

Smart Neighbourhoods and Gentrification in Tehran: Sustainable Urban Planning and the Challenge of Inclusive Development

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Chapter One:

My thesis examines gentrification in cities and how neighbourhoods and homes, as well as sustainable urban planning, can reduce or mitigate its effects.

In this chapter, I begin by setting the scene through an overview of the neighbourhood context and the broader debate. Next, I explain the current importance of these issues and identify the existing gap in the literature. Finally, I present the research questions that shape the direction of the thesis.

“Projects work better when people are involved from the start.” (planner, Interview 5, 2025)

“The towers seem beautiful, while my neighbours are going out.” (Residents, Interview 6, 2025)

Tehran changes fast not only in its skyline, but in everyday life of people who call it home. In Fereshteh, Shahrak-e Gharb, and Sadat Abad, new apartments, all homes, and services are available, despite harder choices about what people can afford to live. As a someone who lived and grew up in Sadat Abad myself, I was a witness to these changes first-hand. This personal acquaintance with this area adds grounded, lived experience to these questions explored in my thesis. It’s asking a simple question with a big outcome: can smart and sustainable planning in fact help to keep these neighbourhoods inclusive, or do they risk accelerated gentrification?

Introduction

1.1 Background and Context

Tehran urban’s landscape has suffered dramatic developments in the last decades, particularly in northern and western neighbourhoods of Tehran, such as Shahrak-e Gharb, Fereshteh, and Saadat Abad. These areas were low-density suburbs before, has been specified by empty fields and single-family villas. Due to increasing land costs and development compression, they evolved into these luxurious district filled with modern apartments, luxury shopping malls, and new businesses. For example, Shahrak-e Gharb, which is known as Gharb Town, was in principle developed in the 1960s on Tehran’s northwestern margins and today is one of the most wealthy neighbourhoods in the Tehran, has a lot of luxury apartments, towers and villas, wide infrastructure, malls, sustainable parks, and cultural centres (Wynn et al., 2023). Also, Saadat Abad and Fereshteh, which are located in the city’s north and northwest, seem to be full of high-level residential towers and commercial complexes with premium amenities, transforming their skyline. My case-studies, I mean these three neighbourhoods, that, it is considered among the best-developed areas of Tehran; indeed, urban municipality study ranks districts 1 and 2 (which include Fereshteh, Saadat Abad, Shahrak-e Gharb, and the nearby fourth) as they have the highest rate of development and housing quality in the capital. The prosperity in these areas

has strongly contrasted with some southern part of the city, highlighting Tehran's spatial inequality. Due to the reports, Wealthiest residents decisively live in the upscale northern districts 1 and 2, although it is estimated 42% of the city's population, which lives below the poverty line, is concentrated more in the poor southern districts. City authorities noted that expensive development projects are being implemented only in the elegant northern parts of Tehran, while some low-income neighbourhoods seem to have small improvement. (Financial Tribune, 2017)

Tehran's pattern of concentrated affluent development is indicative of a larger trend in several Middle Eastern cities. Researchers have noted that distinctive tall structures and urban renovation projects, gentrified districts, include coastal tourism infrastructure, large commercial centers, and informal settlements, which are the primary indicators of Middle Eastern urbanism in the twenty-first century (Wynn et al., 2023). These trends illustrate how social displacement and inequality processes often occur with modernization and smart urban development throughout the area; this thesis examines this dynamic in the context of Tehran.

In Tehran's case, as the proliferation of contemporary modern smart buildings and luxury complexes in formerly quiet districts can be seen as a form of gentrification, a process in which urban redevelopment and the entrance of wealthy inhabitants modify an area, frequently increases property values and altering its social fabric. The swift gentrification of neighbourhoods such as Shahrak-e Gharb, Fereshteh, and Saadat Abad raises important questions for urban planners and policymakers. These recent developments have improved the housing and services in the capital city, however they also risk spreading social and spatial inequalities by making housing unaffordable for long-term residents and focusing on advance infrastructure in the wealthy areas. This study examines how the rising of smart neighbourhoods in this gentrifying background connecting to Tehran's aims for sustainability and being inclusive. As highlighted in during interviews, one resident of Saadat Abad (Resident Interview 3, 2025) explained: "Everything looks modern now, new towers, malls, and roads, but it feels the city is not for everyone and all groups of society." also, a municipal planner (Planner Interview 2, 2025) stated: "We often design for efficiency and aesthetics, it's not always for liability; the outcome is divided Tehran's smart within some parts to struggling with others."

1.2 Conceptual Framework

This part introduces the three main ideas that support my thesis: in smart neighbourhoods, gentrification, and sustainable urban development, which are examined in this section. These concepts are from the theoretical framework for analyzing Tehran's urban change. The study examines itself at the convergence of these three ideas, also examine how technological modernity and urban renewal are intersect with issues of social equality and inclusivity. The notion of the smart city refers to integrating data and communication technologies (ICT) with urban infrastructure and services for improving sustainability,

efficiency, and level of life. While invention such as the Smart Tehran Program (STP), which was launched in 2019, Tehran has searched to increase urban viability and environmental performance by using digital connectivity, data, and automation for better managing resources and engaging citizens (Wynn et al., 2023), (Robin,2013). These efforts are declared at the neighbourhood's scale in smart infrastructure, IoT-enabled homes, and digital services aiming to improve comfort, energy performance, and relief.

Gentrification, however, explains the socio-economic upgrade of the neighbourhoods that go along with redevelopment as well as new investment. It's cause of infrastructure improvements, but sometimes pushes out long-term residents and changes local people (Masoud, Zamani, Rezagah,2019). In Tehran, gentrification is clear both in the renewal of old central areas and in Condensation of the wealthy northern areas such as Saadat Abad and Fereshteh, where luxury smart buildings replace older residences. (Basirat and Arbab, 2022; Madanipour, 2006; Kheyroddin & Ghaderi, 2020) These dynamics help to find how technological, novation and smart urban development can overlapping with process of social frustration and strengthen existing layouts with spatial inequality, in particular cities of the Global South (Hollands,2008).eventually, sustainable and inclusive urban development focuses on balancing economic growthing and environmental protection, and social equality, along with the UN Sustainable Development Goal 11: "Make cities self-inclusive, safe, resilient and sustainable" (Hu & Bock, 2018) In smart cities, this needed ensure that technological innovation has benefits for all citizenship rather than deepening social splits. However, as global research which is showing, many smart city initiatives stay from top to bottom and technocratic, privilege performance over inclusivity (Robin,2013) (Masoud et al., 2019)

By tying these viewpoints together, the thesis explore if Tehran's appearing smart neighbourhoods to contribute to sustainability and inclusion or risk reinforcing socio-spatial segregation. Therefore, the conceptual framework positions Tehran as a case in which smart urbanism, gentrification dynamics, and sustainability goals intersect, offering seeing how digital transformation transforms urban equality and everyday life.

1.3 Research Aim and Questions

This research aims, is exploring that, how smart neighbourhood development and gentrification interact with Tehran and if these changes really encourage sustainability and an inclusive future. In other words, if cities are pushing for technological modernization comforms with fair development or deepens current issues. The case studies of Shahrak Gharb, Fereshteh, and Saadat Abad introduce clear examples of Tehran's rapid and growing conversion. According to this aim, this research is guiding one main question and three sub-questions. The main research question that led to the writing of the thesis is:

How do smart neighbourhoods and the process of gentrification in Tehran relate to sustainable development and urban planning, and can these transformations support an inclusive future for the city?

According to this, a set of sub-questions has been extracted to structure the research:

What defines a smart neighbourhood in the context of Tehran, and how have such developments emerged in the city?

This question is clarifying the idea by looking at the characteristics of smart buildings and digital infrastructure in Tehran's neighbourhoods.

How have the selected neighbourhoods (Shahrak-e Gharb, Fereshteh, and Saadat Abad) transformed over time, and in what ways do these changes reflect gentrification processes?

This is an analytical and contextual question. It necessarily asks: what happened in these districts, who has benefited or has been affected by these transformations?

To what extent do these smart neighbourhood transformations align with the principles of sustainable and inclusive development in Tehran's urban planning?

This question is evaluating outcomes faced the ideals discussed in the conceptual framework. This sub-question researches the positive and negative consequences of the smart neighbourhood to improving the quality of life and innovation to address potential disadvantages such as social exclusion or pressure on urban infrastructure.

These research questions take the variety of approaches to the subject. The main question connects the main themes of the study, called smart development, gentrification, and inclusive planning, to the one large inquiry regarding their interaction in Tehran. The sub-questions break this: the first is defining key terms and context, the second examines the real examples of the case study areas, and the third one is evaluating if these changes conform to Tehran's goals for sustainability and inclusion.

The reason for choosing these questions was both academic and personal. Academically, they fill up gaps in current research and create a more comprehensive picture of Tehran's urban developments. Personally, as an urban planner who was growing up in Tehran, I have seen how the city is changing and the tension between modernity and social justice. This experience shaped the focus on local neighbourhoods, keeping the study grounded in real conditions. The main question asks if Tehran will become smart without leaving wealthy groups; however, the sub-questions shift from defining the smart city view to analysing neighbourhood changes and evaluating them according to the principle of inclusive, sustainable urbanism.

1.4 Research Gap and Significance

This study fills a significant gap in existing research and policy discussions. However, smart cities and gentrification are often explored separately; some research examines that, how smart-city's projects might be the reason or may reduce gentrification, especially in developing cities such as Tehran. Recent studies have also mentioned a lack of work connecting smart city invention to the main issues like housing affordability. (Wynn et al.,

2023). Also, the social effects of high-tech urban transformation are still not well understood. The idea of inclusive smart urbanism is also quite new researchers note that the inclusivity dimension of smart cities is often ignored, and there is still no clear definition of what truly makes a smart city inclusive. (Hu & Bock , 2018)

By focusing on Tehran's smart neighbourhoods, clearly understand it can support an inclusive future. this study directly participate with that conversation, and it seeks to provide transparency on how to measure or achieve inclusion in a smart city. In Iran, the connection between smart urban development and social equality has not yet been investigated. Since Tehran's Smart City program run, few researches have looked at its real effects or relationship to the sustainable goals. Even though Gentrification, has only recently gained notice, and redevelopment is already uprooting residents and changing neighbourhoods. (Masoud et al., 2019)

The thesis goals attempt to close this double gap by combining two fields of inquiry smart city invention and gentrification, in the context of Tehran's urban planning. this will help document a new case-study on how technology-driven development is taking place in Tehran's neighbourhoods and what social effects are associated with it.

This research also motivated by a personal and regional gap in last researches. Most of the work on smart cities and gentrification has focused more on Western and global big cities, while cities such as Tehran never understudied. By exploring Tehran is a fast-growing Middle Eastern metropolis, this thesis offers a crucial local viewpoint. As a native resident of Tehran and an urban planner, I have firsthand knowledge of the city's spaces, culture, and development plans. This view helps to keep the connection between local realities and academic analysis, asking important questions: How can Tehran become smarter while remaining inclusive? What lessons can prevent inequality during these changes? thus, the study fills a vital gap by linking technology-driven and urban growth with issues of social equality and sustainable planning.

1.5 Structure of the Thesis

This thesis is prepared in six chapters, As specified below, to address the research questions and objectives:

1. Chapter One: Introduction This opening chapter has been given an overview of the study problem and setting. Presents the research challenge, explains the growth of gentrification and smart neighbourhoods in Tehran, defines key concepts, outlines the aim and questions, and highlights why the study is important both academically and personally.

2. Chapter Two: Literature Review The second chapter will examine related literature and theoretical outlook that support the study. Also, it will Review researches on smart cities, gentrification, and sustainable urbanism, in Iran and around the world. It recognizes weaknesses in existing research and places in Tehran a more comprehensive comparative framework.

3. Chapter Three: Research Methodology This chapter will be covered in detail the research design and techniques used to carry out the research. It will explain the logical for choosing a case study approach that focusing on Tehran and the exact neighbourhoods. This chapter will Explain the research design, case study approach, and data collection ways (fieldwork, interviews, or secondary data). It has also discusses ethics, data analysis, and how the study was carried out.

4. Chapter Four: Case Study Analysis Tehran's Smart neighbourhoods and Gentrification , This chapter explains the empirical findings of the research. This article will examine in detail the case studies of Shahrak-e Gharb, Fereshteh, and Saadat Abad. It might be organized by neighbourhood or by thematic aspects. Presents results from these three districts and recognizes their changes through smart developments, changing demographics, and indications of gentrification

5. Chapter Five: Discussion In this chapter, the findings of the case study will be interpreted and discussed in the thesis and the literature review. Interprets the findings, connecting Tehran's experience to international notions of smart urbanism and gentrification. It assesses the advantages (modernization, better services) unto challenges (inequality, displacement) and evaluating city's policy on inclusivity.

6. Chapter Six: Conclusion and Recommendations The last chapter will conclude the thesis while summarise the answers to the main research question and sub-questions. The study's key findings, for example, which also extends to the development of smart neighbourhoods in Tehran in line with sustainability, inclusive growth, and the conditions under which positive or negative outcomes are most likely occur. Summarizing key insights, a reflection on how smart neighbourhood development aligns with sustainable and inclusive growth, and it proposes policies to balance innovation and social justice. It cocludes with constrains and further research directions.

Following the structure of this chapter, the thesis will logically proceed from the introduction of the problem, through the theoretical background and methodology, to carefull analysis, and ultimately to thoughtful discussion and conclusion. Each chapter creates against the the previous ones, It has created a coherent narrative about smart neighbourhoods, gentrification, and sustainable urban renewal in Tehran. Therefore the reader is guided by an of this topic.

Eventually, this structure reinforces the thesis's framework: which starts with the query of whether smart neighbourhood reforms can support an inclusive future, and it's ending with providing an informed response to the question, backed by documents and analysis. By this framework, the thesis goals are contributing both local insights for Tehran and broader lessons for other cities managing the intersection of smart urbanism and social justice.

Chapter 2: Literature Review

2.0 Introduction, Purpose of the Literature Review

The literature review is organised together to key strands of literature on smart urban development, gentrification, and sustainability, in order to frame the analysis of Tehrans recent urban transformation. Through examining these studies, the review focuses on, how technological innovation, and urban regeneration, and social equity have been addressed in recent scholarship, also where the gaps stand in understanding their combined impacts. It lays a conceptual foundation for analysing, as smart neighbourhood development and gentrification it can advance sustainable and inclusive urban futures, or if it may instead to intensify space and social inequalities. This chapter is structured into sub-sections as if define main concepts, outline the evolution and causes of gentrification, exploring its relationship by emerging green and smart urban trends and conclude with a landscape that has been drawn, with the specific case of Tehran's neighbourhoods.

2.1 Defining Core Concepts: Smart Cities and Sustainable Urban Development

In my thesis, I argue that Urban development in the 21st century has been shaped by two, and it's defined by two dominant and often competing frameworks models, in fact these are understood as the rise of smart cities agenda and the necessity of sustainability in urban growth. On the one hand, and the rapid improvement in data and communication technologies (ICT) was gave cities a series of new tools and ideas to increase services and connectivity, which often birthed the concept of the smart city. By contrast, mounting environmental, social challenges was driving cities to reach sustainable development aims, guaranteeing that urban growth faced with present needs without undermining future generations (World Commission on Environment and Development, 1987, p. 43) (Jarvie, 2016). This approach is growing assessment that these two options might converge. Looking into the future of cities, it shows us that they are going to be both high-tech and liveable. This section summarizing the basis of smart cities, sustainable urbanism, and also examining their operating principles and frameworks. The subsections will explore the evolution of the smart city idea along with its scales (2.1.1), main sustainability principles are guiding urban development (2.1.2), plus how the integration of smart and sustainable agendas is giving rise to new models of urban planning (expanded in subsequent parts). Through surveying global examples of Singapore's smart nation to Copenhagen's climate-friendly innovations, the argument emphasizes how technology and sustainability are useful in leading cities.

Singapore and Copenhagen have been shown as illustrative global references case in comparison with the case studies. These are not treated as models to be replicated in Tehran but as contrasting reference points that help clarify how governance structure and political context shaped the social consequences of smart urban development, where digital infrastructure and data-driven governance, and large-scale planning have been

systematically deployed to increase efficiency plus service delivery. In contrast, Copenhagen is widely recognized for the integration of smart technologies along with sustainability-oriented, covering, and climate-focused urban policies. By considering these two cities together to more clearly understand how smart and sustainable urban plans emerge from different governance models and socio-political contexts, preparing a useful conceptual backdrop to assess how similar narratives are adapted in Tehran.

Ultimately, understanding the fundamentals can provide a context for how cities like Tehran can map out own smart and sustainable urban strategies with a global approach. While smart technologies and sustainable urban strategies are both promoted as tools to improve cash flow, environmental performance, and quality of life and their social impacts are not equally distributed. Without considering detailed planning, smart urban development has the potential to focus investment in areas of current advantage, so increasing housing costs and intensifying socio-spatial inequalities happen. This raises important questions about inclusion, specially in cities where technological modernization intersects with rapid real estate development. In this context, Tehran's recent embrace of smart urbanism through the Smart Tehran Program is a timely example to examine whether the development of smart neighbourhoods can support sustainability without fostering gentrification, modernization, and social exclusion.

2.1.1 Smart City Foundations

The term smart city generally refers to an urban strategy that uses modern technology and data-driven innovation to improve urban services, economic development, and quality of life. Early definitions of smart cities emphasized the role of information and communication technology infrastructure in increasing civil efficiency and competitiveness. For instance, according to (Caragliu et al., 2011),(Toli & Murtagh, 2020), a city is smart when investment in human and social capital, along with information and communication technology networks, fosters sustainable economic growth and a high quality of life, through participatory governance and wise management of natural resources (Caragliu et al., 2011). This definition is significant because it links technology to sustainability and quality of life implications; it shows that the concept of a smart city from the beginning was not just about tools but also about long-term urban well-being.

Researchers have recognized multiple dimensions of smart cities. A framework that is often cited by (Giffinger et al., 2007) outlines six characteristics: Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living, and Smart Governance. These categories show that truly smart cities are not only digitally connected but also in an innovative economy, in a sustainable environment, including educated and participating citizens, providing a high quality of life, and with transparent governance. Essentially, technology is being applied across all urban areas, from transportation to education and public services, to make systems more efficient, innovative, and responsive (Kourtit & Nijkamp, 2012). Importantly, this multidimensional perspective considers people and institutions as important as sensors and software in a smart city. In fact, subsequent research and

practices have shifted the emphasis toward smart communities and smart citizens. (Hollands, 2008)

Several city leaders and urban theorists now emphasize that a smart city is fundamentally about its people. As an illustrative example, often hailed as a smart city pioneer, the city of Barcelona initially made major investments in city-wide sensors, open data platforms, and digital infrastructure. It introduced networks of Internet of Things sensors to monitor air quality, noise, traffic, and waste management, along with free Wi-Fi and smart lighting systems (Smith, 2018). While these technological innovations led to increased efficiency gains (for example, real-time data helped reduce water use in parks and improved public transportation planning), the city also learned that technology alone does not automatically equal a better city. By 2016, Barcelona had shifted its approach towards a more citizen-centric one, launching initiatives like Decidim (Decidim is an open-source digital participation platform developed by the City of Barcelona that enables citizens to propose, discuss, and vote on public policies, urban projects, and municipal decisions.) a collaborative democracy platform to involve residents in decision-making. This change was summarized in the appointment of a Chief Technology and Digital Innovation Officer with the mission of “rethinking the smart city from the ground up” by focusing on the needs of citizens. A prominent refrain emerged: “it is people, not technology, that make a city smarter” (Smith, 2018). This perspective emphasizes that human capital, skills, creativity, public participation, and good governance are the main axes of the smart city concept. (Nam & Pardo, 2011).

Practically, smart city strategies all over the world often combine top-down planning with bottom-up innovation. For example, some cities have been built from the ground up as an indicator for smart cities. Songdo in South Korea is a notable case: a master-planned city on reclaimed land near Seoul, envisioned as an immersive computing environment. Songdo was connected to its foundations with sensors and fibre-optic networks, allowing for automated control of traffic, energy consumption, and even waste disposal (via an underground pneumatic waste system). Most of the developers in Songdo are in partnership with technology firms such as Cisco, which created an integrated city-wide operating system that allows everything, including parking and indoor climate control, to be managed smartly and even autonomously. Although Songdo showcases the potential of technology-driven design often touted as a blueprint for advanced cities of the future, it has also faced challenges in making people interested and encouraging community in its early years. This shows that social factors are still very important: a city cannot be truly smart without considering liveability and inclusion.

In contrast, many established cities have taken gradual approaches and applied smart solutions to specific problems. Singapore stands out as a leading example of a comprehensive government-led smart city or Smart Nation agenda. Singapore has been implementing smart transportation solutions since the launch of its smart nation initiative in 2014 (such as an AI-driven traffic congestion pricing and autonomous shuttles), national digital identity and e-government platforms, and pervasive sensors for everything from water management to elderly care (Thales Group, 2023). Notably, Singapore consistently ranks at

the top of global smart city indices and is outspoken about using technology to build an inclusive and responsive city for its citizens. Cities, such as Barcelona, London, and Vienna, have combined digital technologies with social innovation policies in different ways. Vienna, for example, integrates digital tools with its long-standing tradition of strong social welfare policies, open data platforms, and digital public services. These initiatives are explicitly linked to goals of social inclusion and improvement in residents' quality of life (City of Vienna, 2020). Diversity of these examples shows that there is no single formula for the smart city. At the same time, a shared characteristic among leading smart cities is the emphasis on an innovation ecosystem. Many cities actively support, start-up, public private partnerships and social initiatives to develop new solutions at the local levels, and an emphasis on data-driven decision-making in shaping urban governance processes (Albino et al., 2015).

Rather than focusing solely on technological advancement, contemporary smart city approaches increasingly link digital infrastructure to human capital and governance capacity. From this perspective, urban smartness is assessed not only by how advanced its technology is, but by how effectively that contribute to sustainable and inclusive improvements in everyday urban life. This shift from early tech-centric models toward more people-oriented and holistic models leads to the alignment with sustainability and equity, which naturally leads into the discussion of sustainability principles in the following section.

2.1.2 Sustainability Principles in Urban Development

In parallel to the rise of smart cities, the concept of sustainable urban development has become a guiding framework for city planning since the late 20th century. Sustainability in the urban context fundamentally means pursuing development that balances environmental protection, economic growth, and social well-being, the three pillars of sustainability (often referred to as environment, economy, and equity). The roots of this concept are famously articulated in the Brundtland Commission's report *Our Common Future*, which defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 43). This definition introduced the principle of intergenerational equity, emphasizing long-term responsibility in how we build and manage cities. Implicit, too, was an understanding that development must consider the needs of the poor and the limitations of technology and social organisation on the environment. In an urban sense, this translates to cities needing to provide housing, mobility, and services for today's residents while ensuring that natural resources (air, water, land) are conserved and climate risks mitigated for the future.

Multiple frameworks and agreements have since been built on these principles to shape urban sustainability goals. Notably, the United Nations' Sustainable Development Goals (SDGs), adopted in 2015, include Goal 11 which explicitly calls on cities and human settlements to be "inclusive, safe, resilient, and sustainable" (United Nations, 2015). This global goal underscores the broad mandate of sustainable urban development, reducing slums and inequality, improving public transport, participatory planning, safeguarding

cultural and natural heritage, cutting pollution, and enhancing resilience to disasters. It recognizes that by 2050, roughly 68% of the world's population will live in cities (United Nations, 2019), and therefore, sustainable development will be won or lost in urban areas. Cities around the world have responded by setting targets for carbon emission reductions, renewable energy use, green space provision, and more, aligning local plans with the SDGs and the Paris Climate Agreement. For example, Copenhagen aims to become the world's first carbon-neutral capital by 2025, through measures like fossil-free municipal heating, wind energy investment, and making 75% of trips by foot, bike or public transit (City of Copenhagen, 2012) Similarly, Oslo has targeted a 95% reduction in greenhouse gas emissions by 2030 compared to 1990, while becoming a virtually car-free city centre and heavily promoting electric vehicles. These targets reflect the environmental dimension of sustainability, often termed green urbanism or climate-friendly cities.

Beyond environmental goals, sustainable urban development frameworks also stress social sustainability, equity, inclusion, and liveability for all citizens. From the policy perspective, this involves ensuring access to affordable housing, clean water, sanitation, healthcare, education, and economic opportunity across all segments of society. The 'Right to the City' movement and calls for inclusive cities dovetail with sustainability by insisting that the benefits of urban innovation are shared and that vulnerable groups are not left behind. In this context, digital equity becomes particularly important in the era of smart cities. As cities digitise services and infrastructure, existing digital divides can exacerbate social exclusion. Residents without reliable internet access, digital literacy, or modern devices may be unable to benefit from smart city innovations (Maxwell, 2018). For instance, if transit information and municipal services move primarily to smartphone apps, elderly or low-income residents who lack smartphones or digital skills could effectively be marginalised. A truly sustainable smart city must proactively address these risks. Cities such as Portland (USA) and Philadelphia have explicitly included digital inclusion goals in their smart city roadmaps. These initiatives prioritise projects that bridge connectivity gaps and actively engage underserved communities (Horrigan, Whitacre, & Galperin, 2024). As critical commentary has noted, smart city planning is only truly "smart" when it remains aware of those and puts in place measures to address the digitally excluded. This is providing broadband access for all, training in digital skills, multi-language e-services, and accessible design for people with disabilities, so that smart solutions enhance social sustainability rather than undermining it.

One key dimension of sustainability in urbanism is the integration of ecological principles into city design and planning. Partly as a reaction to the often-technocratic bent of early smart city rhetoric, some urban theorists advocate for approaches like ecological urbanism and sustainable urbanism that ground city planning in environmental science and community needs. Ecological urbanism, for example, is a framework that seeks to merge ecology and urban design, promoting cities that work with natural systems rather than against them. (Mostafavi & Doherty, 2010) Describe ecological urbanism as an approach that is socially and sensitive to the environment, driven less by ideology and more by holistic thinking. At the planning level, this involves designing urban layouts that preserve natural

habitats, integrating green infrastructure such as parks, green roofs, and water-sensitive design, as core elements of city systems, and utilising nature-based solutions for challenges like stormwater management or heat reduction. A concrete example is the planning of Singapore's new Tengah district as a "forest town" with centralized cooling, extensive parks, and car-free zones blending smart technology (like a smart energy grid) with biophilic design for sustainability (Igini, 2022). In parallel, cities embracing sponge city principles (originating in China) focus on using natural wetlands and permeable surfaces to manage urban flooding, rather than just concrete sewers. This shows how sustainability principles urge cities to view themselves as ecosystems, where human, technological, and natural components must co-exist in balance.

Recent research increasingly treats sustainability and smartness as complementary in urban development. Overall, a growing body of literature now speaks of 'smart sustainable cities', denoting cities that harness smart technologies in service of sustainability goals (Bibri, 2017). ICT and data analytics become tools to optimise energy use, reduce emissions, and make urban services more resource-efficient, while sustainability frameworks provide the value-driven goals and performance metrics for those technological interventions. For example, a smart traffic management system, which means a classic smart city application, can contribute to sustainability by reducing congestion and pollution, but only if aligned with a policy to discourage car use and promote clean transport, as seen in cities like Copenhagen, where intelligent transport systems support their shift to electric vehicles and cycling. Likewise, smart grids and sensor-enabled utilities help detect leaks and save water or electricity, directly supporting environmental conservation. Even the principles of the circular economy (recycling, waste reduction), which are part of urban sustainability, are being improved by digital technology such as sensor-equipped trash cans and data-driven recycling programs. In short, sustainability principles (e.g., resource conservation, social justice, resilience) provide critical direction for smart city projects, and ensure that technological innovation delivers green and equitable outcomes rather than just productivity.

It is increasingly evident that translating sustainable urban development frameworks, such as the UN Sustainable Development Goals, into local green cities strategies provides a necessary foundation for guiding smart city initiatives. In many cases, leading cities have explicitly merged these agendas. Vienna's Smart City Framework, for example, defines its core mission as achieving "quality of life for everyone through social and technical innovation while maximising conservation of resources" as its core mission (City of Vienna, 2022). This statement captures the central idea that technological innovation must serve people by improving the quality of life, as well as the planet by conserving resources. Vienna's strategy also aligns with long-term objectives such as achieving carbon neutrality by 2040, and emphasises that 'smart' solutions are not an end in themselves. Instead, they are framed as tools that must always focus on people and their quality of life, without doing so at the expense of the environment or future generations. Such integrative thinking is increasingly reflected in contemporary urban policy documents.

Taken together, sustainability principles introduce a long-term and inclusive perspective that is essential for smart city planning. While a decade ago ‘smart cities’ and ‘sustainable cities’ were often discussed as separate agendas, contemporary scholarship recognises that the two must be intertwined. A city cannot be considered truly smart if it is not sustainable, and effort to achieve sustainability can be significantly aided by smart technologies. Building on this understanding, the following parts (2.1.3 and beyond) will delve into how this integration plays out in practice, examining the concept of smart sustainable cities and neighbourhoods, drawing on global and regional examples such as Singapore, Copenhagen, Songdo, Oslo, Barcelona, and Vienna, where technological innovation and sustainability objectives converge. This perspective provides the stage for understanding how a city such as Tehran, through its emerging Smart Tehran Program, is seeking to chart a path informed by both these global paradigms.

Subsequent sections of chapter 2, therefore, address the integration of smart city initiatives with sustainable development goals, explore the concept of smart neighbourhoods and cities, and provide a brief on Challenges and Equity in Smart Urbanism.

2.1.3 Smart Sustainable Cities: Integrated Models

The notion of smart sustainable cities represents a convergence of two major urban development paradigms: the technologically driven smart city and the environmentally and socially oriented sustainable city. In essence, a smart sustainable city seeks to harness advanced ICT and data analytics to address present urban needs, such as efficient services, economic vitality, and quality of life, while safeguarding the ability of future generations to meet their own needs through resource conservation, social equity, and environmental protection (Bibri et al., 2023). This integrated model is characterised by technological innovation is embedded within clearly defined sustainability objectives. The International Telecommunication Union, for example, defines a smart sustainable city that uses ICT and other means to improve quality of life, efficiency of urban operation and services, and overall competitiveness while ensuring that economic, social, an envoironmetal needs of both present and future generations are met smart city (Bibri,2017). In a similar way, (Höjer & Wangel, 2015) describe a smart sustainable city as one that satisfies the needs of its current inhabitants without compromising those of future generations, with ICT functioning as a key enabling factor. Taken together, the smart sustainable city model integrates the smart dimension (digital, networked, data-driven) with the sustainable (green, resilient, inclusive) in order to address urban challenges in a holistic manner.

Integrated urban models have gained prominence as scholars and planners recognise the limitations of siloed approaches. Earlier smart city initiatives were frequently critiqued for prioritising technology-centred solutions with limited consideration for sustainability or equity, while more traditional sustainable city approaches sometimes overlooked the opportunities offered by emerging digital technologies. Over the past decade, the discourse has gradually shifted toward bridging these gaps rather than treating smartness and sustainability as separate agendas. Recent research point to a growing convergence on the idea that ICT play a central roll in contemporary urban planning, alongside calls to move

beyond fragmented concepts towards more integrated frameworks (Bibri et al., 2023). By around 2020, a diverse setup of hybrid models had emerged that reflected this integration. Terms such as sustainable smart city and smart sustainable city (often used interchangeably) began to appear alongside newer labels, including eco-smart city, green smart city, data-driven smart sustainable city, and AI-enabled sustainable city, each highlighting a particular emphasis but sharing a common foundation of techno-sustainability synergy. These integrated models illustrate how cities increasingly combine strategies in practice, for example, some traditionally sustainability-oriented cities, such as Stockholm or Copenhagen, have incorporated smart technologies to improve environmental monitoring and efficiency, at the same time, leading smart cities like Singapore or Barcelona are increasingly aligning their high-tech innovations with climate goals and social well-being (Bibri, 2017). The result is a blurring of boundaries between previously distinct approaches, yielding new comprehensive paradigms of urban development.

Crucially, smart sustainable city models are not one-size-fits-all; they are context-dependent and multi-dimensional. Each city tends to formulate its strategy based on local priorities and challenges, whether that be cutting carbon emissions, improving mobility, fostering economic innovation, or enhancing governance. Nonetheless, common elements can be identified. Most integrated models seek to connect urban systems and services that were traditionally managed in isolation. For example, instead of treating energy, transport, water, and waste separately, a smart sustainable city approach looks at their interdependencies and optimises them together through data-driven management (Sharifi & Allam, 2021). (Bibri & Krogstie, 2020) observe that recent initiatives combine the strengths of sustainable urbanism (e.g. green infrastructure, compact city design, community resilience) with smart urbanism (e.g. sensor networks, real-time data, automation) in ways that “harness synergies” across domains. This can mean deploying IoT sensors to monitor environmental conditions (air quality, noise, flood levels) and using the data to inform urban planning decisions or emergency responses, thereby directly linking technology to sustainability outcomes. It also means using smart systems (like intelligent traffic management or smart grids) to reduce resource consumption and pollution while improving service delivery and liveability. The integration often extends to governance and institutions: effective smart sustainable city initiatives typically involve cross-sector collaboration for instance, public-private-academic partnerships and community participation (the so-called triple helix or quadruple helix models) to ensure that technological solutions are developed and implemented with sustainability and citizens’ needs in mind. In summary, the hallmark of these integrated models is holistic integration: technologically, by linking infrastructure and data platforms across city systems; institutionally, by coordinating stakeholders and sectors; and in policy, by aligning smart city projects with the broader sustainable development agenda.

This integrated perspective is increasingly seen not only as an ideal but as a practical necessity. Urbanisation and climate change pressures have made it clear that cities must maximize the benefits of urbanization and offset its negatives by leveraging innovation for sustainability. As one report noted, “integrating sustainability strategies and technology

solutions in urban planning” enables cities to tackle challenges like energy efficiency, mobility, and waste in a coordinated way. For example, a city might simultaneously deploy electric autonomous buses, implement dynamic congestion pricing, and improve cycling infrastructure as a package, using data platforms to tie these together, reducing emissions and congestion and sustainability goals, while enhancing accessibility and convenience. By 2025, many city strategies explicitly reference such cross-cutting initiatives, often under the banner of becoming a Smart Sustainable City or similar. The COVID-19 pandemic further highlighted the value of integrated digital infrastructure for resilient and sustainable cities, accelerating investments in tele-health, e-government, and remote environmental sensing (Micozzi & Yigitcanlar, 2022). The lesson is that technology is most effective for cities when deployed in service of clear, sustainable development targets, and conversely, sustainability efforts are most powerful when augmented by the capabilities of modern technology. In conclusion, smart sustainable cities epitomise an integrated model of urban development, one that transcends the earlier dichotomy of smart versus sustainable, and instead synergises both to promote a future-ready form of urbanism that is at once innovative, green, and inclusive.

2.1.4 Smart neighbourhoods in Global Practice

Translating the smart sustainable city vision into reality often begins at the neighbourhood or district scale. Around the world, governments and planners have established pilot projects and living labs at the district level to demonstrate how integrated smart and sustainable solutions can improve urban life on a smaller scale before scaling up city-wide. These smart neighbourhoods serve as microcosms of the smart sustainable city manageable in size, yet rich in innovation, where new technologies, designs, and policies can be tested in situ. Global and regional examples abound, each highlighting different facets of smart sustainable development in practice. This section explores several notable cases from Asia to Europe to Latin America that illustrate how smart neighbourhood initiatives are being implemented in diverse contexts.

Singapore Punggol Digital District (PDD): Singapore is frequently cited as a leading smart city-state, and its approach exemplifies comprehensive planning at both city and neighbourhood scales. One flagship project is the Punggol Digital District, which is envisioned as a full-fledged Smart and Sustainable Town within the city. Punggol is a newly developed area that integrates residential districts with a business park, university campus, community amenities, and green spaces, effectively creating a mixed-use smart neighbourhood from the ground up. It has been designated a Strategic National Project under Singapore’s Smart Nation initiative, underscoring its importance as a test bed for innovation. The planning of Punggol emphasises seamless integration of technology in daily life: for instance, sensor networks and an Open Digital Platform will monitor and optimise utilities and services across the district (from energy usage to waste collection), while residents benefit from smart home infrastructure and digital citizen services. Starting from 2023, Punggol is serving as a living laboratory for new urban concepts. Autonomous electric buses have been piloted on its streets to offer convenient, green mobility within the town. Public facilities like the upcoming regional sports centre and community club are leveraging

virtual reality and cashless systems to enhance user experience. A Triple Helix partnership model in Punggol brings together government agencies, industry partners, and the local university (Singapore Institute of Technology) to co-create solutions and fast-track innovation deployment. Sustainability is built into the neighbourhood's design: Punggol was earlier developed as Singapore's first Eco-Town (with energy-efficient buildings and ample greenery), and now additional features like district-level solar power grids, energy storage systems, and pneumatic waste conveyance are being implemented to minimise carbon footprint and waste. By combining smart tech with eco-friendly design, Punggol aims to improve residents' quality of life for instance, smart energy meters and apps help households monitor and reduce consumption while also creating jobs and opportunities in the digital economy. In short, Singapore's Punggol district demonstrates how an integrated model at neighbourhood scale can showcase how digital technologies improve liveability and sustainability, acting as a blueprint for the rest of the nation's urban development, its early successes are influencing the planning of other upcoming districts (such as Tengah new town and the Jurong Lake District), making Punggol a pivotal experiment in smart sustainable urbanism.

Barcelona 22@ Innovation District: In Europe, Barcelona has emerged as a pioneer of the smart city movement, and much of its reputation is built on innovative neighbourhood-scale projects. The most famous is the 22@Barcelona district, often cited as a model of urban regeneration fused with smart technology. Launched in 2000, the 22@ project transformed the former industrial area of Poblenou into a vibrant mixed-use innovation hub (Hu, 2020). This large-scale redevelopment covering 200 hectares was driven by a “triple objective”: urban renewal of a derelict area, economic revitalisation through attracting knowledge industries, and social improvement for local residents. To achieve these goals, Barcelona's planners pursued an integrated approach that intertwines technological infrastructure, economic strategy, and community needs. The 22@ neighbourhood is equipped with extensive fibre-optic networks and IoT sensors forming a network of networks that enable smart city services (Aljoufie, Tiwari, 2013). For example, sensors in streetlights, traffic signals, and waste bins collect data to intelligently manage energy use, traffic flow, and garbage collection in real time. A central data platform (the City OS) aggregates information and supports a variety of apps from smart parking systems that guide drivers to free spots, to environmental monitoring dashboards open to the public (Bakıcı et al., 2013). Moreover, Barcelona put strong emphasis on technological sovereignty and citizen engagement in this district. Under the leadership of figures like Chief Technology Officer Francesca Bria, the city implemented policies for open data and encouraged local startups to develop solutions, reducing dependence on big tech vendors. Initiatives like Decidim Barcelona, a digital participation platform, were piloted to involve residents in co-creating neighbourhood improvements (e.g. deciding locations for new parks or bike lanes). As a result, 22@ became a living lab where smart city ideas (such as shared electric mobility, energy-efficient buildings, and smart grids) are demonstrated in daily life with direct community input. The outcomes have been notable: the district successfully attracted clusters of tech, media, and design companies (over 4,500 firms and 56,000 new jobs by the 2010s), while also adding affordable housing and preserving some industrial heritage for cultural use.

Importantly, the project is ongoing and has faced challenges like gentrification, but it remains a benchmark for balancing innovation with inclusion. Barcelona's example shows how a city can retrofit an existing neighbourhood with smart infrastructure and strategic urban planning to advance both competitiveness and sustainability. Today, Barcelona boasts more than 20 smart city programs citywide, ranging from smart transit and energy to e-government but 22@ stands out as the emblem of its integrated approach (Barcelona City Council, 2017). In academic literature, it is often highlighted how Barcelona moved to a Smart City 3.0" model focused on citizen-centric solutions, and 22@ was at the heart of that shift (Marsal-Llacuna et al.,2015). Thus, as a smart neighbourhood, 22@Barcelona illustrates global best practice in building a high-tech district that is also socially sustainable and responsive to residents.

Songdo, South Korea a Planned Smart City District: Whereas Singapore and Barcelona applied smart strategies to existing urban areas, Songdo International Business District in South Korea represents a purpose-built smart neighbourhood, constructed entirely from scratch with integrated technology and sustainability features. Songdo is located on 1,500 acres of reclaimed land along Incheon's waterfront near Seoul. Initiated in the early 2000s, it is one of the world's most ambitious master-planned smart cities, with an investment of over \$35 billion. The vision for Songdo was to create a ubiquitous city (or U-city) a place where digital connectivity is ubiquitous, and all urban systems are networked and intelligent. By design, Songdo incorporates state-of-the-art infrastructure: citywide sensors, high-speed data networks, automated systems for buildings and transportation, and an Integrated Operations Centre that coordinates city functions in real time (Zhou, 2015). For instance, traffic cameras and sensors adjust signals automatically to optimise flow; smart meters and controls in offices and apartments manage energy consumption; and CCTV combined with analytics bolster security and emergency response. Cisco played a key role in providing a technological backbone, embedding its Smart Connected Communities platform into Songdo's infrastructure. On the sustainability front, Songdo was planned with green city principles from the outset. Over 40% of its area is reserved as green space, including a central park and numerous pocket parks to ensure walkability and biophilic design. All buildings are required to meet LEED energy-efficient standards by 2015 Songdo had the highest concentration of LEED-certified floor space in the world. An advanced waste management system was installed: rather than garbage trucks, every building is connected to a pneumatic waste tube system that sucks trash to a central facility, where waste is sorted and recycled or incinerated for energy this reduces landfill use, traffic, and carbon emissions. The district also uses a smart water grid: rain and wastewater are recycled to reduce fresh water consumption by 30–40%, and a centralised district heating and cooling system improves energy efficiency for all buildings. Transportation in Songdo prioritises low-carbon options extensive bike lanes, pedestrian-friendly streets, and water taxis complement the road network, and the city was initially planned to be car-lite with a focus on public transit and even autonomous electric vehicles in the future. Songdo's development has indeed yielded a showcase city of the future: it demonstrates how a new district can integrate technology (such as telepresence screens in homes, sensor-laden street lighting, and real-time environmental monitoring) directly with urban design to

achieve efficiencies. However, it also offers lessons on challenges critics have pointed out that Songdo at times felt sterile or underpopulated, raising questions about creating community and vibrancy in master-planned smart districts. By 2020, Songdo reached a population of around 100,000 and attracted global companies and universities, but it undershot original growth projections (Zhou, 2015). Even so, it remains an influential prototype frequently studied in smart city literature (Lee et al., 2016). Songdo's successes (such as significantly lower energy use per capita and advanced urban services) and shortcomings (such as social connectivity issues) both provide valuable insights. In global practice, Songdo stands as a cutting-edge example of a smart sustainable neighbourhood built holistically integrating digital infrastructure with eco-friendly design and its experience helps other cities refine their approaches to building smart districts from the ground up.

Medellín, Colombia Socially Smart Urban Transformation: Not all smart neighbourhood initiatives focus predominantly on high technology; some, like Medellín in Colombia, highlight the power of blending social innovation with appropriate tech to create sustainable communities. Medellín has gained recognition over the past decade for its dramatic transformation from a city plagued by crime and inequality in the 1980s–90s to a globally lauded innovator in urban development by the 2010s. This transformation, sometimes dubbed the Medellín Miracle, was rooted in inclusive, community-driven interventions often at the neighbourhood level. A hallmark of Medellín's approach is the Metrocable, an aerial cable car system introduced in 2004 to connect the steep, marginalised hillside neighbourhoods (barrios) with the main city metro lines. This relatively low-tech transit solution proved incredibly smart in context: it slashed commute times for the poorest residents, integrated previously isolated communities, and literally and figuratively brought these neighbourhoods closer to the city's opportunities. The Metrocable, coupled with the installation of outdoor escalators in another hilltop community (Commune 13), has been credited with promoting social equity and urban integration (Brand & Dávila, 2011). Furthermore, Medellín invested in public infrastructure like libraries, schools, parks and innovation centres in the heart of disadvantaged areas a strategy known as social urbanism. All these efforts were guided by data and citizen feedback, targeting resources to where they were most needed (e.g. mapping crime data to decide locations for new amenities and police presence). As a result, Medellín's neighbourhood interventions have yielded tangible improvements: the city's homicide rate fell to roughly one-twentieth of its peak in 1993, and the majority of residents in extreme poverty have since risen above the poverty line. By focusing on people and needs first, Medellín exemplified a human-centred smart city ethos. In the words of one researcher, Medellín "looked for initiatives that are inclusive of every facet of society," driven not by tech companies but by communities themselves (as cited in Freedman, 2019). Technology still played a role, for instance, the city implemented an open data platform and a state-of-the-art Urban Control Centre to improve governance, disaster response, and service coordination (Flórez, 2016). However, these tools were employed in support of social programs, such as using data analytics to better target poverty alleviation efforts or to run Medellín's free public Wi-Fi zones and digital kiosks in poor districts, which improved access to information and education. Medellín's recognition as the World's Smartest City by the 2019 Smart City Awards was thus not for cutting-edge tech per se, but

for the innovative integration of social and technological solutions to uplift its neighbourhoods (Newsweek, 2019). For other developing cities, Medellín provides a template for smart neighbourhood practice that emphasises equity, education, and empowerment, proving that smart outcomes (safer, more inclusive, more sustainable communities) can be achieved with a blend of appropriate technology and strong civic engagement.

Vienna, Austria Holistic Smart Districts and Quality of Life: Vienna often ranks at the top of global liveability and smart city indices, showcasing a model of urban development where technological smartness and sustainability are aligned with a high quality of life and social inclusion. The city's Smart City Wien framework (first adopted in 2014 and updated in 2019) takes a long-term view to 2050, encapsulating goals across all sectors mobility, energy, buildings, education, health, and more under the guiding principle of providing a high quality of life for all residents with the greatest possible resource conservation through social and technical innovation. In practice, this means Vienna's smart city efforts are not confined to tech gadgets or pilot projects; they are woven into its broader urban policies, from expanding e-government services and open data platforms to investing in affordable housing and clean energy. One standout example at the neighbourhood scale is Aspern Seestadt, a new urban district on a former airfield at the city's edge. Aspern Seestadt is one of Europe's largest urban development projects (240 hectares), planned as a city within a city for 25,000 residents and 20,000 jobs when fully built. Sustainability and smart tech are built into Aspern's DNA. The development boasts energy-efficient architecture, including Austria's tallest timber high-rise (HoHo Wien) and extensive use of passive house standards and solar panels. A dual-mode energy system provides district heating in winter and district cooling in summer, using waste heat and renewable sources to drastically cut carbon emissions (a concept Vienna is expanding citywide to reach carbon neutrality by 2040). Aspern's layout encourages green mobility: two metro stations, light rail links, cycling networks and car-free zones ensure that residents can travel easily without private cars. Crucially, Aspern also serves as a testing ground for smart city technologies. The Aspern Smart City Research (ASCR) lab is an on-site facility collecting data from smart energy grids, building automation systems, smart home appliances, and even smart charging stations for electric vehicles installed in the neighbourhood. This allows Vienna's utility providers and researchers to analyse how all these systems interact in a real urban environment informing strategies to optimise energy use, balance the grid with renewable inputs, and engage residents in saving energy via smart apps. In essence, Aspern is a living lab for integrated urban innovation, aligning with Vienna's ethos that technical advances should serve social and environmental ends. Beyond Aspern, Vienna's Smarter Together project in the Simmering district is another EU-supported initiative, retrofitting an existing neighbourhood with smart lighting, communal solar installations, and participatory budgeting tools to foster community-centric smart solutions (European Commission, 2018). Citywide, Vienna has digitised many public services (from transit ticketing to digital city maps) and promotes data transparency, but always under an approach that values privacy, digital rights, and inclusion (Pereira et al., 2018). The Viennese model underscores that smart is not merely about technology it is about forward-looking governance. The city government actively coordinates across

departments to ensure innovations in one domain (say, smart traffic management) reinforce its goals in others (like emissions reduction and road safety). Because of this integrated governance, Vienna's smart city journey has been incremental yet steady, maintaining public trust and focusing on measurable improvements in sustainability and liveability rather than tech for tech's sake. In summary, Vienna's smart neighbourhood practices exemplified by developments like Aspern Seestadt demonstrate a holistic integration of smart solutions into the urban fabric, enhancing an already high baseline of social welfare and environmental quality. It stands as a leading example of how a city with historic infrastructure can innovate and adapt at the district level to meet 21st-century challenges, all while keeping citizens at the centre of its smart city strategy.

In conclusion, the experiences of Singapore, Barcelona, Songdo, Medellín, and Vienna reveal the rich diversity of smart neighbourhood implementations. Each case offers insights: the value of test-bed districts for innovation (Singapore), the importance of coupling tech with urban regeneration (Barcelona), the possibilities and pitfalls of building a smart community from scratch (Songdo), the power of social innovation and inclusion (Medellín), and the need for long-term holistic vision (Vienna). Despite differing in approach and context, all these examples underscore a common theme: integrated models at the neighbourhood scale can drive sustainable urban transformation. By focusing on districts, cities are able to experiment and learn successes can be replicated and scaled up, while challenges can be addressed in a contained setting. These smart neighbourhoods thus act as critical building blocks of smart sustainable cities, bringing abstract concepts to life in tangible ways from a safer street in Medellín thanks to better mobility, to a cleaner park in Songdo from automated waste disposal, to a new business and community hub in Punggol enabled by digital connectivity. As global practice matures, we see increasing cross-pollination of ideas among such projects: city leaders tour each other's smart districts (learning from mistakes and best practices), and international frameworks (like the UN Sustainable Development Goals and ISO standards for smart cities) draw on these on-the-ground examples. The continued evolution of smart sustainable cities will likely depend on multiplying these successes across many neighbourhoods, ensuring that innovation is grounded in local needs and sustainability goals.

2.1.5 Challenges, Critiques, and Equity in Smart Urbanism

Despite the promises of efficiency and sustainability associated with smart urbanism, a growing body of critical scholarship highlights its uneven social impacts and equity challenges (Hollands, 2008; Kitchin, 2014). Many smart city initiatives have been implemented through top-down, technocratic approaches that prioritize technological solutions, data infrastructures, and corporate interests while marginalizing citizen participation and local needs (Datta, 2015). As smart technologies are often first deployed in high-income or strategically prioritized districts, they risk widening digital divides and reinforcing existing socio-spatial inequalities (Graham & Marvin, 2001). This uneven distribution of digital infrastructure can contribute to forms of technological or digital gentrification, whereby smart investments attract wealthier residents and capital, increase property values, and indirectly displace lower-income communities. At the same time, the

expanded use of sensors, data analytics, and surveillance technologies raises concerns about privacy, civil liberties, and disproportionate monitoring of vulnerable populations (Kitchin, 2014). In response, recent literature increasingly calls for more inclusive and just models of smart urban development that integrate equity, participatory governance, and digital justice as core principles rather than secondary considerations (Sharifi & Allam, 2021). This perspective is particularly relevant for cities such as Tehran, where smart city agendas emphasize citizen engagement and social improvement, yet where the challenge remains translating inclusive intentions into equitable outcomes in practice (Smart Tehran Program, 2019).

2.2 Gentrification: Concept and Causes

2.2.1 Origins of Gentrification

Gentrification is commonly understood as a process of neighbourhood change marked by the influx of more affluent residents and capital into previously lower-income or disinvested areas, leading to physical upgrading, rising property values, and, in many cases, the displacement of existing residents (Shaw, 2008). The term was first introduced by British sociologist Ruth Glass in her seminal study of London in the early 1960s, where she observed how working-class districts were being transformed by middle-class newcomers the “gentry” resulting in profound social and spatial change (Glass, 1964). Since then, gentrification has become a central concept in urban studies, though scholars continue to debate its precise definition and boundaries. Despite this lack of consensus, most definitions emphasize a common set of characteristics: reinvestment in the built environment, socio-economic upgrading of residents, rising rents and property prices, and the direct or indirect displacement of lower-income populations (Lees, 2008). While public discourse often frames gentrification negatively due to its association with social exclusion and community loss.

Early academic efforts to explain why gentrification occurs, particularly during the 1970s and 1980s, focused primarily on sociocultural and demographic factors, often referred to as demand-side explanations. These perspectives emphasized the changing preferences, values, and lifestyles of emerging middle-class groups, especially young, highly educated professionals employed in service-sector and creative occupations. Scholars argued that these groups were increasingly drawn to inner-city neighbourhoods offering historic architecture, cultural diversity, and urban amenities that contrasted with suburban living. Influential work on New York’s SoHo district illustrated how artists and professionals repurposed former industrial lofts, initially attracted by low rents and cultural authenticity qualities that later became commodified as the area gained prestige. Similarly, David Ley (1996) linked gentrification to the rise of a new middle class whose cultural capital, liberal values, and consumption patterns supported a broader “back-to-the-city” movement. Other researchers, such as other researchers, such as Rose (1984), highlighted shifts in household city neighbourhoods the growth of single-person households and the increasing economic independence of professional women, which expanded the social base of

potential gentrifiers. Collectively, these studies framed gentrification as a process driven largely by cultural tastes, lifestyle aspirations, and demographic change.

In response to these accounts, economic and political-economic explanations emerged as a critical alternative. Most notably, Neil Smith's rent gap theory reframed gentrification as a fundamentally capital-driven process rather than the outcome of individual residential preferences alone. (Smith, 1979) argued that gentrification becomes possible when a significant gap develops between the actual ground rent generated by a property under its current use and the potential ground rent that could be realised through redevelopment. When this rent gap widens, it creates strong incentives for developers and investors to acquire undervalued properties, rehabilitate or replace them, and extract higher returns through increased rents or resale values. From this perspective, gentrification represents a movement of capital back into the urban core, facilitated by real estate markets and investment strategies, rather than a spontaneous social trend. Smith later expanded this argument to describe gentrification as a broader class-based restructuring of urban space, embedded within neoliberal urban policies and uneven patterns of development.

By the late 1980s and early 1990s, scholars increasingly sought to move beyond the polarized debate between sociocultural and economic explanations. (Hamnett, 1991) among others, argued that gentrification is best understood as the outcome of an interaction between demand-side factors, such as changing lifestyles and occupational structures, and supply-side dynamics, including property markets, state policies, and investment flows. This integrated perspective acknowledges that cultural preferences may shape who moves into gentrifying neighbourhoods, while economic conditions determine where and when gentrification becomes possible. As such, contemporary understandings of gentrification recognize it as a multifaceted process rooted in both social change and political-economic restructuring, providing a conceptual foundation for analysing how gentrification unfolds in different urban contexts.

2.2.2 Gentrification as a Global Phenomenon

Although first conceptualised in London and subsequently observed in North American cities, gentrification is now recognised as a global phenomenon. From the 1980s onward, similar patterns of reinvestment and displacement have been documented in cities across Western Europe, and by the 2000s, in rapidly-urbanising centres of East Asia and Latin America as well. Some critics argue that the term gentrification has been applied so broadly to these varied contexts that it risks losing analytical precision. Nevertheless, others counter that its core dynamic, a market- and state-driven class remake of urban space, is evident in cities worldwide (Shaw, 2008). In fact, Smith characterised turn-of-the-century gentrification as a global urban strategy: a deliberate policy approach employed by cities around the world to attract investment and a higher-income populace under the euphemisms of revitalisation or renaissance. Scholars like Loretta Lees similarly observe that what began as a peculiar London term has evolved into a generalised mode of urban restructuring under neoliberal globalisation. By the early 21st century, gentrification had

transformed from a niche process in a few Western cities into an increasingly prevalent urban trend across the globe (Lees , 2008).

2.2.3 Impacts of Gentrification

The process of gentrification is often presented as a form of urban revitalisation, associated with physical renewal, reduced vacancy, declining crime rates, and increased economic activity. Municipal governments frequently highlight rising property values, new investments, and expanded tax bases as indicators of success. However, a substantial body of critical urban literature demonstrates that these benefits are accompanied by profound social, cultural, political, and health-related costs. At its core, gentrification represents a reconfiguration of urban space that reshapes who can live, work, and belong in the city.

One of the most immediate and widely documented impacts of gentrification is the displacement of long-term, lower-income residents. Displacement occurs through multiple mechanisms. Direct displacement refers to situations in which residents are forced to leave their homes due to rising rents, evictions, redevelopment projects, or landlords' refusal to renew leases. In rapidly gentrifying neighbourhoods, rent increases alone can be sufficient to price out households whose incomes do not keep pace with housing costs. Indirect or exclusionary displacement operates more subtly: as original residents leave, voluntarily or otherwise, housing prices escalate to a level that prevents other low-income households from moving in. As a result, neighbourhood change proceeds even without universal eviction, gradually transforming the social composition of the area.

Empirical studies show that such processes are not exceptional. Research in New York City, for instance, estimates that approximately 6,10% of renter moves in gentrifying neighbourhoods were directly attributable to gentrification-related pressures (Newman & Wyly, 2006). Displaced households frequently relocate to peripheral or economically disadvantaged areas, contributing to the “suburbanisation of poverty” and reinforcing spatial inequality. In more severe cases, displacement results in housing instability or homelessness when no affordable alternatives are available. Beyond material consequences, displacement disrupts long-standing social networks, dissolving ties between neighbours, families, and informal support systems that may have taken decades to form. Even residents who remain in place may experience what scholars describe as displacement in place, a sense that the neighbourhood has changed so profoundly that it no longer feels socially or culturally accessible.

Gentrification also reshapes the cultural identity and commercial landscape of neighbourhoods. Long-standing local businesses, ethnic shops, and community centres are frequently replaced by cafés, boutiques, galleries, and lifestyle-oriented services designed to attract wealthier consumers. This process, often described as *boutiquing*, has been documented in cities such as New York, London, and San Francisco, where traditional working-class retail steadily gives way to upscale consumption spaces. While these changes are sometimes framed as signs of vibrancy or renewal, they can undermine the sense of belonging among long-term residents. When everyday services are replaced by

venues that cater to different tastes, prices, and lifestyles, residents may feel that the neighbourhood is no longer for them, even if they remain physically present. Such symbolic or cultural displacement erodes historical memory and weakens collective identity, effectively rewriting the meaning of place.

These cultural transformations are closely tied to political contestation and power relations. Gentrification has become a focal point for activism and resistance, with residents and housing advocates framing upscale redevelopment as a form of social cleansing. Drawing on Lefebvre's concept of the Right to the City, grassroots movements in cities such as Berlin, Barcelona, London, and San Francisco have mobilised against evictions, rising rents, and speculative development, demanding stronger tenant protections and community control over land and housing. At the same time, scholars argue that many contemporary urban policies actively promote gentrification as an economic development strategy. From this perspective, gentrification reflects a broader class-based remaking of the city, in which central neighbourhoods are reclaimed by more privileged social groups through state-supported market mechanisms.

Recent research further highlights the intersectional nature of gentrification's impacts. Displacement and exclusion do not affect all residents equally. In North America and the United Kingdom, racially marginalised communities face disproportionate risks due to historical legacies of redlining, urban renewal, and discriminatory housing policies. Studies show that low-income Black residents displaced from gentrifying neighbourhoods are more likely to relocate to equally disadvantaged areas, while non-Black residents more often move to improved environments, reinforcing patterns of segregation. Gendered dynamics also play a significant role. Low-income women, particularly women of colour, face heightened vulnerability to eviction and housing insecurity due to persistent wage and wealth gaps. Their displacement can destabilise neighbourhoods further, as women frequently sustain informal care networks, mutual aid practices, and community organisations. Even groups that initially benefit from early stages of gentrification, such as LGBTQ+ communities, may later experience renewed exclusion as redevelopment intensifies and housing costs escalate.

The consequences of gentrification extend beyond housing and culture to encompass public health, wellbeing, and perceptions of safety. Forced relocation and housing instability have been identified as major social determinants of health. The concept of root shock captures the trauma associated with displacement, describing the emotional and psychological disruption that occurs when individuals lose their homes, routines, and social environments. Research links displacement to increased levels of stress, anxiety, depression, and chronic illness, as well as reduced access to healthcare and employment stability. Children and older adults are particularly affected, facing educational disruptions, social isolation, and the loss of essential support systems. Even the anticipation of displacement can generate chronic stress, undermining wellbeing long before residents are forced to move.

Gentrifying neighbourhoods may also experience changes in public safety. Many studies report declines in violent crime as investment increases, buildings are renovated, and public spaces become more actively used. Improved lighting, infrastructure upgrades, and increased policing can contribute to these trends. However, the relationship between gentrification and safety remains uneven and contested. Crime may be displaced to adjacent non-gentrifying areas rather than eliminated, while intensified policing can produce new forms of insecurity for long-term residents, particularly those subject to racial profiling or surveillance. As a result, perceptions of safety often diverge: while newcomers may feel more secure, original residents may experience exclusion, loss of autonomy, and weakened informal safety networks. This raises a critical question increasingly posed in the literature: safety for whom?

Taken together, these social, cultural, political, and health-related impacts demonstrate that gentrification is not simply a process of physical upgrading or economic revitalisation. It represents a profound restructuring of urban life, redefining access to housing, identity, power, and wellbeing. While gentrification can improve the built environment and local economies, it often does so by displacing vulnerable populations and eroding existing communities. For this reason, urban planners and researchers increasingly advocate for approaches to inclusive revitalisation that seek to balance neighbourhood improvement with social equity, ensuring that development does not come at the expense of those who have historically called these neighbourhood's home.

2.3 Types and Evolutions of Gentrification

Gentrification was first observed in inner-city neighbourhoods when middle-income households began moving into working-class areas, renovating housing, and displacing original residents (Shaw, 2008), (Smith, 1979). Over time, however, the phenomenon has taken many diverse forms. Urban scholars now identify multiple types of gentrifications beyond the classic model each defined by different actors, assets, and processes. These include upgrades centred on commerce, new construction projects, policy-driven renewal, environmental improvements, tourism, and digital technologies. All represent variations on a common logic of neighbourhood change, but with distinct characteristics and drivers. Importantly, gentrification is now recognised as a global process. Case studies in Tehran, for example, confirm similar patterns (Sadrabad et al., 2013), showing that neighbourhoods worldwide can experience these dynamics. The next subsections outline the main types of gentrifications identified in the literature, their defining features, and notable examples.

2.3.1 State-Led Gentrification and Policy Drivers

Beyond private market forces, government actions and neoliberal urban policies have also fuelled gentrification, especially from the 1990s onwards. In many cities, municipal authorities and developers have partnered in urban regeneration initiatives such as enterprise zones, tax incentives, new transit hubs or flagship redevelopment projects that deliberately encourage upscale reinvestment in run-down areas. This state-led gentrification involves policy-driven or publicly subsidised upgrading of neighbourhoods

and often serves as a tool to renew cities. Examples include large-scale inner-city renewal schemes and new-build luxury housing projects that attract affluent residents to formerly disinvested districts. Such interventions essentially institutionalise gentrification as a planning strategy, often justified under the banner of revitalisation or combating urban decline. As (Hackworth & Smith, 2001) note, by the turn of the millennium gentrification had entered a third wave in which public-sector involvement and global investment play a much larger role than in the sporadic, pioneer-driven gentrification of earlier decades. In effect, gentrification has become embedded in urban policy discourses, with city governments at times actively facilitating the process in hopes of economic gains (higher tax revenues, increased property values) and city branding benefits.

2.3.2 New-Build Gentrification

New-build gentrification refers to the production of upscale residential or mixed-use projects on sites that were previously vacant, industrial, or otherwise not in residential use, leading to a new enclave of affluence in the urban fabric. Unlike the classical pattern of renovating old housing, this form involves entirely new construction luxury apartment complexes, office towers with high-end condos, gated communities often marketed to wealthy buyers. Direct displacement of prior residents is typically limited (since few people lived on the exact site before), but the indirect effects on the surrounding area can be profound. By inserting a high-income development into a formerly lower-value or industrial zone, new-build projects can induce broader change in the neighbourhood, raising nearby land values and encouraging further upscale investment. Researchers in the late 1990s and 2000s noted that such projects were becoming increasingly common, from waterfront redevelopments to converting former docks and railway yards into trendy districts. For example, the London Docklands redevelopment once a stretch of derelict docks in East London was transformed into a financial hub with glossy apartment towers, emblematic of how new-build schemes can create “instant gentrification” of an area. (Davidson & Lees, 2005) argue that these new-build developments are indeed a form of gentrification, representing a mutation of the process in the post-recession era (Davidson, Lees, 2004), Rather than simply residentialisation (as some critics suggested), they contend new-build gentrification is part and parcel of the maturation and mutation of the gentrification process into a more expansive urban strategy.

Global North cities offer many examples of new-build gentrification. In *New York City*, the Hudson Yards project and waterfront conversions (e.g. in Brooklyn) turned rail yards and industrial piers into upscale residential-commercial enclaves. *Amsterdam*’s Eastern Docklands and *Paris*’ Rive Gauche redevelopment similarly involved new luxury housing where none existed, attracting affluent residents and corporate investors. These projects align with what has been called the third wave of gentrification, characterised by large-scale, developer-led initiatives often supported by public-private partnerships (Hackworth & Smith, 2001) Even though they don’t evict existing communities on-site, the influx of luxury construction drives up local property prices, eventually pressuring adjacent lower-income areas. For instance, London’s Docklands saw nearby working-class neighbourhoods like parts of Tower Hamlets experience rising rents and indirect displacement after the Canary

Wharf skyscrapers and condos were built. Similarly, San Francisco's Mission Bay redevelopment on former railyards created a biotech and condominium district, contributing to soaring land values citywide. Planners in these cities often promote new-build projects as "urban regeneration", aiming to revitalise derelict lands and boost the economy; however, the social repercussions include creating exclusive zones that local residents may find financially (and sometimes socially) inaccessible.

Crucially, new-build gentrification is not limited to wealthy Western cities it has also become prevalent in the Global South, albeit with distinct dynamics. In Istanbul, for example, massive new towers and luxury gated compounds have risen on former military lands and along the periphery of older neighbourhoods, bringing elite housing into the city's fabric. Developments in areas like Levent or Maslak once sparsely built introduced high-end offices and condos that cater to Istanbul's upper class and foreign investors, reconfiguring land values across the city. Johannesburg has seen private developers create fortified upscale complexes (like the Maboneng Precinct in a formerly neglected part of the inner city), drawing in artists and professionals and sparking a wider property market upswing. In Lagos, the ambitious Eko Atlantic project a completely new luxury city quarter built on reclaimed land off the coast exemplifies new-build gentrification in an African context: it creates a high-income enclave from scratch, with gleaming skyscrapers and marinas marketed to global elites. While Eko Atlantic did not displace residents on its reclaimed site, its existence highlights the stark contrast between exclusive new urban islands and the surrounding metropolis, and it may spur speculative land hikes in adjacent districts. Similarly, Beirut's post-war reconstruction of the downtown (Solidere project) replaced a war-torn but mixed-use quarter with a glossy financial district and luxury downtown for the wealthy. This state-sanctioned new-build gentrification erased previous affordable markets and housing, effectively excluding many ordinary Beirutis from the city centre. Across these examples in the Global South, governments and private investors often justify new-build projects as symbols of modernity and economic progress building a new rather than upgrading informally developed areas. Yet, as in the Global North, the outcome is a form of urban "*enclavisation*" that feeds into wider gentrification pressures: land prices surge not only within the project boundaries but also in adjacent locales, and the city's socio-spatial map becomes more polarised between the new high-end zones and the rest. In sum, new-build gentrification has become a global phenomenon, reflecting how contemporary city-making from London to Lagos leverages upscale development as a tool for urban change, often with *exclusive* results. Cities worldwide have, in effect, embraced these projects as part of what Neil Smith termed a "global urban strategy" to attract investment and affluent taxpayers, even as the strategy's equity impacts remain highly controversial.

2.3.3 Tourism and Airbnb Gentrification

One increasingly visible driver of gentrification in the 21st century is tourism especially short-term rentals and the so-called Airbnb effect. Tourism gentrification is a term coined by Kevin Gotham to describe the transformation of urban districts by tourism-driven investment and consumption (Yong-Chen Tsai & Hsiu-Tzu Betty Chang, 2024). In tourist-attractive cities, neighbourhoods with historic charm, cultural amenities, or scenic

locations often see an influx of boutique hotels, cafes, souvenir shops, and holiday apartments that cater more to visitors than to longtime residents. This process can lead to the displacement of local populations and businesses, as rents soar and everyday shops (grocery stores, hardware shops, community services) give way to bars, galleries, and short-term stay facilities. Gotham's study of New Orleans' French Quarter showed how real estate capital poured into that historic neighbourhood to serve a growing tourism industry, reshaping the land use from residential to predominantly commercial/touristic and driving out many working-class residents (Fox Gotham, 2018). The concept has since been applied globally, recognising that in many cities' tourism has become entwined with gentrification as a deliberate redevelopment strategy (Gravari-Barbas, Guinand, 2017). Local governments often promote tourism for economic development, branding certain neighbourhoods as destinations but this very success can price those areas beyond the reach of their original communities.

In the era of Airbnb and similar platforms, tourism gentrification has accelerated and spread to new locales. Short-term rentals allow property owners (or speculative landlords) to earn much higher returns from tourists and travelling professionals than from local long-term tenants. This creates a strong incentive to convert housing into vacation rentals, reducing the supply of homes for locals and bidding up the cost of remaining long-term rentals. In cities like Barcelona, Amsterdam, Paris, and Berlin, officials have raised alarms that an overconcentration of holiday rentals is effectively hollowing out certain neighbourhoods turning them into seasonal quarters for outsiders and eroding the resident community. For instance, by the mid-2010s Berlin introduced strict regulations (a ban on unregistered short-term leasing in 2016) to curb what Germans termed touristification, after seeing popular districts like Mitte and Kreuzberg flooded with Airbnb listings and noticing concomitant rent spikes and evictions of locals. Amsterdam likewise set quotas and fines for illegal holiday rentals in its UNESCO-listed canal district, aiming to protect residential character. These policies underscore a common pattern: left unchecked, the Airbnb effect can amplify gentrification trends that were already underway. As one study in New York City showed, the growth of Airbnb in just a few years enabled hosts (often catering to foreign visitors with greater purchasing power) to bid up housing prices and accelerate displacement in gentrifying areas (Wachsmuth & Weisler, 2018) also, estimated that the rapid proliferation of short-term rentals contributed measurably to rent increases in several NYC neighbourhoods, effectively creating a rent gap that incentivised landlords to replace long-term tenants with higher-paying tourists. In other words, the sharing economy has provided a new avenue for capitalising on urban space, often at the expense of housing affordability for locals.

These dynamics are by no means limited to the Global North; tourism-led gentrification now spans the globe. A vivid recent example is Mexico City, which in the wake of the COVID-19 pandemic saw an influx of foreign remote workers and tourists drawn by the city's cultural appeal and comparatively low costs. By 2023–2025, thousands of digital nomads many from the US and Europe had taken up residence (temporarily or semi-permanently) in Mexico City's trendier districts. Local residents noticed rapid changes: English replacing Spanish in

cafes, upscale co-working spaces proliferating, and rents in previously affordable areas (like Roma Sur or Condesa) shooting up beyond middle-class locals' reach. Tensions erupted in summer 2025 when protestors marched through the city accusing foreigners of driving gentrification and chanting Fuera Airbnb! Airbnb get out. Their anger was fuelled by statistics: a flood of over 26,000 Airbnb listings has overtaken the city's most desirable neighbourhoods, replacing longtime residents with tourists and short-term renters, as reported by the advocacy group Inside Airbnb. This scenario mirrors the strife seen in other cities from Lisbon and Barcelona to Cape Town and Seoul where locals have mounted backlashes against the conversion of their communities into tourist playgrounds. In Istanbul's historic Beyoğlu district, for example, the growth of boutique hotels and Airbnb units has contributed to evictions of poorer residents and the fading of traditional shops, much as Cairo's central areas have seen old apartment blocks sold off and renovated into guesthouses for overseas visitors. Even in cities not traditionally thought of as tourism hotspots (like Lagos or Johannesburg), a kind of elite tourism or business-traveller gentrification occurs in select enclaves for instance, upscale districts and nightlife zones oriented towards expatriates and wealthy travellers, which can marginalise locals through higher prices and policing of public space.

From Europe's great capitals to emerging megacities in the Global South, tourism-driven gentrification raises a key paradox: the same cultural and historical qualities that make a neighbourhood attractive to outsiders can, through market forces, end up pushing out many of its insiders. Without regulation, the lucrative lure of tourism means housing units shift to short-term use, landlords prefer Airbnb guests over local families, and whole communities can lose their permanence. Urban scholars and activists therefore call for policies to manage this phenomenon such as caps on holiday rentals, taxes or restrictions on absentee owners, and support for local businesses in order to strike a balance between welcoming visitors and sustaining liveable, inclusive neighbourhoods for residents. This delicate balance is now part of the gentrification debate worldwide, reminding planners that cultural preservation must go hand-in-hand with social preservation if historic districts and city centres are to remain more than just open-air museums or investment assets.

2.3.4 Classic and Residential Gentrification

Classic (residential) gentrification refers to the original pattern described by Ruth Glass in 1960s London. In this process, more affluent (often middle-class) residents invade a run-down urban neighbourhood, rehabilitate older housing stock, and gradually transform the area's character. As (Glass ,1964) noted, once this process of gentrification starts in a district it goes on rapidly until all or most of the original working-class occupiers are displaced. In essence, older dwellings are upgraded, building facades are restored, and new amenities such as cafés or artisan shops appear. Middle-class homebuyers or professional developers convert rental tenements into owner-occupied flats, as in many New York brownstone neighbourhoods or London mews. This classic form involves a transition in tenure (often from rented to owner-occupied) and a change in social mix, with wealthier families replacing long-time working-class households.

Early definitions distinguished gentrification from wholesale redevelopment. As Neil Smith put it, gentrification was the rehabilitation of existing housing by middle-class newcomers, whereas redevelopment involved demolition and new construction. In practice, however, these often overlap today. Classic gentrification also has cultural markers: landscaped streets, improved street furniture and public art, and a visible consumer culture in public spaces (e.g. diners, organic groceries, art galleries). The result is a neighbourhood that resembles an upscale suburb more than it did previously. Crucially, this process usually excludes those who cannot afford higher rents or purchase prices renters on low incomes are frequently pushed out (Atkinson, 2000). Artist-led gentrification is a common variant, where bohemian or creative professionals are the initial pioneers, attracted by cheap lofts; later their presence attracts investors and upscale services.

This form of residential gentrification was first noted in Western cities of the 1960s–70s but has since spread. It is sometimes called “pioneer gentrification” or “organic gentrification”, emphasising how it can emerge at a grassroots scale. In many world cities, classic gentrification occurred in historic inner districts (e.g. northern Manhattan, Brooklyn, Southwark in London) during late 20th century as deindustrialisation left old housing abandoned. Residents who cannot afford the rising rents are displaced to suburbs or informal settlements. In sum, residential gentrification is defined by *in-situ* housing upgrade and class replacement, shaping neighbourhoods once dominated by local populations.

2.3.5 Commercial Gentrification

Commercial gentrification describes the simultaneous transformation of retail and services that often accompanies residential change. When a neighbourhood’s income profile rises, its shops and eateries change too. Local convenience stores, independent cafés, or ethnic grocers may be replaced by chain boutiques, organic food markets, or designer coffee bars. This shift in the commercial landscape is both a symptom and driver of gentrification. For example, as middle-class tenants move in, investment in retail follows; luxury chain retailers and restaurants move into renovated storefronts, signalling a higher-status neighbourhood. Shaw, notes that gentrified areas often feature “designer shops, art galleries, bars and restaurants” catering to new residents.

Importantly, commercial gentrification can occur even where housing remains constant. In some cases, an area’s shops and streetscape change first (e.g. a food market is redeveloped into cafés and wine bars), which then attracts wealthier residents (Cameron et al., 2003). Gotham (2005) and others have argued that retail change is integral to tourism-driven gentrification as well (covered below). Regardless, the effect is that older customers and small business owners may be priced out. The character of the neighbourhood shifts: what once served a local community is transformed into consumption space for outsiders or affluent locals. Thus, commercial gentrification refers to this upscale makeover of business districts an important facet of how places change during gentrification.

2.3.6 Tourist Short-Term Rental Gentrification

Tourist short-term rental gentrification refers to patterns of neighbourhood change that emerge as tourism activity and short-term accommodation expand within residential areas, particularly through digital platforms such as Airbnb and VRBO. In many cities, housing that was once intended for long-term residents is increasingly converted into short-term tourist rentals, introducing new forms of tourism-driven capital into local housing markets. While these developments are often promoted as opportunities for urban revitalisation or supplementary income, a growing body of research points to their less visible consequences for housing affordability, residential stability, and everyday community life (Cocola-Gant, 2018). A key mechanism underlying short-term rental gentrification is the gradual removal of dwellings from the long-term rental market. Property owners, particularly in centrally located or culturally attractive neighbourhoods, are often encouraged to prioritise short-term letting because it offers higher and more flexible returns than conventional residential leases. As increasing numbers of apartments are redirected toward tourist use, the supply of housing available to local residents' declines, placing upward pressure on rents and property prices. Empirical research by Wachsmuth and Weisler, illustrates this dynamic in New York City, where the rapid expansion of Airbnb contributed to the creation of new rent gaps by shifting tens of thousands of housing units out of long-term circulation, thereby intensifying displacement pressures in several Manhattan and Brooklyn neighbourhoods.

The effects of tourism-driven short-term rentals extend beyond housing markets to reshape the social and functional character of neighbourhoods. As visitor presence grows, local services and commercial activities often reorient themselves toward tourist consumption, leading to what scholars describe as functional or symbolic displacement (Cocola-Gant, 2018) Everyday amenities that support residential life, such as grocery stores or community services, may gradually be replaced by souvenir shops, cafés, entertainment venues, and short-term rental agencies. analysis of New Orleans' French Quarter demonstrates how tourism-led investment can transform historically residential areas into spaces primarily organised around leisure and consumption, altering both social relations and patterns of everyday use.

More recent scholarship treats short-term rental gentrification as a distinct, though closely related, form of gentrification characterised by the presence of temporary rather than permanent newcomers. Although tourists do not settle in neighbourhoods on a long-term basis, their continuous circulation produces housing market effects similar to those observed in more conventional forms of gentrification, including rising demand, speculative investment, and the displacement of long-standing residents. Well-documented examples include Barcelona's Gothic Quarter and Venice, where the proliferation of short-term rentals has contributed to population decline, the erosion of local communities, and growing resistance to tourism-led urban change.

Overall, tourist short-term rental gentrification highlights how gentrification can be driven not only by residential in-migration or traditional real estate development, but also by the expanding tourism economy and platform-based housing markets. By prioritising short-term profitability over long-term residential needs, this process risks undermining neighbourhood stability and exacerbating housing insecurity, particularly in centrally located and culturally significant urban areas, (Cocola-Gant, 2018).

2.3.7 Green, Digital, and Smart Gentrification as Interacting Processes

Recent research increasingly suggests that contemporary forms of gentrification should not be read as neatly separated or mutually exclusive processes. In practice, neighbourhood change often emerges through a combination of environmental upgrading, technological investment, new construction, and planning strategies, which together reshape urban space. Treating green, digital, or smart gentrification as isolated categories risks oversimplifying how these dynamics actually unfold. Instead, many scholars argue that it is their interaction that produces the most significant socio-spatial effects.

Within this broader picture, green gentrification has become a particularly important mechanism. Green gentrification refers to situations in which environmental improvements such as new parks, green infrastructure, energy-efficient buildings, or climate-adaptation projects contribute to rising land values and the displacement of lower-income residents. Although such interventions are typically justified through environmental and public health objectives, they can unintentionally increase neighbourhood desirability for wealthier groups. As (Anguelovski et al., 2019) note sustainability-oriented projects may activate new rent gaps, especially in areas that were previously undervalued, unless explicit measures are taken to protect existing communities. In this sense, green infrastructure can become both an environmental asset and a driver of socio-economic change.

These processes increasingly intersect with digital and smart urban transformations. Smart city agendas frequently combine environmental goals with technological solutions, including sensor-based monitoring, smart lighting, energy-management systems, and data-driven approaches to climate governance. While such initiatives are often presented as tools to improve efficiency and sustainability, critical scholars caution that they can intensify gentrification pressures when investments are spatially concentrated or aligned with market-led development strategies. Neighbourhoods selected for smart and green pilot projects often receive disproportionate attention, funding, and branding, which may further enhance their appeal to developers and higher-income residents (Taylor Sh, Matthew Z & Alan Wi, 2014).

From this perspective, digital and smart interventions do not replace green gentrification but frequently reinforce it. As cities increasingly compete through sustainability, innovation, and quality-of-life narratives, environmental performance and technological connectivity become new sources of urban value (Shaw, 2008). Areas where green amenities, smart infrastructure, and new-build developments coincide are often promoted as flagship

projects of contemporary urbanism. Empirical evidence suggests that such neighbourhoods may experience faster increases in property values and redevelopment pressures, even when inclusivity and resilience are stated policy goals

This integrated understanding is particularly relevant in contexts where smart transformation, green implementation, and real estate development advance together. Rather than asking whether gentrification is driven by environmental policy, digital innovation, or new construction alone, it becomes more productive to examine how these elements combine within specific urban settings. In the case explored in this thesis, this approach makes it possible to assess whether the cumulative effects of smart urban strategies, new residential developments, and green-oriented interventions have contributed to gentrification processes. Framing green gentrification as central while recognising its interaction with digital and smart urbanism provides a more nuanced and context-sensitive lens for analysing contemporary urban change.

2.3.8 Typologies of Gentrification

Type of Gentrification	Description	Example(s) / Notes
Classic (Residential)	Influx of higher-income residents into working-class neighbourhoods, rehabilitating old housing and displacing locals. Typically involves renovation of existing stock and a tenure shift from renting to ownership.	1960s London (Glass' original example); Brooklyn brownstones; Hackney, London. Key feature: gradual social upgrading of neighbourhoods.
Commercial	Upgrading of local businesses and retail to upscale chains and services. Follows or drives residential change .	Mom-and-pop shops replaced by boutiques, cafés, chain stores. E.g. new wine bars and designer shops in formerly working-class high streets.
New-Build	Construction of brand-new luxury housing on vacant/industrial land by private developers (Davidson & Lees, 2005). Little on-site displacement initially, but transforms landscape.	London Docklands redevelopment; Tehran's affluent high-rise complexes in redeveloped zones.
State-Led (Policy-Driven)	Government-initiated urban renewal (e.g. highways, parks, plazas) that clears low-income housing for redevelopment. Residents are relocated for state or public-private projects.	Tehran's 1990s Navab Highway project (3,000 families moved for new highway and tower blocks).
Green (Eco-)	Environmental or climate adaptation projects (parks, waterfronts, greenway trails) that raise nearby property values, attracting wealthier buyers.	New York's High Line or European urban riverside parks: nearby rent increases; studies warn of "climate gentrification" (Anguelovski et al., 2019)

Type of Gentrification	Description	Example(s) / Notes
Tourism / Short-Term Rental	Influx of tourists and short-stay rentals transforming residential areas. Driven by hotels, attractions and platforms like Airbnb; leads to rising rents and tourist-oriented commerce.	Venetian Canalside becoming tourist-only zones; Airbnb boom in historic districts (Wachsmuth & Weisler, 2018).
Digital / Smart	Arrival of advanced digital infrastructure and “smart city” projects that enhance connectivity and services in particular districts, making them more attractive to high-tech industries and affluent residents.	Technology districts or “innovation zones” with fibre optics, 5G, IoT sensors. Critics warn smart programs may benefit wealthier areas first.

Table 1: *Typologies of gentrification: definitions & illustrative examples, Author's compilation based on the literature cited in the text. (based on the literature cited in the text).*

2.4 Gentrification in the Context of Sustainable and Smart Urban Development

Urban greening initiatives, though intended to improve quality of life, can inadvertently accelerate gentrification by raising housing costs (Wolch et al., 2014). Studies of North American and European cities have documented a “green gentrification” cycle where new parks, bike lanes, and waterfront improvements attract higher-income residents who value these amenities, driving up property values. Without strong safeguards, the original community often cannot afford the higher costs. In this way, environmental upgrades may undermine social sustainability by concentrating benefits among wealthier newcomers. Scholars therefore call for “just green enough” planning implementing greening projects in partnership with local residents and at a scale that avoids large-scale displacement. This includes coupling green investment with anti-displacement policies, such as affordable-housing provisions, rent controls, or community land trusts, to ensure long-time residents share in the benefits.

As noted, environmental enhancements like new parks, greenways, bikeways, tree planting, or waterfront restoration tend to raise surrounding real estate values. Cities around the world have observed this green gentrification cycle. For instance, research on multiple North American and European cities found that neighbourhoods receiving significant greening investments (parks, improved waterfronts, etc.) often experienced faster increases in housing costs and influxes of higher-income residents compared to areas that did not. The improved environmental quality and aesthetics attract wealthier homebuyers who value those amenities. The literature emphasizes that without policy intervention (like affordable housing mandates, rent controls, or inclusive zoning), even well-intentioned sustainability projects can exacerbate inequality effectively transferring the benefits of a cleaner, greener environment to a new, more affluent population, while original residents are displaced and may not get to enjoy those benefits. Thus, a contradiction arises: sustainable development

projects can undermine social sustainability. A truly sustainable city, in the full sense, must integrate environmental gains with social equity. This has led to calls for “just green enough” planning (making improvements in collaboration with the community and at a scale that benefits locals without triggering massive gentrification) and coupling any green investment with strong anti-displacement measures.

In sum, efforts to make cities more sustainable must explicitly guard against displacement. Planners should design green improvements with equity in mind, ensuring that housing around new parks or bike lanes remains affordable (Agyeman, Evans , 2003). By integrating social justice into environmental upgrades, a city can pursue lower carbon and healthier neighbourhoods without inviting exclusive wealth influxes.

2.4.1 Smart Urban Development: Innovation or Inequality?

Likewise, the rapid rollout of smart city technologies often mirrors this pattern of uneven development. Early smart city pilot projects typically target high-profile districts with better infrastructure and higher returns on investment (Townsend, 2013). As a result, affluent areas receive cutting-edge digital services such as gigabit internet, smart lighting, or sensor-enhanced transit well before poorer neighbourhoods. Critics warn that this tech-first approach can widen the digital divide, concentrating the benefits of connectivity in already advantaged communities. For example, the deployment of autonomous shuttles or high-speed broadband in rich districts may increase convenience and safety there, making those areas more attractive to wealthier residents, while adjacent, underserved areas fall further behind. This process of technological gentrification is visible in many global cities, where high-tech infrastructure and innovation hubs drive up local property demand (Townsend, 2013).

Similar concerns are raised about the rapid rollout of smart technologies in cities. By design, smart city initiatives often start with pilot projects in select districts, or they require significant infrastructure that tends to be deployed in higher-income, high-priority areas first (where ROI is clearer or there is less risk). Scholars and urban critics argue that this can widen the digital divide the gap between those who have access to advanced technology and those who do not. In the context of urban communities, this means wealthy neighbourhoods benefit early from things like gigabit internet, smart transit apps, sensor-enhanced public services, etc. while poorer neighbourhoods lag behind. Lauren Papa describes how these patterns “introduce new dimensions to the age-old issue of gentrification”, noting that as cities become smarter, the benefits of digital infrastructure are often concentrated in more affluent neighbourhoods. This phenomenon accelerates the gentrification process, where technological advancements intended to improve urban life may inadvertently alienate low-income residents. For example, installation of smart street lighting, security cameras, and IoT networks might make one district safer and more attractive, spurring upscale development there, while adjacent neglected districts continue to struggle, effectively pushing investment (and higher-income movers) toward the smart area. High-tech infrastructure projects like autonomous shuttle services or cutting-edge broadband often bypass low-income quarters, reinforcing a cycle where the rich areas get

richer (and more high-tech) and the poor areas are left further behind. The presence of tech startups or innovation hubs in certain neighbourhoods also drives up demand for housing there (a phenomenon seen in cities like San Francisco during the tech boom, where Google bus routes to Silicon Valley were pinpointed as corridors of gentrification). In short, smart city development can act as a new driver of spatial stratification. Property values increase in tech-enabled districts, inviting more affluent tech workers; long-time residents may find themselves priced out. This has been dubbed technological gentrification. Importantly, these effects are not inevitable: they depend on policy choices and how inclusively smart city planning is conducted. If city leaders intentionally invest in digital equity for example, expanding affordable internet to underserved areas, launching smart city pilots in low-income neighbourhoods, or using civic tech for all the outcome can be more inclusive. However, critics have pointed out that many smart city programs to date have not adequately addressed inclusion, focusing more on efficiency and innovation than on equity (Hollands, 2008)

without deliberate policies to promote fairness, smart city innovation risks deepening existing inequalities. Scholars suggest measures such as universal broadband access, digital literacy training, and affordable smart mobility options to mitigate these risks (Townsend, 2013). By prioritising access and equity in technology deployment, cities can harness innovation without leaving vulnerable communities behind.

2.4.2 Balancing Progress with Inclusivity

Urban scholars increasingly call for explicitly integrating social equity into smart and green initiatives. Concepts like inclusive smart city and just sustainability's emphasise that technological and environmental improvements must also reduce, not worsen, inequality. For example, to counter digital gentrification, some cities have introduced free or low-cost Wi-Fi in underserved areas, invested in training programs to boost digital skills among disadvantaged groups, and ensured that new mobility services (bike-share, e-scooters, etc.) serve low-income neighbourhoods affordably. Similarly, equitable greening strategies might include community land trusts or mixed-income housing requirements around new parks to keep nearby housing permanently affordable (Agyeman, Evans, 2003). Key to these approaches is genuine community engagement: involving local residents and stakeholders in designing smart city projects helps align them with neighbourhood needs. Such inclusive planning can transform smart and sustainable projects into tools for social cohesion, rather than drivers of exclusion.

Balancing Progress with Inclusivity: The literature increasingly calls for an integration of the equity lens into smart and green urban initiatives. Terms like “inclusive smart city” and “just sustainability's” have emerged to emphasize that technological and environmental advances must be steered toward reducing inequality, not aggravating it. For instance, to counter digital gentrification, cities can implement policies such as: providing free or low-cost Wi-Fi in low-income areas, investing in digital literacy and skills training for marginalized groups, ensuring new smart mobility services (bike-share, e-scooters, etc.) are accessible and affordable to all neighbourhoods, and engaging community representatives

in the design of smart city projects. In the realm of green development, equitable green planning might include measures like land trusts to secure some housing around new parks as permanently affordable, or zoning that requires mixed-income housing as part of redevelopment projects spurred by transit or park improvements. These strategies align with the concept of sustainable development that is not only environmental and economic, but also social. It is encouraging to note that Tehran's own Smart Tehran Program documentation explicitly mentions goals like improving public engagement, increasing citizen satisfaction, and promoting an inclusive, integrated approach to smart urban management. The STP aims to involve all stakeholders and achieve a "smart economy, smart environment, smart governance, and smart life" as part of a sustainable urbanization strategy.

Thus, the key insight is that any assessment of urban innovation must scrutinise its social inclusivity. The concept of sustainable urbanism demands an intersectional view: environmental and technological gains should be complemented by strong social policies. In practice, this means that a truly smart or green project must be accompanied by plans for affordable housing, participatory governance, and equitable service provision, by consciously balancing progress with fairness, cities can strive to achieve sustainability in the fullest sense of the word.

Chapter 3: Methodology

3.1 Introduction

This chapter outlines the methodological framework for investigating how smart neighbourhood development and gentrification are transforming urban spaces and planning for social relationships in Tehran. This study shows a qualitative approach, build in an interpretivist paradigm and inductive reasoning, to explore lived experiences, institutional dynamics, and socio-spatial change. Multiple-case study design (Yin, 2018) (Creswell, 2014) has been used to enable in-depth comparison across three neighbourhoods Shahrak-e Gharb, Fereshteh, and Sa'adat Abad, each reflecting a different mode of upscale redevelopment. I collected all data through semi-structured interviews, my field observations, and analyzed these documents, then triangulation was performed to ensure accuracy and depth.

Also using (Braun & Clarke, 2006) thematic analysis, four main themes were identified through an iterative process of coding and interpretation. The theme of displacement captures both direct and indirect reshaping of residential and social displacement experienced and anticipated by residents. Luxury smart urbanism refers to the concentration of high-end residential developments and smart technologies that primarily serve affluent groups. The policy gaps highlight Incompatibilities between planning objectives, Regulatory frameworks, and field results, Specifically according to housing affordability and social protection. Eventually, community change reflects shifts in neighbourhood identity, social relations, and everyday practices that are a result of redevelopment and demographic turnover. With all these themes structure the analysis by linking individual experiences with broader planning and governance processes.

Ethical methods followed Polytechnic di Torino and GDPR standards and ensuring that informed consent, confidentiality, and cultural sensitivity. Researcher situation and reflection were addressed throughout the research process to support transparency and analytical integrity (berger, 2015). These methodological choices form a strong, human-centred foundation for examining how smart urbanism intersects with inequality and inclusion, setting the stage for the chapters that follow.

3.2 Research Design and Rationale

The thesis adopts a qualitative multiple-case study design to examine how smart urban development and gentrification spread out in particular neighbourhood contexts in Tehran. This design was chosen because the research addresses complex, context-dependent processes that cannot be meaningfully separated from their spatial, social, and institutional settings. Smart urbanism and gentrification don't operate as abstract or uniform phenomena; rather, they are shaped by local planning practices, governance arrangements, real estate dynamics, and everyday social relations. A case study approach allows these interdependencies to be examined holistically, capturing how technological interventions, new development patterns, and social change interact on the ground. Moreover, case study

research is particularly suited to investigating contemporary urban transformations that are still evolving and where causal mechanisms are difficult to isolate (Yin, 2018). By situating the analysis within real neighbourhoods, this approach enables the study to move beyond policy rhetoric and explore how smart development is actually experienced, negotiated, and contested in practice.

The selection of Shahrak-e Gharb, Fereshteh, and Sa'adat Abad is intentional and theoretically informed rather than illustrative or statistically representative. These neighbourhoods were chosen because they constitute key sites of contemporary urban transformation in Tehran, where smart technologies, luxury-oriented development, and new construction converge most visibly. While all three are located in northern Tehran an area historically associated with higher socio-economic status they differ significantly in terms of urban morphology, development history, and modes of intervention. Shahrak-e Gharb reflects a planned, large-scale residential model with increasing integration of smart infrastructure; Fereshteh exemplifies high-end redevelopment closely linked to symbolic capital, prestige, and consumption; and Sa'adat Abad illustrates rapid densification driven largely by private real estate investment. Examining these neighbourhoods together allows the study to explore how similar development logics produce divergent gentrification outcomes depending on local conditions. This comparative logic strengthens the analytical value of the research by enabling both pattern recognition and contextual differentiation, which is essential for understanding how smart urban development interacts with gentrification processes in Tehran.

The study is grounded in an interpretivist paradigm, which conceptualizes social reality as constructed by meanings, experiences, and interactions. This epistemological position is particularly appropriate for the research aims, as the study seeks to understand how residents, planners, and developers perceive, interpret, and respond to smart neighbourhood development and gentrification. Rather than treating gentrification solely as a structural or economic process, the interpretivist approach allows attention to be paid to lived experiences, narratives, and everyday practices through which urban change is made meaningful. As (Denzin, Lincoln, 2018) argue, qualitative researchers act as interpretive bricoleurs, assembling multiple forms of evidence to understand how social change is experienced within specific contexts.

Aligned with this philosophical stance, the research follows an inductive analytical approach, allowing insights and interpretations to emerge from the empirical material rather than being imposed through predefined hypotheses. The analysis progresses from detailed observations, interview narratives, and field notes toward broader thematic interpretations. This inductive logic is particularly suited to the exploratory nature of the research questions and to the limited existing empirical work on the intersection of smart urbanism and gentrification in the Tehran context. It also allows space for unexpected findings to surface, reflecting the open-ended and context-sensitive character of interpretivist inquiry.

A qualitative approach was selected over a purely quantitative design because the research aims to capture perceptions, lived experiences, and institutional dynamics rather than to

measure prevalence or test causal relationships. Processes such as gentrification and smart urban development involve subjective interpretations, power relations, and symbolic meanings that are difficult to capture through numerical indicators alone. The case study strategy supports a holistic understanding by integrating multiple sources of evidence, including semi-structured interviews, field observations, and document analysis. This approach is consistent with Shaw argument that gentrification must be understood in relation to local conditions, as well as with (Lees, Slater & Wyly, 2008) view that while gentrification is a global phenomenon, it takes shape through diverse local expressions.

Within this design, each neighbourhood is treated as both an individual case and part of a broader examination of Tehran's urban transformation. Patterns that recur across all three sites such as the concentration of luxury development, the integration of smart technologies, or the exclusion of lower-income groups are interpreted as structurally significant, while differences between cases help illuminate the role of contextual factors such as planning practices, governance arrangements, and market dynamics.



Figure 1: *Tehran and its 22 municipal districts (with inset showing location within Iran).*

Note. Author's elaboration

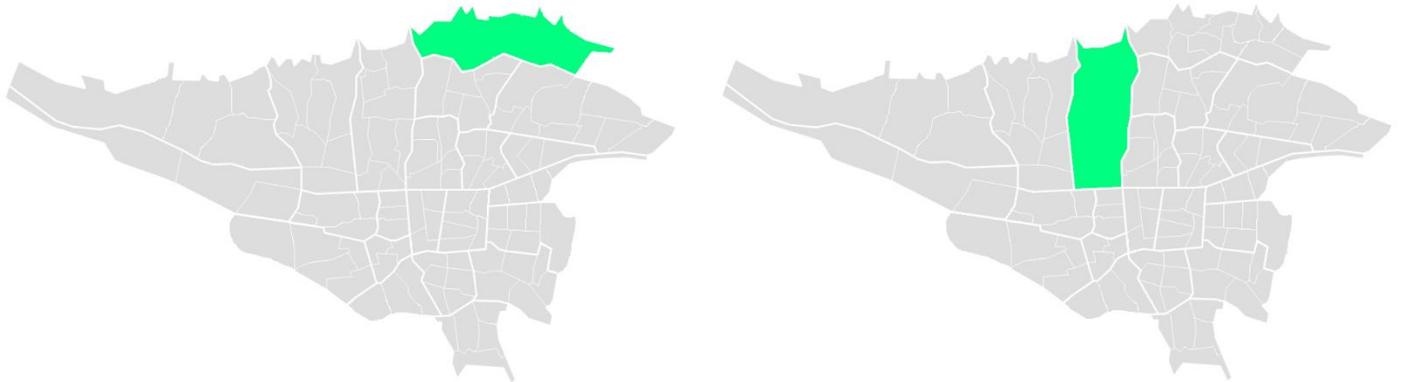


Figure 2: Location of Tehran’s Municipal Districts 1 and 2 (highlighted). District 1 (north). District 2 (west and north-west). Note. Author’s elaboration.

3.3 Case Study Selection

The three selected neighbourhoods Shahrak-e Gharb, Fereshteh, and Sa’adat Abad were chosen using purposive sampling because they represent the frontline of Tehran’s new-build, upscale, and smart urban development. As discussed in Chapter 2, all three are located in Municipal Districts 1 and 2, consistently ranked among Tehran’s highest in terms of housing quality, access to services, and overall development. These districts contrast sharply with the city’s disadvantaged southern areas, where poverty rates are significantly higher. By focusing on these northern and northwestern neighbourhoods, the study examines Tehran’s most modern, affluent, and technologically advanced residential environments, offering insight into whether emerging “smart” developments support inclusivity or intensify socio-spatial divides. Together, the three cases allow an exploration of different trajectories of upscale transformation long-term suburban gentrification, vertical luxury redevelopment, and large-scale greenfield expansion within Tehran’s broader smart-city ambitions. The choice of three cases also provides diversity within the upscale spectrum: Shahrak-e Gharb as an older master-planned area now fully gentrified; Fereshteh as an infill luxury transformation; and Sa’adat Abad as a newer built-from-scratch high-end district. This range enriches the analysis by covering different modes of gentrification (redevelopment of existing suburb vs. verticalization vs. greenfield development) within Tehran’s smart city ambitions.

Shahrak-e Gharb: Master-Planned Suburb Turned Dense Luxury District

Shahrak-e Gharb was developed in the late 1960s–70s as one of Tehran’s earliest master-planned suburbs, originally characterized by low-density villas and modern urban services. Since the 1990s, the area has undergone intensive densification, with villas replaced by high-rise luxury residential towers. Today, it represents a mature form of new-build gentrification, marked by high property values, commercial megaprojects, and pronounced socio-spatial contrasts with adjacent lower-income neighbourhoods. Its long-term transformation makes it a key case for examining exclusionary redevelopment dynamics within Tehran’s northern districts.

Fereshteh (Elahieh): Vertical Smart Luxury in an Already Elite Context

Fereshteh, located within the elite Elahieh area, has historically been associated with diplomatic residences and large villas. Over the past two decades, it has experienced intense vertical redevelopment, becoming one of Tehran's most exclusive high-rise luxury corridors dominated by smart residential towers. Rather than displacing lower-income groups, this transformation intensified exclusivity and erased architectural heritage, replacing garden estates with technologically advanced buildings. Fereshteh illustrates how smart urbanism can function as a class-based process reinforcing elite lifestyles rather than social inclusion.

Sa'adat Abad: Greenfield Gentrification and the Making of a Modern Elite District

Sa'adat Abad developed rapidly during the 1990s and 2000s on formerly rural and peripheral land following major infrastructure investments. Unlike older neighbourhoods, it represents greenfield gentrification, where high-end residential and commercial development emerged without direct displacement of existing urban communities. Nevertheless, the district contributes to Tehran's north-south socio-spatial polarization through its concentration of wealth, car-dependent infrastructure, and premium lifestyles. Sa'adat Abad provides a critical case for evaluating the inclusivity and sustainability of expansion-led smart urban development.

3.4 Data Collection Methods

To investigate the research questions, I collected data through multiple qualitative methods: semi-structured interviews, Sampling Strategy, direct observations, and secondary document analysis. Using multiple methods ensured a comprehensive understanding of the phenomena and improved the credibility of findings by cross-verifying information from different sources. (Creswell, 2014)

3.4.1 Semi-Structured Interviews

The core method was semi-structured interviews conducted between Sep to Nov 2025 with 16 participants across three key groups: (1) planners, policymakers, (2) private developers and technology providers; and (3) residents and community members. Most interviews were carried out face-to-face in Tehran, with a few conducted online. Each lasted between 35 and 60 minutes. Interviews were conducted in Persian (with occasional English terminology) and followed a flexible protocol to allow in-depth, narrative responses (Denzin , Lincoln, 2018). Interview themes addressed gentrification, smart infrastructure, affordability, displacement, and planning policies. Recordings were transcribed and translated into English for analysis. Pseudonyms were used where necessary to ensure confidentiality. A summary of interviewees is provided in the table above.

3.4.2 Sampling Strategy

A purposive sampling strategy was used to recruit individuals with relevant expertise or lived experience of urban transformation. Planners and developers were selected for their involvement in smart housing and policy implementation, while long-term residents and local business owners were chosen for their insights into neighbourhood change. To expand the sample particularly among residents a snowball sampling method was applied, where initial participants referred others in their networks. This approach was especially effective in Tehran's urban context, where access often depends on personal trust and connections.

The interviews yielded rich qualitative data, capturing diverse perspectives from planners, policymakers, and residents on neighbourhood transformation in Tehran. Planners and officials reflected on policy intentions versus on-the-ground implementation, often noting the interplay between regulatory frameworks, market dynamics, and urban upscaling. Several interviewees mentioned challenges related to affordability and the limited inclusion of social equity objectives in current planning practices. Residents, in turn, provided lived experiences of neighbourhood change, highlighting issues such as cultural displacement, affordability pressures, and unequal access to the benefits of smart or sustainable housing initiatives. These accounts underscored how technological and aesthetic improvements can coexist with growing socio-economic divides. Overall, the interviews offered a multi-voice understanding of how urban modernization and gentrification intersect in Tehran's northern districts. Detailed thematic interpretations and representative quotations from participants are presented in Chapter 4.

3.4.3 Observations and Site Visits

To complement the interviews, I conducted non-participant field observations during multiple visits to the three neighbourhoods. These were undertaken at different times and days to capture variability. An observation checklist guided the process, recording indicators such as: presence of smart technologies (e.g. sensors, cameras), public space use, business types, and signs of exclusion. For instance, in Fereshteh, I observed cranes and new towers dominating the skyline, while in Shahrak-e Gharb, gated luxury complexes and private gyms contrasted with limited affordable services. In Sa'adat Abad, I noted evening traffic congestion and a lack of public transport confirming planners and residents' remarks about car dependency. These observations provided vital context and were often used to refine follow-up interview questions.

3.4.4 Secondary Documents and Triangulation

The third data source involved document analysis, including municipal plans, Smart Tehran Program reports, housing data, news articles, and scholarly publications. These helped situate interview data within Tehran's broader planning and policy framework (Yin, 2018). For example, official reports confirmed that Districts 1 and 2 have received disproportionately high real estate investment. The Smart Tehran Program documents revealed pilot projects for smart infrastructure in areas matching my case sites. Documentary data helped validate or elaborate interview claims for example, a planner's comment about weak inclusionary zoning was supported by policy documents lacking affordable housing requirements. This methodological triangulation across interviews, observations, and documents increased the study's credibility. (Creswell, Poth, 2018)

3.5 Researcher Positionality and Reflexivity

As a native of Tehran and long-term resident of Sa'adat Abad, I entered this research with an insider's familiarity with the city's language, culture, and urban dynamics. This positionality offered advantages, including ease in building rapport with participants, contextual sensitivity to local references, and a personal commitment to more inclusive urban development. My academic training in urban planning, pursued through postgraduate study at Polytechnic di Torino, further shaped my approach, aligning me with principles of sustainability and social equity. Aware that positionality influences qualitative inquiry, I adopted a reflexive stance throughout the research process. Reflexivity, as defined by Berger, entails sustained self-examination of how a researcher's background, assumptions, and standpoint may shape the research process and its outcomes. Drawing on Finlay's (2002) notion of grappling with the messy swamps of subjectivity, I critically reflected on my dual roles as both an informed Tehran insider and a trained academic investigator.

To manage these dynamics, I kept a reflexive journal to document emotional responses, biases, and analytical decisions following each interview or field visit. For instance, I was conscious of moments where my own assumptions for example, viewing Fereshteh as inherently elite might colour interpretation. During interviews, I adopted an attitude of conscious naïveté, asking participants to clarify points even when I was familiar with the topic, thus minimising presumption. Power dynamics were also addressed. As a young female researcher interviewing senior male officials, I noted occasional feelings of deference and took care to ask critical follow-up questions. Peer debriefings with fellow Iranian researchers and my academic supervisor (based in Italy) helped surface and challenge any implicit assumptions. These steps supported a more robust and self-aware interpretative process.

My insider status was, however, not uniform. While I shared cultural background with many participants especially long-term residents I often felt more like an outsider when engaging with affluent developers or high-level planners. As (Berger,2015) notes, researchers move

along a fluid continuum between insider and outsider positions. I navigated this by being transparent about my research identity and remaining alert to how power, privilege, and familiarity shaped interactions. I also took steps to minimise bias and enhance rigour, including prolonged engagement in the field, informal member checks through clarifying follow-up questions, and the use of thick description to provide contextual depth and analytical traceability. Rather than suppressing my connection to the topic, I used it as motivation to probe more deeply while consistently questioning whether my own perspectives influenced interpretation.

In sum, I approached this project as a critical insider leveraging cultural familiarity while actively interrogating my positionality. This reflexive practice contributes to the trustworthiness and transparency of the research, following best practices in qualitative inquiry (Lincoln , Guba, 1985)

3.6 Data Analysis Procedures

The data comprising interview transcripts, field observations, and supporting documents were analysed using a qualitative, interpretive approach aimed at understanding participants lived experiences and perceptions of urban transformation. The objective was not to quantify responses, but to explore how various actors make sense of the neighbourhood changes unfolding across Tehran. Analysis began with repeated, immersive reading of all materials. I wrote analytical memos during this process to record emerging ideas, patterns, and tensions around key themes such as housing affordability, displacement, modernisation, and urban governance. Attention was paid to how different stakeholder groups residents, planners, policymakers, and technology providers framed these issues, revealing both overlapping concerns and divergent perspectives. For instance, while residents often emphasised emotional and social consequences, planners tended to focus on technical and policy dimensions. Through iterative coding and thematic reflection, I identified four core analytical categories:

Socio-Spatial Transformation and Displacement- physical, economic, and symbolic restructuring of neighbourhoods.

Smart Urbanism as Luxury and Status- the framing of smart technologies as high-end features tied to class and exclusivity.

Governance, Policy, and Inclusion Gaps- institutional drivers of uneven development and regulatory shortfalls.

Community Experience and Identity- emotional attachments, cultural shifts, and residents' sense of place.

To enhance validity, findings were triangulated across data types: interview insights were cross-checked with direct observations and policy. This helped ensure that participants'

accounts were grounded in the material realities of neighbourhood change and broader institutional context. Ultimately, this analysis approach sought to provide a nuanced, human-centred account of how smart urban development, inequality, and identity intersect in Tehran's evolving built environment.

3.7 Ethical Considerations

This study adhered to ethical guidelines set by Polytechnic di Torino and international research standards, with careful attention to informed consent, confidentiality, and participant well-being throughout.

Informed Consent: All participants were briefed on the purpose of the study, their rights, and the voluntary nature of participation. A Persian-language consent form outlined the interview topics and data use. Consent written or verbal was obtained prior to each interview, and all participants agreed to audio recording after confidentiality was explained.

Confidentiality and Anonymity: Data were stored securely in encrypted files accessible only to the researcher and supervisor. Pseudonyms or general professional titles (e.g. "District Planner") were used in reporting, and sensitive identifiers were omitted. This ensured participant privacy and encouraged honest responses.

Avoidance of Harm and Cultural Sensitivity: Given the emotional nature of topics like displacement and gentrification, interviews were conducted with empathy. Participants could pause or skip questions freely, and emotional moments were handled with care. Cultural norms were respected interviews were timed appropriately, questions were phrased neutrally, and political distance was clearly maintained. Being familiar with the Tehran context supported respectful and professional engagement.

Data Protection and Institutional Approval: The research received ethical clearance from Polytechnic di Torino and complied with GDPR standards. All digital files were password-protected and will be deleted five years after project completion. Politically sensitive details were anonymised to avoid risk to participants.

Reciprocity and Debriefing: Each interview concluded with a debrief, clarification of next steps, and the researcher's contact details. A Persian-language summary of findings will be shared with interested participants and the Tehran Municipality's research office, ensuring the study gives back to the communities involved.

The research was guided by principles of voluntariness, confidentiality, non-maleficence, and respect for persons. No ethical issues arose, and participants appreciated the opportunity to share their views fostering trust and strengthening the credibility of the findings.

3.8 Validity, Reliability, and Trustworthiness

This study follows (Lincoln,Guba,1985) framework for ensuring qualitative rigour, comprising credibility, transferability, dependability, and confirmability. Credibility was established through triangulation comparing interviews, observations, and policy documents to identify recurring patterns such as displacement and affordability pressures. Participant quotes are presented in the findings, and limited member checking helped confirm the accuracy of interpretations. Prolonged field engagement and cultural familiarity enhanced the depth of understanding (Creswell , Poth, 2018).

Transferability was supported by thick descriptions of Tehran’s neighbourhoods and redevelopment dynamics. Although not aiming for universal generalisation, the study highlights processes like exclusion through luxury redevelopment recognised in global literature.

Dependability was reinforced by a transparent audit trail of interviews, memos, and analytical steps. Feedback from my supervisor served as informal peer review. Adjustments such as adding questions on smart housing were documented (Braun & Clarke, 2006).

Confirmability relied on reflexivity and careful documentation. A reflexive journal tracked potential bias, and counterexamples (e.g., residents with positive views) were included to ensure balance. While the sample was context-specific, triangulation and reflexive strategies helped ensure the study met accepted standards of trustworthiness.

Chapter 4 – Policy and Planning Context in Tehran

4.1 Introduction

This chapter explains that, Tehran’s planning and policy landscape, focusing on how municipal institutions, planning instruments, and urban strategies have shaped the production of space, with a specific emphasis on smart neighbourhood development and gentrification. Tehran’s urban growth has been mediated through overlapping institutional arrangements, evolving ideologies of modernisation, and a complex relationship between national objectives and local implementation. In doing so, the chapter provides the structural context behind the spatial transformations examined in subsequent chapters.

The city’s planning trajectory is marked by a series of abrupt shifts from early modernist interventions under Reza Shah, to the post-revolutionary redistribution era, to contemporary growth driven by speculative real estate and densification. Each phase has contributed layers of institutional logic, regulatory tools, and spatial priorities that continue to shape current urban development. Tehran’s present planning regime is a hybrid of centralised state oversight and fragmented municipal governance, with strong influence from private developers and political actors. This has led to uneven policy enforcement, discretionary land use practices, and a persistent prioritisation of affluent northern districts over poorer southern areas.

4.2 Historical and Institutional Urban Planning Context in Tehran

Tehran’s urban planning context is shaped by rapid urbanization, a complex political history, and evolving governance structures. As Iran’s primate city and capital, Tehran grew explosively in the late 20th century under both monarchical and post-revolutionary regimes, necessitating formal planning responses. The first comprehensive Master Plan for Tehran (1968), (“The Tehran Master Plan functions as a long-term statutory planning instrument that defines land use, infrastructure development, and growth control strategies for the city.”) prepared under the Shah’s government, introduced modern zoning and infrastructure schemes (Mashayekhi, 2019). This plan and subsequent revisions laid out new highways, satellite towns, and green spaces, reflecting a technocratic approach to urban modernization. After the 1979 Islamic Revolution, urban planning underwent institutional restructuring centralized under ministries yet gradually incorporating local government roles. Since the 1990s, Tehran Municipality and an elected City Council (established in 1999) have taken leading roles in city planning within a framework set by national policies (Madanipour, 2006). (“The establishment of Tehran’s elected City Council in 1999 marked a shift toward greater municipal involvement in urban governance, although planning authority remains constrained by national regulatory frameworks.”) The Supreme Council of Urban Planning and Architecture (under the Ministry of Roads and Urban Development) provides higher-level guidance, while municipal authorities implement local plans. This multi-tiered governance means Tehran’s planning context is influenced both by national development plans and the city’s own strategic plans.

Population growth and urban challenges: Tehran's planning context cannot be separated from its massive population growth and attendant urban problems. The metropolis had about 8.9 million residents in 2018, a figure projected to exceed 10 million by 2030 (United Nations, Department of Economic and Social Affairs). Such rapid urbanization, combined with administrative deficiencies in past decades, has exacerbated environmental pollution, traffic congestion, housing shortages, and socio-spatial inequalities. The city sprawled dramatically, especially during the late 20th century, extending into the foothills of the Alborz Mountains and incorporating villages as new urban districts. Unplanned settlements and informal housing areas emerged as rural migrants and low-income households sought affordable shelter on the urban fringe. Planners have struggled to keep pace with this growth; Tehran's Master Plans (revised in 1992 and 2007) aimed to manage sprawl and redevelop the decaying inner-city fabric, but implementation has remained uneven (Madanipour, 2006). These revisions sought to contain urban expansion, regulate land use, and promote inner-city renewal, yet were constrained by rapid population growth and institutional fragmentation. The result is a city of stark contrasts: modern high-rise districts and gated communities exist alongside deteriorated inner-city neighbourhoods and informal settlements on the periphery. This duality presents a major challenge for sustainable and inclusive development, as will be examined through Tehran's recent policy initiatives.

Sustainable development discourse: In recent years, the language of sustainable and inclusive development has entered Tehran's policy realm, influenced by global agendas. Iran's endorsement of the UN Sustainable Development Goals (especially SDG 11 on sustainable cities) has prompted Tehran to frame its plans in terms of "sustainable urban development" and social inclusion. Notably, Tehran joined the UN's "United for Smart Sustainable Cities" (U4SSC) initiative in 2020 to benchmark its progress toward SDG 11's targets of making cities inclusive, safe, resilient, and sustainable (Tehran Times, 2020). "Tehran Times is a newspaper/media outlet". This signifies an alignment of Tehran's urban vision with international norms. This move signals an attempt to align Tehran's urban policy discourse with international sustainability frameworks. However, realizing these ideals on the ground requires confronting entrenched urban issues from air pollution and seismic risk to socio-economic inequalities and inadequate housing through effective planning and policy measures. In the following sections, we examine Tehran's major contemporary urban initiatives and policies, focusing on how they relate to smart urbanism, urban regeneration and gentrification, and the pursuit of sustainable, inclusive development.

4.3 Contemporary Urban Policy Framework and Strategic Initiatives

By the 2010s, Tehran's urban policy had pivoted toward innovative strategies to address its complex challenges. Two pillars of the current approach are the Smart Tehran Program (STP) exemplifying smart urbanism and an aggressive drive for urban regeneration of blighted areas. These run in parallel with environmental sustainability efforts. Tehran's strategic plans thus integrate technology-driven management with physical redevelopment

schemes, all under the stated goal of achieving a sustainable and liveable city. This section outlines the key policy initiatives, highlighting how they connect to the theoretical concepts of smart urbanism, gentrification (including green gentrification), and inclusive development introduced in Chapter Two.

One of the flagship policy initiatives is the Smart Tehran Program (STP), launched in 2018–2019 as a comprehensive roadmap for transforming Tehran into a “smart city.” The STP represents Tehran’s embrace of smart urbanism the application of digital technologies and data-driven solutions to urban management with an explicit emphasis on sustainability and inclusion. According to Tehran Municipality, the STP’s vision is to build “a liveable and inclusive city, with a dynamic economy and integrated infrastructure” (Providas & Farjood, 2021). In practice, this means leveraging technology not as an end in itself, but as a means to improve quality of life for all residents and promote sustainable urban development.

Core objectives and components: The Smart Tehran Program articulates six strategic objectives that closely mirror global smart city discourses: (1) improving transparency and public engagement in governance; (2) increasing citizen satisfaction with services; (3) promoting sustainable urban development; (4) fostering partnerships and co-creation (including public–private and citizen collaborations); (5) advancing digital transformation of municipal functions; and (6) encouraging urban innovation and startups (Tehran Municipality, 2022). These objectives reflect an integrated approach linking technology to broader social and environmental goals. The STP framework encompasses multiple initiatives: for example, Smart Citizen and Digital Services (including the “My Tehran” citizen app to consolidate e-services), Smart Mobility, Smart Environment, Energy and Safety, Municipal Digital Transformation, and an urban innovation hub called Inno Tehran (Providas & Farjood, 2021). By 2019, Tehran had rolled out STP 1.0, involving 5 initiatives and 12 concrete plans, and is now in STP 2.0 (2022–2025) focusing on scaling up services and evaluating impacts (Tehran Municipality, 2022). The program also established new governance bodies a Smart Tehran Council for policy and a Smart Tehran Centre for implementation to institutionalize the smart city agenda. This framing positions the Smart Tehran Program not merely as a technological modernization strategy, but as a policy instrument with direct implications for social equity, spatial inclusion, and patterns of urban redevelopment.

People-centric approach and inclusion: A notable aspect and a key theoretical linkage is STP’s stated commitment to citizen-centric smart urbanism. Planners argue that “truly smart cities recognise that their greatest asset is their population” (Providas & Farjood, 2021). This philosophy echoes academic critiques that early smart city models were too technocratic; in response, Tehran’s strategy stresses open data, civic tech, and collective intelligence. For instance, the My Tehran platform and the “Baham” neighbourhood engagement app are designed to channel citizen feedback and encourage participatory urban problem-solving (Urban Agenda Platform – Smart Tehran Programme, 2022). The STP also emphasizes improving government transparency (e.g. through open municipal data portals) to build trust and accountability (Tehran Municipality, 2022). In theory, these

measures align with the concept of inclusive smart urbanism, which seeks to avoid the digital divide pitfalls by involving all stakeholders. Inclusive smart urbanism emphasizes participation, accessibility, and equity, ensuring that digital infrastructures do not disproportionately benefit already privileged groups. Indeed, Tehran's approach is presented as moving away from siloed, top-down governance towards an "inclusive, integrated and innovative open-data approach" engaging residents, businesses, and officials alike. The underlying idea is that a smart city should not only deploy ICT for efficiency, but also empower communities and ensure that benefits reach marginalized groups, resonating with the notion of sustainable inclusive development.

Smart Tehran and sustainable development: The STP explicitly links smart city projects to Tehran's sustainable development goals. The program contributes to multiple Sustainable Development Goals (SDGs), notably SDG 11, sustainable cities, and SDG 13, climate action, by improving urban systems in transportation, energy, waste management, and more (Providas & Farjood, 2021). For example, Tehran is piloting smart traffic management and promoting green mobility (such as electric buses and bike-sharing) to reduce air pollution. Digital platforms are used for environmental monitoring with upcoming initiatives for water and energy consumption tracking and smart lighting to conserve resources (Providas & Farjood, 2021). These efforts illustrate how Tehran's planners envisage technology as a tool for balancing the city's growth with environmental stewardship, a core tenet of sustainable development. Furthermore, Tehran's participation in U4SSC provides an external benchmark for measuring progress on inclusivity and sustainability indicators (Tehran Times, 2020; U4SSC, 2020) "U4SSC (United for Smart Sustainable Cities) is a United Nations-led initiative that supports cities in measuring and advancing smart, inclusive, and sustainable urban development through standardized indicators".

Critical perspective: While the Smart Tehran Program is ambitious, from a critical viewpoint it is important to assess whether its implementation lives up to its inclusive rhetoric. Literature on smart urbanism cautions that many so-called "smart cities" have been "technologically led, corporately influenced and tied to competitive city branding" (Hollands, 2008). There are concerns globally that high-tech smart city solutions, if not guided by equity principles, can exacerbate urban inequalities for instance by privileging affluent, digitally connected citizens and neglecting low-income residents who lack access or skills (Hu & Bock, 2018). In Tehran's context, issues such as unequal internet access, low digital literacy in some older or poorer communities, and the affordability of smart services could pose challenges. Planners must also guard against the "technocratic trap" where heavy surveillance or data-driven management might infringe on privacy or citizen agency (Hu & Bock, 2025). "This refers to governance models in which technological systems substitute political deliberation, reducing citizens to data points rather than active participants in decision-making". Encouragingly, Tehran's discourse acknowledges some of these issues for example, officials note that inclusivity is "essential to enable an effective and sustainable transition to smart cities" (Hu & Bock, 2018). The true test will be ensuring that vulnerable groups (the elderly, the poor, those in informal settlements, etc.) are not left behind in Tehran's digital transformation. In summary, the Smart Tehran Program represents a forward-thinking policy aligned with smart urbanism theory and aims to

support sustainable development by improving governance and infrastructure. Its success in supporting an inclusive future for the city, however, depends on continuous attention to social equity and broad-based citizen engagement, consistent with the ideals of inclusive smart urbanism discussed in Chapter Two.

4.3.1 Urban Regeneration Policies and the Gentrification Process

Alongside the smart city agenda, Tehran's policy context features strong efforts in urban regeneration the renewal or upgrading of decayed urban areas. The city contains numerous ageing inner-city districts (often termed deteriorated fabrics in Iranian planning language) as well as informal settlements on its fringes , The term refers to areas characterized by ageing building stock, inadequate infrastructure, high residential density, and heightened vulnerability to environmental and seismic risks. To address substandard housing and urban decay, Tehran's municipality and the national government have launched regeneration and rehousing programs, offering incentives for redevelopment of older neighbourhoods. Notably, the Tehran Urban Regeneration Organization (established in the 2010s) coordinates many of these projects, targeting hundreds of hectares of run-down residential fabric for revitalization, Its mandate includes facilitating land consolidation, attracting private investment, and accelerating redevelopment through regulatory and financial incentives. While such policies ostensibly aim for socially beneficial outcomes safer housing, improved services, and a more beautiful city they also intertwine with the dynamics of gentrification, as highlighted in the literature. This section examines how Tehran's regeneration initiatives relate to gentrification and what that implies for sustainable, inclusive development.

Gentrification in Tehran's context: Gentrification, originally defined by (Glass ,1964) , is the process by which lower-income residents of an urban area are displaced and replaced by more affluent groups, changing the social character of the neighbourhood. For a long time, gentrification was not an explicit concept in Iranian planning discourse as one study notes, "nearly half a century after its introduction, it is still unrevealed in Iran and has a rough path ahead to become a professional concern" (Massoud et al., 2019). Nevertheless, the underlying phenomena of gentrification are observable in Tehran. The city's "worn-out" central neighbourhoods and even some informal settlements have experienced rising property values when redevelopment occurs, often leading to the displacement of long-time residents. Tehran's policymakers generally frame regeneration in terms of "improving degraded areas" rather than using the term gentrification, but academic studies reveal gentrification as a side-effect or indeed a direct outcome of many regeneration efforts (Tajbakhsh & Pakzad, 2016).

Regeneration-led displacement: Research confirms that in Tehran, urban regeneration projects have in some cases accelerated the gentrification process. For instance, a comparative study of two inner-city neighbourhoods (Khani-Abad and Atabak) found that regeneration interventions (such as infrastructure upgrades and new housing developments) significantly increased housing demand and prices in those areas (Massoud et al., 2019). As property values rose, original lower-income residents found themselves

unable to afford the higher rents or property taxes, resulting in their displacement to cheaper peripheral zones. The study's data from 2006–2016 showed a sharp uptick in construction permits and land prices following regeneration, correlated with a turnover in population. The symptoms of the gentrification process, such as the influx of middle-class newcomers and the out-migration of poorer long-term residents, were “more evident in neighbourhoods where extensive regeneration interventions and greater physical changes” took place (Massoud et al., 2019). In other words, Tehran's own experience mirrors global patterns: This alignment between local evidence and international theory underscores the structural nature of regeneration-led gentrification rather than treating it as an isolated or unintended outcome. When urban renewal focuses on physical revitalization without strong protections for existing communities, it tends to produce classic gentrification outcomes (as theorized by Smith's rent-gap model and others; (Smith, 1979) Wealthier groups are attracted to the newly improved areas, and lower-income households are pushed out, thereby defeating one of the implicit goals of regeneration (i.e. improving living conditions for the original residents).

A pertinent Tehran example is the transformation of neighbourhoods like Behjatabad and Farahzad in recent years. In Behjatabad (a central area), private redevelopment of old villas into luxury apartments in the 2000s displaced many renting families a process documented as a case of gentrification in Tehran (Sadraabad et al., 2013). Residents who relocated often faced higher costs elsewhere or inferior housing, highlighting a social cost to the city's modernization. Likewise, in southern Tehran, large-scale clearance of deteriorated housing around Shahr-e Rey has made way for new projects, with original low-income communities largely unable to return. Such cases illustrate the tension between urban renewal and social inclusion. Although Tehran's regeneration policies aim to address urban decay (a legitimate goal aligned with sustainable cities), they risk undermining inclusive development if they do not concurrently safeguard affordable housing and community networks.

Policy measures and inclusive regeneration: Tehran's authorities have recognized some of these issues and introduced measures to mitigate adverse impacts. For instance, there are rent assistance schemes and promises of priority in new housing for displaced residents of renewal areas. The city has also offered density bonuses and low-interest loans to encourage developers to include affordable units when rebuilding old neighbourhoods (Tehran Municipality, 2021). Despite these measures, evidence suggests many vulnerable residents still struggle. A study on the impacts of gentrification on tenants in Tehran (Tajbakhsh & Pakzad, 2016) revealed deep social and psychological consequences for those uprooted by urban redevelopment. Through interviews with low- to middle-income families forced to move out of gentrifying districts, it found a “crisis” in personal and community relations: displaced residents experienced loss of place attachment, social seclusion, diminished community engagement, and erosion of shared cultural memories in their new locales (Tajbakhsh & Pakzad, 2016). Such outcomes underscore that regeneration, if not managed carefully, can “defeat the actual purpose” of upgrading programs by harming the very communities they intended to help (Tajbakhsh & Pakzad, 2016).

In theoretical terms, this reflects the critique that gentrification contradicts the goal of sustainable inclusive development: development is not truly sustainable if it marginalizes certain groups. The social pillar of sustainability (equity, inclusion) is as vital as the environmental and economic pillars. Tehran's challenge is to reconcile its regeneration ambitions with social inclusion. This might involve stronger community participation in planning (to incorporate local needs), phasing projects so residents can return, and enforcing mixed-income housing policies. Notably, Tehran has recently empowered Neighbourhood Councils locally elected bodies operating at the district level to give residents a formal voice in urban management. These councils could play a role in negotiating more inclusive regeneration outcomes. It is encouraging that some Tehran regeneration projects now emphasize "people-oriented renewal" for example, the Nabard project in distressed districts uses community facilitators to build consent for improvements rather than imposing evictions. Still, the prevailing market forces and the attractiveness of central land mean gentrification pressures will persist. As we move to environmental policies next, the pattern continues: even well-intentioned "green" initiatives can produce exclusionary effects if not pursued with equity in mind. Tehran's policy context thus presents a nuanced picture progressive in rhetoric and in some frameworks, but facing on-the-ground contradictions that resonate with the debates on gentrification and inclusive development from Chapter Two.

4.4 Urban Greening Initiatives and the Risk of Green Gentrification

Environmental improvement has become a central theme in Tehran's urban policy over the past two decades. Faced with severe air pollution, heat island effects, and a shortage of public green space per capita, the city has invested in expanding parks, tree planting, and other green infrastructure. For example, Tehran's municipality greatly increased green space coverage from large flagship projects like the Chitgar Lake and Park in western Tehran to numerous small neighbourhood parks and the rejuvenation of river-valley corridors (e.g., the Darband and Farahzad valleys) (Kamjou et al., 2024). These efforts align with the concept of urban sustainability and are intended to enhance liveability by providing cleaner air, cooler micro-climates, and recreational opportunities. However, consistent with the literature on green gentrification, Tehran's greening initiatives have sometimes had unintended socio-spatial consequences. (Anguelovski et al., 2019) This section examines how the pursuit of environmental sustainability in Tehran can clash with social inclusion, drawing on the illustrative case of the Farahzad Valley project.

Greening as policy: Tehran's environmental policies have prioritized increasing urban green infrastructure to mitigate pollution and improve quality of life. The Tehran Parks and Green Space Organization reports that dozens of new parks have been created since 2000, and tree planting campaigns have added millions of trees to the metropolis (IRNA, 2015). A notable project was the creation of an artificial lake (Chitgar Lake) and surrounding green parklands, envisaged since the 1980s and finally completed in the 2010s. While these green projects offer clear environmental benefits such as dust reduction and providing much-needed open space for citizens they also tend to raise nearby property values and attract

upscale real estate development. In northern Tehran, greenbelt preservation in the foothills inadvertently made adjacent neighbourhoods more desirable (and expensive). In western Tehran, the Chitgar development turned a once-remote area into a magnet for luxury high-rises with lake views. Such phenomena reflect environmental amenity migration within the city, akin to green gentrification processes noted in Western cities: new parks spur condominium booms that price out existing residents.

Farahzad Valley case “green gentrification” in practice: The Farahzad Valley in northwest Tehran provides a concrete example linking urban greening to gentrification dynamics. Farahzad was historically a village area absorbed by the city, housing an informal settlement along a river-valley with a relatively pristine natural environment (streams, gardens, and a green corridor). In recent years, Tehran’s planners formulated a Restoration Plan for Farahzad, a municipally led environmental regeneration initiative, aimed at ecological conservation of the valley’s green space and development of a public park for the whole city. This plan fell under the banner of climate adaptation and sustainable development protecting an urban green lung from encroachment and improving it for public use. However, the plan also entailed the eviction of the informal settlement communities in Farahzad, who were deemed to be illegally occupying the environmentally sensitive zone (Kamjou et al., 2024). Local authorities justified this as being in the “public good,” arguing that removing informal houses would allow the valley to be restored and made accessible to “all” citizens of Tehran as a park (Kamjou et al., 2024). In essence, the rhetoric framed it as a win-win: ecological restoration, plus a new green amenity for the wider public, aligning with sustainable development. Yet for the several thousand low-income residents of Farahzad’s informal neighbourhood, the outcome was highly exclusionary. This dynamic reflects a classic pattern of green gentrification, where environmental improvements disproportionately benefit higher-income users while displacing vulnerable populations. They faced displacement from their homes and livelihoods.

Scholars have analysed this Farahzad case as emblematic of green gentrification in the global South. (Kamjou et al, 2024) point out that uneven greening approaches toward informal settlements can exacerbate inequalities, producing exactly the kind of displacement seen in Farahzad.. In Tehran, as elsewhere, eviction policies for environmental ends often hit the most vulnerable communities. The Farahzad residents, many of whom had lived there for decades (some holding informal title claims under a traditional “Roots Right” system for gardeners, a customary tenure arrangement granting long-term cultivation and residency rights without formal land titles), were portrayed by private-sector planners as obstacles to ecological rehabilitation even as unreliable stewards of the land (Kamjou et al., 2024). By highlighting the lack of formal deeds and the ideal of a pristine nature, proponents of the plan effectively marginalized the local community’s stake . The conflicting rationalities were stark: officials saw an ecologically valuable valley that needed saving from informality; residents saw a home imbued with social ties and economic necessity. The authorities’ stance aligns with what green gentrification literature describes as an “eco-technocratic” narrative where green infrastructure is promoted as an absolute public good, glossing over the social costs.

Indeed, Farahzad's informal residents became, in one planner's words, acceptable collateral for the "public good of ecological restoration," and their forced removal was rationalized as a necessary sacrifice for Tehran's environment .

The social fallout in Farahzad underscores why green gentrification is viewed critically. Residents reportedly received cash compensation offers to leave, but these were insufficient for buying homes elsewhere in Tehran's pricey market (Kamjou et al., 2024). As one local council member noted, "even if residents sell to the municipality, they really cannot buy a house anywhere in Tehran. They will become homeless or tenants forever" (Kamjou et al., 2024). This outcome displacement without viable resettlement highlights how a project can be environmentally sustainable yet socially unsustainable. This contradiction lies at the core of critiques of sustainability frameworks that prioritize environmental metrics while neglecting social justice and housing security. Moreover, many Farahzad residents suspected that the greening was a pretext and that after evictions the land would be leveraged for profitable upscale development (given the area's attractiveness) . Whether or not that suspicion holds true, it reflects a deep mistrust: the community felt excluded from the vision of the inclusive city that Tehran espouses. Instead of being beneficiaries of a cleaner environment, they were being excluded from the city's future. Such scenarios directly relate to the thesis question of whether these transformations (smart neighbourhoods, gentrification processes) can support an inclusive future. In cases like Farahzad, the transformation towards a "greener" Tehran came at the expense of inclusivity, indicating a misalignment with sustainable inclusive development.

Reconciling green and inclusive goals: Tehran's policymakers face the challenge of pursuing environmental improvements without falling into green gentrification traps. Some steps can be taken to reconcile these goals. For instance, inclusive green space planning would involve consulting and compensating communities fairly, perhaps integrating informal settlers as participants in park maintenance or providing on-site re-housing options so they are not uprooted. Additionally, protections could be established to prevent speculative real estate spikes around new parks e.g. by reserving some land for affordable housing or community facilities. So far, Tehran's green initiatives have largely been top-down. The Farahzad conflict did spark public debate, and urban activists in Tehran have called for a more justice-oriented approach to urban green projects, echoing global calls for "just green enough" (Anguelovski et al., 2018) strategies (greening the city while explicitly safeguarding incumbent residents). Encouragingly, Tehran Municipality has in other projects shown flexibility for example, along the Nawab Expressway corridor redevelopment, some displaced households were given new apartments in the reconstructed buildings at subsidized rates, which could be a model for future green redevelopment as well. (Madanipour, 2006) (Tehran Municipality, 2010)

In summary, Tehran's expansion of parks and green infrastructure underscores the city's commitment to the environmental pillars of sustainable development, but it also illustrates the phenomenon of green gentrification, where environmental gains can produce social losses if not managed inclusively. This highlights a recurring theme in Tehran's planning context: the tension between modernization efforts (whether digital smart projects, physical

regeneration, or greening) and the goal of an inclusive city. The final section will tie these threads together, considering whether Tehran's policy trajectory can support an inclusive future and how it aligns with the theoretical frameworks of smart urbanism, gentrification, and sustainable development.

4.5 Toward Sustainable and Inclusive Urban Development in Tehran

Drawing together the analyses above, this section reflects on how Tehran's current policy and planning context positions the city in relation to sustainable and inclusive development. The thesis question asks: How do smart neighbourhoods and the process of gentrification in Tehran relate to sustainable development and urban planning, and can these transformations support an inclusive future for the city? We have seen that Tehran's major urban initiatives its smart city program, its regeneration drives, and its green infrastructure projects are double-edged. They hold promise for advancing sustainability (in terms of economic vitality, environmental quality, and urban efficiency), yet they also pose risks to social inclusion and equity. In this section, we consider the policy context's alignment with theoretical concepts from Chapter Two and identify key opportunities and challenges for fostering an inclusive future in Tehran.

4.5.1 Alignment with Smart Urbanism and Sustainable Development Goals

From a policy perspective, Tehran has explicitly embraced global sustainable development frameworks and the smart city paradigm. The Smart Tehran Program is a clear manifestation of smart urbanism, intended to leverage technology in pursuit of sustainability goals. It aligns with international models that see smart cities as engines to achieve the SDGs by improving urban systems and governance. For instance, Tehran's STP includes objectives like promoting sustainable urban development and indicators tied to SDG benchmarks (Urban Agenda Platform, 2022; Tehran Times, 2020). The city's engagement with U4SSC and its showcase at the Smart City Expo (2019) demonstrate its commitment to being seen as a modern, innovative metropolis. In many ways, Tehran's narrative resonates with the literature on smart sustainable cities highlighting co-benefits such as economic innovation, better service delivery, and environmental monitoring. The STP's comprehensive approach (covering smart economy, mobility, environment, governance, living) suggests a holistic understanding that sustainability spans multiple dimensions (Urban Agenda Platform, 2022).

However, the trade-offs identified in smart city literature are equally relevant. One trade-off is that while smart solutions can drive efficiency and growth (supporting the economic and environmental aspects of sustainability), they may inadvertently widen social gaps (contradicting the inclusion aspect). Indeed, a recent review observed that smart city research often emphasizes positive outcomes while overlooking challenges like digital divides or gentrification effects. Tehran's policy documents are aware of this; they champion inclusive smart city ideals, but the implementation needs continual scrutiny. For

example, if smart transportation systems mainly benefit formal, affluent districts and neglect slums or lower-income commuters, then the sustainability impact is uneven. Similarly, high-tech initiatives require funding if financed through public-private partnerships, there is a risk that corporate interests dominate, which could sideline poverty alleviation or affordability concerns (critical urbanists like Graham and Marvin have termed this splintering urbanism). In Tehran's case, the balance of priorities will be crucial. The city must ensure that smart infrastructure investments (e.g. sensor networks, data platforms) complement, rather than replace, investments in basic services for poorer neighbourhoods (water supply, public transit access, etc.). Achieving socially inclusive smart urbanism might involve simple steps like designing apps and e-services in Persian with user-friendly interfaces for all literacy levels, providing community internet centres in less-connected areas, and using civic tech to actively include women, the elderly, and other underrepresented groups in decision-making.

On the sustainable development front, Tehran's policy context also grapples with the classic challenge of integrating environmental, economic, and social goals. The strategic plans (including the Tehran Master/Structural Plan and successive five-year development plans) increasingly reference concepts of resilience, low-carbon growth, and social justice. It is evident that Tehran understands sustainable development not just as environmental protection but also as poverty reduction and cultural preservation. For instance, the city's 2016 Resilience Strategy (as part of the 100 Resilient Cities network) emphasized community preparedness and reducing social vulnerability to earthquakes, recognizing that inclusivity (e.g., upgrading informal housing to be safer) is part of sustainability.

The question is how consistently these high-level commitments translate into everyday policy decisions. The earlier sections showed instances where economic and environmental pursuits (smart growth, green beautification, upscale regeneration) risked undercutting the social foundation of sustainability.

In theoretical terms, Tehran's scenario echoes the arguments of "Just City" scholars (Fainstein, 2010) that deliberate policy intervention is needed to ensure equity. Without it, the market-driven aspects of development (whether smart tech companies or real estate developers) could produce exclusion. A positive aspect in Tehran's context is the existence of a relatively strong public sector role in urban development, the municipality is a major actor, not completely yielding to laissez-faire forces. This gives Tehran the ability to enforce regulations for inclusion if the political will exists. For instance, Tehran could require that smart neighbourhood pilots (areas where new tech infrastructure is concentrated) also include social components like affordable housing or digital literacy programs for local residents, thereby marrying the smart and inclusive agendas. The degree to which Tehran's current policy framework does this remains to be fully seen, but at least the discourse of city leaders (as evidenced in UNDP interviews and Tehran's own publications) suggests an awareness that "smart cities need to be people-centred" (Providas & Farjood, 2021) and that inclusivity is crucial for long-term success. In summary, the policy context provides a blueprint that is theoretically supportive of sustainable development and even contains innovative approaches to inclusion, but the real measure will be in outcomes, a theme the thesis will explore further in subsequent chapters.

4.5.2 Challenges and Opportunities for an Inclusive Future

Analysing Tehran's planning context through the lenses of smart urbanism and gentrification reveals several challenges to building an inclusive future, as well as some opportunities and best practices that could be scaled up.

Challenges: A primary challenge is managing gentrification and displacement so that development does not deepen urban inequalities. The policy context has shown that market pressures in Tehran whether triggered by regeneration projects or by environmental improvements tend to disadvantage lower-income groups. Left unchecked, these processes could lead to a more polarized city: smart and green neighbourhoods with high property values on one side, and marginalized communities pushed to the periphery on the other. Such an outcome would undermine the inclusive future that Tehran's vision statements champion. Additionally, Tehran's socio-economic context (with high inflation and housing costs in recent years) makes achieving affordability even harder; gentrification is partly fueled by macroeconomic factors beyond urban planners' direct control. Inclusive development requires tackling these structural issues, perhaps through stronger housing policies (e.g. rent control, social housing provision currently limited in Tehran) and community land trusts to keep some land immune from speculative rises.

Another challenge lies in the realm of governance and participation. While Tehran now has Neighbourhood Councils and public consultation mechanisms on paper, there is often a gap between community input and final decisions. The Farahzad episode, for example, showed that residents' opposition and their "Right to the City" claims were overridden by a top-down agenda. (Lefebvre, 1968; Harvey, 2008) For an inclusive future, planning processes must evolve toward genuine power-sharing with citizens. This may be culturally and politically challenging in Tehran's context, but small steps (like participatory budgeting in districts or involving local NGOs in project design) could build trust and yield more inclusive outcomes. The lack of data transparency in some areas is another issue; although STP aims to improve transparency, urban data (such as who benefits from projects, who is displaced, and which areas receive investments) should be openly available so that civil society and researchers can hold authorities accountable to inclusion goals.

Furthermore, the digital divide and varying capacities across Tehran's populace pose a challenge to the smart city being inclusive. Without careful policy, the benefits of smart technology might skew towards younger, tech-savvy, and wealthier citizens. The challenge is not unique to Tehran globally, cities struggle to ensure that smart innovations (like app-based services or sensor networks) (Kitchin, 2014) do not inadvertently exclude those without smartphones or with limited tech literacy (Hu & Bock, 2025). Tehran will need to invest in digital education and perhaps maintain offline alternatives to smart services during a transition period so that, for instance, an elderly person can still pay a bill or report a problem without a smartphone. This human-centered approach distinguishes a truly inclusive smart city from one that is merely high-tech.

Opportunities: On the positive side, Tehran’s policy and planning context also contains the seeds of inclusive transformation. The very fact that concepts like inclusive development and social resilience are now part of the city’s planning lexicon is an opportunity it provides a mandate and justification for pro-poor and participatory initiatives. One opportunity is to harness Tehran’s innovation ecosystem (universities, startups, tech companies) in service of inclusion. For example, the city could encourage tech incubators to focus on solutions for informal settlements (such as low-cost environmental sensors or apps that connect day labourers with jobs), merging the smart city and poverty-alleviation agendas. Tehran’s young, educated population could be mobilized in hackathons or urban labs to co-create solutions with residents of distressed neighbourhoods, bridging social divides.

In terms of urban form, Tehran still has a stock of public land and vacant spaces that could be strategically used to demonstrate inclusive development. The municipality owns some large tracts (e.g. former industrial sites, barracks) these could be developed not into the highest-bidder luxury complexes, but into mixed-income “smart” neighbourhoods that showcase how technology and affordability can coexist. A pilot project might include smart energy grids and sensors (aligned with STP) along with social housing and community facilities for diverse income groups. If done well, it could counter the notion that smart urbanism inevitably leads to gentrification.

Another opportunity arises from community initiatives. Tehran has a tradition of neighbourhood-based problem-solving (for instance, religious charities and local cooperatives often step in to improve local services). Integrating such grassroots efforts with formal planning perhaps through the Baham urban engagement platform (Urban Agenda Platform, 2022) could ensure that smart city tools amplify the voices of the poor rather than mute them. There have been instances where Tehran’s citizens have successfully negotiated with the municipality (for example, residents in some districts managed to get plans for a noisy highway altered to include sound barriers and parks). These instances could be built upon to form a more institutionalized community participation framework.

Policy direction for inclusivity: To directly address whether Tehran’s current transformations can support an inclusive future: it will depend largely on policy choices and safeguards integrated into these transformations. Smart neighbourhoods could support inclusivity if, say, smart technologies are used to improve services in informal settlements (e.g. smart water recycling units) and if data-driven governance actively targets inequality (for example, using data to identify underserved areas for more resource allocation). Conversely, if smart city efforts focus only on affluent areas or on flashy projects (like high-end business districts with 5G networks), then they will bypass those who most need improvement, thereby exacerbating divides. The gentrification processes associated with regeneration and greening could be managed through inclusive zoning and community benefit agreements. Tehran’s planners might, for instance, mandate that any large redevelopment reserve a percentage for original residents to return (perhaps through subsidies or ownership stakes), thus keeping the social fabric intact. International examples such as community land trusts (which keep housing permanently affordable) or inclusionary housing quotas could be

adapted to Tehran's context as forward-looking measures .(Lees, Slater & Wyly, 2008) Finally, it is worth noting that Tehran's urban future will also be influenced by broader socio-political shifts economic sanctions, migration trends, and national housing programs will all play a role. The policy and planning context described in this chapter illustrates a city in transformation, attempting to become smarter, more sustainable, and more globally connected. Whether this transformation leads to an inclusive future city one that truly leaves no one behind is not predetermined. It hinges on continuing to strengthen the linkages between the progressive ideas in policy (smart city, sustainable development) and their on-the-ground implementation with equity. Tehran has opportunities to learn from other global cities' mistakes and successes in this regard. As we proceed in this thesis to analyse specific neighbourhoods and projects in Tehran (the smart pilot areas and gentrifying districts), we will see more concretely how these policies play out and what recommendations might ensure that Tehran's urban development trajectory aligns with the principles of sustainable inclusive development that were outlined in the Literature Review.

CHAPTER 5: Case Study Analysis & Discussion

5.1 Introduction to the Case Study Context

Tehran's planning and policy landscape is characterised by strong strategic ambition but limited capacity for inclusive execution. Historical legacies, institutional fragmentation, and speculative development have produced a governance system in which smart urbanism and urban renewal frequently deepen spatial inequality. Programs such as the Smart Tehran Program (STP) and the Urban Resilience and Renewal Framework (URRF) reflect ambitions to modernise the city, yet their implementation remains largely technocratic and unevenly distributed (Tehran Municipality, 2021). Tehran's continued dependence on land-based municipal financing, coupled with limited participatory mechanisms and regulatory inconsistencies, has hindered progress toward equitable urban development. Interviews with planners, policymakers, and residents underscore these tensions: while visions of a smart, resilient Tehran abound, they are frequently constrained by institutional inertia and market pressures. Without structural reforms such as inclusive zoning, decentralised planning capacity, and participatory urban design Tehran risks entrenching a two-tiered urban system (Shafiei & Sarrafi, 2019).

These dynamics are especially evident in the northern and western districts of Tehran, which have become emblematic arenas for contemporary processes of urban restructuring, gentrification, and smart development. Districts 1 and 2, particularly the neighbourhoods of Shahrak-e Gharb, Sa 'adat Abad, and Fereshteh, have emerged as key sites of socio-spatial transformation. These areas are defined by high-end residential towers, gated communities, planned residential complexes, and mixed-use hubs. Compared to much of the metropolitan area, they exhibit higher levels of environmental quality and service access. Yet, they are simultaneously shaped by volatile land-value dynamics, speculative development, and widening socio-spatial inequalities (Mohammad et al., 2021)

Tehran's broader development context is stratified into five levels, ranging from Level 1 (most developed) to Level 5 (underdeveloped). As illustrated in municipal spatial data, the developed zones are concentrated in the north, while underdeveloped areas are predominantly in the south of the metropolis. Such spatial divisions are not natural market outcomes but are instead the result of historically contingent combinations of state policy, private investment, and cultural-symbolic revalorisation. These mechanisms displace lower-income residents while reconfiguring local identities (Shaw, 2008; Redfern, 2003).

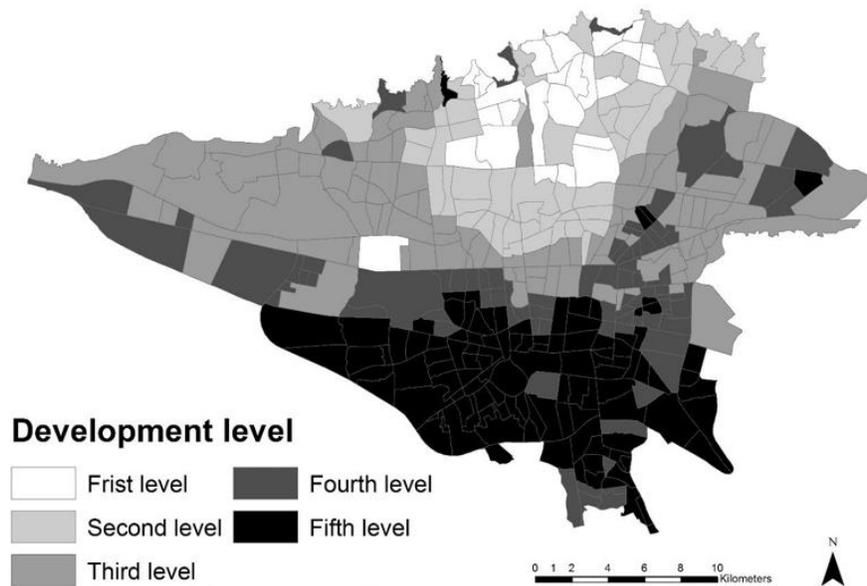


Figure 3: *Development levels in Tehran metropolis (Levels 1–5).*
Note. Reproduced from Shali, Rahimi, and Shirazi (2021).

As it is shown in the Figure (3), the first level zone is mostly in north of Tehran and therefore this part is the developed area of the city. The south of Tehran in the fifth level zone of the city and that is why it is the underdeveloped area.

As discussed in the literature on gentrification, such environments are rarely neutral outcomes of natural market forces. They are produced through historically specific combinations of state policy, private investment and cultural-symbolic processes that revalorise certain inner-city or peri-urban districts while displacing lower-income residents and reconfiguring local identities (Shaw, 2008; Redfern, 2003). Classic works on gentrification emphasise the transition from disinvestment to reinvestment, the arrival of middle- and upper-middle-class groups, and the transformation of neighbourhoods into landscapes of consumption and distinction. More recent scholarship highlights how gentrification has been generalised and increasingly intertwined with state-led urban regeneration, cultural flagship projects and entrepreneurial governance, rather than occurring only as small-scale, household-led rehabilitation.

In the Iranian context, research has documented similar dynamics in various parts of Tehran and other major cities. Studies of urban renewal and regeneration policies show that state-sponsored projects intended to improve physical conditions often produce gentrification and spatial inequality, particularly when they are not accompanied by robust affordability protections or social housing measures. (Arbab & Shabani, 2023) Analyses of socio-spatial segregation in Tehran underline the emergence of affluent, often gated or semi-gated

enclaves in the north and north-west of the city, which contrast sharply with peripheral zones characterised by informality, overcrowding and environmental vulnerability. Research on gated communities has further identified how mixed-use design, controlled access, and targeted marketing reinforce socio-spatial separations and reshape the experience of urban citizenship. (Einifar et al., 2019)

At the same time, Tehran has positioned itself within the global smart city discourse. The Smart Tehran Programme and related initiatives seek to deploy digital technologies, data platforms and smart infrastructure to enhance urban management, improve service provision and support sustainable development. Urban Studies of housing development and smart-city strategies in Tehran point to an uneasy relationship between technology-driven solutions and pre-existing structural issues such as housing unaffordability, speculative development and unequal access to basic development. Urban.2023) Scenario-based work on smart sustainability in Tehran similarly stresses that technological innovation alone cannot deliver socially just outcomes, especially when broader patterns of inequality and segregation remain unaddressed. (Journal of Urban Management,2023)

Against this backdrop, this chapter investigates how the transformation of Shahrak-e Gharb, Sa 'adat Abad and Fereshteh relates to the broader themes of smart neighbourhoods, gentrification and sustainable development introduced in earlier chapters. It combines a spatial and socio-economic analysis of the three neighbourhoods with a thematic interpretation of semi-structured interviews conducted with residents, planners and policymakers (see Chapter 3 for methodological details). The aim is not to produce a statistically representative portrait, but to deepen understanding of how different actors perceive and experience ongoing changes, and to examine whether these processes can plausibly support a more inclusive future for Tehran.

Interviewees consistently described the case-study neighbourhoods as desirable places to live, characterised by relative safety, better infrastructure and a higher quality of public and semi-public spaces compared with many other parts of the city. At the same time, they drew attention to the rising costs of housing, the proliferation of gated blocks, and the erosion of social mix. One long-term resident of Sa 'adat Abad (R2) remarked that “we used to know most of the families on this street; now people move in and out quickly, and new buildings feel like islands for rich strangers.” A planner working at district level (P1) similarly reflected that “upgrading roads, parks and digital systems has clearly improved the area, but because there are no strong affordability policies, benefits are captured mainly by investors and higher-income households.”

The chapter is organised as follows. Section 5.2 provides an overview of the spatial and socio-economic characteristics of Districts 1 and 2, focusing on morphology, land-use patterns and socio-economic indicators. Section 5.3 examines gentrification dynamics in the three neighbourhoods, discussing historical development trajectories, housing-market restructuring and emerging forms of symbolic and material exclusion. Section 5.4 turns to the interview material, presenting four cross-cutting themes: perceptions of change and

identity; experiences of exclusion and affordability pressures; evaluations of “smartness” and sustainability; and aspirations for more inclusive planning. Section 5.5 synthesises these findings in light of the central research question: How do smart neighbourhoods and gentrification in Tehran relate to sustainable development and urban planning, and can these transformations support an inclusive future for the city?

5.1.1 Case Study Context (Short contextual description of each area)

This section provides a brief contextual overview of the three case study areas analysed in this chapter. Rather than reiterating the rationale for case selection, the focus is on outlining the key urban development characteristics, spatial form, and socio-economic context of each neighbourhood. Together, Shahrak-e Gharb, Fereshteh, and Sa’adat Abad represent distinct but interrelated forms of upscale and smart urban transformation, forming the empirical basis for the analysis that follows.

Shahrak-e Gharb: Master-Planned Suburb Turned Dense Luxury District

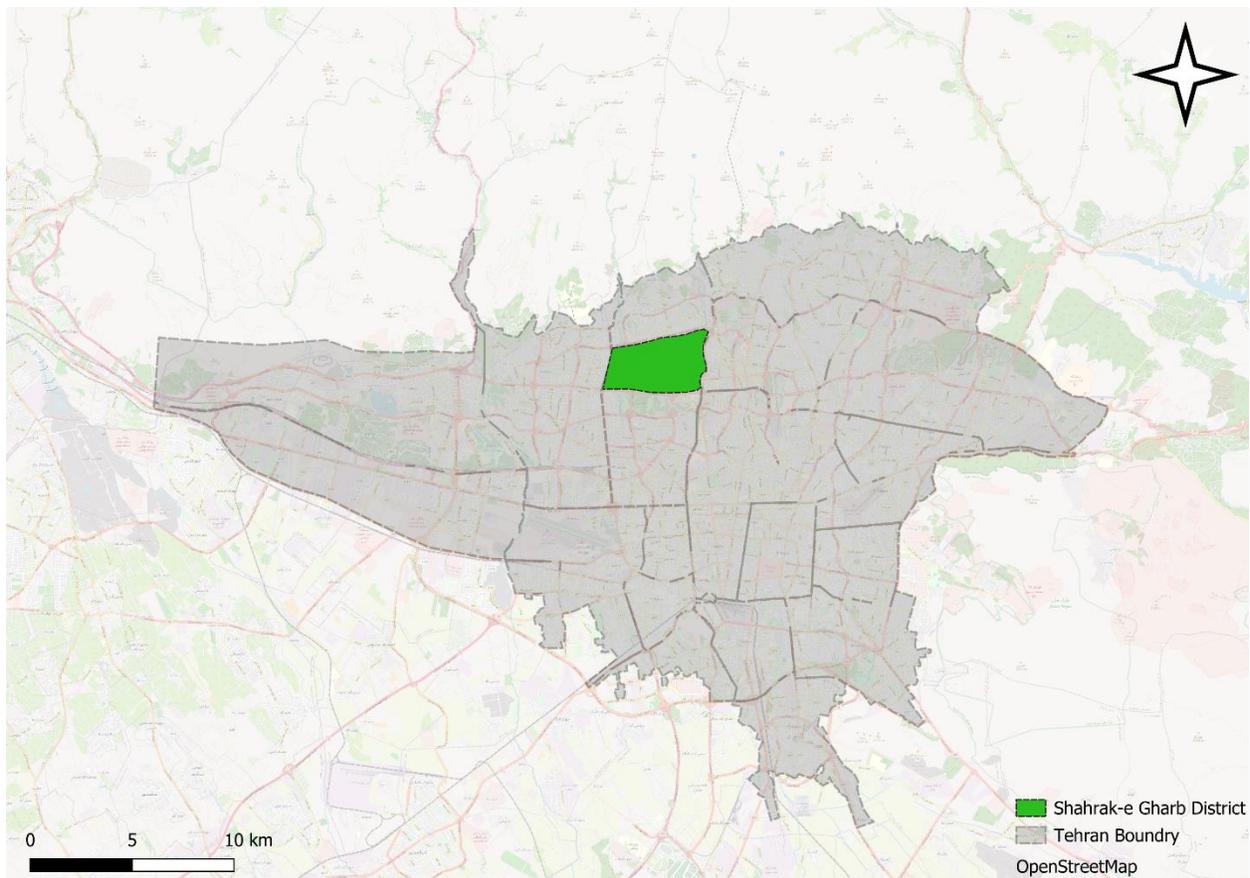


Figure 4: Location of *Shahrak-e Gharb* within *Tehran* (Municipal District 2):
Note. *Author’s elaboration using OpenStreetMap as the basemap.*



A



B



C



D

Figure 5: *Shahrak-e Gharb (District 2): high-rise residential development and commercial intensification.*

Note. Author’s photographs. (A–C) Residential towers. (D) Opal Mall.

Shahrak-e Gharb (literally “West Town”) was established in the late 1960s–70s as one of Tehran’s earliest master-planned suburbs, designed with curvilinear streets, modern services, and a primarily villa-based urban fabric. Over the decades, especially from the 1990s onward, the area experienced intensive densification, with many original villas replaced by high-rise apartment towers. Today, Shahrak-e Gharb is considered one of Tehran’s wealthiest districts, characterized by luxury residential complexes, major

shopping centres such as Opal Mall and Milad-e-Noor, and some of the highest property prices in the city. The neighbourhood’s evolution from low-density suburb to a vertical, high-end enclave makes it a significant example of new-build gentrification, where upscale redevelopment gradually reshapes urban form, population composition, and social life. Its proximity to lower-income areas such as Islam-Abad/Niayesh intensifies contrasts and highlights the socio-spatial inequalities embedded within Tehran’s development patterns. Media reports frequently note the shadow effect, where service-poor, lower-income communities sit directly adjacent to Shahrak-e Gharb’s gleaming towers. For this reason, the neighbourhood provides a critical case for understanding long-term transformation, exclusionary dynamics, and the limits of inclusive development within Tehran’s northern districts.

Fereshteh (Elahieh): Vertical Smart Luxury in an Already Elite Context

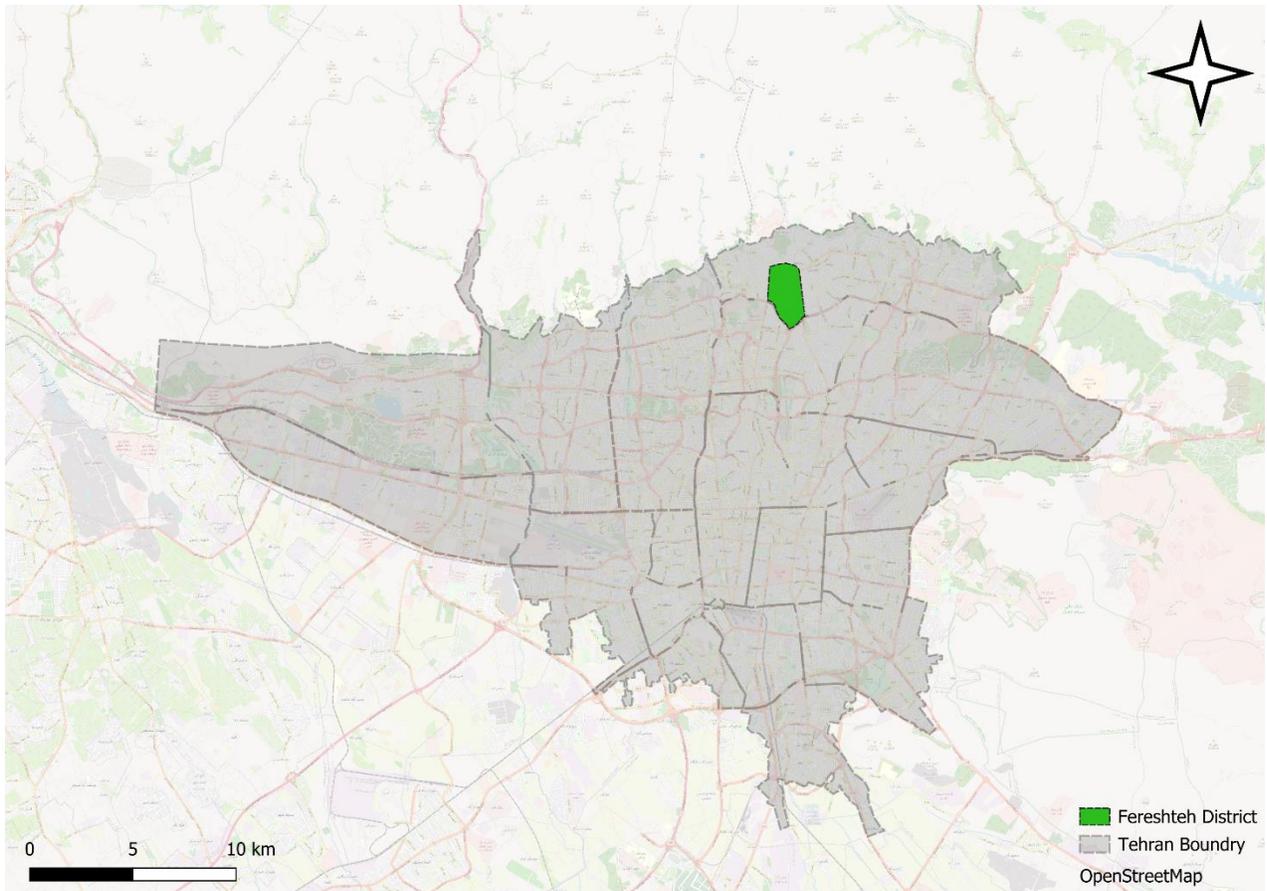


Figure6: Location of *Fereshteh* within *Tehran* (*Municiple District 1*):
Note. Author’s elaboration using OpenStreet Map as the basemap.



Figure 7: *Fereshteh (District 1): High-rise luxury redevelopment and emerging sustainability features. High-rise residential towers & Green building with sustainability features (LEED-oriented design). Note. Author's photographs.*

Fereshteh, located within the Elahieh district, has historically been associated with embassies, diplomatic residences, old-money villas, and large garden estates. Over the

past 15–20 years, it has undergone dramatic vertical redevelopment, becoming one of Tehran’s most exclusive high-rise luxury corridors. Many of the historic villas and green estates have been sold to developers and replaced by smart, high-tech residential towers most notably the Fereshteh Palace Towers, a trio of ~46-floor buildings equipped with advanced building management systems, integrated smart home technologies, private gyms, pools, and in some cases helipads. Numerous other mixed-use and high-rise luxury complexes follow similar patterns of technological sophistication. Fereshteh’s transformation did not involve classic displacement because the area was already affluent. Instead, the process represents a shift toward hyper-luxury redevelopment, intensifying exclusivity and erasing much of the district’s architectural heritage. While older elite families remain in some low-rise buildings, the social fabric now includes a growing population of affluent newcomers seeking smart amenities, global lifestyles, and high-end security systems. This case is valuable because it illustrates how smart urbanism functions as a class phenomenon: technology and luxury features reinforce exclusivity, rather than supporting broader social inclusion. It raises important questions about accessibility, the beneficiaries of modernization, and the cultural consequences of replacing heritage villas with technologically advanced high-rises.

sa'adat Abad: Greenfield Gentrification and the Making of a Modern Elite District

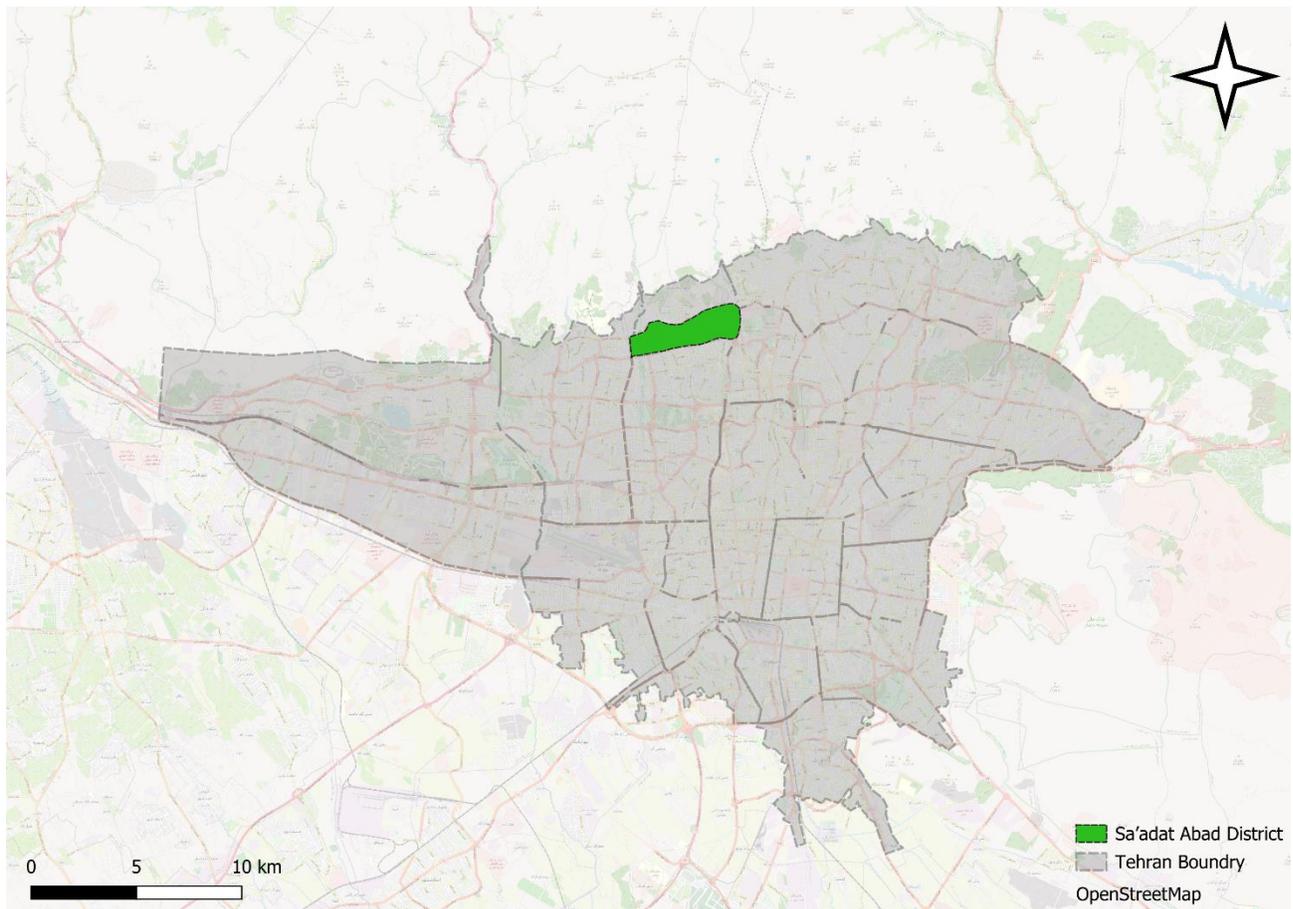


Figure 8: Location of Sa'adat Abad within Tehran (Municipal District 2).
Note. Author's elaboration using OpenStreetMap as the basemap.



Figure 9: *Sa'adat Abad (District 2): high-rise residential development and greenfield gentrification in north-west Tehran.*

Note. Author's photographs. Residential skyline view, High-rise apartment building, Gated residential entrance, Night-time view of high-rise complexes.

Sa'adat Abad, located in northwest Tehran, experienced most of its development in the 1990s and 2000s. Historically composed of rural land, orchards, and small villages such as Deh Vanak, the area urbanized rapidly after infrastructure expansions particularly highways such as the Chamran Expressway opened it for development. Unlike older districts, Sa'adat

Abad was not built through replacement of existing urban communities. Instead, it represents greenfield gentrification, where previously undeveloped or peripheral land is transformed into a high-end district featuring broad boulevards, modern high-rise apartments, premium shopping centres, and upscale leisure venues.

As a newly built district, Sa'adat Abad did not generate displacement in the traditional sense; however, it did contribute to the north–south socio-spatial polarization that defines Tehran today. Analysts frequently describe Sa'adat Abad as emblematic of the widening wealth gap, with its luxury apartments, expensive cafés, and modern infrastructure contrasting sharply with the economic struggles of residents in the southern districts. Sa'adat Abad also highlights sustainability challenges linked to high-income development, including heavy traffic, reliance on private cars, and limited public transit integration. This makes it a useful case for examining whether expansion-driven smart development can support inclusive, sustainable urban growth.

5.2 Spatial and Socio-Economic Characteristics of Districts 1 and 2

5.2.1 Urban form and morphology

Districts 1 and 2 are situated in the northern and north-western and western sectors of Tehran, benefiting from topographical and climatic advantages compared with the southern parts of the metropolis. They are closer to the Alborz foothills, experience relatively lower levels of air pollution, and enjoy more favourable microclimatic conditions. Research (Rabiei-Dastjerdi, 2023) Historically, these areas were at the urban fringe, accommodating garden villas, low-density residential settlements and a limited number of planned complexes. Over the past three decades, however, they have been progressively integrated into the metropolitan core, with extensive road infrastructure, commercial corridors and residential high-rise developments.

Shahrak-e Gharb is a planned town dating back to the late 1960s and 1970s, conceived as a modern residential enclave inspired by Western models, with wide streets, green spaces and a mix of apartment blocks and villas. The neighbourhood has retained many of its original planning principles but has also witnessed densification, particularly through infill high-rise projects and the vertical expansion of existing plots. Sa 'adat Abad, to the east of Shahrak-e Gharb, has undergone a more gradual transformation from a semi-urban area into a dense residential and commercial district, characterised by mid to high-rise apartment buildings, shopping centres and a network of local streets intersected by major arterial roads. Fereshteh, located closer to District 3 but strongly connected to the broader northern corridor, is marked by steep topography, luxury towers, embassies and a concentration of high-end residential and commercial premises. summarise these characteristics concisely, the following table is integrated into the chapter.

Spatial, socio-economic and infrastructural features of Shahrak-e Gharb, Saadat Abad and Fereshteh.

Neighbourhood	Urban Form & Morphology	Socio-Economic Profile	Smart & Environmental Features
Shahrak-e Gharb	Planned modernist district from 1970s; wide streets; mix of mid-rise and new high-rise towers; increasing vertical densification.	Upper-middle class; older established homeowners; high education levels; relatively stable population.	Smart parking, digital municipal services; green spaces; private BMS in newer buildings.
Saadat Abad	Gradual transformation; mix of old low-rise + new dense blocks; major commercial corridors; high traffic.	Mixed but trending upper-middle class; rising costs pushing out mid-income groups; many service workers commute in.	Smart traffic systems; selective green upgrades; limited energy-efficient retrofits in older stock.
Fereshteh	High-end vertical towers; steep topography; embassies; luxury residential complexes; most intense densification.	Extremely high-income households; symbolic “elite” neighbourhood; younger affluent newcomers.	Private smart-building systems (security, HVAC automation); rooftop green solutions; high environmental quality.

Table 2: *Spatial, socio-economic, and smart/environmental features of Shahrak-e Gharb, Sa’adat Abad, and Fereshteh. Note. Author’s elaboration.*

From a morphological perspective, these neighbourhoods are defined by relatively high plot values, substantial built-up coverage and increasing verticality. They also exhibit growing internal differentiation: older, low- to mid-rise blocks and residual villas coexist with new luxury towers, gated compounds and mixed-use developments. This juxtaposition of old and new typologies reflects both the incremental nature of redevelopment and the strong influence of land and construction markets. Similar patterns have been observed in other Iranian cities undergoing uneven urban regeneration processes. (Pourjafar et al., 2021)

5.2.2 Socio-economic profiles and inequalities

Socio-economic data and previous empirical research indicate that Districts 1 and 2 host some of the wealthiest segments of Tehran’s population, with higher average household incomes, educational attainment levels and employment rates in professional and managerial occupations compared with the city average. (Mohammad et al., 2021) At the same time, these districts are not entirely homogeneous. They include pockets of older residents on fixed incomes, mid-income households who bought property before recent price surges, and service-sector workers who commute from other parts of the city to work in local shops, offices, schools and households.

Research on socio-spatial segregation in Tehran underscores that income, employment and education are key drivers of residential differentiation and the formation of gated and semi-gated communities. (Moghani Rahimi & Dadashpoor, 2024) Wealthy households are increasingly able to “buy distance” from perceived social and environmental problems in

other parts of the city, while lower-income groups are displaced to more peripheral or less serviced areas. In this context, Shahrak-e Gharb, Sa 'adat Abad and Fereshteh function as high-status residential locations, enabling residents to combine socio-economic distinction with discourses of modernity, safety and environmental quality.

Interviewees accounts confirm this picture. Planners and policymakers described the case-study neighbourhoods as “strategic” zones within Tehran’s urban hierarchy, often used as reference points for benchmarking urban quality. One district official (M2) referred to Shahrak-e Gharb as “a showcase of middle- and upper-middle class housing models in Tehran.” However, long-term residents emphasised that rising property and rental costs are progressively excluding younger generations and lower-income households. A resident in Fereshteh (R5) noted that “our children cannot afford to live here unless they inherit; buying or even renting in this area has become almost impossible for normal employees.”

5.2.3 Smart infrastructures and environmental features

Districts 1 and 2 host a number of initiatives associated with the Smart Tehran Programme, including smart parking systems, digital platforms for municipal services, upgraded traffic management technologies and pilot projects related to environmental monitoring. Additionally, many new residential and mixed-use developments in the case study areas incorporate private forms of smartness, such as building management systems, controlled access, CCTV networks, and energy-efficiency features marketed as green or sustainable.

Studies on Tehran’s smart-city trajectory suggest that while such investments can improve efficiency and environmental performance, they often remain concentrated in affluent districts and large-scale developments, thus reinforcing uneven geographies of digital and infrastructural provision. (Hatami et al., 2023) Interviewees echoed this concern. While some residents appreciated the convenience of smart parking apps, online municipal platforms or enhanced security systems, others observed that smart solutions do little to address core issues such as housing affordability, lack of inclusive public spaces and long commuting distances for service workers. A planner (P3) commented that “we have islands of smartness in the north, but many basic services in the south and peripheries are still under pressure; without a city-wide redistribution, smartness becomes another layer of inequality.”

Environmental features are central to the attractiveness of these neighbourhoods. Tree-lined streets, proximity to the mountains, relative access to parks and slightly better air quality contribute to their desirability and to their symbolic association with a healthier, more European lifestyle. (Rabiei-Dastjerdi, 2023) However, pressures for densification and car-dependent development, combined with broader metropolitan environmental crises, challenge the long-term sustainability of this model.

5.3 Gentrification Dynamics in Shahrak-e Gharb, Sa ‘adat Abad and Fereshteh

5.3.1 Historical evolution and redevelopment trajectories

The three neighbourhoods exhibit different but interconnected gentrification trajectories. Shahrak-e Gharb, as a planned town built with modernist principles, attracted middle- and upper-middle-income households from the outset. Over time, successive waves of renovation and infill construction have upgraded the housing stock, transformed open spaces and intensified land use. While the area did not undergo a classical cycle of disinvestment and then reinvestment, as observed in early gentrification literature, it has experienced what some authors describe as “upgrading of the already upgraded” or forms of super-gentrification. Sa ‘adat Abad presents a different trajectory. Initially characterised by lower-density development and a more mixed social profile, it has increasingly become a site of speculative construction and high-rise development. Commercial corridors, shopping centres and office buildings have proliferated, transforming the neighbourhood into a regional hub for consumption and services. Research on urban regeneration in Iran shows how such transformations often lead to the displacement direct or indirect of lower-income households and small, locally rooted businesses, which are priced out by rising rents and redevelopment pressures. (Arbab & Shabani, 2023)

Fereshteh, finally, has seen perhaps the most intense vertical densification and symbolic rebranding, with luxury towers, embassies and exclusive residential complexes redefining the area’s image. This shift resonates with studies of urban regeneration-led gentrification in the Middle East and North Africa (MENA), which emphasise the convergence of domestic elites, global capital and state-led planning in producing enclaves of hyper-privileged urbanism. Systems

Interview evidence indicates that in all three neighbourhoods, long-standing residents perceive a clear “before and after” in terms of built form, social composition and everyday life. A resident from Sa ‘adat Abad (R3) described how “small houses and low-rise apartments have been replaced by tall buildings with underground parking, gyms and private facilities; the street feels different, less familiar.” Similarly, a shopkeeper in Shahrak-e Gharb (R1) noted that “old customers have moved away; new residents often shop in malls or online, not in small local shops.”

5.3.2 Housing markets, gated complexes and displacement pressures

A key driver of gentrification in the case study areas is the housing market. Land and property prices in Districts 1 and 2 have risen significantly faster than in many other parts of Tehran, partly due to their status as safe investment opportunities and anchors of symbolic prestige. (Mohammad et al., 2021) The promotion of gated or semi-gated communities, with

controlled access, private amenities and enhanced security features, further contributes to this dynamic. (Einifar et al., 2019)

In line with broader literature on gentrification, these processes produce a mix of direct displacement (evictions or non-renewal of leases following redevelopment) and indirect displacement (where rising rents and living costs gradually push lower-income residents to relocate). Several interviewees recounted stories of neighbours who had to move due to abrupt rent increases or the sale of their building for redevelopment. A long-term tenant in Shahrak-e Gharb (R6) explained: “Our landlord decided to sell; the new owner wanted to demolish and build something new; we had to leave and could only find a smaller flat far from here.”

Planners and policymakers acknowledged that existing regulatory tools do little to mitigate these pressures. Although certain planning documents mention social equity and the need for mixed-income neighbourhoods, interviewees emphasised that there are few effective instruments to preserve affordable housing in high-demand areas. This mirrors findings in recent Iranian research, which argue that urban renewal and regeneration policies often fall short of addressing affordability and are instead aligned with market-oriented approaches that privilege capital accumulation. (Arbab & Shabani, 2022)

5.3.3 Symbolic boundaries, lifestyles and socio-spatial segregation

Gentrification in the three neighbourhoods is not only a material process but also a symbolic one. New developments articulate particular lifestyles associated with modernity, cosmopolitanism and technological sophistication. Marketing materials emphasise images of young professional families, private leisure facilities and carefully curated green spaces, suggesting that these environments are designed for specific social groups. Interviewees repeatedly referred to the emergence of two worlds within the same districts: those who live inside luxury towers or gated compounds and those who live in older buildings, work in local services or commute from other parts of the city. Residents and workers outside gated complexes often reported feelings of exclusion, even when they formally share the same public streets and infrastructures. A service worker (R7) employed in Fereshteh noted: “I come here to work every day, but I never feel I belong to this neighbourhood; it is like a separate city for rich people.” These perceptions resonate with studies that conceptualise gated communities and high-status enclaves as manifestations of socio-spatial segregation, whereby physical and symbolic boundaries reinforce social distance and reshape the meaning of public space. (Moghani Rahimi & Dadashpoor, 2024) In Tehran, as in many other cities, such developments challenge traditional notions of neighbourhood solidarity and shared urban citizenship, raising questions about who is included in the vision of smart and sustainable urban futures.

5.4 Thematic Findings from Interview Analysis

This section synthesises the interview material across the three actor groups residents, planners and policymakers organised into four cross-cutting themes. The approach is based on academic summarisation, complemented by short anonymised quotes that illustrate key points.

5.4.1 Perceptions of change and neighbourhood identity

Across all three neighbourhoods, long-term residents described profound changes in physical form, social composition and everyday rhythms. Many recalled a time when the area was less dense, more socially mixed and characterised by stronger interpersonal relations among neighbours. In their narratives, these memories often serve as a baseline for evaluating contemporary transformations. Several residents framed change ambivalently. On the one hand, they recognised improvements in infrastructure, public services and local amenities. On the other hand, they felt that these benefits had been accompanied by the erosion of a sense of community. As one Sa ‘adat Abad resident (Resident Interviewee 3, 2025) explained: “Now we have better roads, cafés and services, but people are closed in their apartments; the feeling of knowing everyone has gone.”

Planners and policymakers similarly acknowledged that these neighbourhoods had undergone a shift in identity, from relatively mixed residential areas to emblematic sites of high-status urban living. Some viewed this as a natural outcome of Tehran’s socio-economic restructuring and its integration into global urban networks; others expressed concern that such a trajectory might undermine long-term social cohesion. These debates echo broader findings in gentrification scholarship, where improvements in the physical environment coexist with contested narratives around displacement, cultural loss and the redefinition of place identity. (Abdelfattah, Maghela, 2024)

5.4.2 Experiences of exclusion, affordability and displacement

A second major theme concerns affordability and perceived exclusion. Interviewees repeatedly emphasised that housing costs had risen dramatically, making it increasingly difficult for younger households, lower-income groups and long-term tenants to remain in the case study areas. While the interviews did not produce comprehensive quantitative data, they nonetheless highlighted the cumulative effects of rent increases, deposit requirements and redevelopment on residential trajectories. Several respondents described indirect displacement processes. According to an interviewee (Resident Interviewee 5, Fereshteh, 2025): “Many of our old neighbours have gone; they moved to cheaper areas in the west or south of Tehran.”

Planners and policymakers recognised these trends but often framed them as unavoidable outcomes of market dynamics. Some argued that it was unrealistic to expect high-demand

neighbourhoods to remain affordable for all socio-economic groups, especially in the absence of targeted housing policies or subsidies. This position reflects a broader shift towards what some authors describe as advanced liberal urban governance, in which the state retreats from direct provision but continues to shape markets through regulatory and infrastructural interventions. (Habibi et al., 2022) At the same time, the interviews suggest that experiences of exclusion are not limited to housing. Service workers and lower-income residents also highlighted how the design of gated complexes, the location of high-end retail spaces and the increasing privatisation of semi-public areas (such as cafés, malls and private parks) create subtle barriers to access and participation. These observations reinforce the argument that gentrification should be understood not only as a shift in who lives where, but also as a broader transformation of the everyday geographies of inclusion and exclusion (Einifar et al., 2019)

5.4.3 Smartness, sustainability and mistrust in governance

The third theme relates to perceptions of “smart” and “sustainable” initiatives. Interviewees were generally aware of increased digitalisation of municipal services, the use of apps for parking or billing, and the introduction of new traffic management systems. However, many questioned the extent to which these measures addressed fundamental urban challenges such as air pollution, congestion, unaffordable housing and unequal access to quality public spaces. Residents often described smart-city interventions as useful but superficial. Some people agree with that is good we can do things online and pay with apps, but this does not solve the main problems; it just makes daily life a bit easier for those who already have smartphones and cars.” Similar concerns appear in the literature, where critics argue that smart-city strategies can reinforce socio-spatial inequalities if they predominantly benefit already advantaged populations and fail to confront structural drivers of exclusion. (Thommandru et al., 2024)

Planners and policymakers interviewed for this study were acutely aware of these tensions. Some emphasised the potential of smart technologies to improve data availability, support better decision-making and enhance transparency. Others highlighted the risk of over-reliance on technology, especially when institutional capacities and participatory mechanisms remain weak. As a (Planner Interviewee 1,2025) argued that “smart systems can support more sustainable mobility or energy use, but only if they are combined with social policies; otherwise, they risk becoming tools that serve mainly high-income groups in specific districts.” This scepticism connects to broader debates on post-political forms of urban governance, where complex issues such as inequality and environmental justice are reframed as technical problems to be solved through data and expertise, rather than as matters of political contestation and democratic negotiation. (Abdelfattah, Maghela,2024) Similar dynamics of dissent and depoliticisation in urban space are also discussed by (Bragaglia, 2024) who examines how urban slogans and graffiti can act as both political expression and objects of post-political framing.

5.4.4 Aspirations for more inclusive planning

Despite these concerns, interviewees expressed strong aspirations for more inclusive and participatory forms of urban planning. Residents emphasised the importance of preserving social mix, supporting small businesses and maintaining accessible public spaces where diverse groups can meet. Several suggested that future redevelopment projects should include provision for affordable housing, community facilities and stronger protection for tenants. Planners and policymakers likewise recognised the need to move beyond narrowly technical or market-driven approaches. Some pointed to existing experiments with participatory planning in other Iranian cities, or to international examples of more inclusive urban regeneration, as potential references for Tehran. They highlighted the importance of integrating social equity, cultural diversity and environmental resilience into planning frameworks, rather than treating these dimensions as separate or secondary concerns. (Fanni & Boodaghi, 2022)

(Interviewee: Planner 5, 2025) explained that, “If we want smart and sustainable neighbourhoods, we must design them with people, not just for people; this means listening to different groups, especially those who are at risk of being pushed out.” Such statements resonate with recent calls in the literature for just and socially sustainable smart cities, in which technology and innovation are explicitly oriented towards inclusion, participation and the reduction of inequalities. (Providas & Farjood, 2021)

5.5 Synthesis: Smart neighbourhoods, Sustainability and Inclusive Futures

5.5.1 Smart and sustainable for whom?

The findings presented in this chapter indicate that Shahrak-e Gharb, Sa ‘adat Abad and Fereshteh function simultaneously as smart, sustainable and gentrifying neighbourhoods. They host technological upgrades and relatively high-quality infrastructures; they enjoy environmental advantages and a concentration of services; yet they are also sites of intense socio-spatial differentiation, rising housing costs and emerging forms of exclusion.

In line with critical scholarship on gentrification, the case study suggests that improvements in the built environment and local services often coincide with processes that displace or marginalise lower-income groups. The interview findings indicate that residents and workers who cannot keep pace with rising costs are gradually pushed to peripheral or less-serviced areas, while those who remain experience shifts in neighbourhood identity and a weakening of social ties. At the same time, gated complexes, private amenities and symbolic boundaries reconfigure the meaning of public space, undermining the potential for inclusive urban life.

The smart-city dimension adds further complexity. While digital and infrastructural innovations hold potential for improving efficiency and supporting environmental goals, current implementations in Tehran appear unevenly distributed and insufficiently oriented towards social justice. (Hatami et al., 2023) The risk, as highlighted by both interviewees and international literature, is that “smartness” becomes a new layer of advantage for already privileged districts and developments, rather than a tool for addressing systemic inequalities. Taken together, these observations pose a central question for sustainable development in Tehran: smart and sustainable for whom? If smart neighbourhoods primarily serve high-income groups and reinforce existing patterns of socio-spatial segregation, their contribution to an inclusive future remains limited. Conversely, if smart and sustainable strategies are reoriented towards redistributive objectives such as enhancing public transport and services in peripheral areas, protecting affordable housing and fostering participatory governance they could support a more equitable urban transition.

5.5.2 Towards more inclusive planning scenarios for Tehran

The analysis in this chapter suggests several implications for urban planning and policy in Tehran, particularly regarding Districts 1 and 2: Embedding social equity in regeneration and smart-city programmes.

Urban regeneration and smart-city initiatives should explicitly incorporate social-equity goals, including the preservation of affordable housing, protections for tenants and support for small local businesses. (Arbab & Shabani, 2023) Without such measures, smart and sustainable technologies are likely to deepen existing inequalities rather than mitigate them. Strengthening tools to address socio-spatial segregation and gated development. Given the documented relationship between income, education and the formation of gated communities in Iranian cities, (Moghani Rahimi & Dadashpoor, 2024) planning regulations could be used to limit excessive enclosure, encourage mixed-use and mixed-income developments, and ensure permeability of urban space. This does not imply abolishing security measures, but rather balancing them with requirements for public access and social interaction. Scaling smart solutions beyond affluent districts. To align smart-city strategies with the principle of right to the city, technological investments should prioritise basic services in under-served areas and support city-wide improvements in air quality, public transport and energy efficiency.

This would counteract the current tendency to concentrate digital and infrastructural innovations in already advantaged neighbourhoods. Fostering participatory and communicative planning. Interviews indicate strong demand for more inclusive forms of planning that engage residents, workers, planners and policymakers in dialogue. This aligns with broader calls for communicative and collaborative planning approaches that treat citizens as co-producers of urban futures rather than passive recipients of top-down projects. (Fanni & Boodaghi, 2022) Institutionalising such practices could help surface diverse needs and aspirations, and improve the legitimacy and effectiveness of urban interventions. Reframing smart neighbourhoods as laboratories for social as well as technical innovation. Rather than viewing Shahrak-e Gharb, Sa ‘adat Abad and Fereshteh

solely as showcases of high-end smart and sustainable design, they could be treated as laboratories for experimenting with inclusive policies such as inclusionary zoning, participatory budgeting, or new forms of cooperative housing. (Zeynali Azim et al., 2023) Lessons learned could then inform broader strategies for the metropolis.

Also To illustrate the systemic relationship between smart technologies, gentrification and inclusion, the following conceptual diagram is inserted directly into the chapter text. This conceptual diagram illustrates the relationship between smart technologies, improved services, land-value increases and displacement pressures in the case-study neighbourhoods of Districts 1 and 2. It highlights how smart and sustainable interventions may reinforce gentrification unless accompanied by strong equity-driven planning mechanisms.

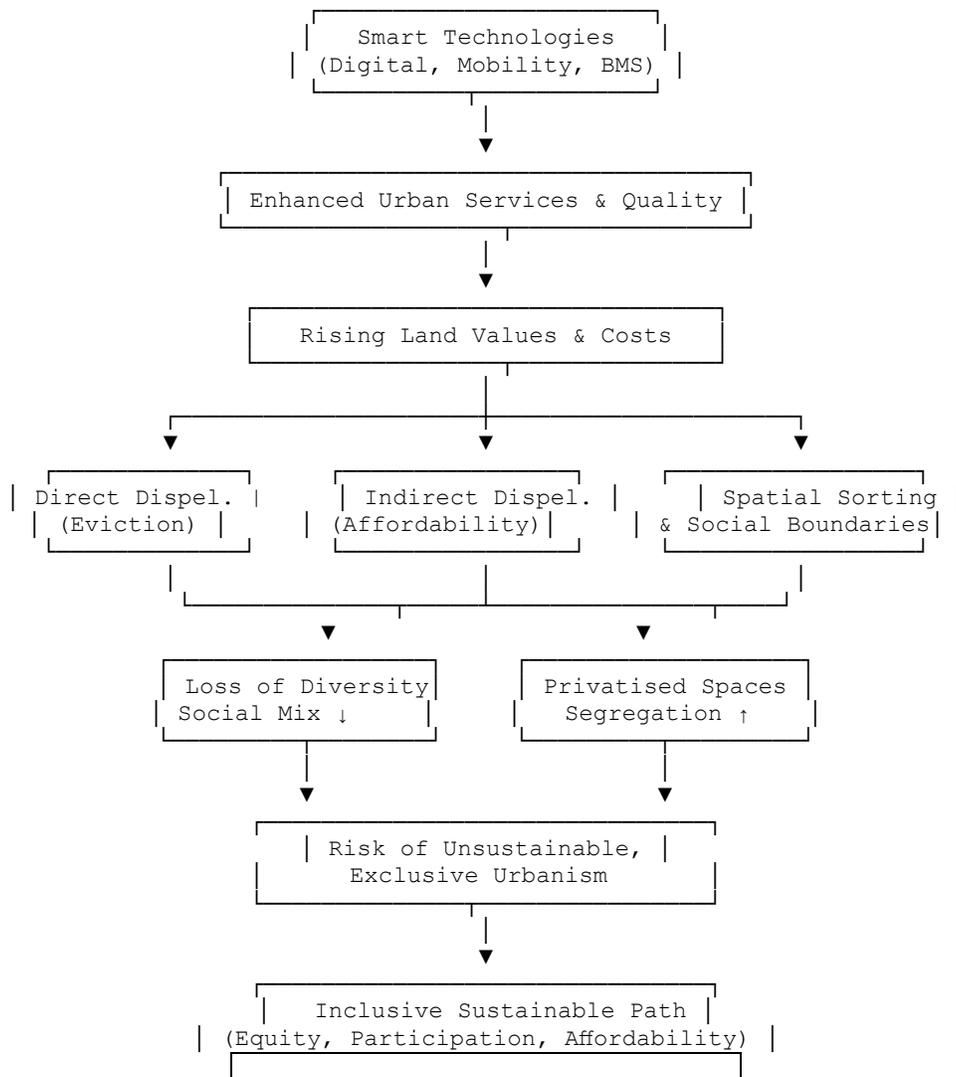


Figure 10: Conceptual model linking smart technologies, service improvements, land-value increases & displacement pressures in Tehran's case-study neighbourhoods (Districts 1 & 2).

The case study analysis and interview findings suggest that smart neighbourhoods and gentrification in Tehran are closely intertwined. Current trajectories in Districts 1 and 2 deliver tangible improvements in physical and technological infrastructures, but they also exacerbate socio-spatial inequalities and challenge the prospects for an inclusive urban future. Whether these transformations can be reconciled with the principles of sustainable development will depend on the extent to which urban planning and governance are able to move beyond narrow notions of efficiency and competitiveness, and instead prioritise justice, participation and the right to the city for diverse residents.

5.6 Discussion

In this section I discuss that, the Tehran case study findings in relation to my thesis's main research question concerned with how infrastructure-led development and smart city initiatives are transforming Tehran and the associated sub-questions on stakeholders' perspectives, displacement, and sustainability. My analysis shows that infrastructure projects and real-estate investment in Tehran are driving neighbourhood change with clear winners and losers. These processes exacerbate existing north-south and centre-periphery divides (Hedayat Nezhad Kashi et al., 2025) and reflect a classic pattern of gentrification (Lees, Slater & Wyly, 2008). At the same time, interviews reveal sharp differences between planners, residents and developers over causes and solutions. In what follows, I synthesise the evidence from my case and all interviews, drawing on urban theory and Iran-specific literature to interpret these dynamics. The aim is to answer how Tehran's development is shaping spatial inequality and social inclusion, and what each stakeholder group sees as the way forward.

5.6.1 Gentrification and Spatial Inequality

My case study confirms that Tehran's urban transformation has strong gentrifying tendencies. Major infrastructure investments (new metro lines, highways and redevelopment of central districts) have driven up land values in inner-city neighbourhoods, exerting pressure on lower-income residents. This echoes (Forouhar et al. 2022), who show that Tehran's land-use policies and comprehensive urban plan have spurred commercial and residential gentrification. In my all interviews, several residents explicitly described being "priced out" of their homes by rising rents and redevelopment, mirroring one informant's comment in the literature that "working class and new workers, are kicked out of the city" (Wynn et al., 2023). Such processes, defined as gentrification, involve the inflow of capital and higher-income groups into poorer areas, displacing existing communities and altering social character (Lees, Slater & Wyly, 2008). In Nasr neighbourhood, for example, commercial development of formerly residential streets has degraded local life even while improving accessibility a finding document, and which our cases replicate in broader form.

These gentrifying trends are deepening Tehran's long-standing spatial inequalities. Objective analyses by Hedayat Nezhad Kashi et al. (2025) show that northern districts (2, 5,

etc.) enjoy far better housing, services and environment than central and southern districts a north–south pattern echoed by nearly all our respondents. Infrastructure investment (like new subway stations) tends to locate where land is already expensive, further concentrating amenities in wealthier zones. By contrast, peripheral districts and informal settlements continue to suffer from poor housing quality and overcrowding. In my interviews, residents from older central quarters lamented that new projects benefit outsiders more than themselves. One planner acknowledged that policies often “build for vision”, yet in practice poorer households are pushed further out. This dynamic reflects Soja’s notion of spatial injustice Tehran’s development produces a dual city, with affluent enclaves on one side of the urban divide and under-served areas on the other (Soja, 2010). Social justice scholarship e.g. (Fainstein, 2010) would stress that such inequality conflicts with the idea of a fair or “just city”.

My findings also highlight the state role in this gentrification. The Tehran municipality, together with national housing initiatives, has promoted high-density housing and large masterplans (e.g. north-west Chitgar developments) under slogans like the National Housing Movement. But these schemes often fall short for the urban poor. (Wynn et al., 2023). note that many new apartments are of “terribly low” quality and unaffordable to working-class families. Interviewees confirmed this “workers sharing rooms” at the city’s edge, while residents pointed to vacant luxury flats and thriving high-end malls coexisting with unmet needs. This juxtaposition of shiny new towers and persistent slums underlines how Tehran’s modernisation has been uneven. In short, as in many global cities, Tehran’s infrastructure-led redevelopment has produced gentrification and worsened affordability, leaving the urban poor and migrants vulnerable (Lees, Slater & Wyly, 2008). This interpretation directly addresses the thesis’s questions on displacement and inequality: the evidence shows that strategic development without explicit equity measures has indeed amplified socio-spatial divides.

5.6.2 Stakeholder Perspectives

The three stakeholder groups expressed converging goals but divergent priorities, illuminating the governance challenges behind Tehran’s urban change. All interviewees agreed on the city’s urgent needs better housing, transport and utilities but they framed solutions differently. Planners and policymakers tended to emphasise large-scale, top-down interventions. For example, many planners celebrated new transit lines and the Smart Tehran infrastructure programme as ways to modernise the city. A deputy mayor we spoke with noted that “building infrastructure is the only way to relieve traffic and pollution”, reflecting a technocratic view that hard projects can solve social ills. Developers and technology providers shared this optimism: they saw smart traffic sensors, data platforms and high-tech precincts as engines of growth. These actors often assumed that the benefits of modernization would trickle down naturally.

Residents, by contrast, voiced scepticism. A common theme was that infrastructure investments rarely helped those already struggling. Several residents pointed out that new

metro stations made commuting easier, but did nothing to lower rent or improve schooling and parks in their neighbourhoods. In their view, the gains of smarter transport were offset by the loss of affordable homes and local shops, as outsiders moved in. This tension reflects a wider phenomenon noted in the literature: one person's "regeneration" is another person's displacement. Some community leaders asked, "If we have smart roads and apps, what about smart housing support?" highlighting the uneven perception of who the smart city serves.

Despite these contrasts, there were also surprising areas of agreement. For instance, both planners and residents cited Tehran's acute housing shortage. Developers acknowledged that demand was outstripping supply. Many planners privately admitted that the existing planning system is fragmented and that lack of coordination among agencies was a major obstacle. In fact, as (Wynn et al., 2023) observe, "meaningful change in housing provision is hampered by the over-centralized and bureaucratic political system, an out-of-date planning process, and lack of integration of planning and housing initiatives, my own interviews corroborated this: even well-intentioned planners complained that little of the Smart Tehran agenda has connected to the housing agency, for example.

planners claimed to hold public consultations, but residents generally felt sidelined or consulted too late. This gulf mirrors scholarly debates on urban governance: (Healey, 1997) argues that collaborative, inclusive planning can reconcile competing interests, but Tehran still shows a rather instrumental model where experts and investors largely set the terms. In practice, I saw evidence of an urban regime in which powerful developers and the state drive project, while community groups struggle to influence outcomes.

These stakeholder tensions were particularly stark on questions of housing affordability. Planners often framed the high housing costs as inevitable due to land scarcity or market forces. By contrast, residents blamed policy for example, pointing to inadequate social housing and speculative investment. Developers tended to defend market rationality, though a couple acknowledged that without subsidies, average citizens cannot afford urban land. Ultimately, this disagreement meant that while everyone agreed Tehran needs 'liveable' improvements, they disagreed on priorities. This pluralistic picture accords with the literature: urban scholars note that smart city policies risk exacerbating exclusion unless all stakeholders' needs are integrated (Hollands ,2008; Alizadeh and Sharifi 2023). My case highlights the need, emphasized in participatory planning theory (Healey , 1997), for genuinely listening to residents when shaping interventions.

5.6.3 The Role of Smart Technologies in Tehran's Urban Transformation

Smart technology initiatives in Tehran have attracted much attention, but our findings suggest a cautious assessment of their social impact. The Smart Tehran programme involving e-governance, data analytics and digitised infrastructure was widely praised by officials in our interviews as a vision for a modern, efficient city. Indeed, respondents noted its rollout of smart traffic lights, remote waste management, and integrated municipal apps.

Several planners argued that such technologies are essential for sustainability and could eventually improve all residents' lives. In this sense, the Smart Tehran effort reflects global 'smart city' thinking, which posits that ICT can make cities more workable and "sustainable" as e.g. the Smart Cities Council suggests, (Townsend ,2013).

However, both interview and theoretical evidence warn that technology alone is insufficient. many interviewees agreed the Smart Tehran programme has made progress on basic urban systems there was less enthusiasm about its effects on housing or inequality. In fact, only a minority of their participants believed the programme would directly improve living conditions in poor neighbourhoods. My interviews reflected this doubt. For example, some planner wryly noted that the smart city dashboard "shows the pollution levels live, but who is controlling it?" Residents often saw the smart city as cosmetic: they might use a new transit app, but they were more concerned about health clinics, schools or affordable rents. In sum, technology was welcomed for improving services quality, but no one assumed it would automatically address deep social needs. This resonates with critical smart city literature. (Hollands, 2008) warned that so-called smart cities could become technocratic centres that serve elites rather than the general public. What (Hollands, 2008) actually means: In his article "Will the real smart city please stand up?", Robert G. Hollands argues that many so-called smart cities are not genuinely designed to improve life for all residents. Instead, they often function as elite-oriented developments. I see a similar pattern in Tehran: smart systems are being deployed largely where there are political will and budget often in downtown or affluent areas while poorer districts lag in coverage. (Alizadeh & Sharifi ,2023) argue that without an explicit justice dimension, smart city projects can aggravate exclusion. Our evidence fits that Mold: one interviewee used the phrase "digital divide" to describe how well-off Iranians can benefit from e-government and gig work platforms, whereas lower-income residents remain offline and marginalised.

On the positive side, the smart infrastructure does have potential to mitigate some problems if applied inclusively. For instance, smart traffic management could reduce congestion and pollution, a major grievance raised by many residents. From Chapter 2, I recall the research sub-question asking whether smart technologies can enhance sustainability in Tehran. In theory, if smart growth principles (Caragliu et al., 2011) are followed, Tehran's digital tools could support public transit use, energy efficiency and disaster resilience. A few of my interviewees noted early warning systems for earthquakes or floods being piloted and they hoped such data-driven planning might help poorer communities who are often in hazard-prone areas. However, implementing this requires linking technology with social policy, which currently seems underdeveloped.

In short, while smart city discourse is prominent among Tehran's planners, our case suggests this is largely "smart city in name". The technology initiatives have not fundamentally changed the development paradigm. Residents feel left behind, arguing that the programme's promises of inclusion have been overstated. This aligns with the concept of a "societal smart city" one that is human- or people-centric which Tehran has yet to realize. Instead, Tehran's experience to date underlines Hollands's critique: without

deliberate attention to equity and participation, smart technology tends to reinforce existing power structures rather than create a truly inclusive urban future.

5.6.4 Policy and Institutional Context in Tehran

My interviews underscored how Tehran's development is shaped by specific policy regimes and institutional constraints. Planners often pointed to national housing programs: for example, the recent "National Housing Movement" under Iran's 12th Plan aims to build 4 million homes by 2025 (with ~3.2 million in cities). In Tehran this includes large sites like the Chitgar development (15,000 apartments to be completed by 2025) with government loans for developers. Yet local actors noted that such schemes tend to serve middle-earning groups and often reproduce the quality and affordability issues of past projects. As one interviewee observed of new state-built complexes, "for working class and new workers housing quality is at its lowest level sometimes two or three people are sharing one room" a vivid example of how supply-side fixes alone have failed to stabilize rents or improve living conditions. This echoes recent policy analyses: even a program to build 400,000 homes (2019–22) the latest iteration of the earlier "Mehr Housing" plan is judged unlikely to resolve Iran's housing (Alaedini, 2021) In other words, interviewees saw Tehran's big-build approach as insufficient without complementary measures (subsidies, rentals, slum upgrading) to help the poor. Residents and NGOs repeatedly framed housing as a right rather than a market commodity; one community organizer reminded us that housing "should have been a basic need" but has been treated as an investment goodeprints.glos.ac.uk.

At the same time, experts criticised Tehran's fragmented governance. National ministries, the Tehran Municipality, and quasi-state bodies (such as the Housing Foundation) often pursue housing and infrastructure projects with limited coordination. Planners in this study argued that many housing challenges in Tehran stem from weak planning and urban management, which results in parallel schemes rather than an integrated strategy (Planner/Policy maker Interview 1, 29 Sep 2025; Planner/Policy maker Interview 2, 30 Sep 2025). Several interviewees also described Tehran's planning and housing system as highly centralised and difficult to implement in practice. One municipal planner explained that social inclusion is often present in policy documents, but remains weak in delivery and is treated more like a checklist than a binding requirement (Planner/Policy maker Interview 1, 29 Sep 2025). Another official similarly noted that engagement and inclusion measures exist in some projects, but they are uneven and not applied consistently across the city (Planner/Policy maker Interview 2, 30 Sep 2025). Residents echoed this implementation gap: they reported being informed after major decisions and experiencing the benefits of redevelopment as selective, mainly supporting households and businesses that can afford the new developments (Resident Interview 2, 28 Sep 2025; Resident Interview 1, 25 Sep 2025; Resident Interview 4, 2 Oct 2025). In short, even well-intentioned policies can be weakened by an over-centralised and bureaucratic system, a point also emphasised by (Wynn et al., 2023), who argue that Iran's rigid political-administrative structure limits equitable housing change. Residents also highlighted this gap between official plans and everyday outcomes, describing a disconnect between technocratic visions and lived

realities in Tehran's governance (Resident Interview 2, 28 Sep 2025; Resident Interview 4, 2 Oct 2025).

5.6.5 Interpreting Interviews and Comparative Insights

The interviews revealed sharp contrasts in how stakeholders make sense of these policy dynamics. Planners and developers often discussed Tehran's smart-city and infrastructure projects in abstract terms of efficiency or modernization. They celebrated smart traffic lights or city dashboards, implying benefits would eventually trickle down. Yet even many planners privately expressed doubt about local impacts. One city official wryly noted that the new air-quality dashboard "shows pollution levels live, but who is controlling it?" suggesting a gap between data and action. By contrast, residents and community leaders spoke from daily experience: for them, "better apps" felt irrelevant if rents and utility bills kept rising. Some asked rhetorically, "If we have smart roads and apps, what about smart housing support?" capturing the sense that the smart-city agenda has overlooked basic social needs. These perspectives match broader scholarship. For example, Kharas and Remes warn that without closing the digital divide, smart technologies can deepen inequality (Kharas & Remes, 2018) similarly, our respondents highlighted how many low-income families lack internet or smartphones, excluding them from e-government services.

Importantly, interviews also revealed some consensus. Both planners and residents agreed Tehran suffers from an acute housing shortage and poor-quality construction. Developers acknowledged booming demand outpacing supply. Many interviewees (planners, NGOs, even some city council members) privately admitted the planning system is too siloed and opaque a point reflected in policy critiques. One urban activist pointed out that citizens often file formal complaints (about parks, schools, etc.) via new digital channels, but rarely see any response; a group of planners lamented that without genuine public feedback, projects proceed with little legitimacy. In this sense, Tehran resembles other cities where smart-city programs have been criticized as technocratic and elite-driven. Robert Hollands' classic critique of smart cities that many are little more than entrepreneurial branding exercises fits Tehran's case: the smart city label has been applied more as a growth strategy than as a means to empower (Hollands, 2018). Alizadeh and Sharifi introduce the idea of a "societal smart city" that prioritizes social justice and participation, yet our Tehran interviews showed this ideal is still distant. The People aspect of the Smart City (e.g. inclusive governance, education, housing access) was noticeably weaker than the "Technology" aspect.

In comparative theory terms, my findings place Tehran alongside many Global South megacities: rapid infrastructure projects boost land values and benefit elites, while the poor face displacement a pattern noted in Mumbai, Istanbul, and elsewhere (Atkinson, 2000). In Lefebvre's terms, long-standing residents are being denied a "right to the city" as their neighbourhoods are reshaped without their consent. Yet unlike some Western cities where robust civil-society counter-movements can rein in gentrification, Tehran's authoritarian governance limits protest a dynamic highlighted in recent work on Iran's "performative" right

to the city (Dadpour,2025). Ultimately, Tehran's smart and infrastructure initiatives share the same shortcoming flagged in global literature: without explicit mechanisms for equity and inclusion, technology-driven planning risks reinforcing existing divides, my interviewees urged that the smart-city paradigm must expand beyond transit apps and data hubs to include serious housing support and participatory planning. In sum, while smart technologies offer tools for efficiency, Tehran's case emphasizes that policy design and governance are the critical factors for whether modernization translates into a just city.

In sum, the discussion shows that Tehran's infrastructure and smart city interventions are generating mixed outcomes. The case study evidence and interviews confirm that the city's current development trajectory is intensifying gentrification and spatial inequality: northern and west areas reap modernisation gains, while poorer residents confront displacement and exclusion. Multiple stakeholders share concerns (e.g. about traffic, housing shortage), but they diverge on solutions, revealing governance challenges in balancing economic growth with social justice (Healey 1997; Fainstein, 2010). Smart technologies offer tools for improvement, but alone cannot substitute for policies that protect affordability and participation . Overall, the insights here directly address the thesis's research questions by showing how Tehran's ambitious projects interact with local politics and social dynamics. These findings set the stage for Chapter Seven, which will draw together the analysis to make conclusions and recommendations for Tehran's urban planning emphasizing how smart, infrastructure-led development must be coupled with measures for social equity and citizen engagement if the city is to become both modern and just.

Chapter 6: Conclusion and Recommendations

In this thesis, I examined how Tehran's recent "smart neighbourhood" development intersects with gentrification, and whether these infrastructure-led transformations align with sustainable and inclusive urban planning, or whether they instead intensify gentrification and socio-spatial inequality. More specifically, I aimed to understand how smart neighbourhood development is being produced in Tehran, who benefits from it, and how it reshapes affordability, access, and everyday urban life in the neighbourhoods I studied. The existing literature already provides strong grounds for treating this intersection as more than a local coincidence. Critical smart-urbanism research repeatedly shows that "smart" investments are rarely spatially neutral: because they depend on capital, infrastructure capacity, and visible pilot areas, they often cluster in districts that are already strategically prioritised or market-attractive. As a result, smart technologies can reinforce gentrification pressures indirectly by increasing neighbourhood desirability, rapid growth real estate investment, and producing new "premium" urban zones marketed through innovation narratives. At the same time, gentrification scholarship emphasises that when reinvestment is concentrated and uneven, it tends to create class-based restructuring and displacement risks, even where change is framed as revitalisation, modernisation, or sustainability (Smith, 1979) (Lees, Slater & Wyly, 2008). Taken together, these debates suggest it is fair to approach smart neighbourhood development not only as a technical upgrade, but also as a political-economic process that can reshape who the city is for.

My conclusions build directly on the debates reviewed in Chapter 2. The literature shows that smart urbanism is often promoted as a pathway to efficiency, liveability, and sustainability, yet critical scholarship warns that smart agendas can become technocratic and market-oriented, concentrating investment in already advantaged areas and reproducing inequality. Likewise, gentrification research highlights that reinvestment and upgrading often bring displacement pressures and class-based restructuring. Recent work further suggests that green and digital/smart interventions can function as value-adding mechanisms that accelerate exclusion if equity is not actively protected. For this reason, I used spatial justice as a guiding lens: I was not only interested in what changed, but in how benefits and burdens were distributed across the city and experienced by different groups. I also treated Tehran as a context where neighbourhood change is frequently shaped by state-led projects, developer influence, and fragmented governance, rather than only the "classic" gentrification pathways discussed in many Global North accounts.

An additional, closely related thread in the literature concerns the gap between official inclusivity language and lived outcomes. Many policy documents and smart city strategies now adopt the vocabulary of inclusion, liveability, and citizen engagement often aligning themselves with global frameworks such as the SDGs yet scholars argue that this can remain largely rhetorical when implementation is driven by technocratic governance, corporate partnerships, or market-led development logics (Hollands, 2008; Kitchin, 2014; Datta, 2015). In this critique, smart becomes an umbrella term that can legitimise

interventions without necessarily changing the distribution of housing opportunity, access to services, or decision-making power. This is why a substantial body of research argues that equity cannot be treated as an optional add-on: without explicit mechanisms to protect affordability and expand access, smart and sustainable interventions may reproduce inequality and intensify socio-spatial polarisation (Graham & Marvin, 2001; Soja, 2010). In my interviews, this tension also appears in the contrast between how planners describe upgrades as improving efficiency and order, while residents tend to judge them through everyday impacts rents, costs, accessibility, and whether long-term needs are actually addressed. This divergence matters because it shows how “success” can look very different depending on whose perspective is taken seriously.

The main research question asked: How do smart neighbourhoods and the process of gentrification in Tehran relate to sustainable development and urban planning, and can these transformations support an inclusive future for the city? I approached this as a practical tension: whether smart neighbourhood development supports sustainability and inclusion in practice, or whether it mainly reinforces gentrification and socio-spatial separation. Three sub-questions guided my analysis: (1) definition and emergence of smart neighbourhoods in Tehran; (2) the nature of neighbourhood transformation and gentrification in Shahrak-e Gharb, Fereshteh and Sa’adat Ābād; and (3) the extent to which these transformations align with Tehran’s goals for sustainable and inclusive development.

To answer these questions, I used a qualitative multiple-case design focused on the three neighbourhoods, combining semi-structured interviews (planners, developers/experts, and residents), observations, document review, and spatial analysis. This approach allowed me to connect policy narratives (what smart urbanism claims to deliver) with lived experience and observable urban change.

Importantly, the literature also suggests that more redistributive or equity-oriented measures are often required if urban upgrading is to avoid exclusionary outcomes. This is a recurring conclusion in work on gentrification and on green/amenity-led upgrading: environmental and infrastructure improvements may raise quality of life, but they can also raise land values and create new rent gaps unless affordability protections and benefit-sharing measures are built into the process (Smith, 1979; Wolch et al., 2014; Anguelovski et al., 2019) Similarly, critiques of smart urbanism argue that digital innovation can deepen inequalities when the benefits accrue mainly to already advantaged groups or districts, unless cities actively invest in digital inclusion and equitable service provision (Hollands, 2008; Kitchin, 2014). In other words, the existing research already goes beyond simply stating that “smart technologies can reinforce gentrification”: it explains why this happens (through selective investment, value uplift, and governance priorities), and it warns that inclusivity often remains more aspirational than practical when equity is not structurally embedded in implementation.

Across the three cases, my findings show that Tehran’s current pattern of urban renewal has strong gentrifying tendencies, producing clear advantages for some groups and growing

pressures for others. Upgrading investments such as transport projects, major roads, enhanced public spaces, and high-end residential development have contributed to rising land values and housing costs, increasing displacement risk and economic exclusion for long-term renters and less affluent households. Crucially, my analysis suggests that “smartness” in Tehran does not operate as a neutral technical improvement. Instead, it frequently functions as a branding and value-creation strategy that aligns closely with upscale real estate logics. This is one reason the Tehran case is particularly important: while smart city discourse promises public benefit and improved urban management, its implementation remains spatially selective and often concentrated where land is already valuable.

This is also where Tehran becomes particularly emblematic, and where the case differs in meaningful ways from “traditional” gentrification narratives developed primarily from Western European and North American contexts. Much classic gentrification theory emerged from settings where neighbourhood change was often associated with rehabilitation of older housing stock, the cultural and residential preferences of a changing middle class, and later the re-entry of capital into the urban core through rent-gap dynamics (Glass, 1964; Smith, 1979; Ley, 1996; Lees et al., 2008). Tehran certainly shows capital-driven upgrading and exclusion, but the pathway is frequently shaped by a different configuration: large-scale infrastructure projects, high-end new-build development, gated or semi-gated residential forms, and state-linked planning and investment structures, rather than primarily incremental rehabilitation or “pioneer” waves.

In Tehran, “smart neighbourhood” development often appears entangled with new-build and state-led forms of gentrification, where the production of premium urban space is closely connected to planning decisions, land-development dynamics, and branded modernisation agendas. In this sense, the “smart” label can function less as a city-wide service logic and more as a mechanism of spatial selectivity, concentrating resources, attention, and symbolic value in already upscale districts. My interviews reinforce this: while some professional actors interpret smart upgrades as progress and efficiency, residents and local observers repeatedly link them to rising costs and a feeling that the neighbourhood is being re-made for wealthier groups. The result is not simply “gentrification plus technology”, but a context where smartness, luxury urbanism, and exclusionary development logics can become mutually reinforcing.

This is why the Tehran case should not be presented as only confirming what is already known. Instead, it helps refine the debate by showing how smart urbanism and gentrification intersect under conditions of uneven development, fragmented governance, and elite-oriented urban investment priorities and how this intersection can produce a particularly sharp pattern of winners and losers in urban change. It also strengthens the argument that global smart-urbanism debates must take context seriously: what looks like a technical sustainability agenda on paper may operate as a value-creation strategy in practice, with distributional effects that become visible only when analysed through spatial justice and lived experience .

6.1 Strengths and Weaknesses of Tehran’s Urban Transformation

This section highlights both the positive and negative outcomes of Tehran’s recent redevelopment, across the dimensions of gentrification, infrastructure, smart technology, sustainability, and equity. The evidence from the three case studies and interviews points to the following:

Infrastructure and Amenities (Strength): Major infrastructure projects new metro lines, highways, utilities upgrades and public spaces have clearly improved physical conditions in northern Tehran. Residents now enjoy better connectivity, parks and community facilities (e.g. “parking, parks, or playgrounds” added around new blocks). Such investments address chronic problems of traffic, pollution and poor services in the inner city. Planners emphasise that these enhancements are long overdue. In many interviews, officials contrasted the modern infrastructure of Fereshteh or Sadat Abad with what existed before, noting improved drainage, green roofs and reliable water/energy supply. From my perspective, this matters because it shows that redevelopment is not only symbolic: it has produced tangible changes in everyday urban functioning, from smoother circulation and upgraded services to more comfortable housing standards in the areas that received investment. It also suggests that Tehran’s transformation has followed a recognisable “modernisation” logic, in which large-scale physical upgrading is treated as a visible sign of progress and improved urban management. For example, new green features (roofs, passive cooling) and mandated solar panels have made buildings more energy-efficient and environmentally friendly. These sustainability upgrades, along with smarter traffic signals and waste management systems under the Smart Tehran programme (In this chapter, I use the term *Smart Tehran programme* to refer to Tehran Municipality’s smart-city agenda, coordinated largely through the municipality’s ICT organisation and publicly presented as a package of digital platforms and smart-city projects (including the “Tehran Man” service platform). The programme is described in municipal communications as moving from planning (c. 2018–2019) into early implementation (c. 2019–2020), that can help reduce emissions and resource waste city-wide. In principle, this combination of infrastructure and environmental performance is a real strength: it shows the city has the capacity to mobilise resources, redesign urban space quickly, and implement higher technical standards than earlier development phases. Overall, the transformation has mobilised substantial investment in Tehran’s infrastructure and has raised the standard of living for many parts of Districts 1 and 2 (Elahiye , Saadat Abad, Shahrak Gharb districts).

Displacement and Rising Costs (Weakness): The flip side is that these physical gains have come at a social cost. In every case-study neighbourhood, interviewees reported steep increases in housing prices and rents. Some Long-term residents of Sadat Abad and Fereshteh described being “priced out” by new luxury towers. One planner (Planner Interviewee 5, 2025) noted that without tenant safeguards, better utilities raise values and make households vulnerable to displacement. Similarly, commercial rents jumped, forcing small shop owners to the margins. These dynamics are precisely the process of

gentrification: capital inflow and higher-income groups displacing lower-income communities. What becomes clear through my findings is that improvement is not experienced in the same way by everyone: the same metro access, upgraded street, or renovated public space that improves daily life for one group can simultaneously trigger price increases that undermine stability for another. In effect, infrastructure investments have inadvertently fuelled a real-estate boom in already-affluent areas. This helps explain why the redevelopment feels, to many residents, less like a neutral public project and more like a mechanism that accelerates speculative value: it turns neighbourhoods into investment opportunities and pushes out those without financial flexibility. Ironically, efforts meant to improve sustainability (e.g. green roofs, solar power) have made these neighbourhoods even more desirable but only to the rich. A resident of Sadat Abad (residents Interviewe 3, Azade,2025) observed that while green infrastructure is a “good for the environment,” it has also “pushed up property prices. So, they are not affordable for everyone”. This quote is important because it captures the central contradiction of sustainability-led upgrading: environmental benefits can become part of a “premium” lifestyle package, rather than a shared public good. Interviews confirm that smart technologies follow the same pattern: Advanced home automation and smart meters are only available in new, gated housing complexes, while older blocks enjoy few benefits. In other words, affordability and displacement are not side effects here: they are deeply connected to how the transformation is financed, marketed, and targeted.

Smart Technology and Sustainability (Mixed Impact): On the plus side, Tehran’s early adoption of smart-building features and green design has introduced advanced amenities. Developers now routinely include sensors, climate controls and energy-saving systems in new projects. Where applied, these can reduce utility bills and enhance comfort. This is significant because it indicates that “smartness” is not only present as a political slogan: it is materially embedded in buildings through energy management systems, security technologies, and automated services that reshape daily routines. Some public programmes have piloted low-cost retrofits (smart meters, LEDs, efficient boilers) in ordinary blocks. These promise equity if scaled up. From my viewpoint, this is one of the most important ‘potential positives’ in the entire process: if retrofitting and basic smart upgrades were expanded beyond elite developments, smart urbanism could function as a tool for broader urban improvement rather than selective advantage. However, the uptake of smart solutions remains largely confined to premium housing. Several interviewees pointed out that average families have neither access nor purchasing power for full home automation. In practice, smart systems have clustered in the north-west towers, subtly reinforcing social divides. This matters because it shows that the smart transition is unfolding through market capacity and consumption, not through universal access or need-based prioritisation. For example, in (residents Interviewe, 6, Kian, 2025) he enjoyed automated lighting and security, but notes that this “comes at a cost” with very high service fees. His comment illustrates a second layer of exclusion: even when smart systems are technically available, their ongoing costs can turn them into a form of gated service meaning smartness is not only about who can buy a unit, but who can keep paying to access the benefits. In summary, smart and green features are strengths in terms of technology

deployment, but their impact on equity is limited: without deliberate programmes to share these benefits, they mostly “widen the gap” between haves and have-nots.

Socio-spatial Equity and Inclusion (Weakness): By any measure of equity, the transformation has left many behind. Upgraded neighbourhoods now have more cafes, malls and leisure options, but these largely serve wealthier patrons. Long-term residents repeatedly expressed that the new developments “have benefited only certain groups”. Local people opinions that everyday costs (parking, groceries, school fees) rose for locals even as amenities improved only for newcomers. In Fereshteh and Saadat Ābād, older residents feel the area is “not for them anymore”. This feeling is not only emotional; it signals what the literature calls social and cultural displacement, where people remain physically present but lose the sense that the neighbourhood still reflects their needs, purchasing power, and way of life. Interviews revealed that planning processes rarely involve these communities: projects are announced without consultation, meaning that basic needs (affordable housing, job security) often go unmet. From my perspective, this governance pattern is central: it shows how exclusion is produced not only through market dynamics, but also through limited participation and a planning style that prioritises delivery, visibility, and investment attraction over negotiation and distributional fairness. In effect, Tehran’s transformation has intensified socio-spatial inequality. Wealthy northern districts accumulate modern infrastructure and smart services, whereas southern and poorer areas (outside our case studies) receive little investment. This unevenness matters because it reproduces the city’s long-standing north–south divide and risks institutionalising it through infrastructure placement and service quality, making inequality harder to reverse later. This dual outcome upgraded built environment for some, displacement and exclusion for others underscores the main weakness of the current trajectory.

Overall, the strengths of Tehran’s urban transformation lie in its rapid upgrading of physical infrastructure, environmental performance, and high-end amenities. However, the weaknesses accelerated gentrification, an affordability crisis, and unequal access to smart and sustainable improvements are equally salient. In essence, the process has delivered “smartness” and “greenness” most visibly to districts that were already wealthy, while doing little to reduce inequality. This is the key tension of my case studies reveal in Fereshteh, Sa’adat Ābād, and Shahrak-e Gharb: the city can produce impressive urban change, but the distribution of that change is neither socially neutral nor automatically inclusive. These neighbourhoods show clear strengths in modernised infrastructure, sustainable transport, and advanced digital amenities, yet these gains have been accompanied by sharp weaknesses, including rising living costs, resident displacement, and uneven access to technology. For this reason, the SWOT analysis below summarises not only the internal strengths and weaknesses visible across the three cases and Tehran, but also the opportunities for more inclusive, data-driven interventions (such as subsidised retrofits and participatory planning) and the threats that follow if corrective measures are not taken. If these issues remain unaddressed, risks such as entrenched inequality and housing-market volatility may further undermine trust in governance and intensify social fragmentation concerns that directly inform the recommendations that follow in Chapter 6.

SWOT analysis of Tehran’s current urban transformation trajectory

Strengths	Weaknesses
Major infrastructure upgrades (metro lines, highways, utilities, public spaces) that improve connectivity and basic urban functioning in Districts 1 and 2.	Rising rents and housing prices; long-term residents “priced out”; affordability crisis intensified by luxury new-build development.
Visible improvement in services and building standards (drainage, reliable water/energy supply, better public realm).	Gentrification dynamics: capital inflow + higher-income groups displacing lower-income communities; small businesses pushed out by commercial rent increases.
Integration of green and smart features in new development (green roofs, passive cooling, mandated solar panels, smart traffic signals, smarter waste systems).	Smart and green benefits concentrated in gated or premium housing; older blocks receive fewer benefits; unequal access reinforces socio-spatial divides.
Demonstrated capacity to mobilise investment and deliver rapid physical change.	Limited inclusion in planning processes; projects announced without consultation; everyday needs (affordable housing, job security) not prioritised.
Opportunities	Threats
Scaling low-cost retrofits (smart meters, LEDs, efficient boilers) beyond pilots to spread benefits across ordinary neighbourhoods.	A “locked-in” dual city: smart services and quality infrastructure concentrated in the north, deepening the north–south divide long-term.
Using smart-city tools for equity goals (targeted upgrading of under-served areas; transparent prioritisation; service delivery that reaches older housing stock).	Further displacement and social conflict if redevelopment continues without tenant safeguards or affordability protections.
Designing sustainability upgrades as shared public benefits rather than premium value (greening without price escalation, benefit-sharing mechanisms).	Smartness becomes a branding/value-creation strategy rather than public service logic, reinforcing speculative investment cycles.
Improving participatory processes so local residents shape priorities and outcomes (especially around services, housing, and affordability).	Loss of community identity and “displacement in place”, where long-term residents remain but feel the area is no longer for them.

Table 3: SWOT analysis of strengths and weaknesses in Tehran’s urban transformation.

Note. Author’s compilation based on the three case studies and interview findings.

6.2 Policy Recommendations

Building on these insights, I outline specific planning and housing policies that could help balance Tehran's modernisation with equity, situating them within Iran's institutional context. Each recommendation is grounded in interview evidence and Tehran's policy framework.

Inclusionary Housing and Zoning: One way to counter displacement is to tie new permits to affordable housing commitments. Tehran's municipality could require that a share of units (for example 10–20%) in any large new development be priced for low- or middle-income families. These units should be dispersed among market-rate apartments to foster mixed-income neighbourhoods. This idea aligns with the objectives of the Tehran Comprehensive Plan and national housing schemes. In practice, inclusionary zoning might be introduced via a municipal ordinance (approved by the city's Islamic Council) or by conditioning government loans (such as those from the National Housing Movement) on meeting affordability quotas. In other words, building permits would only be granted after a developer agrees to set aside some units as affordable.

One developer interviewee welcomed this approach: “we should welcome policies such as subsidised green loans or tax breaks to lower costs,” he said, but warned that “unless policy forces us to set aside units or support current tenants, we mostly see a transformation toward a more affluent community.” (Developer Interview 1, 30 September 2025) This suggests that voluntary incentives alone have failed to protect affordability. A modest mandatory rule introduced carefully, perhaps piloted in one district could ensure a permanent source of affordable housing. For example, Tehran could update its development code to specify quotas, and offer modest benefits (like density bonuses or reduced fees) for compliance. Internationally, inclusionary housing is common for instance, Vancouver recently enacted a law requiring affordable units in new projects vancouver.ca but any model must be adapted to Iran's legal and economic setting. In sum, a calibrated inclusionary zoning policy, embedded in Tehran's existing planning regulations and backed by clear guidelines, could channel part of the current building boom into mixed-income communities.

Tenant Protections and Relocation Assistance: Long-term residents are often most at risk from urban renewal, so Tehran could strengthen tenants' rights and support for those displaced. Stakeholders suggested that any redevelopment project evicting renters should guarantee them a right-to-return and some assistance during construction. A municipal housing official argued that redevelopment should include “temporary rent support during construction” and a “negotiated right-to-return” for those displaced. (Planner/Policy maker Interview 2, 30 September 2025) In practice, the city might require redevelopers to offer new leases at controlled rents or provide equivalent subsidised units nearby. The municipality could also set up a compensation fund (for example, financed by impact fees on luxury projects or by the Housing Foundation) to help rehousing. Similarly, an infrastructure

planner stressed the importance of sequencing redevelopment projects to reduce social disruption, noting that phased construction can give residents time to relocate and potentially return once projects are completed (Planner Interview 4, 1 October 2025).

These ideas fit with Iran's own emphasis on housing rights. Article 31 of the Constitution guarantees that every family has the right to adequate housing constitutionproject.org, which provides a legal basis for stronger tenant safeguards. Tehran's city council and national lawmakers could use this mandate to justify amending the civil code or urban-planning laws to protect tenants (for instance, by limiting unjust evictions and ensuring fair compensation). Similar policies exist in other cities: Vancouver now allows local "tenant protection bylaws" that require developers to provide financial help, relocation assistance and first-refusal rights on new units to evicted renters vancouver.ca. Tehran could adapt this principle by using its permit approvals and legal code. Even simple protections built into the redevelopment approval process would help ensure working-class families are not forced out without support, balancing modernisation with social equity.

Smart Technology Accessibility : Smart-city upgrades should benefit everyone, not just luxury developments. Interviewees noted that digital home technologies (smart meters, automation, etc.) are currently concentrated in high-end projects. To democratise the gains, Tehran could subsidise basic smart infrastructure for existing buildings. For example, the municipality or a national housing agency might provide free or low-cost smart meters, energy-efficient appliances or broadband vouchers to low-income households. The uneven distribution of smart technologies was highlighted by several planners. One municipal planner explicitly suggested that "subsidised basic smart meters and better building management systems could make smartness fairer, especially for older housing blocks" (Planner Interview 3, 1 October 2025). Such measures would allow more residents to save on energy and use digital tools without bearing the full cost.

New developments can also be asked to contribute to community-wide technology access. For instance, when approving a new tower, the city could require the developer to install public Wi-Fi in nearby parks, set up a neighbourhood digital kiosk, or fund a community tech training centre. Procurement rules could mandate open, low-cost standards so that municipal digital infrastructure (like traffic sensors or street-lighting systems) is affordable for all. The aim is to avoid a scenario where only gated communities enjoy automation while the rest of Tehran is left behind.

Other cities offer useful examples. Barcelona runs a programme called "Connectem Barcelona" that loans laptops to low-income residents and provides internet training ajuntament.barcelona.cat. Tehran could take inspiration: for example, libraries or cultural centres might lend devices and host digital literacy classes. The emphasis must be on simple, low-cost solutions that fit Iran's budget and regulations. By extending digital upgrades to under-served neighbourhoods, Tehran can ensure its smart-city projects improve life for a broad population rather than deepen the divide.

Institutional Coordination and Implementation : Any of the above policies must contend with Iran’s complex governance structure. Tehran’s planning involves many overlapping authorities the Municipality, the Islamic City Council, national ministries (e.g. Roads & Urban Development), the Housing Foundation, etc which often operate in silos. For example, a new subway line can be built without any housing strategy attached. In this context, reforms need to be “carefully engineered” into existing programmes and legal tools. A pragmatic strategy is to use top-down channels already in place. For instance, inclusionary housing requirements could be mandated by a city ordinance (approved by the Council) or by attaching conditions to loans from the national Housing Movement fund. Similarly, tenant-rights measures could be advanced through legal amendments for example, updating the Civil Code or urban planning law to recognise housing as a social right (consistent with Article 31 constituteproject.org).

Higher-level endorsement can also help. Engaging national bodies such as the Ministry of Roads and Urban Development or the Supreme Council of the Architectural and Urban Planning Revolution would ensure local policies align with national goals. Practically, this might involve inter-agency committees or granting the Tehran Municipality clear authority to enforce equity conditions. In all cases, success will depend on strong political will and coordination. By embedding new requirements into zoning bylaws, permit conditions and existing housing programmes, Tehran can implement change through familiar channels rather than relying on unofficial guidelines. In short, reforms should be incremental and rooted in Iran’s own institutional framework, with champions at both city and national levels to carry them forward.

Phased Implementation and Public Participation: Finally, these policies should be introduced gradually and with community engagement. Interviewees emphasised that local buy-in is crucial: residents need to understand and support the changes. One approach is to pilot new programmes in a limited area (for instance, District 2) before scaling them city-wide. Public consultations, education campaigns and demonstration projects can build trust. For example, the city could run workshops to show how smart meters save money or hold neighbourhood meetings about mixed-income housing plans. This concern was echoed by an urban policy analyst interviewed for this research, who observed that “smart technologies offer tools for improvement, but alone they cannot substitute for policies that protect affordability and participation” (Expert Interview 1, 28 September 2025).

In practice, this means pairing every technical upgrade with a social safeguard. In Iran’s context of strong central directives, that might take the form of parallel decrees: one decree authorises the infrastructure or “smart” project, and another simultaneously imposes the equity condition. For example, a new high-speed transit line could be approved only if the plan also guarantees that 10% of the housing in the corridor is reserved for low-income residents or that relocation allowances are provided to families affected. Such a two-track approach reflects how Tehran already implements major plans.

By phasing in reforms and engaging communities, Tehran can build support over time. In the long run, adopting a coordinated set of measures mixed-income zoning, tenant protections, subsidised tech retrofits and mandated participation could guide the city's development toward greater inclusiveness. Local stakeholders in this study saw these policies as both necessary and achievable. Even within Iran's centralised system, change is possible if influential institutions (from the Municipality to national planning bodies) champion equity. Ultimately, the goal is to transform Tehran's smart-city agenda from a purely technological vision into one that, in the researcher's words, explicitly "codes in equity," a message our respondents echoed repeatedly.

6.3 Limitations of the Study

No research is without constraints, and it is important to clarify the conditions under which the findings of this study should be interpreted. Rather than undermining the value of the research, the following discussion situates its conclusions within the scope, design choices, and contextual boundaries of the study.

My research adopted a qualitative multiple-case study design, focusing on three neighbourhoods Fereshteh, Sa'adat Ābād, and Shahrak-e Gharb in northern Tehran. As such, the study does not aim for statistical generalisation across the whole city or to other Iranian or international contexts. This is not a methodological weakness but a deliberate research choice. The purpose of the study was to prioritise depth, contextual understanding, and interpretative insight into how smart neighbourhood development intersects with gentrification in specific urban settings. The findings are therefore analytically transferable rather than statistically representative, and they should be applied to other contexts with caution and sensitivity to local conditions.

A related limitation concerns the spatial and socio-economic focus of the case studies. All three neighbourhoods are relatively affluent areas of Tehran, where smart technologies, large-scale redevelopment, and high-end housing investment are most visible. This focus was intentional, as these districts represent the frontline of smart and luxury-led urban transformation. However, it also means that the dynamics of smart urban interventions in low-income, informal, or southern neighbourhoods where vulnerability to displacement may be even more acute were not directly examined. As a result, perspectives from residents of informal settlements or marginalised areas, who may experience urban inequality in different ways, are underrepresented in this study.

The empirical material is primarily based on semi-structured interviews and policy and planning documents, rather than large-scale quantitative datasets. While this qualitative approach allowed for rich insight into lived experience, governance practices, and planning rationales, it limits the ability to measure outcomes such as exact displacement rates, income changes, or housing affordability trends in numerical terms. Quantitative indicators could complement this work in future research by providing a broader measurement of the socio-economic impacts identified qualitatively here.

The study is also temporally bounded. Fieldwork and interviews were conducted in 2025, during a period of rapid urban development and evolving smart-city initiatives in Tehran. Given the dynamic nature of housing markets, technological roll-outs, and policy reforms, conditions may change after the period of data collection. Future regulatory shifts, economic fluctuations, or expansions of national housing and smart-city programmes may alter the trajectories identified in this research.

In conceptual terms, the study examines smart neighbourhoods primarily through the lens of residential development, physical infrastructure, and housing-related technologies. The notion of the “smart city” is broader and can include digital governance, urban data platforms, mobility apps, and citywide service integration. These wider dimensions were not the main focus here. Consequently, the conclusions drawn about smart urbanism relate specifically to neighbourhood-scale, housing-centred smart interventions, rather than to Tehran’s smart-city agenda as a whole. Moreover, the study reflects the local understanding of “smartness” as it emerged in interviews, where the term was often closely associated with luxury, modernity, and high-end development. This means that the technological performance or environmental efficiency of smart systems was not evaluated in technical detail.

Finally, the researcher’s positionality must be acknowledged. As a planner with personal familiarity with Sa’adat Ābād, the author brought an insider perspective that enhanced contextual understanding and access. At the same time, this positionality carries the risk of interpretative bias. To mitigate this, the study relied on systematic coding, triangulation across interviews and documents, and explicit engagement with critical literature on gentrification, smart urbanism, and spatial justice.

Taken together, these limitations suggest that the study provides a grounded and context-specific account of Tehran’s smart neighbourhood transformation rather than a comprehensive or definitive assessment of smart urbanism across the entire city. The findings should therefore be read as an in-depth contribution to understanding how smart development and gentrification intersect under conditions of uneven development, and as a foundation for further comparative and mixed-method research.

6.4 Future Research Agenda

Building on my thesis, future work can deepen and broaden the exploration of Tehran’s urban change. First, a quantitative follow-up could map housing price trends, demographic shifts, and GIS-based indicators of smart infrastructure to rigorously measure gentrification and inclusion. Surveys of a larger, random sample of residents (including displaced families) would help validate interview findings and capture marginalized voices. Second, comparative case studies in other Tehran neighbourhoods (especially in mid- or low-income zones) would reveal whether the observed dynamics hold citywide. Third, longitudinal research could track outcomes of any new policies (e.g. if an inclusionary zoning law is passed) to see if displacement is mitigated over time. Fourth, since smart city initiatives are

evolving, studies could examine how emerging projects (like e-government platforms or networked utilities) actually impact daily life across income groups. In the theoretical realm, researchers might investigate how Tehran's experience compares with other Global South cities undergoing "smart" modernization, contributing to a broader agenda on technology and spatial justice . Finally, given the identified governance issues, further work could analyse institutional reform: for example, engaging in action research with policymakers to pilot more inclusive planning processes.

Throughout, a consistent thread should be integrating technical innovation with social equity. I hope future researchers will carry forward the central question of this thesis: how to make smart growth work for everyone.

In conclusion, this thesis has shown that Tehran's current infrastructure-led, transformation exhibits clear strengths in physical and technological development, but also serious weaknesses in social equity. The evidence from case studies and interviews confirms that modernization under the current trajectory tends to benefit higher-income residents and amplify gentrification, unless countermeasures are taken. Addressing this will require deliberate policy action the very measures outlined above tailored to Iran's governance structures. As some interviewee put it, "sustainable development is really the only way forward" if modernization is to protect rather than erode social equity. Tehran's future as a smart city must therefore hinge not just on the latest technologies or grand projects, but on embedding justice and inclusion into every plan and policy. Only then can the city become both truly modern and truly just.

From my perspective, shaped by both professional training and lived experience in Tehran, recent smart and sustainable developments have clearly improved urban quality in certain districts. However, these improvements have often come alongside rising housing prices and growing social displacement. Many long-term residents are now unable to remain in neighbourhoods where they have lived for decades, showing that smart urban transformation is not socially neutral. Without clear attention to affordability and social continuity, even well-intentioned sustainable interventions can deepen inequality rather than reduce it. Aligning technological progress with inclusive planning is therefore essential if Tehran is to become both truly modern and socially just.

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Full Interview Transcripts

Annex A –Interview Transcripts

A.1 Interview with Planners & Policymakers

1.District Planner (municipal), 9 years' experience | Date: 29 Sep 2025 | Location: Municipal office (north-west) Fereshteh, Saadat Abad | Duration: 40 mins

Q1. From your perspective, what are the main drivers of gentrification in Tehran, especially in areas like Fereshteh, Shahrak-e Gharb, Saadat Abad?

A1. Land values and redevelopment rights are the big levers. Combine attractive locations with permissions for higher floor-area ratios and investment follows. Lifestyle services cafés, clinics, gyms then reinforce demand and push prices further up.

Q2. In your view, what are the main drivers of urban transformation in Tehran? Do you think these dynamics contribute to gentrification, and if so, in what ways?

A2. Transport upgrades, plot consolidation and market confidence make projects viable but where affordability and tenant protections are absent, displacement accelerates. It becomes a chain reaction.

Q3. When new sustainable urban projects are planned, to what extent is social inclusion considered?

A3. It appears in documents but is weak in delivery. Inclusion is often a checklist, not a binding requirement. We need clearer rules: minimum affordable shares and mandatory participation steps.

Q4. How do you see the role of smart home technologies in Tehran's urban future are they tools for equity or mostly for the wealthy?

A4. For now, they cluster in upscale schemes. Without incentives for retrofits in older stock, "smartness" widens the gap. Subsidised basic smart meters and better building management could make it fairer.

Q5. In your opinion, what policy measures could help balance modernisation with protecting vulnerable communities?

A5. Tie inclusionary requirements to permits, offer relocation support during works, phase construction, and collect impact fees from high-end schemes to fund nearby upgrades

2. Interviewee: Housing & Regeneration Officer (city) | Date: 30 Sep 2025 | Location: Central office, now, | Duration: 55 mins

Q1. From your perspective, what are the main drivers of gentrification in Tehran, especially in areas like Fereshteh, Shahrak-e Gharb, Saadat Abad?

A1. Expectation of capital gains. Developers target plots where consolidation is feasible and buyers value status, views and amenities. After a few successful projects, the pattern repeats and accelerates.

Q2. In your view, what are the main drivers of urban transformation in Tehran? Do you think these dynamics contribute to gentrification, and if so, in what ways?

A2. Yes, when “renewal” concentrates on high-spec product. Without parallel rehabilitation of modest stock nearby, there’s a step change in prices that filters out long-term renters.

Q3. When new sustainable urban projects are planned, to what extent is social inclusion considered?

A3. Improving but uneven. Some tenders now score engagement plans and a few schemes include accessibility and small retrofit grants for older residents. Not yet scaled across the city.

Q4. How do you see the role of smart home technologies in Tehran’s urban future are they tools for equity or mostly for the wealthy?

A4. Both, depending on design. If bundled only with premium amenities, it’s a luxury. If we support basic retrofits in existing buildings smart meters, efficient boilers it becomes an equity tool.

Q5. In your opinion, what policy measures could help balance modernisation with protecting vulnerable communities?

A5. Clear relocation frameworks, temporary rent support during construction, negotiated right-to-return, plus incentives for a small share of mid-market or price-controlled units.

3. Interviewee: Sustainability / Smart-City Programme Officer | Date: 3 Oct 2025 | Location: Hybrid (video call) | Duration: 45 mins

Q1. From your perspective, what are the main drivers of gentrification in Tehran, especially in areas like Fereshteh, Shahrak-e Gharb, Saadat Abad?

A1. Demand for comfort and reliability. Residents pay for stable utilities, good indoor environments and secure access. Developers respond with high-spec systems, which capitalise into higher prices.

Q2. In your view, what are the main drivers of urban transformation in Tehran? Do you think these dynamics contribute to gentrification, and if so, in what ways?

A2. Green upgrades and digital systems add value good in itself but they also raise prices. The task is to extend basic benefits (efficiency, safety) beyond luxury towers.

Q3. When new sustainable urban projects are planned, to what extent is social inclusion considered?

A3. We've piloted "retrofit-first" blocks LEDs, smart meters, common-area sensors at low cost. Results are promising, but financing and resident buy-in are bottlenecks.

Q4. How do you see the role of smart home technologies in Tehran's urban future are they tools for equity or mostly for the wealthy?

A4. Today: mostly luxury. Potentially: equity if paired with subsidies and technical assistance for older stock, and if procurement requires open standards to keep costs manageable.

Q5. In your opinion, what policy measures could help balance modernisation with protecting vulnerable communities?

A5. A small city retrofit fund, performance-based rebates, and a rule that major new projects contribute to upgrades within a defined radius.

4. Interviewee: Urban Infrastructure Planner (energy/water/transport), 12 years' experience | Date: 5 Oct 2025 | Location: Site office (north-west corridor) | Duration: 50 mins

Q1. From your perspective, what are the main drivers of gentrification in Tehran, especially in areas like Fereshteh, Shahrak-e Gharb, Saadat Abad?

A1. Service reliability attracts investment. When we upgrade mains, substations and roads, investors move quickly and infrastructure costs end up priced into housing.

Q2. In your view, what are the main drivers of urban transformation in Tehran? Do you think these dynamics contribute to gentrification, and if so, in what ways?

A2. Yes, upgrades raise values when social safeguards are missing. Better access and utilities are positives, but tenants without protection are the first to be displaced.

Q3. When new sustainable urban projects are planned, to what extent is social inclusion considered?

A3. Too often a “nice-to-have.” Inclusion needs to be hard-wired: phasing that allows people to stay, protection for vulnerable customers during interruptions, and clear communication.

Q4. How do you see the role of smart home technologies in Tehran’s urban future are they tools for equity or mostly for the wealthy?

A4. Network-level smart systems help everyone. Building-level smart features tend to be luxury unless subsidised or required in retrofits.

Q5. In your opinion, what policy measures could help balance modernisation with protecting vulnerable communities?

A5. Phasing to minimise displacement, connection-fee discounts for older buildings that retrofit, and dedicating part of efficiency savings to affordability programmes nearby.

5. Interviewee: Planner 5 | Date: 27 Sep | Location: Fereshteh and Saadat Abad (specify) | Duration: [28min] Location: personal office

Q1. From your perspective, what are the main drivers of gentrification in Tehran, especially in areas like Fereshteh, Shahrak-e Gharb, Saadat Abad?

A1. To be honest, the pace of development in these neighbourhoods has been really fast. You see all these high-rise towers with luxury facilities, and every year there are more cafés and restaurants popping up. It’s definitely changed the character of the area. More wealthy families move in, more people come just for leisure, and that creates a kind of social shift what we’d call displacement in planning terms. It doesn’t feel like the same place it used to be.

Q2. In your view, what are the main drivers of urban transformation in Tehran? Do you think these dynamics contribute to gentrification, and if so, in what ways?

A2. Smart housing construction and urban redevelopment projects have been a major driver of urban transformation. In my opinion, this only helps in some cases, for example in areas where rich people live, but in most cases, it does not help the community or the worn-out structures because the main problem is with the infrastructure, which is the primary need of the community.

Q3. When new sustainable urban projects are planned, to what extent is social inclusion considered?

A3. For me, the community is the key. If people are left out of the process, the project might look successful at first, but later it causes huge problems. In Iran, unfortunately, people usually aren't involved. There's no proper communication, no awareness campaigns most residents only find out about the project after decisions have already been made.

Q4. How do you see the role of smart home technologies in Tehran's urban future are they tools for equity or mostly for the wealthy?

A4. Smart housing technologies are something I've mostly seen in wealthier areas. They're not really accessible for average families. So right now, it feels more like a luxury add-on than a tool for equity. It's hard to say they're making life better for everyone, because honestly, they're not.

Q5. In your opinion, what policy measures could help balance modernisation with protecting vulnerable communities?

A5. I believe sustainable development is really the only way forward. If we want modernisation but also want to protect vulnerable groups, we need to think about both at the same time. Otherwise, the class divide just keeps growing. Without policies that balance the two, social equity will keep shrinking, and that's something we can already feel in Tehran.

A.2 Interview with Residents

Interviewee 1. Resident of Fereshteh | Date: 25 Sep | Location: Fereshteh, Tehran | Duration: [36 mins] | local resident

Q1. How has your neighbourhood (Fereshteh) changed in recent years?

A1. Over the past ten years, the pace of development in Fereshteh has been very high, especially in the construction sector. Most of the new projects are high-rise towers equipped with top-class facilities, since residents here value comfortable living and modern amenities. In addition, several new shopping centres with advanced facilities, along with cafés and restaurants, have also been established.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Because construction is moving so rapidly in this area, there has been a significant and uncontrolled increase in both housing purchase and rental prices. This has particularly affected those who rent, making it very difficult for them to stay in the neighbourhood.

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. In my opinion, the new developments have benefited only certain groups. You can clearly see the speed of progress in Fereshteh, but in other areas of Tehran there has been little to no development. This makes the advantages very selective and not inclusive.

Q4. Have you heard of or experienced smart housing technologies? If yes, how accessible are they?

A4. Yes, I have. Most of the residential buildings constructed in recent years have integrated smart technologies in different aspects. This has become very important for people who want to live in Fereshteh, but it is mostly associated with newer, luxury developments.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. At the moment, no. In Iran, development does not happen symmetrically across regions. More importantly, sanctions and economic conditions have created a significant class divide in society, meaning that the needs of long-term or lower-income residents are often overlooked.

Interviewee 2. Mina, secondary-school teacher, age 46 | Date: 28 Sep 2025 | Location: Shahrak-e Gharb, Tehran | Duration: 50 mins | long-term resident

Q1. How has your neighbourhood (Shahrak-e Gharb) changed in recent years?

A1. The pace feels faster every year. Low-rise blocks are being replaced by taller, gated complexes with gyms and concierge desks. The streets are busier, cafés stay open late, and there's more delivery traffic. We've gained convenience, but we've lost the quiet, neighbourly rhythm we had when my children were small.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Absolutely. Rents have climbed so much that some of our friends moved further west. Even owning doesn't protect you service charges in newer buildings are high, and schools and activities feel pricier because the area is seen as "premium."

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. They improve life for households who can afford the amenities. For others, everyday costs rise parking fees, club memberships, even groceries near the new complexes. You can feel the social gap widening, even in the playground.

Q4. Have you heard of or experienced smart housing technologies? If yes, how accessible are they?

A4. My sister's building has app-based access, smart meters and common-area sensors. It's convenient, but the monthly maintenance is steep. In my older block we only have a basic smart meter. The technology is uneven new towers have it; older residents go without.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. Not really. We're usually informed after the big decisions. I'd like to see phased works so people aren't forced to move, and practical support for long-term tenants during redevelopment

Interviewee 3. "Azade (pseudonym), long-term resident, age 34 | Date: 2 Oct | Location: Saadat Abad, Tehran | Duration: [45min] | Selection: long-term resident

Q1. How has your neighbourhood (Saadat Abad) changed in recent years?

A1. I have been living in Saadat Abad for many years. The biggest change is that many of the old villa-style houses were demolished and replaced with towers and large apartment complexes. I remember when most of the residents were local families, but over time, gentrification and segregation have changed the social fabric. Many shops and traditional markets closed, while luxury stores, institutions, and exhibitions opened. The neighbourhood has become more modern, but also very crowded and high in traffic compared to before.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Yes, housing prices have risen sharply, even the price of land. Newer buildings are smart and equipped with advanced features, which makes their value much higher. This has created difficulties for long-term residents like us who cannot easily exchange or upgrade older homes for newer ones.

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. In Saadat Abad and also in Shahrak-e Gharb, many new projects include green infrastructure. For example, green roofs and other nature-based solutions are common, and some smart buildings help reduce energy consumption. These are good for the environment, but at the same time they have pushed up property prices. So, while they bring benefits, they are not affordable for everyone and mainly improve life for wealthier groups.

Q4. Have you heard of or experienced smart housing technologies (like energy-saving systems, home automation)? If yes, how accessible are they?

A4. Yes, I know them well. In fact, my own house has a smart fire suppression system and automated energy control for heating and cooling, which helps prevent waste. These technologies are useful, but they are not accessible to everyone. Many developers avoid installing them because of the high costs, so only some houses and buildings include them.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. To some extent, yes, but not for lower-income groups. Most sustainable or smart homes in this area are very expensive and beyond the reach of ordinary families. Because of this, many long-term residents have been forced to leave. Development has improved the neighbourhood's image, but it has also made it less inclusive.

Interviewee 4: “Reza”, small-business owner (stationery shop), age 58 | Date: 2 Oct 2025 | Location: Saadat Abad, Tehran | Duration: 45 mins

Q1. How has your neighbourhood (Saadat Abad) changed in recent years?

A1. It used to be more mixed families, older residents, small shops. Now many old villas are gone and towers with underground parking have appeared. Footfall is higher but people browse rather than buy; many prefer the chain stores that arrived with the new complexes.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Residential rents are up, and so are commercial leases. My landlord increased the shop rent twice in three years. Some neighbours closed or moved to side streets. It even affects where my staff live longer commutes and higher costs.

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. The area looks modern and the pavements are better lit, but the benefits are not for everyone. Services in the new complexes are priced for wealthier clients. Older customers tell me they feel the area is “not for them” anymore.

Q4. Have you heard of or experienced smart housing technologies? If yes, how accessible are they?

A4. At home, only the lifts were upgraded no fancy systems. The newer places have smart access and energy controls, but maintenance fees are not small. For small shops, “smart” often means paying extra for digital services we didn’t need before.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. We rarely get asked. If there were proper consultations, we would suggest simple things: keep some units at affordable rents, give small shops priority for ground-floor spaces, and phase construction so we can survive the disruption.

Interviewee 5: “Laleh” retired teacher, age range: [insert] | Date: 8 oct | Location: Fereshteh, Tehran | Duration: [50 min] resident

Q1. How has your neighbourhood (Fereshteh) changed in recent years?

A1. I have lived in Fereshteh for more than 25 years. When I first came here, it was much quieter, with tree-lined streets and mostly low-rise apartments. In the last ten years, everything has changed. Now, you see tall towers everywhere, and many of the old gardens and houses are gone. The neighbourhood feels more crowded, and traffic has increased a lot. On the other hand, there are many new cafés, restaurants, and shops, which bring life, but it is not the same community feeling anymore.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Absolutely. Prices have gone up in a way that is unbelievable. Young families, even my own children, cannot imagine buying a home here. Renting is also very high. We were lucky to buy our apartment long ago, but I know many neighbours who had to move away because they couldn’t afford the rent anymore. It makes me sad because the faces of the neighbourhood have changed so quickly.

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. Honestly, I think they are designed for the wealthy. The new towers with gyms and swimming pools are not for people like us; they are for those with very high incomes. Some services have improved, like supermarkets and pharmacies, but the overall direction of development is not inclusive. It creates more distance between social groups. For older people like me, many of these changes don't feel like they are meant for us.

Q4. Have you heard of or experienced smart housing technologies? If yes, how accessible are they?

A4. I have heard of them, yes. Some of my friends live in new buildings that have automatic systems for lighting, security, or heating. It sounds very convenient, but also very expensive. Personally, I do not use such technologies in my own home, and I don't think they are accessible to ordinary residents. It feels like something made for the younger, wealthier families who move into the towers.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. I don't think so. The municipality seems to prioritise large investors and new projects. The needs of people who have lived here for decades, like myself, are not really considered. For example, green spaces are disappearing, while luxury shops are expanding. There is little attention to affordable housing, and lower-income groups are being pushed out. It feels like Fereshteh is becoming a place only for a very specific class of people.

Interviewee 6: “Kian” (pseudonym), IT specialist, age 32 | Date: 1 Oct | Location: Fereshteh, Tehran | Duration: [55 mins] | recent in-mover

Q1. How has your neighbourhood (Fereshteh) changed in recent years?

A1. I moved to Fereshteh about three years ago, so I didn't see all the old changes, but even in this short time, I can tell the area is developing really fast. Every few months, I see a new tower or shopping centre being built. Compared to other parts of Tehran where I lived before, Fereshteh feels much more modern, with luxury shops and international cafés. It's attractive if you like convenience and modern lifestyles, but it also feels a bit disconnected from the rest of the city.

Q2. Do you feel housing prices or rents have changed in ways that affect families like yours?

A2. Honestly, rents are extremely high here. If I didn't share an apartment with a colleague, I couldn't afford it. Buying is impossible for me at this stage. It's clear that the housing market is designed for high-income people or investors, not for young professionals. Even

among my friends, most of them could never consider living here unless they had family support.

Q3. What do you think about the new developments are they improving life for everyone, or only for some groups?

A3. From my perspective, the new developments are very impressive—everything looks modern, and services are close. But if I think about it honestly, they mainly benefit a limited group. You can see the wealth gap clearly: some people live in luxury towers, while others are pushed further away. So, yes, it improves life for people like me who can access these services, but it doesn't solve problems for the wider city.

Q4. Have you heard of or experienced smart housing technologies? If yes, how accessible are they?

A4. Yes, I live in a building with smart features. We have automated lighting, energy-saving systems, and digital security access. It's convenient and gives a sense of safety. But of course, it comes at a cost. The service fees are very high, and not everyone can afford this kind of living. For me, it's exciting because of my interest in technology, but I know it's not something accessible for most people in Tehran.

Q5. Do you feel local planning or development projects consider the needs of long-term and lower-income residents?

A5. From what I can see, no. Most projects in Fereshteh are focused on high-end development. There isn't really a balance between modernisation and social inclusion. Long-term residents often complain that they feel excluded, and lower-income groups are clearly being displaced.

A.3 Interviews with Developers and Technology Providers

Interviewee 1. Luxury Housing Developer (CEO, Arman Luxury Developments) | Date: 1 Nov 2025 | Location: Saadat Abad, Tehran | Duration: 45 mins

Q1. What motivates investment in neighbourhoods like Saadat Abad? Is it demand for luxury, in neighbourhoods?

A1. In our experience, the primary driver is demand for luxury. This area has the most affluent buyers who expect top-quality construction and amenities. Land values are high, and buyers are willing to pay premiums for prestige, views, and brand-name developments. We do

incorporate sustainable elements (like solar shading, efficient HVAC, LEED standards) in projects like our Fereshteh tower, but that is mostly to enhance marketability and efficiency. Sustainability alone isn't the main reason to invest; it's really the combination of luxury and location that draws developers here.

Q2. How often are smart home technologies integrated into your housing projects?

A2. Almost always in our high-end projects. In any new tower or villa, we build in Saadat Abad or Fereshteh, we include integrated smart systems from the start. Our standard package covers smart lighting, HVAC controls, security cameras, and access control all centrally managed. Buyers in those markets expect these features, so we make them a basic offering now. In smaller projects aimed at a more modest market, we might limit it to smart meters or app-controlled lifts, but for our flagship luxury developments, smart home tech is essential.

Q3. Who do you think is the target audience for these technologies' upper classes, middle classes, or a broader spectrum?

A3. Right now, it's almost exclusively the upper classes. Our clients are usually very high-income professionals or business owners who see smart features as part of the lifestyle. The middle class in Tehran isn't demanding full home automation at the moment because of the extra cost. In practice, maybe half of our buyers in Shahrak-e Gharb ask about smart appliances, but when it comes to fully integrated systems, the buyers in Fereshteh and Saadat Abad are mostly wealthy. Occasionally younger upper-middle-class couples will buy a smaller unit in our developments and enjoy some tech, but the fully connected smart homes are for the affluent market.

Q4. Do you see any efforts (or challenges) to make sustainable and smart housing more affordable for wider groups?

A4. It's definitely a challenge. The technology is still expensive, so without government incentives or mass production, costs remain high. We try to include energy-saving measures like better insulation, LED lighting, or a few solar collectors to lower utility bills, which helps indirectly. Some firms are exploring modular smart units to cut costs. But to be honest, making high-tech housing affordable is not where we have the most expertise. We'd welcome policies such as subsidized green loans or tax breaks for solar panels that could lower costs. Right now, most affordable housing projects in Tehran have very basic systems; real breakthroughs would come from city programs or local manufacturing bringing prices down.

Q5. In your view, how do redevelopment projects affect the social fabric of the neighbourhoods where you work?

A5. They change it quite significantly. When we build a luxury tower in Saadat Abad or Fereshteh, it tends to bring in new, wealthier residents, which shifts the character of the area. Some long-time neighbours sell and move out as prices rise. At the same time, the neighbourhood gains upscale shops, cafes, and better services from higher tax revenues. There is a trade-off: projects can revitalize an area but also make it less mixed-income. We try to mitigate this by funding community spaces or parks around our sites, but fundamentally, redevelopment tends to make these neighbourhoods more exclusive. Many of my colleagues are aware of the displacement issue, but unless policy forces us to set aside units or support current tenants, we mostly see a transformation toward a more affluent community.

Interviewee 2. Mid-Size Residential Contractor (Owner, Mehrgan Construction) | Date: 19 oct 2025 | Location: Fereshteh, Tehran | Duration: 40 mins

Q1. What motivates investment in neighbourhoods like Fereshteh, Shahrak-e Gharb, or Saadat Abad? Is it demand for luxury, sustainability, or both?

A1. From our perspective, it's mainly market demand and location advantage. These neighbourhoods have a lot of pent-up demand for modern housing, not just luxury. In Fereshteh and Shahrak-e Gharb we see young families and middle-class professionals looking to move into larger, safe apartments with decent amenities. Sustainability features (like better insulation or green spaces) are a plus that can attract buyers and save on operating costs, but they're usually secondary. So yes, luxury features help sell higher-end units, but a big motive is simply providing quality homes in in-demand areas where people want to live.

Q2. How often are smart home technologies integrated into your housing projects?

A2. It varies by project. For most of our mid-market developments, we install a few basic systems: smart meters for electricity and water, and sometimes remote-control heating panels. Full home automation (like integrated apps and sensors) is still rare for us because it adds significant cost. Maybe one in five projects will have a complete smart package, usually when an investor specifically wants that as a selling point. In general, basic energy-saving tech is common in our builds, but elaborate smart systems appear only occasionally in our portfolio.

Q3. Who do you think is the target audience for these technologies' upper classes, middle classes, or a broader spectrum?

A3. The target is moving beyond just the very rich, but still skews high. Upper and upper-middle class buyers are definitely the early adopters in these neighbourhoods. For example, in Saadat Abad some tech-savvy middle-class couples are now interested, especially younger homeowners. But many middle-income families are cost-conscious; they prefer practical benefits like lower utility bills over flashy gadgets. So, I'd say upper-middle and higher is the main market now. That said, as devices get cheaper, I expect a broader segment of the middle class to start using smart thermostats or automated lighting, especially if we bundle them into new developments.

Q4. Do you see any efforts (or challenges) to make sustainable and smart housing more affordable for wider groups?

A4. It's definitely challenging. We try to select materials and systems that improve energy efficiency without huge price jumps for example, double-glazed windows or basic solar hot-water systems. On the smart side, some companies are offering cheaper packages or modular add-ons for contractors like us. But without scale or subsidies, the upfront cost is still a barrier. The government has talked about green building codes, but enforcement has been slow. In practice, making these homes more affordable means either lowering tech prices or providing incentives. We've experimented with passing savings (from things like solar energy) back to residents in calculations, but that's a tough sell without a strong policy push.

Q5. In your view, how do redevelopment projects affect the social fabric of the neighbourhoods where you work?

A5. They change the neighbourhoods noticeably. When we replace older homes with new apartment blocks, the area gains new amenities like parking, parks, or playgrounds, which some longtime residents appreciate. But we also see that rents and living costs go up, which pushes out some lower-income families. In Fereshteh or Shahrak-e Gharb, there's a sense that we're making these places more modern but also more homogeneous. Original neighbours may feel less connected if a development is gated or if the atmosphere becomes noisier. We try to keep some community-friendly features (like small retail units on the ground floor or shared gardens), but overall, the social mix shifts toward newer, often younger residents. It's a balance: redevelopment brings investment and better buildings, but it does strain the old social fabric.

Interviewee 3. Smart Home Technology Provider (Founder, Smart Tehran Solutions) | Date: 30 oct 2025 | Location: Shahrak-e Gharb, Tehran | Duration: 35 mins

Q1. What motivates investment in neighbourhoods like Fereshteh, Shahrak-e Gharb, or Saadat Abad? Is it demand for luxury, sustainability, or both?

A1. In my experience, these neighbourhoods become hotspots because of wealth and prestige. Developers know that buyers in Fereshteh and Saadat Abad want the latest technology and modern features, so they target those areas to show off. Sustainability is often included as a marketing angle (like adding solar panels or green facades) because it's trendy, but the real pull is innovation and luxury. Shahrak-e Gharb is slightly different with more tech-savvy professionals, so smart features can be a big selling point there. Essentially, investors build in these districts because they offer rich customers and a chance to brand a project as cutting-edge.

Q2. How often are smart home technologies integrated into your housing projects?

A2. In my experience, we see smart tech in about half of the new developments we work with. It's more common in entirely new projects than in renovations. For example, our company has outfitted smart lighting and climate controls in several recent towers in Saadat Abad. In Fereshteh, any luxury villa or tower tends to include our systems from day one. That said, a number of projects still opt out due to cost, or only include minimal systems like smart meters or app controls. So, while integration is growing, it's not universal yet, especially outside the luxury segment.

Q3. Who do you think is the target audience for these technologies' upper classes, middle classes, or a broader spectrum?

A3. Right now, primarily upper and upper-middle class. The full smart home setups we provide built-in sensors, automation hubs, etc. are mostly aimed at wealthy homeowners. But we're starting to see interest from the middle class too, as off-the-shelf devices become available. For example, some Shahrak-e Gharb condominium projects include basic smart appliances that a middle-income buyer can afford. Our goal is to broaden the market: we now offer modular systems where residents can start small (like a smart thermostat) and expand. However, the most comprehensive systems still cater to high-end developments.

Q4. Do you see any efforts (or challenges) to make sustainable and smart housing more affordable for wider groups?

A4. Yes, there are efforts, but several hurdles remain. One challenge is financing: the high upfront cost of smart hardware discourages many buyers. We've started partnering with financing firms to offer instalment plans or performance-based contracts where the savings pay for the tech. On the sustainability side, we work with local manufacturers to produce lower-cost sensors. Technology is gradually getting cheaper, but without policy support it's tough. For example, we lobbied for tax incentives on green tech in homebuilding, but implementation has been slow. So far, most progress comes from market solutions more

competition among providers and improved local capacity, which is slowly making smart and sustainable features reach a broader audience.

Q5. In your view, how do redevelopment projects affect the social fabric of the neighbourhoods where you work?

A5. Smart technology can both bridge and widen social gaps. On one hand, systems like smart meters or building management can benefit an entire community if rolled out city-wide. On the other hand, I see that when a single new tower has a full smart home ecosystem, it tends to feel exclusive. In Fereshteh, for instance, a smart-enabled development created its own micro-community; other residents nearby didn't have access to those amenities. So, redevelopment with tech often clusters benefits with wealthier groups. Ideally, more city-wide initiatives (like smart grids or public Wi-Fi) would share the benefits, but right now smart projects in Saadat Abad or Shahrak-e Gharb mostly highlight the difference between new, tech-savvy residents and the older community.

Interviewee 4, **Green Building Consultant (urban ecosystem integration), 7 years' experience** | Date: 8 Oct 2025 | Location: Tehran (virtual) | Duration: 35 mins

Q1. What motivates investment in neighbourhoods like Fereshteh, Shahrak-e Gharb, or Saadat Ābādīs it demands for luxury, sustainability, or both?

A1. In my experience, the luxury market remains the main driver. These neighbourhoods carry prestige and high land values, so developers build premium projects there. Sustainability features like green roofs and passive cooling are often added to attract environmentally-conscious buyers, but they usually play second fiddle. In practice, investment is driven by the demand for an exclusive, comfortable lifestyle, with eco-friendly elements pitched as a bonus.

Q2. How often are smart home technologies integrated into your housing projects?

A2. Quite rarely in the projects I oversee. My focus is on passive design and ecological integration rather than gadgets. Many developers partner with separate tech teams for smart home systems. When smart tech is present, it's usually basic for example, automated irrigation or lighting tied to energy sensors. Full home automation (app-controlled systems, voice assistants, etc.) shows up mainly in top-tier luxury villas or condominiums, not in ordinary residential complexes.

Q3. Who do you think is the target audience for these technologies' upper classes, middle classes, or a broader spectrum?

A3. Predominantly the affluent. Wealthy buyers in these areas expect premium amenities and can afford the extra cost of green and smart features. Upper-middle-class owners of private villas might show interest, but it's a niche. Ordinary middle-class families rarely invest in new housing with these extras. In short, right now it's largely the elite segment; I hope adoption will broaden over time, but today it's an exclusive market.

Q4. Do you see any efforts (or challenges) to make sustainable and smart housing more affordable for wider groups?

A4. There are small efforts, but affordability is a big challenge. The government has introduced rules requiring solar panels on large buildings, which nudges developers to include basic green tech. However, most advanced sustainable features still add significant cost. We'd need incentives like subsidies or low-interest loans to really make them widespread. Some local architects try scaled-down solutions (shaded facades, native landscaping, etc.) for more modest housing, but without stronger policies or financial support, these remain limited.

Q5. In your view, how do redevelopment projects affect the social fabric of the neighbourhoods where you work?

A5. Green redevelopment can improve the environment for example, green spaces cool and beautify an area – but it often comes at the cost of displacement. Upgraded eco-towers tend to price out longtime residents. I've seen original families have to leave because rents and property values jump. The new developments are usually private or gated, so their benefits don't extend to the old community. In other words, sustainability gains coexist with social shifts: neighbourhoods become greener, but also more exclusive, unless policies enforce inclusion.

Interviewee5: Solar Energy Specialist (private residential systems), 8 years' experience | Date: 14 Oct 2025 | Location: Tehran (company HQ) | Duration: 30 mins

Q1. What motivates investment in neighbourhoods like Fereshteh, or Saadat Abad is it demand for luxury, sustainability, or both?

A1. It's mostly about luxury and reliability. Buyers in these areas want comfort and prestige first, and solar energy provides both an eco-friendly image and energy security. Frequent power outages in Tehran make off-grid systems very attractive to wealthy homeowners. Also, new regulations now require solar panels on any large new building, so developers include them as a feature. In summary, investment is driven by the high-end lifestyle demand, with sustainability (solar power) acting as an added value and a response to policy.

Q2. How often are smart home technologies integrated into your housing projects?

A2. In my field, we always include smart energy management as part of the solar installation for instance, apps and monitors that let owners track generation and usage. Beyond that, full smart-home integration varies by project. Many high-end developers do add things like smart thermostats and security systems, especially if the buyer requests it, but those are usually implemented by other specialists. I would say about half of the luxury projects I encounter incorporate some kind of broader smart home tech, mostly in villas and upscale condos; it's still uncommon in more ordinary developments.

Q3. Who do you think is the target audience for these technologies' upper classes, middle classes, or a broader spectrum?

A3. In practice, it's the wealthy. Private homeowners in Fereshteh or Saadat Abad who build or buy luxury homes are the ones installing solar panels and batteries. Upper classes clearly drive the market. A few middle-class groups have tried solar for example, cooperatives of apartment owners applying for a rooftop array but that's rare and complicated. Overall, the technology is priced for affluent buyers. We hope government incentives (like guaranteed purchase rates) might encourage broader use, but so far, it's largely the elite market.

Q4. Do you see any efforts or challenges to make sustainable and smart housing more affordable for wider groups?

A4. There are some positive steps. The mandated solar requirement effectively spreads solar adoption across new buildings, not just luxury ones. The authorities have also offered 20-year feed-in tariffs for rooftop installations, which helps justify the investment. However, the upfront costs of panels and batteries remain high due to import expenses and sanctions. Financing is a big hurdle we'd need more green loans or subsidies for ordinary families. Also, space is a constraint: apartment buildings often don't have enough roof or shared land. Efforts like small solar loans or community solar projects are emerging, but it will take stronger policies to make these systems truly affordable for the wider population.

Q5. In your view, how do redevelopment projects affect the social fabric of the neighbourhoods where you work?

A5. Solar installations themselves have a subtle impact on social life, but they tie into the broader redevelopment narrative. When high-end projects go green, it modernizes the area's image but also highlights the gap between old and new residents. For example, a street where one house has full solar power and its neighbour doesn't can create a sense of inequality. On the positive side, shared solar in a building could bring neighbours together

under a cooperative scheme, but we haven't seen much of that. Mostly, these technology-driven redevelopments tend to reinforce exclusivity: they make the neighbourhood more attractive to affluent buyers while long-time residents often feel left behind.