

Ties of Architecture and Music

Hamed razipour Murchekhorti ^{1*}, Houtan Iravani ²

¹MA student of architecture in Islamic Azad University of Ardestan

²Assistant Professor, Department of Architecture, Ardestan branch, Islamic Azad University, Iran

*Corresponding Author email: Hamedrazipuor@yahoo.com

Abstract

Architecture is a frozen music. *Goethe* With understanding of beauty, human was inspired by the nature and imitating natural forms and music, created the art, as an important factor to express feelings and beauty, and reflected it in different forms. Human emotions and feelings are the same concepts, the difference is in their expressions and descriptions. Emotions, feelings, perceptions and inner secrets as well as internal processes resulted from these factors that have always been associated with human should be expressed in some form, and then that form could not be anything but the words and deeds. Therefore, human revealed his/her internal processes, feelings, and impressions by gestures and words, as the most appropriate means to express emotions, which are reflected in the music and architecture. The purpose of this study was to compare the architecture and music, to revive music and valuing to the bright spirit of Persian music, and to shed the quality on architectural spaces. All the arts want to reach the music. *Schopenhauer*.

Keywords: nature, architecture, music, comparative analysis, revival.

Introduction

The connection of different forms of arts with each other is an issue that has always discussed among artists. The influence and impact of the arts on each other have ever been creative and driving over the history of art. It is usually stated in the architecture universities and schools that one of the arts that architecture is involved is the music, but it is less expressed how to use it. *Goethe* once called architecture as a frozen music. Are both architecture and music throughout human history, or at least in the modern era to have influenced each other? In other words, has one of them been effective in the creation of another? On the assumption that it is not the direct or principal factor, has not it had impact on the another one indirectly? If yes, where, how and when? Is there any relationship between physical space in architecture and nonphysical space in music? What is the music that is tended to architecture? These are questions that I try to address in this article. *Schopenhauer* claimed that all the arts want to reach to the stage of music. Due to the position of *Schopenhauer*, the least thing we can see in this statement is that the architecture will eventually move to the stage of music, or the fate of architecture is similar to the position of music in the world of art.

Here, we can see that the music itself is not the goal, but its position in the world of art and abstraction has more prominent role. Therefore, the path that architecture really passes, is not the music itself, but its position in the world of art. Therefore, the similarity in the pattern and organization between music and architecture cannot be due to their influence on each other, but perhaps the common origin or fate has caused their similarity. In other words, architecture and music both originate from the human emotion and the soul, and reach the same position of beauty in the world of art through different directions.

Research Objectives

First: to understand the relationship between physical space in architecture and non-physical space in music.

Second: to understand the tools used in music and the architecture.

Third: to understand the influence of architecture and music throughout human history, or at least in the modern era whether directly or indirectly.

Research Literature

In general, there are two approaches in examining the relationship between music and architecture over the time: formal approach and conceptual approach. The Formal approach includes studying the outer and inner layers. In this section, we examine each of these approaches, and determine the approach of this article. Formal approach with the study of the outer layers is a merely formal approach which only considers the outer layers. The simplest examples of these approaches include attributing the skyline of the mountains and religious buildings to the peak and trough used in the music notes. A contemporary approach is to translate voice to a visible form. Wassily Kandinsky and Paul Klee were two artists who tried to convert music to a visible form. For this purpose, they selected Beethoven's Symphony No. 5, and finally obtained a collection of visual diagrams (Jormakka, 2009). Another contemporary research in this regard is results of a project in the field of digital design by Chris Tensen. He designed a parametric software including numbers and proportions to produce 48 virtual forms according to introductions of the Johann Sebastian Bach's first book (Christensen, 2005). And finally, the latest study is a contemporary research conducted by Martin Wattenberg. He used arched diagrams for translation of the most famous music works of the world. In this study, he proves that the relations in pre-modern musical pieces, unlike the post-modern era, has great layers, and compares them with diagrams of some famous modern music piece (Wattenberg, 2009). In formal approach to the inner attitude, it is believed that music works are pleasant, lovely, and beautiful when they follow certain rules; rules that are technically identified in physics on the basis of the sensitivity of the human ear and mind and over thousands of years, are measured and evaluated by the instruments (Falamaki, 2008). This is also true in the case of architecture. Our approach focuses more on this subject. "Pythagoras" and "Plato" were the first to demonstrated the interrelationship of mathematics, geometry, music, and architecture and founded and developed hypotheses in this regard, so that it ultimately led to the expression of the cosmic and harmonic ratios (Antoniades, 2007). As the Greeks thought that the sound of music in the form of geometry, architects at renaissance era believed that architecture is mathematics that is returned to space units (Ching, 2007) Jorgiades, at least in his

specialized view proves that audio or visual harmony is a guarantee for aesthetic pleasure. In contrast, Bartok combines the principles of ancient Greek architecture, such as the golden ratio and the five principles of the Pythagorean with acoustic harmony principles derived from the thinking of Western Europe in his compositions (Antonyades, 2007). One of the people that seriously studied the internal relationship between music and architecture in the modern era was Xenakis, who was Le Corbusier's student. In his book, "Music and Architecture", he emphasized on the role of geometry in approaching and adapting these two arts, and studied examples of music that were converted into architecture in his own and others' works. The interesting thing is that at the end of his book, he concluded that the relationship between music and architecture is a virtual and mental relationships, not a real relationship (Xenakis, 2008). Therefore, generally, the basis of formal approach dealing with the inner layers is the ratios existing in music and architecture using geometry science.

Conceptual approach

This paper presents a third approach for the first time from a different perspective which is considered a conceptual approach. In terms of conceptual approach, less research has been conducted compared to the formal approach, but very brief points have been discussed, such as the creation of concept in music and architecture space, the common language of music and architecture in conveying meaning, and a few other things, but unfortunately, these studies are not comprehensive and there are no examples to help better understand them.

Research methodology

In this study, qualitative descriptive research method is used. Data collection is performed through library-based method and interviews, and finally after the classification and analysis, common principles will be extracted. Since each researcher must first move in the context of studies and scientific results as literature review, much of the research is conducted through library-based methods to provide the context for research. Familiarity with ideas, works, and information in books and articles will help to come out of speculation and come closer to explain the main lines of research. In this way, referring to

foreign and domestic research and practice has been very effective. In the present study, since there are a few research on the subject of linkages between architecture and music, we had to struggle for access to information and research in this regard. Then we classified the information and translated foreign literature, and took notes to prepare the main framework of the final material. It should be noted that in the preparation of this report, the researcher has been as honest as possible in mentioning the references.

The relationship between music and architecture

These arts are abstract in form and concept, and daily approach to them is also separate and abstract. Abstraction is a common feature among arts; key and clear example of our discussion here is the commonality and abstraction means of these arts that certainly paves the way to examine other arts. Music is a hearing art and at early stage of "communication with the audience" can create audio states to make his/her sense in the moment, or cause the subconscious to invoke meanings. Music states follow certain rules derived from mathematics and physics that are inspired by the order of nature, famous mathematical formula such as Fibonacci numbers, or golden numbers, and geometric proportions and principles found in geometric analysis of nature is abundant in music.

One of the human features is that they want to plasticize the elements to record and reuse them, and this resulted that the known music principles were recorded and used again to replay the music. The invisibility and intangibility of inspirations is one of the main elements in abstraction of this art. Now, reviewing and identifying the material and natural elements in architecture, and considering the inner states and thoughts of the audience, it can be said that architecture is also abstract, since natural elements are not themselves in architecture, but are reshaped. Creating the architecture is conducted in the context of geometry and dimensionalising the mathematical elements. Difficulty in understanding the architecture and making an ambiguity for the audience and users will result in a mystical and abstract state that eventually forms a specific geometry in the mind. An artist friend says architectural is music of the place, and music is architecture of the time.

The music is not static, but architecture is static. In the case of paintings, statics is presented in the context of the work. The collision of two sciences with the same foundation (geometry and arithmetic), that both are subjective arts derived from the nature has caused a sort of consistency in music and architecture, that reinforces a sense of commonality between architecture and music, and provides a way to evaluate these two arts. The basis of architectural is the vision of the designer and needs of the user, and the basis of music is also the view of musicians and the creator, as well as the audience. In fact, art is dialogue of the artist with the audience: the art work is saying and the audience's criticism is hearing.

The reasons for the relationship between music and architecture

1. Their same terms and interpretations

The easiest relationship is similarities, common chapters and similar expressions in music and architecture. For example, the axis, symmetry, proportion, hierarchy, rhythm and stillness, assumed factor, changed form, homogeneity, contrast, repetition, rhythm, harmony, etc.

2. Visual perception of sounds

Visual perception of the sounds and waves in environment and nature are involved in creating both. For example, the Buddhist music created in China and among a lot of trees and today is used as the relaxation music resembles to the blow of wind, or cloud that flies the valley. Heavy metal music that is created in the protest and for expressing disappointment and insecurity and causes the singer to complain the situation with an angry and plaintive voice reminds you the sound of cars and massive skyscrapers with the harsh sound of guitar and its rhythm. This music is very good to protest this situation.

3. Creating or evoking the space

Some styles of music have naturally a spirit of space creation and visual imaging. Musician, by picking melodies and the sounds of his/her own, and combining it with unique art of arrangement, creates a completely virtual space and imagination for you. This space can be pleasant, relaxing, hallucinogenic, stressful or intimidating. This rule is used for soundtracks of criminal or horror movies to double

your fear. Although the Iranian classical music is not visual, as Professor Hossein Alizadeh states, reminds the memory of places and cities.

4. Selecting the type of instruments and sound

Such as Latin American flute with its imaginary and heavenly sound that creates a different feeling of place in us.

5. Memory and data transfer

Iranian classical and folk music, although does not create spaces, enter useful information in human mind. All of these affect the mind of an architect and are effective in creating space.

Table 1. The linkages between concepts of architecture and music

architecture	music
Space in architecture	Space in music
National architecture	Folk music
Religious architecture	Religious music
Monumental architecture	Memorial music
Profitable architecture	Entertaining music
Using popular symbols	Using national tunes
Using natural phenomena	Using natural phenomena
Imitation	Imitation
Using color in architecture	Coloring in music
Gravity in the construction	Gravity in music
Traction in motifs of the construction	Traction in sounds and tunes
Height of the construction	Peak in music
Contradiction in motifs	Contradiction in harmonies
Repetition of motifs in the construction	Repetition of motifs in music
Symmetry	Symmetry
Creating rhythm in the view and different level of the construction	Rhythm in music
Feeling (using shade and light)	Feeling in music, esp. playing
Proportionality in architecture	Harmony
Ratios and using the golden ratio	Ratios in harmony
Form in architecture	Form in music
Line in architecture	Line in music
Shade and light in architecture	Valeur in music using the tones
Color in architecture	Color in music
Mathematics and geometry in architecture	Mathematics in music theory
Acoustics in the construction	Acoustics in music
Psychological issues and their importance in architecture	Psychological issues and their importance in music

Rhythm

Rhythm is a function of time and in different visual and audio aspects is like the meaning name is the grammar, like the light in flame or scent in flower. Rhythm is a complex phenomenon that flows in all the works of art. In fact, it is the breathing pulse

which gives life and causes movement; it is a hidden heart that beats inside, and it is for the rhythm that an order is set in a series of events to be introduced harmonically. English philosopher, Herbert Spencer writes the rhythm regulates the universe, and gives

order to the infinite sky and the planets with different shapes.

The concept of space in architecture and music

In all the arts, creating a sort of emotional and psychological space is one of the goals of creators.

In architecture, space have a special position- the architect, like other artists and other creators of art, is able to create different spaces to make the same emotional and spiritual impressions that musician creates with the help of sounds and instruments. As a piece of music affected by phonosphere can create an emotional space, full of spiritual and heavenly appeals, or as a piece of poetry can create a space full of mysticism and illumination, building of a mosque with its minarets that are raised to the sky and stretch of the corner of a church represent the path to excellence and create a space full of religious and spiritual appeals. As Xenakis stated, whether we want or not, there is a linkage between architecture and music -this issue is based on our mental structures that are the same in both arts.

Harmony in architecture and music

By harmony, we mean the combination of simultaneously sounded musical notes to produce a pleasing effect, and in architecture, the accord of motifs, themes, and subjects together.

In architecture, when we talk about all the relations within and around the building, we are in fact referring to the concept of harmony. As professor Alsop stated, in architecture, colors, textures, shapes, softness, roughness, and reflection can all be coordinated and in harmony. The overall impression is that the architecture should be comforting and in harmony. It is true that in the music harmony is in the compromise of sounds, but in a broader sense, it is ratio between sounds, such as the sound, color and tone of instruments. The tone of a plectrum instrument is different from the tone of a bowed instrument, but when used in a certain way, they will be pleasant and harmonious.

In the science of harmony, some compromises are unpleasant and some are pleasant. In pleasant compromises, there is a distance that is very pleasant to hear, which is called the Golden distance.

The concept of line in architecture and music

The line is a collection of points. The feature of line is movement towards a destination. The horizontal, vertical, inclined, curved, broken, and spiral lines each induces a special feeling in the viewer.

In the architecture, line has a major role in dramatization. And in music, is represented in different ways: sometimes horizontal (as monodique sentences), sometime vertical (by accords in classical harmony science), sometimes parallel (in counterpoint), and sometimes crossed, screwed, or curved (in modern harmony).

The concept of valeur in architecture and music

Valeur in music is to create harmony between bass and tenor sounds and stretch of sound from weak to strong, in painting is movement of color from light to dark, and in architecture is demonstrating the value of light from pale to dark (whether by light or by lines and surfaces).

Xenakis views on architecture and music

Architecture is generally a three-dimensional space in which we live. Indentation and bumps are important both in the music and the visual arts. Considering right proportions is necessary here. The best architecture should not deal with decoration, but with simple proper proportions and volumes. Architecture is a visual art. In the field of visual art, there are components that are associated with what we call rational, and yet is a part of the music as well. Whether we like it or not, there is a linkage between architecture and music. This is based on our mental structures that that are the same in both arts.

Acoustics and Architecture

Audio harmony, like visual harmony is a guarantee for aesthetic enjoyment. Silence is a task of architecture so that the sound of space can resonance. Due to numerous problems and the complexity of issues related to indoor sound propagation, these studies are conducted using simplified methods to achieve a practical way to this purpose. And the easiest way to acoustic studies on building's halls is hypothesis of sound ray and linear propagation of acoustic waves.

Unitarianism as the most significant conceptual feature of Iranian music and architectural

With another look based on our mystical worldview to our culture and country, especially in the field of architecture and music, we are faced with a beautiful and glorious dialectics that has developed several contradictions in imagination, while their unity.

Basically essence of Iran's architecture is unity-oriented and seek unity, and spatial organization based on hierarchies, that is detectable both from outside and inside seeks for simplicity and consistency and purity, and is free from any material belonging, and also looks for themes that cannot be included in worldly bodies, and finally, the result is an introverted architecture, inseparable from the perspective of urban perspective, that exhibits its main effect in the empty spaces.

Conclusions

Finally, it should be said that if the comparative analysis of architecture and music is reduced to the periodic movement at playing the corners of a row and converting these corners in improvisation of musician, and the space divisions in Iranian architecture, the result of such a comparative analysis, as clear, is a formal game and a null relationship. All the arts are transversely linked together, since the source of all of them is manifestations of beauty. This beauty is manifested in architecture and sculpture in the form of length, width, and height ratios. And sometimes proportions of the colors create beauty, where in fact the frequencies of light make pleasant proportions. In the music sound ratios lead to beauty. Proportionality is sometimes manifested in visual aspect, and sometimes in audio aspect. Therefore, all the arts have the same aspect and that is the aspect designed with the geometry of our heart and soul. Thus, pointing to the importance of Iranian art and music, and according to the fundamental theory of music and considering the concept and principles of aesthetics in architecture, a specific harmony is found in the world of architecture and music. The art of Iranian music, as well as the art of shaping the face of the city and valuing the architecture is now on the wane, since it is a while that pure architecture and music are replaced by the fantasy and business arts. At this time, there is an urgent need to change and review of this field of art to not only revive the authentic and valuable art of past generations, but also create spaces

for the development of latent talents; and this is the task of architecture.

Resources

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