Preparing procedural process of provision of colorful palette of city

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Abstract

Color in a city can be indicative of the identity of that city and its cultural features. This is color that creates vitality and the difference in the experience of citizens from urban spaces. Colored perspective of a city has been formed by colored combination of building walls and decorative elements, as well as movable elements such as the color of the cars. The geography theory of color considers colored perspective of cities dependent on natural and human geography of them, and considers it an expression of historical character and identity of those cities. New constructions have turned all cities to dark and gray form of mass of cement and iron regardless of visual conditions and historical identity. So finding a method for how to provide a colored palette for a city is an answer to this problem that in one hand is related with identity and geography and history of that region, and on the other hand meets psychological expectations of citizens from the perspective of color. This research tries at first to investigate and analyze the methods posed in the field of colored palette of city in the world and then provides procedural process for how to provide of colored palette of city after posing questions.

Keywords: colored palette of city, geography of color, identity of city.
Introduction

"Color" is one of the factors, which plays an important role in better understanding of the urban spaces. Today, the identity of many cities in the world has been defined by the colors used in the appearance and perspective of those cities. Colors are able to change meaningless spaces to meaningful spaces, and cause the readability of cities and even urban neighborhoods, and create a pleasant and desirable feeling in citizens from the city. This can increase the sense of belonging to the city, and improve also urban identity and even local identity in citizens. (Shakibamanesh, Mahmoud, 2005) Today's cities of us are extremely poor in terms of color. Language of colors is forgotten language in our urban spaces for various reasons. City needs to be guided in order to give a specific quality and nature and distinguish it from other cities. Colored palette of city includes both objective and subjective aspects. Physical effects of colors in the city form the objective dimension and their psychological effects are included in subjective dimension. Colored perspective of the city (objective dimension of palette) can play a fundamental role in the formation of mental colored image (subjective dimension of palette) from the city in people's minds through its colored palette. In fact, the reason why some cities create boring mental image and some others create happy image in the memory of visitors is related in a large extent to the colored palette of city. (Einollahi, 2012)

Research Methodology

Library Studies has been placed as the base of the research method in order to investigate subjects of color, scale and colored palette and to find different ways to produce colored palette for a city. In continue, qualitative - descriptive - analytic method has been chosen by the extraction of various indicators, as well as provision of questions of procedural dimension. The order of colored palette in this research is a tool by which be able to categorize colored perspective of cities and urban places, and design colored perspective of city by using colors. This colored palette is obtained by examining all samples, including materials, color of facade, furniture and so on and putting together the removed colors. Better results can be achieved from colored palette by survey of users. Also the order of the questions of procedural dimension in the presented research is recording and evaluating colors used in artificial elements, natural elements and color preferences of people, such as color of citizens' covering, cultural factors and so on.

Factors affecting the color on an urban scale

Traditional color of city is the one aspect of its history. Small and big European cities were developed with slow flow of natural growth by the early nineteenth century; they generally used local materials in their regions. Architectural methods, including resource constraints were available, and shaped this form of the buildings that were related to human scale. The mutual use of local materials created an urban collection with a visual proportionality despite the diversity of forms. Subject of color in architecture in modern and traditional industrial and urban perspective architecture is related with visual quality. Change from constraint to the broad colors provided a degree of attention. It creates a unique position as a general view of architecture outside the building. Any changes to it are related to us and cannot be changed by arbitrary choice or reciprocating decisions, however incentive. (2009: Porter)
In general can be said color of city on this scale is affected by the geography and climate, cultural and historical context, technology and urban indicative elements.

### Geography and climate

"Jean-Philippe Lanka" is the first person who put the concept of "Geographic Color" based on culture. In his research, he sees color in the viewpoint of geography and culture. This means local geography is a factor of incidence of cultural meaning of color. Different geographic locations and physical environments each have their own specific climate. These factors affect the incidence of human life, culture and so on, and form different artistic tastes. Geographic effects, the Earth topography, proximity to the waters, latitude and longitude, height above sea level, and natural context play an important role in formation of mental image of the color of city in the minds of citizens.

(Swirnoff, 2000, 16) The climate colors towns and villages. Geographical location, weather conditions and the amount of utilizing sunshine have essential role in the formation of colored combination. (Bakhtiari Fard, 2009) Among these, the vegetation coverage of city is one of the most important elements supplying variety of color and has fundamental role in shaping colored appearance of city.

### Cultural and historical context

Each city has its own unique color tone that has been obtained during its development and by its natural history and cultural environment. Sometimes a specific color is used over time in a city to the extent that allocates important part of the culture of that city or area to itself because of this continuation. In such conditions, the color becomes severely symbolic mode. In a way that can be said the color of a city reflects its history. (Porter, 1982)

The phenomenon of color is characterized by related new and stable system of semantic tools. This is defined objectively, but is still open for improvement towards people. This enables its dynamic development with social culture. Phenomenon of color that poses semantic, emotional and aesthetic information is called culture of color. This is caused by variety of social - spatial processes and continues it, and shows a special reflection of spiritual conditions and the physical - spatial environment level of society, groups and individuals. A relationship between color and objectives, events and ideas is derived with different cultures and leads to crystallization of colored symbols' system that especially the time frame prolongs a unit production. (2009: Porter)

### Technology development

Most of traditional cities were using their local materials before the industrial revolution. Architectural styles have been shaped by the constraints caused by materials. This ordered the buildings' form, as well as their color. (Behbudi, 3, 2003)

Although the use of new technologies has injected new and various colors in large surfaces to the today's cities, this variety of materials has caused almost none of them to be considered as dominant color in the entire city in large cities despite their great effect across the city. But on
the other hand these technologies can be utilized to make dominant one or more limited colors in parts of cities. For example, the use of 3-centimeter-brick in historical contexture of Isfahan has caused us to be witness of dominance of Acker color in this contexture.

**Urban indicative elements**

Urban indicative elements are reference points in the appearance of city, which are turn to fundamental elements across the city to because of their specific appearance, performance and / or meaning. Urban indicative elements are building, visual elements, natural effects and so on that are turn to characteristic of a place. Of their manifest characteristics is that they are indicative and unique. Obviously, visual scale and dominance of urban indicative elements are determinant in specifying their position. Elements of city indicator have very direct relationship with human mental process to perceive space. Mental image of individual of environment is the achievement of two main factors: on the one hand, memories, relationships, experiences, wishes, and expectations of him, that all as a conceptual set provide context of linking between the individual and perspective, on the other hand, the three-dimensional data received from "perspective" shape the mental image as an schema (Pakzad, 2007, 168) Now among these, there are indicative elements in the minds of citizens that are posed on an urban scale. Thus, an image is formed in their mind by stating the name of each city for its citizens that include indicative elements of that city. Therefore, color of the image formed in the minds of citizens, which includes the color of urban indicative elements is also considered a part of the color of city. For example, according to a research has been conducted on the color of Isfahan, a part of the dominant color in the minds of the citizens of the city of Isfahan had been related to turquoise-colored of Zayandehroud River as a symbol of this city, as well as because of the turquoise-colored of tiling that had been posed in the whole city, and is of the other indicative elements of city (Ghaleh Noee, 2010: 250). So one of the factors and perhaps the only factor by which the designers can affect the color on the scale of city is utilizing urban indicative elements. These indicative elements can be placed in two categories: natural and artificial. So that if the natural elements such as river and mountain and so on can be placed in the first category and elements such as buildings, or even indicative urban space can be placed in the second category.

**Constituent elements of color in city**

Colors can be seen everywhere in the urban environment. In buildings' body and facade, roofing, flooring, urban furniture and green space, cars; and even sky as well as coloring of the people's clothes, all of which play an important role in determining the colored appearance of city. So the way of combining and correct identification of color stability by designers along with other design factors can make city legible, with identity, lively and beautiful. So that citizens always remember their city with pleasant memory and in the other words colored and beautiful memories. Some physical elements and non-physical elements that are effective in the color of city have been brought in Table 1.
Effective elements in color of city

<table>
<thead>
<tr>
<th>Physical elements</th>
<th>Natural elements</th>
<th>Vegetation coverage - Green</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soil and suchlike - khaki to brown, gray and similarly</td>
<td></td>
</tr>
<tr>
<td>Artificial elements</td>
<td>Buildings</td>
<td>Old</td>
</tr>
<tr>
<td>Urban spaces</td>
<td></td>
<td>New</td>
</tr>
<tr>
<td>Movable elements</td>
<td>Vehicles</td>
<td>People and their clothes</td>
</tr>
<tr>
<td>Fixed elements</td>
<td>Furniture</td>
<td>Insertions</td>
</tr>
<tr>
<td>Non-physical elements</td>
<td>Light</td>
<td></td>
</tr>
</tbody>
</table>

Source: Davarinezhad and Shabani, (2013)

Environmental effects on color perception
Culture and symbolic meanings
According to Rappaport's view, culture creates a set of rules that the made form is a reflection of that. On the other hand, he emphasizes that culture is indirectly one of the main bases of human mental life. Human perception from the environment that he has made around himself can be realized by studying culture. He notes that although the process of association is done individually and seems that there is no common association, yet there are common symbols in every cultural domain. (Pakzad: 2009, 395) He also emphasizes that because meanings depend on the particular culture, such as environments that belong to them, paying attention to symbolic meanings of colors in every culture and its background is a necessity. Sometimes particular colors are familiar signs or reminder of particular time and place in minds of people. (Hoseinioun, 2001)

Psychological Factors
Basis of color perception is giving meaning to the image formed on the retina that has been created as the result of light reflected from objects. In fact, giving meaning helps us to be able to identify the things. An important part of the factor of giving meaning is values and attitudes are affected by social conditions. Factors such as a person's social level, occupation, age, gender and even his mood when seeing a color affect his perception from color (Einollahi, 2012).
Environmental changes

Surrounding environment changes over time in some parts of it, that its effect on color is very evident. The effect of environment changes about color perception can be generally considered as the result of several factors that are: technology advance, change of architectural style, taste change, as well as color obsolescence. These factors, in addition affecting the environmental colors, affect also evaluation and valuation of environmental colors by people (Einollahi, 2012).

Investigating methods and techniques of provision of colored palette for city

Detailed studies on most important methods conducted so far to achieve the color palette of city have been done in this part. These methods have been conducted in the world with different environmental and climatic conditions. the way of providing colored palette for city according to the presented methods is in this way that in each city color of facades, doors and windows, urban furniture, flooring, ceiling and roof of buildings, and basically all urban elements are limited to specific colors that are somehow considered a colored identity card of that city depending on the climate, local materials, resources of supplying materials, and the people's taste and culture. Colored palette of the city can be provided by juxtaposition of these colored samples. (Shakibamanesh, Mahmoud, 2005, p. 113) colored palettes can offer a lot of choices but they cannot take the place of good taste of people. But they can cause that color plays a unifying role instead of being a discriminating component in the urban environment. Therefore, color can be used to meet a number of goals of people and policy makers in this city such as making more beautiful city, more dynamic urban economy (Sabbagh Alvani, 2011: 191).

A number of basic questions that meet the procedural part of the research are dealt after the conducted investigations. These questions have been posed based on the main indicators of color in the cities. They are fully investigated and answered in all presented projects. Referring to Lanko activities as the most prominent theorists in the field of color in city is required in this part. Jean Philippe Lanko color stated concept of geography of color in 1997 that the purpose of the geography of color is investigating color from the angle of geography and culture. (Sabbagh Alvani, 2011: 193) Lanko in this concept referred to the characteristic of traditional colors in France and the use of local building materials. (Boeri, 2010: 461) His method for investigating colored characteristics of the environment in order to present an appropriate colored pattern is as follows:

1. The analysis of the primary colors area or location (nature, plants, soil, and suchlike)
2. Determination of qualitative and quantitative relationship of color in different in architectural and urban elements
3. Provision of color spectrum table that faithfully introduces detailed colored qualities of each location.

Each colored map includes two systems of colored curtains that are two main colored palette and final product of this work.

First: the system of harmonic colors for spots and large architectural surfaces.
Second: wider system that contains wider spectrum of natural and artificial samples.

Other work of Lanko is continuation of the second palette that introduces colors that are opposite of each other in the color cycle, but visually are in the same colored curtains. When these colors are placed beside each other, each intensifies the effect of the other color. (Hoseinioun, 2001)
this research, Lanko has compared and identified colors across the city by using Natural Color System (NCS) (Sabbagh Alvani, 2011: 193). The next sample about coloring in place and how materials (e.g., color, contexture, and design) are chosen to build an environment has been investigated.

**Analysis of NCS method:**

Another method to achieve colored palette is use of Natural Color System (NCS). This is a system that can be defined with the help of possible superficial colors (Other than fluorescent and metallic colors). This facilitates and guarantees precise movement of colors in design, communications and productions. NCS system has been specified (illustrated) by an NCS atlas including 1950 color samples. Today, NCS is one of the most widely used tools to define colored systems in the world and has obtained an international scientific position. It is also a Swedish, Norwegian, Spanish, and African national standard. NCS colored samples has maintained global prominent qualities to provide accurate coordination between different productions of color to ensure that their color is always the same. NCS colored space is a three-dimensional space and is based on six basic colors, 4 colors of yellow (Y), red (R), green (G), blue (B) and white (W) and black (S). They are of the primary colorless colors, and match with six primary colors of NCS. In which all other colors can be described based on their relations with primary colors and the degree of similarity to primary colors. In short, it can be said that color is usually shown in two images: colored circle, colored triangle. Colored triangle shows small differences among colors. (Xiaomin & Yillin 1014, 2009)

In this context, S before NCS symbol means this method is a sample standardized by Scandinavia Color Institute - NCS Qualitative Center- and follows NCS qualitative management system. The variables in this symbol are entirely caused by the visible visual properties of colors. So that the first two digits indicate the percentage of visual blackness in color in NCS symbol for color S 1050-Y 90R. The next two digits indicate the level of color darkness. This means how much strong the color is. The next number, after the dash indicates appearance of the color that means includes which properties of color and what relationships are between them. In this example, this is yellow color with 90% redness. NCS can also show graphic in three-dimensional models, where the blackness and darkness have been specified in an equilateral triangle and also the appearance of color in a circle. A point within a triangle and a line on the circumference of a circle provide an unambiguous definition of color. NCSS 1050-Y90R color in the triangle and circle has been specified according to following image.
NCS Color visual system facilitates imagining, design, selection, relationship, citation, and producing any kind of color reasonably, accurately and reliably. NCS symbol has a true visual meaning and can be linked and understood globally. NCS has created a special tool for the design, marketing, sale, communication and production that has been placed in a system for multiple industries. Simply as: a system, a color, a symbol, with each type of material. Unlike many other color systems, NCS is fully based on color that
people are able to see it. This is a method in which one color is combined or its physical features are considered as an important part. Of course, only if it had been favorite of its producers and manufacturers. In this method, in most of tests related to evaluation of color, people are asked to look at the colors and then estimate the close relationship between the primary colors. Another type of research is investigation of color design of a separate building that emphasizes on separate and individual buildings and on building regions away from the border. (Xiaomin & Yillin, 2009, p 10) Color system of urban landscapes is extracted and analyzed based on the above method. (Porter, 2009, 84)

Investigating questions of procedural dimension of the research:

Questions will be posed after investigating methods of providing colored palette for city. These questions are answered in line with procedural dimension of the project. Topics that have been generally investigated in the methods of providing colored palette have been mentioned in these questions. Topics such as investigation of natural and artificial elements as the dominant color elements in cities, as well as the investigation of preferences of people of each city on various issues such as identity and cultural issues and so on.

1. Do the artificial elements have been attended?
   A: If the artificial elements have been attended, what have been mentioned?
   B: how the color of artificial elements have been recorded and evaluated?

2. Do the natural elements have been attended?
   A: If the natural elements have been attended, what have been mentioned? (Layers of sky, soil, vegetation coverage)
   B: how the color of natural elements have been recorded and evaluated?

3. Do the color preferences of people have been attended?
   A: If the color preferences of people have been attended, what have been mentioned? (Culture, identity, covering of people, customs and traditions, and so on)
   B: how the color preferences of people have been recorded and evaluated?

Conclusion

According to the results obtained from the research and extraction of procedural dimension questions, these questions can be investigated in most of quintet layers of urban form, and more detailed results can be achieved in this regard. So that can be said what cases of systems of city form layers have been mentioned in each of the questions posed in this regard.

Investigation of city form layers in most of procedural dimension questions

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<tr>
<th>Procedural dimension questions</th>
<th>Quintet layers of city form</th>
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<tr>
<td></td>
<td>Land use system</td>
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<td></td>
<td>Movement and access system</td>
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<td>Physical form system</td>
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<td>Urban perspective system</td>
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<td>Public spaces system</td>
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http://www.ijhcs.com/index.php/ijhcs/index
Colors in addition to physical dimension and apparent effects have also meta-physical dimension that has different psychological effects on citizens. In general it can be said that the mood

<table>
<thead>
<tr>
<th>Paying attention to artificial elements</th>
<th>Mentions cases</th>
<th>- Building with different use - urban installation and equipment</th>
<th>- Vehicle and routing signs - Terminals and parking lots</th>
<th>- Architectural feature and building cover</th>
<th>- centers and corridors of vision - Lighting of artificial signs - Day and Night perspective of artificial elements</th>
<th>-Urban open spaces and furniture -spaces (public arts and landscapin g)</th>
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<tbody>
<tr>
<td>How to record and evaluate</td>
<td>This process is in a way that color of different artificial elements is perceived and recorded and evaluated according to analytical methods</td>
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<tr>
<th>Paying attention to natural elements</th>
<th>Mentions cases</th>
<th>- Green elements used in buildings - Lands with agricultural use, natural resources</th>
<th>- Planting trees and creating space side of the routes and highways</th>
<th>- Use of natural dominant elements in different bodies</th>
<th>Color of Sky Natural landscapes such as soil and vegetation coverage</th>
<th>-area decorating with an emphasis on natural elements</th>
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<tbody>
<tr>
<td>How to record and evaluate</td>
<td>This process is in a way that color of different natural elements in city is completely perceived and recorded and evaluated according to analytical methods</td>
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<tr>
<th>Paying attention to color preferences of people</th>
<th>Mentions cases</th>
<th>-Paying attention to colors used in existing uses by people</th>
<th>-Use of colors that attract the viewer's attention</th>
<th>- Investigating the way of effect of attracting the viewers in spaces</th>
<th>-Paying attention to the color of people's covering and customs and traditions</th>
<th>-Creating spaces to improve sensory identity and richness</th>
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<tbody>
<tr>
<td>How to record and evaluate</td>
<td>This process is in a way that preferences of people are achieved and the result is recorded and evaluated through interview and questionnaire according to qualitative methods</td>
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dominating over the cities is because of the meta-physical effects of colors used in spaces of that city and is originated from them. Despite the fact that each color is always seen and perceived in relation with other colors, being familiar with the performance and psychological effects of each of the colors can lead to choose an appropriate combination of colors for a city. Each city requires a certain mood according to its nature that the colors used in spaces of that city can improve or even create the colored palette of that city. This is while must be seen that colors are perceived by what kind of people and what kind of culture, and what specific and symbolic meaning different colors have for them. As a result is better appropriate utilization of the colors that are symbolic and have connotation for that culture should be paid attention when providing colored palette. This also is itself one of the factors of improving colored appearance of the city in the minds of citizens.

Thus, with knowledge of color and the effects of color on the perception of citizens, and different aspects of environmental effects on color perception, the designer can choose a color that fits with that city by knowing completely the city. But this requires that he knows the color effects on which dimension of the city and in what form affects the citizens. Provision of colored palette is an effort for comprehensive and targeted utilization of using color in different areas of the city. Complementary part to provide colored palette is to know the tastes of people, indigenous culture and other social factors affecting the identity of cities. The important point is that the color cannot be added to it after constructing buildings and city, but this must be decided when constructing buildings and city.

On the one hand, the majority of studies on color design in cities are also limited to just the traditional colors that can be only seen in the historical center. This does not mean that new areas are appropriate pattern for design of colored perspective, but an appropriate pattern for provision of the colored palette of city can be achieved by referring to buildings' historical center of different periods and more complex consensus of urban symbols that are related with the definition of public and social spaces and lead to create a sense of place. Finally, transferring knowledge of color to people can be done by providing appropriate instructions and coordinated with the superior projects. So that freedom of choice and creativity are provided for the architect and the owner, and creation of participatory projects can be used meantime coordinating with the context.
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