HUMANITIES ESSAY

Megastructure Reloaded: A New Technocratic Approach to Housing Development in Ekbatan, Tehran

Mohamad Sedighi

Under the USA's free-market foreign policy in the 1960s and 1970s, the Tehran Redevelopment Company (TRC) in collaboration with a New York firm, Starrett Housing Corporation, undertook one of the most extensive and innovative Middle Eastern public housing projects. As part of Tehran's masterplan designed by the Austrian-American urban planner Victor Gruen – aided by Iranian architect Abdolaziz Farmanfarmaian – the scheme accommodated 15,500 low- and middle-income families, especially those of civil servants, in an area that became known as *Shahrak-e Ekbatan* (Ekbatan). On one hand, the development aimed to change the everyday life of middle-class people; on the other, it sought to institute a capitalist economy with a bias towards rapid industrialisation. To achieve these objectives, the TRC asked Gruzen and Partners (USA) and Space Group (South Korea) to create a prototypical model: they selected the strongly collective urban form of a Brutalist concrete megastructure. Noting the influence of US President Jack Kennedy's doctrine for developing countries during the Cold War, this article reveals how the Ektaban scheme addressed local culture and society, while also accommodating change over time. As a Middle Eastern Modernist megastructure, it was erected after Reyner Banham in 1973 had declared that typology 'dead' in the Western world.

Keywords: Iran; cross-cultural exchange; urban modernisation; public housing; Brutalism; megastructure

Introduction

While modernisation in Iran can be seen as starting from the mid-1850s, it gained a real momentum in the aftermath of the Second World War. Sharing similar characteristics to the transformation of other non-Western countries, Iran's modernisation process accelerated under the oil-led geopolitics of the Cold War Middle East. The period of the 'post-war corporatist compact', as Kevan Harris terms it, saw US hegemony pervading the region and sponsoring state-led development, in particular while President John Fitzgerald (Jack) Kennedy held office [1]. As the Cold War began to intensify in the early-1960s, the Kennedy administration opted for a foreign policy to defeat Communist aggression in so-called 'emerging nations' [2]. For the main part, Kennedy's doctrine was based on adopting a free market-oriented economic policy and land reform strategies [3]. Yet, it also aimed to stimulate community development within underdeveloped countries, mainly by providing cutting-edge American technologies and scientific knowledge [4]. As Kennedy declared, this new US policy would be capable of giving 'these new nations a hand in building a society, and a glimpse of the best that is in our country' [5: p.12]. Indeed, this US-led modernisation project was intended to create a more integrated platform in which 'economic, social, and political change could be simultaneously addressed' [4, p.78].

Iran's large oil reserves and its long border with the Soviet Union put the country at the intersection of American and Soviet spheres of political influence. However, the anti-Communist figure of Mohammad Reza Pahlavi, the Shah of Iran, wished to integrate the country more strongly into the American capitalist strategy [6]. Under the auspices of Kennedy's doctrine, Mohammad Reza Shah launched a reform programme in 1962. The programme was known as the '*Enghelab-e Sefid-e Shah va Melat*' ('White Revolution of the Shah and the People'), and aimed to abolish the quasi-feudal landlord class in rural Iran [6]. At the same time, it promoted

Department of Architecture, TU Delft, NL, s.m.a.sedighi@tudelft.nl

privatisation and the inculcation of a Capitalist economy with a clear bias toward rapid industrialisation [7]. Supported by the exponential growth of oil revenues, this modernisation policy made high-speed urbanisation possible from the mid-1960s and throughout the 1970s, leading to a massive rural-urban migration to Tehran, with corresponding urban sprawl.

To respond to the rapid growth of population in its main cities, Iran's 'Fourth National Strategic Plan' (1967–72) recognised the need for constructing large-scale housing projects. Highlighting the importance of involving private and public sectors in this process, this initiative focussed either on providing accommodation for blue-collar workers in new industries, or for white-collar civil servants, especially in Tehran [8]. In addition, the *Sazman-e Barnameh va Budjeh* (Planning and Finance Organisation) asked the Municipality of Tehran in 1965 to prepare a masterplan for the city's development, an objective that intended to control the unprecedented urban growth [9]. As a result, Victor Gruen Associates, a Los Angeles-based architectural firm, was assigned to prepare the Tehran's masterplan, with help from a local architect, Abdolaziz Farmanfarmaian. Interestingly, Gruen's design offered a futuristic urban imagery for the capital city, with an agglomeration of satellite towns and megastructures to form a new backbone for Tehran.

This article will discuss the extent to which the Shah's 'White Revolution' paved a path for the 1960s ideals of the urban megastructure in Tehran. It will also argue that this utopian architecture along with cutting-edge technologies led to an internationalised version of Modernism in Iran, as Seyed Mohsen Habibi has noted [10]. Finally, the article will examine *Shahrak-e Ekbatan* (Ekbatan Town), one of the key housing districts developed during this period based on the ideals of the Tehran masterplan.

Megastructure movement

In the 1960s, the megastructure became a significant arena of innovative design. As argued by Rosemary Wakeman in her seminal book, *Practicing Utopia*, the avant-garde architects of the 1950s and 1960s in Western nations 'shared an unwavering belief that the physical structure of cities could transfer society' [11, p. 254]. Accordingly, these architects aimed to replace static space and architecture by 'mobility, flows of people, transportation, communication, and adaptability to change' [11, p. 255]. The outcome was a series of designs for multi-level cities and cybernetic modules, with computers being asked to play a crucial role in solving complex planning challenges [12]. Moreover, these architects tended to design and erect numerous massive reinforced-concrete megastructures that were mostly raised up on platforms.

These design principles became so pervasive that Reyner Banham, the well-known British architectural historian and critic, labelled these megastructures as the 'Dinosaurs of the Modern Movement' [13]. Banham was in general a key figure in reshaping the discourse around futuristic architecture. For instance, he curated a special issue of the *Architectural Review* in 1960 in which he collected a series of articles on the possibilities of new forms based upon innovations in science and technology [12]. Another of Banham's important contribution was the publication of *Megastructure: Urban Futures of the Recent Past*, in which he extensively framed interpretations of that typology [13]. In this book, Banham defined Megastructuralism as an international movement rooted in the works of Le Corbusier, the Italian Futurists, the Russian Constructivists, and contemporary avant-garde Japanese architects. Banham also argued that Le Corbusier's 1930s project for Fort l'Empereur Algeries, often called the 'Plan Obus', was a key reference for and driving force behind the megastructure movement.

Yet, prior to Banham's book, one of the first direct references to the idea of megastructure can be found in a 1957 article by Jean Gottmann, where he introduced the term 'megalopolis' [14]. In his text, Gottmann, a French geographer, provided a general description of this concept, noting that the exceptionally dense urban agglomeration of discrete but interconnected cities along the northeast coastline of the United States formed a bigger ensemble, that of a megacity. His idea became a source of inspiration for architectural design and urban planning, including the model of 'Ecumenopolis' introduced by Constantinos Doxiadis, and alongside the wider technological progress of the 1960s, it stimulated discourse about futuristic urban schemes and megastructures [11].

The 1960s megastructural schemes shared a common characteristic whereby the urban realm was reconfigured in totality. The outstanding futuristic urban proposals of this period were for Tokyo Bay by the Japanese Metabolists and Archigram's 'Plug-in City' scheme, both unbuilt. Tokyo Bay was designed by Kenzo Tange, a key member of the Metabolist group [15]. Tange introduced a network of multi-functional clusters and settlement modules linked together by a transportation system, and his plan was extended across Tokyo Bay to reach the opposite shore [16]. Similarly, the British group Archigram conceived cities as independent living entities, with for instance 'Plug-in City' as an attempt to introduce a constantly evolving structure that could incorporate modular residential units, transportation services and other essential pieces of infrastructure [17].

While this kind of futuristic project represented a mixture of Pop Culture, Pop Art, visionary architecture and flexibility, it also had an effect way beyond the narrower field of urban design [18]. Indeed, such proposals represented a form of social rebellion and human emancipation from the Capitalist system. New Babylon, the work of a Situationist artist, Constant Nieuwenhuys, was a very good example of this interpretation. According to the art historian, Jan Maruhn, it was Nieuwenhuys's belief that:

> … the increasing automatisation of production and the associated liberation from the necessity of alienated labour, created a new type of urban nomad, who was scarcely bound to any specific place, aloof from his or her native land, and in search of diversion … Thus, Constant's *homo ludens* should not live anymore in a 'radiant city', but rather, a 'New Babylon' … an ideal 'exercise' of a creation of new social space. [19, p. 46]

Collective urban life was, thus, visualised through a form of monumental architecture. Arguably, the gap between reality and vision in these futuristic models led the pioneers of the megastructure movement to consider the design of megacity as a tool to develop the idea of 'the whole human environment' [13, p. 9]. As Wakeman observes, New Brutalism bridged this gap in that it 'built up colossal structures that joined the functions of urban society into a unified whole' [11]. This concept, according to the US architect, Paul Rudolph, was rooted in an older historical model of town-building, whereby growth and change could simultaneously take place in a collective urban infrastructure [13]. One of the most comprehensive descriptions of a 'unified whole' or 'collective structure' was provided by Fumihiko Maki, another of the Metabolist architects, when he defined the megastructure as a collective form: 'a large frame, in which all the functions of a city or part of a city are housed' [20, p. 8].

Fumihiko Maki's notion of collective form requires further elaboration. Maki defined the three prototypes of urban form as the compositional form, the megastructure, and the group form. He, then, noted that 'the first of these, the compositional approach, is a historical one. The second two are new and are efforts towards finding master forms which satisfy the demands of contemporary urban growth and change' [20, p. 6]. Noticeably, Maki placed more accent on the relevance of mega-form, claiming that it offered 'a legitimate way to order massive grouped functions', and this to promote a new urban life [20, p. 8]. As part of this view, it was no surprise that Maki described his megastructural approach as the medium for facilitating environmental engineering, developing multi-functional structures, and stimulating public investment. Subsequently, he argued that technological progress and advanced structural techniques made the development of such megastructures possible [20].

This technological vision also caused other megastructure theorists and architects, such as John Habraken in The Netherlands, to rationalise their architectural intentions. However, Maki's approach was not merely limited to technological innovations, since he added two subsidiary categorisations of hierarchical and open-ended megastructures to his theory, aiming to expand the concept to fit urban planning. That is probably why Banham defined Victor Gruen's theory of the 'cellular metropolis' as a combination of Ebenezer Howard's Garden City concept and Maki's megastructural notions, which provided a profitable proposition in the hard-nosed 1960s Capitalist economy [13].

Paradoxically, while utopian futuristic megastructures were initially developed as an alternative to consumerist principles and state-led plans, these ideas also inspired dirigiste states and real-estate developers eager to cash in on the movement. From the early-1960s, state technocrats and private developers therefore began to invest in large-scale urban projects. For instance, Victor Gruen was commissioned by Nelson Rockefeller and the New York State and Urban Development Corporation in 1961 to propose a masterplan for Roosevelt Island in New York; the Philadelphia City Planning Commission asked Louis Kahn to submit a proposal for Philadelphia's 'Viaduct Plan' in 1964; Hugh Wilson and Geoffrey Copcutt were hired in Britain to design Cumbernauld's town centre in 1966; and South Korea's government appointed Kim Swoo Geun in 1966 to design the Sewoon Complex as part of Seoul's urban redevelopment. Indeed, these projects can be considered as prototypical models of 1960s urban megastructures, alongside others.

Megastructures had other characteristics than being self-contained urban projects of gigantic size. According to Ralph Wilcoxon, these projects were mostly constructed out of modular units, capable of apparently unlimited extension [21]. Moreover, their structures displayed the aesthetics of exposed precast or in-situ reinforced concrete as the key construction material. Indeed, the idea of open-ended self-reliant megastructures, as singular buildings that could function as a city, in combination with the use of reinforced concrete, gave birth to the New Brutalist architecture as outlined by Reyner Banham [13]. That is why Banham also categorised megastructures into two scales – urban and architectural – when describing

projects like the Berlin Free University designed by Alexis Josic, Georgis Candilis and Shadrach Woods in 1963, the Brunswick Centre in London by Patrick Hodgkinson in 1964, the Yamanishi Communication Centre in Kofu by Kenzo Tange in 1967, and Moshe Sadie's Habitat project for the 1967 World's Fair in Montreal, as important architectural models of New Brutalism.

Despite the fact that megastructural ideas influenced the design and construction of many projects in the 1960s and 1970s, it also seems that those non-Western countries with the most imposing state apparatuses were able to implement the most complete versions at both scales. Arguably, Tehran is one of the few examples in the world of a realised 'megacity', whereby, according to Wouter van Stiphout [22], the whole urban structure and its related architectural projects are 'tamed by a single idealistic planning vision' [22]. This 'megacity' today is largely a result of the aforementioned masterplan by Victor Gruen, in a joint-venture collaboration with an Iranian firm, Farmanfarmaian Associates, as designed between 1965 and 1968. This project was developed under Mohamad Reza Shah's ambitious modernisation project for the 'White Revolution', and as such reflected the Shah's obsession with 'sweeping showcase projects that signified Iran's catching up with the West and arriving at the Great Civilization' [23, p. 72].

The 'White Revolution'

While the 'White Revolution' facilitated the absorption of US-led Modernism into Iran's political and social scene, it was in fact the fear of Soviet military domination that made Mohammad Reza Shah so heavily dependent on American military support and financial aid [24]. To protect Iran, and to make it a regional superpower, the Shah asked the USA for advanced military weapons, equipment and facilities. The Kennedy administration was willing to do so under one condition: 'the Shah has to begin internal reform' [24, p. 564].

The Iranian reform programme was duly launched in 1962. On one hand, it was a modernisation project aimed at abolishing the quasi-feudal landlord class in rural areas [6]. On the other, it was 'a bloodless revolution from above aimed at fulfilling the expectations of an increasing politically aware general public as well as an ambitious and growing professional socio-economic group, and as such anticipating and preventing what many considered to be the danger of a bloody revolution from below' [7, p. 2]. To militate against the spread of Soviet influence in the Middle East, in light of Communist-inspired revolutions in China, Cuba and Iraq, the Kennedy administration convinced the Shah to undertake land reform to win support from the peasantry and labour organisations, in favour of the Pahlavi monarchy. Accordingly, large agricultural lands were subdivided among the peasants, thereby extending state authority into rural areas.

This so-called 'White Revolution' was also a medium to industrialise Iran and advocate the Shah's utopian vision. To finance his modernisation project, Mohammad Reza Pahlavi allowed global oil companies such as Exxon and Shell to expand their petroleum-related facilities, as well as oil extraction and export, thus multiplying the country's national income [25]. This tremendous increase in oil revenues attracted many international developers, construction companies and architectural firms to become involved in Iran [25]. From the mid-1960s and throughout the 1970s, American enterprises and agencies such as the Ford Foundation, General Motors and the Starrett Housing Corporation actively collaborated with the Iranian government to develop new industrial and infrastructural projects [26].

The Shah's modernisation project represented more than just an attempt to become an integral part of the Capitalist world system. Arguably, Mohamad Reza Pahlavi intended to turn Iran into a 'model' country that, under his leadership, would become a symbol for what he called the 'Great Civilisation' [27]. Under this utopian vision, 'everybody, from his birth to his death, will enjoy every kind of social insurance' [27, p. 56]. Moreover, the Shah described Iran as a country where 'its future would be more glorious than its [ancient] past …; its standard of living would soon surpass that of Europe; it would produce a way of life superior to both capitalism and communism.' [28, p. 131] This might explain why Mohammad Reza Shah was so eager to allocate a large portion of Iran's budget to the construction of new urban projects, mostly in Tehran, and to engage the services of internationally leading architects and planners such as Victor Gruen, Richard Llewellyn Davies, Louis Kahn, Constantinos Doxiadis, and many others [6].

The Shah's idea of the 'Great Civilisation' was also an attempt to legitimise Iranian tradition, and therefore his monarchy, though a particular conception of modernity [7]. This can particularly be seen from the way that he contextualised the need for development within the narrative of Iranian history. Accordingly, Mohamad Reza Pahlavi pointed out to his citizens that they had to 'consistently concentrate on our great ancient Iranian ideology, while trying to involve the best parts of international culture and civilisation' [29, p. 223]. Thus, he referred to the need to employ 'the technologies and knowledge of developed countries', while simultaneously emphasising the fact that they should not have any enmity towards Western countries. Finally, the Shah concluded that 'when we talk about culture and history, it does not mean we should follow

the outdated traditions … we need to find a balance between our glorious past and the modern technologies of our time' [29, p. 224].

Juxtaposing Iranian cultural traditions with Western industrial technologies was not only an ideology to institutionalise the Pahlavi monarchy. The concept also became a source of inspiration for new legislation, urban design and architectural discourse in Iran. For instance, while promoting free-market policies, the Planning and Finance Organisation (PFO) implemented from 1964 an initiative by which Iran's consulting and engineering firms were asked to engage an international partner whenever they were designing large-scale urban projects [30]. Likewise, global construction companies had to establish a joint-venture with a local company to be eligible to build in Iran [30].

The intertwining of tradition and technology also entered the realm of Iranian architectural discourse. Published from 1968 to 1980, one of the main platforms for such debates was the *Iranian Journal of Art and Architecture* (Persian: *Honar va Memari*), initiated by Abdolhamid Eshragh, an influential Modernist. Each issue introduced readers to archetypal elements of traditional Iranian architecture, but also discussed their relevance for developing the new architecture. Moreover, the journal depicted a series of student projects that were developed along those lines (**Figure 1**). Simultaneously, the *Iranian Journal of Art and Architecture* published innovative architectural projects of the twentieth century around the world, discussing how advanced construction technologies and techniques had made these projects possible [31]. Interestingly, the journal was printed in a tri-lingual format – Persian, French and English – and was published in Tehran, Paris and London, expressly to address a wide international audience.

Another platform to expand debate about the interaction of tradition and technology was the first Iran International Congress of Architects (IICA), held in Isfahan in 1970. Organised by the Association of Iranian Architects in collaboration with Iran's Ministry of Development and Housing (IMDH) and Ministry of Culture, this event brought together a small group of Iranian and international architects and urban planners (**Figure 2**). Among the overseas participants, Louis Kahn, Paul Rudolph and Georges Candilis played influential roles. Kahn described tradition as a result of inspiration where its essence is fixed, yet its style is subject to change [32]. Rudolph defined regionalism as an individual creative response to place and climate, while Candilis urged Iranian architects to use tradition with a critical approach and as a reforming force [32]. By referring to the structure of traditional medieval villages and cities in Iran, these foreign architects were also urging the relevance of developing quasi-urban architectural megastructures as part of the process of development [33].

In defining a new relation between tradition and technology, it was no coincidence that the key figures in the 1970 IICA conference proposed megastructural visions. Arguably, the international participants took the opportunity precisely to reconceptualise the megastructure for the Iranian context. In this light, Louis Kahn and Kenzo Tange were commissioned in 1972 by the Municipality of Tehran to design a mega-project for a new urban centre in the Abbas-Abad district (**Figure 3**). Indeed, the idea of developing Tehran as a megacity, composed of megastructures, was introduced to Iran by one of the movement's pioneers, Victor Gruen, who was commissioned by the Planning and Finance Organisation to prepare Tehran's masterplan. According to
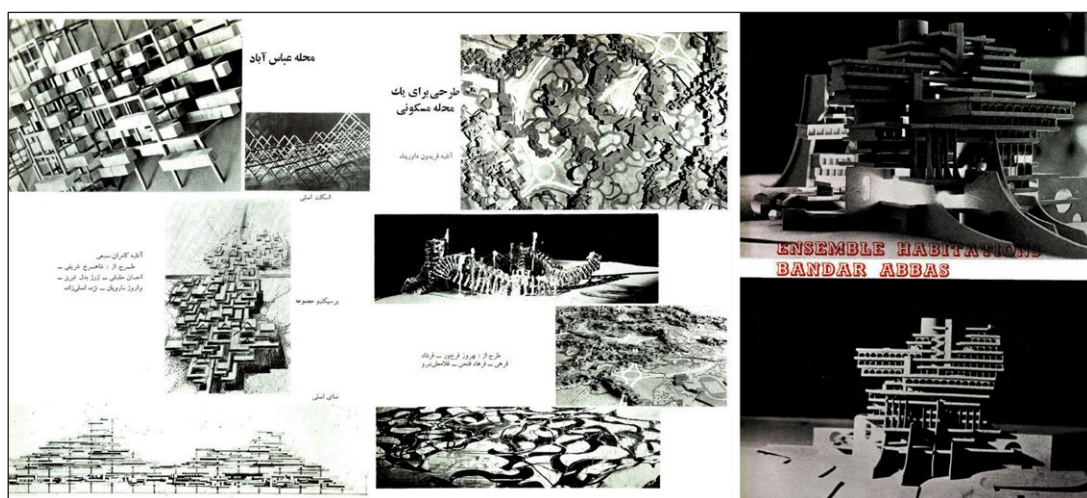

Figure 1: Examples of students' projects as published by the *Iranian Journal of Art and Architecture*. Source: *Honar va Memari* 1, no. 2 (1969): 63–64.

Figure 2: Opening of the First Iranian International Congress of Architects in Isfahan, 1970.
Source: *The Interaction of Tradition and Technology: Report of the Proceedings of the First International Congress of Architects* (Tehran: 25th Shahrivar Press, 1970), 18.
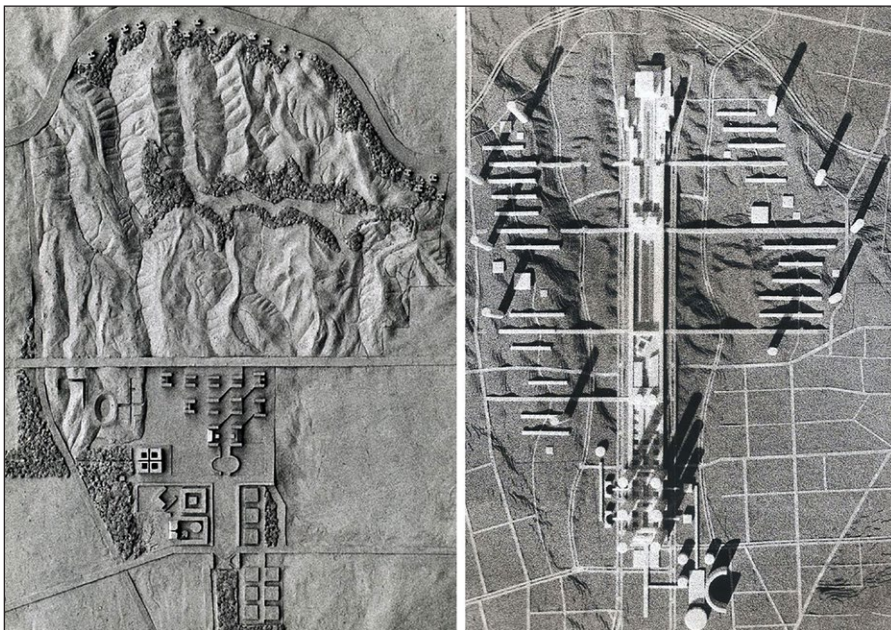

Figure 3: Initial urban proposals for *Shahestan Pahlavi* by Louis Kahn (left) & Kenzo Tange (right), 1972.
Source: Left-hand photo taken by George Pohl, Louis I. Kahn Collection, University of Pennsylvania and the Pennsylvania Historical and Museum Commission; right-hand photo taken by Osamu Murai.

an Iranian scholar, Ali Madanipor, the need to construct a megacity was a direct result of the Shah's 'White Revolution', which had caused a massive rural-urban migration, thereby forcing the Tehran Municipality to find way to envision the city's growth in future [34].

The Master Plan of Tehran

In 1965, Tehran Municipality asked the Los Angeles-based architectural firm, Victor Gruen Associates, to design the city's masterplan. To do so, Gruen formed a joint-venture with Abdolaziz Farmanfarmaian, an Iranian Modernist involved in large-scale governmental projects. Approved by the Supreme Council of Planning in 1968, the plan proposed a comprehensive planning for Tehran over the next twenty-five years. It

was designed based upon Gruen's theory of the 'cellular metropolis', an urban idea first mentioned in his 1964 book on *The Heart of Our Cities: The Urban Crisis, Diagnosis and Cure*. Gruen believed that Modernist architecture and planning using modern technologies could cure nearly all urban problems [35]. Building upon the concept of 'the city with a heart' that had been discussed in the CIAM's eighth congress in 1951 [26], Gruen invented the American shopping mall as a remedy for the absence of a socio-commercial heart for its suburbs [36]. In his imagination, the mall was an ideal community space that was 'derived from the tradition of the market squares of Europe or the main streets of American cities', and which could play the role of the Greek agora for the twentieth century [11, p. 279].

Victor Gruen defined urban sprawl as the major problem of contemporary cities. As a cure, he proposed that by developing a series of self-contained and interconnected satellite towns, urban planners and designers might resolve this problem [35]. Heavily influenced by Ebenezer Howard, Lewis Mumford and Jane Jacobs, his hierarchical order of neighbourhoods, districts, community towns, cities and metropolitan cores was an attempt to restore a sense of community belonging [11]. In this model, each metropolitan core was a 'mega-city' consisting of ten cities; each of these cities was in turn formed by ten towns around the city centre; each town consisted of four districts around the community centre; and each district was constructed out of four or five neighbourhood units around the district centre.

In Gruen's vision, the shopping mall became the space of modern public life. He defined the shopping mall as the core of each urban centre around which public facilities could be constructed. Interestingly, he pointed to the town centre of Cumbernauld, a concrete megastructure near to Glasgow, as the best example. In an early attempt, Gruen designed the Southdale Mall at the Northland Centre, outside Detroit, as a self-contained and controlled urban environment. This megastructure, according to *Architectural Forum*, conveyed 'the feeling of a metropolitan downtown' [37, p. 117]. Gruen's ideas became so influential that Paul Rudolph described his megastructural approach as one of the most important architectonic innovations of the twentieth century, after Ludwig Mies van der Rohe [38]. Although in the 1950s and 1960s, Gruen did partly implement new communities such as New York's Roosevelt Island, Downtown Fort Worth in Texas, and Valencia town centre in California, his ideal metropolis was mostly realised in fragments, especially through commercial shopping centres [13]. Thus, when Iranian technocrats asked Gruen to design the masterplan for Tehran, he grabbed this offer as an opportunity to implement his vision at a complete urban scale.

As might have been expected, Gruen relied upon his concept of the 'cellular metropolis', adapting this schema to Tehran's geographical and socio-economic structure [39]. The city is situated on the foothills of the Alborz Mountains, which had long limited the exposition of the city to the northeast. Furthermore, Tehran had already grown strongly in a northern and southern direction (**Figure 4**). Its northern zone, full of large gardens, was a place where mostly upper-class families lived, while the city's southern district was

Figure 4: Tehran in 1965.
Source: *The Comprehensive Plan of Tehran: The General Ideas and Schemes*. Tehran: The Planning and Finance Organisation, 1968, cover page.

a dense urban fabric where low-income families could find affordable accommodation close to their workplaces. Interestingly, Gruen proposed his scheme as a linear growth of the central part of the city, where the majority of middle-income groups resided. This might explain why his proposal aimed to make Tehran a utopia for middle-class families, in his words [9]. Accordingly, Gruen stretched out his idealised diagram for a metropolis over Tehran, pulling it in a westerly direction, thus forming a cross-shaped linear form that intersected in the city's centre (**Figure 5**).

Population size and density were two particularly influential parameters in Victor Gruen's proposal. In his diagram, Tehran was divided into 10 satellite towns, held together through a chain of gigantic highways and a high-speed public transportation network that were embedded in a flowing of parks and green landscapes. Intended to limit the city's population to 5.5 million people, each of these satellite towns was designed for a maximum population of 500,000 persons, and then subdivided into the districts of 15,000 to 30,000 residents; furthermore, each district was designed as a series of neighbourhoods with 5,000 inhabitants. Moreover, the masterplan defined a density of up to 150 persons per hectare for areas in northern Tehran, yet of up to 500 persons per hectare for central and southern districts.

Gruen also proposed a hierarchical order for urban facilities within each satellite town. According to the masterplan, the neighbourhood centre was to be defined as a place where a small park, primary school, medical clinic and a precinct of small shops should be located. At a larger scale, the district centre to be the location of the local hospital, high school, workspaces, small shopping malls, and a few governmental institutions. The various town centres were, then, to have a minimum area of 150 hectares, so as to accommodate larger commercial centres, major shopping malls, recreation centres, governmental institutions, larger workspaces and offices, and clusters of high-rise residential buildings. Moreover, Gruen's masterplan highlighted the fact that the town centres needed to be established as identifiable areas within Tehran's urban structure, with high-density environments in the form of high-rise residential towers and slab blocks [9].

Gruen's proposal also included a detailed programme for residential buildings and large-scale housing schemes. He suggested five stages of 5-yearly development for Tehran, giving high priority to providing housing for middle-income groups. In Gruen's view, the existing middle-class housing stock would thus be released to give lower income groups the proper living conditions, while upper-class families could as ever afford to build their own homes. Accordingly, his masterplan estimated that in the first development phase, the Iranian government needed to erect 283,500 dwellings for middle-income civilians, particularly civil servants. To achieve this objective, Gruen suggested that 40 percent of the total investment in Iran's construction sector, equal to 16 percent of Gross National Income, should be dedicated to this Tehran housing programme [9].

In this regard, Gruen's housing proposals aimed to imply a certain lifestyle among Iran's middle classes, provided through state sponsorship. To facilitate the initiative, the masterplan described an affordable dwelling as an apartment of between 36–112 square metres in size, a wide range. The rationale for this dwelling size was to make at least some of these newly constructed houses also affordable for lower income families who would eventually become part of the middle class [9]. Hence, the masterplan grouped together

Figure 5: Victor Gruen and Abdolaziz Farmanfarmaian's 1968 urban proposal for Tehran.
Source: *Honar va Memari* 2, no. 5 (1970): 57–61.

different households based upon their yearly income, with a series of incrementally larger dwelling types for each group. It also set out the sizes of outdoor spaces for each of the housing types. Gruen's proposal usefully included a series of illustrations depicting how these affordable housing schemes should be constructed (**Figure 6**).

Conspicuously, Gruen's housing design was based on the promotion of apartment mode of living among Iranians. In the second volume of book about Tehran's masterplan, Gruen and Farmanfarmaian extensively analysed the typologies and living conditions of both traditional and newly-built residential neighbour-hoods in the city, arguing for the construction of multi-storey prefabricated residential blocks as a solution to affordable housing [40]. They described the physical form of older Iranian houses as being commonly based on three factors: socio-cultural traditions, local climate, and available construction materials and techniques. They noted that Islamic traditions, which imposed certain social rules on women, were a crucial parameter in the layout of traditional dwellings, restricting the everyday life of inhabitants to an inward-orientated type surrounded by high walls, with almost no visual relationship to the streets or other public spaces (**Figure 7**). Now, they argued, the involvement of Iranian women in contemporary social life emancipated architects from these cultural constrains, allowing them to design more outward-orientated dwellings [40].

Gruen and Farmanfarmaian also regarded the application of advanced building techniques and materials as a way to improve living conditions through affordable housing schemes. They defined the low-tech con-structional system of mud-brick loadbearing walls and wooden beams as a major limitation for traditional houses, since it made structures vulnerable to seismic activity and variable weather. Moreover, they claimed that while these older, thick loadbearing walls insulated internal spaces against heat and cold, the thick-ness of these walls greatly reduced the net habitable space inside. Traditional construction techniques were also described as time-consuming and labour-intensive, and thus costly. Private courtyards were labelled as overly large outdoor spaces for the storing of clean water for everyday practices. Gruen and Farmanfarmaian argued that the provision of piped water supply in Tehran now enabled architects to design not only dwell-ings with smaller courtyards, but also to stack them up on top of one another in apartment blocks. Moreover, they contended that prefabricated building systems could reduce construction costs, increase the lifespan of structures, and provide more greenery at ground level by concentrating housing units into taller residential blocks [40].

Arguably, Gruen and Farmanfarmaian's proposal as agreed in 1968 was also an attempt to promote a new urban life among Iranians. For instance, the housing schemes implemented by the Iranian government at
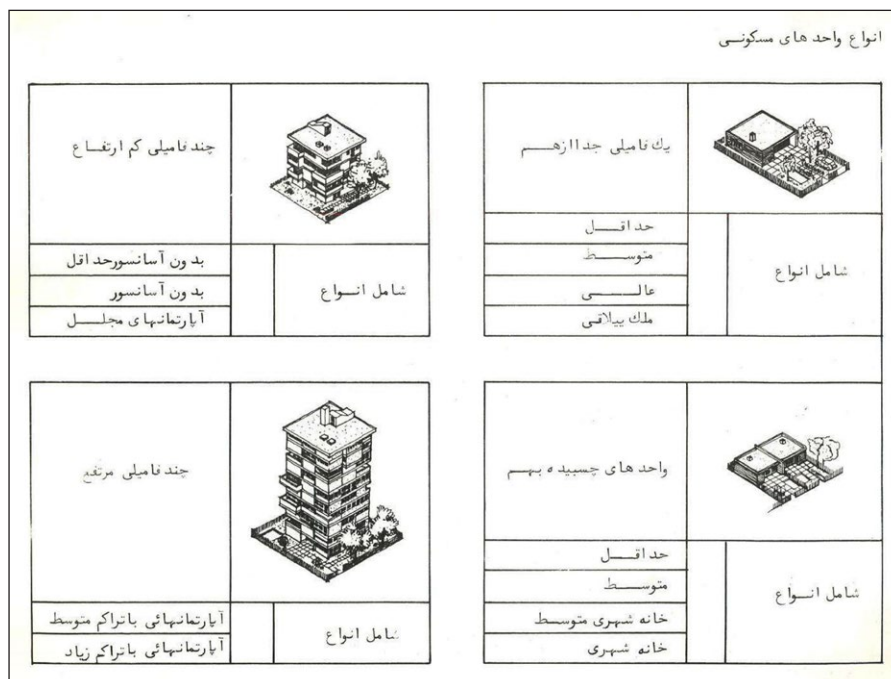

Figure 6: Proposed housing typologies in the Tehran masterplan.
Source: *The Comprehensive Plan of Tehran: The General Ideas and Schemes.* Tehran: The Planning and Finance Organisation, 1968, 69.
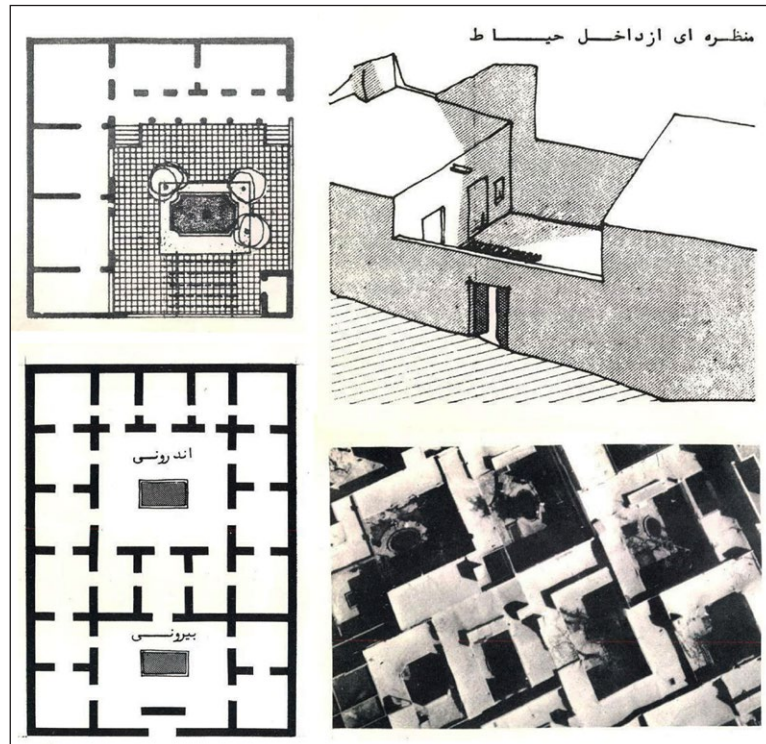
Figure 7: Two typical traditional houses, as depicted and analysed in Gruen's housing proposal.
Source: *The Comprehensive Plan of Tehran: Review and Evaluation.* Tehran: The Planning and Finance
　Organisation, 1970, 3.01–3.06.

Figure 8: Urban layouts of Kuy-e Kan (left) and Kuy-e Nohom-e Aban (right).
Source: *The Comprehensive Plan of Tehran: Review and Evaluation.* Tehran: The Planning and Finance
　Organisation, 1970, 3.15–3.16 (top); and National Archive of Iran (bottom).

Kuy-e Kan (middle income) and Nohom-e Aban (lower income) were described as successful, since 'their
urban forms were based on a proper set of urban standards and design regulations' [40: p. 3.16]. In fact, they
focussed more extensively on the Kuy-e Kan scheme (**Figure 8**). Indeed, in their view, the Kuy-e Kan scheme
provided an ideal living environment for middle-class families, since the distances between its residential
blocks enabled adequate sunlight into dwellings and sufficient access to greenery and other public outdoor

spaces at ground level. Moreover, the Kuy-e Kan project created facilities such as schools and water/sewage treatment plants, along with parking areas to encourage private car ownership and facilitate higher speed transportation [40].

Aside from indicating the importance of urban mobility, Victor Gruen's intention was to set a basis for self-contained megastructures in Tehran. Gruen criticised the housing scheme of Kuy-e Kan for being too low in density. He argued that it could have been scheme with blocks of 5–10 storeys, with lifts providing access to the upper floors, as part of a multifunctional structure containing all everyday urban activities, such as shopping and leisure. While constructing residential areas around shopping malls was a means to promote a consumer society, as Pamela Karimi observes [41], it was also a strategy that encourages architects to design self-contained urban environments for Tehran. It is little surprise, therefore that the masterplan by Gruen and Farmanfarmaian suggested the construction of urban centres as the first stage of implementation, with the large-scale, high-rise housing following afterwards.

Gruen and Farmanfarmaian's masterplan also formed different constellations of local and international actors. Tehran Municipality established the *Sherkat-e Nosazi va Omran Shahr-e Tehran* (Tehran Redevelopment Company) to involve private and public developers, and investors, in constructing the new urban centres and in supervising the process. The Planning and Finance Organisation made the *Bank-e Saderat* (Export Bank), together with the *Bank-e Omran* (Development Bank) and *Bank-e Rahni* (Mortgage Bank), responsible for financing these Tehran mega-projects. The masterplan was also undertaken with the direct guidance of American institutions such as the Ford Foundation, and was partly funded by massive loans from the World Bank and the US Development Fund. Indeed, the proposal opened the door to a flood of international architects, engineers and construction firms; it also formed a basis for the preparation of a comprehensive national housing programme by the Greek architecture firm of Doxiadis Associates [42].

Shahrak-e Ekbatan

As part of the initiative, Tehran Municipality in 1970 authorised the Tehran Redevelopment Company (TRC) to implement the first masterplan stage. Hence, the TRC granted land to private developers to provide affordable middle-class housing. One of the first districts allocated was a vast piece of vacant land in western Tehran, a location that later became known as Shahrak-e Ekbatan (Ekbatan Town). Under the leadership of Rahman Golzar Shabestani, a young Iranian architect, the TRC planned the pilot project for Ekbatan in 1972: it was to accommodate 15,500 middle-class families, with around 80,000 inhabitants, in an area of 220 hectares. Situated to the west of Tehran, approximately 5 kilometres from the city borders, Ekbatan was planned in three phases (**Figure 9**). Two residential zones were envisaged: one of 110 hectares to the east, zoned for 7,500 dwellings, and another of 50 hectares to the west for 8,000 units – each with its own communal amenities, schools, administrative buildings and commercial centre. Dividing them was to be a 60-hectare non-residential zone that formed the urban centre, with facilities such as water/sewage treatment plants, transportation networks, hospital, major shopping mall and recreation centre.

To implement these objectives, the TRC in collaboration with the *Bonyad-e Pahlavi* (Pahlavi Foundation) established a transnational partnership between local and international companies. In 1974, the TRC appointed an American architecture firm, Gruzen and Partners (as directed by Jordan Gruzen and Peter Samton) to design East Ekbatan, with a New York developer called Starrett Housing Corporation, directed by Henry Benach, being asked to finance and construct 7,500 apartment units, there [44]. A South Korean architecture office, Space Group, founded by Kim Swoo Geun, was assigned in 1976 to design West Ekbatan. Prior to being appointed for the Ekbatan scheme, all of these had been involved in prestigious architectural projects sponsored by the Pahlavi Foundation. Indeed, the foundation was commissioning many American developers and international architects during the 1970s to create luxurious housing projects for privileged Iranians, mostly in Tehran [45]. For instance, Kenzo Tange, Moshe Safdie and Moshe Bashan were commissioned to design the ASP project, the Habitat 76 housing scheme, and the Eskan residential towers, respectively. As part of Tehran's general masterplan, the Pahlavi Foundation also initiated two megastructures elsewhere in Tehran – the Zomorrod and Alborz housing complexes (**Figure 10**).

Arguably, the Zomorrod scheme created the model of development for Ekbatan, being one of the first results of the Starrett Housing Corporation's close collaboration with the Pahlavi Foundation [45]. It was built between 1974–76, and was designed by Gruzen and Partners [46]. The Starrett-Gruzen link had already gained a good reputation for large-scale joint-venture housing projects in New York, such as Northtown II in Roosevelt Island [47]. When the Pahlavi Foundation brought this to the notice of the TRC, Gruzen and Benach grabbed this opportunity to expand into Iran through schemes like Zomorrod and later Ekbatan. Based on the contracts signed between Starrett and the TRC, more than 80 percent of building materials

Figure 9: Location of *Ekbatan* in West-Tehran, 1972 (top), and the urban layout of Ekbatan (bottom). Source: Mohamad Sedighi.

had to be imported from the USA, and construction works had to be completed within two years [48]. This might well explain why Ekbatan was developed with the same design and construction principles that the Gruzen-Starrett joint-venture used previously for the Zomorrod project.

Ekbatan was not only developed by Western actors, however. While the TRC relied heavily on importing American architectural models and construction technology for East Ekbatan, it chose to employ Iranian experts and use locally produced building materials, such as pre-cast concrete façade panels, for West Ekbatan. To that purpose, the TRC asked a few Iranian engineering firms to obtain licenses from European building material suppliers (French double-glazing, German cement, Italian tiles and such like). In the long term, as the TRC's director Rahman Golzar was to argue, the Iranian construction industry used this inflow to make itself more independent from foreign technical aids, enabling it to contribute directly to constructing Ekbatan [49].

The localisation of construction process was not limited to materials production. Rahman Golzar also asked the Starrett Housing Corporation to train its engineers to help build East Ekbatan. In the case of West Ekbatan, as mentioned before, the TRC hired Kim Swoo Geun in 1976. Geun had a long reputation for designing large-scale urban projects using prefabricated consecution systems, such as the Sewoon Complex in Seoul, and was already in charge of designing the Alborz housing project for the Pahlavi Foundation in northern Tehran. Moreover, the TRC asked Geun to collaborate with the *Sherkat-e Omran-e Ekbatan* (Development Organisation of Ekbatan). Indeed, the latter organisation was responsible for approving architectural plans and supervising the construction process – under the leadership of Freydoun Azari, another Iranian Modernist architect – and it also involved many other young Iranian architects and experts, such as Ali Akbar Nasrabadi and Davood Shahin, for the Ekbatan scheme.

Ektaban's layout and design

As noted above, Ekbatan was divided into three zones with an interconnecting motorway. Each of the two housing zones was surrounded by a ring road, and then split into two districts of a few neighbourhoods, containing in total 33 reinforced-concrete residential slabs. These modular blocks each consisted of 5-, 9-

Figure 10: Zomorrod (top) and Alborz (bottom) housing projects in Tehran.
Source: Mohamad Sedighi (top), and Minsuk Cho, © designboom (bottom).

and 12-storey towers, with a triple-stepped profile. In East Ekbatan, Gruzen and Partners designed 14 huge Y-plan slabs along a central boulevard, along with another 4 super-slabs alongside the northern ring-road to achieve the required dwelling density. Each of these mega-slabs had a series of gardens and pools embedded within it, and sat upon a double row of V-shaped concrete columns to provide a continuous ground-level landscape. Interestingly, this design principle echoed that of Le Corbusier's 1952 Unité d'Habitation in Marseilles (**Figure 11**). For the construction of the Y-plan slabs with their three modular towers, Gruzen and Samton used the Starrett Housing Corporation's construction system for Zomorrod, where prefabricated concrete panels formed the main appearance [48]. They used five dwelling types, each with small variations in dwelling size or in the number of habitable rooms (**Figure 12**).

Following Tehran's masterplan, the initial urban layout by Gruzen and Partner had rigidly functional zoning and primacy for private cars rather than pedestrians. Between the central boulevard and the non-residential zone, a local urban centre was proposed. Gruzen and Samton designed a shopping mall and included public amenities such as schools, administrative buildings and a sport complex around it (**Figure 13**). Undoubtedly, this resonated with Victor Gruen's car-based ideals for Tehran. For the revised version of their proposal, however, only the sport facilities were retained: the boulevard was instead replaced by a linear commercial megastructure, pedestrian at ground level, and with spaces for residents parking underneath.

A car-free zone was also created in West Ekbatan. Kim Swoo Geun placed parking areas under the residential blocks that were only accessible from the surrounding ring-road. His urban design was based on an agglomeration of 19 semi-hexagonal residential super-slabs around a central green spine, providing some 6,000 dwelling units. Each super-slab consisted of a series of modular towers, again on a double-row of huge pier-like *pilotis*. Furthermore, these *pilotis* were partly closed off in each block to provide indoor communal spaces at ground level for the residents. Initially, Geun suggested a combination of 9- and 12-storey towers to form a dynamic skyline comparable to that in East Ekbatan. But in the revised scheme, all towers were uniformly 12-storeys high (**Figure 14**). This was done to create an additional amount of 2,000 apartments in West Ekbatan, as added into the brief by the TRC [43]. For the modular towers, Geun designed an in-situ concrete frame with prefabricated concrete infill elements, similar to Gruzen and Partners. To allow changeability and provide visual diversity, the loadbearing concrete walls and floors had varied openings, enabling
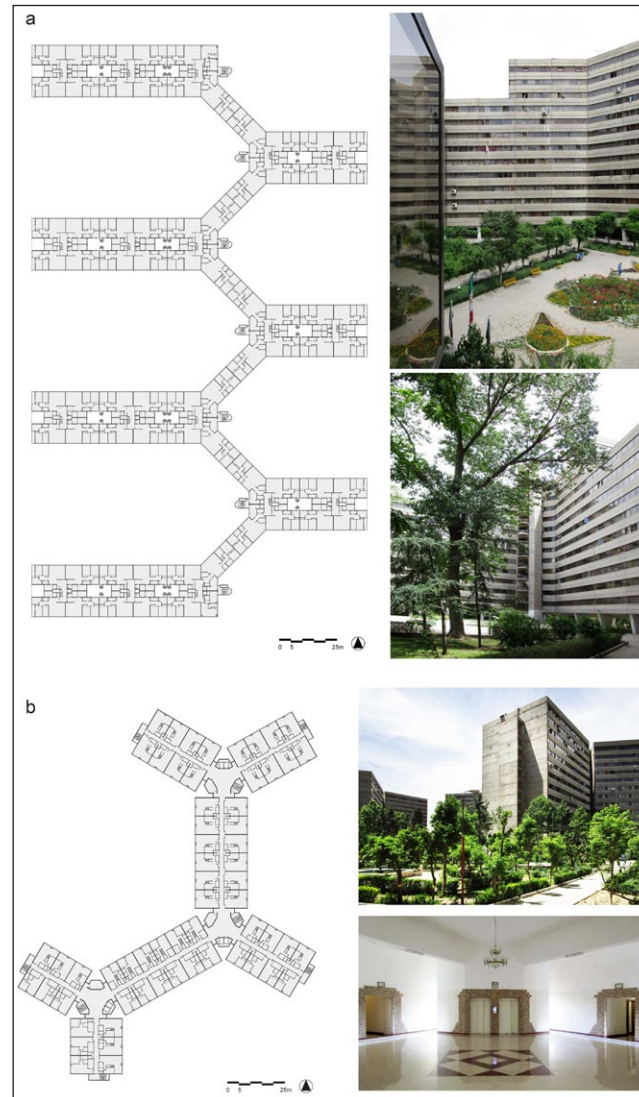
Figure 11: a: Typical residential mega-slab in East Ekbatan. **b:** Typical residential mega-slab in West Ekbatan. Source: Mohamad Sedighi.

Geun to create a playful combination of duplex dwellings and single-floor apartments. In all, he created twelve dwelling types of different sizes (**Figure 15**).

Kim Swoo Geun also collaborated with Kwaak Young-hoon, a South Korean landscape architect who considered greenery to be the heart of any urban community [50]. Thus, in West Ekbatan, the 19 residential slabs were placed around a central linear park not only for leisure activities, but also for everyday urban life. Geun integrated public amenities such as schools, culture centres, playgrounds, and shopping centres into chain of gardens and pools, again with a sports complex and shopping mall placed centrally. Interestingly, this urban centre included a plaza partly built over a west-east street that divided West Ekbatan into its two neighbourhoods. A whole series of communal spaces such as workshops and pavilions were also distributed throughout the central park to encourage pedestrian movement. Despite the fact that the 1979 Iranian Islamic Revolution interrupted the construction process, and resulted in the elimination of some public facilities like the outdoor pools and pavilions, the layout for West Ekbatan was otherwise implemented between 1976 and 1992.

Megastructure reloaded

Tehran's masterplan by Gruen and Farmanfarmaian stimulated market-led urbanism and a neo-liberal housing system. Except for a small elite, the majority of Iranians were unfamiliar with living in multi-storey residential buildings. Lower income industrial workers, as well as civil servants and other mid-tier government employees, mostly lived in small 1-, 2- or 3-storey houses around a courtyard [51], or else perhaps in 4-storey apartment buildings that were constructed by the *Bank-e Sakhtemani* (Construction Bank) from
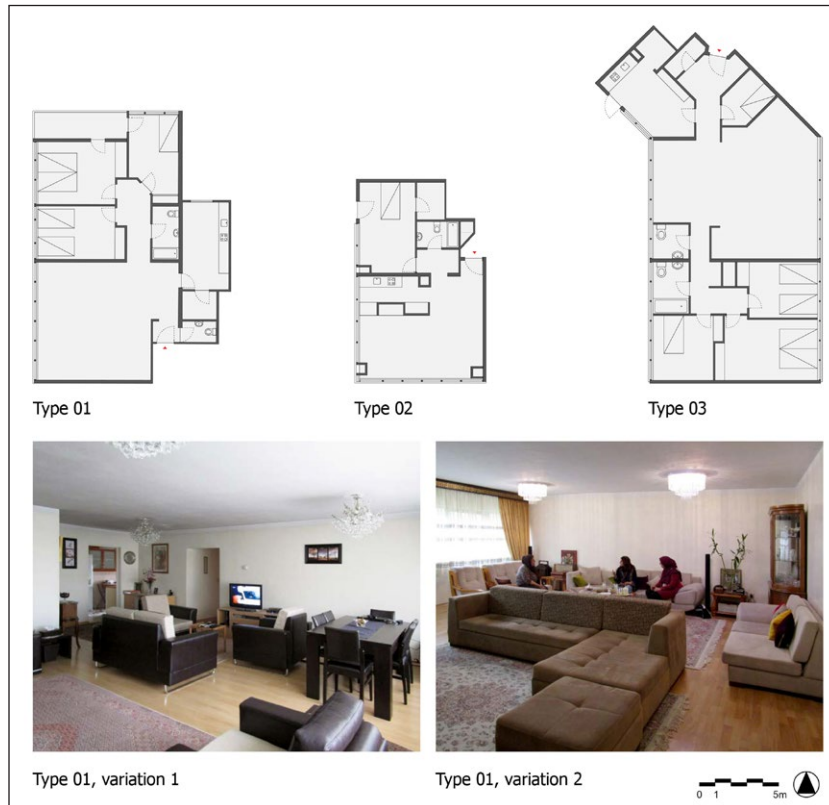
Figure 12: Three typical dwelling units in East Ekbatan.
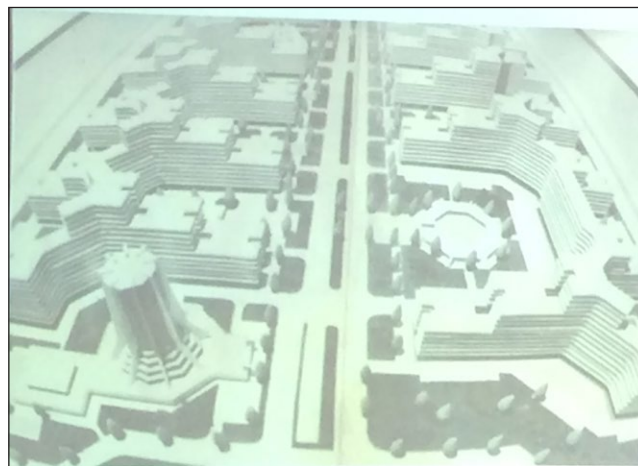Source: Mohamad Sedighi.

Figure 13: Initial housing proposal for East Ekbatan by Gruzen and Partners.
Source: Archive of the Ekbatan Redevelopment Company.

the early-1960s [52]. In contrast, living in high-rise flats was very popular among upper-income families, especially for those who preferred to live close to Tehran's centre [53]. Private investors and real-estate agencies were thus interested in developing multi-storey apartment – complete with luxurious facilities such as saunas and swimming pools – to attract rich Iranians and extract more surplus value from urban land. The residential complex of Behjat-Abad was a representative example of this market-led urbanism, as a group of high-rise towers erected in 1967 in downtown Tehran (**Figure 16**). As expected, the implementation of Tehran's masterplan from 1968 eased the involvement of private investors in the housing market, and the privatisation of urban land also contributed to an expansion of multi-storey blocks for privileged Iranians. As a result, numerous high-end projects like the Elisabeth skyscrapers (1968), Saman Towers (1969) and Kuh-e Nour complex (1970) were erected in Tehran.
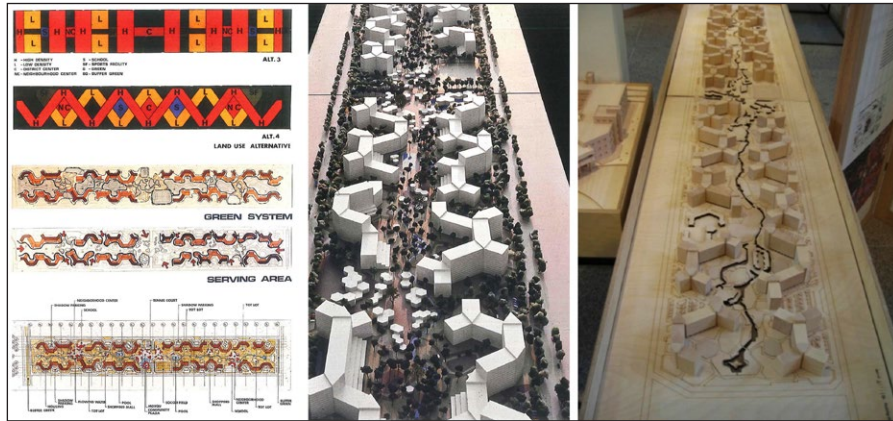
Figure 14: Concept diagram (left) and the initial plan of West Ekbatan (middle), plus the revised urban proposal (right).
Source: Kim Swoo Geun Foundation (left & middle). The right-hand photo was taken by Joonwoo Kim.

Figure 15: Four typical dwelling units in West-Ekbatan.
Source: Mohamad Sedighi.

Arguably, therefore, the Ekbatan scheme formed a synthesis between the Iranian government's housing ambitions and the market-led urbanism promoted by Gruen and Farmanfarmaian's masterplan. According to Iran's 'Fourth National Strategic Plan', the government was to be responsible to provide housing for blue-collar industrial workers and civil servants, mostly in Tehran [8]. Moreover, since all land within a city's boundaries, whether it was *Mavat* (undeveloped) or *Bayer* (unutilized), was now nationalised and in the possession of the government, this situation encouraged the construction of affordable housing in urban areas [54]. As a consequence, Iranian municipalities were to become responsible for providing urban facilities, while private developers would be the main agents for housing production. This might explain why the TRC granted urban sites in Tehran for free to the Starrett Housing Corporation, and in the agreement signed between Golzar and Benach, Starrett could ask lower- and middle-income applicants for a small down-payment fee, while selling a certain amount of apartments to upper-income Iranians in the free market [48]. It was a strategy that secured the developer's required capital return on its investment. In this sense, it is no surprise that Ektaban's layout included numerous luxurious amenities and leisure facilities, and that apartment sizes ranged from 50 up to 350 square metres, providing options to make the project attractive to and affordable for different social groups.

The urban structure of Ekbatan was also an early attempt to design self-contained residential megastructures for ordinary Iranians [45]. It certainly seems that its designers took inspiration from architectural models developed by the pioneers of megastructure movement, including Marcel Breuer, Paul Rudolph and Kenzo Tange. For many years, Peter Samton worked in Marcel Breuer's office, while Jorden Gruzen's role

Figure 16: Behjat-Abad residential complex in Tehran, 1967.
Source: *Honar va Memari* 5, no. 18–19 (1973): 103.

model was Paul Rudolph: the latter's Art and Architecture Building at Yale University was a main source of inspiration for Gruzen's works, such as Schomburg Plaza in New York [55]. It would explain why East Ekbatan resembles a combination of Breuer's and Rudolph's architectural language. Likewise, Kim Swoo Geun graduated under Kenzo Tange, and had a great interest in the architectural principles of Japan's Metabolist group [56]. This can be seen from Guen's early architectural projects where for instance he proposed plug-in capsules for a masterplan for Yeoudio, or incorporated idea of growing structure to design his model for the 1970–71 competition to design the Pompidou Centre in Paris.

To more fully understand these influences, Ekbatan's layout deserves further elaboration. Initially, Gruzen and Samton's proposal resembled Marcel Bruer's unrealised 1943 project for the Stuyvesant site in Lower Manhattan. Breuer's scheme was based on an assemblage of Y-shaped and 'Siamese' Y-shaped prefabricated high-rise blocks in a park-like setting that, according to Breuer, provided the most economic answer for accommodating New York's middle classes [57]. It seems that Gruzen and Partners regarded a modification of Breuer's design as the proper solution for the same target group in Tehran (**Figure 17**).

The Development Organisation for Ekbatan, however, rejected this proposal. According to Golzar, East Ekbatan needed a more coherent integration of public amenities and housing [58]. He made references to the traditional urban fabric of Iranian cities such as Isfahan, where the bazaar, as the main public space, interwoven with the structure of residential neighbourhoods. This could explain why, for their revised design, Gruzen and Samton proposed a strip-like, two-storey megastructure with a road and huge car-parking area beneath (**Figure 18**). This urban structure recalled Paul Rodolph's scheme for Lower Manhattan Expressway, where a gigantic underground transportation network formed a platform over which buildings were stretched among New York's existing urban fabric.

Gruzen and Samton's urban megastructure was more than just a commercial centre. This continuous linear structure, 1.5 kilometres long, was cut through at sharp angles to connect visually the residential slabs on both sides of the mega-complex. This in turn created a series of plazas as gathering places for pedestrians and as playgrounds for children. Around these plazas, Samton and Gruzen included a few urban amenities such as a cultural centre, mosque, bars, restaurants and workshops. It would help to stimulate outdoor activities and social encounter in these plazas, creating a bazaar-like urban structure for East Ekbatan. It also explains why Alexandra Staub highlighted their importance in creating a strong collective identity and sense of belonging among Ekbatan's residents [59].

Geun's housing model for West Ekbatan made clear reference to the works of the Metabolist group. Generally speaking, Metabolist architects emphasised the temporary nature of living units – as could be seen in the 'Ocean City' model of Kiyonori Kikutake, in which a permanent frame with plug-in modular
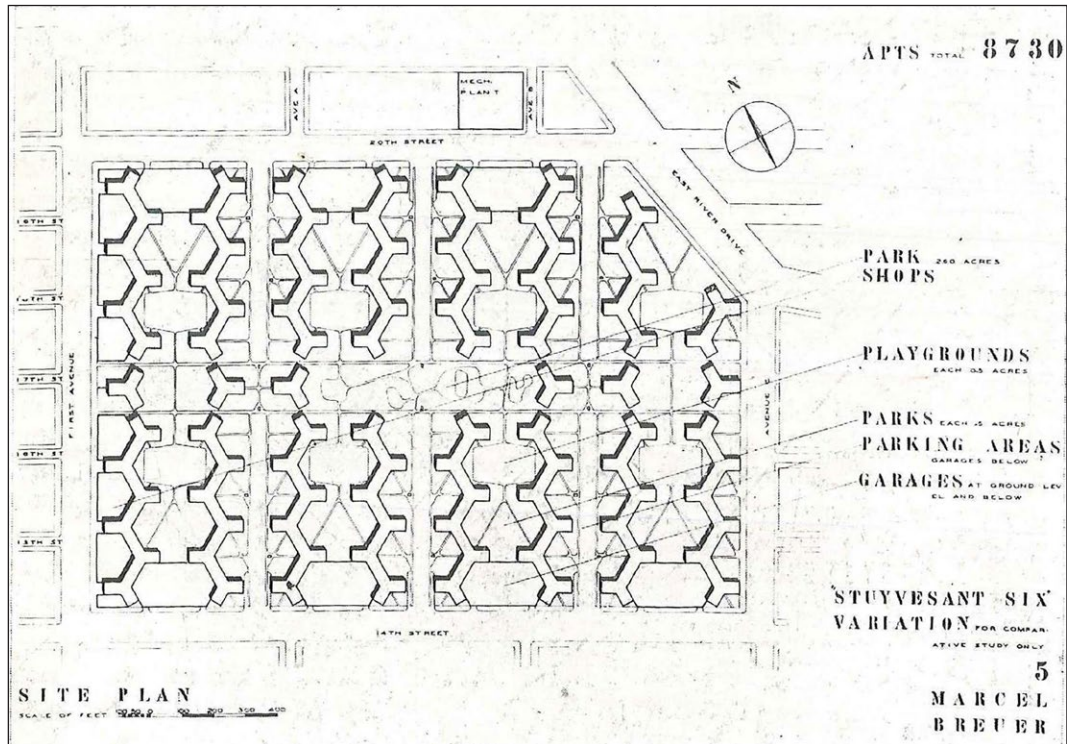
Figure 17: Marcel Breuer's urban proposal for Stuyvesant site in Lower Manhattan, 1943.
Source: *Honar va Memari* 4, no. 14 (1972): 18.

Figure 18: East-Ekbatan before (left) and after its completion (right).
Source: Left-hand image is from *Honar-e Memari*, no. 27 (2011): 117; right-hand picture is taken by
   Saeed Ghazi.

capsules enables growth and change within an urban fabric. Although these ideals mainly remained theo-
retical and were only tested in a few pilot projects such as the Nakagin Capsule Tower in Tokyo, they formed
the basis for the clustering of functionally functional spaces around shared common facilities [60]. This
concept can be traced in the projects like the Yamanashi Broadcasting and Press Centre in Kofu, and the
Shizuoka Press and Broadcasting Centre in Tokyo. In both projects, vertical shafts provided the main access
route and structural backbone, while the inserted elements were conceived as flexible capsules indepen-
dently arranged around the cores [60].

   Kim Swoo Geun's modular towers were, thus, based on two simple components: a vertical shaft and a
series of modular concrete cells with a proportion of 7.2 metres wide by 21.6 metres deep by 3.2 metres high,

and forming dwellings of between 60–300 square metres. The triangular-shaped core was constructed to accommodate staircases, lifts and such like. By stacking the cells on top of one another, Geun could create his 9- and 12-storey towers. He, then, clustered these towers in groups of three, and in the middle of each, placed a central core. Finally, by combining these towers into groups of three, four or five, Geun formed a series of semi-hexagonal slabs in various configurations (**Figure 19**). By enabling the clustering of living cells in all directions, and independently, Geun was hence able to add in an extra 2,000 units when the TRC increased the dwelling density for West Ekbatan. Interestingly, Geun's scheme recalls Habraken's notion of 'Support and Infill', whereby the permanent structure constituted a frame within which change could take place over time [61].

The role that Rahman Golzar and his Iranian architectural team performed in developing Ekbatan must also not be ignored, particularly in the considerable attention they paid to designing the public spaces. Their use of vernacular references helped to create a bazaar-like urban realm with a human scale that activated the public life of residents at ground level, with integral gardens and parks. It became an effective characteristic of Ekbatan's urban spaces, an aspect that Thomas Erdbrink, a Dutch journalist, described in his 2015 documentary movie about Iran as 'a peace of paradise within a concrete jungle' [62]. Ali Javan Forouzandeh and Ghasem Motallebi observe that these well organised public spaces and urban facilities are the most important indicators of neighbourhood attachment among the residents of Ekbatan, and that as such the project comprises a self-reliant district of Tehran [63].

Other design decisions by the TRC were also instrumental in creating a collective community. While part of Ekbatan's central zone was allocated for a hospital, subway station and motorway, much of this area was left empty for future development. This enabled the urban structure of Ekbatan to grow from within, accommodating new urban needs and facilities. Peter Rowe notes in *Modernity and Housing* that this characteristic testifies to an open-ended structure that provides 'a balance between self-determination on the part of prospective inhabitants and technical decision-making capable of exploring useful options' [64, p. 285]. Accordingly, the Development Organisation for Ekbatan in collaboration with the Municipality of Tehran were able to implement a subsequent redevelopment plan in 2008 that included new recreational facilities such as a golf course and rowing lake, so as to improve the district's urban quality and increase the real-estate value of its properties. Thus, it seems that this megastructure is still capable of responding to the socio-economic needs of Ekbatan's inhabitants.

Ekbatan also became an inspiring, popular place to live. While sharing architectural characteristics with 'failed' megastructure project such as Bijlmermeer in Amsterdam, Vele in Napoli, and Robin Hood Gardens in London, its dense yet green urban environment gained a reputation amongst Tehran's citizens. This can be seen in representational mediums such as social media, movies and artworks. For instance, the Facebook 'Ekbatan' group forms a platform where residents can share their old photos and memories. A spectacular movie, *Ekbatan* (2012), directed by the well-known Iranian novelist, Mehrshad Karkhani, depicted it as a peaceful and welcoming neighbourhood for artists and lovers. Artworks such as the photographic exhibition of Behnam Sedighi titled 'Ekbatan: West of Tehran' portray the district as a paradoxical place where well-designed greenery and public spaces contrast sharply with the Brutalist architecture of the residential slabs.
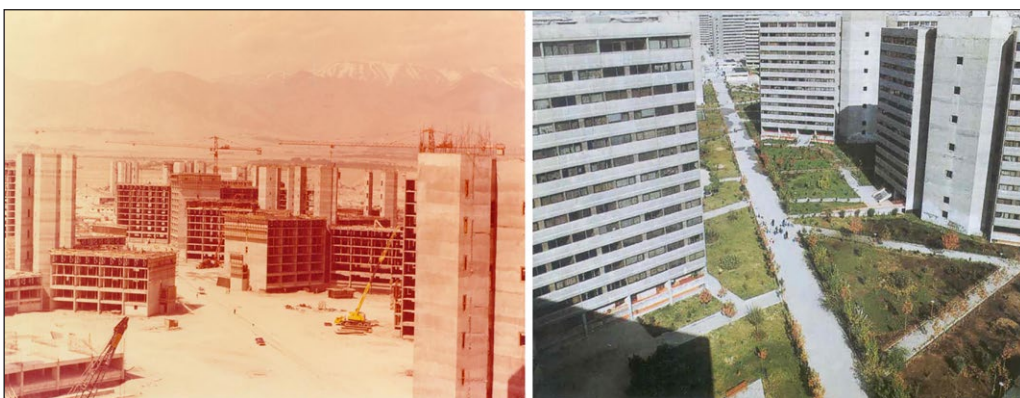

Figure 19: West-Ekbatan before (left) and after its completion (right).
Source: Archive of the Ekbatan Redevelopment Company.

Figure 20: Shahrak-e Omid (left-up), Shahrak-e Apadana (right-up), Shahrak-e Atisaz (left-bottom), and Shahrak-e Lavizan (right-bottom).
Source: Mohamad Sedighi.

Conclusion

The Shah's 'White Revolution' facilitated the expansion of the 1960s ideals of the urban megastructure in Tehran, thereby bringing internationalised Modernism to Iran. A tremendous increase in oil revenues enabled the Iranian government to involve Western architects and construction firms in development projects, creating transnational collaboration. Numerous urban projects were realised, among which the masterplan for Tehran by Victor Gruen and Abdolaziz Farmanfarmaian played a decisive role. In their proposal, particular emphasis was given to high-rise residential blocks using advanced construction technologies. This gave birth to the expansion of megastructure ideals in Tehran, after the model was declared 'dead' by Reyner Banham at the time of the 1973–74 'Oil Crises' in Western countries. Indeed, districts like Ekbatan were representative in that their urban layouts produced self-contained urban megastructures that simultaneously facilitated growth and change.

Ekbatan's design also created a demand for a 'minimum home' for Iranians. Smaller apartment units of between 50–70 square metres was very rare in a context where market-let urbanism pushed public and private developers into building larger dwellings for wealthier families. Instead, the smaller apartments related to the new need of an emerging social group, especially young professionals, entrepreneurs, couples, artists, students, and lower-income civil servants, all of whom were seeking affordable living units. In a situation where Tehran's masterplan was based upon a car-based lifestyle, a self-reliant neighbourhood like Ekbatan offered the great privilege of accessing all necessary urban facilities within a walkable distance – a condition that created a safer, car-free zone environment for residents and facilitated social encounters at ground level. Advanced structural techniques such as prefabricated concrete systems also contributed to create a positive mind-set among ordinary people, since they believed that Ekbatan's residential slabs would resist all kinds of seismic activity [65]. In relation to the rest of Tehran, these Modernist megastructures also formed a notion of the 'other', as the French existentialist philosopher, Jean-Paul Sartre, famously put it [66]. Indeed, this sense of otherness provided a peculiar distinction between the residents of Ekbatan and the general public, elsewhere.

Ekbatan's development also led to the expansion of industrialised housing production in Iran. Although the Starrett Corporation was guaranteed technocratic autonomy to build, the TRC also asked the company to train and involve local engineers and sub-contractors in the new construction processes. In so doing, the TRC aimed to localise these techniques, contributing to transfer technological knowledge to Iran. That is why Iranian contractors and engineers were able to complete Ekbatan even after the 1979 Iranian Islamic Revolution, when the USA government imposed sanctions on technological exchange. Representing a

decade of industrial progress in Iran, Ekbatan became a source of inspiration for subsequent state-led large-scale housing projects in Tehran, notably those at Shahrak-e Omid (1976–88), Shahrak-e Apadana (1977–90), Atisaz complex (1978–92), and Shahrak-e Lavizan (1979–85) (**Figure 20**).

Acknowledgements

Competing Interests

The author has no competing interests to declare.

Author Contribution

Seyed Mohamad Ali Sedighi graduated as an architect from TU Delft in 2009. Between 2010 and 2014, he worked as guest lecturer at and was co-founder of Architectonic-Group at the Iran University of Science and Technology (IUST). In 2013, he received an honourable mention certificate from the Ministry of Housing and Urban Development for his housing project in Abrisham Town, near Tehran. Since 2014, he has been carrying out PhD research related to the design of affordable housing in Iran: he also works as visiting tutor at the Chair of Architecture and Dwelling, TU Delft. Recently, he was awarded a MIT Grant (GAHTC) for his research proposal on 'The Architecture of Public Housing in the Cold War Middle East: The Example of Iran.'

References

1. **Harris, K.** Making and Unmaking of the Greater Middle East. *New Left Review*. 2016; (101), 5–34.
2. **Kennedy, JF.** Special Message to the Congress on Foreign Aid. *Public Papers*. 1961; 1(203): 205–206.
3. **Hoberek, A.** (Ed.). *The Cambridge Companion to John F. Kennedy*. New York, NY: Cambridge University Press; 2015. DOI: https://doi.org/10.1017/CCO9781107256699
4. **Latham, ME.** *Modernization as Ideology: American social science and 'nation building' in the Kennedy era*. Chapel Hill, NC: University of North Carolina Press; 2000.
5. **The Office of the Federal Register.** *Public Papers of the Presidents of the United States: John F. Kennedy. 1962*. Washington D.C.: United States Government Printing Office; 1962.
6. **Matin, K.** *Recasting Iranian modernity: International relations and social change*. London: Routledge; 2013.
7. **Ansari, AM.** The Myth of the White Revolution: Mohammad Reza Shah, 'Modernization' and the Consolidation of Power. *Middle Eastern Studies*. 2001; 37(3): 1–24. DOI: https://doi.org/10.1080/714004408
8. **Abdi, MA, Mehdizadegan, S** and **Kordi, F.** *Six Decades of Housing Planning in Iran (1948-2008)*. Tehran: BHRC Publications; 2011.
9. **Gruen, V** and **Farmanfarmaian, A.** *The Comprehensive Plan of Tehran: the General Ideas and Schemes*. (351). Tehran: The Planning and Finance Organisation; 1968.
10. **Habibi, SM.** *Sharh-e Jaryan-haye Fekri Memari va Shahrsazi dar Iran Moaser*. Tehran: Daftar-e Pajhuhesh-haye Farhangi; 2006.
11. **Wakeman, R.** *Practising Utopia: An Intellectual History of the New Town Movement*. Chicago, IL and London: University of Chicago Press; 2016. DOI: https://doi.org/10.7208/chicago/9780226346175.001.0001
12. **Vidler, A.** *Histories of the Immediate Present: Inventing Architectural Modernism*. Cambridge, MA: MIT Press; 2008.
13. **Banham, R.** *Megastructure: Urban futures of the recent past*. London: Thames and Hudson; 1976.
14. **Gottmann, J.** Megalopolis or the Urbanization of the Northeastern Seaboard. *Economic Geography*, 1957; 33(3): 189–200. DOI: https://doi.org/10.2307/142307
15. **Kawazoe, N.** *Metabolism: the proposals for new urbanism*. Fukuseibon (ed.). Tokyo: Mori Bijutsukan; 2011.
16. **Lin, Z-J.** From Megastructure to Megalopolis: Formation and Transformation of Mega-projects in Tokyo Bay. *Journal of Urban Design*. 2007; 12(1): 73–92. DOI: https://doi.org/10.1080/13574800601072442
17. **Merin, G.** *AD Classics: The Plug-In City/Peter Cook, Archigram*. 10 July 2013; Retrieved from: https://www.archdaily.com/399329/ad-classics-the-plug-in-city-peter-cook-archigram.

18. **Ley, Svd** and **Richter, M.** *Megastructure reloaded: visionäre Stadtentwürfe der Sechzigerjahre reflektiert von zeitgenössischen Künstlern.* Ostfildern: Hatje Cantz; 2008.

19. **Maruhn, J.** Le Corbusier and his revolutionary childeren: from the ville radieuse to new babylon. In: Ley, Svd and Richter, M (eds.), *Megastructure reloaded: visionäre Stadtentwürfe der Sechzigerjahre reflektiert von zeitgenössischen Künstlern.* 2008; Ostfildern: Hatje Cantz.

20. **Maki, F.** *Investigations in collective form.* St Louis, MI: Washington University; 1964.

21. **Wilcoxen, R.** *A Short Bibliography on Megastructures.* (Vol. 66). Monticello, VA: Council of Planning Librarians; 1968.

22. **van Stiphout, W.** The Saddest City in the World: Tehran and the legacy of an American dream of modern town planning. *The New Town.* 2 March 2006.

23. **Emami, F.** Urbanism of Grandiosity: Planning a New Urban Centre for Tehran (1973-76). *International Journal of Islamic Architecture.* 2014; 3(1): 69–102. DOI: https://doi.org/10.1386/ijia.3.1.69_1

24. **Summitt, AR.** For a White Revolution: John F. Kennedy and the Shah of Iran. *The Middle East Journal.* 2004; 58(4): 560–575. DOI: https://doi.org/10.3751/58.4.12

25. **Hein, C** and **Sedighi, M.** Iran's Global Petroleumscape: The Role of Oil in Shaping Khuzestan and Tehran. *Architectural Theory Review.* 2017; 21(3): 349–374. DOI: https://doi.org/10.1080/13264826.2018.1379110

26. **Mumford, EP.** *The CIAM Discourse on Urbanism, 1928-1960.* Cambridge, MA and London: The MIT Press; 2000.

27. **Milani, MM.** *The Making of Iran's Islamic Revolution: From Monarchy to Islamic Republic.* Colorado: Westview Press; 1994.

28. **Abrahamian, E.** *A History of Modern Iran.* Cambridge: Cambridge University Press; 2008. DOI: https://doi.org/10.1017/CBO9780511984402

29. **Pahlavi, MR** and **Pahlavi, A.** *Toward the Great Civilization: A Dream Revisited.* London: Satrap Publishing; 1994.

30. **Bavar, C.** *Negahi be Peydayeshe Memarie Nou dar Iran.* Tehran: Nashr-e Faza; 2010.

31. **Eshragh, A.** *Honar va Memari, Nokhostin Majaleh Elmi be do Zaban dar Iran/Interviewer: A. Tabibzadeh.* 2012, 25 November. Memarnet, https://memarnet.com/en/node/737.

32. **Bakhtiar, L** and **Farhad, L.** *The Interaction of Tradition and Technology: Report of the Proceedings of the First International Congress of Architects, Isfahan, 1970.* Tehran: Ministry of Housing and Development of the Imperial Government of Iran; 1970.

33. **Eshragh, A.** International Congress of Architects, Isfahan Sepember. 1970. Honar va Memari, 1971; 3(6–7): 1–34.

34. **Madanipour, A.** *Tehran: the making of a metropolis.* Chichester: John Wiley; 1998.

35. **Gruen, V.** *The heart of our cities: the urban crisis: diagnosis and cure.* New York, NY: Simon and Schuster; 1964.

36. **Hardwick, MJ** and **Gruen, V.** *Mall maker: Victor Gruen, architect of an American dream.* Philadelphia, PA: University of Pennsylvania Press; 2004.

37. **A Break-Through for Two-Level Shopping Centers.** *Architectural Forum.* December 1956; 105: 117–136.

38. **Cook, JW, Klotz, H** and **Johnson, P.** *Conversations with Architects: Philip Johnson, Kevin Roche, Paul Rudolph, Bertrand Goldberg, Morris Lapidus, Louis Kahn, Charles Moore, Robert Venturi & Denise Scott Brown.* London: Lund Humphries; 1973.

39. **Special Issue on the Master Plan of Tehran.** *Honar va Memari.* 1970; 3(5), 4–102.

40. **Gruen, V** and **Farmanfarmaian, A.** *The Comprehensive Plan of Tehran: Review and Evaluation.* (232). Tehran: The Planning and Finance Organisation; 1970.

41. **Karimi, P.** *Domesticity and Consumer Culture in Iran Interior Revolutions of the Modern Era.* London and New York, NY: Routledge; 2013.

42. **Doxiadis Associates.** *Five-Year National Development Programme for Housing and Related Facilities.* Retrieved from Tehran; 1972.

43. **Ekbatan Redevelopment Company.** *Shahrak-e Ekbatan.* Retrieved from Tehran; 1993.

44. **Gruzen, J** and **Samton, P.** *Loyal Partners, Loyal Donors/Interviewer: S. Hatch.* (Vol 78), Plan; 2009. https://sap.mit.edu/article/alumni-profile/peter-samton-barch57-and-jordan-gruzen-barch57.

45. **Barron, J.** American Architects in Iran Saw Gigantic Projects Fade Away. *The New York Times.* 1979, 9 September, p. 1.

46. **Mapp, W.** *The Iran-United States Claims Tribunal: the first ten years, 1981-1991: an assessment of the tribunal's jurisprudence and its contribution to international arbitration.* Manchester and New York: Manchester University Press; 1993.

47. **Blair, G.** *The Trumps: Three generations of builders and a presidential candidate.* New York, NY: Simon & Schuster Paperbacks; 2015.

48. **Pogany, R.** *Iran-U.S. Claims Tribunal Reports.* (Vol. 28). Cambridge: Cambridge University Press; 1996.

49. **Habibi, R.** *Modern Mass Housing in Tehran: Episodes of Urbanism 1945-1979.* (PhD), KU Leuven, Leuven; 2015.

50. **Marbaghi, B.** *Shahrak-e Ekbatan: Madaniyat Moaser Memari Iran.* Tehran: Payam; 2018.

51. **Habibi, SM.** *Az Shar ta Shahr: Tahlili Tarikhi az Mafhume Shahr va Simaye Kalbudie an Tafakkor va Taassor.* Tehran: University of Tehran Press; 1999.

52. **Eshragh, AH.** Sakhteman-haye Bank-e Rahni Iran. [The housing projects constructed by Bank-e Rahni]. *Honar va Memari.* 1971; 3(10–11): 109–124.

53. **Feniger, N** and **Kallus, R.** Israeli planning in the Shah's Iran: a forgotten episode. *Planning Perspectives.* 2015; 30(2): 231–251. DOI: https://doi.org/10.1080/02665433.2014.933677

54. **Helgeson, E** and **Lauterpacht, E.** *Iran-U.S. Claims Tribunal Reports.* (Vol. 29). Cambridge: Cambridge University Press; 2000.

55. **Bloom, ND, Lasner, MG** and **Schalliol, D.** *Affordable housing in New York: The people, places, and policies that transformed a city.* Princeton, NJ: Princeton University Press; 2016.

56. **Geun, KS** and **Hyungmin, P.** *Dense modernities: Kim Swoo Geun Korea's architect for the Twentieth Century.* Berlin: Aedes; 2011.

57. **Plunz, R.** *A history of housing in New York City: Dwelling type and social change in the American metropolis.* New York, NY: Columbia University Press; 1990.

58. **Habibi, R.** The Domesticated Shopping Mall in Modern Tehran: The 1975 (Re)Development of Ekbatan. *Paper presented at the The Shopping Centre, 1943–2013: the Rise and Demise of a Ubiquitous Collective Architecture,* Delft; 2014.

59. **Staub, A.** *Conflicted identities: Housing and the politics of cultural representation.* Basingstoke: Taylor and Francis; 2015

60. **Steele, J.** *Contemporary Japanese Architecture: Tracing the Next Generation.* Florence: Taylor and Francis; 2017.

61. **Habraken, NJ** and **Valkenburg, B.** *Supports: An alternative to mass housing.* London: Urban International Press; 1999.

62. **Erdbrink, T (Writer)** and **van Broekhoven, R. (Director).** Het land waar niks mag maar alles kan. In N. Frints (Producer), *Onze man in Tehran.* The Netherlands: nop; 2015.

63. **Javan Forouzandeh, A** and **Motallebi, G.** The role of open spaces in neighborhood attachment. Case study: Ekbatan Town in Tehran Metropolis. *International Journal of Architecture and Urban Development,* 2012; 1(3): 11–20.

64. **Rowe, PG.** *Modernity and Housing.* Cambridge, MA and London: MIT Press; 1993.

65. **Fallahi, A** and **Khodabandeh loo, A.** Barnamerizi moghabele ba zelzeleh dar mojtama haye maskuni shahri: nemuneh motaleati, faze 1 shahrak-e ekbatan. [Earthquake Counteraction Planning in Urban Residential Complexes: Case Study, Ekbatan Phase 1]. *Nameh Memari va Shahrsazi,* 2011; 3(6): 103–121.

66. **Sartre, J-P.** *Being and Nothingness: An Essay on Phenomenological Ontology.* London: Taylor and Francis; 2015.