Spaces 1.4 Public Space Lost	1.1 Creation of spaces to be used by the public and constructed leading up the mega event 1.2 Creation of gardens or courts for example 1.3 Creation of residential plots 1.4 Any transformation of original public space	Comparing master plans, key-notes, academic journals, satellite maps selectively compiled (time-based), mega event promotional websites.	
	2-Infrastructure Delivery (Transport Expansion)	2.1 Metro constructions and new extensions (km)	2. New projects with new lines constructed leading up to event. (Just the expansions, not observing overall preexisting network) ***Must be completed by the event (applied to (1 & 3)**		Desk Research (Framework and Document Analysis) + Interviews
	3-Socio-economic (Public Services)	3.1 Major Public services created 3.2 Major Public services lost	3. Public service can also mean transport, the focus here is commercial areas added as a result of a mobility expansion.		

Mobility Legacies (Dependent Variable)	4-Main Similarities & Differences in Overall Focus based approaches (Based off IVs data)	4.1 Public Space Processes 4.2 Transport Expansion Processes 4.3 Public services processes	4. Similarities and differences of priorities found amongst the 3 dimensions. (Planned or Unplanned) – *political agenda comparisons* Resiliency contemplative chapter will utilize these components' findings	Results from independent variables research as well as additional conclusive based literature	

Important classification parameter: All 3 dimensions are interlinked, so public spaces and public services focus will revolve specifically on significant spaces/services lost, created or untouched around a transport infrastructure expansion.

3.3 Expected Challenges and limitations

Most of the research will be backed up by secondary data and the use of multiple mapping mediums in understanding the spatial configuration of the metro lines at the time of development. As the method is to go back in time and understand the planning processes, a lot of intricate details may be overlooked for the sake of adapting to the time constraint of the thesis. Furthermore, as it is an "extensive" analysis, simplification of data will be prioritized, and selection criteria will be a lot more streamlined for the purpose of gaining the most depth in results from selective methodology. As the subject of the thesis being specific already, most of the choice of analysis stems from staying realistic to the purpose and goal of the thesis core. Challenges may range from finding the right time-specific documents as well as the additional limitation of working purely digitally and whether the scope is ambitious or not remains to be seen.

Chapter 4: Presentation of Results Shanghai, Milan, Qatar Mega event - led Metro Development (Spatial Understanding)

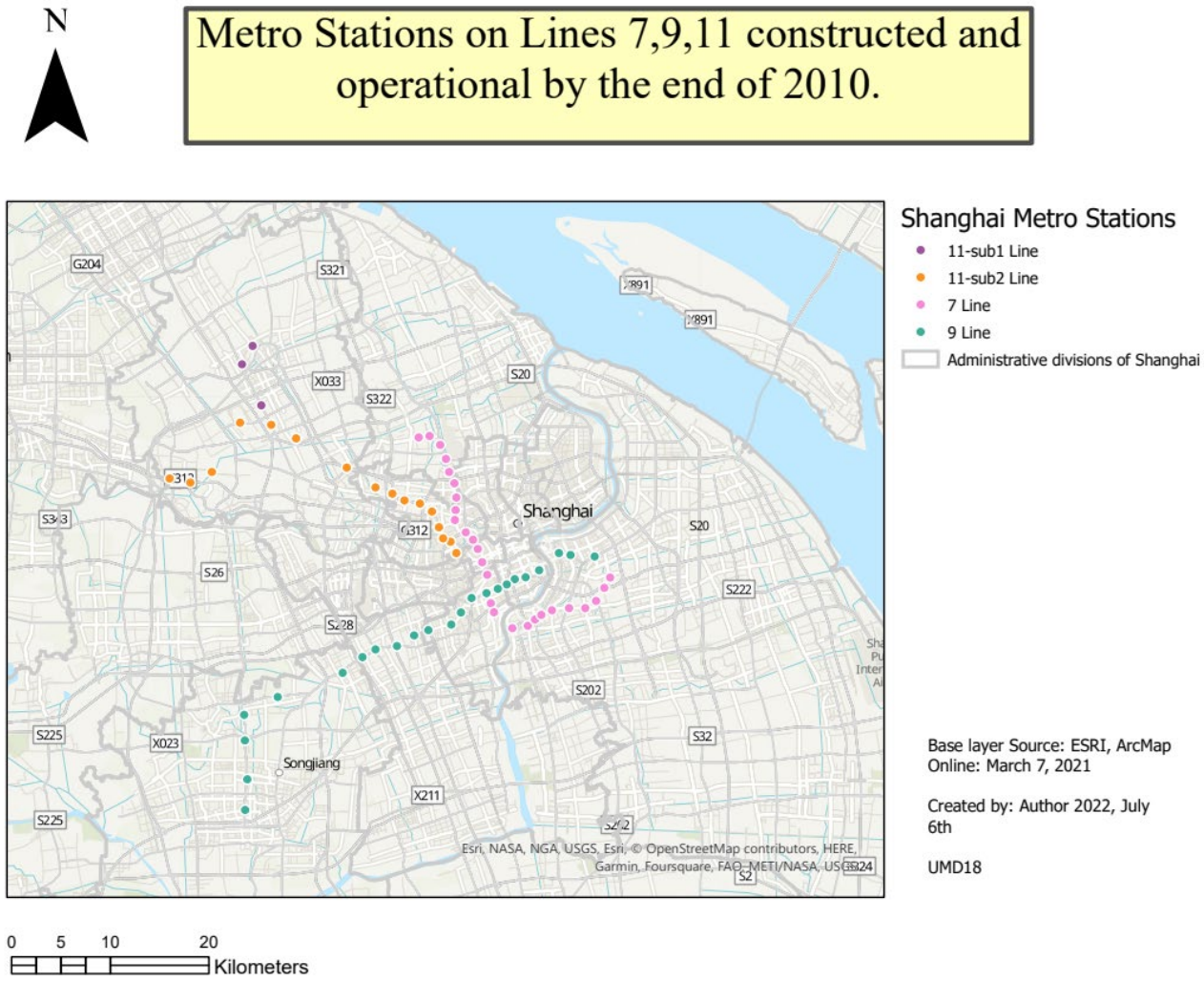
Shanghai Expo 2010

The collection of results obtained from the research matrix, the most prominent development for metro construction "finished by the event" were the three lines 7, 9 and 11, some literature mentioned other lines, but the focus was to dive into the most ambitious lines developed and in closest proximity to opening year of Expo. The thematic of this sub chapter will firstly present the spatial layout of the three lines across Shanghai through various mediums and understanding the planning process, then extrapolating any form of "spatial restructuring" occurring through public services and spaces around prominent stations that the lines cover to further reinforce the planning complexities.

4.1 A study of Metro Lines 7,9, 11 Results

In terms of operationalization, one criterion was found missing in identifying which stations on the line to specifically explore with public spaces and services as well as adapting to the time constraint. Thus, based on findings, the best criteria for station choice were whether it was underground or elevated. Most of the 3 lines and their stations are located underground with few stations that are above ground, making the elevated stations the best choice since the changes on the overall built environment is undoubtedly easier to link in comparison to underground and relevant for this case study.

Figure 1: 7,9,11 metro line map made in ArcGIS Pro



This map (selected by attribute and modified) shows the overall metro line development by opening date, until the end of 2010, the purpose was to first identify the total city coverage by singling out the lines and then selecting by attribute for only the stations that were operational within the year of the Expo.

Adapted Attribute Table Results (for map above) – Timeline Creation – Modified/Compiled by Author 2022

2009-2010 – Spatial Transformations

Station - Route - Year								
Shanghaidaxue	7 Line		Shijidadao	9 Line		Longdelu	11-sub1 Line	
Nanchenlu			Shangchenglu			Caoyanglu	11-sub1 Line	
Shangdalu			Xiaonanmen			Fengqiaolu	11-sub1 Line	
Changzhonglu			Lujiabinlu			Zhenru	11-sub1 Line	
Dachangzhen			Madanglu			Shanghaixizhan	11-sub1 Line	
Xingzhilu			Dapuqiao			Liziyuan	11-sub1 Line	
Dahuasanlu			Jiashanlu			Qilianshanlu	11-sub1 Line	
Xincunlu			Zhaojiabinlu			Wuweilu	11-sub1 Line	
Langaolu			Xujiahui		31/12/2009	Taopuxincun	11-sub1 Line	
Zhenpinglu						Nanxiang	11-sub1 Line	
Changshoulu						Malu	11-sub1 Line	
Changpinglu						Jiadingxincheng	11-sub1 Line	
Jingansi						Baiyinlu	11-sub1 Line	
Changshulu		5/12/2009				Jiadingxi	11-sub1 Line	31/12/2009
Zhaojiabinlu						Jiadingbei	11-sub1 Line	
Donganlu						Longdelu	11-sub2 Line	
Longhuazhonglu						Caoyanglu	11-sub2 Line	
Houtan						Fengqiaolu	11-sub2 Line	
Changqinglu						Zhenru	11-sub2 Line	
Yaohualu						Shanghaixizhan	11-sub2 Line	
Yuntailu						Liziyuan	11-sub2 Line	
Gaokexilu						Qilianshanlu	11-sub2 Line	
Yanggaonanlu						Wuweilu	11-sub2 Line	
Jinxiulu						Taopuxincun	11-sub2 Line	
Fanghualu						Nanxiang	11-sub2 Line	

Longyanglu	**5/12/2009**		**Malu**	**11-sub2 Line**	**31/12/2009**

Table 1: First stage of openings, Planning stage for World Expo 2010 of 7,9,11. Source: Arc ESRI data

Line 7 – 26 stations opened along the line on 5th December 2009, From Shanghaidaxue to Longyanglu

Line 9 – 9 Stations Opened up on 31st December 2009, From Shijidadao to Xuijiahui

Line 11- 26 stations opened up on 31st December 2009, From Longdelu to Malu

Table 2: Second Stage of Openings; Execution Stage of Expo 2010-year, Source: Arc ESRI data

Station	Route	Date						
Meilanhu	7 Line	28/12/2010	Yanggaozhongu	9 Line	7/4/2010	Jiadingxincheng	11-sub2 Line	29/03/2010
Luonanxincun						Shanghaisaichechang		
Panguanglu						Changjidonglu		
Liuxing						Shanghaiqichecheng		
Gucungongyuan						Anting		
Qihualu								

Line 7: 6 stations opened along the line on 28th December 2010, Meilanhu to Qihualu

Line 9: 1 station opened on 7th April 2010

Line 11: 5 stations opened on 29th March 2010

Elevated stations

By the end of 2010 based on the tables, lines 7,9,11 had 73 operational stations in total that had opened up. However, the focus was to identify and analyze the spatial surrounding of "elevated" stations, since it's above ground and better contextually to analyzing public spaces and services around them. Below is a table with elevated stations and their respective lines. For line 9, the elevated stations opened up in 2007/2008, based on findings it is also one of the longest lines in km running through Shanghai (the stations aren't included in the tables above), so the development was a lot more gradual and earlier compared to its sibling lines, nonetheless, construction was rapid year by year.

Station	Line
Luonan (Xincunlu)	**7**
Meilanhu – Meilan Lake Station	
Songjiang University Town	**9**
Dongjing	
Shesan	
Sijing	
Anting	**11**
Jiading North & West (2)	
Jiading Xincheng	
Malu	
Xiuyang	
Baiyin Road	
Shanghai Automobile City	
Total: 14 elevated stations	

Table 3 – Criteria for selecting stations Compiled by Author 2022

The final count is 14 in total (all operational by the end of 2010), so these do not include any expansions that followed as those are separate to the expo itself. However, focus wise, 14 is still a large number of stations to analyze, so the goal is to assess at least 2 per line, 6 to analyze in the spatial environment.

Out of the 6 stations chosen, present date all expect Meilan Lake station have been permanently closed (most likely temporary stations built for the expo – Lingyue Li 2019), which is the case for all of the line 9 stations and some line 11 stations as well. However, in the context of the Expo 2010, these were all fully operational and were initially built for the master metro plan 1999-2020. For public spaces, based on google earth differences in landscapes and other promotional sites. Below shows two maps to show an example in the change in environment for a type of public space for instance, in the span of one year alongside line development.

*All following satellite imagery compiled by Author 2022 (Google Earth Pro, Google Maps Street View – Time based)

Following pages show how the research was conducted in terms of spatial understanding any significant changes to the public services and spaces within the same time as the opening and pre-development to the Luonan station, same method applied to all the other stations

Elevated Stations 7,9,11 & Public Services & Spaces

Photo.1: March 2009, Development stage for Luonan Station (1.63 km frame)

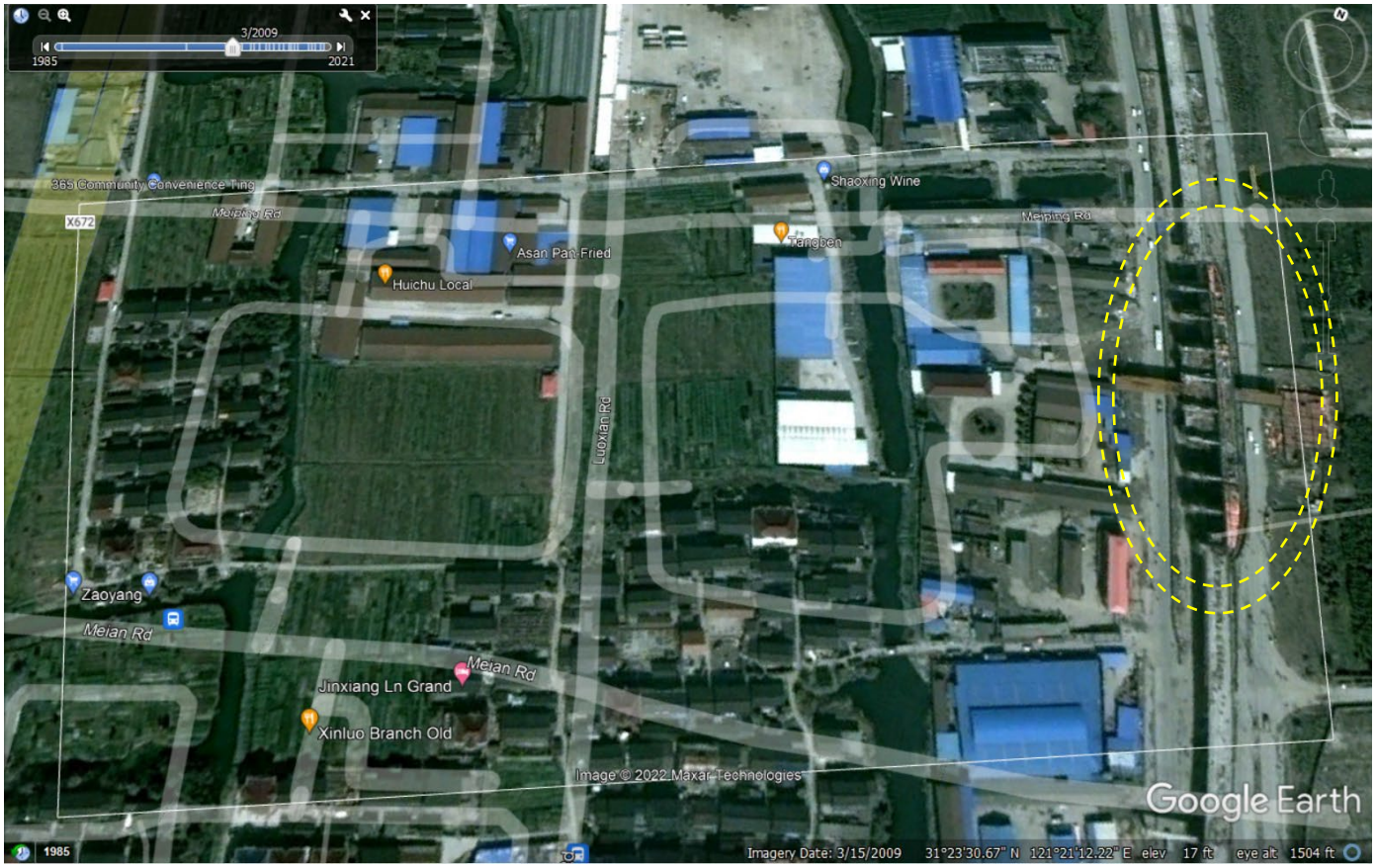


Photo. 2: August 2010, Green circle is the Luonan Station Opening (1.63 km frame)

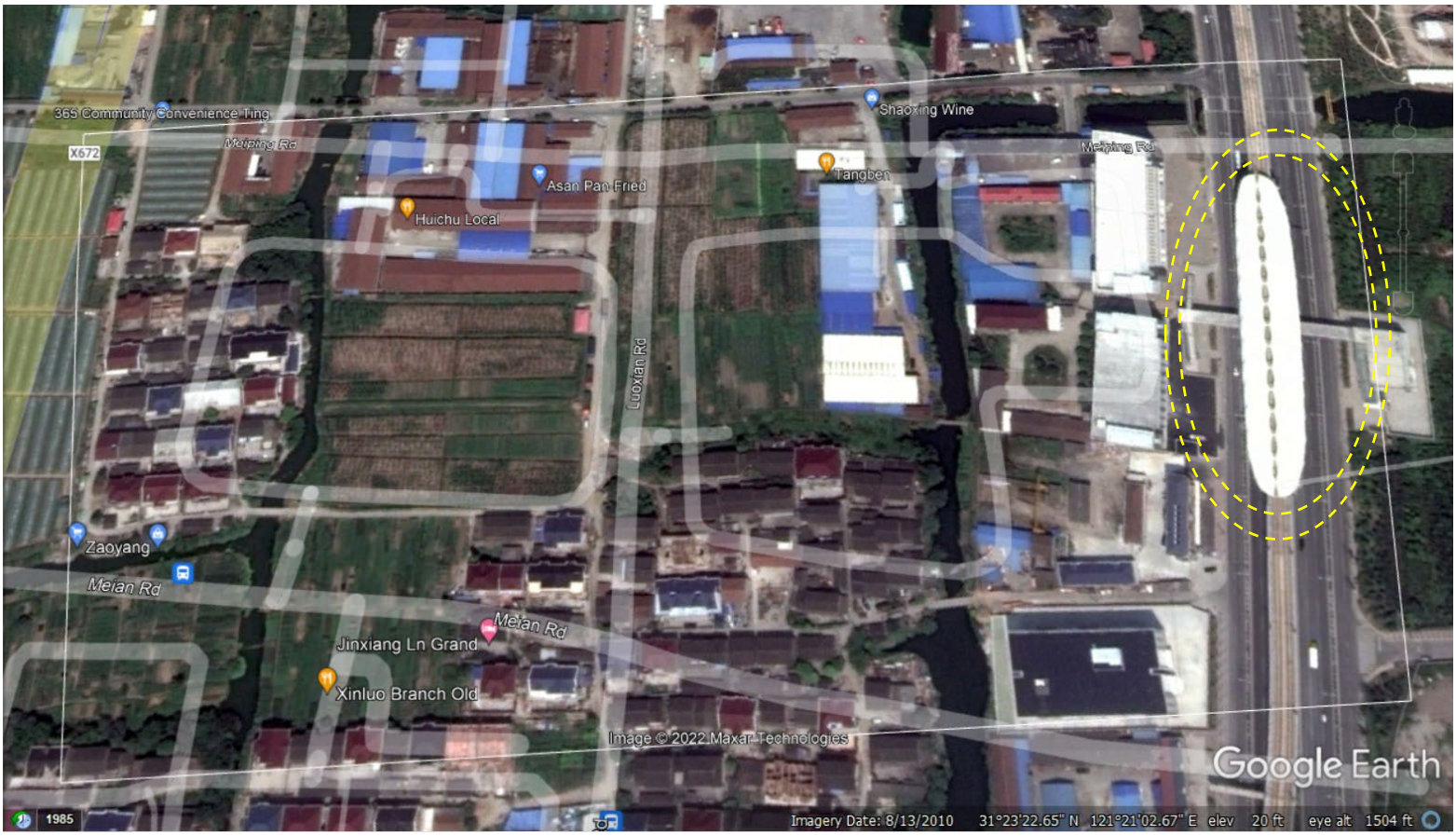
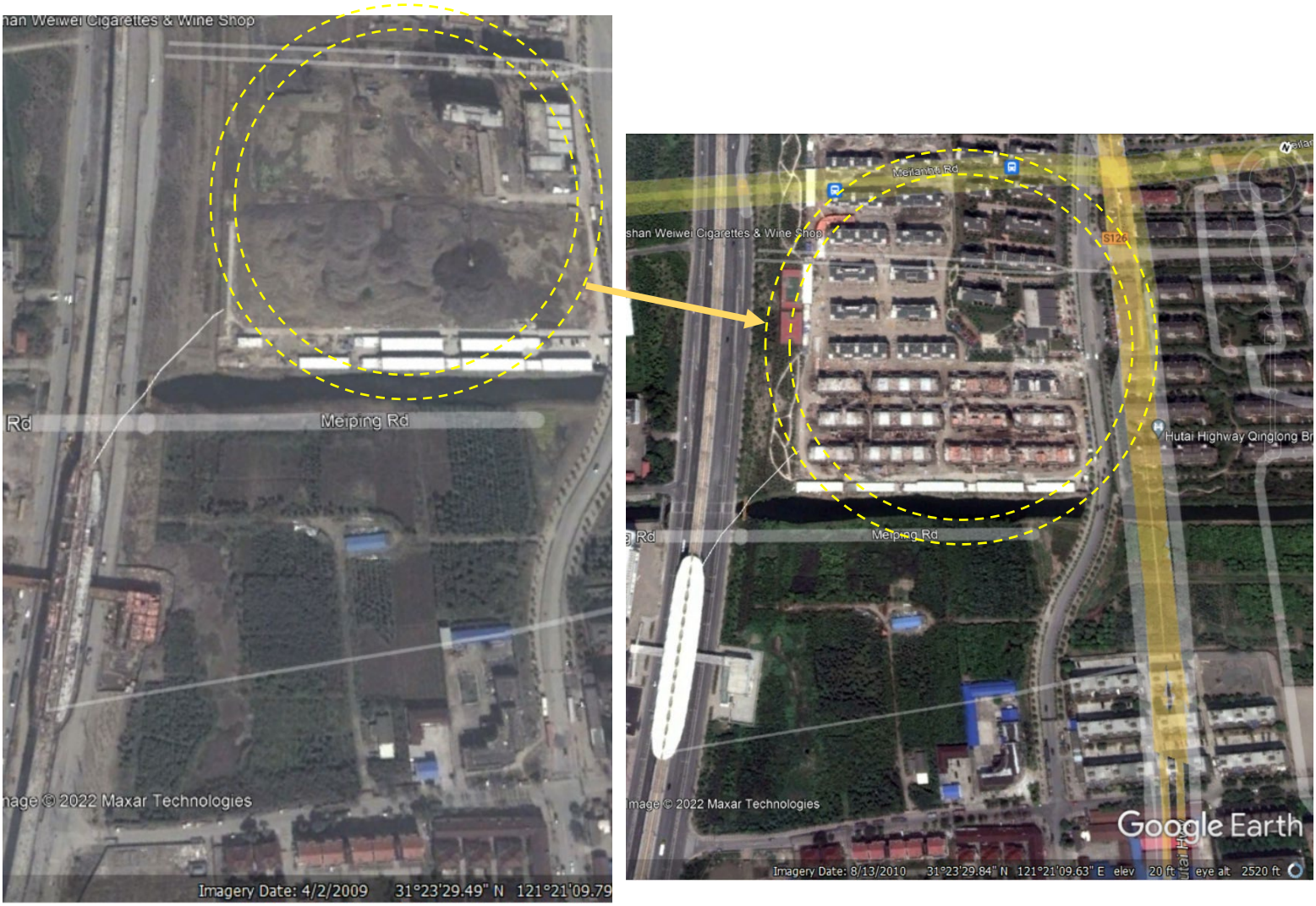


Photo.3: 1 year comparison of apartment complex with greenification of some spaces, planning to execution stage of Luonan Line 7 – 120 meters away



Side by Side Comparison Spatial- Temporal Maps of the other Stations (2009-2010)

Photo.4: Meilan Lake Station

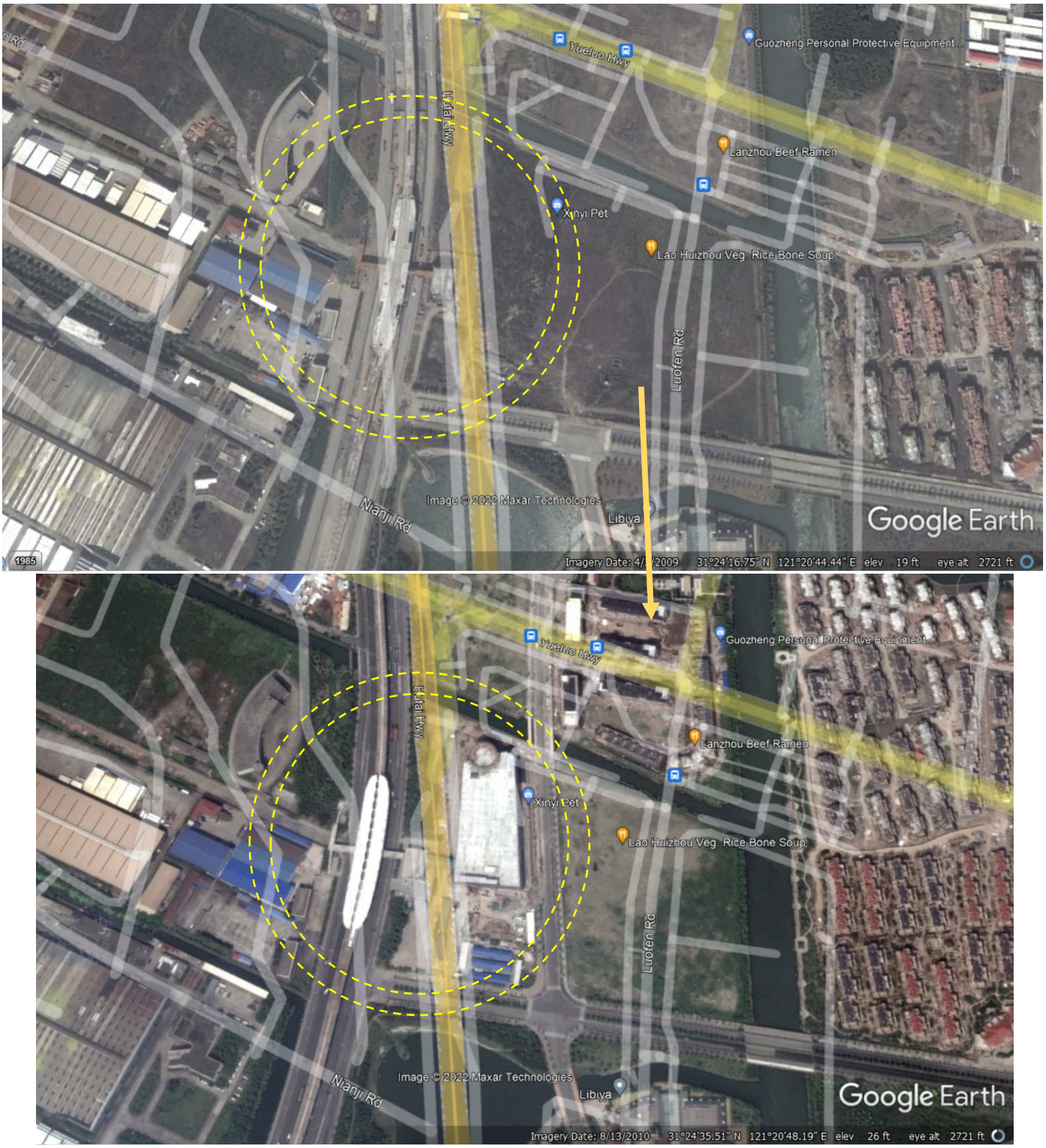


Photo.5: Songjiang University Town Station

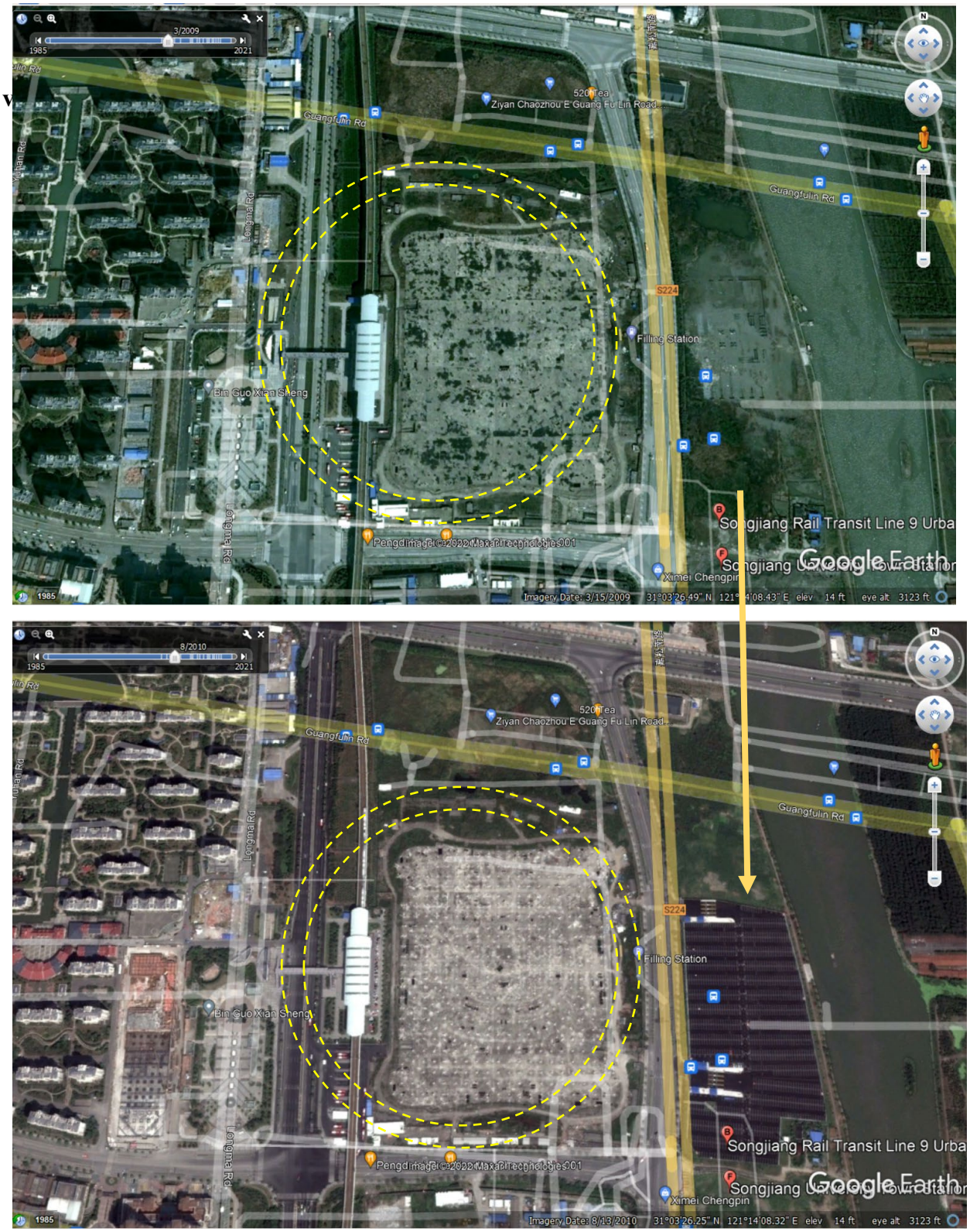
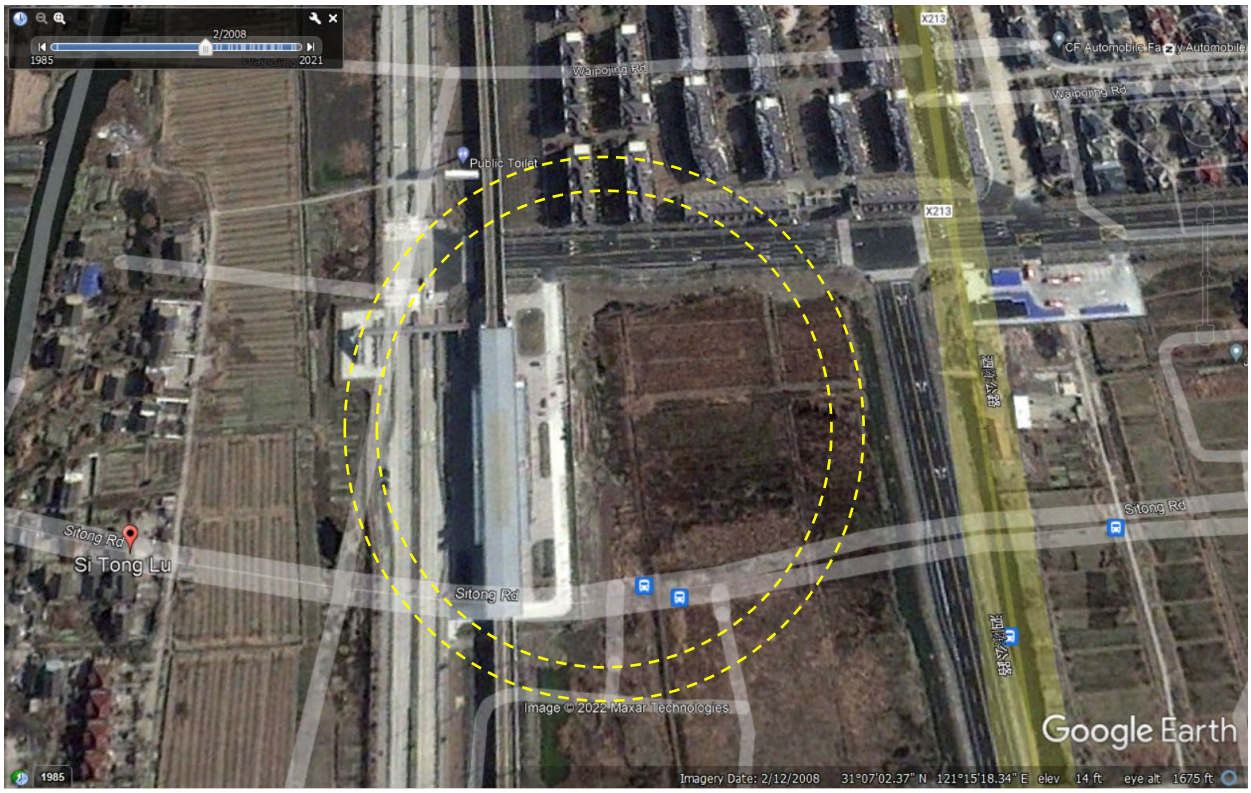


Photo.5 Sijing Station



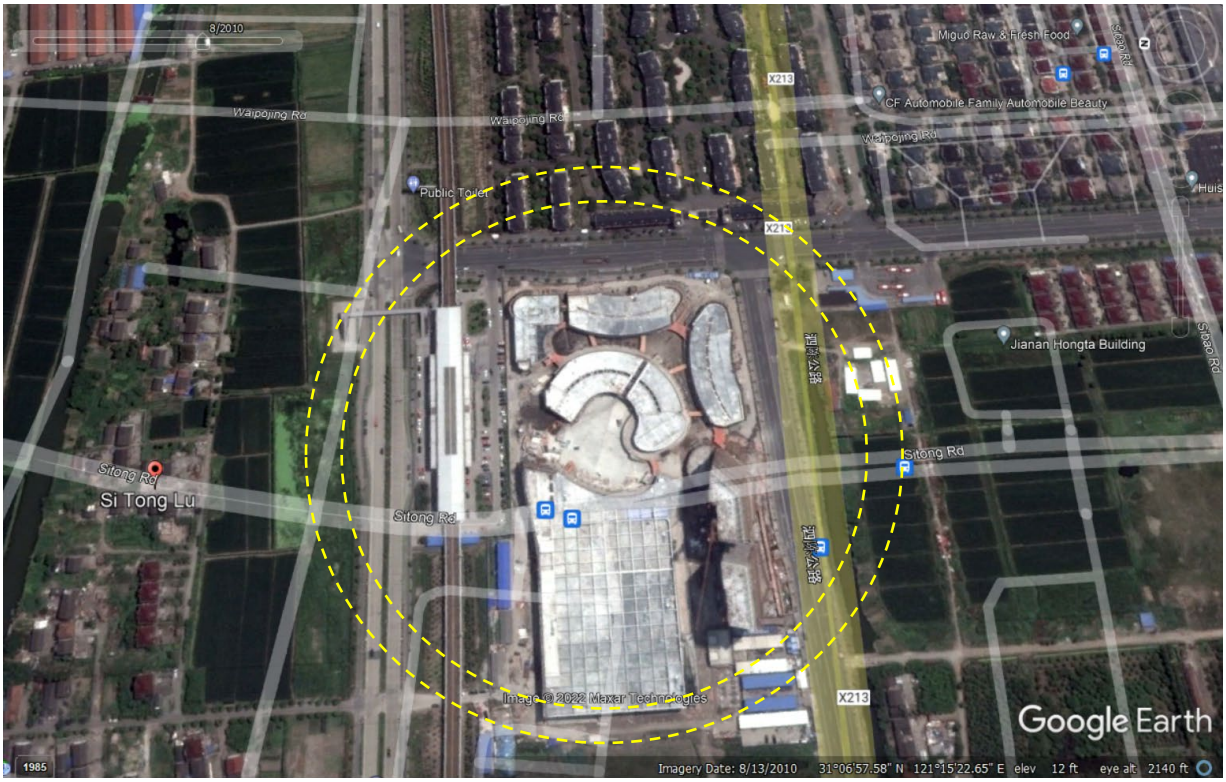
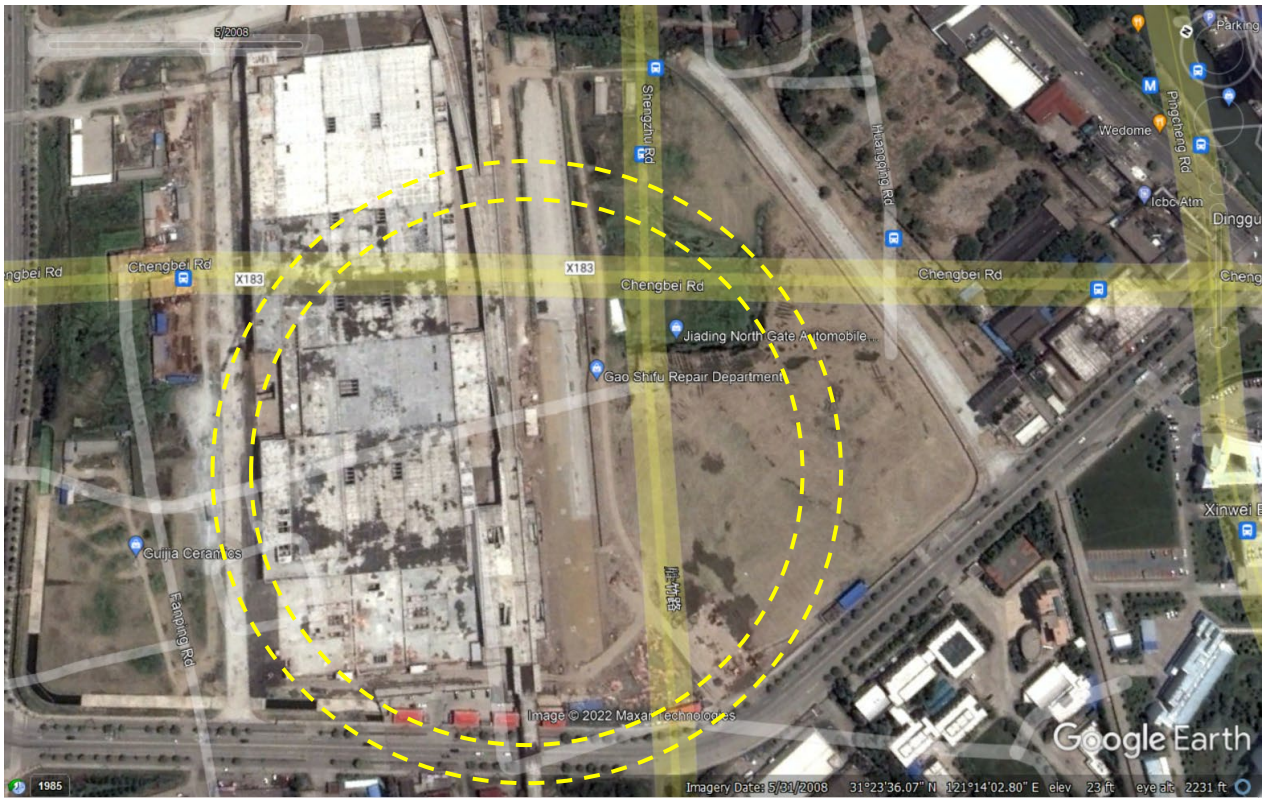


Photo.7: Jiading North Station



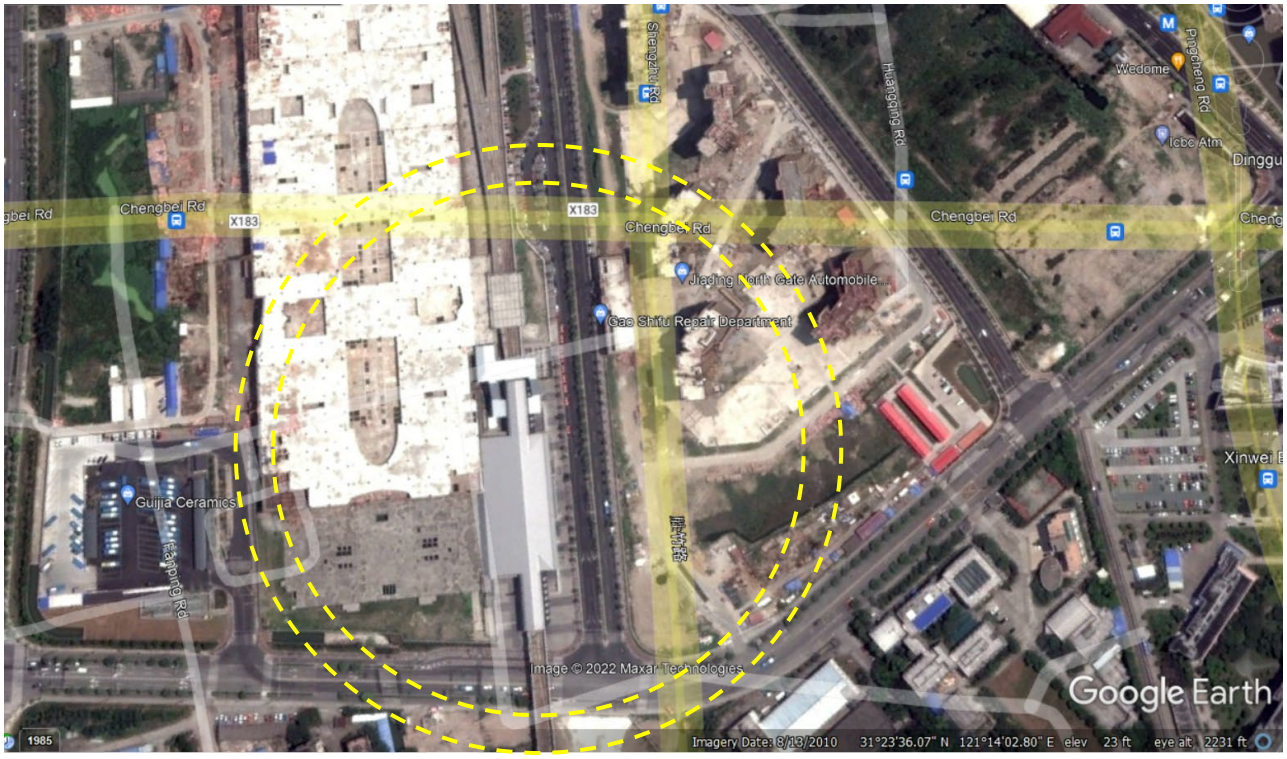


Photo.8: Anting Station

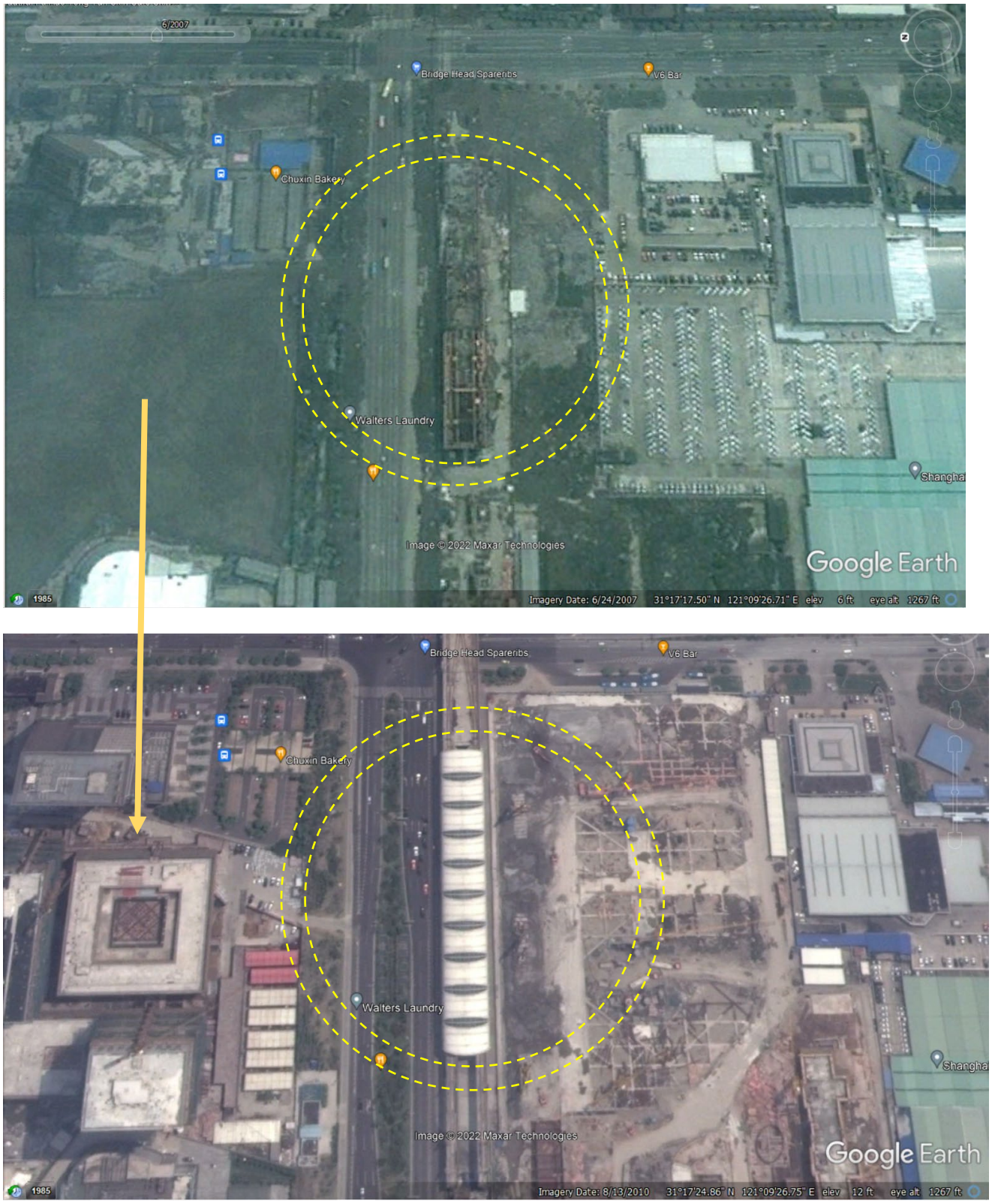


Table 4: Public-Private Spaces Framework (1.63 km frame both sides)

Station	Public Created	Private Created	Semi Private Created
Luonan – Major development on both sides of the station	- More greenery over one year in other parcels - Parking Lots	- A housing complex parcel	- Green Spaces within the apartment complex as well as a basketball and tennis court
Meilan Lake – Major development on the right-hand side	- Greenification and development of green space, left opposite to station	- Opposite right some development of residential apartments	- Green spaces within apartment space
Songjiang UT – Not much development	- Minimal change in public environment	- Further development to apartment complexes	- Minor development to the gardens in residential space
Sijing – Minor development on left hand side and major development on right hand side	- Parking Lots - Green Spaces close to buildings - Open spaces around buildings - Large piece of land to the left and right of station covered in trees, forestation	- Apartment complex made towards the right-hand side of station	**X**
Jiading North – Development on both sides of the station	- Parking Lots - Green parcel close to parking lot	- Office Complexes/buildings towards the right of the station	- Developing Gardens and open spaces in front and outside of office complexes
Anting – Major development on the left side of the station	- Parking Lots on the top right side from the station	X	X

Public Space Lost: This wasn't included in the table since it only applied to one station; Anting had a parking lot on the right-side during development, but it changed from a parking lot to a construction space for a building. Loss of parking lot. As well as green parcel in the bottom right uprooted for construction project for future sporting sites (football field and courts).

Table 5: Public Services Framework (1.63 km frame both sides)

Station	Created	Lost
Luonan	- Mall center was still undergoing construction	X
Meilan Lake	- Construction of an industrial building with parking	X
Songjiang UT	- A lot of unfinished development of buildings and foundation	X
Sijing	- Commercial area with multi- use buildings (rooftop parking)	X
Jiading North	- Still under development of a commercial building on the left side	X
Anting	_- Commercial buildings, shopping complex - Office buildings	X

Overall Observations

Across the 6 stations, Sijing has shown to have the highest amount of urban development in the span of a year during and after construction of the station, whereas Songjiang experienced the least number of urban changes around it over the course of the station construction. Common spatial outputs were the creation of parking lots and residential buildings, which is an important element as it plays into why these stations were created in the first place, to foster better mobility elements; accessibility, inclusivity and convenience. The main fundamental factor however to lack of conflicts with other spaces during development, Shanghai at the time was in a boom of developing as a city, thus lots of open land and free spaces prior to construction. The final sub chapter will go into greater detail behind this urban creation and explain the main focalizing spillover effects.

4.2 Underground Milan Metro Line 5 Study

The second case study being analyzed is the next world fair that takes place 5 years later, the 2015 Milan Expo, like its predecessor in Shanghai, in terms of metro line development, one line was constructed leading up to the event, the underground subway line 5. In terms of scale a lot less ambitious but an event driven transport delivery nonetheless, rooted in mobility, the same structure of analysis will be applied to this chapter. The M5 master plan was conceived between 1997-2001.

Metro Line 5 Map

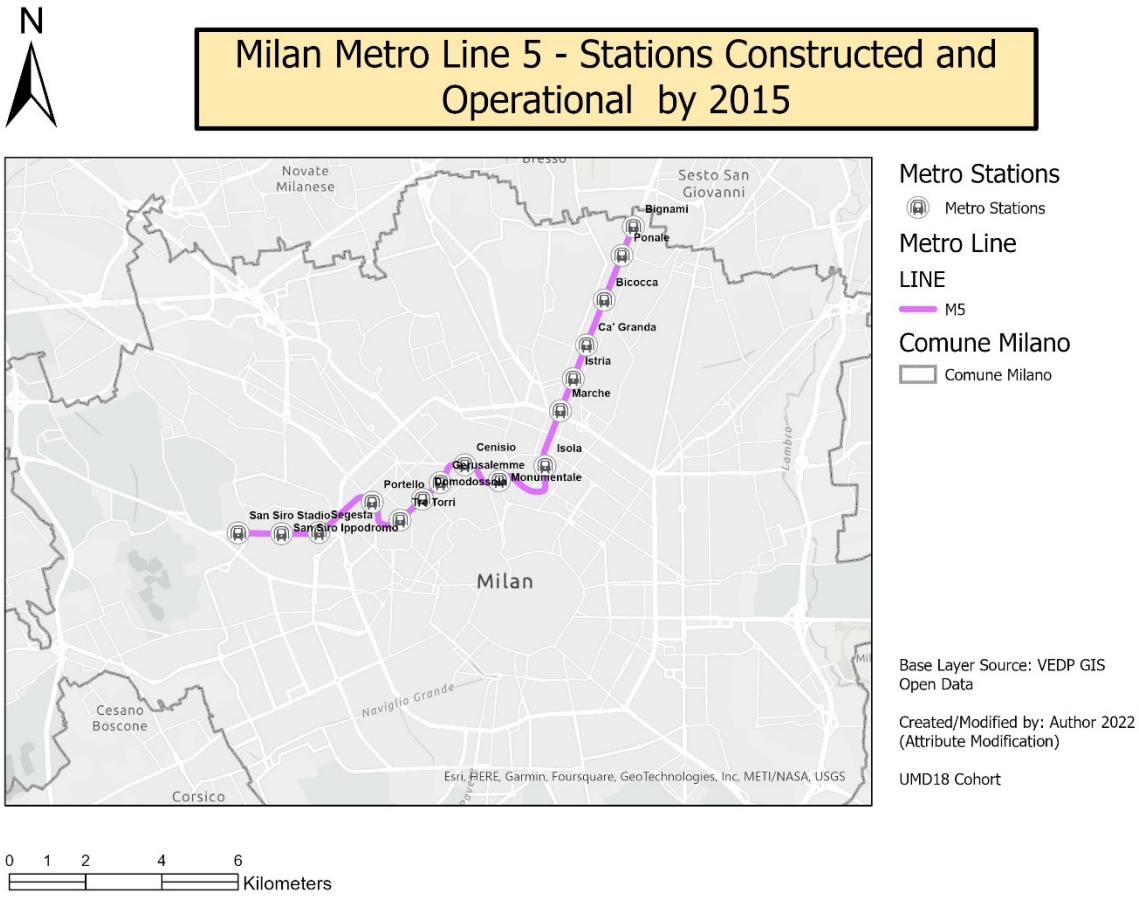


Figure 1: Map of the Line 5 metro network coverage in Milan.

Line 5 is an underground fully automated driverless urban light rail, a first in its design, that covers 12.8 km across the city of Milan. This line was built in two stages from 2013-2015, with a total of 16 stations but 3 other stations from other lines connected to it.

Table 1 : Attribute Milan 5 Study – Modified by Author 2022 from VEDP GIS Open Data with addition of opening dates – Timeline Creation

ID_FERMATA	Name	LINE	CODSAF	COD_LINE	NOME_LM	Opening Dates
300	Bignami	5	300	MM5	Linea 5 - Linea Lilla	10-Feb-13
301	Ponale	5	301	MM5		
302	Bicocca	5	302	MM5		
303	Ca' Granda	5	303	MM5		
304	Istria	5	304	MM5		
305	Marche	5	305	MM5		
307	Isola	5	307	MM5		1-Mar-14
309	Monumentale	5	309	MM5		11-Oct-15
310	Cenisio	5	310	MM5		20-Jun-15
311	Gerusalemme	5	311	MM5		26-Sep-15
312	Domodossola	5	312	MM5		29-Apr-15
313	Tre Torri	5	313	MM5		14-Nov-15
314	Portello	5	314	MM5		6-Jun-15
316	Segesta	5	316	MM5		29-Apr-15
317	San Siro Ippodromo	5	317	MM5		
318	San Siro Stadio	5	318	MM5		

Process for selection of stations to analyze

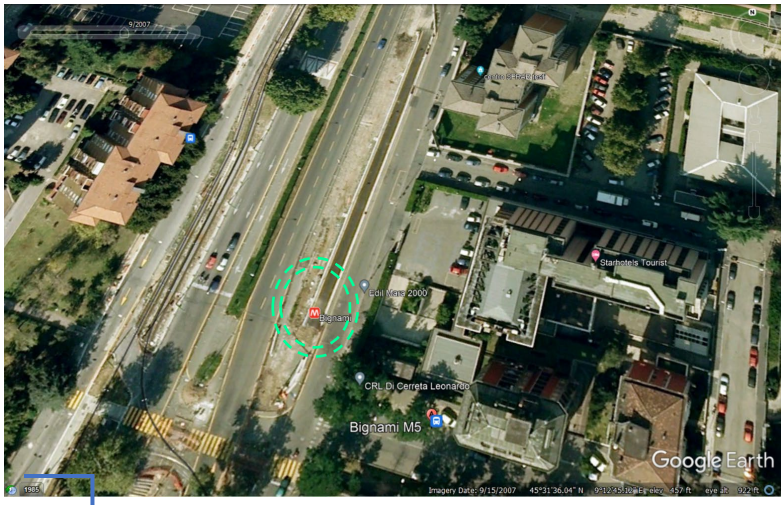
Unlike Shanghai where there were multiple lines as well as some elevated stations, the entirety of the M5 Metro Line runs underground, thus the idea was to look at specifically the surface level entry points to access the metro and see surrounding changes over time for the built environment around them. Similarly metro stations were chosen based on differing opening dates with wide gaps in time. An added variable in terms of time-based map observations, construction for line 5 began around 2007, so unlike Shanghai the development was a lot slower but contextual situations are exceptionally different, which will be shown in this SU chapter.

Chosen stations: Bignami, Isola, Portello, Monumentale, Tre Torri and San Siro Stadio.

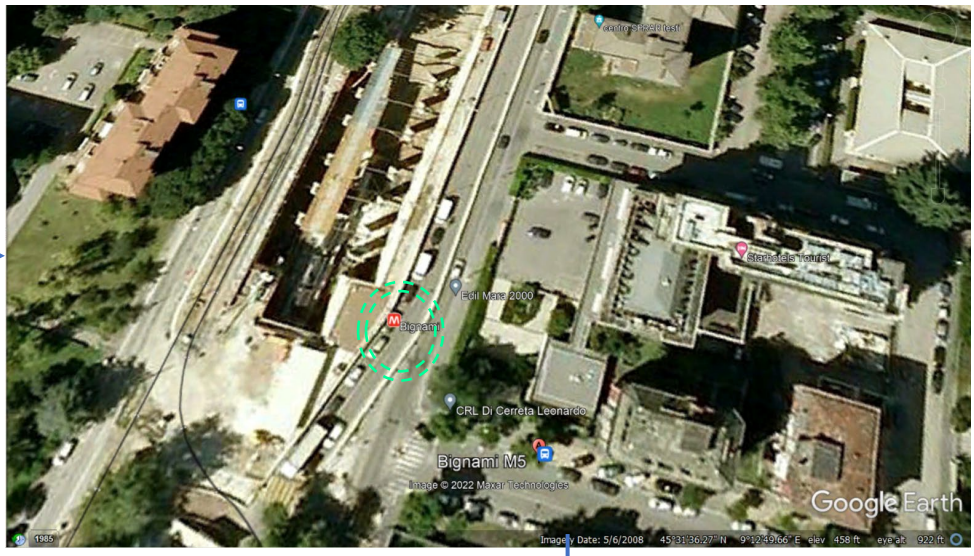
Milan has an abundancy in terms of street view maps from 2008, these will also be included. Like Shanghai from Pre-development to Opening date.

*All following satellite imagery compiled by Author 2022 (Google Earth Pro, Google Maps. VEDP GIS Open Data (for informational data), Street View – Time based)

Photo.1 Bignami Entry Point 2007, 2008, 2014



2007



2008 Street View

2014 Street View

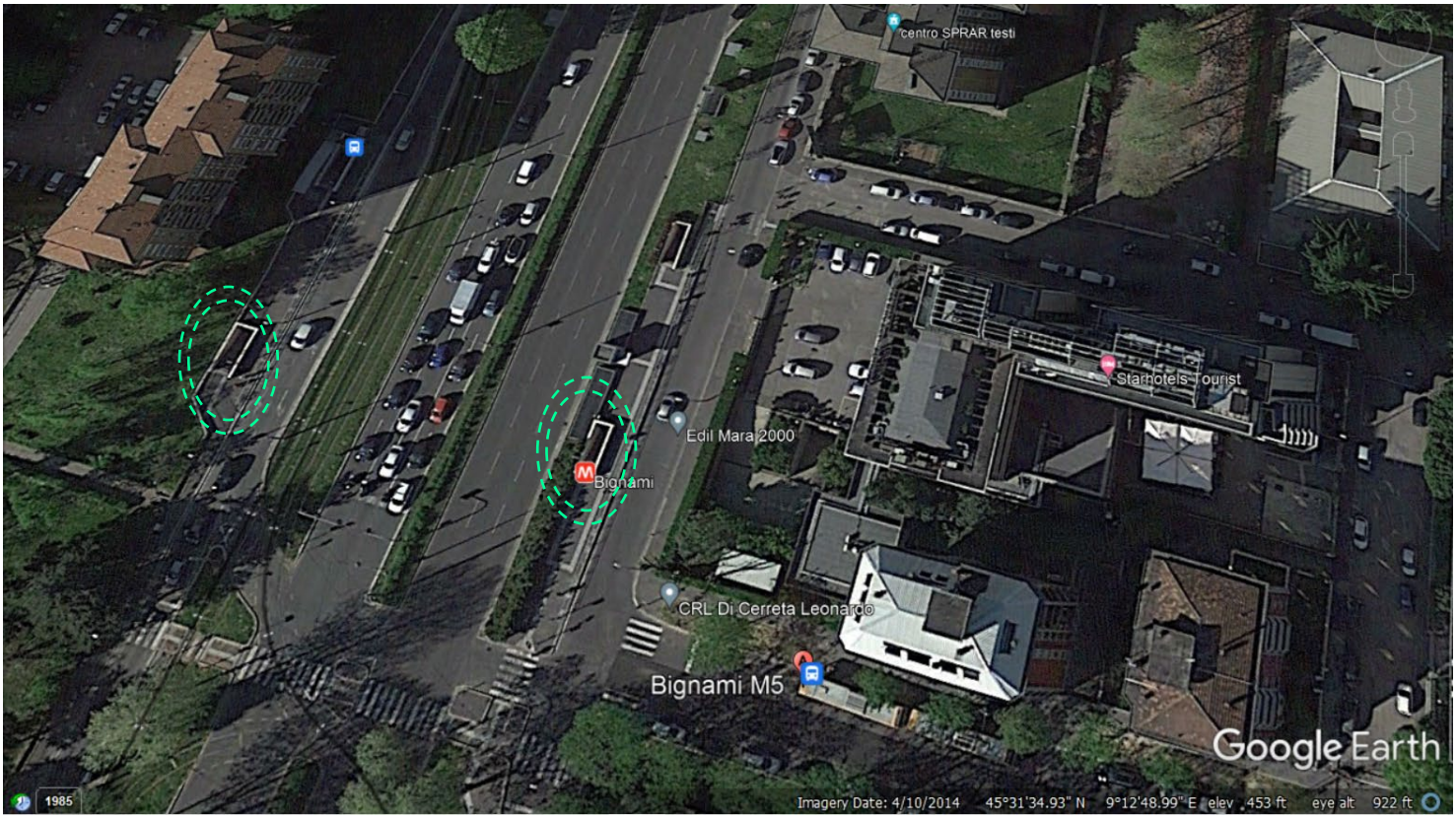


Photo.2 Isola 2007-2014 – Area emptied for redevelopment of neighborhood (Yellow)

2007

2008

2014 Opening (Yellow circles = Entry Points)

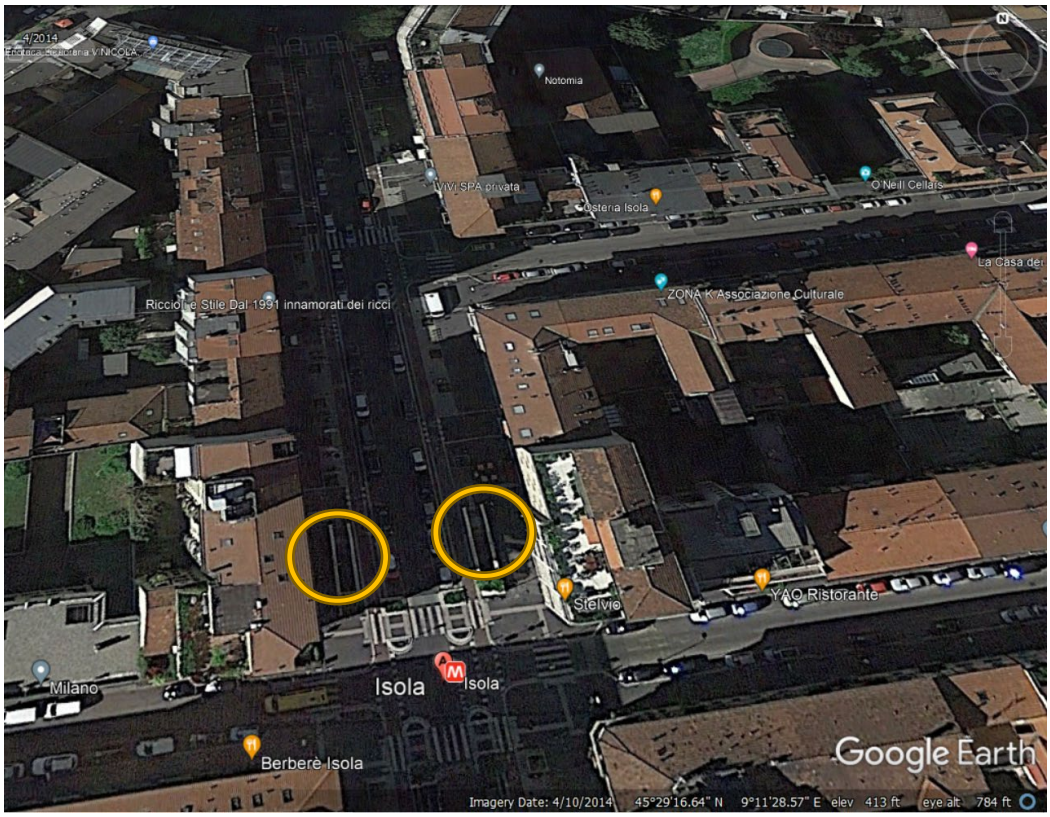
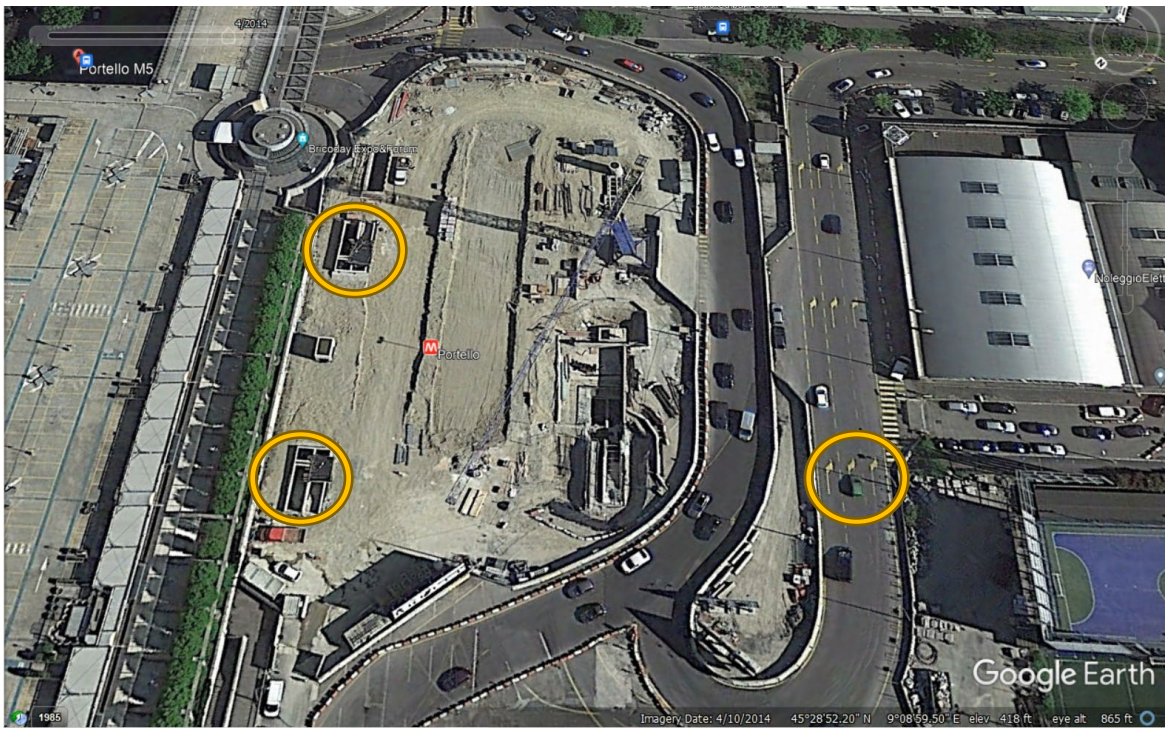


Photo.3 Portello – 2010-2015 Entry Points

2010 Street View



2014 Construction still in progress

2015 Opening Street View + Aerial Map

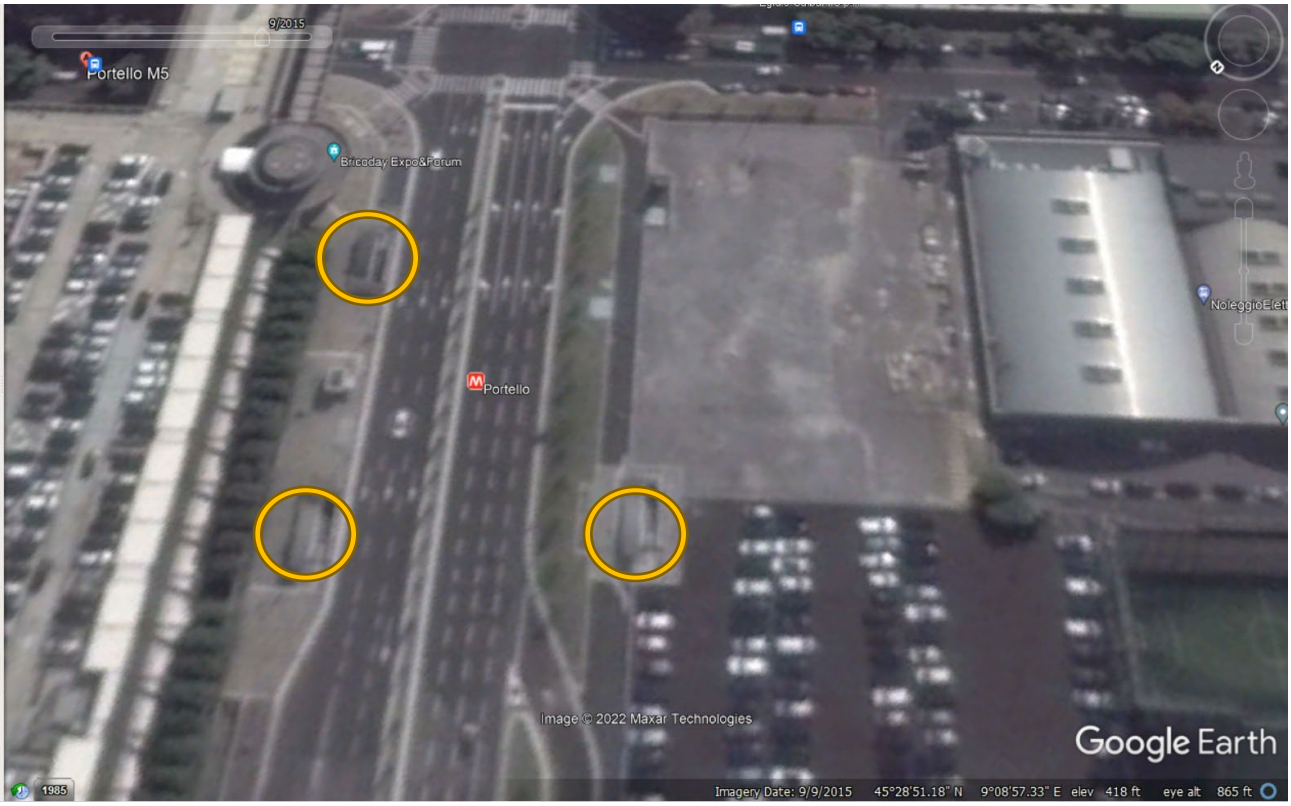
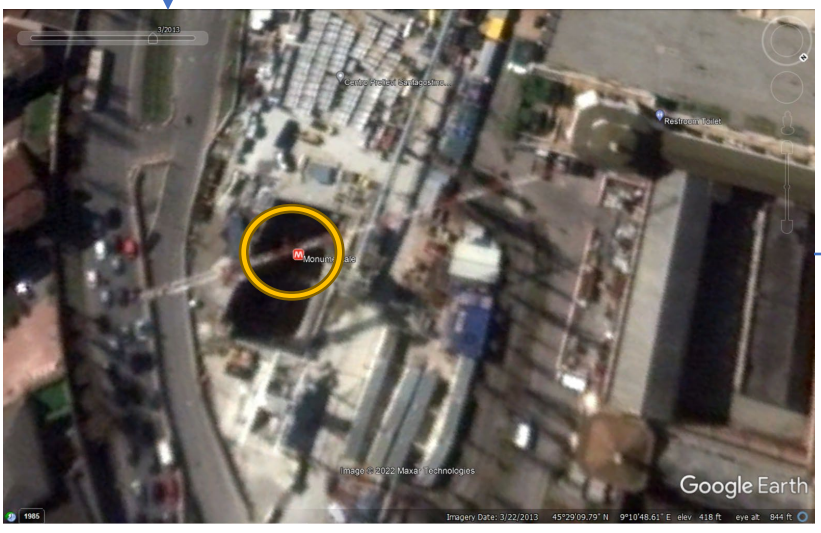
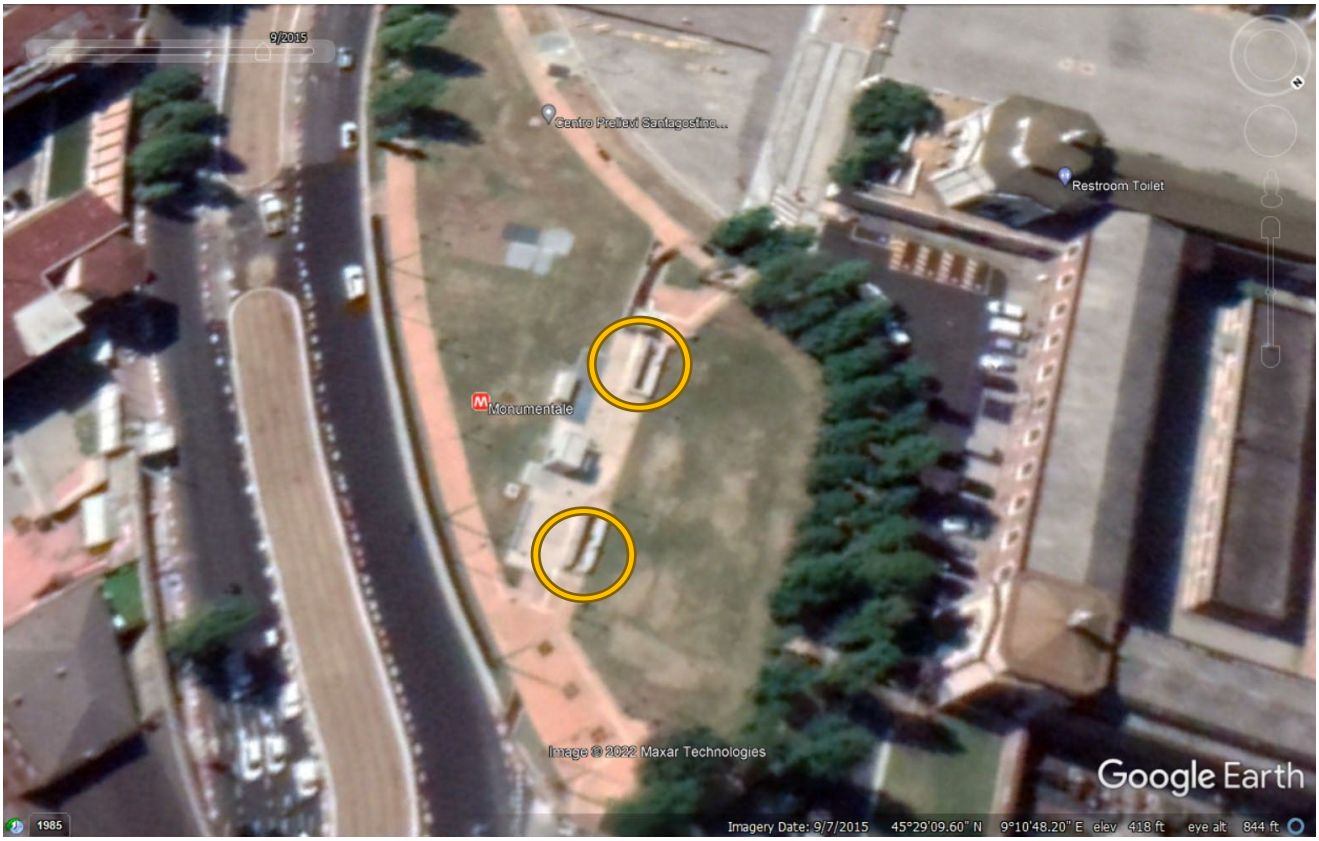


Photo.4 Monumentale 2008-2015 – Two entry points

Phases of Construction



2015 Opening Date October



Street View 2016

Photo.5 Domodossola 2008-2015 (Only Street View) Satellite imagery was distorted and pixelated

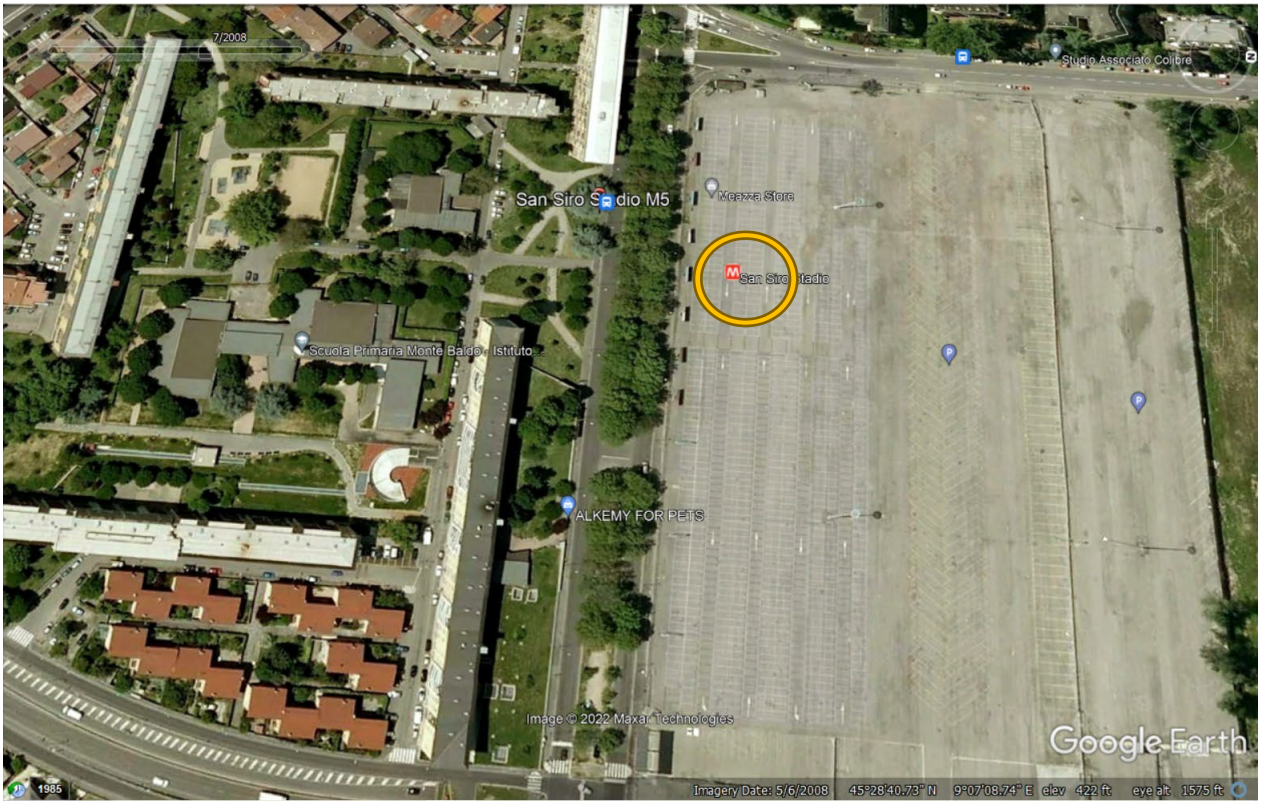
April 2008

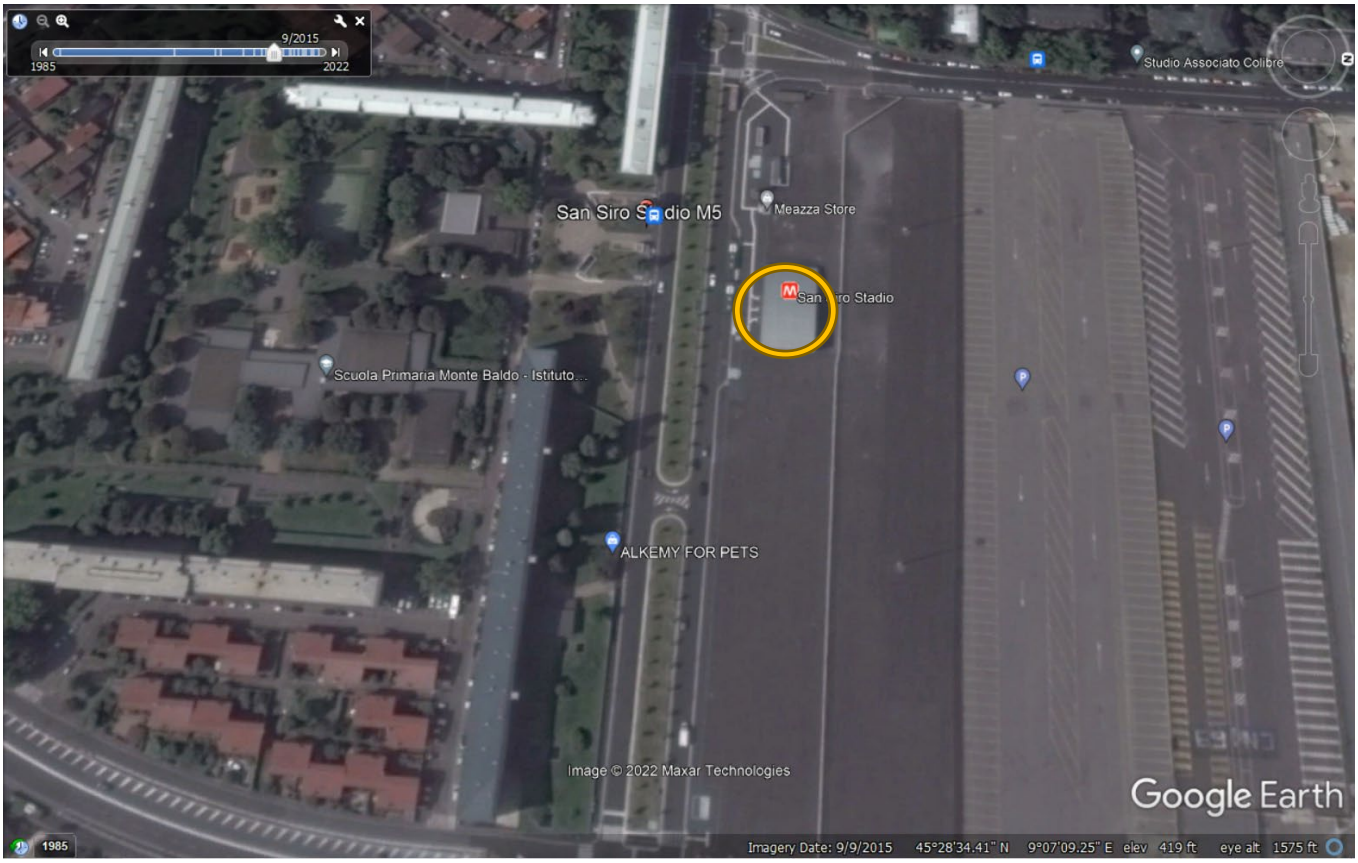
July 2015


11 Via Domodossola
Milan, Lombardy
Google
Street View - Jul 2015
Via Domodossola
Domodo
Giovanni da Procida
Google
Image capture: Jul 2015 © 2022 Google Netherlands Terms Privacy Report a problem


15 Via Domodossola
Milan, Lombardy
Google
Street View - Jul 2015
Currently shown: Jul 2015
2008
2021
Jul 2015
Domodo
Giovanni da Procida
Google
Image capture: Jul 2015 © 2022 Google Netherlands Terms Privacy Report a problem

Photo.6 San Siro Stadio – 2008-2015




9/2015
1985
2022
Studio Associato Colibrì
San Siro Stadio M5
Meazza Store
Scuola Primaria Monte Baldo - Istituto...
ALKEMY FOR PETS
Image © 2022 Maxar Technologies
Google Earth
1985
Imagery Date: 9/9/2015 45°28'34.41" N 9°07'09.25" E elev 419 ft eye alt 1575 ft


Via Harar
Milan, Lombardy
Google
Street View - Oct 2018
SAN SIRO Stadio
Google
Image capture: Oct 2018 © 2022 Google Netherlands Terms Privacy Report a problem

Table 2 Public Spaces Framework 0.17 km range

Station	Public Created	Private Created	Semi Private Created
Bignami:	**Revision of space**	**Revision of space**	**Revision of space**
Isola:	- Pedestrian Pavements on both sides connected to entry points.	**Revision of space**	**Revision of space**
Portello:	**Revision of space**	- Empty plot of land (turns into an expansion for another parking lot few years later)	**Revision of space**
Monumentale	**Revision of space**	**Revision of space**	**Revision of space**
Domodossola	- Renovated Park - Pedestrian Crossings - Open spaces - Green Spaces	**Revision of space**	- Bike Parking Space
San Siro Stadio	- Green Spaces	**Revision of space**	**Revision of space**

Rather than created spaces, most of the development was reverting back to the original state of built environment, hence most stations having “no” public spaces “created”. This is why most times the changes to spaces were mainly the streets and roads being diverted away from the construction site for the temporary duration of the construction.

Table 3 Public Services Framework 0.17 km range

Station	Public Created	Lost
Bignami	**X**	**X**
Isola	- Stores located on the ground floor of the buildings running parallel to the streets. In the 2008 street view, majority of the stores on this street were empty spots, by 2014 a few stores had opened up and populated the street. - Paid Parking placed in parallel on both sides of the street moving southwards	- An entire line of vending stalls was displaced from the area to make way for the construction of the station and reconfiguration of the street.
Portello	- Two large parking lots on both sides in parallel to the entry points (private or paid)	**X**
Monumentale	**X**	**X**
Domodossola	- Tram service - Shopping complex renovation - New shops	- Parking permissibility was lost - Small restaurants and tuck shops - Possible gentrification
San Siro Stadio	- A McDonald branch opened up opposite side of the street - The actual entry point acts as an area to recuperate and plan out journey - Renovated Open Land behind into open developed road tracks with lines - An elevator a few meters away from the station that goes down to the metro	- The area that is now occupied by the station of the parking lot, however a minor part

Observations and Thematic Analysis:

Temporary Disruptions in Landscape

Bignami: In terms of construction or development, the left-hand side of the road's traffic was diverted as they had the dig and built the station underground. After development the scenery returns to its original space with slightly more aesthetic focus of green hedges

Portello**:** Similar to Bignami, diversion of traffic and then a return to original state in built environment with few added additions.

Heritage Protection:

Monumentale: Very minimal changes, the goal here was to create the station and have the overall environment perturbed for the duration of the construction. As shown from the maps, spatially extremely similar to before and after with just the addition of the entry points. The reasoning for this, it was built right in front of the Monumental Cemetery which is a renowned heritage site for the burial of historical figures in Milano's history, thus the goal to increase accessibility but reduce overall built transformative impact around the burial grounds of the site.

Urban Revitalization/ Building an Image

Isola: The area above the station is intriguing as it originally seemed to be occupied by outdoor shops, such as a flea market or fruit/vegetable vendors. It's difficult to perceive what the actuality was under the coverage as the assumption is based off the umbrella ceilings and organized in stall like grid format. 2008 onwards however all of these stalls have been cleared out for the construction of the station underground but also a revitalization of the space by adding more streets and greenery. Purpose was to increase fluidity in flow traffic dedicated to cars.

(Most Transformed Area) Domodossola: In 2008, by exploring around the entry point in both directions there were a lot of noticeable changes. a.) train tracks used to run through, however it was modified into tram tracks to seemingly meld into the environment, b.) a street with pavements and bike parking areas were created, c.) graffitied walls removed and building facades were aesthetically improved d.) shopping complex connected to the station was also improved e.) park on the opposite side of the station was developed and greenified more, e.) a lot more open spaces friendly to the general public.

San Siro Stadio: Built an above ground access building to the subway line, which originally used to be a parking lot dedicated for the stadium. The goal here was to provide easier access to non-car users to go to the stadium or access other services and areas around it.

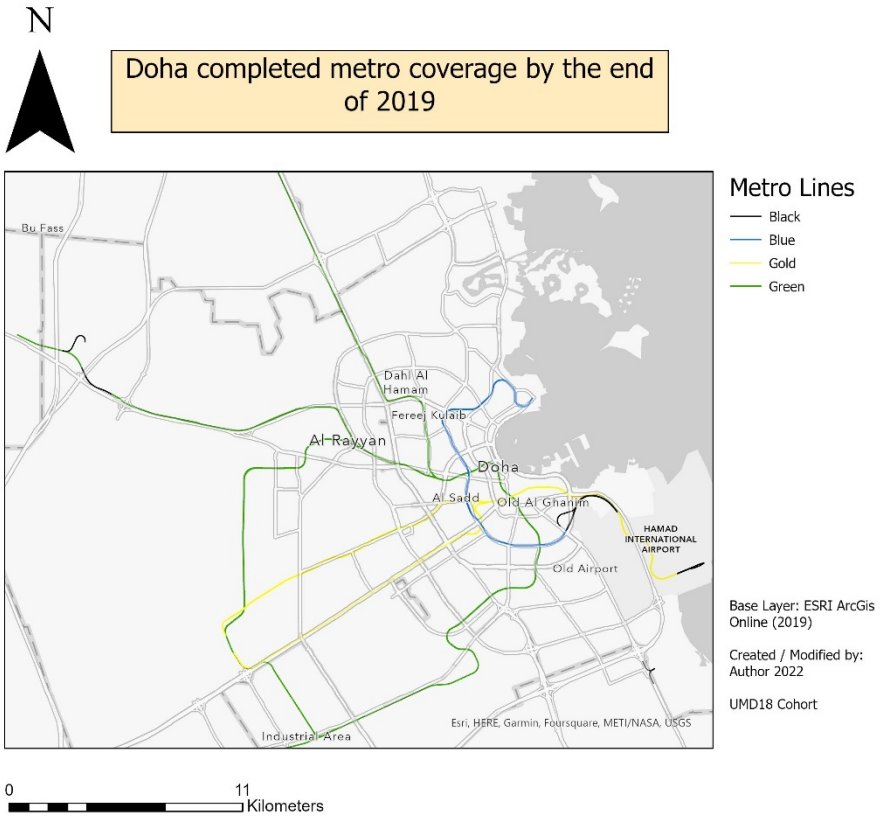
4.3 Doha Metro System

This brings the most recent event in the present year, Doha World Cup 2022. Whilst the more viable option may have been the Expo 2021 in Dubai, in terms of mobility development connected to the event, Dubai saw only one station expansion with minimal changes in the actual surrounding environment, and a new station within the venue itself, which does not fall under the scope of thesis. Doha on the other hand an extremely ambitious project fulfilled, as of 3 years ago, 5 years ago the existing city metro system was not operational and still in the midst of construction. Furthermore, one of the core purposes of the new metro, was to provide easier accessibility to the stadiums all over the city of Doha. This chapter will in broad strokes take the same approach compared to the previous two chapters, but a more intensively applied method, by utilizing what was gathered for Milan and Shanghai, to see if the planning and political processes followed similar or differing flows of execution, and analyzing a final framework constructed from the 3 cities in the conclusion for a final analysis for future implications in resiliency and mobility legacy.

Doha Metro Study (First Phase)

Three lines opened and were operational by the end of 2019, gold, green, blue and red line. The composition of the stations is comprised of elevated and underground stops, similar to the Shanghai metro system in a way.

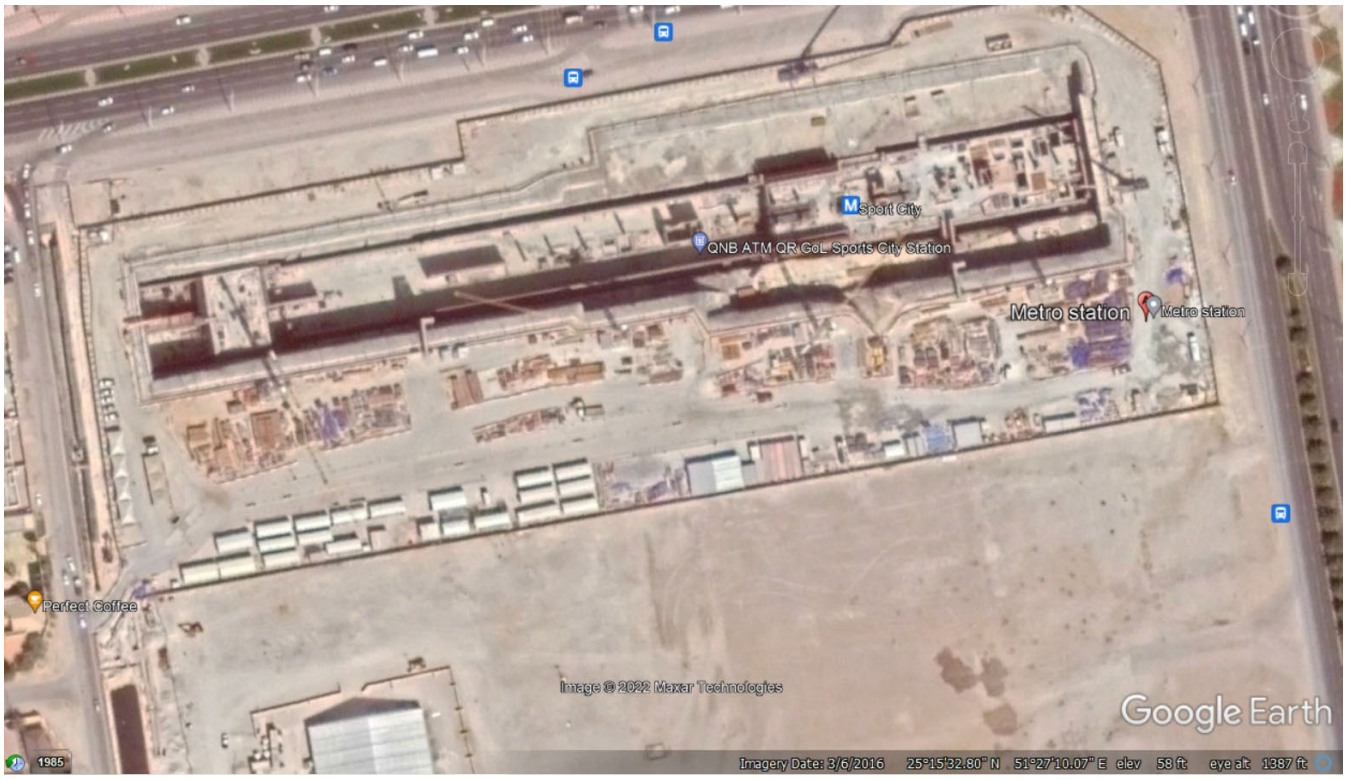
Fig.1 ArcGIS Pro Map of Metro network in Doha

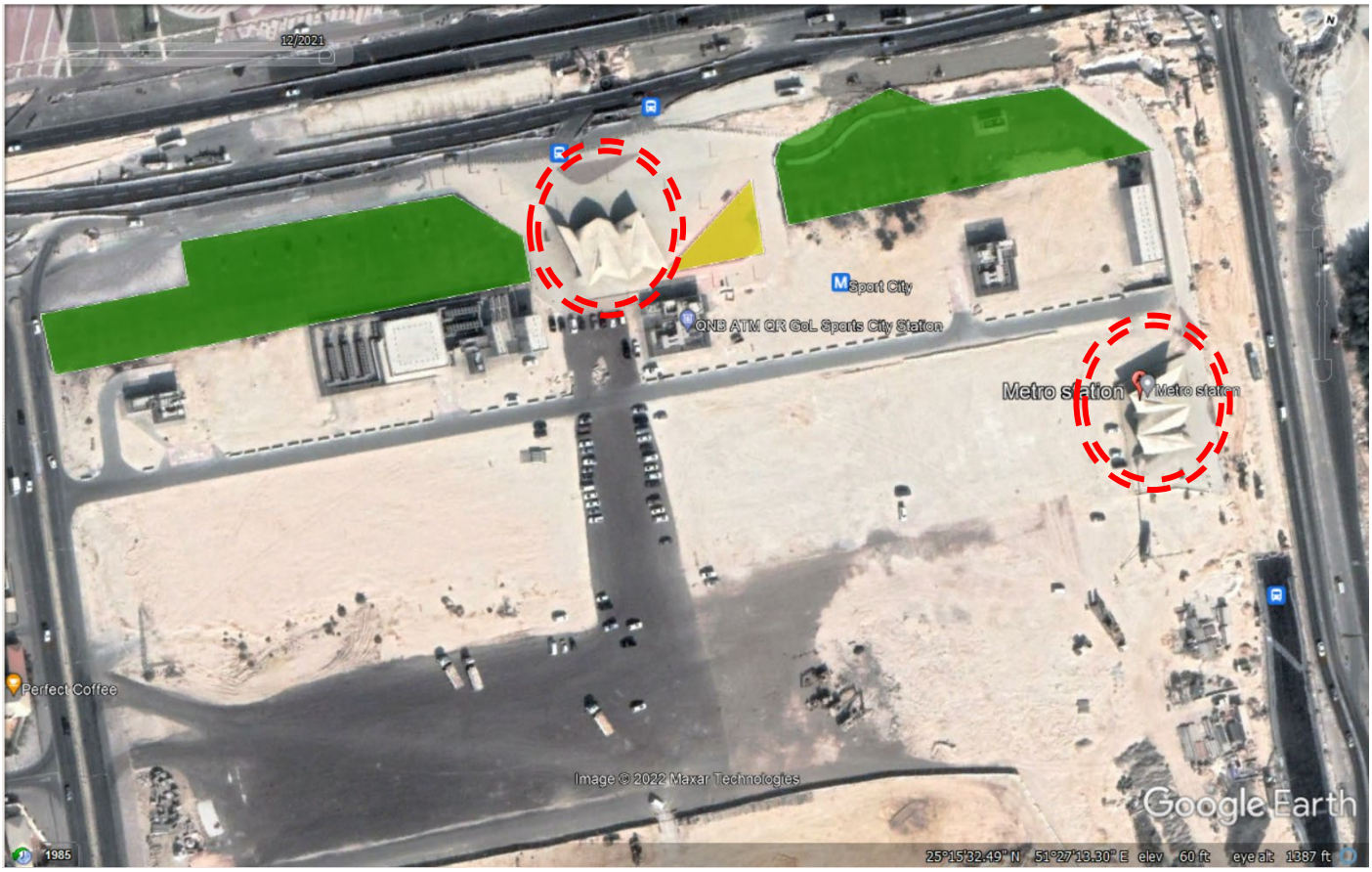


The total time it took to construct the entire network was 8 years, with 112 km of tunnels, 86 km of track and a total of 37 stations, all completed by 2020 (Demmler M et al 2019; ArcGis open data).

Unlike previous chapters, Doha's entire metro system was conceived before the mega event and a few years earlier as well, thus it is difficult to pinpoint select which stations where developed "specifically" for the event. Thus, the choice was selecting one station from each line which held significant "spatial" value in terms of event access or event area of interest; 3 stations were chosen.

Photo1 : Sports City Metro Station Gold Line (2016-2022)

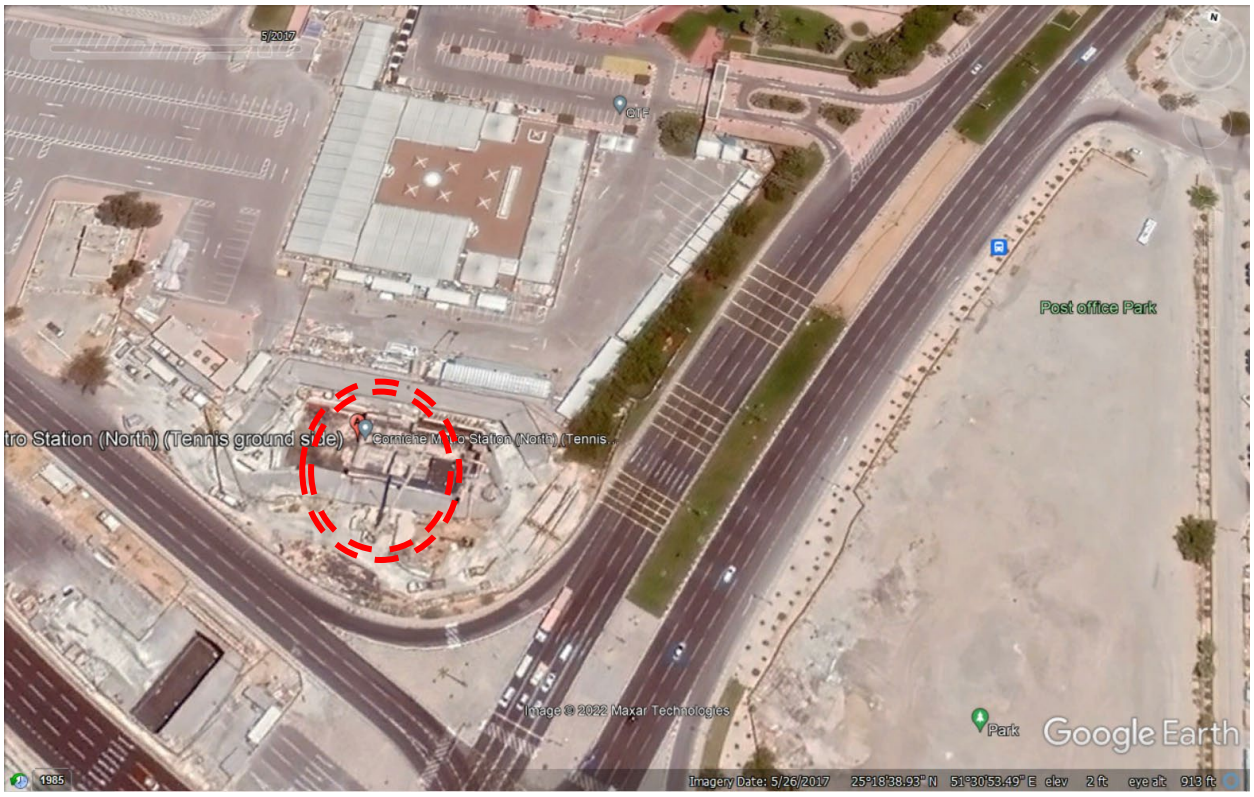


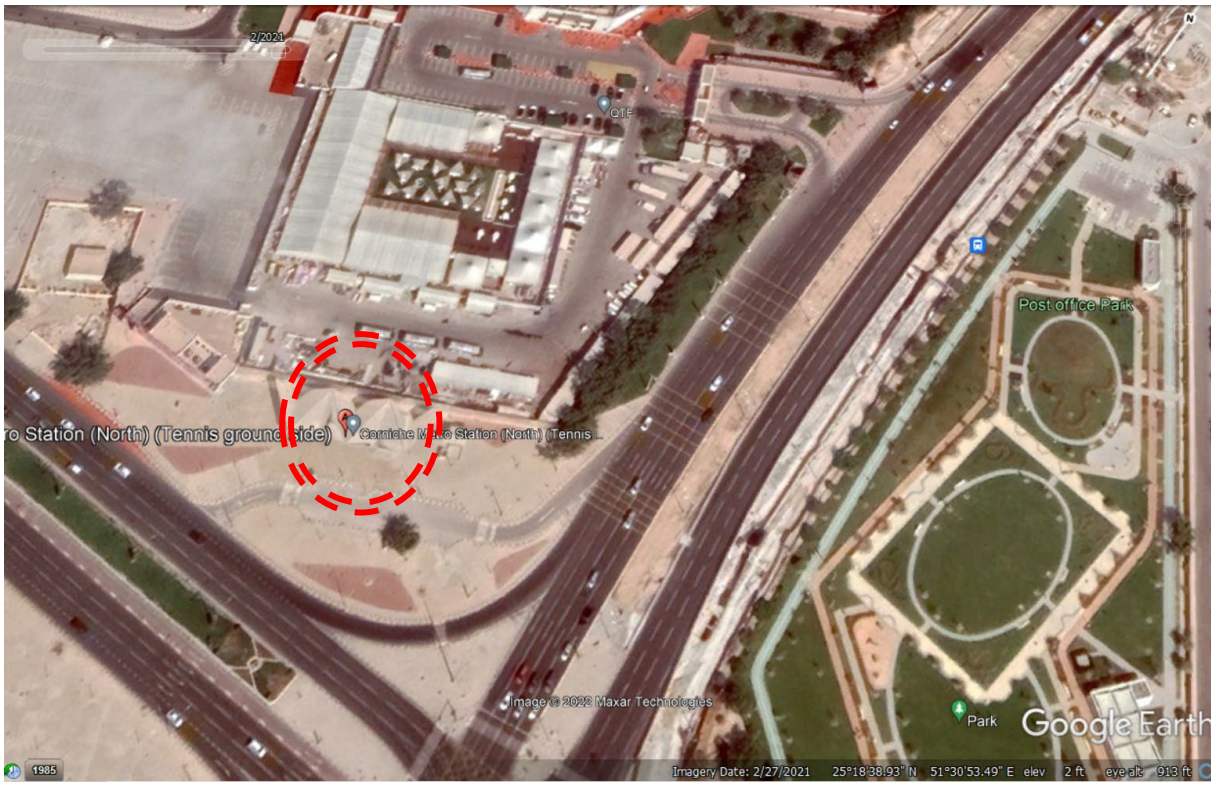


Observations:

In 2016 the metro stations were non-existent and approved in the planning stage, the area around it was an industrial site storing containers filled with materials. This makes sense as it is located very close to the Olympic stadium that was also undergoing construction at the time. The theme of this type of planning and execution would coincide with transformation of space, as the area was underdeveloped and purely an industrial zone. By 2021 as highlighted in green (green spaces) and highlighted in (yellow) a designated public space was created. parking connection points were added. In terms of stations, there are two of which one is temporarily closed, whilst the other one is open, both designed in the same architectural form. The sand pits still remain with undesignated purpose. Based on the spatial changes so far, it implies a singular purpose of accessing and exiting the metro.

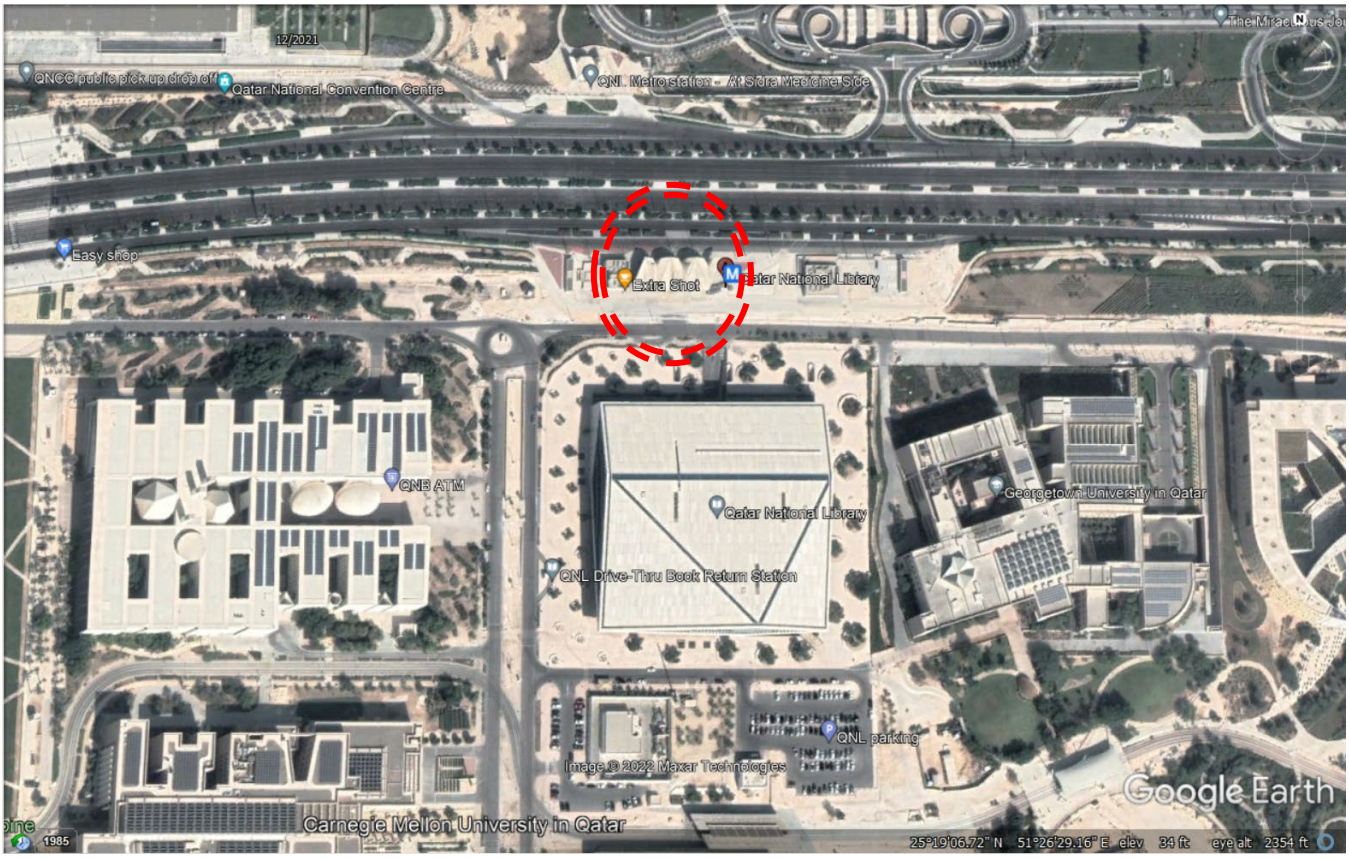
Photo 2 Corniche Metro Station (Red Line) (2017-2021)





A lot more aspects to space utilization compared to the previous station, the area in 2017 also was already quite developed with the exception of the large plot of empty land on the right-hand side of the station. By 2021 a large public park was created with embedded public spaces, the metro station itself as well as development of the silver roof building behind the metro station and the demarcations for the parking zones. One can observe both regenerative and transformative urban planning elements occurring spatially over time. The separator as on the highway however experienced loss of greenery for a new construction project that is still occurring till today, whether it's a renovation or transformation remains to be seen.

(Most transformed zone) Qatar National Library Metro Station Photo 3(Green Line) (2017-2021)



Observations: This station's vicinity had the most spatial "public space" oriented transformation compared to the other two stations. Naturally apart from the metro stations, a lot greener spots were created as well as construction of parking lots and pedestrian walkways. Most of the buildings were already constructed and in-use however in 2017 it still seemed barren and empty. The purpose based on observations over time show was to place an emphasis on aesthetic and make it more pedestrian friendly. A lot more artificial micro planning occurring here and augmentation of biodiversity to fill in the desertique natural environment. In terms of larger scale planning and construction, a highway which was non-existent was also developed as a means to further infrastructure and flow of traffic, running parallel to the metro station. The belt which the station is located on has developed lots of mini parks and green spaces which fall in the view to drivers in the cars that pass through the highway on a regular basis, or as a means of attracting both citizen and tourist population, highway and station are both connected as both seemed to have been constructed in the same time frame based on the satellite imagery.

Chapter 4.4 Further Data and Discussion of Results (Information Processing)

4.4.1 Political and Planning Policy/Complexities - Discussion (IP) – Shanghai "Better City. Better Life"

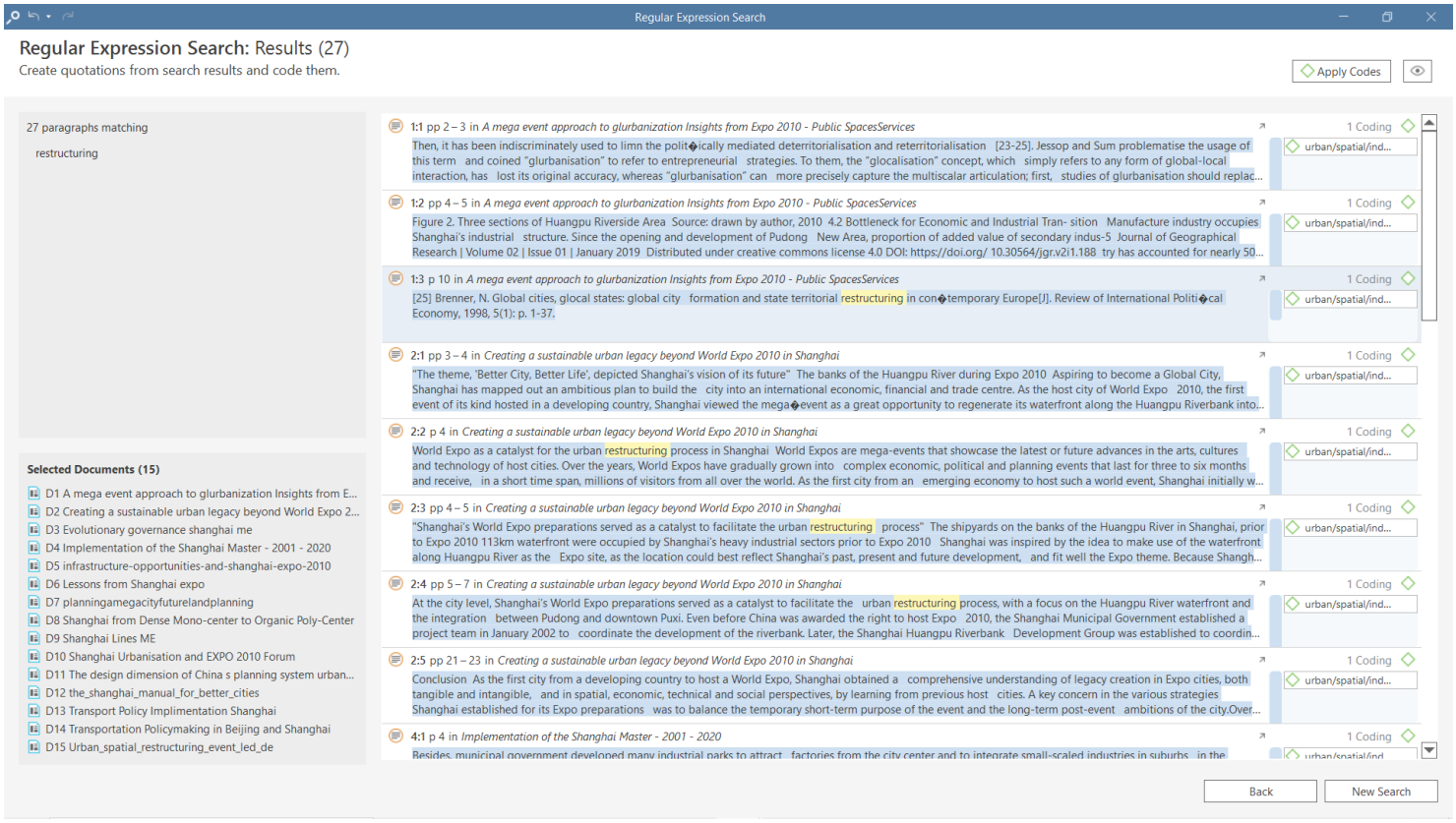
This manual coding was applied to "15" types of documents (*see appendix) ranging from research and plans spectrums, other additional documents were used by they didn't hold much relevance hence the totality being "15". The basis behind choosing these complexities was to search by frequency and degree of representation, terms that coincide with the political and planning notions embedded in the Shanghai ME context. Which can potentially be linked when understanding the processes and motivations behind the metro lines and overall transport development. Adding metro as a term was to highlight also the importance of it in terms of ME development and legacy framework, and overall policy priorities at the time.

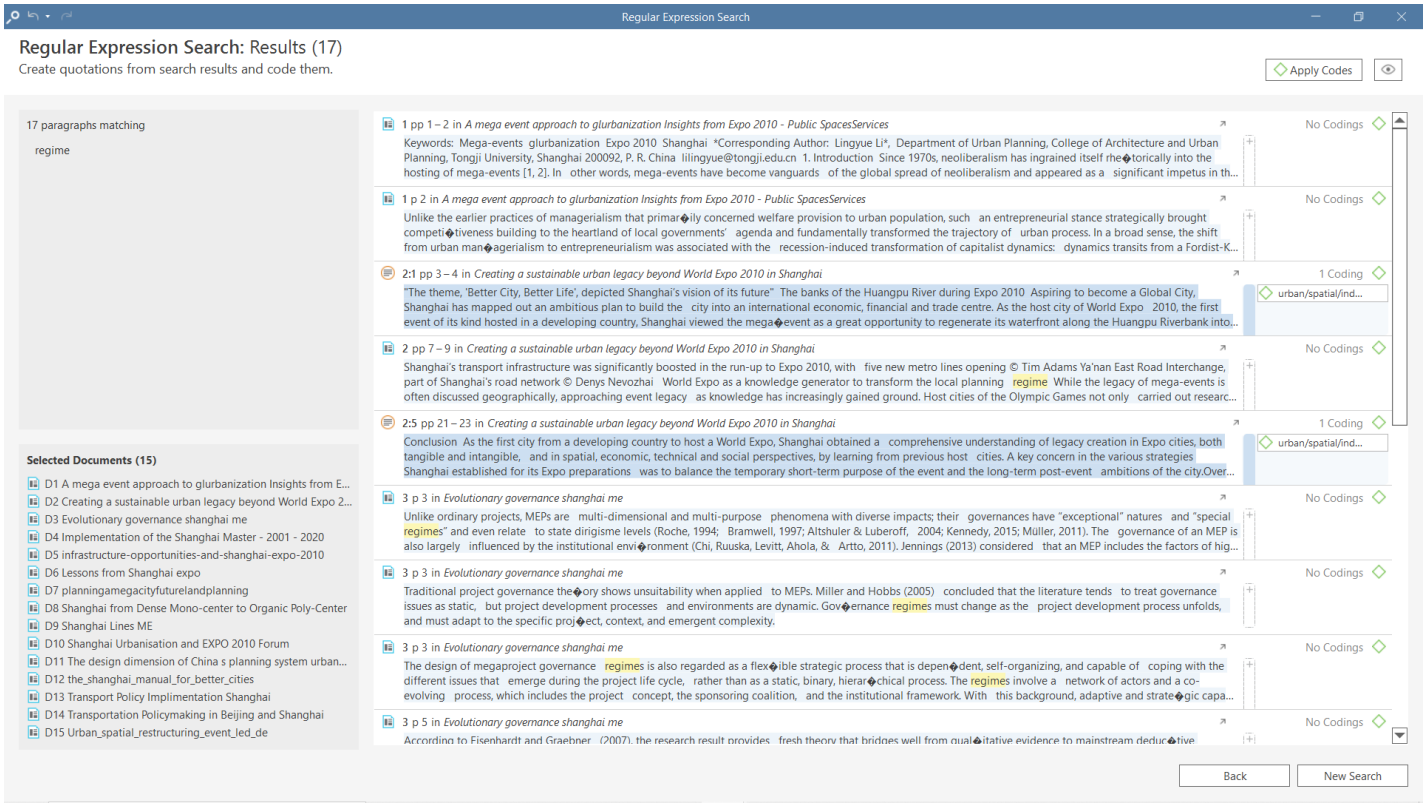
Atlas Ti Results

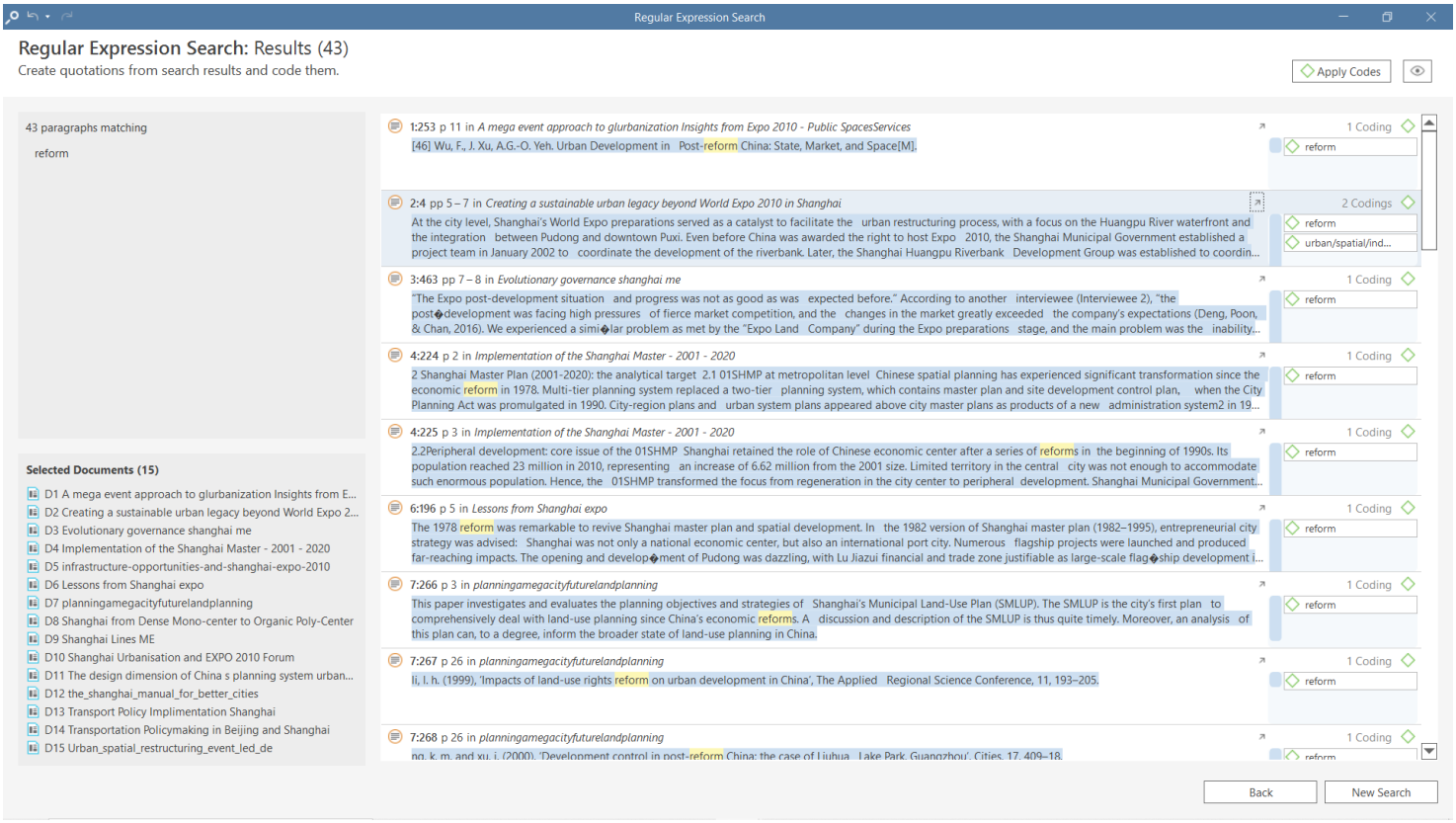
Table 1. Frequency of Relevant Concepts in Shanghai 2010 ME context - (Compiled by Author 2022) – Below shows screenshot of actual output in AtlasTi

Concept – Complexity / n = 15	n= no. of paragraphs mentioning
Spatial/Urban Restructuring	27
Planning Regime(s)	18
Planning Reform(s)	25 (18 others from sources)

Metro(s) Lines – 145 times




Regular Expression Search
Regular Expression Search: Results (17)
Create quotations from search results and code them.
Apply Codes
17 paragraphs matching
regime
Selected Documents (15)
D1 A mega event approach to glurbanization Insights from E...
D2 Creating a sustainable urban legacy beyond World Expo 2...
D3 Evolutionary governance shanghai me
D4 Implementation of the Shanghai Master - 2001 - 2020
D5 infrastructure-opportunities-and-shanghai-expo-2010
D6 Lessons from Shanghai expo
D7 planningamegacityfuturelandplanning
D8 Shanghai from Dense Mono-center to Organic Poly-Center
D9 Shanghai Lines ME
D10 Shanghai Urbanisation and EXPO 2010 Forum
D11 The design dimension of China s planning system urban...
D12 the_shanghai_manual_for_better_cities
D13 Transport Policy Implimentation Shanghai
D14 Transportation Policymaking in Beijing and Shanghai
D15 Urban_spatial_restructuring_event_led_de
1 pp 1 – 2 in A mega event approach to glurbanization Insights from Expo 2010 - Public SpacesServices
No Codings
Keywords: Mega-events glurbanization Expo 2010 Shanghai *Corresponding Author: Lingyue Li*, Department of Urban Planning, College of Architecture and Urban Planning, Tongji University, Shanghai 200092, P. R. China lilingyue@tongji.edu.cn 1. Introduction Since 1970s, neoliberalism has ingrained itself rhe•torically into the hosting of mega-events [1, 2]. In other words, mega-events have become vanguards of the global spread of neoliberalism and appeared as a significant impetus in th...
1 p 2 in A mega event approach to glurbanization Insights from Expo 2010 - Public SpacesServices
No Codings
Unlike the earlier practices of managerialism that primar•ily concerned welfare provision to urban population, such an entrepreneurial stance strategically brought competi•tiveness building to the heartland of local governments' agenda and fundamentally transformed the trajectory of urban process. In a broad sense, the shift from urban man•agerialism to entrepreneurialism was associated with the recession-induced transformation of capitalist dynamics: dynamics transits from a Fordist-K...
2:1 pp 3 – 4 in Creating a sustainable urban legacy beyond World Expo 2010 in Shanghai
1 Coding
urban/spatial/ind...
"The theme, 'Better City, Better Life', depicted Shanghai's vision of its future" The banks of the Huangpu River during Expo 2010 Aspiring to become a Global City, Shanghai has mapped out an ambitious plan to build the city into an international economic, financial and trade centre. As the host city of World Expo 2010, the first event of its kind hosted in a developing country, Shanghai viewed the mega•event as a great opportunity to regenerate its waterfront along the Huangpu Riverbank into...
2 pp 7 – 9 in Creating a sustainable urban legacy beyond World Expo 2010 in Shanghai
No Codings
Shanghai's transport infrastructure was significantly boosted in the run-up to Expo 2010, with five new metro lines opening © Tim Adams Ya'nan East Road Interchange, part of Shanghai's road network © Denys Nevozhai World Expo as a knowledge generator to transform the local planning regime While the legacy of mega-events is often discussed geographically, approaching event legacy as knowledge has increasingly gained ground. Host cities of the Olympic Games not only carried out researc...
2:5 pp 21 – 23 in Creating a sustainable urban legacy beyond World Expo 2010 in Shanghai
1 Coding
urban/spatial/ind...
Conclusion As the first city from a developing country to host a World Expo, Shanghai obtained a comprehensive understanding of legacy creation in Expo cities, both tangible and intangible, and in spatial, economic, technical and social perspectives, by learning from previous host cities. A key concern in the various strategies Shanghai established for its Expo preparations was to balance the temporary short-term purpose of the event and the long-term post-event ambitions of the city.Over...
3 p 3 in Evolutionary governance shanghai me
No Codings
Unlike ordinary projects, MEPs are multi-dimensional and multi-purpose phenomena with diverse impacts; their governances have "exceptional" natures and "special regimes" and even relate to state dirigisme levels (Roche, 1994; Bramwell, 1997; Altshuler & Luberoff, 2004; Kennedy, 2015; Müller, 2011). The governance of an MEP is also largely influenced by the institutional envi•ronment (Chi, Ruuska, Levitt, Ahola, & Artto, 2011). Jennings (2013) considered that an MEP includes the factors of hig...
3 p 3 in Evolutionary governance shanghai me
No Codings
Traditional project governance the•ory shows unsuitability when applied to MEPs. Miller and Hobbs (2005) concluded that the literature tends to treat governance issues as static, but project development processes and environments are dynamic. Gov•ernance regimes must change as the project development process unfolds, and must adapt to the specific proj•ect, context, and emergent complexity.
3 p 3 in Evolutionary governance shanghai me
No Codings
The design of megaproject governance regimes is also regarded as a flex•ible strategic process that is depen•dent, self-organizing, and capable of coping with the different issues that emerge during the project life cycle, rather than as a static, binary, hierar•chical process. The regimes involve a network of actors and a co-evolving process, which includes the project concept, the sponsoring coalition, and the institutional framework. With this background, adaptive and strate•gic capa...
3 p 5 in Evolutionary governance shanghai me
No Codings
According to Eisenhardt and Graebner (2007), the research result provides fresh theory that bridges well from qual•itative evidence to mainstream deduc•tive
Back
New Search


Regular Expression Search
Regular Expression Search: Results (43)
Create quotations from search results and code them.
Apply Codes
43 paragraphs matching
reform
Selected Documents (15)
D1 A mega event approach to glurbanization Insights from E...
D2 Creating a sustainable urban legacy beyond World Expo 2...
D3 Evolutionary governance shanghai me
D4 Implementation of the Shanghai Master - 2001 - 2020
D5 infrastructure-opportunities-and-shanghai-expo-2010
D6 Lessons from Shanghai expo
D7 planningamegacityfuturelandplanning
D8 Shanghai from Dense Mono-center to Organic Poly-Center
D9 Shanghai Lines ME
D10 Shanghai Urbanisation and EXPO 2010 Forum
D11 The design dimension of China s planning system urban...
D12 the_shanghai_manual_for_better_cities
D13 Transport Policy Implimentation Shanghai
D14 Transportation Policymaking in Beijing and Shanghai
D15 Urban_spatial_restructuring_event_led_de
1:253 p 11 in A mega event approach to glurbanization Insights from Expo 2010 - Public SpacesServices
1 Coding
reform
[46] Wu, F., J. Xu, A.G.-O. Yeh. Urban Development in Post-reform China: State, Market, and Space[M].
2:4 pp 5 – 7 in Creating a sustainable urban legacy beyond World Expo 2010 in Shanghai
2 Codings
reform
urban/spatial/ind...
At the city level, Shanghai's World Expo preparations served as a catalyst to facilitate the urban restructuring process, with a focus on the Huangpu River waterfront and the integration between Pudong and downtown Puxi. Even before China was awarded the right to host Expo 2010, the Shanghai Municipal Government established a project team in January 2002 to coordinate the development of the riverbank. Later, the Shanghai Huangpu Riverbank Development Group was established to coordin...
3:463 pp 7 – 8 in Evolutionary governance shanghai me
1 Coding
reform
"The Expo post-development situation and progress was not as good as was expected before." According to another interviewee (Interviewee 2), "the post•development was facing high pressures of fierce market competition, and the changes in the market greatly exceeded the company's expectations (Deng, Poon, & Chan, 2016). We experienced a simi•lar problem as met by the "Expo Land Company" during the Expo preparations stage, and the main problem was the inability,..
4:224 p 2 in Implementation of the Shanghai Master - 2001 - 2020
1 Coding
reform
2 Shanghai Master Plan (2001-2020): the analytical target 2.1 01SHMP at metropolitan level Chinese spatial planning has experienced significant transformation since the economic reform in 1978. Multi-tier planning system replaced a two-tier planning system, which contains master plan and site development control plan, when the City Planning Act was promulgated in 1990. City-region plans and urban system plans appeared above city master plans as products of a new administration system2 in 19...
4:225 p 3 in Implementation of the Shanghai Master - 2001 - 2020
1 Coding
reform
2.2Peripheral development: core issue of the 01SHMP Shanghai retained the role of Chinese economic center after a series of reforms in the beginning of 1990s. Its population reached 23 million in 2010, representing an increase of 6.62 million from the 2001 size. Limited territory in the central city was not enough to accommodate such enormous population. Hence, the 01SHMP transformed the focus from regeneration in the city center to peripheral development. Shanghai Municipal Government...
6:196 p 5 in Lessons from Shanghai expo
1 Coding
reform
The 1978 reform was remarkable to revive Shanghai master plan and spatial development. In the 1982 version of Shanghai master plan (1982–1995), entrepreneurial city strategy was advised: Shanghai was not only a national economic center, but also an international port city. Numerous flagship projects were launched and produced far-reaching impacts. The opening and develop•ment of Pudong was dazzling, with Lu Jiazui financial and trade zone justifiable as large-scale flag•ship development i...
7:266 p 3 in planningamegacityfuturelandplanning
1 Coding
reform
This paper investigates and evaluates the planning objectives and strategies of Shanghai's Municipal Land-Use Plan (SMLUP). The SMLUP is the city's first plan to comprehensively deal with land-use planning since China's economic reforms. A discussion and description of the SMLUP is thus quite timely. Moreover, an analysis of this plan can, to a degree, inform the broader state of land-use planning in China.
7:267 p 26 in planningamegacityfuturelandplanning
1 Coding
reform
li, l. h. (1999), 'Impacts of land-use rights reform on urban development in China', The Applied Regional Science Conference, 11, 193–205.
7:268 p 26 in planningamegacityfuturelandplanning
1 Coding
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ng, k. m. and xu, j. (2000), 'Development control in post-reform China: the case of Liuhua Lake Park, Guangzhou', Cities, 17, 409–18.
Back
New Search

Spatial/Urban Restructuring

The reasoning behind selecting this term wasn't only rooted in its frequency, but also the pathways and concepts that followed within the documents, specifically; transformations and built environment. Restructuring represents a plethora of urban concepts, so whilst it's lesser in frequency to the following concepts, it stands to show greater representation for the urban planning principles when observing the Shanghai Mega event environment as a whole.

Shanghai is a very special case in terms of mega event research, it was one of the first countries to host such a large-scale event all the while still being a developing country at the time (Lingyue Li 2019). As shown by the maps as well, there was minimal loss of "public defined spaces" but more large scale "transformations" as most of it was open untouched plots of land waiting to be constructed upon. Furthermore, under ME context, Shanghai's main underlying motivations initially stemmed from soft power appeal of rapid development of their city's architecture, strong "city branding" and innovation prowess, however the paradigm of planning principles shifted from just these facets to "urban restructuring" as the leading trait of a city during project development stages (Chen, Yawei 2020). It has also been stated that otherwise stagnant development was rapidly induced by the Expo 2010 allowing for the overall ambitious master plan to be completed almost 10 years ahead of schedule. In Lingye Li's paper the linkage with ME catalytical development, for Shanghai yielded results that showed less of an international competitiveness benefit but rather a higher facilitation of advancing local goals and motivations; hence the focus of urban restructuring rather than global representation. This factor in the process of planning is further corroborated by two other papers which discuss the evaluation and monitoring frameworks to assess the success behind planning implementation within and outside ME context for the master plan in Shanghai. The first was an annual 26th congress "Aesop" (He, J. 2012). documentation discussing the master plan implementation in Shanghai, a table showing indicators of evaluation (Figure 2). All the indicators listed were in line with the transformations seen around metro lines in the SU chapter. Granted this table was a more overall agenda framework, but monitoring just the metro lines as a main component, tied in with development of land, industrial, infrastructure and green space development (the main planning and political priorities).

Land development	Total area of developed land	Spatial distribution of developed land
	Total area of residential land use (*)	Spatial distribution of residential land use
Industrial Structure	Industrial development (area and proportion)	Spatial distribution of secondary industry (and industrial parks)
Infrastructure	Length of roads (*)	Road system
	Length of metro lines (*)	Spatial distribution of metro lines
Green space	The area of undeveloped land	Spatial distribution of strategic green space (*)

Note： * represents lack of data

Table 1 Variables and indicators for the evaluation of planning implementation

Figure 1: Monitoring indicators from Aesop 26th Congress 2012 He, J. 2012

The second document analyzed was an urban research paper (Pan Haixiao 2006) explaining the transition process of the urban fabric of Shanghai from dense monocenter to organic poly center and presenting goals to be achieved. More monitoring indicators were found for the Expo by applying variables such as "accessibility to suburbs" and linkages in transport with other neighboring cities. This again is reinforced by the maps compiled by observing major apartment complex construction occurring around the stations (despite stations being temporary).

The final major paper for this component, which also had the most frequency under this variable was a paper written by Dr. Hyun Bang Shin LSE in 2014. The big difference was the city study, rather than Shanghai it was Guangzhou and the Asian Games. In terms of data extrapolation, it held relevancy since the Asian games are a large-scale event and the context was still a Chinese based city (results in paper also were based off of interviews conducted with government and academic experts over the course of 3 years). The premise indicated a similar element in terms of planning authorities using the event as a basis to expand personal local based agendas through a geo political scope. Urban restructuring was more so tied in with production capabilities (industrial expansion) and the event led projects focusing more on a global competitiveness. One key importance to the paper was the significance between the bodies involved within mega events; central state and transnational organizations. Usually for events including the Expo 2010 the process of planning and acquiring funds for these ventures forces them to seek transnational organizations and cutting away from the central body, including their conditions. This in turn turns ventures into more localized based agendas rather than fulfilling national ones in the pursuit for global competitiveness; "jump scale" (Shin, H.B 2014). Critical perspective aside, this gives a broad understanding to the political framework in what the structure resembled in terms of metro development as well.

Figure 2 (Author 2022): A word cloud that was generated from the coding used to find most common complexities to further understand the tokens found under these high frequency terms.

Observing it, demonstrates the importance of governmental and policy systems in place when understanding any spatial development in the EXPO Shanghai context.

Planning Reform - Regime

Continuing off jump scale, the central body can be referred to as the traditional regime in the local planning processes. As such whilst Guangzhou pursed a more balanced engagement with the central body (government), the pursuit of finding transnational actors in Shanghai's entrepreneurial case allowed for better knowledge sharing or "generating" for progression in the societal sense. On the Aesop 26th Congress document one of the critiques was "*Urban planning regulations places much emphasis on control rather than on guidance of urban development*", this showed the need for a shift in the planning process for better project facilitation.
Despite this critique there was more inclusion options for the general public during the design process; hosting competitions for concept designs of the waterfront area of Haungpu River prior to its development, thus a change in the planning regime by breaking away from the traditional mold (Yawei Chen 2020). Furthermore, the new planning regime involved using people centric focus on research and development for sustainability. Whilst the main case study was the waterfront, metro development was a sub agenda as a legacy goal post event, to combine both sides of the waterfront.
Whilst planning paradigm shifts occurred, it was less geared towards the metro lines, according to the master implementation document and a research paper by Fei Chen on China's planning system, the diagram adapted when focusing on infrastructure and transport could be categorized as below. These three plans would also coincide with the development with landscape, boundaries, land management, green spaces and suburban plots. This is what the overall planning framework would have likely corresponded with essentially leading up to the Expo and for any other urban related project.

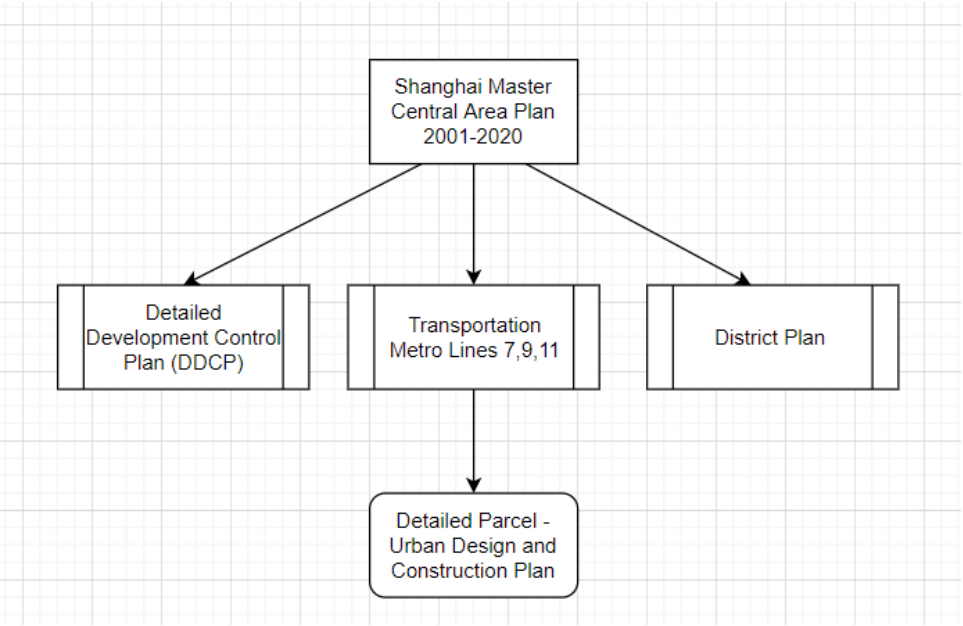


Figure 3: Relevant Planning components for design and construction of infrastructure and transport (Adapted by: Author 2022) (Sources: Fei Chen 2015, Yu 2008)

4.4.2 Political and Planning Complexities (IP) – Milan Feeding the Planet, Energy for Life

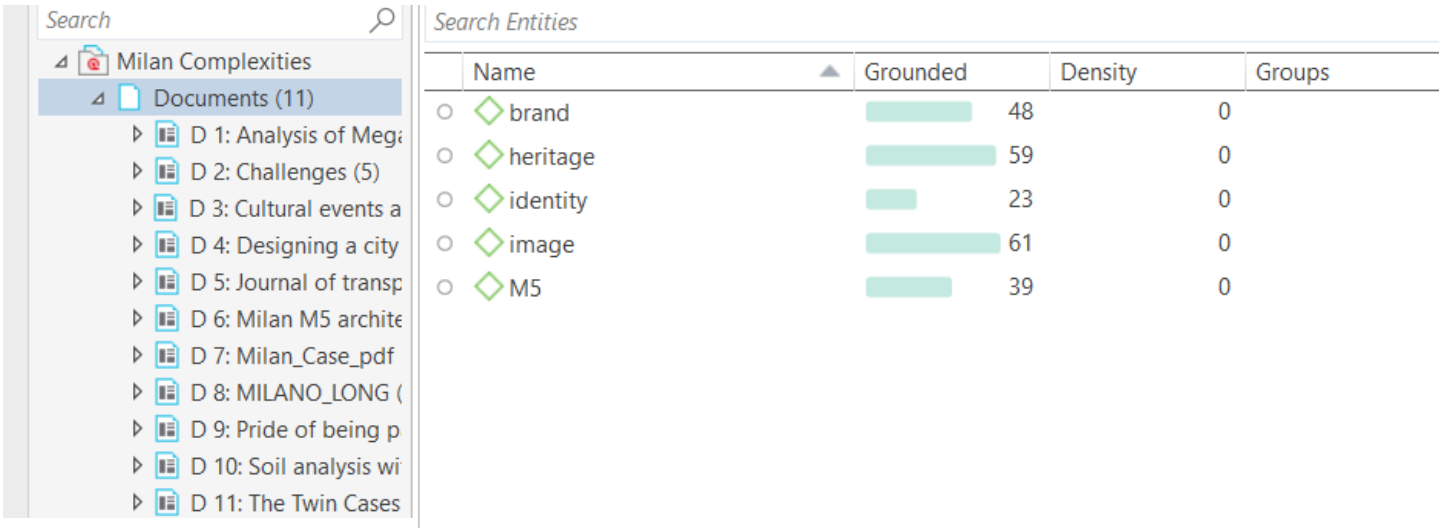
As shown Milan's planning to execution stages where a lot more different in contrast to Shanghai. Since the city is a lot smaller but a lot more developed around the bid for the Expo compared to its predecessor, rather than creation of spaces and services, it was urban re-designing of spaces, and focus on enhancing the Milan experience through protection of heritage and renovation of old spaces as well as revision of public spaces.

Hence to understand more the literature side, the goal was to first apply the same method as the previous chapter for IP but start off experimentally by searching the frequency of themes mentioned based on personal interpretation and also include other terms with high frequency (within Milan context) for further validity, as well as find any monitoring measurement models conducted, to see if the variables match up with the complexities under metro development.

Focus of Complexities	**n= no. of paragraphs mentioned**
Heritage	59
M5	39
(City)Image	61
(City)Identity	23
(City)Brand	48

Table 1 Milan ME Coding - Compiled by Author 2022

Sample size was 11 types of research papers, fewer in sample size but however much richer in representative and validated data, with more complexities to explore and to connect with the scope of results found.



Heritage-Led Intervention (Event Led)

Across the 9 research papers, 2 papers were found to show the most representative information within the context of heritage and the expo 2015. The first paper discusses the implications behind the "*uncertain planning processes*" and the "*enhancement of historic places*" both in the context of the host city spatial configuration. (Stefano Di Vita 2022). The second paper highlights the degree to which cultural heritage was important within Milan 2015 planning (Manuelo De Carlo et al. 2009). In majority of the analysis, indicates the turbulent planning process leading up to the expo itself, due to 2007-2012 lots of political issues e.g., banking crisis (Enrico Fontanari 2017), as well as the post event usage of the legacies made. Naturally, since there were obvious flaws within the process, this forced planners from both temporal settings to find potential drivers as well as mitigation cogs to counteract the negative externalities. Evidence shows the necessity of protecting heritage sites/ mini scale events in Milan as ways to support "political orientation" in terms of strategic policies revolving around large scale events ((Stefano Di Vita 2022). Whilst there are the obvious criticisms, the focus is understanding the encompassing elements leading up to the event, and as shown by the satellite maps as well as literature, Expo 2015 through its "rigid top down" approach was able to facilitate effective spatial "redevelopment" of Milan (Pasqui 2015). An added factor whilst Shanghai sought transnational actors as a hope to detach from the central government, Milan's planning process remained governmental, despite the overarching funding issues from the global crisis in 2011 and managed the development of infrastructure and transport.

Brand, Identity, Image (M5 Prioritization)

All expo events require high levels of accessibility within the host city, which is why like Shanghai, a metro line expansion is usually always pre-planned and put into operations prior to the event. Milan was no exception, like any master plan, there was a subliminal "basket" of infrastructure-based projects which were abandoned due to time and budgetary constraints, whereas the M5 was completely, even if partially (Corinna. M 2015). When observing the 3 traits found in Milan Expo literature, one focalizing aspect kept recurring; citizens' daily life. It is a given that an Expo should factor in citizens needs, especially in legacy development, the contradicting discourse however found is the awareness and flow of information between the governmental and societal structures (Stefano Di Vitta 2018 pg 35). This is to say despite the heavy prioritization of public benefit found in the overarching goals, participation and feedback was only starting to get collected in 2012, after much of spatial transformations (as shown M5 in the maps, development started as early as 2008).

The word cloud generated in the figure below demonstrates the tokens found under the collection of coding terms used to express the complexities. It can be observed that vast majority of the nodes seem to be linked to societal/communal and spatial regenerative features under the premise of national and international competitiveness.

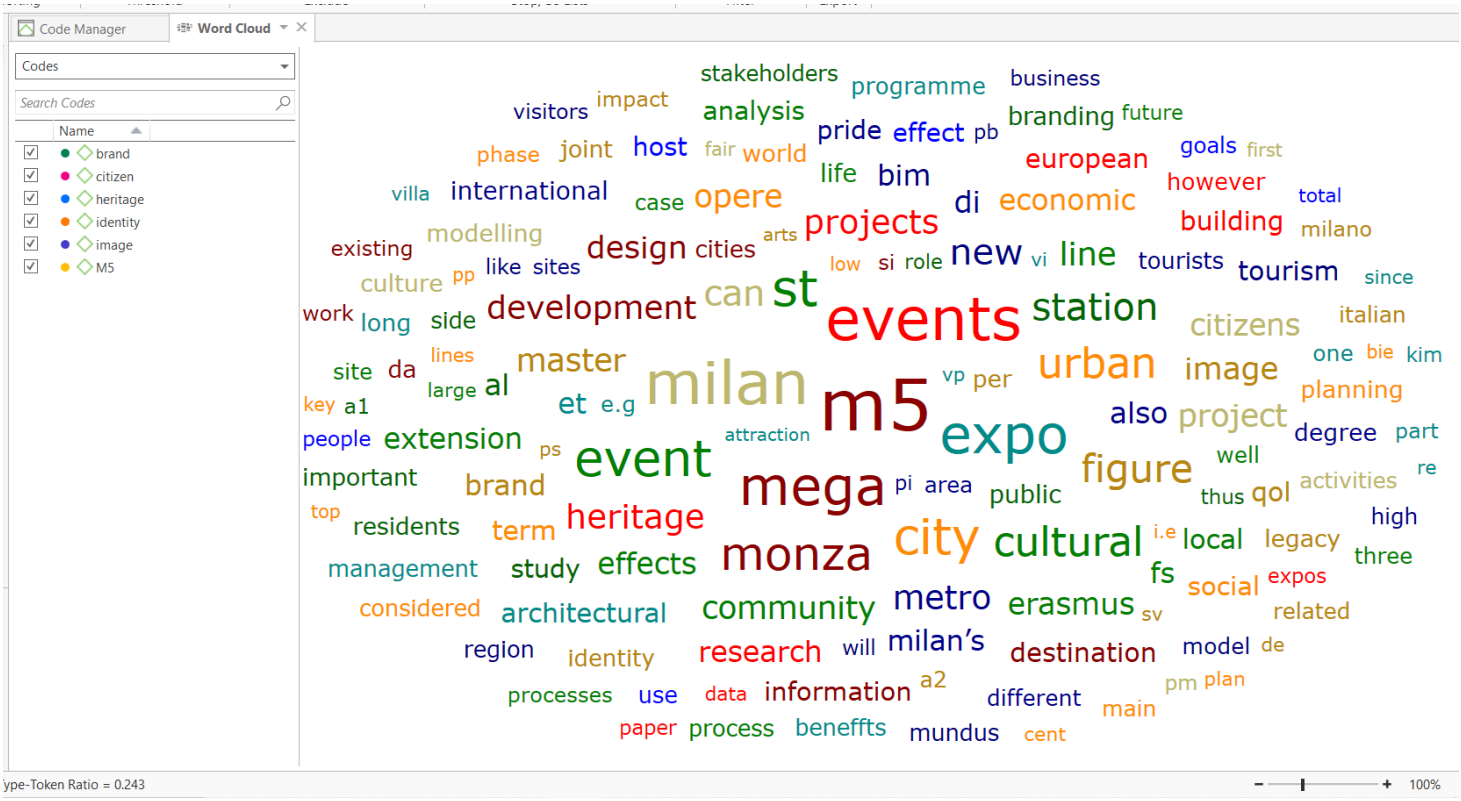


Fig.4 Word Cloud Token generated from base coding (Author 2022)

Monitoring Tools and Goal Identifiers (used in literature 2014/2020) - Adapted

Based on the aforementioned elements, several papers were identified with the same variables being prioritized in terms of research, out of which two papers showed the most promising and relevant results. One paper was a quantitative based by monitoring coefficient values connecting resident's level of lifestyle (community pride) due to Expo developments (Francesca Magno et al. 2020 pg 6). Second paper was qualitative with goals laid out in the "Candidature Document Chapter 21" which highlighted the long-term goals for the Expo long after it's execution "legacy" (Riccardo Ferrazzo et.al 2014, pg 69).

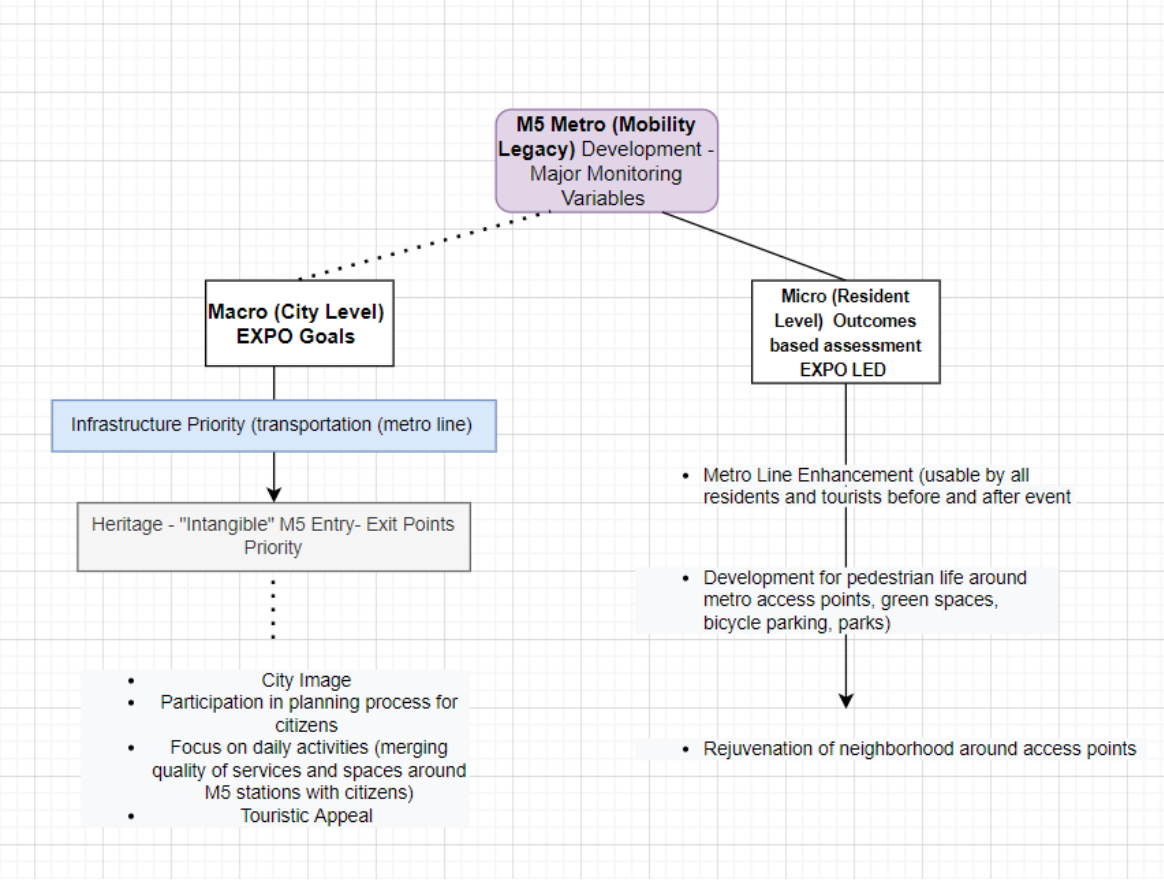
By combining and modifying both papers indicators, a macro and micro level framework can be adapted to the M5 line scope, as the elements found to be measured ran in tandem with the spatial changes observed through the maps. The spatial variables found affected within the satellite imagery above were stitched with the goal and outcomes assessment through the years 2014/2020, creates a tailored process and goal-oriented outlook for M5.

Fig.5 Measurement Indicators Adapted into metro line development – Adapted by Author 2022

Legend

Dashed line = goals

Filled line = actual outcome



As seen the overall goals and perceptions of measuring EXPO developments coincide quite similarly with the spatial actual development, a heavy emphasis on elements such as "enhancement" and "heritage" as well as citizens/resident perceptions along with tourism. A third paper on the M5 construction around Monza FS Station proves that the architectural goals corroborate the goals and outcomes being measured in the above-mentioned framework (pg 29 Sara A. Ben Lashihar 2019/2020).

4.4.3 Doha Political and Planning Complexities (IP)

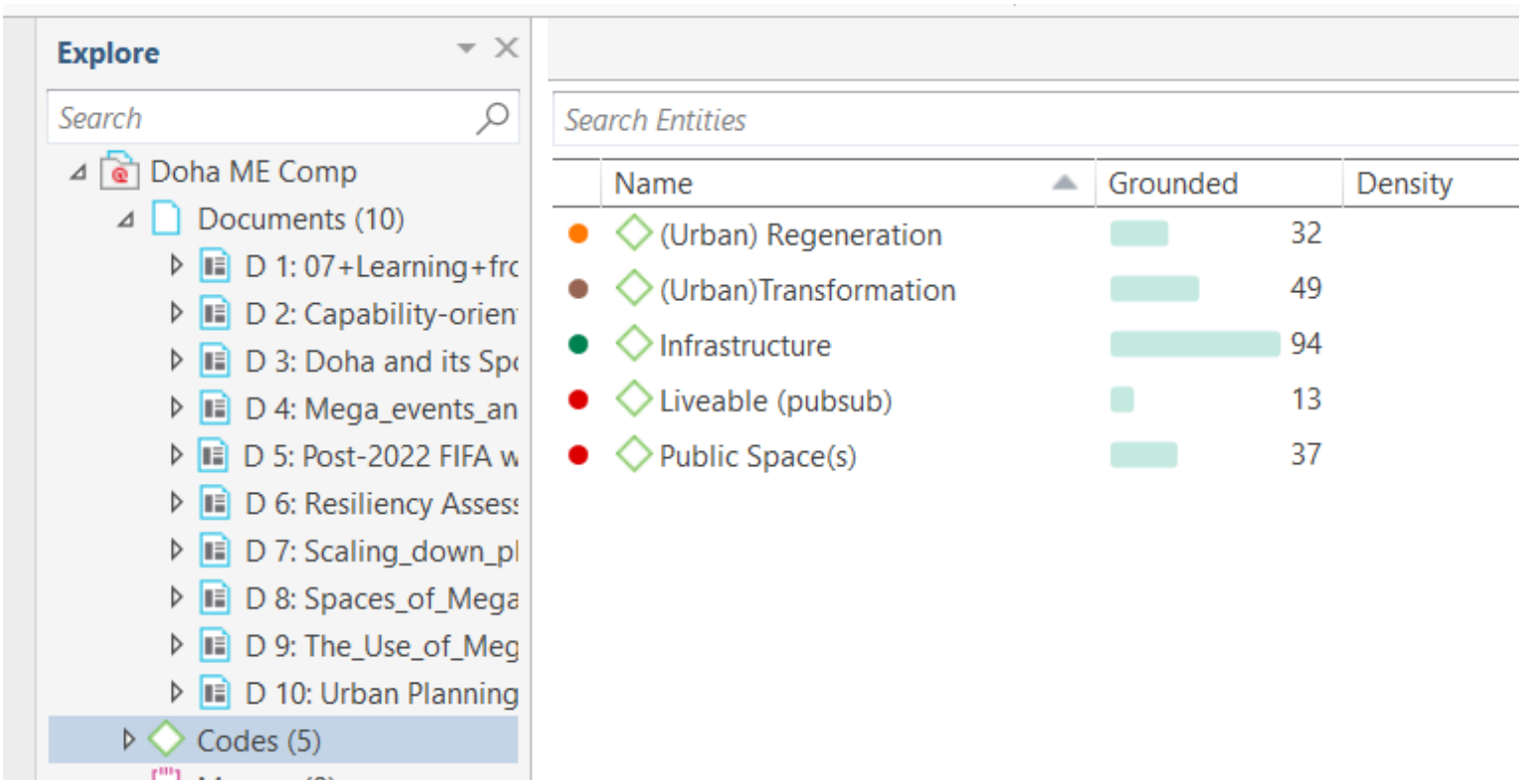
To give more in-depth about the complexities in the process, literature for Doha was dispersed into differing categories when looking at the metro analysis as well as mega event or sporitification of Doha, this led rather than collecting and combining all documents into one coding, the metro documents, and the mega event documents, and then seeing the results side by side. To see if any synergy were found.

Metro Documents = n (8)

ME Doha documents = n (10)

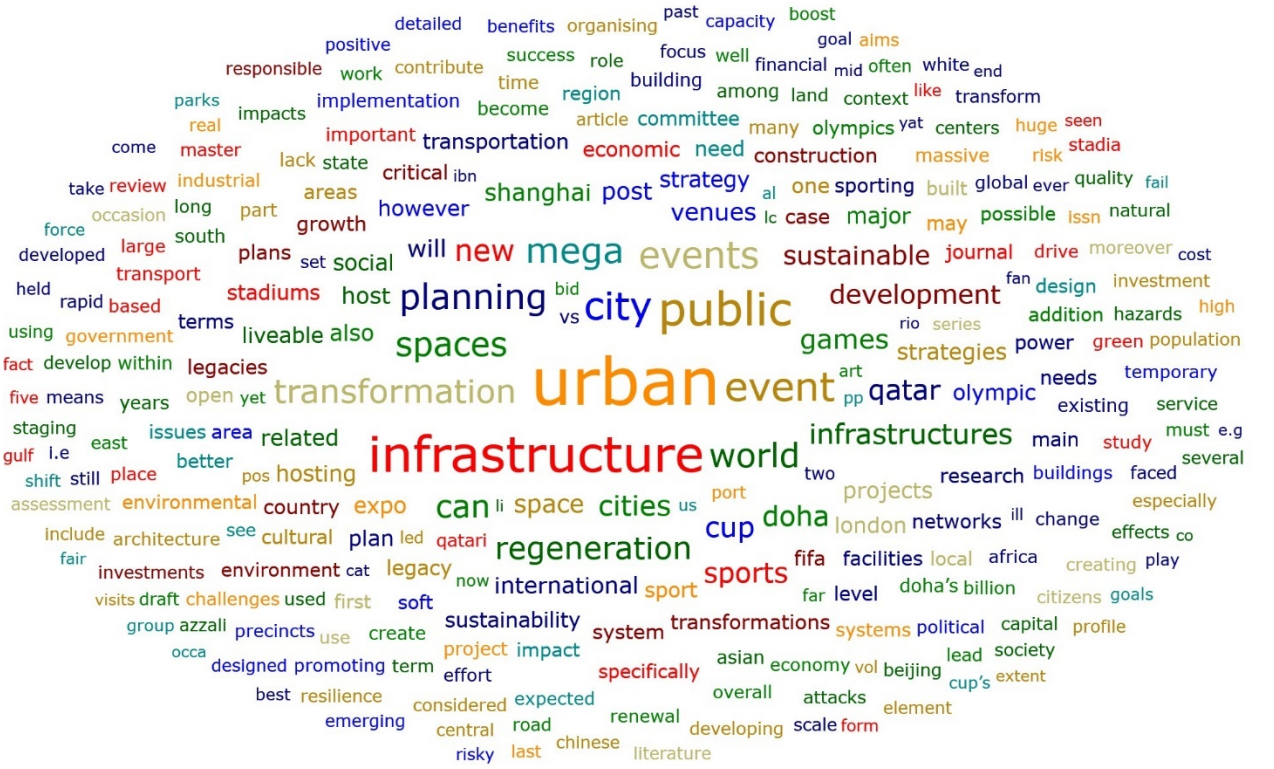
AtlasTi Results

Fig.6 (Author 2022). Frequency of most common terms by sentences found mentioning key word in the 10 Doha ME documents.



"Liveable" code is associated as a sub component of public spaces thus its inclusion.

Fig.7 (Author2022). Word Cloud generated under coding parameters for the ME Docs



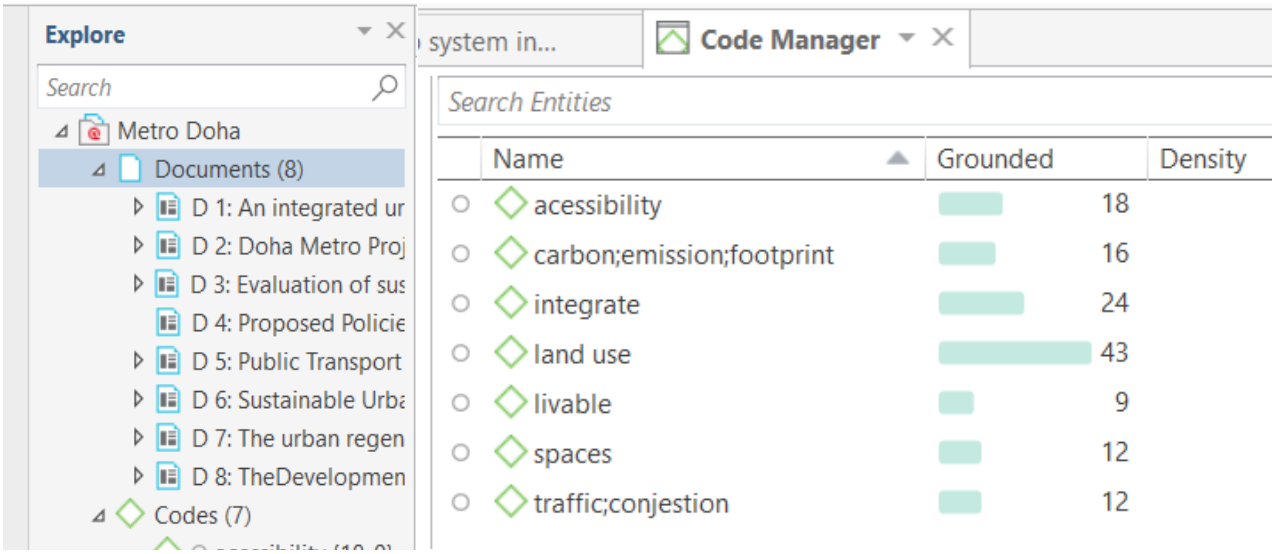
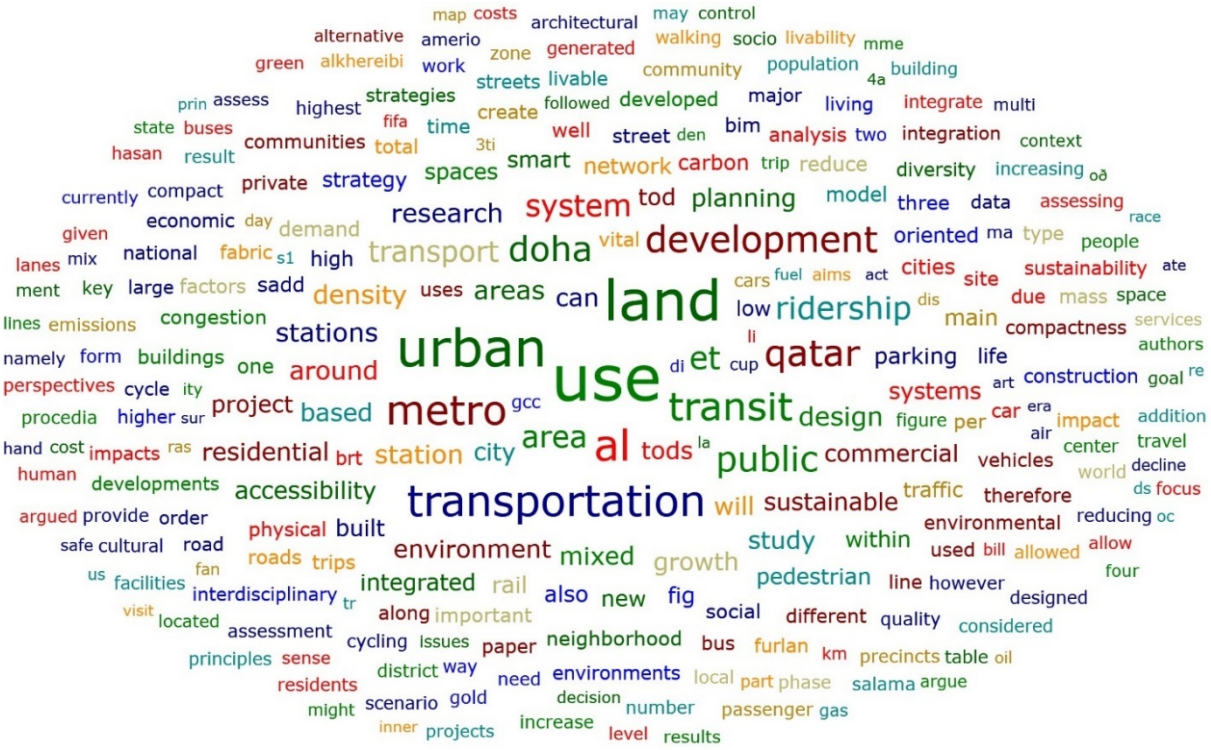


Figure.8 Metro Line Doha Docs Highest Frequency Keywords (Author 2022).

Fig.9 Word Cloud Generated from the coding parameters for the Metro Docs



Qatar's 2nd national development strategy (2018-2022) - Stitched monitoring

This was kept out of the sample set to try and analyze in a broader sense whether there was any similar focus under the national policies. The purpose here is to present the connections between the goals found in the national document with the spatial changes and information processed in the ME and Metro Doha samples; hence stitched.

Table 1 (Compiled by Author 2022): Goals in National and Doha (ME and Metro Development Context)

Exact Phrases	**Connection to coding (ME&Metro)**
"Improving Urban Transport Infrastructure(pg73)"	Carbon Emission, transformation; infrastructure
"Increase of Parks and Green Spaces(pg305)" / "Livability of urban environment (pg41)"	Spaces; livable; land use
"Integrated Land Use Plan" (subway and highway extension) (pg75)	Traffic; carbon; spaces; integrate
Integrated public transport network (pg80)	Integrate; land use; traffic; traffic; accessibility; infrastructure

Firstly, observing the 10 documents surrounding mega events and sporitification, the concepts that were mentioned or researched extensively revolved around 4 complexities; urban regeneration, transformation, infrastructure and public space morphology all connected to the facets of the framework focus as well as acting as a structural base for all specialized metro line variables that follow. Public services aspect was minimal and insignificant as it was usually referred to an economic initiative.

As portrayed by the Word Cloud as well as the development strategy in fig.3, fig4 and table 1, there is a huge emphasis on developing the existing fabric of the city through "integrated land use planning" as well focusing on economic, sustainable and infrastructure construction that would help with national and international competitiveness. This is validated by the observations seen through the satellite imagery, where there's more of a focus on filling up empty spaces with greening as well as parks and developing infrastructure such as the metro line station construction in tandem with highway delivery. This form of planning and execution of goals can be translated into the 4 planning complexities. When it comes to urban regeneration and transformation, there is a grey area between the strategies formulated and the implementation of them proven by the Supreme Committee that was interviewed within the document and indicated in a post outcome study of Doha strategies after the World Cup (Raffaello F 2018). Interpretively as shown by the surrounding land around the stations selected, many plots of land remain unchanged and empty, despite minute changes occurring such as greenification or walkway creation.

Public Space morphology is also a major topic researched and found ME relevant to the current state of Doha. In a research article for instance on neighborhood planning in Doha, outlining the issues behind large scale developmental plans often neglecting the public space for the inhabitants. (Qaddumi D et al. 2017). This is corroborated by the coding, as most the elements found within the world Cup and metro development context, show spatial changes occurring in the nationalistic sense with large scale architecture (metro stations) and only focusing on making parks. Another journal piece by Simona Azzali 2019 shares the same notion of lack of public spaces but more focused on the reutilization of the World Cup are and other stadiums as well as the infrastructure and the possibility of creating livable spaces out of them. As shown by the metro stations created which is undoubtedly an infrastructure, bubbles are created for localized planning initiatives where the potential for creating better integrated living spaces specific to the citizens is possible due to underdeveloped spaces around these rapidly developed events led transport hubs.

However, a gap remains within the public space configuration within the planning and execution process and the conflict between planning small scale initiatives and the overall political top-down approach for Doha's aesthetic, economic and overall sustainable outlook, where "resiliency" is addressed.

4.4.4 Community Use-Accessibility to Metro Stations - Contextualization Analysis

Before conclusively comparing and contrasting the planning processes as a whole amongst the 3 mobility projects, it is also important to analyze the overall community benefits and services found to be prioritized and expressed around the metro areas of influence for better contextualization using both the SU and IP extrapolation.

X = Commonly found across stations and well developed (at the time of operation)

Typology of Access in Mobility (Public), Table 1 (Author 2022)

Metro Line Development (Only Selected Stations)	Parking Lots	Walkways/Pedestrian (designated)	Bus stops	Tram
Shanghai 7,9,11	X	X	X	No
Milan M5	X	X	X	X
Doha Metro	X	Lack of (lots of sandpits instead)	X	No

Metro Line Development (Only Selected Stations)	Parks	Restaurants/Tuck Shops	Mall (Commercial Hubs)	Recreational	Special Access
Shanghai 7,9,11	Lack of (there was more unperturbed areas of greenery vs formalized parks	X	X	X	Meilan Lake
Milan M5	X	X	No (commercial services are more dispersed rather than hubs)	X	Monumental Cemetary (Monumentale Station)
Doha Metro	X	Overall lack of / no	No (however there are other stations that are connected to the mall of Qatar for instance)	X	National Library

Typology of Access (Private / Semi Private) Table 2

Metro Line Development (Only Selected Stations)	Housing Complexes	Office Buildings	Garden/Recreational Complex in Housing
Shanghai 7,9,11	X	X	X
Milan M5	X	No	X
Doha Metro	Lesser convenience (housing complexes are further away)	No	Minimal

As shown in the tables, in terms of community access to public services is not at all homogenous in nature, with the exception of parking lots and bus access points which is seemingly visible in almost all station developments across the 3 cities. In terms of other services however there are varying differences. Based on the selected stations, an individual's personalized track of mobility would have had access to several spaces and services.

Shanghai 7,9,11 (2010)

Simulating the mobility sphere based on the table and spatial configuration in this city around the chosen projects an individual would have access to; a.) neighborhoods whether they live there or visiting someone, b.) access to commercial buildings such as shopping complexes, c.) embedded bus stops, d.) some parks, e.) access to recreational facilities such as a tennis or basketball court. However, lacking an access to open public spaces, since most of the elevated stations ran in parallel to a highway, one wouldn't have been able to stay too long outside the station unless they went into a neighborhood or building. In areas such as Luonan and Meilan Lake which is the Jiading district, one of the primary goals behind this ambitious project was to allow for better access and inclusivity for the people living in this region, connecting the city from district to district. When it came to urban restructuring the planners not only focused on the housing and commercial aspect but also tried to facilitate park creation or biodiversity initiatives at most areas located near the stations selected, despite those stations being permanently closed but existent in the physical form, the surrounding services and spaces created for the community have been progressively gotten more developed to optimize convenience.

Milan M5 (2015)

Compared to Shanghai, the overall urban environment was already well developed, so framework of the actual urban environment was only perturbed during the construction time frame of the M5. However certain areas such as Domodossala the entire physical image of the neighborhood changed through mass renovation and planification. By placing metro points activated by the ME, it forced change on the overall small urban radius located around these points. Aspects such as transformation of a train route changed into a tram route and more bus stops allowed for better connectivity for not just inhabitants living in the area but also allowing external visitors to visit or move through, such as tourists. Revision of space was a huge aspect, but also "designation" of space was changed, in Isola, existed an outdoor market square where stores were temporarily open in the street to sell produce. However, after the Isola underground tunnel was constructed, the area was changed to be a two-way street with a pavement and parking, shops opened up formally in parallel at the ground floor of the buildings. A transitionary aspect of public spaces and services shifting from a less unplanned, spontaneous urban street to a more formalized and clear designation of how a space must be utilized. However, there was a loss in a more intangible sense, identity, and interaction. As an assumption, Domodossala whilst it may have cleaned up the graffiti and overall modernized the space, the original identity that was imprinted on the neighborhood was lost, the same perspective of which could be applied to Isola where the market no longer can operate in the area, traffic gets better fluidity, but residents lost the original day to day interaction with the sellers. Mobility project in Milan showed a transition in a concentric way impacting and changing a neighborhood, whilst in other spaces trying to maintain the same space configuration to preserve natural and heritage environment. M5 Line is still completely in operation till present date unlike Shanghai's case where most elevated stations have been rerouted to underground instead.

Doha Metro Station (2022)

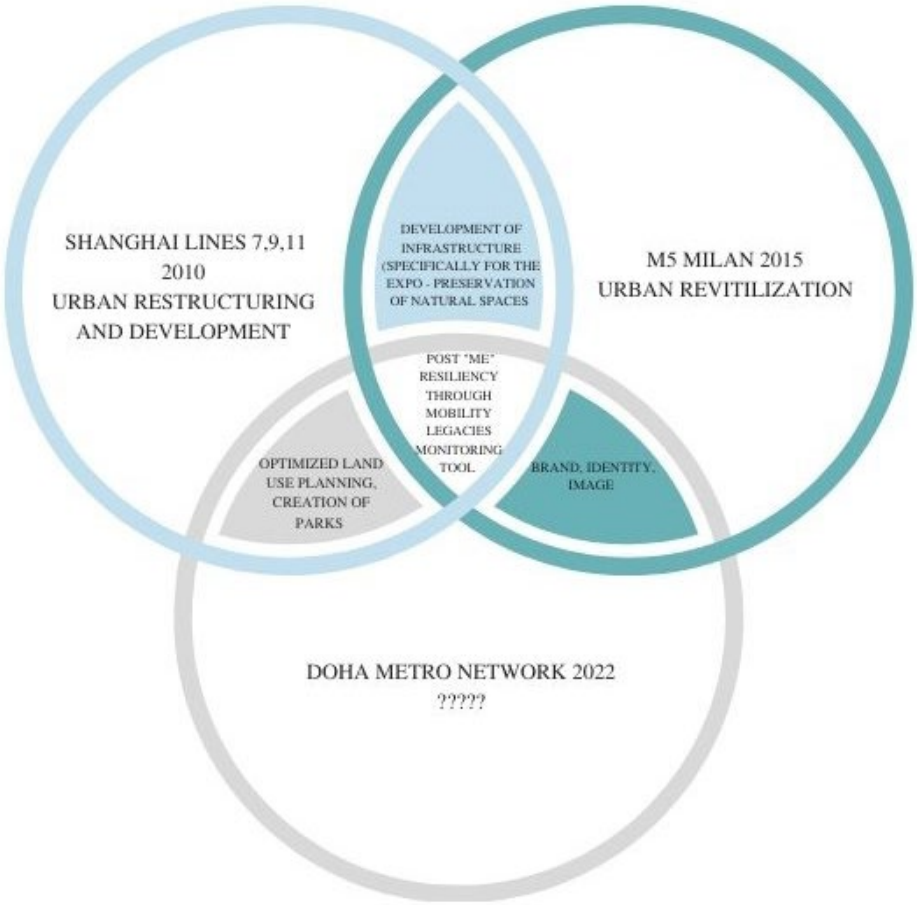
Only recently was the entire rail network conceived, thus the surrounding spaces and services are still in a flux of planning. As shown above in both spatial and the plethora of secondary data there is a lack of public spaces for the citizens. This can be chalked up to land use planning and the lengthy process of what do precisely do with the open areas of land. Doha has shown to have a modernized and aesthetic architecture from constructing stadiums all the way down to the actual structures of the metro stations. However, whilst the construction for these events led initiatives are successful the overall landscape in terms of service access and space convenience is shown to be lacking. Doha unlike Milan did not have an established historical base of urban environment, like Shanghai it is at a point of great development, but on a smaller scale. However, the added handicap is the natural environment, which at its core is a desert. Most Gulf cities main priorities as shown in Doha around the metro points, is increasing green biodiversity and parks, to break past the natural barrier and provide parks to the community. As shown in the maps, there is still a lot of open sand pits. Comparatively to the previous two cities as well, there is less of a convenience of access to these stations, as they are seemingly further away from people living in dense neighborhoods and would require a car to drive to the station itself. This is all based on the spatial maps shown by location and overall radius of access around stations.

4.5 Conclusions and Recommendations

4.5.1 Comparing & Contrasting– Milan, Shanghai and Qatar

Shanghai's fast paced metro development applied a transnational and entrepreneurial route to counteract governmental conditions with the funding that came through unorthodox channels, whilst Milan had a route that involved a financial crisis and budgetary red lines, remaining a top-down planning process that focused on people centric benefit goals, with late participation and feedback from citizens themselves, well after the transformations had begun. From two different countries, the sheer spatial and political complexities presented through just one facet of development in ME planning, shows to impact the city in concentrated forms. Qatar based on findings shows to have followed a combined planning process that constitute Milan and Shanghai separately. Doha like many of its gulf counterparts is a modernized desert city, so whilst it is internationally competitive in many areas such as sporitification, it's still very developing in terms of transport and infrastructure. Below is a framework constructed on the foundation of the starting conceptual framework used to understand the processes, embedding the planning complexities found across the 3 cities through the spatial and information analysis.

Figure 1: New Conceptual Framework Author 2022 – Similar and Differing Complexities



The framework's purpose is not to create "one definitive" structure for mobility legacies but generate a visually simplistic understanding of the commonalities amongst the 3 cities and

events. It serves as a basis of seeing what focalizing areas were impacted or modified to serve the city's overall goals for progress, hence the addressing of resiliency. As shown by the framework, there are varying polarizing similarities when looking at the pattern of space and services development for amongst the 3 different mobility projects. In terms of achieving their sustainability goals and other various initiatives the plans, these shape up to be the major themes one sees in the framework, such as urban restructuring or revitalization. Shanghai focused on quick, efficient and impactful development that raised the standards as well as competitiveness nationally and globally, despite the massive development required at the time. Milan on the other hand wanted to re new their urban environment, bring better city branding/culture and infrastructure modification. Milan had opted to drop many other initiatives and projects, but the metro project which the government focused on priority completion was a success as well as the spatial changes around the metro stations on the line itself. Preservation and development of space and infrastructure were the commonalities in both the planning processes of Milan and Shanghai, just the scope of ambition as well as funding/governmental power dynamic remained different in principle. Qatar is still within the execution stage, and overall, the spatial ambiguity of current land use purpose leaves further research required in the future. A lot of initiatives still being carried out as well, as most gulf cities who've experienced a boom in development due to oil discovery like the United Arab Emirates serve as literal "sandboxes" for urban creation.

Resiliency byproduct / Concept of Knowledge Sharing - Recommendations

When it comes to resiliency, rather than outright stating whether these mobility projects augment or contribute to legacy, based on both spatial and informational analysis, by analyzing developments of these changed neighborhoods or added public spaces and services over time, allows one to make an evaluation matrix for resiliency. Rather than conclusions, the best method shows that by analyzing community benefit and spatial access over time due to an event led development in transport, even extensively observed can allow for better data collection in the micro-mobility planning context. Furthermore, it remains relevant today as most stations studied still exist today with bustling neighborhoods, spaces and services in constant flux. Shanghai despite having most of the elevated stations permanently closed and infrastructure shifted underground, the area around it is more urbanized with greater density than when it began. The research conducted also yields informational benefit for future mobility extensions catalyzed by an ME allowing for better micro planning and weighing out ambitious policies against real city benefit, hence allowing for an adaptable strategic urban planning tool that can be applied. Doha's analysis takes this further, as the entire metro network was only created 3 years back, with land use and built environment in vague flux.

4.5.2 Suitability and Validity of Research (Starting Conceptual Framework)

When looking at the original concept and comparing it to the findings, the focuses chosen in the operationalization remained relevant post analysis. As the new framework touched upon more specific and specialized routes, the general focus still impacted, public spaces and services and the metro line development was an effective choice to monitor the spatial legacy outputs before and after the development phase. The research itself retained validity, as mapping allowed for real time snap shots of the urban environment from both aerial and pedestrian point of view. By applying both spatial and informational, the extrapolation allowed for richer results and construction for the 3 cities planning complexities under mobility legacies.

4.5.3 Future Research

Venue creation and legacy assessment as shown through literature review has always been heavily researched, but what this study shows is that transport infrastructure and the spatial mobility involved when connected to community access / inclusion weighed against touristic opportunity and profit is still not researched as much when observing mega event led development. Just observing one neighborhood where a metro line was created yields a plethora of minute urban changes and transformations to analyze when considering urban related goals i.e., Domodossola station in Milan. In terms of limitations and other research elements that were left out, aspects such as bus network connections as well as tram connections, could have also been investigated further for the thesis, but time and structure constraints prevented that. Other limitations lied with the coding, as the idea was to gage and obtain general thematic complexities, so more specific focuses may have been less prioritized. As emphasized, the variations this analysis could take, are limited to the understanding and empirical data currently in existence, form the gigantesque complexities that could be analyzed from a policies and strategic planning perspective.

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Appendix 1 – Research Instruments and Time Schedule

1. **Atlas TI –** Qualitative Coding Software, used it to conduct document analysis
2. **Arc GIS Pro -** Mapping Software – Exceptional software for linking and modifying external attributes and map layers
3. **Google Earth Pro –** Satellite Imagery Software - Using time-based satellite imagery with pinpoint accuracy for spatial
4. **Google Maps –** Terrain and Street View Software (Fieldwork streamlined digitally)

Thesis Segment Task	Feasibility 20-100 (realistic pace under my control)	Time Frame (provided if I get everything on first try
Introduction	100 %	30th May – 4th June
Literature Review + Hypothesis	80 % (20% accounts for literature I may not have access to)	5th June – 15th June
R&D / Methodology	100 %	16th June – 25th June
Results, Analysis, Discussion	65-80% (lots of unpredictable factors)	The entirety of July & August
Conclusion	80 % (hindered by results time)	Last half of August & 1st week of September
Bibliography, Appendices, Tuning of thesis	100 (continuous)	Rest of September

Appendix 2: Information on plagiarism

(From the Examination Regulations 2021-2022 document, Annex 8: Fraud and plagiarism procedure.)

The purpose of this document is to briefly explain the fraud/plagiarism procedure at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam. It provides the definition of fraud and plagiarism and defines the steps that are followed if student is suspected of fraud or plagiarism.

Definition of fraud and plagiarism

Fraud and plagiarism involve acts as the result of which the assessment of student's performance, knowledge or skill is partially or totally hindered.

Fraud might be in many different forms such as ghost-writing, cheating during an exam, plagiarism, etc. The following acts are considered to be fraud:

1. Obtaining knowledge concerning the questions or tasks in an examination in advance;
2. Assuming another person's identity or having another person assume one's identity during a test;
3. Consulting sources of information or having them at hand (such as books, syllabi, notes written on paper or the student's skin or clothing, programmable calculators, mobile telephones, smartphones, and all other electronic devices that might contain information), the use of which is not explicitly permitted. Mobile telephones, smartphones, etc. Must be switched off and remain off during tests;
4. Copying other students' answers or exchanging any information whatsoever with them inside or outside the examination room during the test. Providing other students with the opportunity to commit fraud is also deemed to be fraud;
5. Changing the issued question forms and/or examination papers or exchanging them with other students and/or taking question forms and/or examination papers away with them and/or copying them without permission.
6. Making any changes to previously submitted examination answers during a subsequent inspection.
7. Committing plagiarism, which means the copying of a passage containing more than one or a few words from one's own or someone else's work, either literally or in translation, for an individual or group assignment, project, thesis or any other type of text that is part of an examination, without indicating this by quotation marks or similar unequivocal typographical means, even if a bibliographically traceable and correct source reference is included. Providing other students with the opportunity to commit plagiarism is also deemed to be fraud.
8. Making it partially or completely impossible to form an accurate opinion of the student's acquired knowledge, insight and skills by actions or omissions in any other way.
9. Assuming a different identity during compulsory educational meetings.
10. Being represented by a third party during compulsory educational meetings.
11. Collaborating on the report for an individual assignment without permission.
12. All other forms of misconduct.
13. The following are likewise prohibited:
14. Taking part in a test without being entitled to do so;
15. Making it partially or completely impossible in any other way to form an accurate opinion of the student's knowledge, insight and skills through deceitful actions or omissions.

Plagiarism is a specific form of fraud and involves the use of other's work with no proper referencing and acknowledgement.

For detailed information on steps to follow regarding cases of fraud/plagiarism, sanctions and fraud involved in online examination please refer to the Examination regulations 2021-2022, Annex 8.

Appendix 3: Privacy regulations: addressing the GDPR

It is important that students ensure they are using GDPR-safe options for their research:

1) When collecting data using a survey, avoid asking for personal data if that is not directly relevant for your research.
2) If you need to include the name and personal information from the interviewee, inform him/her about the inclusion of their name in the thesis and make sure they give their consent. This can be done with, e.g., a separate tick-box to consent to this ('yes, my name can be included in the thesis').
3) Inform the interviewee what will happen with their personal information.
4) We recommend using the Qualtrics software for surveys as it is GDPR compliant. Further, Qualtrics is covered by a campus-license and free for students.

Appendix 4: IHS copyright form

In order to allow the IHS Research Committee to select and publish the best UMD theses, students need to sign and hand in this copyright form to the course bureau together with their final thesis.

By signing this form, you agree that you are the sole author(s) of the work and that you have the right to transfer copyright to IHS, except for those items clearly cited or quoted in your work.

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