

Non-Visual Elements of Perception in Bazars

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Abstract

Visual dominance has been recently propagated through a considerable number of technological innovations and development of a cornucopia of images. Although human experiences and world perception are regulated through a combination of the five senses, yet it seems that generation of contemporary architecture is solely affected by the visual sense, vision. Consequently, nowadays we encounter locations which do not leave any shared memories among people. It seems that the physique and structure of bazar can directly affect human's non-visual perception and the bazar has been formed to affect non-visual perception of space. As the manifestation of the Iranian traditional architecture, the bazar has been designed to engage all the senses. The present study investigates the non-visual components such as the visible and non-visible space-constituent architectural elements in Iranian bazars. The study was conducted with regard to the ecological theory of perception and based on comparative studies of documents, field study and library investigations. According to the results obtained, architectural pattern of bazars in Tabriz, Isfahan and Arak not only emphasize auditory territory but also they call for the presence of physical and tactile senses. These constructions were not formed based on an abstract visual idea; rather, they reflect a pattern of implementing senses in architecture which leads to establishing non-visual connection to the architectural space, aesthetic comprehension, strengthening mental image of environment as well understanding the surrounding environment.

Keywords: Non-visual elements, bazar, space,

Introduction

Throughout the history of philosophy-oriented sciences, proponents of mentalism and experimentalism have been arguing in favor of their own schools of thought. Taking advantage of their innovative ideas and opinions, Philosophers such as Kant and Burgson have tried to establish connections between these two approaches. The result is that the importance of human knowledge and comprehension can be analyzed from theoretical and practical aspects; most modern scientists reject the role of feelings and do NOT consider sensation as the only instrument to realizing the truth. However, regarding scientific value they believe that although sensations do not yield comprehension of the truth, they do direct humans in their actions. Thus, there is a direct correlation between human perception and external objects. For instance, physical stimuli such as sound and light waves exist in human's surrounding which facilitate perception by respective organs and leave impacts in mind. In order to connect to the world outside and adapt to the conditions, human beings benefit from their sensational experiences which are evaluated and analyzed via mental operations and instinctive processes. The findings might not completely specify the nature of external objects and internal world, but they direct us to comprehend this external element concisely (Ebrahimi Dinani, 1986).

Perception through the five senses as the basic form of comprehension has been neglected by the modern architects. Even in architecture-related courses, plans are assessed through observation, without benefitting from other human senses. Modern architecture rests upon strategies of psychological advertisement and in-moment promotions rather than existential flexibility and spatial

experience. That is why today we encounter places which do not leave common memories in people's minds. (Judat, 2001)

Nature, due to the ever-existing contrast of the quality of perceptions, is always healing and revitalizing. The eye is in collaboration with the body and the other senses. Individual perception of the truth is strengthened through these permanently in-contrast perceptions. Whatever is felt by the tactile sense – which can be considered as the subconscious ego- may be revealed through the eyes. We can feel far away surfaces, edges and shapes just by seeing while satisfaction or dissatisfaction with a certain experience is expressed through tactile sense. By the same token, an architectural artifact manifests a series of non-divisible inferences. A tangible example would be Frank Lloyd Wright's waterfall house, which combines the surrounding forest, volumes, surfaces, colors of the house and even forest smells and river sound in an absolutely unique experience. An architectural artefact is not confined to the images; rather, it is perceived in the texture of its materials and the spiritual presence it creates (Pallasma, 2005).

Any certain space or building is endowed with its idiosyncratic sound with regard to its intimacy or grandeur, its calling or rejecting, its friendliness or enmity. As much as we feel and perceive space from its visual elements, echo of sounds does affect our spatial perception as well. Auditory perception, however, remains in the background of mind as a subconscious experience. Vision is the sole observer while auditory perception is accompanied by the sense of connectivity and uniformity. The sounds of body organs create a feeling of conformity to the space in us. Making a sound of applause together with other audience or hearing the echo of our steps on brick-laden sidewalks, are examples of feeling an emotional load; sound reflects the spatial dimensions by making its measures perceivable. We feel spatial borders through auditory sense. The obtained experience from the contrast of a certain piece of art and the observer's body is a reflection of the artist's physical emotions. Accordingly, architecture is a direct link between the architect's body and the body of an addressee who may encounter the building centuries later (Pallasma, 20005).

The aim of the present study is to obtain basic information and to analyze the components of perception in bazars and to investigate visual proportions responding to the forgotten requirements of architectural design. In a contrastive analysis, document and statistics-based data and documents were categorized and arranged with regard to the research objectives and were analyzed as a next step. The research objectives include:

- Elaborating on a specific aspect of architectural concepts i.e., sensual perception
- Establishing a method to investigate sensual perception theoretically
- Introducing new criteria for emotional architecture and utilizing them in modern architecture.

Definitions of Sense and Perception

The term perception in its general sense, refers to the man's knowledge and understanding of the external world and his internal being and throughout history it has been the topic of discussion among philosophers as the basis for identifying and recognizing human. In the past, sense and perception were regarded as two distinct concept for ease of investigation. However, they are considered as inseparable issues today and scientists evaluate both perception and sense as certain behaviors, whether from a human or an animal, through precise and accurate experiments (Iravani and Khoda Panahi, 2010).

On the other hand, Mortazavi (2001) maintains that Perception and sense are two different concepts; perception is the external mechanism of a process related to the way sense organs are stimulated. It is about the manner of data gathering and specifying an internal mechanism of the process and the effect of background knowledge, as well as psychological and behavioral variables involved in interpreting and explaining the gathered sensational data. Environmental psychology

emphasizes on the closely-knit and incorporated nature of perception and recognition and environmental conditions, maintaining that such cohesion is revealed specifically when we distinguish between perception of objects and environmental perception (Mortazavi, 2001:66).

Our environmentally-perceived information and awareness depend on the variation and the level of contrast between the obtained data as well as the manner of categorizing and classifying them i.e., detecting patterns. The process is made possible by benefitting from senses in different levels although not all human senses can be directly utilized in thinking and making inferences (Shah Cheraghi, 2011:160). Generally, ecological theory of perception realizes data reception through the senses and the specifications of orienting and motional systems as forming the crucial basis of human perception system. Light, sound and texture can transfer data directly and without reconstruction of mind. In order to better comprehend the details, people explore their surrounding environment through body movements and facial gestures. As a matter of fact, people are capable of recognizing trivial details and more comprehensive environmental relations (Shah Cheraghi, 2011:161).

From the point of view of ecological environment psychology, aesthetical aspect of environment is determined with regard to its joyfulness which stems in sensational values and satisfaction of the 5 senses. Essentially, the meaning of environment is to be learnt inside the cultural core of any certain society by its members (Shah Cheraghi, 2011:161). With a closer look at the ecological approach to perception, it can be concluded that this pioneering approach is in contrast with the concept of uniformity asserted in the Gestalt Theory and interpretation of the role of experience in perception referred to by the Mutual Interaction Theory. Instead of considering senses as channels of sensation, Ecology-oriented approach takes a perceptual view towards them. According to this model, the universe has two levels; longitudinal and cross-sectional. Horizontal aspect expands when the distance from the viewer is enhanced. The ability to comprehend the perception of depth seems to be diametric and not to be learnt through mutual interaction. During different periods of time, architects have taken advantage from these level variations to create errors of depth, a type of usage specifically fashionable during the Renaissance (Lang, 2001,103)

Jean Payard (1974) argues that the data received from external world of a creature become uniformed through a sensational- muscular perception which is why movement and act in the world outside are such crucial concepts in this regard (Roklen, 1977). However, what matters is that ecology- oriented findings -based on appropriate consideration of the perceptual system of the five senses as well as orienting systems- can yield in two major outcomes;

- Creation of a sensational richness in the environment which adds to the quality and potential of environmental calling,
- Directing individuals towards contemplation, self-analysis and self-evaluation and (as asserted in Maslow humanistic model) to self- flourishment.

Ecological psychology asserts that aesthetic aspect of environment is formed based on its appealing nature which stems in sensation values and satisfaction of human's five senses.

Non-visual Perception of Space

Auditory perception

The most essential duty of auditory system in creatures is detecting and navigating sound and its location. Human can easily distinguish the direction of sound sources. The physical reason for such capability is the distance between ears and the source of sound production. Research has confirmed that auditory system can determine the direction and location of sound within a time gap of 0.00003 seconds (Irvani and Khoda Panahi, 2005: 76).

Haptic perception

Feelings associated with heat, coldness, pressure and the like are qualities often described by the tactile sense. Since 1890, it has been publically understood that sensitivity of human skin is not identical in various parts. Different experiments by Fery and Gold Scheider have revealed that certain parts of body are sensitive to heat while some other parts might be specifically responsive to touching or pain. Other skin areas, which are located between these sensitive spots, do not manifest significant reactions. The data obtained from different studies have given the researchers the chance to classify tactile sense into sense of pressure and touch, heat and cold, and the sense of pain. The major difference between tactile sense and the other senses is that the receivers of this sense are not located in one specific organ of the body, as the receivers for sight and auditory sense are. Instead, they are widely spread all over the body. Centralized cords are not connected to special nerves, but, they are linked to a network of nerves (Iravani and Khoda Panahi, 2006:85).

Olfactory Sense

Human beings are capable of distinguishing a variety of smells. Yet, this capability in man is far from being comparable to most animals. That is why research in this regard is very limited and rare, in addition to the fact that other human senses have been the subject of interest by researchers in most cases.

Table 1. The sense of considered as perceptual systems, based on Lang (1987)

Label	Manner of attention	Activity	Sensitive to	External data to be received
Auditory system	Listening	Paying attention to sounds	Airflow vibration	quality and location of vibrating acts
Tactile system	Touching	Various explorations	Variations in texture, formation of joints	
Olfactory system	Smelling tasting	Sniffing, sipping, etc.		
Visionary system	looking			
Basic orienting system	General orientation	Physical balance		

Bazar

According to the existing documents and clues the background of bazars in Iran dates back to thousands of years Before Christ (Soltan Zadeh, 2001: 12). Within the physical configuration of bazars, various spaces are present including: mosques, religious centers, libraries, temporary shelters for tourists, castles and defensive facilities. Moreover, similar spaces such as coffee shops, public baths and in some cases hospitals have been arranged. The element of “bazar” is the only distinctive factor and the most outstanding criterion of the originality in Islamic/ oriental cities (Zia Tavana, 2001:20).

Essentially, the term “bazar” refers to a cluster of shops which are attached and connected through a roofed space (Falamaki, 1371:71). In fact, bazars were combinations of various buildings and constituted the backbone of cities in the past. They could be seen either as a string of shops and buildings attached to them or a main body and its belongings. The string, in some cases a straight form and sometimes a plant-like shape, might acquire different branches. Yet, it is always created by the repeated pattern of a simple arcade with two shops on both sides. Opposite to this monotony, the adjacent buildings are varied with regard to the shape, structure and function including:

governmental, commercial, educational, religious and services. However, the most important ones were business and commercial buildings (Haji Ghassemi, 2004:7).

A commercial construction and the bazar string – though two connected and attached entities- are separate from each other: it is quite possible to visualize a commercial building without the string and vice versa. However, the total image of bazar is created by the co-existence of these two factors.

When a person passes through intertwined, packed and crowded spaces – normally dark and busy areas in bazar- and then arrives at a wide-open courtyard or a vast, elegant, roofed timcheh, he/she is relieved and a feeling of relaxation embraces them. As a matter of fact, without its neighboring attached buildings, the structure of bazar is unfinished and incomplete. The adjacency of relaxation to the crowded bazars combines spaces related to business and those linked with life, metaphorically suggesting that even within the humdrum of a crowded bazar it is possible to feel relieved and relaxed, not just on the part of customers but for the shopkeepers and businessmen as well (Haji Ghassemi, 2004:7).

Bazar has a variety of sub-classes including: Sarā, Caravan Sarā, Tim and Timcheh, peripheral spaces such as docks and baharband. Sarā is normally a building with wide yards; Timcheh is a roofed, large space with a high altitude. Caravan Sarā, has been used as a place of temporary residence of caravans which mostly has a large courtyard and its rooms are more shut; Tim is a large Timcheh while dock and baharband refer to out-of-sight spaces with vast yards where in the former cargo and luggage were loaded and the latter was a sort of barn or stable for keeping horses and livestock. It is worth mentioning that Gheysariyeh and Charsoo are not categorized under bazar-dependent buildings because they are members of bazar main row (rāsteh) classified as parts of this chain. In other words, Gheysariyeh refers to the major line of the bazar and Charsoo is the junction of two bazar rows (rāstehs) which is distinctly identified from others through a significant dome.

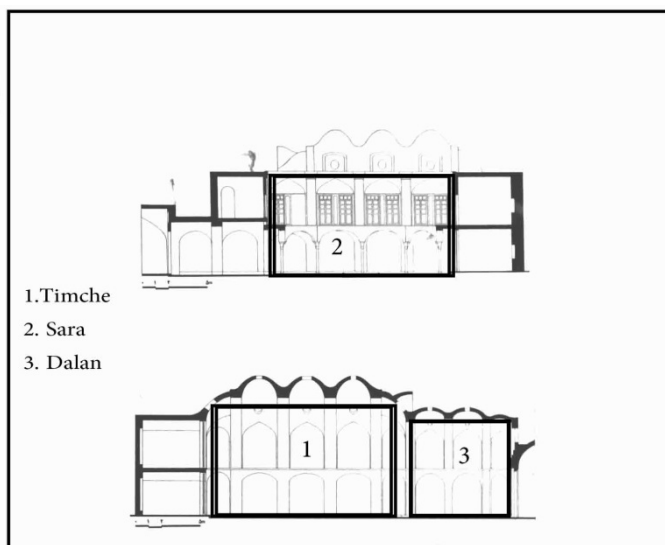


Figure 1. section of Timche, Sara, Dalan, from Authors

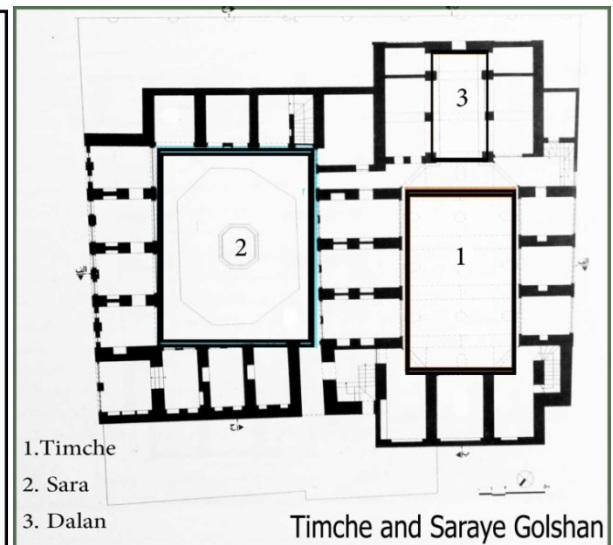


Figure 2. Plan of Timche, Sara, Dalan, from Authors

Statement of Research Objectives and Methodology

During the past decades, the necessity of making sound inferences and comprehensions from the concepts related to the social/ spatial status of Iran in the past, namely the structure of bazar as a social organization has led to an increasing interest in systematic study of the basics of Iranian traditional architecture by researchers and experts. The very first step in specifying the effect of the structure of bazar on human perception and sense begins with recognizing the structures, the arrangement of spaces and utilization of materials and natural elements in Iranian bazars. In the present study, first, three sample bazars formed in different historical eras were investigated from the structural point of view: bazar of Tabriz in the Safavid era, bazar of Isfahan in Safavid era, bazar of Arak in Kajar era. In science related to the environmental and perception issues, the importance of orienting systems and the perceptual system of human senses is emphasized with regard to the environment. This is exactly the topic of discussion which has long been neglected by architects and designers who have applied a unidirectional approach based on perception of shape, form, color and texture without organizing other human senses in environment. Therefore, the present research is an attempt to specify the strengthening elements of perceptual system of senses, its characteristics and properties through a comparative analysis to the properties of Iranian bazars.

An Overview of Isfahan Bazar

By selecting Naqsh-e-jahan square as the most important so-called governmental square of the Safavid Government, the direction of development and expansion of Isfahan Bazar was set towards its connection to the new square to expand its surrounding spaces. In spite of its initially organic growth in the ancient texture, the bazar was revolutionized at once by designed construction leading to the creation of a well-organized bazar with specific geometry and structure (Ahari, 2001:137).

Isfahan Bazar Complex is the backbone of the organic texture of the city, the subsidiary branches of which have opened their way into the major city lines ending at its gates of entry. The axis of bazar has a straight, linear form similar which in some points has dotted centers of decisive importance for controlling the city life and making decisions. The backbone continues to be seen in its linear form again after passing these spots. It also includes vertebra and binds which are curved based on the mode of formation and the movement of the texture in which they are located. As the city backbone and retainer of the city life system, the bazar circulates civil and social activities of its surroundings as well as the urban texture leading to the city center and the parts stretched to its physical extremes. Benefitting from vastly-expanded sub-branches, it both determines and delimits the direction and nature of growth in the city based on the principle of centralizing general urban activities. The system of city life comes into practice via bazar and its sub-branches and in this way the tightly-connected structure of bazars and mini-bazars gains a substantial role in the city life system (Ahari, 2001:138)

An Overview of Arak Bazar

Arak Bazar Complex, was created during the construction of Arak City in the middle of 18th century based on a pre-planned design at the order of city governor. In contrast to most bazars, its routes are not free, curved lines, rather, they are straight and geometrical. It consists of a main bazar row, a peripheral row and a number of passages crossing them. Combination of the main bazar row with numerous meeting passages create the chess-like blueprint of the city. Most of the buildings located here date back to the Ghajar dynasty reign. A great level of similarity is to be observed among these various buildings, such as:

- Relatively well-ordered lands,
- Major lines paralleled to the main row or bazar routes,

- Each building consisting of open sections (Sarā) and closed spaces (Timche): in this bazar, independent Timche and Sarā is rare,
- Insignificance of the spatial configuration and order of Timche and Sarā with regard to the entrance: some times Timche comes first whereas at other times Sarā takes precedence.
- Similarity or identity of divisions and geometry of Timche and Sarā in each building,
- Insignificance of the middle lids
- Simplicity or lack of accessories, decoration or additional parts,
- Brick facades and in some cases stone columns; in general, utilizing materials which are similar concerning shape, color and materials applied in facades,
- Simplicity of doors and windows,
- Lack of detailing in entrance spaces,
- Mono-layer close spaces around middle spaces (Hadji Ghassemi, 2004: 48)

Examples of the most important Timche and Sarā in Arak Bazar are Akbaryan Timche and Sarā, Hadji Bāshi, Kashani Timche, Golshan Sarā.

An Overview of Tabriz Bazar

The bazar of Tabriz has always represented the glory, significance and importance of the city. Throughout history, geographically strategic location of this city has led to its decisive role as the meeting point among different cultures from the past to the contemporary times. Authentic documents referring to this bazar date back to the 11th century B.C and onwards (Ismaeili, 2008: 33).

Similar to most Iranian bazars, Tabriz bazar has a linear and organic structure which has acquired a limited number of major lines (Rāsteh) and some more peripheral Rāstehs. All of the significant elements of architecture in Iranian bazars can be observed in this bazar including: Timcheh, Sarā, Rāsteh, Mosques, Public Baths, etc. (Ismaeili, 2008: 45).

Today, the Main City Bazar is regarded as an urban block within the ancient city texture playing the role of a landmark for the city. As one of the world's largest roofed bazars, Tabriz bazar constitutes of 16 Rāstehs, 14 Dāllans, 20 Timches, 25 Sarās, 14 mosques and almost 8 thousand shops.

Table 2. Structure of Isfahan Bazaar

Isfahan Bazaar	Malek Complex	Saroutaghi Complex	Mokhles Sarā	Mohammad Sadeq Khan Sarā	Golshan Sarā	Hadj Karim Sarā	Hall Sarā
General Theme	3 major parts: timcheh (2-storey), sarā and baharband located next to each other on an east-to-west axis Axis of symmetry perpendicular on the bazar rāsteh	-Charsoo (four-edged), entailing a large sarā+ two small sarās + one hashti and two dāllans -The main sarā has a rectangular courtyard, double-storeyed	Middle yard with rectangle-shape base, double-storey shops	Squared courtyard, asymmetric edges	Rectangular yard -Entries on the sides, mono-floored	Four-terraced	Similar to four-terraced school design
Decorations	-Delicate decoration of timcheh arch -Tile and brick -wooden façade chambers - porches with wooden roofs	-combinations of tile and brick on quarters of arches -wooden façade of chambers Brick-laden façade of courtyard and	Simple, fully bricked	Balanced rhythm of facade	Brick, tile and plaster Identical arches, monotonous	Brick-derived material+ wooden windows and doors	Only brick with no decoration

	stabilized on stone columns	plastered façade of small porches			rhythm, decorated arch		
Entrance	Forecourt has plaster-decorated facade	The initial space is a squared hashti attached to the dāllan through an elegant gate	-western entry is decorated and embellished Middle arch receives more light+ more decoration		-four entries on the corners none of which is significant	The backward and dark view of dāllan entry under rooms and its contrast to the outward parts	Not significant
Difference of height to the bazar	Short corridor attaching timche to the bazar	Double-floored hashti -Daallan has a base of a hasht and half+ decorated arch Circle-form arch with more height compared to other dāllans	Dāllan height is rather short in the beginning, then becomes higher, double-storey		Courtyard is attached to a long corridor and it has single-floored layer	Dāllan is attached to sarā, changing the altitude from one to two storeys	Corridor height is decreased to one floor by embedding an attic-like space
Courtyard building	Under tiche aperture, there is a pool. The form corresponds to spatial base and dimensions. Within sarā courtyard, a diamond-like pool in accordance with stretches of yard		Combination of soft surfaces and plantings+ heavy colors applied to the floor and body	Stream-like, stretched pool with fountains and stone	Circle-form pool Vast green area in the middle of courtyard		Construction of courtyard cannot be evaluated due to manipulations done.
Illumination	Timche has 3 apertures: Middle aperture is a little larger and more details have been added to that. Apertures between arches are reticular and zigzag- form	No patio or other light-receiving spaces	Open and light space adjacent to closed, half-dark bazar space -Middle court is specified with enhanced decoration and different manner of lighting - No openness on the base				
Movement space		Similar, proportionate chambers with steady rhythm	Dāllan space enjoys the quality of dynamicity				
Pause space		Changing entry size in the middle, northern and southern fronts	The width of bazar enhances just in front of dāllan entry (known as Mokhles Charsoo)			Timche has been designed within a dāllan	

The most magnificent Timcheh in this bazar is Mozafariyeh where Iranian carpet is traded whereas the dome of Timche Amir is the largest of all, allocated to merchandising jewelry. Among the well-known bazar Rāstehs, one can refer to Dalaleh zan, New Bazar Rāsteh, Kolahdoozan, Old bazar Rāsteh and She'er bafan. It is worth mentioning that today these famous Rāstehs are separate from bazar while they used to be attached to it in the past, before the street line zoning during Pahlavi era (Ismaeili, 2008: 46).

Table 3. Structure of Arak Bazaar

Arak Bazaar	Nozari complex	Golshan timche and sarā	Ketabforoushan (book sellers)	Kashani timche and sarā	Haji bashi (major manipulations have occurred)	Akbarian
General Design	-Combination of open and close spaces, entailing 5 separate parts joint to the sarā+ 2 dāllans on both sides	-Adjacent timche and sarā with separate entries -double-storey timche with rectangular base	Orthogonal, rather organized shape of land -Unusual combination of closed and open spaces	Adjacent sarā and timche -Polygonal geometric form	-U-form timche with stretched proportions	Simple, organized set of a timche and a double-storey sarā
Decorations	-Stone columns -Simple bricked façade and wooden windows	-Sarā: semi-lunar arcs of the porch rest on stone columns -Wooden doors and windows -Simple brick decorations	-Internal façade of timche is fully bricked. -Timche plays the role of hashti for whole complex. -Brick and stone-base decorations Flat, wooden ceiling	-Regarding material form and size , upstairs differ from downstairs -Completely bricked first floor -Upstairs is a combination of plaster and brick and semi-lunar frames, flat doorway	-Fully-bricked arches and vaults -simple arches -zigzag-form arcs -plaster-based decoration -wooden doors and windows	Fully-wooden façade chambers Brick façade +wooden windows
Difference of height at the bazar joint	Single-floored dāllan		Dāllan is double-floored and relatively higher than timche.	Timche entry to the bazar is signified by height enhancement		Joining single-floored dāllan to a double-floor sarā
Courtyard building		There is a pool in the middle of courtyard, its shape corresponds to the yard shape with u-form entry header. It has been altered to look like a garden	Relatively large pool in the middle of courtyard, its shape follows timche format, with four rectangular gardens on the 4 corners	A large garden. Its shape corresponds to the yard form.		Stretched, north-to-south pool

Illumination		Timche ceiling embraces consecutive brick arches with a circular aperture in the middle	-Dällan is connected to the timche -Successive arches and vaults with lateral aperture	On both sides of each arch an aperture with zigzag arc has been embedded		Timche has a stretched shape and frequent light holes (cheshmeh), light reception occurs through the center of each cheshmeh. Chambers receive light from both sides; fully bright as opposite to bazar chambers
Movement space	Sarā: the entries do not enjoy any specific rhythm.			Steady rhythm of entrances and arches	Monotonous chamber entry and arch- design of timche have	Timche with stretched space
Pause space				Sarā has got Square-like base		Central, Square-form space of sarā

Table 4. Structure of Tabriz Bazaar

Tabriz Bazaar	Mirza Shafie Complex	Amir complex	Mir Abulhassan Sarā	Haj Mohammad Qoli	Timche Malek	Mozaffariyeh timche	Haj Safar Ali	Haj sheikh kazaem
General Theme	Sarā, long timche, dällan	A large sarā, 2 timches; one in north-western, another in south of sarā. Four-terrace design	Combination of bazarche (small bazar) and timche-like charsoo+ its surrounding dällan, courtyard and chambers	Combination of open and closed spaces including 2 dällans, one timche, one sarā with entry on the corners	Stretched form, adaptable to the land format	Timche is similar to a dällan with two parallel entries	Dallan+ mediator y spaces	3 cores: Large Timche Small timche Small sarā located in the north of main timche
Decorations	-Red-colored bricks with white rope-linings - Plaster-based formal decoration -Wooden façade of chambers -Simple decorations with outstanding shapes	The arc of porch is higher and the frame has onward appearance by the measure of one floor. -Façade materials include Dark brick and light – colored rope-lining -formal	-Relatively constant rhythm of facades with high pitch Porch is stabilized and strengthened in the middle of each front Façade is a combination of zigzag arcs and frames covered by	-Wooden columns with plaster covering in the sarā courtyard -Dark brick and light –colored rope-lining in timche	-Dark brick and light – colored rope-lining -wooden doors and windows -plaster-based formal decoration	Formal decoration of the middle arch - Dark brick and light – colored rope-lining - macro-size Plaster modelling with simple shapes on arch quaters	-Heavy decoration on ceilings, Dark brick and light – colored rope-linings -old wooden windows have been replaced by metal	Formation of arch is based on organized geometries -A high arch and two domes in the middle and four half-arches on the corners

		decoration based on plaster designs	brick and plaster coatings				windows	- Simplicity of materials favoring geometry - wooden columns and fences -white walls and plain windows
Difference of height at the bazar joint	-Longitudinal axis of sarā is perpendicular on that of timche. -in the junction of these two axis, the timche base has acquired more openness and iys arch is highe, circular form and decorated. -Dallan is narrowed but it has the same height as timche		-Dallan is double-floored and courtyard is single store. -Charsoo appeared on this junction has decorated arch and its height is equal to two floors. Thus, changing entry size has led to its relative independence from the bazar	Dallan is lower than timche. Yey it is double-floored	-A small and low-rise dāllan attaches timche to the main bazar rāsteh -spatial preparation for joining entrances through changing altitude size and base form (climax and perigee are observed in the design)			- Connection to the bazar rāsteh is via a small corridor which has a surface lower than the bazar - Second timche is lower in height compared to the main timche
illumination				-Formal decoration of timche arch ends in a scheme, in the middle of which there is a circular aperture	-Dome has no central aperture but a number of lateral apertures	Central arch leads to a circular aperture in the middle through a 16-angle scheme -Two other arches which are symmetric compared to the middle arch, have formal decoration as well. Yet, the design is simpler leading to an 8-gonal scheme and an	-No central patio -Dallan has several hornos similar to bazar rāsteh - declined floor of dāllan	Simple formal decoration leading to an eight-angled patio at its climax

						aperture. -lighting mode emphasizes on the organized geometry and central spaces as well as orderly rhythm.		
Movement space			-Small pool in the middle of rectangular gardens - charsoo-shaped			Having similar arches, arcs and entries		
Pause space		A hasht and hasht-like pool in the middle of bazar -Middle arch is signified as the center of space or scheme.		Four gardens on the four corners of a small pool in the courtyard	Centralized space is significant because of openness of base and increasing height of dome in addition to the shape of decorations and light-reception	Moderately-higher middle arch		

Discussion

In this section of the study, data gathered through literature review are categorized and classified in tables in order to be easily analyzed and interpreted. Based on relevant studies and available documents, regarding spatial hierarchy, Isfahan Bazar consists of: Timcheh, Dāllan and Sarā which are attached to the bazar Rāstehs, respectively. To enter a specific Sarā, the user has to pass these steps of spatial hierarchy. However, in some Iranian bazars such classification might not be seen today, due to the interferences and alterations done to the general scheme of bazars during Ghajar dynasty and onwards. As an example, in Golshan Timcheh and Sarā in Arak bazar there are separate entrances for either Timcheh or Sarā which is a non-customary combination in Iranian bazars.

As was mentioned earlier in the part dealing with theoretical foundation of this research, materials and illumination have substantial roles in sense-based perception. Regarding decorations applied in the 3 bazars under study, the most frequently-used material is brick, the implementation and type of which varies in accordance with its surrounding space. In Tabriz Bazar dark-colored brick has been applied along with white rope-linings. Utilization of brick, wood and glass is obviously abundant in Iranian bazars. This materials have been implemented in a manner that viewer eyes follow the lines in a direction from floor to the ceiling. Such variety of texture was not created merely because of static position of ceilings, especially in Timcheh which enjoys fully-decorated ceilings.

In addition to the above-mentioned materials, in Arak bazar, which dates back to the Ghajar Dynasty, stone is also occasionally seen. With regard to the entrance spaces and their significance in sense-based perception, in Isfahan bazar, the entrances have been attended to specifically, the manifestation of which can be realized in Gheisariyeh entry gate header. In general, entrances are normally half-dark, back-drawn spaces with heavy decorations. Based on the investigations done, with regard to height, spaces are classified as illustrated in the following picture, so that in most cases the mediatory space has acquired lower height compared to main spaces while having less decoration. An exception would be in Isfahan bazar where some Dällans, e.g., Saroutaghi, start with a base size equal to a Hasht and half and dome-like decorated arch connected to a longer Dällan.

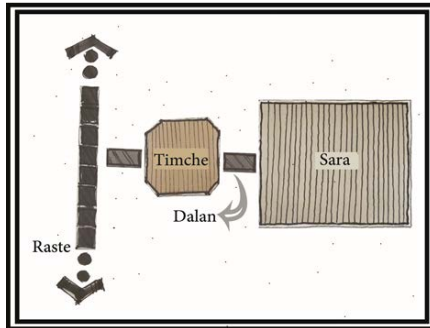


Figure 3. Plan graphic for Bazaar, From Authors

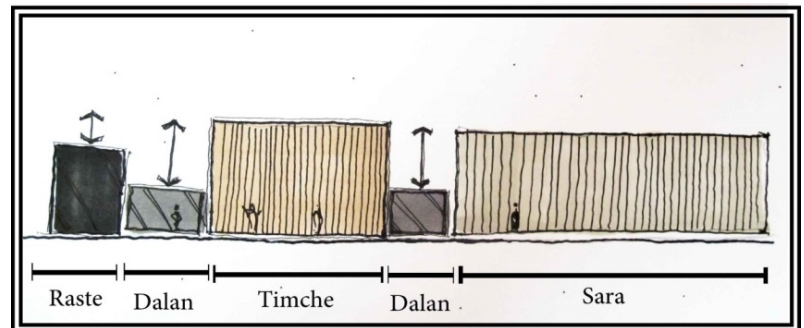


Figure 4. Section Graphic for Bazaar, from authors

Such variations of height could be traced in all 3 bazars studied, although the difference of altitude in Tabriz bazar is less compared to the other two. However, despite the importance of preserving natural texture and attention to elements of water and plantings in old bazars, today most ponds and pools have been omitted from the bazars due to structural manipulations applied.

Results and Conclusion

In sciences dealing with sense/ perception issues as well as environment recognition studies, ecological theory of perception emphasizes on the importance of environment- orienting systems as well as the five-sense system. Table 5 depicts physical systems of irrigation, planting and establishment of buildings in Iranian bazar and the manner in which any of these items affect human senses.

Basic Orienting System

Direct movement in the environment awards human beings feelings of contemplation, urgency and target-achievement (Shah Cheraghi, 2011; 164). Bazar consists of direct, linear Rāstehs where elements have been arranged and organized in a rhythmic manner. Humans tend to move in the direction of targets, i.e. sense-related stimuli. Within the domain of a bazar, these stimuli might be; light prisms radiating and glittering from Hornos, bricked arches, shops with wooden doors repeated with a symmetric pattern along the whole Rāsteh. In addition to light, decorations and stability of arch positioning rhythm, existence of movement axis is also emphasized in the structure of Iranian bazars. Thus, the user walks towards a certain target in a steady and direct movement while his/her five senses are being affected by the light, shadow, temperature variations, plants and water. Beside this linear path, there are elements and buildings creating a static mode of space which makes user stay and think for a moment regardless of the surrounding crowd and noise. The structure of bazar, therefore, has organized a combination of pause and movement spaces.

Visual Perception

Iranian bazar is a center for daily life activities and social interactions. Thus, it is very important to be seen there. A passer-by notices the location of a bazar from its various urban elements such as mosques, entries and central squares (sabze meydan).

Proportions, similarities, the rhythm of arches, shops and Hornos which are located next to each other symmetrically and uniformly create a sort of continuity and connectivity of sight in rāstehs.

Along with such linear monotony, differences in spatial proportions have also led to variegation and diversity of visual data. Such variety is also apparent in materials and their mode of application such as brick laying or brick arranging seen in different spaces.

Auditory

Generally, presence of sound, echo and acoustic variation are among the factors which make a certain place favorable or not. A number of factors are involved in the quality of auditory perception as a result of alterations in spatial echo. These factors include: spatial dimensions and size, changing roof form, difference of materials applied in different spaces; open, closed or semi-closed spaces. Due to its rhythmic order of arches and continued proportions, the bazar rāsteh creates a more crowded space compared to other spaces. As was mentioned earlier, dāllan is a space with low height and width, normally with no opening on the roof; these characteristics have led to the creation of a silent space used for passing. A fully-decorated ceiling is supposed to be a better sound absorbent since more materials (mostly brick and) are implemented and different forms are applied; thus, in timcheh, normally, less sound is heard and it is regarded as a sort of silent space in bazar.

Smelling

Within the system of assigning functions in bazar, smelling stimuli are felt inside different sections of bazar just as the auditory stimuli do. Position of certain goods or services at a specific rāsteh such as carpenters row or groceries awards a unique smell to the place which not only attracts people to the area but also it becomes a part of mental images and memories associated with that.

Haptic

This sense is extremely effective on comprehending aesthetic aspects of space. The more the variety of materials, texture and form might be, the greater the impact of this sense on realizing beauty becomes. A major point regarding haptic sense is that memories associated with this sense are stronger compared to other senses. It is also directly in line with the visual sense. While using decorations in architecture certain factors should be observed such as perception through haptic sense as well as availability. One can identify a variety of brick laying modes in bazar. Decorations of Moqarnas, Moarraq, Knot-forms and Bowl-forms are frequently-seen examples which have acquired shades of form and shape. Such variety can be realized even in the design of roofs, pinpointing the fact that it is not solely due to the static mode of ceilings. Light and temperature are elements perceived by the tactile sense. Since the bazars are normally roofed, illumination of different spaces is location-specific; while shops and stores have no source of direct exposure to daylight being located in darkness, bazar main rows and rāstehs are half-dark due to receiving sunlight from the roof. Meanwhile, the hierarchy of light prisms emitted from the roofs advocate users' willingness for movement. By passing through these connected spaces of darkness and light, the user spontaneously encounters a half-lit space depicting another phenomena of presence of fully-light spaces somewhere beyond the present space. These are regarded as the spaces mediating between surrounding buildings which welcome visitors and create a sense of spatial identity for the user (Behzad Far, 2009: 15).

Rhythmic light orders, in the form of optical prisms in the main bazar row, lead viewers along the path by creating both repeated patterns of pause through that specific *rāsteh* and a half-dark space as well. Intensity of this light enhances in *timcheh* due to the presence of wider *Hornos*. In *dāllans*, however, lack of openings has created dark spaces and *sarā* is supposed to be a fully lightened, open space. Within the 3 bazars studied, difference in the roof openings is related to their position; whether it is on rooftop or at the corners. However, the quality of light-reception, which ends in the creation of dark, semi-dark and light spaces, seems to be quite similar.

Table 5. Elements of Sense Perception in Bazars.

Bazaar physical system	Weather system	Water system	Greenery system	Light system	Building placement system	
System of perception of the 5 senses	Visual sense		Stone-carven pools on Sagha Khane junctions.	Plant shapes carved on entries. Plants used in surrounding buildings of bazar like Caravansarā	-Fully-lightened spaces -Dark spaces -Half dark and half-light spaces	-Urban symbols and elements informing a passerby about the existence of a bazar (mosque, entries, sabze meydan) -Position of similar activities close to each other (form-based unity) -Similarity and continuity of chambers -Connectivity and cohesion of sight in <i>rāstehs</i> -Physical confines through walls and ceiling -Visual tone of architectural elements such as arches, chambers, etc. -Variety of decoration in different spaces -Similarity and rhythm of space concerning shape, color and materials applied in facade
	Auditory sense		Using small fountains in space		-Major <i>rasteh</i> with an arch-like ceiling has a different echo sound compared to other <i>rāstehs</i> -Changing spatial measures and dimensions -Changing roof height -Constant rhythm of arches -Reducing height in <i>dāllans</i> and lowering floors	
	Taste/smell sense				Positioning different functions in <i>rāsteh</i>	
	Haptic sense	The bazar orientation is not facing the unfavorable west wind. Pleasant wind flow through windows and Bazar passages are located in the direction of wind.			Rhythm of light Different light intensities in different spaces Monotony of entries and parallel walls	-Variety of decorations on walls and ceilings in different spaces -Texture of tiles, brick and localized materials -Brick and simple, wooden windows of chambers -Bricked and wooden envelope frames -Wooden columns and constructions
Basic orienting system	Movement axis		Creating central space via placing pool in the middle		Intensity of light is enhanced in pause spaces	-Rhythms of different fronts within bazar -Creation of different visual axis -Linear, organic structure

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Glossary

- Ajor Chini (brick-laying): Laying bricks in different manners applied in masonry.
- Ajor Kari (brick-arranging): Decorating and modeling with various shapes obtained through arranging bricks in different angels.
- Jelokhan (forecourt): An open area located prior to gate header. A part of entry system.
- Charsoo (four-edged): A vast area with circle-form arch in the junction of two or more bazar rāstehs.
- Dāllan (corridor): A roofed area usually used as passage. A short, narrow and roofed rāsteh with specific start and end.
- Bazar rāsteh (main row): The axis of movement inside bazar with the shops and chambers on both sides.
- Sarā: A building inside bazar containing a courtyard and its surrounding chambers. It is the center of trading and storing goods.
- Zarb ahang (rhythm): the visual tone or pitch obtained from the concession or go-togetherness of architectural elements such as: arches, chambers and windows.
- Gereh chini (Knitting the ties): Creating ties by wood products.
- Timcheh: A construction within the domain of bazar, entailing a high, roofed central space and its surrounding chambers. It is a center for merchandising and preserving goods.