The role of the urban soundscape in identification of Baghdad traditional city

Susan Abed Hassan¹, Hiyam Siham Taha²

¹,² Department of Architectural engineering, College of Engineering, Al- Nahain University-Iraq
suzana302002@yahoo.com, hayamalani85@gmail.com

Abstract: Sounds of the city reflect daily life activity, social interaction, and special features. The interaction between people and sounds strengthens the identity of a place in the city. Each city has its own characteristics and elements of sounds that distinguish it. There were many recent studies that define the city soundscape. The main research problem is the lack of knowledge about the role of the urban soundscape in the identification of Baghdad traditional city. This article studied the impact of urban soundscape and analyzed its characteristics and elements and its effect on identification of traditional Baghdad city, a questionnaire were conducted in 10 points about the patterns of sound sources and the presence of sounds, satisfaction, belonging, relaxing, spatial enclosure, annoying, specialty of the soundscape, the locate of position, and gradient of sounds, and a total of 30 people were interviewed in three main traditional streets in Al-Shawakaa traditional district. Measurements of sound pressure levels were also made for the total sounds to identify the most prominent types of sounds. The results showed that soundscape for the traditional cities had its indices that enhancing human awareness of soundscape and identification of the place.

1. Introduction
Recently the sound identity of the cities was loosening, cause of the various and different sounds types that began to weaken the sounds field, aesthetic diversity, and the space depth of sound in cities. Cities had become noisier, with more traffic for cars and airplanes, the danger of weak sound identity has emerged, as sites within cities do not provide any indications of a specific human affiliation in history or present, the local or natural environment, and urban roads or open spaces are not defined or known to the occupants of any information. Recent literature tried to study the soundscape for the cities. Like (Leus, 2011) studied the soundscape integrity with history of the city, through its component, that enhance the historical layers in open space sites in the northern part of the city center of Antwerp [1]. While (Susan.2014) studied the acoustics environment of the traditional city, and compared it with the modern city. Consistent relationships were found between measured overall sound levels and perceived sound quality, sound source identification was found to be a stronger predictor of sound quality than measured sound levels. Sound quality was negatively related to presence of technological sounds (road-traffic noise, gasoline generators) in modern type of City Street and positively related to presence of nature sounds in traditional street [2]. (Rehan,2014) aimed to discover the soundscape depended approach in the planning of urban spaces in the planning process for Cairo city,[3]
2. Urban Soundscape
Even in the background of the sound scene, sound provides urban residents with varied and important information. Most inhumane voices, such as those in weather, have limited meanings, but their importance is evident in rural areas, as they are more important in the activities of daily life and have an impact on the production of crops and animals. In cities, on the other hand, people's voices are most important and constitute an influential component of the semantic system. The combined human experience of local phonemic signs in the urban environment defined the societies in the same way that the visual signs formed, and the local interference helped define the overlapping neighborhood communities. People belonging to a certain neighborhood recognize their voices and respond to them in ways that others do not, and any interference with local voices evokes a feeling of danger in the group, even if the voices being heard unintentionally. The sudden calm, the sound of a sword clap, or something else, draws everyone to see the event. At the same time, the daily interaction of people with the familiar sounds of the sound scene provides a feeling of reassurance and belonging. It is part of the feeling of a particular city or neighborhood and is the key to feeling of the place. The first mention for the sound scene was used by Canadian musician and ecologist R. Murray Schafer in 1977 in his book "The Tuning of the World". He explained that the term sound scene represents the sound qualities that achieve the sense of the sound place, sound indicators as equivalent to visual indications or the visualization of sounds that form acoustically influencing environments [4]. The soundscape had also been known as the overall sound phenomenon that leads to perception, understanding and aesthetic evaluation of the sound world [5]. The study of soundscape falls within the sound ecology. The concept refers to all sounds from natural sounds such as sounds of living beings and other natural sources such as the atmosphere and natural sounds like animals. And man-made sounds, such as music, conversation, work, and machine sounds, include unwanted sounds like noise [6]. There are many other studies that define soundscape [7, 8 and 9]. From these studies, urban soundscape can be defined as the sound environment perceived by man within the context of the city, which include all the sounds produced by humans, nature, and man-made sounds that lead to perception, understanding and aesthetic evaluation of the sonic world.

3. The soundscape for the traditional cities
The soundscape for the traditional cities had special features and differs from one city to another around the world. Throughout history, cities were characterized by sound features that defined its soundscape, and through it, the human was able to determine its location and give a distinct identity to the different city sectors. For example, the human voice had a great influence on the soundscape of cities, which included conversations between individuals, the voices of the street, the change of sound, pitch and rhythm to get the most impact in pedestrians. Another sounds that were also distinct in the sound environment like horse-drawn vehicles as a means of transportation, that were adopted by humans before the invention of cars as a means of transportation. The sounds generated by horse carriages from the roads, the movement of wheels, were increased in the central regions within the city. The cities were also distinguished by the voices of other animals such as cats, dogs, and birds, which are currently rare in modern cities.

Songs, chants and sounds of popular music are also features for the traditional city. It was customary for daily actions to be carried out with accompany legacy songs, to encourage work among workers, children's songs, religious songs and life inherited, as the sounds of traditional occupations were also providing clues to the residents, for example, the sounds of hammers that distinguish copper craft and other traditional industries.

The soundscape for the traditional Islamic cities had its own features like the call of prayer time, through which a person was able to determine the times of day and evening. The call of prayer set the time for
rebirth and action, and so on for all times of prayers that were related to human activities from the time of his awakening until bedtime. Gathering people when needed or in the event of the death of a person within the city. Also, the difference in the method, melody, and tone that characterized the call to prayer from one region to another contributed to giving the distinctive identity of each region. The High Mosque had a minaret that can deliver sound to a greater range than small mosques with minarets of limited length. The traditional songs also play a major part in sound scape for the cities. In Iraq one of the traditional songs in Ramdan month is the song of (Majina Yama Jinah). Such songs can represent links between diverse groups of people and give them a sense of belonging to specific locations. Personal voices also contribute to determining how a person sees a person and how they treat him. Typically, high-class people are distinguished by soft voices and low loud voices, while workers are distinguished by high voices due to their dealings with businesses that require raising the pitch, as well as for farmers who require large distances to raise their pitch to deliver sounds. From the method of phonemic interaction between people, it is possible to determine the areas where they live, as mountain areas distinguish their inhabitants with their loud voice.

4. Methodology
The methodology of the research depends on the discovery and analysis of the soundscape indicators for the traditional cities, to test the main research hypothesis, the selected study area at the city of Baghdad at Al-Shawakaa traditional district is one of the traditional urban fabrics, the selected area included 10 points, shown in Fig (1-a), and a total of 30 people from the same districts were interviewed inside the streets shown in Fig (1-b), the selected time of study were (12 pm, 6 pm). Two stages was done first subjective questionnaire about the patterns of sound sources, and the quality of the sound environment in the study area. That includes the extent of dominance of sounds in the space by adopting the classification of sounds into four types, which are: traffic sounds, natural sounds, human voices, and technological voices. The sound pattern dominance were ranged between (slightly audible), and (broad audible). It also included detailed questions about the indicators of soundscape like present of sound, satisfaction, belonging, relaxing, spatial enclosure, annoying, specialty of sound scape, the located position, and gradient of sounds. The questions are presented and the participants mark their perception using a five-point ordinal-category scale. The questionnaire form is in table 1. This uses a questionnaire to collect data on how people perceive the soundscape was done according to ISO/ PRF TS 12913-2 [10].

The collecting information method was obtained than analysis with descriptive statistics of the distributed form, a number of results in the main axes covered by the questionnaire and as shown in Appendix (1). Measurements of sound pressure level were also made for the total sounds. The measurement of sound level period lasted for 15 minutes during the afternoon at 12 and 6 pm, due to the increased daily activity in that period. An audio level meter (SVAN 975) was used to measure the sound level in study areas.
Fig. 1 Al-Shawakaa traditional district
Table 1 The questionnaire of soundscape indicators

| What kind of the sound that you presently hear? | Cannot hear at all | Slightly audible | Hear clearly | broad audible | Dominates completely |
|-----------------------------------------------|--------------------|-----------------|-------------|---------------|---------------------|
| Traffic noise (cars, bus, train, plain)       |                    |                 |             |               |                     |
| Natural sounds (birds, animals, etc.)         |                    |                 |             |               |                     |
| Human voices                                 |                    |                 |             |               |                     |
| Technological voices (industry sounds, air conditioning, etc.) | | | | | |
| Q1) Describe the surrounding sounds?          |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q2) Over all the present of sounds in soundscape are? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q3) How you feeling Belonging when walking in the traditional street? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q4) How you feeling Relaxing when walking in the traditional street? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q5) How you feeling Spatial enclose when walking in the traditional street? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q6) How you feeling Annoying sounds when walking in the traditional street? |                    |                 |             |               |                     |
| Very annoying                                 | Annoying           | Neither good or bad | audible    |               | Cannot hear at all  |
| Q7) Can you locate your position in the district according the sound scape in the street? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q8) To what extent do you feel comfortable in the present surrounding sound environment? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |
| Q9) there are gradient of sounds in traditional street? |                    |                 |             |               |                     |
| Very good                                     | good               | Neither good or bad | Bad        |               | Very bad            |

5. Results

5.1 Subjective measurements

The results of the questioner were adopted and completed by the people living in the in the study area. That includes the extent of dominance of sounds in the soundscape showed that natural and human sounds were the most dominant in the street canyon. While there were a slightly audible for the traffic sounds. With wide presence for Technological voices (industry sounds, air conditioning, etc.). As showed in figure 2. The natural and human sounds that affected the soundscape has marked in red and green color. While traffic and technological sounds were not effect clearly on the soundscape.
Fig. 2 Sound sources pattern

Results of the questioner in Appendix 1, also showed in Fig 2, that the soundscape indicators that included the feeling of belonging when walking in the traditional street, relaxing, spatial enclose, position of the listener, feel comfortable in the present surrounding sound environment, and gradient of sounds in traditional street were between good and very good. While feeling of annoying was very low.

5.2 Sound Level measurements

Measurements of sound pressure level were also made for the total sounds heard. And identify the most prominent types of sounds that exist within the region by the researcher, and divide them into main patterns: the technological sounds generated by the sounds of cars, vehicles, electric generators, various devices, and humanity, which included the sounds generated by human activities such as chatting voices or children’s toys and others and natural ones such as wind and water sounds Animals and others.

The measurement period lasted for 15 minutes during the afternoon at 12 and 6 pm, due to the increased daily activity in that period. An audio level meter (SVAN 975) was used to measure the sound level in 10 points of the study areas. The results in table 2 showed that the sound level ranged between 60-49 decibels.
Table 2. The sound level measurements

| Locations | Sound level dB at 12 pm | Sound level dB at 6 pm |
|-----------|------------------------|------------------------|
| 1         | 60                     | 49                     |
| 2         | 58                     | 50                     |
| 3         | 55                     | 49                     |
| 4         | 57                     | 50                     |
| 5         | 57                     | 49                     |
| 6         | 60                     | 48                     |
| 7         | 59                     | 48                     |
| 8         | 61                     | 50                     |
| 9         | 57                     | 47                     |
| 10        | 59                     | 49                     |

6. Conclusion
The soundscape for the traditional Baghdad city had special sound characters and differs from city to another around the world, it had many sound indicators that show a major role in the identification of a place, the most prominent indicator were the majority of human and natural sounds. Also the present of sounds in soundscape, the feeling of belonging when walking in the traditional street, relaxing, spatial enclosure, position of the listener, feel comfortable in the present surrounding sound environment, and gradient of sounds in the traditional street was between good and very good. The sound level measurements ranged between 60-49 decibels. These results showed that sound scape indicators enhancing human awareness to identification of the place, there is a need to encourage researches in the field of soundscape to develop predictive simulations for the perception of the sound environment starting from acoustics physical features of the soundscape. This might bridge the gap between soundscape, urban planning research. Overall, soundscape research needs more scientific evidence of its potential to promote identity of the urban environments. This will eventually contribute this emerging science into the wider framework of acoustics consulting and urban planning.

Reference

[1] M. Leus. 2011. The soundscape of cities: a new layer in city renewal. WIT Transactions on Ecology and the Environment, Vol 150, 2011 WIT Press
[2] Susan Abed Hasan.2014. Sound environment of Cities: A Comparison Study for Sound Environment between Modern and Traditional urban fabric in Baghdad city, Iraqi journal for architectural engineering,n.27.
[3] Reeman Mohammed Rehan.2014. The phonic identity of the city urban soundscape for sustainable spaces, Housing and Building National Research Center, HBRC Journal
[4] Schafer R.M., 1994. chaf Soundscape: Our Sonic Environment and the Tuning of the World, Destiny Books, Rochester, 1994 (first published 1977).
[5] Jean-François Augoyard, Henrik Karlsson, Justin Winckler. Report and Resolution of the Soundscape Research Study Group. From Awareness to Action, Karlsson, Henrik, 1999, Stockholm, Sweden,pp.130-135.
[6] Blesser, B. and Salter, L. 2006. Spaces Speak, Are You Listening? Experiencing Aural Architecture. MIT Press: Cambridge, MA.
[7] Hiramatsu, K. 2004. Soundscape: The Concept and Its Significance in Acoustics. Proceedings of 14th International Congress of Acoustics, Kyoto, Japan
[8] Lercher, P., and Schulte-Fortkamp, B. 2013. *Soundscape of European Cities and Landscapes – Harmonising*, in Kang, J., et al. (2013). Soundscape of European Cities and Landscapes. (First Edition, Oxford by Soundscape-COSTTD0804), p.126

[9] Kang, J., Chourmouziadiou, K., Sakantamis, K., Wang, B., Hao, Y. 2013. *Soundscape of European Cities and Landscapes*. (First Edition, E-book, Oxford, by SoundscapeCOST TUD ActionTD0804)

[10] Standardization (ISO). ISO. SO/DIS 12913-1, FDIS - Draft 1 (2013-10-03), ISO / TC43 / SC1/WG54, *perceptual assessment of soundscape quality*, International Organization for Standardization.
Appendix 1

Design the questionnaire form Dear respondent …………… honored

We put in your hands the questionnaire prepared to complete the requirements of our research, which is related to "The role of sound scape on the identification Baghdad traditional cities" This research is expected to contribute to identifying the most important obstacles and assistant methods in the identity of sounds. Please help to answer the paragraphs of the form accurately and objectively and we guarantee the complete personal confidentiality of the answers, although the form that did not answer all the paragraphs will be invalid for statistical analysis.

With a great appreciation and respect

Part One First:

Personal data

1- Name: -----------
2- Age:-----------
3- Gender:---------
4- Professional rank (consultant, license, practitioner, other / remember):---

Part Two: Study Variables Please mark in the appropriate box for the following's table.
Questionnaires results

| What the kind of sound that presently hear? | Cannot hear at all | Slightly audible | Hear clearly | broad audible | Dominates completely |
|-------------------------------------------|--------------------|------------------|-------------|--------------|---------------------|
| 1 Traffic noise (cars, bus, train, plain)| 90%                | 10%              |             |              |                     |
| 2 Natural sounds (birds, animals, etc)    | 5%                 | 95%              |             |              |                     |
| 3 Human voices                            | 95%                | 5%               |             |              |                     |
| 4 Technological voices (industry sounds, air conditioning, etc.) | 20% | 70% | 10% | | |

Q1) Describe the surrounding sounds?
Very good  good  Neither good or bad  Bad  Very bad
30%  50%  20%  5%  15%

Q2) Over all the present of sounds in sound scape are?
Very good  good  Neither good or bad  Bad  Very bad
5%  80%  15%  

Q3) How you feeling Belonging when walking in the traditional street?
Very good  good  Neither good or bad  Bad  Very bad
30%  40%  30%  5%  15%

Q4) How you feeling Relaxing when walking in the traditional street?
Very good  good  Neither good or bad  Bad  Very bad
20%  60%  20%  5%  15%

Q5) How you feeling Spatial enclose when walking in the traditional street?
Very good  good  Neither good or bad  Bad  Very bad
50%  40%  10%  5%  15%

Q6) How you feeling Annoying sounds when walking in the traditional street?
Very annoying  Annoying  Neither good or bad  audible  Cannot hear at all
20%  30%  50%  50%  15%

Q7) Can you locate your position in the district according the sound scape in the street?
Very good  good  Neither good or bad  Bad  Very bad
30%  50%  20%  5%  15%

Q8) To what extent do you feel comfortable in the present surrounding sound environment?
Very good  good  Neither good or bad  Bad  Very bad
20%  60%  20%  5%  15%

Q9) there are gradient of sounds in traditional street?
Very good  good  Neither good or bad  Bad  Very bad
30%  50%  20%  5%  15%