

Persian translation of this paper entitled:

مطالعه مقایسه‌ای میدان‌های حکومتی و غیرحکومتی تهران در گستره نمای شهری
is also published in this issue of journal.

A Comparative Study of Tehran's Governmental and Non-Governmental Squares in the Area of Urban View*

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Received: 21/02/2019 ; revised: 15/07/2019 ; accepted: 27/07/2019 ; available online: 20/03/2019

Abstract

Problem statement: The urban view area's extent is an arena for the classification of Tehran's governmental and non-governmental squares creating different similarities and dissimilarities in this regard. The analysis of the similarities and dissimilarities can reveal the special and general properties of Tehran's governmental and non-governmental squares in the urban view area. The comparative study can provide a solution for analyzing the quality and the origins of the differences between Tehran's governmental and non-governmental squares in the urban view extent even with the existence of similarities. Adopting landscape-based approaches, the other researchers of the urban view areas have not so far made use of a comparative study in regard to Tehran's squares.

Research method: The present study has made use of a qualitative research method and it is applied research in terms of objectives. The present research paper has for the first time investigated Tehran's governmental and non-governmental squares in the area of urban view based on a comparative research method. The study was, on the one hand, based on the library data and it was, on the other hand, drawn on the field data. Thus, after obtaining the data, the various forms and shapes used in the architectural structures and façades have been compared in terms of the arrangement at one another's side in longitudinal and transversal proportions and the effects of these shapes have been obtained for the squares' façades.

Research objective: The present study is aimed at analyzing the quality and the origins of the differences and similarities created in the area of urban view.

Conclusion: The performed analyses made it clear that the systems forming the square stemmed from the proportions between the dimensions and levels of the openings, positioning of them and façade's geometry, which was per se influenced by the squares' positioning and function. Although these systems may have undergone changes in the course of the history of Iranian squares, their contents have lasted till the several recent decades and can be applied as a collection of designing indices by the landscape architects and urban engineers.

Keywords: *Square, Governmental, Non-governmental, Façade, Shell.*

* This paper is derived from PhD thesis of Faranak Hooshmand Shaban Abadei entitled "The visual representation of Shells of the Qajar and early part Pahlavi city squares facades in Tehran based on descriptive and visual documents which is done in

2019, under supervision of Dr. Nima Valibeig and advice of Dr. Mostafa Behzadfar and Dr. Mohsen Faizi at Islamic Azad University, Shahrekord Branch, Iran.

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Introduction

The construction of square dates back to long ago in Iran and it has been the focus of attention during all times. Square architectural designing has been established on the geometry of architecture and the methods of geometrical delineation. The geometrical properties and the proportions are considered as an accepted principle in architecture. The majority of the squares in Tehran are located inside the city's texture and center. In fact, a square is one of the integral pillars of the city. The urban view framework of the square is an arena for the classification of Tehran's squares that have brought about various similarities and dissimilarities in this regard.

The present study is aimed at investigating the squares from the Qajar and first Pahlavi Eras that have been placed within Tehran's central and historical texture. This present paper seeks to find an answer to the following questions so as to be able to introduce the latent common geometrical concepts of the squares and their origins to the architects, urban engineers, and designers interested in the recreation of the squares in the contextual environment of the contemporary cities and metropolises. In line with this, a comparative study has been conducted regarding the architectural shapes and the proportions forming the façade. The investigation of the shapes applied in the facades helps to determine the proportions used in the architectural designing of them. The investigation of these principles can also assist to determine the geometrical properties and principles employed in the construction of the squares' shells¹.

What are the most frequently used proportions in the urban view of the governmental and non-governmental squares?

What are the common and distinctive aspects of the entrances and porticos in the shells of the governmental² and in-governmental³ squares?

What are the common and distinctive features of the framing in the shells of the governmental and non-governmental squares? And, what proportions have been repeatedly used regarding the ratio of the frames' surfaces to shells' surfaces in the squares?

There are features in the façade geometry that cause differences in the squares' views. The quality and the

source of such differences have been comparatively studied herein. The existence of contrastive elements in the proportions of the dimensions, openings' surfaces, base forms, shell forms, skyline that result in the squares' similarities and dissimilarities, have enabled the comparison of these squares.

Theoretical Foundations and Background of the Study

Some researchers have studied the urban visage and view. The visage of a city refers to all of the factors of a city that are observable by eyes. These factors work singularly, continuously and in a group (Lynch, 2006, 23). In fact, the visage or the mental image is a mentality that is created through the perception and processing of the landscape in the human mind (Mansouri, 2005, 24). The urban visage and landscape indicate the culture and history of a city or a community as the factors influencing the mentalities of the individuals using them (Cullen, 1998, 15). The shape of a city has been taken as the equivalent to the "city's view or visage". Individuals like Smiles defined it in 1955 as synonymous to the urban landscape that includes visible forms and shapes of the constructed region (Madanipour, 2013, 46). The city's landscapes are subjected to the judgment by the onlookers based on their perception and reading (Vahdat, Sajjadzadeh & Karimi Moshaver, 2015, 17). In definitions, landscape has always been associated with two primary elements, the elimination of each of which makes its perception difficult; the first is the environment incorporating the human beings and the second is the human being that seeks to perceive and establishing communication with that environment (Mahan & Mansouri, 2017, 26). The urban view or visage is indeed a generally continuous whole that includes signs and symbols objectifying the concepts, meanings, values and so forth (Pakzad, 2007, 21). The urban view and landscape feature a spatial nature and are the products of the human experience in the space as an objective-mental and dynamic and relative phenomenon formed in an interaction with the history and nature (Mortazi Mehrabani, Mansouri & Javadi, 2018, 10). Calculated and gradual plans should be made in the urban spaces so as to supply

spaces wherein a diverse array of activities are carried out sufficiently by the large number of individuals from various age groups and social classes during various hours of the day (Haghighi & Shokuhbidhendi, 2019, 47). Urban landscape is inseparably correlated with shell construction (Hanachi, Mozaffar & Jafari, 2018, 78). It is only facades that present the people with the attractions of the visual visage of the facade, scale background, and texture of the building (Antoniades, 2014, 136). Some of the other researchers have dealt with shells: the shells are defined as the vertical surfaces surrounding a passageway. The shell of the body of a space is the primary contextual part of it (Tabatabaei, 2011, 1). A shell is an arrangement and order of several plates by the way of which, entry can be made from outside to the inside of a square or from the inside of the square to the buildings in the periphery thereof (Nejadsattari, 2011, 60). A shell is a subsystem of enclosure and an intermediary composed of proportion and shape and the urban designer is responsible for investigating the realm of the urban designing's interference in the architectural area thereby to investigate the background and its contrast with its periphery through taking advantage of architectural creativity and means of urban designing control (Haghirian, Sajjadzadeh & Karimi Moshaver, 2017, 30). Similar studies are very scarce in Iran and one case can be specifically pointed out which has been conducted under the title "The Recreation of Amin Al-Sultan Square". The investigation of this study's

data was reflective of the idea that another study has to supplement it with its novel, complementary and revised information (Mehrabiyani, 2014). The prior studies are suggestive of the idea that the majority of the analyses have been carried out in the form of case studies on the squares whereas the current paper has for the first time compared the visual and contextual aspects of the squares' facades in various types of them. So far, not many studies have dealt with the systems and general structures in the formation of the façade and proportions and forms that have caused the creation of such systems. The present research paper investigated the general structures and systems in regard to the formation of the facades in Tehran's squares as well as the formations and shapes that have caused the creation of such systems. The theoreticians have offered various ideas regarding the squares' extents and urban view and landscape (Tables1-2). Based on the present study's goals, the theorists whose thoughts specified the present research's theoretical framework were selected. In line with answering the questions and accomplishing the objectives, the theories of these thinkers were used as the basis of the work.

Research Methodology

In the present study, use has been made of the written library documents, illustrations, and maps for comparative study of the squares in the city of Tehran. At first, the elements existing in the facades

Table1. Theorists and theories on the image and urban view. Source: Authors.

Row	Theorists	Theories offered for the extents of the urban view and visage
1	Albert Frey	For the foregrounding of the background elements located on the passageway surface, like trees, use has to be made of the views featuring identical framework (Frey, 2008, 60)
2	Kevin Lynch	Factors that are created based on a vivid image of the city in the mind are road, sign, edge, node, neighborhood (Lynch, 2016, 21)
3	Rudolf Arnheim	The environmental elements specify the visual properties of the exterior views (Arnheim, 2015, 123)
4	Frank Ching	The wall or shell surface is exhibited as an effective visual element in a separate form and/or with roof and floor or a combination of them by the means of form, color, texture and constructional material in the urban structure (Ching, 2001, 24).
5	Gordon Cullen	The art that integrates and makes the visual structure, collection of the buildings, passageways and places is called urban landscape (Cullen, 1998,15)
6	Jahanshah Pakzad	Urban landscape is not limited to the facades of the buildings in a city (Pakzad, 2003,52)

Table2. Theorists and theories across the field. Source: Authors.

Row	Theorists	Theories offered on the extents of squares
1	Camillo Sitte	There should be established an optimal proportion between square and size of the buildings (Sitte, 2015, 67)
2	Cliff Moughtin	“Square is an empty space surrounded by buildings like the painting tableaux in an exhibition” (Moughtin, 2017, 113)
3	Leon Battista Alberti	Each square should have its own specific space and decorations (Alberti, 1986, 81)
4	Marcus Vitruvius Pollio	Squares should be in proportion to their residents (Vitruvius Pollio, 1960, 132)
5	Paul Zucker	A square is realized as alive and dynamic part of the city related to the changing social-economic and technical conditions (Nazari & Asia’ei cited in Tavassoli, 2015, 69)
6	Rob Kriser	The accumulation of the houses around an open space that made the defense against the external attacks feasible via minimizing the exterior surfaces (Krier, 2015, 16)
7	KnirshJurgen	A square should be accountable to the public needs without any excuse and pretext (Knirsh, 2013, 1)
8	Thomas This-Evensen	A square is a calm and static space (Thiis-Evensen, 2012, 51)
9	Roger Trancik	A square is introduced as the preliminary organizing form of the urban structure (Asiabi, 2010, 57)
10	Hossein Soltanzadeh	Open and vast spaces that had surrounded or more or less specified areas (Soltanzadeh, 2012, 82)
11	Mahmood Tavassoli and Naser Bonyadi	The spaces that have the role of collecting the houses with urban and neighborhood elements are called square (Tavassoli & Bonyadi, 1992, 61)
12	Jahanshah Pakzad	A square is a static, crowd-welcoming and integrated area featuring collective life for the citizens (Pakzad, 2007, 70).

were classified. In the next step, the various squares were examined in terms of their similarities and dissimilarities. The arrangement and juxtaposition of the elements in the facades of the squares were explored according to the geometrical properties, proportion and the formative aspects of the frameworks and framings. In the end, the general typology of the squares’ characteristics was determined based on the investigations in the extents of the urban view of them. In the present study, the squares from Qajar and the first Pahlavi Era have been studied. These have been selected for various reasons and cases like the absence of squares in the periods before Qajar and Pahlavi. Furthermore, the squares made after these epochs of history predominantly lacked the Iranian city’s identity and were no more in possession of those valuable historical properties and these led to the selection of that temporal span. Amongst the squares, the ones featuring Iranian architectural styles and having been changed in various periods were selected for the diversity of their shapes, forms, and uses. Tupkhaneh⁴ [artillery], Arg⁵ [Citadel], Hasan Abad, Mokhber Al-Dawleh, Sabzeh and Mohammadiyah Squares in Tehran have been investigated herein.

Square

The shells of Tehran’s squares were made of buildings

that have been classified into several sets: the first set of the shells comprise of the commercial, administrative and military (governmental) buildings that have been constructed with one or two Oshkoub⁶ [Floors] based on design principles and maps. The second set of shells was composed of the business buildings constructed with one Floor that was a space used for service or business purposes; however, some of them were residential and mostly were built with one or two Floors⁷. The present study has dealt with both of the aforementioned sets.

Geometrical Proportions

This section has dealt with the investigation of the proportions, the length-to-height ratio of the squares’ shells and the ratio of square’s portal length to shell length as well as the investigation of the ratios of the other components of the buildings; in the governmental squares, the shells were generally stretched long and the heights were relatively larger with the shell length to shell height ratios ranging between 1. 10 and 1.20, although elongation also existed in the shells of the non-governmental squares, as well, with it being in a range from 1. 4 to 1.8. The façades of the squares were most often situated in the middle span and worked as the view center in the form of a solid volume supporting the stretched

and short façade of the square and it has been made in the majority of the squares with fixed ratios. The shell length to middle span's length was in a range from 1/ 4. 5 to 1/ 8 in the non-governmental squares but varied in a range between 1. 7 and 1. 10 in the governmental squares (Table 3 & see Table 6). Governmental squares had a larger scale with respect to the non-governmental squares. The height difference was due to the elongated nature of the shell and the entry span which was broader in contrast to the other squares. The other reason was the square's use case such as its being applied for military parades and exhibitions and the trying of the persons. The last reason was the showcasing of the system's power and authority and importance of the squares' buildings.

The main proportions and the sector-to-sector proportions have been observed in Tehran's squares. The entire complex of the square, including the middle open space and the shells, featured proper intervals and proportions. The openings generally were stretched rectangles with 1: 2 and 2: 3 height ratios. Some of the openings had arches in the upper sections with their proportions being 1:150 and 2:3. In addition, the spans of the frames whereon the openings were installed, possessed fixed ratios in the governmental and non-governmental squares (Table 4).

Investigation of the Entrance and Portico in Respect to the Surrounding Shells

In the body of the non-governmental squares, the entrance and opening were connected to the building on the first Floor without any recession and protrusion inconsistency with the square's shell. In fact, the shell was directly available for the use of the buildings behind it and it sometimes possessed an interval in the form of portico that was directly accessible without any level difference from the walkway floor; however, the entrance in the governmental squares was created a little past the entry shell's span through an increased depth of the frame in the form of a corridor that a little more foregrounded the entrance. Additionally, the openings (windows), as well, can be visible as a part of the façade in this square a little past the porticos existent in the square's shell and this generally caused the indentation of the building. The

similarity shared by both of the groups in the main entry part was that the frame on the portal featured a protrusion⁸ or recession⁹ and a combination of them can be seen in some of the squares or they have been used in separately in some others (Fig. 1); upon entry into it, a largely deep receded space was reached that caused more highlighting of the entrance which was accompanied by the creation of light and shaded areas. The other similarity existent in the majority of the governmental and non-governmental squares was that the second Floor had a peripheral corridor which was covered with a roof in some of the squares and devoid of a roof in some others (see Fig. 1). The attachment of such elements as corridors and rows of arcades to the buildings in the periphery of the square was added to the visual continuity thereof (Corbet, 2013, 101).

Form Typology

According to the use cases, decorations, filled and empty surfaces, framing and placement sites of the square in the city, the square was investigated based on various form-based typologies. In the governmental and non-governmental squares, the façade featured three shape species: the first one possessed an arcade in the upper section; the second one lacked any bent shape on the top and was usually flat and, in the third type, the façade was flat on the floor and the second floor had an arcade (Table 5). These types were shared in the squares with different numbers of Floors.

Investigation of Framing

The data analyses indicated that not only the shape of the frames was identical in the governmental and non-governmental squares, but also they both shared the same site of frame placement, as well. In fact, the frames were repeated in rhythmic manner and they were mostly placed on the central part of the portal¹⁰ so as to bring about non-uniformity and grant diversity and pleasant motion to the body of the square. Additionally, the vertical towers were shown off in the beginning and ending parts of the shell in the majority of the squares as elements outstanding in terms of height. In both types of squares, the frames

Table3. Proportion in the square. Source: Authors.

Title	Square	Non-governmental	Square	Governmental
The length to width ratio of the shell	Mokhber Al-Dawleh		Mohammadiyeh	
	Hasan Abad		Tupkhaneh	
	SabzehMeidan		Arg	
The ratio of the middle span (portal)'s length to shell's length	Mokhber Al-Dawleh		Mohammadiyeh	
	Hasan Abad		Tupkhaneh	
	SabzehMeidan		Arg	

Table 4. Proportion and shape of the openings in the square. Source: Authors.

Title	Non-governmental	Governmental
The proportion and shape of the openings		

of every Floor were repeated in a coordinated manner and the frame used in the middle span (entrance) was also larger than the other spans.

Essentially, the frames of the first floor were in the form of simple arcades or in the form of arcades with flat span; and, in the second floor, they were in the form of three adjacent arcades in one frame or in the

form of an arcade with a simple small rectangular arcade in the middle (nearly with the same ratio of the frame span in the first floor).

In some of the squares, the frames were covered with completely planar surfaces. Furthermore, the middle section of the façade's body was taller in contrast to the shell's height and featured a larger and taller

Governmental	First Floor of Hasan Abad		Non-governmental	The First Floor of Sepah in the second period	
	Second Floor of Hasan Abad			The Second Floor of Sepah in the second period	
	Hasan Abad Square's portal			The portal of the Sepah in the second period	
	First Floor of Sabzeh Meidan			The First Floor of Sepah in the first period	
	Second Floor of Sabzeh Meidan			The Second Floor of Sepah in the first period	
	Sabzeh Meidan's portal			The portal of Sepah in the first period	

Fig. 1. Comparative study of the porches and entrances portal to the square. Source: Authors.

arch. The brick-laid frame coated the periphery of the window and the façade above it (see Table 5). The span of the frames in every Floor was about four meters and the span of the small frames was about 2.5 meters; it was also possible to distinguish the openings of these two groups in regard to the abovementioned proportions (Table 4).

The ratio of the framed spaces to the shell surface was 36% to 60% in the non-governmental squares and 40% to 69% in the governmental squares (Table 6).


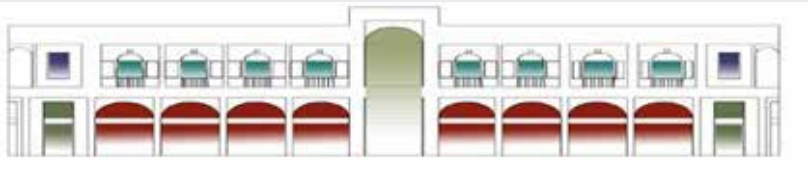
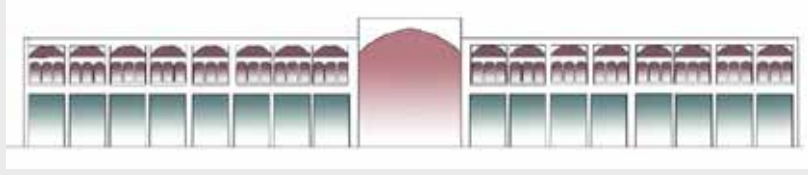



Investigating the Filled and Empty Surfaces in the Square's Shell

In both groups of the squares, the total framed span in the square's shell made is not in an opening manner, rather the opening is a lot smaller than the frame. The non-governmental squares generally include business units on the First Floor and spaces in connection to the business units or separate spaces on the Second Floor. Considering the use case and the more need

for a vitrine-like space that consequently results in the creation of openings with wider spans and taller arcades, the façade of the First Floor was taller in contrast to the Second Floor's façade, but there has been more need for closed spaces in the governmental squares considering the use cases of the buildings that were mostly utilized as military and administrative spaces and the majority of the openings in the frames of the governmental squares' first Floor were smaller than the ones in the non-governmental squares. The shell surface to openings ratio in the governmental squares has been between 7% and 33% and it has been in a range from 26% to 40% for such a reason as the need for different openings in them considering the use case of the squares (Table 7).

As it was mentioned in the previous discussions, in both types of these squares, the repetitive units caused the creation of a pleasant and beautiful space. The frames and the transparent and dim surfaces, the entrance, the empty surfaces, the view

Table 5. Attachments and the way the frames are positioned on the square shell. Source: Authors.

Title	Name	Representative image
Non-governmental	Mokhber Al-Dawleh	
	Hasan Abad	
	Sabzeh Meidan	
Governmental	Tupkhaneh	
	Tupkhaneh	
	Tupkhaneh	

and façade lines, balcony, console or protrusions, column, the attachments of the square's body of façade were elements that formed part of the preliminary plan of the shell constructions in the squares and considerably influenced the shape of the urban landscape. The rhythm and repetition of these elements can be beautifully seen in the governmental and non-governmental squares (Fig. 2). Furthermore, the rhythmic break in the middle of the façade and on the beginning and ending of the shell has led to an impressive symmetry and pretty configuration of them. The squares' shells were very eye-catching due to the perpetual beauty and undeniable symmetry. The towers were most widely utilized for having access to

the higher level Floors. The squares' towers differed in that they were in the form of imperfect cones or nearly cylindrical in the non-governmental squares while they were in the form of imperfect pyramids in the governmental squares (Fig. 3). The spectators were not induced with openness and disintegration and/or, conversely, low view angle and shell's compression whichever the point of view they took towards the squares. The buildings were most often (over 90%) uniform and consisted of two Floors (see Table 5).

Discussions

Many researchers have dealt in the urban area with the functions, formation and use cases of the squares

but nobody has so far investigated and represented the visual aspect of the squares based on comparative studies. The present study dealt with the visual representation of the shells of Tehran’s squares for the first time based on comparative research.

To do so, the descriptive and pictorial documents, on the one hand, and the shape analysis based on the comparative studies, on the other hand, along with taking advantage of the modeling and drawing software were utilized for achieving the study goals.

Table 6. Proportions of frame surface to shell surface. Source: Authors.

Title	Governmental square	Non-governmental square		Reason
The ratio of the framed surface to shell surface on the first Floor	66% to 41%	70% to 42%	Similarity	The frame on the second Floor is originally smaller than the one on the first Floor.
The ratio of the framed surface to shell surface on the Second Floor	72% to 39%	50% to 30%		
Sum of the ratio of the framed surface to the shell surface	69% to 40%	60% to 36%	Difference	The span of the First Floor in the non-governmental squares is larger according to the business type of use case and the need for vitrine. In governmental squares, there has been more need for closed surfaces considering the use case, i.e. governmental and administrative. The frame in the non-governmental squares is attached to the square’s shell on the First Floor; with no difference in the height of the walkway in respect to its floor whereas it has been separated from the shell in the governmental squares through the creation of portico.
The shell proportions (length to height ratio)	1.10 to 1.20	1.4 to 1.8		

Table 7. Appropriate surface to shell surface. Source: Authors.

Title	Governmental square	Non-governmental square		Reason
The ratio of the openings’ surfaces to the shell’s surface on the First Floor	8% to 34%	35% to 50%	Similarity	Opening on the First Floor has a single span and it possesses several frames on the upper Floors (Table 5)
The ratio of the openings’ surfaces to the shell’s surface on the Second Floor	6% to 32%	21% to 30%		
Some of the openings’ surfaces to shells’ surfaces ratio	7% to 33%	26% to 40%	Difference	The opening on the first Floor needs more vitrine-like spaces considering its business use. In the governmental squares, there has been more need for closed spaces for security matters considering the governmental and administrative uses of the buildings (Table 5).

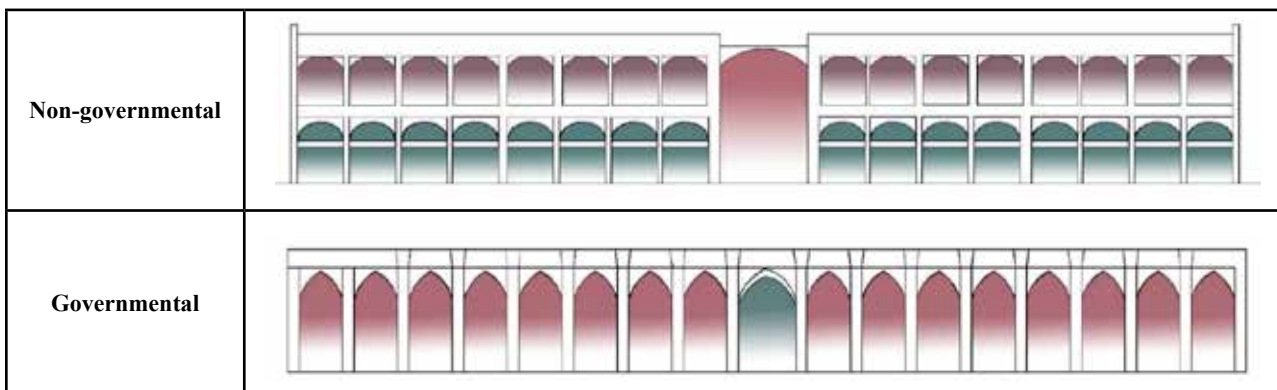


Fig. 2. Symmetry, rhythm, and repetition in the square. Source: Authors.

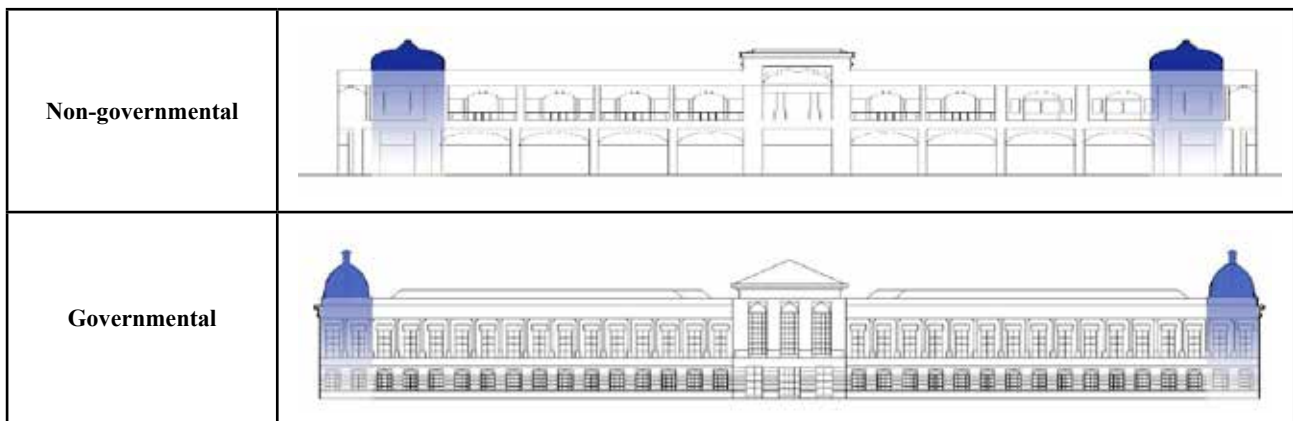


Fig. 3. Location and form of towers on the square Shell. Source: Authors.

Conclusion

The investigation of the urban view of Tehran’s squares revealed the similarities and dissimilarities of the facades on the governmental and non-governmental squares as well as their specific and general properties. It was made clear in a comparative study of the façades of these two types of squares through sample simulation and shape and details comparison in a 2D modeling software as well as calculation of the surface areas that there were used openings with eight shape species in the non-governmental squares and openings with ten shape species in the governmental squares. Both sets of the squares featured three shape types of façade; There are three types of facades that are arched, flat, or a combination of the two. In some cases, each floor has one of these species (see Table 5). Geometric proportions have been used to investigate their differences and similarities.

In all parts of the Shell, including the openings, the frame and the middle spaces, the governmental and non-governmental Squares are proportional, most of the openings having a ratio of one-fifths and two-thirds, often rectangular. Some are arched, with a ratio of one to three and two to three. These proportions are also present in frames with and without openings (see Table 4).

In both types of governmental and non-governmental Squares, there is elongated in the shells. In governmental squares the ratio of shell length to height is between one and one-twentieth and in

non-governmental squares one-fourth to one-eighth. In most squares, the portals has a strong volume in the center, and the elongated shell of the square strengthens its steady rhythm. There is a constant ration in the portal squares, in the non-governmental squares the ratio of the shell length to the middle span is between one-fourth and half to one-eighth, and in the governmental squares the ratio varies from one-seventh to one-tenth (see Tables 3 and 6).

The way the shells of the Squares are positioned and access to the spaces behind it are two types. In the first floor, most governmental Squares initially have access to a porch-like space formed by placing the frames to each other, crossing the porches to open the shells, but in the square Non-governmental organizations are often created directly to the spaces behind the square shell through openings located inside the frame, without any differences in the level of access. There are similarities in both types of Squares, such that they have a portal in both Squares that emphasizes the concept of input with a protrusion and recession as shell as being taller and wider than the other frames. Indicates to other parts of the shell. Another similarity is in the second floor, which often has porches that have no roof (see Fig.1).

On the shell of the governmental and non-governmental squares the frame, porch, vertical towers are fixed, the frames are repeated rhythmically, and the vertical porches and towers reflect this rhythm and repetition. Fractured,

resulting in eye movement and inconsistency in the shell. In most Squares, both groups are simple or flat in the first floor of the frames, and in the second floor the frames are often single-arched, three-arched, or rectangular (see Table 5). Frames span in each floor has two ratios, the larger frame being about four meters and the small frame spacing about two and a half meters, often using the small span for vertical access to the other floor (see Table 4). All the features mentioned in the shell constituent elements such as the placement of the frames, the openings, the way the terraces, the porches, the vertical towers, the porch and the shell protruding, the filled and empty surfaces work shell. The shell of the squares is visible and plays an influential role in the urban landscape. The ratio of framed space to shell surface in non-governmental squares is between one-fourth to three-fourths and in governmental squares more than half (see Table 6).

The solutions offered in the present paper for the first time can be good criteria for the selection of the proportions and the structural system in the designing of the today's squares. On the other hand, the investigation of the specific structural systems of constructions demonstrated that some of the systems and proportions have been more widely utilized in the designing structure of these squares. It is accordingly suggested that more attention be paid in the further and future studies and in the restoration of the historic squares to the combinations, proportions, geometry in façade and framing and skyline so that the contingent confusions in the urban countenance can be reduced and the ground can be set for the construction of an appropriate façade and ground parallel to the setting of the ground for the creation of high-quality spaces as one of the important designing objectives.

Endnote

1. A shell is comprised of the walls of several buildings and accessories that are attached in an immediate and continuous manner.
2. The governmental squares include all of the squares that are constructed by the direct order of the government, including the military squares.
3. The non-governmental squares are the ones that are most predominantly formed in the extent of the urbanization process.
4. The first period from 1891 to 1921 and the second period from 1921 to

1941 and from 1941 to 1978.

5. The first period from 1877 to 1926 and from 1926 to 1978.

6. Every layer of the covering is called *Oshkoub* which is equivalent to *Tabaqeh* in Arabic and Floor and floor in English.

7. In both sets of squares, there are more floors in some parts of the shell that feature a lower frequency.

8. In respect to the recessed shell

9. In respect to the protruded shell

10. In some of the squares, there is a need for several entrances considering the length of the square. The main transom is essentially located in the center of the shell.

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HOW TO CITE THIS ARTICLE

Hooshmand Shaban Abadi, F., Valibeig, N., Behzadfar, M. & Faizi, M. (2020). A Comparative Study of Tehran's Governmental and Non-Governmental Squares in the Area of Urban View. *Bagh-e Nazar*, 17(82), 47-58.

DOI: 10.22034/bagh.2019.172530.4006

URL: http://www.bagh-sj.com/article_101456_en.html

