

## Guidelines of urban squares' formal designing with an emphasis on the visual aspects

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### ABSTRACT

*Urban squares are the most important urban spaces that are considered as parts of the urban culture and civilization due to their possession of a rich memorial load. Squares are the grounds of the social interaction and life and serve diverse and flexible functions. Visual aspects are the most important factors influencing the perception, legibility and memorability of space. Visual beauty brings about an increase in the presence in the square's urban spaces and results in the formation of adventurous events; persistence of the visual aspects of the space causes enhancement of the nonvisual aspects therein. The present study uses a library research method and investigates the formal and visual perspectives of the thinkers towards square and comparatively studies two successful experiences, namely Isfahan's Naghsh-e-Jahan Square and Rome's Campidoglio Square, and, eventually, extracts the aesthetical evaluation principles and indices. Then, using a descriptive-analytical method, these indicators are investigated for a case study, i.e. Tupkhaneh Square. Tupkhaneh Square has been situated in district 12 of Tehran and it has always been accompanied by a lot of morphological changes in the course of time. This historical square has been the locus of various events and incidents in various historical epochs. In the end, the morphological evolution trend of the square and its bodies' forms in the current status are investigated to come up with a guideline for the formal design of square within the format of strategies and solutions in line with restoring the valuable lost spatial qualities.*

*Keywords: urban space, square, morphological changes, visual aspects, Tupkhaneh Square*

### Introduction

Squares' role in the formation and coherence of the urban complexes is of a great importance. A review of the historical trend of the squares' formation in the course of history makes it clear that the square has been the place of gathering, policy-making and spending of the leisure times and it has been transformed through space-building and precinct-development into a place for relaxation, tranquility and exchange of views about the daily issues of the time. In the developing countries and cities, urban squares are losing their physical and visual qualities with the expansion of technology and development of the transportation system and this has in the meanwhile made them lose their primary function [1]. The squares have been

afflicted with difficulties in meeting the human needs with the rapid growth of urbanization and industrialization. The aesthetical investigation of the square is considered as an important matter.

Since the time of Plato up to the past four hundred years, i.e. from about 2500 years ago until now, there are numerous theories written about square and they have been subjected to changes and perfections within 25 centuries [2].

Beauty is used as an all-inclusive word for both the perception of the artistic works and also for the perception of the environment. In fact, environmental aesthetics include the experiencing, perceiving and feeling of the environment by senses in part. As a pervasive system of (human) perceptions, the environmental perception includes factors of this kind: space, volume, mass, dislocation, color, light, scent, sound, touch, movement, pattern, order and meaning. Environmental aesthetics includes the investigation of the experiences of the environmental perception based on inherent and direct value of the cognitive-perceptual aspect [3].

Absence of aesthetical quality in the form and shape of the urban spaces is followed by many problems for the users, including psychological diseases, visual pollution and weak legibility and weak imaginability in the urban environment. Aesthetics is amongst the other branches of the science such as psychology, sociology, marketing and anthropology [4]. This research tries offering appropriate solutions in line with returning the aesthetical principles to the squares.

### **Theoretical Foundations**

#### **Square as an Urban Space**

“Public urban spaces” should be places for “social interaction” and “collective life” and they can be grounds for the development and formation of the “individual” and “social” identity [5]. As believed by Habermas, amongst the most important notable properties of the urban spaces is their exemption of power for they are spaces to which all the citizens from various social classes have access [6]. Urban spaces are part of the open and public spaces in the cities and they are somehow the recrystallizations of the collective life. The essential condition for a public space to be considered as an urban space is that social interaction and communication should occur therein. It is a space wherein there are opportunities for the breaking through some of the social borders and the occurrence of the previously non-codified contacts and the mixing of the individuals in the social environment [7]. All of the spaces between the buildings in the cities can be envisioned as the external spaces or the social spaces of the city. The urban spaces should be able to respond to the human needs. The essential properties of the urban spaces should be in match with the essential needs of the users such as comfortability, convenience and active or passive participation of them [8].

In the entire course of the history, squares have been places wherein the city residents could meet each other, rest and refresh and share their needs with others. Square is a concept that has been pioneering not only in the today’s world but also in the various historical epochs [8]. Squares have been defined as spaces that constantly limited with enclosed environments. In the end of the 19<sup>th</sup> century, square was changed in its meaning as a spatial opening between the buildings. Squares came about when the residential units in the periphery of an open space gathered around again. This type of spatial arrangement not only provides the possibility of controlling the interior space to a notable degree but it also supplies the possibility of its protection against the external factors, as well [9]. For centuries, urban squares were amongst the most important public spaces in the cities. Like urban spaces, urban squares are considered amongst the notable architectural elements in comparison to their peripheral structures [8].

Square, A Ground for Social Interactions:

In Dehkhoda Dictionary, square has been defined as “a wide and open area surrounded by houses or shops”; it realizes this word as being originally Persian but mistakenly pluralized based on Arabic grammatical rules [10]. In all of the languages, a word has been considered for this concept; Greeks call it Agora; Romans name it Forum; Italians call it Plaza /Piazza/ and Hispanics call it Plaza and Germans name it Platz [8]. Plaza has been defined as a public and open space the floor of which has been covered with hard materials and the automobiles cannot enter it and it is substantially a place for walking, refreshing, sitting, eating, drinking and sight-seeing [11].

Vitruvius asserts that the urban square should be directly designed in proportion to the population living in the immediate city meaning that it should not be very small that it cannot be usable and it should not be simultaneously so big that the people get lost therein [8]. Schultz realizes the square as the distinct and notable element in the city structure and also as a well-defined space readily imaginable and providing a goal for movement [12]. According to Schultz, square is viewed as a notable element in the urban texture and also as an urban space with well-defined borders and it is possible for it to be easily imagined [8]. From the viewpoint of Lynch in the book *urban visage*, knot is the focal point of a great importance in the cities and it is usually created in the intersection points of the roads and/or in the meeting place of a group of properties and the onlookers can find a way into it. Squares are amongst the urban knots that play an important role in the creation of a mental image of the city in the people's minds. Rob Career knows square as the product of the houses' gathering around an open space [13].

Tavassoli and Bonyadi introduce square as a space playing the role of gathering the houses, urban elements and neighborhood constituents around a pivotal point [14]. Soltanzadeh realizes square as an open and vast space featuring an enclosed or a more or less demarcated area on the road sides or in their intersections and serving communicational, social, business, sport, military functions or a combination of several functions [15]. According to Pakzad, squares are amongst the urban spaces exerting the highest effect on the citizens' mentality to the extent that the easy way of recognizing the various urban places and also the simplest way of guiding the strangers towards an address is navigating them through the squares as the index urban points. The important attributes of the urban knots is their residence, cumulateness [welcoming people] and integration [16]. Powel Zucker defines square as a psychological station in the public space in his book of "the city and its square". He categorizes squares in five various groups, namely 1) closed square; 2) square dominating over an architectural element; 3) nuclear square; 4) amorphous square; and, 5) grouped square.

Davis realizes the urban square or plaza as an open and big urban space that is often connected to a magnificent building and surrounded by pavement or vegetative cover. As a public space, plaza is most often covered on its floor by hard materials and the vehicles are not allowed to enter it; it is substantially a space for walking, sitting, resting, eating and drinking and sight-seeing [17]. Squares host activities that make people gather around in an urban life and they are considered as the most important instruments of social communication and interaction. The urban squares are of a considerable importance and play an important role in the continuation and development of social life through facilities they provide [18]. Kala'ei and Amiri realize the character of square as being historically associated with certain past histories, elements and memories of the past events and know it as a common memory of the citizens. Square is a chance for resting, thinking and reflection on the visual grounds and it reminds of memories and supplies the senses of seeing and being seen; it is a place for holding political gatherings and it is specifically referred to as a place wherein everything can be done [19].

### **Square's Visual Beauty**

The Persian term *Ziba'ei* [beauty] is the gerund form of beautiful and it means pleasantness, attractiveness and gracefulness. *Sokhan Dictionary* has offered a relatively precise definition for beauty and defines it as a state existent in a beautiful person or object. In *Dekhoda Dictionary*, the term "Ziba" made of "Zib+a" is a participle meaning beautiful and it has also been defined as an equivalent for good and pleasant and an opposite for ugly and bad. *Mo'ain Dictionary* has also offered words like handsome, pretty, good-looking and charming as equivalents for this term. The Persian term "Ziba" is equivalent in English to beauty and words like prettiness, good-looking, comeliness, alluringness and attractiveness have been presented as its synonyms. As opined by Robert Kwon (2005), beauty is a quality that leads to aesthetical pleasure. Cuthbert defines beauty in more vivid terms as a combination of qualities like form, color or shape that cause satisfaction of the aesthetical senses, especially vision.

The Persian term "*Ziba'eishenasi*" or the Arabic term "*Elm Al-Jamal*" (as commonly held in Persian language) are equivalent in English to aesthetics which speaks of a special philosophical system the task of which is exploring in the meaning of the beauty and recognition of this phenomenon's nuances [20].

Bertos (1996) believes that the term “aesthetics” is interpreted as being equivalent to a concept meaning “perception”. The term “aesthetics” was first presented in a writing by Baumgarten (1750) who is known as the father of the modern aesthetics. In Baumgarten’s definition of aesthetics, it has been introduced as a science that includes feelings and perception [4]. Citing Fuller, Kwon writes that “when I am solving a problem, I never think of beauty and my only concern is solving it but, when I am done, I will find out that my solution has not been correct when it is not beautiful” [21].

Based on Plato and Kant’s theories, Hegel believed in two kinds of beauty: 1) natural beauty and 2) artistic beauty. He realized artistic beauty as being more superior for such a reason that he considered it as the rebirth of the natural beauty in the form of an artistic beauty (of soul). He does not believe in the inheritability and instinctiveness of the artistic beauty’s perception rather he realizes it as being more of an acquirable nature and considers this type of beauty as being more taste-based [22].

In a classification, John Lang enumerates three general sets for aesthetical studies: formal aesthetics, sensory aesthetics and symbolic aesthetics. The formal aesthetics is laid on the foundation of the environment’s visual structure. The behavioral researches and sciences’ attention in the elaboration of the environmental designing theory is more directed at the environment’s internal and external visual and combined or geometrical properties that are created by the senses-felt order of the components in terms of shapes, rhythms and combinations [2]. Sensory aesthetics is the product of pleasing senses like touching, smelling, tasting, hearing and walking. Sensory aesthetics is directed at colors, odors, sounds and textures existing in the environment. Symbolic aesthetics means the environment’s association with a mental image and its pleasantness it is directed at the concepts induced by the environment and making it meaningful and pleasant for the people. In fact, environment is a system of symbols that grant real expression to concepts, values, meanings and things of the like. In this regard, symbolism is the primary factor of liking or disliking an environment [2].

Generally, there are two approaches to the evaluation of the urban environment’s beauty: the first is the objective approach that realizes beauty as being latent in the essence of the landscape. This approach is mostly applied by the architectural and urban engineering experts based on certain previously determined regulations and the landscapes created based on the general aesthetical regulations are believed to be perceived as beautiful landscapes by the people. The basis and essence of this set of theories can be sought in the thoughts of the ancient Greece’s philosophers like Plato and Aristotle [23]. This theory has been used in the course of history by different individuals amongst the most outstanding of them Greuther (1987) can be pointed out in the area of architecture and urban engineering. Moreover, many designers have endeavored to make the urban landscapes be built based on rules like balance, clarity, paradox, coordination, integration, proportion and diversity [24].

The second approach is laid on the foundation of mentality and it ascribes the perception of a space’s beauty to an individual’s mind and the individual-related factors [25] such as the personality of the observer, viewpoint, social-economic-economic properties of the onlookers, configuration and complexity of the landscape [26] all of which are allowed to get involved in the evaluations so that a beautiful or ugly landscape can be created based on the individual’s mentality. The premises of this theory can be observed in the theories and ideas by Kant who believed that the beauty is a subject depending on the mind perceiving and judging it and not on the subject itself [27].

Jak Nasar (1994) and John Lang (1998) divide the aesthetical qualities into two groups for discovering the essence of the aesthetical designing: formic and semantic qualities. The study of the form’s composition is termed formic aesthetics and the study of the spectators’ reactions to the content of the constructed environment is called symbolic aesthetical form [28].

Since the present study intends to deal with the objective or formic aesthetics, the following table (1) gives the formic aesthetical indices from the perspective of the thinkers.

**Table 1: principles of formal designing of the urban spaces with an emphasis on the aesthetics from the perspective of the thinkers**

Thinker	Year	Principles of the formal designing of urban spaces with an emphasis on aesthetics
Camillo Sitte	1889	Visual focus, arrangement of a favorable space, closedness, composition
Alexander et al	1980	Density in space, defined border and shape
Lynch	1981	Clarity, continuation, domination, form's simplicity, vividness, connection, awareness of motion, time series
Bentley et al	1985	Permeability, diversity, legibility, visual proportions, color, attachment
Kaplan et al	1989	Legibility, mysteriousness, coherence, complexity
Rapoport	1990	Closeness and narrowness, complex shapes, strong jointing of the surfaces and confining of the elements
Moughtin	1992	Symmetry, scale, proportion, order, unity, balance, rhythm, paradox, harmony
Jak Nasar	1994	Rhythm, scale, complexity, color, shape, proportion, shading, order, hierarchy, spatial communication, incongruence, ambiguity, wonderfulness and newness
Yan Gehl	1996	Size, shape, communications, status of the elements in spaces and designing of the elements' details
Smith et al	1997	Pattern, rhythm, harmony, balance, communication, mobility, liveliness, personification, diversity and freedom
Lawson	2001	Feeling and perception, size and distance, scale and spatial order, background and foreground, verticality, symmetry, color, meaning, ground, zone of comfort
Thomas	2002	Shape, color, materials, texture, size, height and details
Kim	2006	Balance, emphasis, pattern, proportion, movement, harmony, diversity
Graves	1941	
Burton and Mitchell	2006	Legibility, comfortability, security, familiarity, distinction, capability (acceptability)
Weber et al	2008	Symmetry, homogeneity, scale and formic identicalness
Bostanci and Ocaççi	2011	Harmony, diversity and clarity
Reed	2011	Form, line, color and texture
Kalayi and Amiri	2016	Hosting the urban activities, instrument of social communication and interaction, having an important role in the continuation and development of social life
Davis, cited in Molavi, Seyedabadi et al	2017	Surrounded by the pavement or vegetative cover, prohibition of the vehicles' entry, a space for walking, sitting, resting, eating, drinking and sight-seeing
Erkin and Corbaci	2017	In relation to the special historical records, elements and memories of the past events, shared memory of the citizens, a chance for resting, thinking and remembering the memories, supply of the senses of seeing and being seen, a place for holding political gathering

### Successful Examples of Iran and the World

In this section, we deal with the investigation of Naghsh-e-Jahan Square in Isfahan as a successful Iranian example and the admired Campidoglio Square in Rome. After investigating and analyzing them, the extracted designing principles and the executive policies applied in each sample will be summarized within the format of table (2).

#### Naghsh-e-Jahan Square

Naghsh-e-Jahan Square is the only substantial urban space that has been left relatively intact and it is the only example that can be discussed as a sample of the urban space in urban scale. Although Naghsh-e-Jahan square is very vast due to its functioning and some realize this square as boundless due to its huge vastness, the existence of the above-lying arched roofs blocks the view and the external landscape and the observers' view field is limited in the square's precinct only to the square. This issue causes the observers' attention to be directed more than anything else to the dome and minarets of Masjid-e-Shah, Aali Qapou palace's porch and dome of the Sheikh Lotfollah Mosque (the visual elements of the square). The tree rows around the square are also effective in the limiting of the field of vision to some extent.

The perpendicular and oblique corners are amongst the properties seen in the façade and plan of the square. Rectangular geometry is amongst the characteristics of this square which is 150×500 in dimensions and its proportions are one to three. This geometry has also been repeated in the fountain, gardens and tree rows, as well, and it is also even seen in the arrangement of the artificial elements (like Chogan gates in the longitudinal axis of Naghsh-e-Jahan Square).

Emphasis on the symmetry axes and balance is vividly visible in the plans and facades. This emphasis is often violating the uniform rhythm of the architectural elements' repetition and symbolizes a sort of paradox and diversity and contrast in the façade and it contributes to the better legibility and perception of the space; it can be envisaged as a manifestation of melodiousness of the Iranian architecture. In this square, Imam and Sheikh Lotfollah Mosques, Aali Qapu Edifice and Qaisariyeh entry gate emphasize on the symmetry axes. Although the square's transversal axis is not superimposed on the overall symmetry axis, it induces the observers with a sort of visual balance. Besides the contrastive forms, the concentration of the tilework decorations on the transom of Imam and Sheikh Lotfollah Mosques as well as more sporadic tilework ornamentations of Aali Qapu Edifice and the transom of Qaisariyeh gate manifest paradox and emphasis in the method of the constructional materials' placement.

The indentations and the continuation of the walls to the points of the routes' connection to the square, the porches overlooking the square and the stretches along the consecutive roofs all embody the spatial cohesion that generally leads to the formation of a unit whole.

### **Campidoglio Square**

Campidoglio Square in Rome was designed by Michelangelo (1464-1575), the famous Italian sculptor, painter and poet, and it is enumerated amongst the most outstanding urban designing artworks of the world [14]. Capitol Hill which is the most well-known hill amongst the seven hills of Rome has been the base of Senate (ancient Rome's governing body) and the first religious place of the city. Firstly the market and, then, the governing body's base were transferred from Holy Forum to Capitol following the destruction of the city's ancient buildings since the eighth to twelfth century and it was in this way that Capitol was transformed to the political center of Medieval Rome [29]. Once being considered as the spiritual and political manifestation of Rome, this ancient hill was converted to the symbol of the Rome's power during the reign of the Popes.

Campidoglio Square's designing is essentially laid on an axis that, as put by Edmund Bacon, has to be considered as a forced line, i.e. the line that acts like an effective and determinant factor. Gideon states that this axis was later on studied by the French who called it the mother axis and it became the essence of the 18<sup>th</sup> century's urban designing backbone [14].

By the assistance of a voluntary action, Michelangelo created a forced vector on the axis of Palazzo Del Senatore; this vector was subsequently considered as an organizer that transforms chaos and confusion into order. He considered the statue of Marcus Aurelius as the central and guiding point and an ordering factor for the whole complex. Doing so enabled the stabilization of the general idea and the completion of the Palazzo Del Senatore's stairway and the establishment of Marcus Aurelius statue caused the creation of a relationship on this confused ground between two architectural elements in the space.

Michelangelo placed the third building, i.e. the new Capitoline Museum, in front of the Senatore Palace and Municipality Palace with its backside facing the Church. This museum was designed with the same angle as it has been situated to Municipality Palace to Senatore Palace, i.e. in an 80-degree angle, in such a way that a trapezoidal space was formed between the three buildings [14].

Michelangelo designed Capitoline Museum and used the body composition of this museum as the essence of changing and redesigning the Senatore and Municipality Palaces. In Senatore Palace, the ground floor was transformed into a strong, heavy and simple foundation with the addition of symmetrical stairways and the two upper floors were connected with rectangular Corinthian pilasters. These pilasters became the primary elements regulating and reordering the facades of both of the palaces. The main building of the municipality palace was kept and, in order to create unity in the bodies, a columned portico was added thereto and a new tower was designed to be replaced for the asymmetrical medieval tower and the facades were given unity in their forms through the blending of the horizontal and vertical elements.

One of the most important aspects of Campidoglio is the style of the land designing and, in fact, the land's modulation is one of the greatest features of Campidoglio's composition. It has not been possible to obtain unity, cohesion and coherence in this plan without the oval form in the middle of the square and the asteroid 2D shape of its surface are as well as the 3D stretching of its periphery [29].

**Table 2: Designing principles and executive policies drawn on the analysis of Naghsh-e-Jahan and Campidoglio Squares**

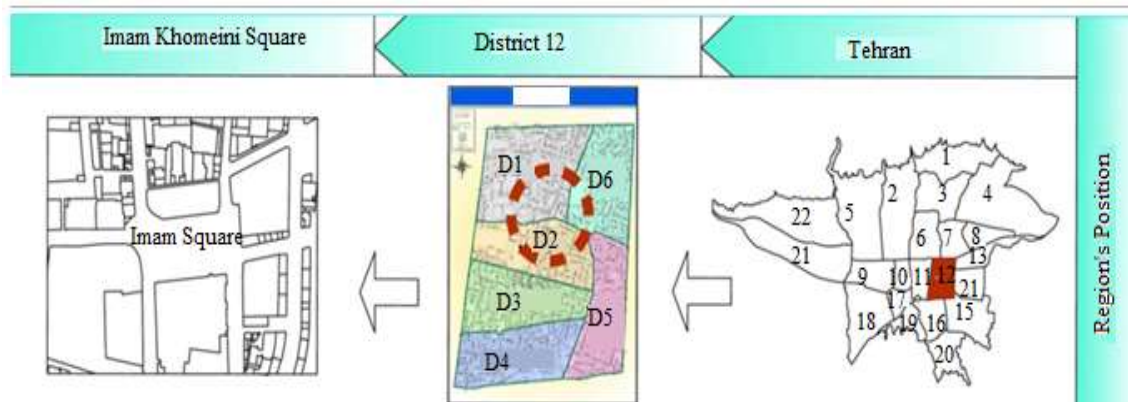
Successful examples	Designing principles	Executive policy
Naghsh-e-Jahan Square	Order	Existence of rhythm and repetition in the walls and specific and defined shape and geometry in the plan and the façade
	Spatial unity	Existence of cohesion in the floor; existence of cohesion in the walls, repetition of forms (arcade in the wall)
	Symmetry	Placement of the outstanding elements of Sheikh Lotfollah and Imam Mosques, Qaisariyeh Gate's transom, Aali Qapu Palace on the symmetry axis of the walls
	Balance	Creation of emphasis on the walls through placing outstanding elements in every wall
	Continuity	Continuation of the walls in the roads' connection points, porches overlooking the square, stretching of the consecutive roofs
	Closedness	Cohesion in the wall, rows of trees around the square
Campidoglio Square	Spatial unity	Cohesion in floor, oval form in the middle of the square and a 2D asteroid shape of its surface area, siting the new Capitoline Museum with the same angel of Municipality Palace to Senatore Palace, creation of well-defined (trapezoidal) shape for the square's space, redesigning of the facades through a combination of the vertical and horizontal elements and use of coordinated forms in their designing
	Closedness	Creation of cohesion in the body via redesigning the façade in the form of consecutive roofs; defining the western body of the square (establishment of the new building of Capitoline Museum) and creation of a well-defined shape for the square
	Balance	Redesigning of the square's walls and use of a balanced composition for the façade's designing, establishment of the new Capitoline Museum led to the balancing of the mass to space ratio in the square's periphery
	Order	Integrated flooring in the whole space of the square, establishment of Marcus Aurelius Statue in the center for creating centrality and order Designing the new tower in Senatore Palace in a symmetrical form in the body; use of the Municipality Palace's establishment angle in respect to Senatore Palace (80°) for establishing Capitoline Museum
	Symmetry	Designing a new tower in Senatore Palace in a symmetrical form in the body; use of the Municipality Palace's establishment angle in respect to Senatore Palace (80°) for establishing Capitoline Museum, creation of a symmetrical staircase in the wall of Senatore Palace, creation of symmetry in the walls and creation of symmetrical forms in the square's plan
	Human-centeredness of the space	Making the space perceivable to the human beings via defining a well-defined shape (trapezoid) and understandability of the space's borders

### Introducing the Study Region and Analyzing its Aesthetical Form

Imam Khomeini Square (Sepah or Tupkhaneh) is the name of a square situated in the middle section of Tehran Municipality's district 12 (figure 1). The reason for its importance is its historical background; this square has been a place for the people's gatherings and, nowadays, diversity can be witnessed therein along with confusion with the existence of various micro-spaces. Although the square was seminally designed and constructed in an integrated form, it was subjected to many changes later on.

In 1877 and in the map of Naseri governor hall, the city center was translocated from Sabzeh Meidan and Arg Squares to Tupkhaneh Square. This square was constructed by the order of Mirza Taghi Khan Amir Kabir in 1868 as a perfect example of metamorphosis. Its architect was Muhammad Ebrahim Azerbaijani (uncle of Kamran Mirza); the construction lasted 10 years.

The (2-storey) buildings around it were primarily served as places for keeping the artilleries and providing domicile to the gunners. Six streets (that are still existing) were connected to it in the past: Naseriyeh (Naser Khosrow), Bab Homayun, Lalezar, Sofara or Amin Al-Sultan (Ferdowsi), Cheragh Gaz or Marizkhaneh (Mustafa Khomeini) [30].



**Figure 1: siting map of Imam Khomeini Square in Tehran and in the district**

### Square's Trend of Evolution

During 1881-1921, the square was constructed as a joint in the center of Tehran in the vicinity of Arg [citadel] for connecting the old section to the new developments. It was rectangular in shape and 110m in width and 220m in length (figure 2); it was applied as a place for holding various ceremonies and accommodated the social and cultural life of the city; it was also a place of the governmental buildings' accumulation. The important elements of the square were the royal post office and municipality in the northern edge of the square; king's bank in the eastern edge; telegraph house in the southern edge and constabulary office in the western edge of the square; there were also gates connecting the square to the connective peripheral routes and roads.

During 1921-1941: it was in Tehran's downtown and it was rectangular in shape and 110m in width and 220m in length. The square served administrative purposes and featured a governmental identity. Due to the establishment of the important administrative and business land uses in the periphery of the square, it enjoyed a special booming and prosperity and the vehicular and pedestrian movements were all in balance. The important elements of the square were municipality in the northern edge, king's bank in the western edge, telecommunication center in the south and Sepah Bank and constabulary office in the eastern edge of the square. The square's entry gates were destroyed in this period.

1941-1991: the square was in the center of Tehran and its shape became completely amorphous and disproportionate. The square started serving as a traffic zone. The important elements of the square in the period of time between 1941 and 1961 were the central building of the municipality in the northern edge; telecommunication center in the south; the trade bank's building in the east; and the constabulary office and Sepah Bank and Lister in the western body. During 1961-1991, the northern body of the square was destroyed but no change was made in the eastern body. Sepah Bank was constructed in the western body. The department of motor vehicles (Lister) was kept until 1980s and it was gradually destroyed and a subway station was constructed on its place. The newest buildings constructed in the square are the fire station and Imam Khomeini subway station.



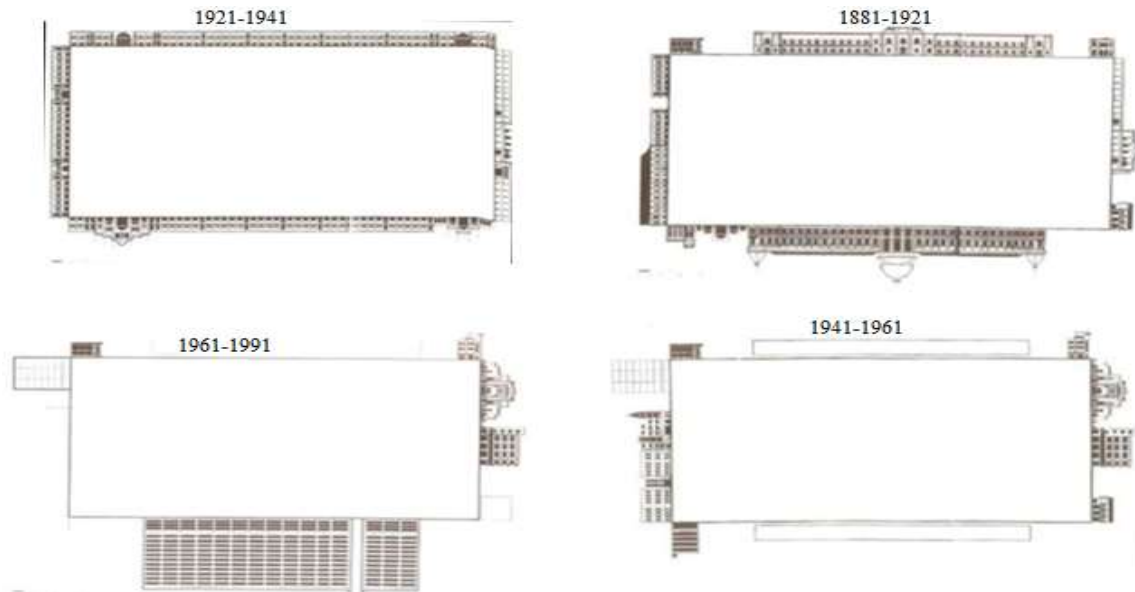


Figure 2: the contextual evolutionary trend of Tupkhaneh Square from 1921 to 1991

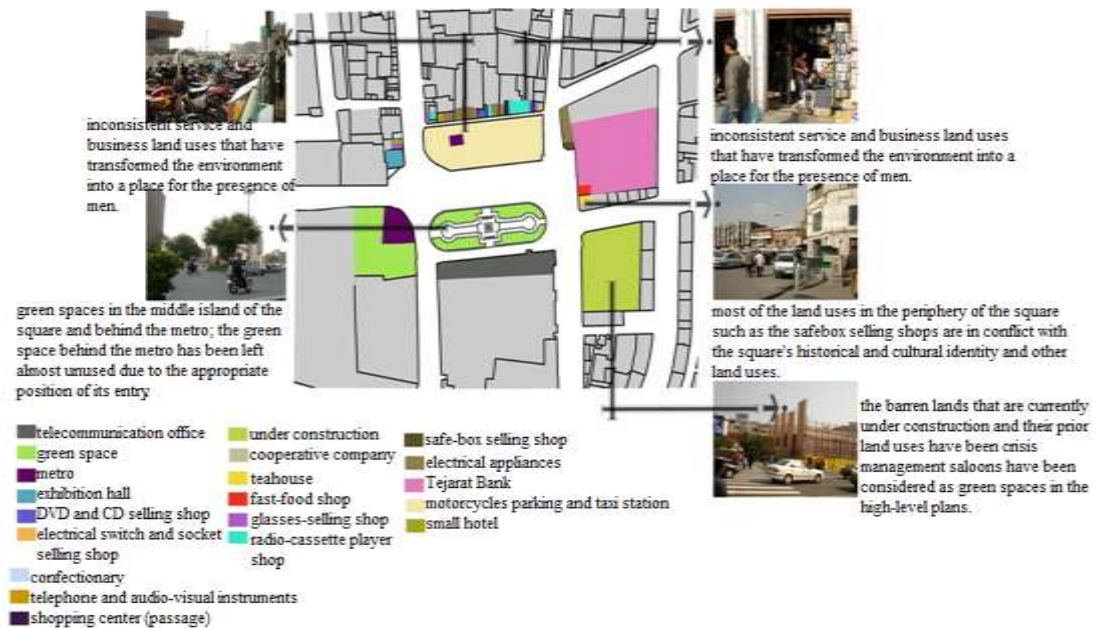


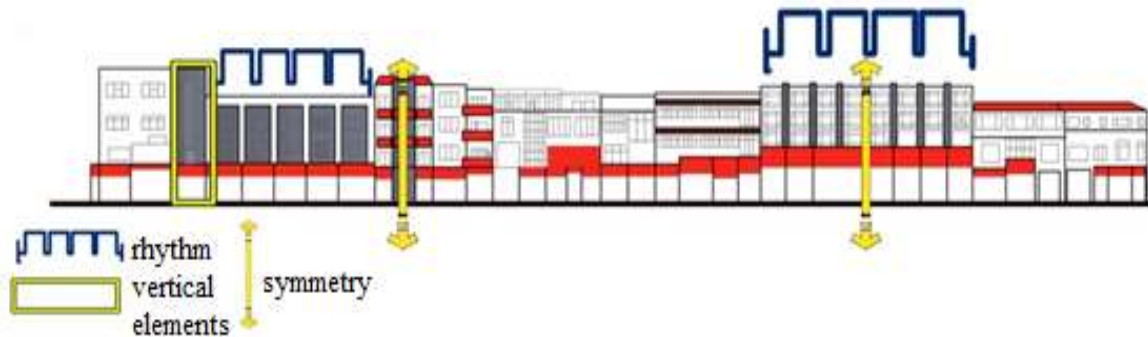
Figure 3: immediate land uses of Tupkhaneh Square in its new status

Presently, there are green houses in the immediate area of the square but they are not suitable in terms of the designing and precinct development and landscaping. The religious land uses like mosques also exist in this area. The land uses are mostly offices, newspaper agencies and so forth and the current parking lots have been created to serve these spaces. Business is the dominant land use (figure 3).

### Analyzing the Northern Body of the Square

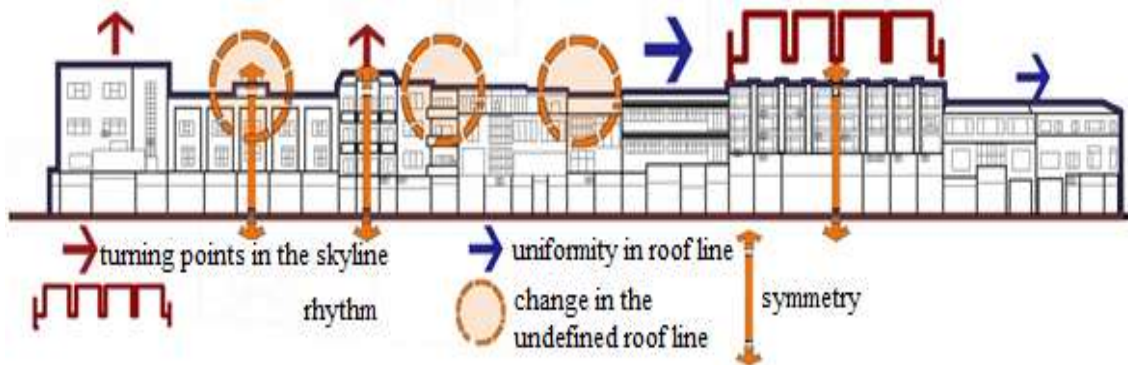
The horizontal elements existent in the northern body of the square include balconies and appended elements such as the shops' tableaus and, of course, the body's openings, particularly the windows, can be also enumerated amongst the horizontal elements. In the façade-construction of one of the buildings, use

has been made of horizontal configuration but it is not enough. Furthermore, vertical elements have also been applied in the construction of facades. This kind of façade construction has well been capable of endowing rhythm and order into one of the facades. No coherence and cohesion is observed between the horizontal and vertical elements and their compositions. The style considered in each building has been designed without paying attention to the other buildings and the patterns existent in the square's background.



**Figure 4: investigating the vertical and horizontal rhythms in the northern body of Tupkhaneh Square**

The skyline and the roof in this edge of the square fall on one another and the roof's line does not feature coherence and uniting elements and confusion can be observed in parts thereof. Part of the roof's line is rhythmic but it is discontinuous. The turning points, as well, have been created by vertical elements that are visually inappropriate and the building line is uniform in some sections with the body's later attachment being deemed as one of the essential problems of the square. These appendances do not follow a special and specific order. Many of the shops' tableaux are located in an inappropriate place and coolers and the cloth banners are amongst the other confusing elements and appendices of the square.



**Figure 5: investigating the roof line and the buildings' appendances in the northern body of Tupkhaneh Square**

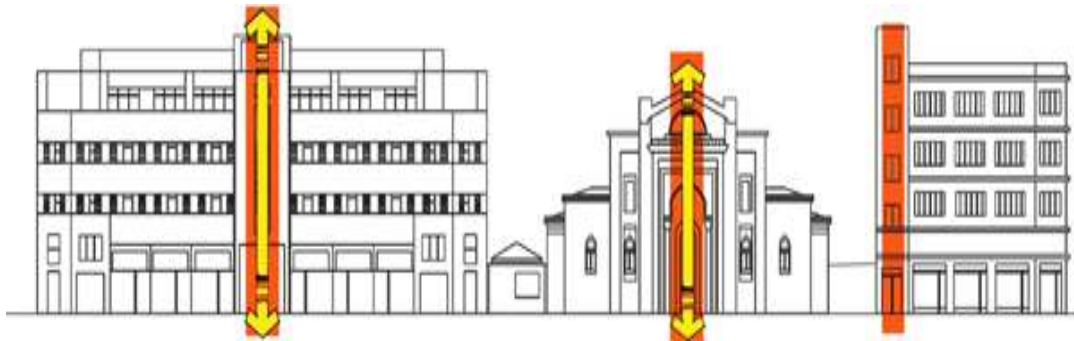
### Analyzing the Eastern Body of the Square

As it is observed in the system of the buildings' openings and the relationships between the open and closed spaces, a lower surface area has been allocated to the openings in the façade of Tejarat Bank and most of the façade is covered by rigid and brick-made surfaces and this can be due to its special and historical architecture. The relationship between these filled and empty spaces in the two other facades is nearly equal and the thing seen in the two is the openings on the ground floors for it has to have been completely permeable for its allocation to business land uses.



**Figure 6: investigating the openings and filled and empty spaces' system of the eastern edge of Tupkhaneh Square**

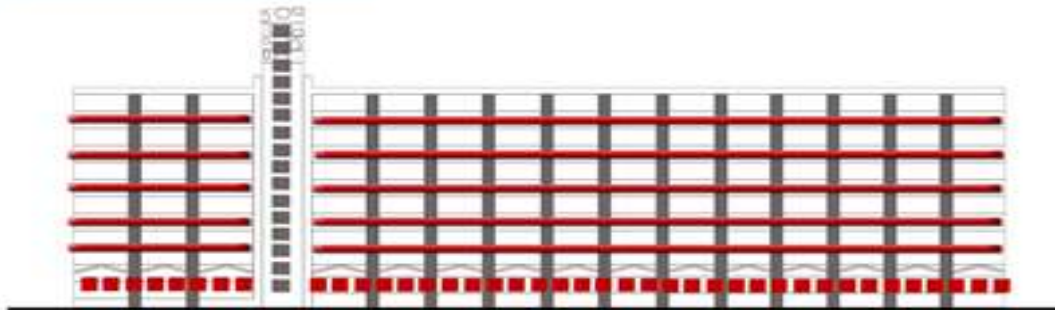
Emphasis on the façade of this building is due to the existence of a vertical pillar in the edge of the building and, unlike the two other buildings, the highlighting element is not superimposed on the building's symmetrical axis. As it has been demonstrated in figure (7), the bank's building and its adjacent building feature symmetry. The symmetry axis of these buildings has been designed and features a specific form so it can be stated that they are also highlighting; the buildings' entrances are aligned with this axis.



**Figure 7: investigating the vertical rhythms in the eastern edge of Tupkhaneh Square**

#### Analyzing the Square's Southern Body

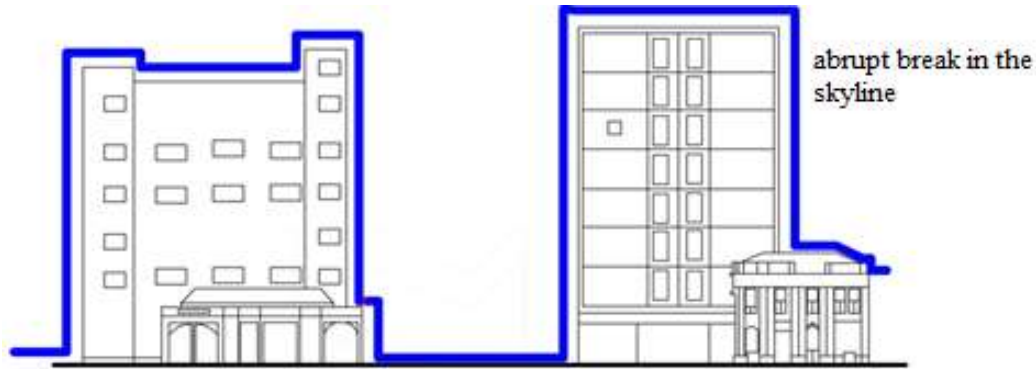
It was found out in the investigation of the vertical and horizontal rhythms that this building possesses horizontal elements due to the existence of the window lines and floors' lines and that there are also straps as vertical elements in the perpendicular direction. In this façade, a vertical element is also visible and it is identified as the vertical pillar; it is the very telecommunication tower that has been illustrated with dotted line. In the horizontal direction, as well, the lines above the windows have different forms with their cohesion creating a different horizontal rhythm. This horizontal rhythm has come about above the second floor and it can be considered as somewhat occurring in the pedestrian level.



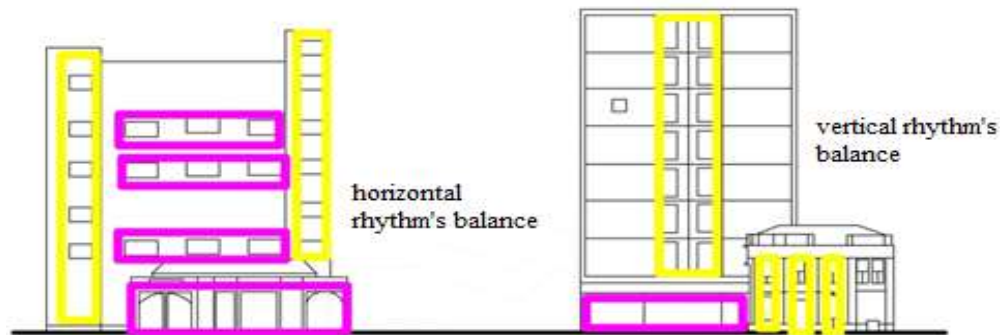
**Figure (8): investigating the horizontal and vertical rhythms in the southern body of Tupkhaneh Square**

### Analyzing the Western Body of Tupkhaneh Square

In an investigation of the horizontal and vertical elements as illustrated in the figure, it was made clear that the horizontal rhythms are more prevalent in the western half with the vertical rhythms being dominant in the eastern half. This situation has flawed the cohesion of the façade. The skyline is not well-defined in this section of the square and no specific feature can be expressed for it due to the absence of adequate closedness. In terms of height, similar elevations are seen on both sides of the street. On the other hand, an abrupt discontinuity of the skyline is vividly seen and felt in the western and eastern sides.



**Figure 9: investigating the skyline in the western body of Tupkhaneh Square**



**Figure 10: investigating the vertical and horizontal rhythms in the western body of Tupkhaneh Square**

### Conclusion

Based on the investigation of the theoretical literature and recognition of the square from the perspective of the thinkers and considering the importance of the urban squares' formal-contextual evaluation and relying on the executive policies and principles drawn on the successful experiences in Iran and the world, table (3) summarizes the scales and indices of the squares' aesthetical assessment.

**Table 3: offering the indicators, principles and indices of the formal evaluation with an emphasis on the squares' visual aspects**

Indicator	Principle	Evaluation indices		Definition	
General communications of the squares' spaces	closedness	Non-coaxial roads and routes	Placement of the square's entrances in various angles and not in parallel	Limitation of the space by walls in such a way that the individuals would feel they are in a closed container	
		Walls' cohesion	Existence of rigid walls and use of gates and arcades in the gates of routes ending in the square		
	Spatial unity	Balanced diversity	Diversity in form and performance while keeping them consistent	Unity means organized cohesion between the buildings and existence of a special (structured) coordinated and mutual relationships between the components. In general, unit means perceiving and experiencing a set of numerous and diverse elements in the form of a unit whole or a favorable whole which is the product of the uniting and accordance between the components.	
		Spatial integration	Non-dividing and slicing and uniformity of the square's space		
Square's elements and components	Balance	Balanced or steadiness of the visual weights in the façade	Neutralization of the horizontal and vertical forces	Generally, balance is felt when the opposite forces counteract each other. In a space, this scale is existent when the action and reaction between all the forces leads to an equilibrium in such a way that no change can be brought about in their compositions.	
		Balance in the skyline (no abrupt break)	Balance in the skyline and no abrupt discontinuity		
		Balance in the opaque and transparent surfaces (visual solidarity)	Balance between the openings and rigid body in the square's wall		
	Human-centeredness of the space	Amount of space allocated to the pedestrians		Proportion between the space's dimension and human dimension in such a way that the space can be perceived by the human beings and does not cause its own domination over them and this is related to the extent of space allocated to the pedestrians.	
		Human scale	Proportion between the wall and the human dimensions and sizes		
	Order	Rhythm in the wall	Repetition of every element in terms of formal considerations (shape, color and so on) based on a given order, rhythm or tempo; repetition of the elements gives a sense of order.		
		Coordination between the walls' components	Consistency in all the dimensions of the wall such as materials and masonry, colors and apparent plan that enhance the aesthetics of the squares' spaces.		
		Principle of combination	Combining the space and the body surrounding it		
	Spaces are made of various elements; these components are all subparts of a system which might be per se simple and clear or complex.				

Tupkhaneh Square in District 12 of Tehran is the carriage of memories. Due to its possession of historical, morphologic and diverse layers and its undergoing of a lot of changes, the square is of a great spatial value in terms of both land use and context. Nowadays, many of its spatial valuable qualities have been destroyed or are declining.

Table (4) gives the proper strategies and solutions in line with revitalization and reproduction of the square's historical contextual-aesthetic qualities.

**Table 4: guidelines of the urban squares' formal designing with an emphasis on the visual aspects**

Indictor	Principles	Guidelines of the urban squares' formal designing with an emphasis on the visual aspects
General communications of the square's space	Closedness	<ul style="list-style-type: none"> <li>- Increase in the wall's visual continuity through revitalizing the positions of the old gates in the periphery of the square</li> <li>- Reducing the number of the vehicle-moving roads connected to the square</li> <li>- Enhancement of the square's spatial contrast via increasing the rigid and soft bodies as well as the rhythm and sequence of the urban furniture</li> </ul>
	Spatial unity	<ul style="list-style-type: none"> <li>- Creation of integrity in the flooring and avoiding the breaking and crushing of the floor through uniform and coordinated flooring in the whole square</li> <li>- Observing the continuity of the lines and the dominant types in the entire walls in the periphery of the square for corroborating the square's contextual unity</li> <li>- Balanced distribution of the land uses and organizing the diverse and proportionate land uses with the dominant spirits in the space</li> <li>- Creation of cohesion in the bodies' skylines</li> <li>- Prediction of the roads' connection points to the square in a way that no discontinuity is created</li> <li>- Improving the body's constituent granules so that they can be coordinated in the overall geometry</li> <li>- Establishing no vegetative cover such as trees or bodies in the form of physical borders</li> <li>- The spatial separations, if needed, should be visually minimized</li> </ul>
Square's elements and components	Balance	<ul style="list-style-type: none"> <li>- Balancing the filled and empty spaces' ratio in the bodies through a comprehensive and integrated plan for square's repair and renovation</li> <li>- Visual balancing in respect to the height of the dominant building in the square through creating an active body of the same height as the other buildings</li> <li>- Organizing and balancing the skyline in the square's precinct through contextual interventions</li> </ul>
	Order	<ul style="list-style-type: none"> <li>- Creation or rhythm in the walls through repeating the dominant architectural types</li> <li>- Creation of dominant building in every wall as the focal element for creating a unit and regular composition</li> <li>- Organizing the interior elements and spaces of the square by creating a gravity center in the square (for instance, urban elements in match with the square's historical identity )</li> </ul>
	Human-centeredness	<ul style="list-style-type: none"> <li>- Allocating more space to the pedestrians through limiting the vehicular movements in the square's interior space</li> <li>- Making the telecommunication tower's scale more human-oriented through creating indentations and stair-like construction of the building or using rigid and soft bodies in front of one another</li> <li>- Creating geometries readily recognizable by mind</li> <li>- Predicting generally perceivable dimensions for the space</li> </ul>

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