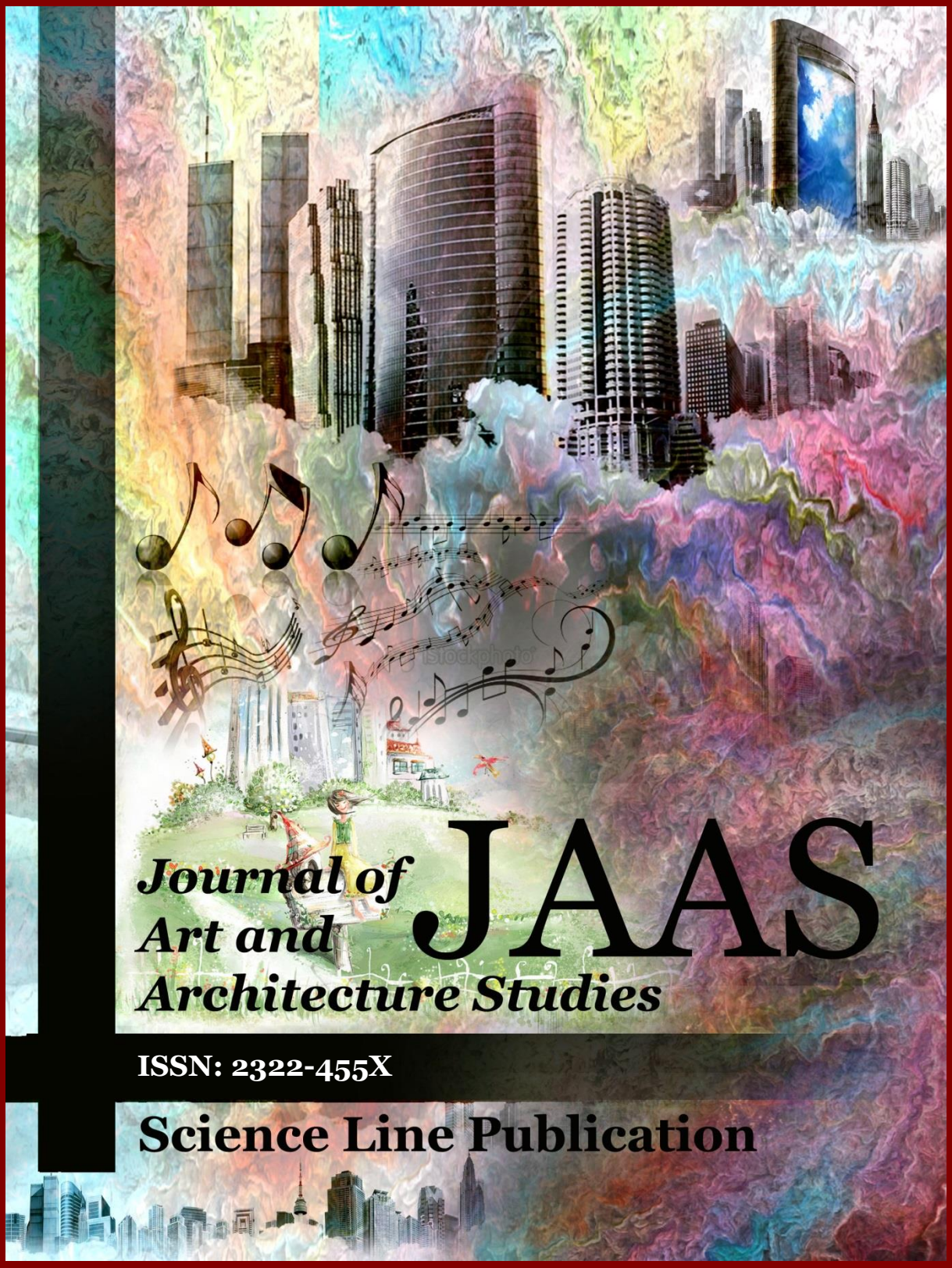
In the Name of God



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Art and architecture as sustainable tools of propaganda: a brief review of the imperial Rome and its influences on the 21st century polity

Hussaini IU, Elnafaty AS, Wakawa BU, and Umar A.
J. Art Arch. Stud., 13(1): 01-11, 2024; pii:S238315532400001-13
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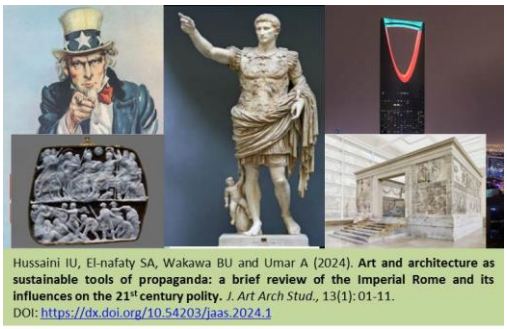
ABSTRACT



Art and Architecture have collectively been used as the historical media of communication and preservation of cultures and values for many civilizations. It is argued that art is an expression of creative human skills and imagination which is usually appreciated for its beauty and emotional power. Architecture on the other hand is perceived to be a component of the art 'you can walk through' that specifically embodies the science of designing and superintending of buildings and other similar structures. However, Rome as a republic and as an empire had greatly explored the phenomena of art and architecture in a variety of ways and elaborations. The Roman emperors and private citizens alike have used buildings, sculptures, paintings, and other art forms as propaganda tools to advertise achievements and mold public opinions on issues of interest. This study therefore, explores on the implications of these phenomena through 'textual' historical review and analysis directed at providing highlights on the significance and power of art and architecture as sustainable factors of propaganda epitomized by the Imperial Rome. Subsequently, the study elucidates on the legacy of its propaganda techniques that has resonated in the 21st century polity with reinforced technological innovations deployed to sustain culture, political power, and economic development. This is evident in the ongoing global developments as typically exemplified by the Gulf States of the Arab world.
Keywords: Art, Architecture, Sustainable Tools, Propaganda, Imperial Rome, 21st Century.

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Research Paper

The effect of the physical characteristics of atriums on the natural ventilation of buildings

Kaviani S and Zarandi MM.
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ABSTRACT

This study explores the impact of atrium designs on natural ventilation and energy efficiency in buildings, focusing on three distinct types of atriums: vertical atriums promoting stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials. Each atrium type was examined through the lens of geometry and size, orientation, material specifications, and internal configuration to determine how these factors influence their effectiveness in enhancing natural ventilation and optimizing energy performance. The methodology adopted a comparative analytical approach, leveraging both theoretical and empirical assessments. Computational Fluid Dynamics (CFD) simulations and architectural modeling were utilized to measure airflow patterns, temperature gradients, and ventilation rates across different atrium configurations. This quantitative analysis was complemented by a qualitative assessment of material impacts and spatial arrangements within the atriums. Results indicate that the physical characteristics of an atrium significantly affect its ventilation efficiency and thermal behavior. Vertical atriums, with their tall structures, were found to effectively utilize the stack effect, particularly when combined with high thermal mass materials such as concrete and brick. These materials help stabilize temperature fluctuations, enhancing the natural cooling and ventilation processes. Horizontal atriums, aligned perpendicular to prevailing winds, maximize cross ventilation, which is further optimized by using low thermal mass materials like wood and gypsum that respond quickly to temperature changes. Atriums with extensive glazing areas benefit from advanced glazing materials

that manage solar gain and maximize natural light, thus improving overall energy efficiency. This research provides actionable insights into atrium design, emphasizing the importance of tailored architectural strategies to leverage natural environmental forces. It contributes to the field of sustainable architecture by offering a comprehensive framework that can guide the design of atriums to achieve optimal ventilation and energy performance in various climatic conditions.
Keywords: Atrium Design; Natural Ventilation; Energy Efficiency; Sustainable Architecture; Thermal Behavior; Computational Fluid Dynamics (CFD).

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Review

Study of mystical concepts at Farshchian Cultural Complex, Isfahan, with the semantic view

Maleki M and Hasanzadeh L.
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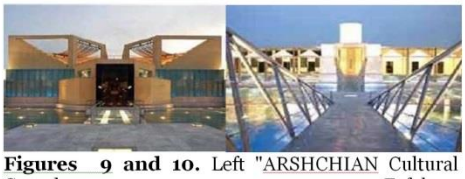
ABSTRACT



Figures 9 and 10. Left "ARSHCHIAN Cultural Complex, Esfahan: http://www.jmmj84.blogfa.com/post-10.aspx

Architectural works can be viewed in different aspects. But so far in two respects has been paid more attention to these works. First, as one of the Seven Arts as a result of the author's artistic creativity (aesthetics) and the second, from the respect of scientific and technical (the highest degree of objectivity). Entire attention to the two mentioned dimensions prevents us from the rest of important aspects of our architectural work analysis. This paper, based on the study of the role of the meaning component in creation place sense and in direction of answering to the questions related to that: the meaning component in each species, including "existing meanings in human's mind and "the existing meaning in places", make what levels and degrees, is formed that in this regard, the study of " mystical concepts at cultural complex of Isfahan Farshchian" with the semantic view frame in relation of architecture and the world of mysticism" is intended as the main objective of this research. In this study, with the documentary approach by referring to authentic texts, such as the types of the related books, publications and valid scientific research site and analysis of information, the evidence has been presented which indicates the meanings in the minds of human and places through sensory experiences is received and form perception arising awareness through the five senses and then the feeling is associated with perception and lead to a full understanding and significant perceptions. Based on all performed analyses based on the recognition of semantic signs in construction and examines limits of the dependence of form and content in architecture, this result is obtained that it interpretation of the hidden code in the architecture, results in a sense of place that is done according to individual perceptions. However, efforts to achieve the society to comprehensive and fundamental meaning of a work, despite the fluidity of construction meaning and attention to importance of the works criticism should also be accepted.
Keywords: Fluidity of building semantic, Mentality complementary objectivity, Comprehensive sense, Morphology of architecture work, Relation of the architecture and mysticism

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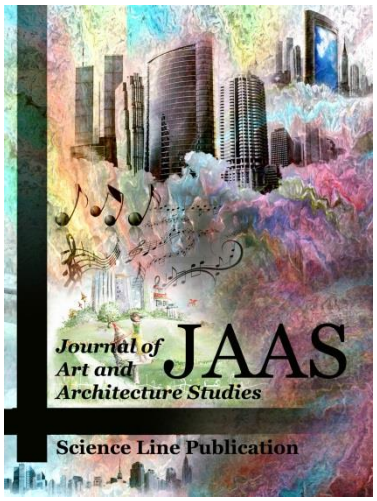

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ART AND ARCHITECTURE AS SUSTAINABLE TOOLS OF PROPAGANDA: A BRIEF REVIEW OF THE IMPERIAL ROME AND ITS INFLUENCES ON THE 21ST CENTURY POLITY

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Review Article

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ABSTRACT: Art and Architecture have collectively been used as the historical media of communication and preservation of cultures and values for many civilizations. It is argued that art is an expression of creative human skills and imagination which is usually appreciated for its beauty and emotional power. Architecture on the other hand is perceived to be a component of the art 'you can walk through' that specifically embodies the science of designing and superintending of buildings and other similar structures. However, Rome as a republic and as an empire had greatly explored the phenomena of art and architecture in a variety of ways and elaborations. The Roman emperors and private citizens alike have used buildings, sculptures, paintings, and other art forms as propaganda tools to advertise achievements and mold public opinions on issues of interest. This study therefore, explores on the implications of these phenomena through 'textual' historical review and analysis directed at providing highlights on the significance and power of art and architecture as sustainable factors of propaganda epitomized by the Imperial Rome. Subsequently, the study elucidates on the legacy of its propaganda techniques that has resonated in the 21st century polity with reinforced technological innovations deployed to sustain culture, political power, and economic development. This is evident in the ongoing global developments as typically exemplified by the Gulf States of the Arab world.

KEYWORDS: Art, Architecture, Sustainable Tools, Propaganda, Imperial Rome, 21st Century.

INTRODUCTION

The city of Rome is historically known to be founded around 754 B.C. by Romulus; which in a period of time had become a confederacy of Italian States; and three centuries later became the hub of western world from Euphrates to the Atlantic under spectacular rulers like Pompey, Julius Caesar, Octavian (Augustus) and Trajan) [1]. According to Nuttgens [2], the Romans were described as hard-headed, pragmatic people, who excelled at making laws, administering territories, and exhibiting military engineering feats. They built their empire by military aggression rather than by exploring and colonizing expeditions. Therefore, the extension of the Roman state and the spread of their culture was neither by conquest of the mind, through philosophy, spirituality, poetry or art; but by military grandeur and display of engineering feats. They built baths to relax in, fora for conducting law and politics, theatres for drama, circuses for gladiatorial fights, and temples for a not too demanding religion; all with salient propaganda connotations.

Ironically, the birth of Imperial Rome is synonymous with the end of the Roman Republic and the rise to power of Augustus. It describes the period of the Roman Empire (27 B.C. to A.D. 476) which typifies the end of Roman republic following the assassination of Julius Caesar. The Imperial Rome attained its peak in a variety of ways and developments through creative engineering skills accentuated by original vision of arts and architecture. The architecture was profound and eccentric particularly in the development of the public spaces. The *forum* was created and became the social and political hub of the city, serving as meeting place and market. The *temple* was designed and built to be seen from a forum with emphasis on the façade. The *basilicas* signified as halls of justice and commerce were built and later served as models of early Christian churches. The *baths* (thermae) established as public facilities served as meeting-places with facilities for athletics and lectures; established on raised platforms with heating systems underneath. The *amphitheatres/circuses/theatres*

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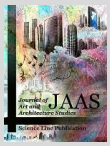

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served as places of entertainment; deadly animals and gladiatorial fights; horse and chariot races; orchestra and drama. The *tombs* were magnificently built as mausoleums and generally placed along the main roads out of town [3]. All these settings and monuments were established to serve primarily as basic civic and entertainment functions; and as memorials or repository, enduring aesthetic values encapsulated with propagandist messages on achievements of the civilization.

The Romans were known to have adopted other foreign cultures including art, - which was specifically influenced by the Greek civilization to some reasonable degree. Nonetheless, the Roman art embraces both the private and public spheres that encompass a wide range of communication media. While the private realm provides the opportunity for the elite Roman home owner to display his wealth, taste and education to the visitors; the public domain is filled with works commissioned by the emperors such as portraits of the imperial family or bath houses decorated with images of important classical statues. There were also commemorative works that indispensably described military life, depicted wars, and marked victories, e.g. the Arch of Titus or the Column of Trajan [4].

The commemoration of private individuals took place in the form of portraits (sculptures) displayed in the homes or in funerary context. Meanwhile, the public figures in the personalities of statesmen, generals, and emperors were usually memorialized through the erection of their portraits in public places. The displayed portraiture basically served as designated propaganda medium for boosting the image of the emperor or any other important personality. It is interesting to stress that the portrayal of the human body in the portraiture with facial features and other subliminal impressions was unequivocally important in the characterization of the personality of the emperor. They were carefully drafted to express and project personality identity in terms of age, experience as well as inner feeling of vigour and responsibility portraying a lack of vanity. In advanced scenarios, the portraits of men were depicted with wrinkles, baldness, and physical imperfections that were thought to convey a sense of their virtue, the quality of selfless duty and sober morality [1].

Emperors had their images depicted on coins as a propaganda tool to showcase fame and power of their influence. The reverse side of coins always pictured deities, temples, military victory or advertised emperor's virtues through inscriptions to serve as reminder of achievements and power. A typical example according to Thompson [1] is Julius Caesar who had his image depicted on coins during his lifetime to remind his paid troops that he was responsible for their livelihood; and this act was gloriously adopted by Augustus and other emperors of the imperial age.

Augustus built glamorous edifices and constructed grand public spaces in Rome to transform it into a truly majestic city of its time. The posture of the Roman buildings helped to create a Roman culture in parts of the empire beyond Rome. The great palaces built were always richly decorated to give a sense of opulence; and its lavishness was meant to impress viewers and advertise on the wealth, power and the taste of the emperor. Temples were rebuilt to encourage a renewal of pious observance of the old rites. Augustus notably commanded flourished arts as a propaganda tool in his quest to make Rome the new Athens, the cultural as well as political nerve centre of the Mediterranean [3].

Roman public buildings were often styled in relief sculptures to depict special events, such as sacrifices to gods, victories at wars, or addresses by the emperor. Portable paintings on wooden panels were on some occasions displayed in public buildings to depict great military battles and victories. At this point, it is necessary to stress that painting as an element, together with architecture and other art forms had been greatly explored as tools of expression of human creative skills and imagination, sustainably maintained till date.

SUSTAINABILITY OF PROPAGANDA IN ART AND ARCHITECTURE

Sustainability as a concept or system is difficult to be defined in one straight perspective, but possible in varied dimensions. In respect of the subject matter of propaganda, sustainability could be referred to as the ability to maintain a system at a certain rate or level to deliver effective results over time. Art and architecture are two known tools that have invariably been used to sustain the propaganda machines of many civilizations in history.

Undoubtedly, propaganda is a communication technique that tends to create emotional appeal in people to accept an opinion leading them to certain behaviours and actions. According to Lysa [5], propaganda has been used in many ways throughout history to broadcast information to give certain ideals and understandings to the people. This act is to promote a particular agenda or viewpoint to shape people's opinion and subsequently their actions. Art

as a propaganda tool can be used to influence public opinion in favour of a political ideal or government policies. This can take the form of posters, political cartoons, commissioned paintings, sculptures, buildings, and literary arts. In literary arts, words are capable of explaining situations, ideas and opinions, but in a lot of times fail to add some desired visual details, references and substance durability to the message. As such, art in imagery in most times presents clearer messages than written words. Although, arts and propaganda are completely different phenomena in context, they are both, forms of communication media. While art explores the mystery of human experience, propaganda seeks to influence intellectual decision by stirring up obscuring clouds of emotionalism. At some points, art becomes propaganda as a tool; and in some other scenario, propaganda becomes art as a medium. The Philosopher, Alain de Botton relates that, 'Art is propaganda for what really matters: the way we live rather than the way we think we should live.' Propaganda in this sense becomes synonymous with furthering ideologies through speeches, writing, and reporting; and has also a powerful history of intentionally manipulating visual art to express political sentiments. It is recorded in history that intentionally propagated images have been used successfully to further states' political sentiments through visual communicating messages. It is notably evident that in World War I, poster art has been used as a propaganda tool to shape public opinion towards states' participation in the war, to encourage community involvement. There were also posters that vilified the enemy. Typical examples are; a political propaganda rallying patriotic support which was expressed in the British Army's 'Your Country Needs You' poster; and also the United States' 'Uncle Sam' poster furthered same sentiments of nationalism to gather recruits for the American army (Figure 1) [6].

In the same vein, architecture has equally been used as propaganda tool to promote an idea or ideology using buildings and structures that are symbolic and would stand the test of time. In fact, architecture as a tool has played a great role in the political and physical developmental growth of many civilizations in world history; such as the Egyptian, Greek, and Roman Empires; and most recently, the western civilizations of Europe and America. Hitler and his Nazi party notably used architecture to promote their programme and ideology with unquestionable emphasis on nationalism [7]. But, in the history of time, only few people have used propaganda (arts and architecture) effectively as the first emperor of Rome, Augustus Caesar [8].

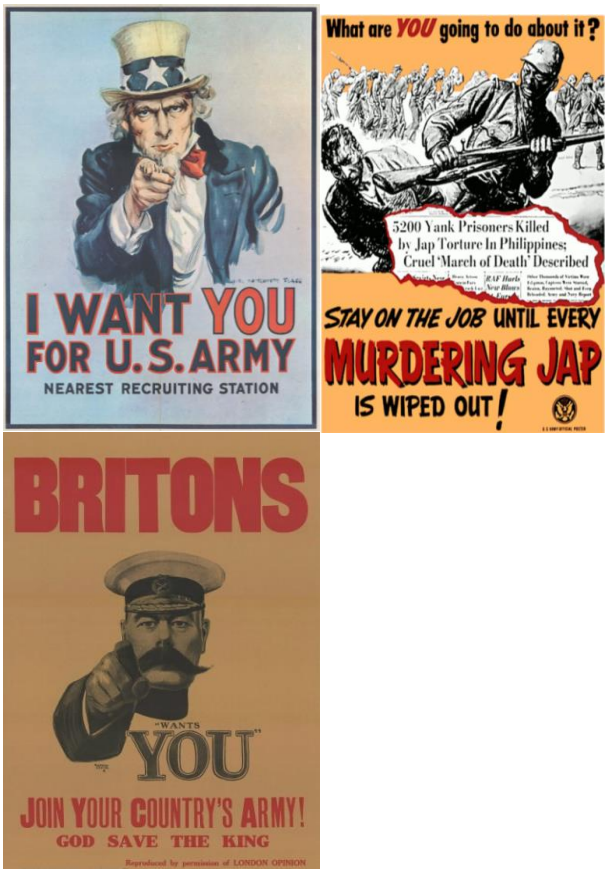

Figure 1. Propaganda art (Wikipedia)

METHODOLOGY

This study is a review analysis of the propaganda phenomenon of the Imperial Rome with particular reference to the roles of art and architecture in promoting propagandist messages. The study specifically explores on the implications of these propaganda phenomena through 'textual' historical review and analysis on the under listed aspects as provided below. This is directed at providing highlights on the significance and power of art and architecture as sustainable factors of propaganda epitomized by the Imperial Rome that subsequently resonated in the 21st century polity. Thus;

A) The Experience of Imperial Rome

The birth of Imperial Rome is occasioned by the end of the Roman republic and the reign of Emperor Augustus. The Roman Empire of post-republican period used propaganda extensively through art and architecture between 30 BCE – 330 CE. The adopted methods range from 'passed on stories,' or visually pushing certain ideals that are in some instances exaggerated in certain figures or ideas to promote their motives. This was necessary to enliven the

personal status of the people and the rulers; and also to unify the empire and promote Pax Romana (roman peace). Propaganda was used to inform the people of the general happenings and important events that must be to their knowledge, such as the success of the ruler and the army among other things. The art of painting and sculpture were used to promote heroic image of a person or cause [5].

In the words of Pollok [9], '...the Roman Empire is arguably the most influential empire that has ever existed.' This is because, its influences has riddled the entire western civilization in the area of military organization and strategy, law and the political order. It succeeded in conquering and assimilating the entire Mediterranean region, extending to most parts of Britain, North Africa and the Gulf region, creating an impressive historical record of territorial expansion and longevity. It however, endured as eastern Byzantine empire for nearly an additional 1000 years before the fall of Constantinople in the hands of the Ottoman empire in 1453 [10].

The political success of the Roman civilization which was accentuated by the stability of the state is particularly credited to good leadership among other factors. One of such leaders, whose greatness stands alone according to scholars, is the personality of Caesar Augustus.

Emperor Augustus was born in 63 BCE; and was earlier known as Gaius Octavius. His adoptive father Gaius Julius Caesar groomed him for leadership by imparting on him important lessons on many aspects of life; and particularly the artistry of political manipulation to garner popular support [11]. He became the master statesman who never had the privilege of the 20th century technology and logistics to underscore public manipulation. However, he was able to make use of the provincial methods of his time, which included some means that are still exploited today – arts, architecture, and the written words. Statues, monuments, coinage and other art works were greatly utilized to solidify and spread his image as; *Augustus* the military commander, *Augustus* the statesman, and *Augustus* the peace keeper. Consequently, Augustus was able to sturdily maintain unabated power in an atmosphere of peace and stability during his reign [9].

B) The Augustan propaganda

In the words of Charlesworth, M. P. year 1937 in Jeffries [8];

"In any large empire, embracing many languages, nations, and culture, the ruler must somehow persuade his subjects (i) that he is fit to rule them, and (ii) that they are being ruled for their own good. He must, in fact, use propaganda."

The era of Augustus the emperor was an epitome of power filled with military triumphs, expansion, peace and prosperity, achievable only with sophisticated propaganda campaign [12]. The physical mode of propagation (statues, monuments and the coinage) were more potent than the 'literary art' form because they could be consumed by anyone both read and unread [9]. The propaganda was heavily focused on promoting the messages of military triumphs, his divine connection and recognition by the gods, the prosperity he created by establishing new provincial cities, and the continuity he established via the peaceful succession of power.

The messages occasioned by the images on monuments, statues and art could be received by only a limited number of people, in contrast to the much broader audience for coinage being a portable form of propagandist imagery [12]. Thus, the followings are the details of the various propaganda tools employed by Augustus.

1) The statues

The statues of Augustus and the associated art depicted his connection to the gods, his military triumphs, his family succession, his political vigour and the totality of his leadership. They portrayed the image of Augustus in different contexts. Thus, there were two notable depictions of Augustus. The first is Augustus 'the leader' which is epitomized in the famous *Prima Porta* statue. The second is the *Via Labicana Augustus* which portrays the emperor as Pontifex Maximus (head of Roman College of Priests and arguably the most exalted title in the Rome).

a. The Prima Porta statue depicting Augustus in military garb portrays the image of Rome as a place of great military service and strength (Figures 2a&b).

b. The *Via Labicana Augustus* portraying Augustus as Pontifex Maximus; displaying a veiled Augustus in a toga robe meant for the magistrates and citizens alike whenever they make public appearances (Figure 3). The veiled head being a pontification of the Roman priests engaged in sacred rites.

The Prima Porta Augustus is an elaborate statue containing hidden propagandistic messages within it that would help to express to the Roman people on the leadership of Augustus. This statue was located in a house belonging to Augustus' wife (Livia) which can only be seen by prominent members of the society, but reflects other similar images found in the public realm.

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Figure 2. a) Augustus Breastplate [12]; b) Augustus of Prima Porta [12]

The Gemma Augustae is another statue that is not shown publicly but has similar propaganda messages showing the emperor surrounded by the gods, as if he had become one (Figure 4). In fact, statues are the physical entities of evocation on the rule as well as accomplishments of Augustus; suggesting a divine favour from the gods, advocating him being the son of a god – Julius Caesar [9, 12].

Figure 3. Via Labicana Augustus [12]

Figure 4. Image of the Gemma Augustae [12]

2) The monuments

There were two monuments that were erected in the name of Augustus. The Ara Pacis and the Res Gestae Divi Augusti.

a. The Ara Pacis (Figure 5) is one of the most famous of Augustan monuments located on the northern outskirts of Rome; and was sanctified on 30 January 9 BCE. In this configuration, the altar is consecrated as a symbol of peace for the people of Rome, occasioned by the authority of Augustus and his family. This establishment is supported by the Augustus statement;

"Pray that the household that is responsible for peace may, together with that peace, last a long time."

b. The Res Gestae Divi Augusti is not a monument per se, but rather a text that was inscribed on monuments in many locations throughout the empire (Figure 6).

Figure 5. Image of Ara Pacis [12]

Figure 6. Res Gestae Divi Augustus (Deeds of the Divine Augustus) [12]

Both monuments promoted Augustan propaganda by extolling his greatness and achievements; and as well emphasizing on the importance of his messages. In short, the monuments served as the medium of eulogy of his life, both present and beyond to the people of Rome

and those outside the empire. However, monuments and other luxurious objects were only available to those in the immediate region or those close to the emperor, whereas the coinage was for all ranks in close and distant places. The impact of all other propaganda tools (statues, monuments and other forms of art) was amplified by the use of coinage to send the same set of messages [9, 12].

The propaganda message of the monuments was able to reach a large number of viewers more widely by those who physically visited them. Meanwhile, the coinage was a more successful campaign because it was the fastest in transmission used by all categories of people both inside and outside the Roman Empire daily in the monetized economy of goods and services. The versatility of coinage benefitted Augustus much as new coins are susceptible to carrying new messages or image [12].

3) The coinage

Coins have served as prominent and effective means of propaganda in the ancient world because they were part of daily life in business transactions; and could reach farthest corners of the empire and beyond. These coins had inscriptions of important images that help to pass on messages to the people. Such images as the Capricorn, gateways built as triumphal arches, laurel branches, eagles, Victory, crocodiles, bulls, altars, and Augustus' stepson and successor, Tiberius (Figures 7a&b).

Figure 7. a) Imperial Aureus with Augustus facing right with Victory on the reverse [12]

Figure 7. b) Imperial Aureus with Augustus right with double Laurel branches around a door on the reverse [12]

Coinage was a primeval (inherited from Julius) element in Augustus' propaganda campaign strategy because of its visual imagery, versatility, intrinsic value, portability, and representation of continuity. The images on the coins had no direct reflection on the market value, but the images depictions were important medium of message transmission in the hands of the citizens. The success of coinage as viral propaganda tool is evident in its legacy; a legacy that continues till date as seen in current messages and propaganda in the form of busts, symbols, and inscriptions on currency all around the world [9, 12].

4) The forum of Augustus and other public places

Augustus built the forum to promote peace and stability in Rome. It was a courtyard at the entrance of the temple of Mars Ultor, meant to house the statues of earlier kings including Julius Caesar; and with colonnades along the perimeter which Augustus claimed his divine ancestors dwell within. However, it was essentially created to become the social and political hub of the city, serving as meeting place and also as a market [8].

Augustus also built other public places like the basilicas (halls of justice), the temples (for worship), the thermae (baths with public facilities), the amphitheaters/circuses/theatres (for entertainment, gladiatorial fights, horse and chariot races, drama, orchestra), and tombs (as mausoleums) for burial of dignitaries.

5) The literary art

Augustus had employed all propaganda tools at his disposal including literature which he used to promote his proclaimed divine lineage. In fact, he was quick to discern on the power of written words as in poems, and the efficacy of the visual content in theatre on the minds of the people. He took advantage of the potency of poetry, and subsequently, many poets facilitated to draw the line from the gods to Augustus [13]. He got involved in the production of poems that would promote his propagandist ideology; leading to stories that buttressed the reception of the subsequent forms of physical propaganda. In a nutshell, the literary works of imperial Rome consigned an enduring impression on the minds of the Roman people [8].

C) The 21st Century (contemporary) Propaganda

The main essence of propaganda in this context is to construct reality according to the interests of specific power structures attainable through

sustainable propagandist messages. Nonetheless, the physical component of arts and architecture according to Hussaini et al. [14] has the potency to denote and symbolize societal and national values in diverse ways. Thus, contemporary propaganda relates to the performance of power in contemporary society derived from contemporary propagandist messages; in which case, art and design are deployed to play a major role in influencing the attitudes of a society.

In the words of Tusa [15];

'the arts matter because they embrace, express and define the soul of a civilization; and a nation without arts is a nation that has stopped talking to itself, stopped dreaming, and had lost interest in the past and lacked curiosity about the future.'

Arts as a propaganda medium is considered a conscious synthesis and creation of forms, sounds, movements, colours, materials and words to express a human condition; and its characterized by its quality to carry messages which are either clearly stated or deeply hidden [16].

Leaders in history have commissioned art and architecture as vehicles to display the best attributes of their societies and for the posterity of their legacies. Through art and architecture, the nations of the Mesopotamia sought to project military victory and a love of their government; the Egyptian Pharaohs were motivated to prove their relationship with the gods above and their power on Earth; and the Greeks sought to develop civic life and honour their military conquests. Though, propaganda may not always be truthful or realistic, it has become a vital resource that both the government and the common people can procure through art [17].

The current dispensation of secular and democratic society has no place for ambitious militarists and would-be dictators who might desire to perpetually cling on to power on feudal or autocratic domain. Nevertheless, arts and architecture remains a power tool in the hands of political leaders in addition to other important contemporary media for the propagation of ideals of the new civilization.

The newfangled propaganda in art and architecture excogitates tradition and non-traditional societal issues of culture, identity, expression, and aesthetic personality in political campaigns; and a demonstration of the height and strength of development in the new civilization. Typical examples are found in the classical architectural edifices in the modern cities of Dubai, Malaysia, Tokyo, China, etc. (Figures 8a&b). All the same, postmodern art focuses on public attention and its role in contemporary society by defining, questioning, and examining art's function, form, content aesthetics, and value [18].

Art is an effective medium to communicate messages to people in politics and as well an inspiration medium of the society through cultivation of new values and ideas which in turn influences the politics of the day. It is the absolute weapon in the hands of politicians which according to Lasswell [19] is the technique of influencing human actions (Figure 9).

Figure 8. a) Burj Khalifa, Dubai (Wikipedia); b) Petronas Twin Towers, Kuala Lumpur (Wikipedia)

Figure 9. Contemporary Propaganda Art (Wikipedia)

Propaganda thus became the modern force of the 19th century politics, and an integral part of the social, political, and economic life of the 20th and 21st centuries with great sophistication and effectiveness. According to the statement of Hussaini et al. [14], 'beyond the depiction of the power of the state and its influence on the emotions of the citizens, architecture and arts have endured a more sustainable approach in creating enduring values in

our daily experiences in recent times by deploying the advanced technologies.' This is accentuated by the development of a wide range of new communication technologies of satellites, Wi-Fi networks, computers, cell phones, social media, etc. offering ingenious potentials of spreading propagandist messages across the world.

THE EMERGENT CASE OF THE GULF STATES OF THE ARAB WORLD

Culture and traditional values in conjunction with political and economic developments remain the driving forces of societal growth and its sustainability. Cultural resources range from imposing monuments to live performances of traditional art; in most cases drama, music and dance. However, the imposing monuments of the contemporary civilizations in all regions of the world are depicted by the presence of super structures of monumental heights and grandeur. The emergence of the supertall buildings as widely recognizable icon of the cities is an impetus for future building growth and economic development [20]. In a grandiose show of eminence and propaganda of strength in socio-cultural, political and economic development, the skylines across the major cities of the world have been rising considerably over the past decades.

A typical example of this development is the current trends of supertall and complex building developments in the Gulf States of the Arab world. The art and architectural feat of this region has helped to shape the image of the emerging cities and the national leadership with strong influences on the perception of the inhabitants and the outside world, and traction towards a more sustainable tomorrow. The building's imagery represents a cultural iconic symbol that depicts societal identities; a reflection of the cultural aspects through historical analysis of the cities [21, 22] as shown in table 1.

Table 1. Examples of high-rise buildings with responsive cultural patterns

	Description	**The building design**	**Inspirative model**
Katara Towers, Doha, Qatar	This tower represents Qatar's symbol of hospitality and generosity. It demonstrates the modern architectural art and advancements which is reminiscence of contemporary design combined with culture and art (Wikipedia).	 The design pays homage to Qatar's iconic scimitar swords, the 2 towers hosting two of Qatar's most luxurious hotels	 **National symbol of Qatar** – (Dawlat Qatar) The coat of Arms of Qatar depicts a variety of different geographical and cultural connotations. It reflects an interactive and harmonious interface between wild and marine lives. It also depicts the palm tree height and its sense of giving, recalling of Arabs mightiest swords, the sense of dignity and safe haven.
Al-Bahr Twin Towers, Abu Dhabi, UAE	The twin towers are popularly known as pineapple building. It is characterized with exotic pineapple and honeycomb design as a solution to the Hot Desert Sun. Depending on the position of the Sun and heat, the shades open and close automatically to keep the Sun off the glass building as it moves across the sky but also let in daylight (Wikipedia).	 Also known as pineapple building.	 Inspired by *Mashrabiya* – an architectural element characteristic of traditional Islamic architecture. It is used traditionally to catch wind and for passive cooling. Jars and basins of water could be placed in it to cause evaporative cooling.

Kingdom Centre Building, Riyadh, Saudi Arabia	The tower is inspired by the growth of folded fronds of a desert plant which represents the formation of new life and growth. It symbolizes the city of Riyadh with simple elliptical tower topped with a curved opening with an observatory bridge spanning an inverted catenary arch. The striking triangular opening is visible from nearly all parts of the capital city, Riyadh (Wikipedia).	 Symbolizes the capital city of Saudi Arabia, Riyadh	 Saudi Arabia desert plant *(Birds of Saudi Ararbia)*
Museum of the Future, Dubai, UAE	This is a torus – shaped (shell) building with windows in the form of a poem about the future, written by His Highness Sheikh Mohammed bin Rashid Al Maktoum. The goal of the Museum is to be the first to look to the future. It is said that everything in the Museum is predicted to be in 2071. It seeks to foster solutions to the challenges of the future cities. The Sheikh says; • "We won't live for hundreds of years, but the products of our creativity can leave a legacy long after we are gone." • "The future will be for those who will be able to imagine, design and build it, the future does not wait, the future can be designed and built today." • "The secret of the renewal of life, the development of civilization and the progress of humanity is in one word: innovation" (Wikipedia).	 A global symbol of the future embellished with cultural arabic calligraphy	 Torus-shaped shell

According to Hollister and Wood [23], "five of the twenty world tallest buildings in 2020 are in three countries in the Middle East; the UAE (United Arab Emirate), Saudi Arabia and Qatar. These projects include the current world's tallest (Burj Khalifa), the future world's tallest (Kingdom Tower), and what is soon to become the world's second tallest (Makkah Royal Clock Tower Hotel)." Nonetheless, it is evident that the motivating factor in these developments has been to push the boundaries of technology and accomplish feats of sustainable political power and socioeconomic strength never before imagined. The Kingdom Centre Building, Katara Towers, Al –Bahr Twin Towers, Museum of the Future, etc. seen in table 1, elaborately exemplified this fact.

Most of these emerging structures have been constructed using sustainable principles to achieve greater sustainability and reduce energy (cooling) loads in their respective hot climatic regions. Principal among others is the desirability of the supper structures; and the intent of public awareness to raise super buildings to a state of the art environmental agenda in which technology innovation in the adoption of natural energy systems is integrated with innovative structures [21].

CONCLUSION

Past studies have indicated that propaganda has been an integral part of human history and the driving force of political systems of all civilizations. However, art and architecture have both played significant roles in the spread of propagandist messages heavily deployed by the Imperial Rome and the subsequent civilizations. They have been

commissioned by leaders to showcase the attributes of the society and to project their legacies as exhibited by Augustus.

Augustus was the first emperor of Rome and had demonstrated his worthiness of the title and accomplishments through a successful propaganda machine of which arts and architecture were prominent, and his propagandist strategies worthy of emulation by his successors. On this platform, Augustus was able to consolidate his powers and subsequently became the most powerful man of Imperial Rome. Nonetheless, Augustus left a long lasting legacy of propaganda campaigns in which coinage was a crucial element, not only in Imperial Rome but also in the currencies used around the world today.

It is asserted that mythical figures were the foundation to Augustan propaganda; in which he attempted to link himself to divinity using mythical images with the infused spirit of establishing power, and consolidating peace and stability. This was a great success upon which he ensured that the next ten succeeding Caesars would be from the Julian family, and to buttress that power to the Julian lineage as well as peace and stability of Imperial Rome were all results of the propaganda of the son of the divine Caesar, Augustus Caesar. Successful as this may sound, the propaganda strategy of art and architecture has resonated through technological innovations in the 21st century to sustain culture, political power, and economic development as typically exemplified by the Gulf States of the Arab world.

DECLARATIONS

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Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Authors' contribution

All authors contributed equally to this work.

Competing interests

The author declares that there is no competing interest.

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THE EFFECT OF THE PHYSICAL CHARACTERISTICS OF ATRIUMS ON THE NATURAL VENTILATION OF BUILDINGS

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ABSTRACT: This study explores the impact of atrium designs on natural ventilation and energy efficiency in buildings, focusing on three distinct types of atriums: vertical atriums promoting stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials. Each atrium type was examined through the lens of geometry and size, orientation, material specifications, and internal configuration to determine how these factors influence their effectiveness in enhancing natural ventilation and optimizing energy performance. The methodology adopted a comparative analytical approach, leveraging both theoretical and empirical assessments. Computational Fluid Dynamics (CFD) simulations and architectural modeling were utilized to measure airflow patterns, temperature gradients, and ventilation rates across different atrium configurations. This quantitative analysis was complemented by a qualitative assessment of material impacts and spatial arrangements within the atriums. Results indicate that the physical characteristics of an atrium significantly affect its ventilation efficiency and thermal behavior. Vertical atriums, with their tall structures, were found to effectively utilize the stack effect, particularly when combined with high thermal mass materials such as concrete and brick. These materials help stabilize temperature fluctuations, enhancing the natural cooling and ventilation processes. Horizontal atriums, aligned perpendicular to prevailing winds, maximize cross ventilation, which is further optimized by using low thermal mass materials like wood and gypsum that respond quickly to temperature changes. Atriums with extensive glazing areas benefit from advanced glazing materials that manage solar gain and maximize natural light, thus improving overall energy efficiency. This research provides actionable insights into atrium design, emphasizing the importance of tailored architectural strategies to leverage natural environmental forces. It contributes to the field of sustainable architecture by offering a comprehensive framework that can guide the design of atriums to achieve optimal ventilation and energy performance in various climatic conditions.

KEYWORDS: Atrium Design; Natural Ventilation; Energy Efficiency; Sustainable Architecture; Thermal Behavior; Computational Fluid Dynamics (CFD).

INTRODUCTION

Atriums, historically central to architectural beauty and utility, have evolved in their application, particularly in enhancing building sustainability through natural ventilation. This research delves into how the physical characteristics of atriums influence natural ventilation, a pivotal element in sustainable building design. Given rising global concerns about energy efficiency and environmental sustainability, this study seeks to dissect the interplay between atrium design and natural ventilation efficacy, addressing significant gaps in the current understanding and application within modern architecture.

In the context of architectural design, atriums serve multiple purposes, from enhancing aesthetic appeal to improving air quality and reducing energy consumption through natural ventilation mechanisms. However, the exact impact of various atrium designs on natural ventilation remains poorly understood and inconsistently documented. This uncertainty presents a compelling challenge, as optimizing atrium design could lead to significant improvements in building sustainability [1, 2]. Research on atriums has primarily focused on their ability to enhance light and space within buildings. Yet, the specific atrium characteristics that optimize natural ventilation—such as dimensions, shapes, orientation, and glazing—are not fully defined, leading to potential inefficiencies in both design and environmental impact. The literature reveals a significant variation in recommendations for atrium design, reflecting a lack of consensus and a clear understanding of the dynamics at play [3, 4].

This study will focus on several key variables affecting natural ventilation in atriums:

- Atrium Geometry: The impact of atrium height, width, and shape on air flow and ventilation efficiency.

- Material Usage: How different building materials used in atrium construction affect thermal properties and air movement [2].
- External Influences: Building orientation, external wind patterns, and solar exposure.
- Internal Configurations: The arrangement of openings, internal partitions, and the inclusion of natural elements like plants and water features [5].

The primary aim of this research is to delineate how atrium design influences natural ventilation, with the goal of formulating guidelines that optimize these designs for better ventilation and reduced energy consumption. Specific objectives include:

- Analyzing the impact of various atrium designs on natural air flow.
- Developing design principles for atriums that enhance natural ventilation.
- Assessing the implications of atrium design on overall building energy efficiency and occupant comfort.

Despite the recognized importance of atriums in modern architecture, detailed studies on their specific impact on natural ventilation are scarce. Existing studies tend to focus on broad thermal comfort or energy efficiency without isolating the unique contributions of atrium designs [6, 7]. Furthermore, there is a notable disparity in findings, particularly regarding the optimal configurations for promoting effective air circulation and reducing reliance on mechanical ventilation systems.

The importance of atriums in contemporary architecture, particularly concerning their role in enhancing natural ventilation, is a well-documented yet underexplored facet of sustainable design. The following review highlights significant studies that have shaped our current understanding, alongside identifying the persistent gaps that this research aims to address.

Atrium geometry and air flow: Research indicates that atrium geometry significantly impacts natural ventilation effectiveness. Moosavi et al. [4] provide a comprehensive review of natural ventilation strategies in atrium designs, discussing the implications of atrium shapes and sizes. However, the study primarily synthesizes existing data rather than offering new empirical insights, suggesting a need for more focused design-specific research.

Material and construction influence: Albuquerque et al. [2] illustrate how materials used in atrium construction affect the thermal and ventilation performance of atriums. Their study, focusing on thermal comfort through nighttime natural ventilation, points to the potential of integrating adaptive materials to enhance atrium functionality. Despite these insights, detailed analysis on the interplay between material properties and specific atrium designs remains sparse.

Impact of internal and external factors: Zhao et al. [5] discuss how external factors like wind and solar orientations and internal factors such as building layout and open spaces influence atrium ventilation. Their findings underscore the importance of strategic design and placement of atriums within the building architecture to optimize natural ventilation.

Despite these contributions, several critical areas remain underexplored:

1. Empirical validation of atrium Configurations: While theoretical models and simulations are prevalent (e.g., Wang et al. [7]), empirical studies validating these models against actual atrium performance are rare. This gap highlights the need for field data to substantiate simulation outputs and refine predictive models.

2. Interdisciplinary approaches to atrium design: Most studies focus on specific aspects of atrium design—either thermal comfort, energy efficiency, or air quality—without integrating these dimensions into a holistic design strategy. Interdisciplinary studies that consider all aspects of sustainability in atrium design are notably lacking.

3. Customization to climatic variations: The interaction between atrium design and local climatic conditions is insufficiently addressed in existing literature. Studies such as those by Yunus et al. [8] touch on tropical conditions but do not extend these findings to other climate zones, suggesting a broader geographic analysis could yield useful design adaptations.

4. Longitudinal and comparative studies: Long-term studies assessing the performance of atriums over different seasons and under varying climatic conditions are virtually non-existent. Such studies would provide deeper insights into the adaptive capabilities of atrium designs across temporal variations.

Building on these gaps, this research aims to conduct a detailed empirical and simulation-based study to evaluate how specific atrium designs function across different climatic conditions. By employing a comparative analysis of multiple atrium configurations, this study will provide a nuanced understanding of optimal design strategies that

promote natural ventilation effectively and efficiently. Theoretically, this research aims to expand the architectural knowledge base by exploring the functional impacts of atrium designs specifically on natural ventilation. Practically, it intends to provide architects and urban planners with empirically backed design strategies that enhance environmental sustainability and occupant comfort, promoting broader adoption of energy-efficient designs across the industry.

To address the research questions, this study will utilize computational fluid dynamics (CFD) simulations to model airflow across various atrium configurations, supplemented by empirical data from field measurements within existing buildings that feature atriums. This mixed-method approach will allow for a detailed examination of theoretical models against real-world applications, enhancing the robustness and applicability of the findings [9].

By addressing the critical gaps in knowledge regarding atrium design and natural ventilation, this study is poised to make significant contributions to both the field of architecture and environmental design. The outcomes are expected to influence future design practices, leading to more sustainable building environments that align with global energy efficiency and sustainability targets.

Effective physical factors

Physical factors affecting atrium design play a crucial role in determining the effectiveness of these spaces in terms of natural ventilation, energy efficiency, and overall environmental comfort. By considering these physical factors in the design and implementation of atriums, architects and designers can optimize these spaces to enhance both the functionality and sustainability of buildings. Each factor contributes to a holistic approach to building design, where the atrium is not just a feature of aesthetic value but a crucial component of the building's environmental strategy. Here's an exploration of each key factor. Table 1 summarizing the factors affecting atriums, detailing their roles, sub-components, a case example, and the respective source for each:

Table 1. The factors affecting atriums

Effective factor	Role in atrium design	Sub-components	Case example	Source
Geometry and size	Influences air movement and light penetration.	Height, Width, Aspect Ratio	Atrium of the Seattle Central Library which uses vertical space to enhance the stack effect.	Moosavi et al. [4]
Orientation and positioning	Affects solar gain and exposure to prevailing winds.	Orientation to sun, Exposure to wind	The Crystal in London positioned to maximize solar gain while minimizing overheating.	Zhao et al. [5]
Glazing and openings	Modulates light entry and thermal performance.	Type of glazing, Size and location of openings	The Eden Project in the UK uses ETFE foil cushions allowing high light transmittance and insulation.	Albuquerque et al. [2]
Material properties	Impacts thermal mass and stability.	Thermal mass, Reflectivity	The Gare do Oriente in Lisbon utilizes high thermal mass materials for temperature regulation.	Omrany et al. [6]
Internal configuration	Affects airflow patterns and enhances thermal comfort.	Placement of plants, water features, furnishings	The Ford Foundation Building in New York integrates plants and water for evaporative cooling.	Wang et al., [7]
Interaction with building systems	Integrates with HVAC to enhance efficiency.	HVAC integration, Passive design strategies	The Manitoba Hydro Place in Winnipeg integrates atriums with mechanical systems for optimal energy use.	Zhao et al. [5]
Environmental exposure	Dictates design strategies based on local climate conditions.	Urban morphology, Climate considerations	The Commerzbank Tower in Frankfurt features atriums designed considering the local wind patterns and urban layout.	Moosavi et al. [4]

1) Geometry and size

The shape and size of an atrium directly influence its ability to facilitate natural ventilation and light penetration. A taller atrium can enhance the stack effect, where warmer air rises and exits through upper openings, drawing cooler air in from

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lower levels [6]. Conversely, a wider atrium can improve cross-ventilation by allowing more lateral movement of air across the space. The aspect ratio (height to width) of the atrium is particularly critical, as it determines the balance between these two types of air movement.

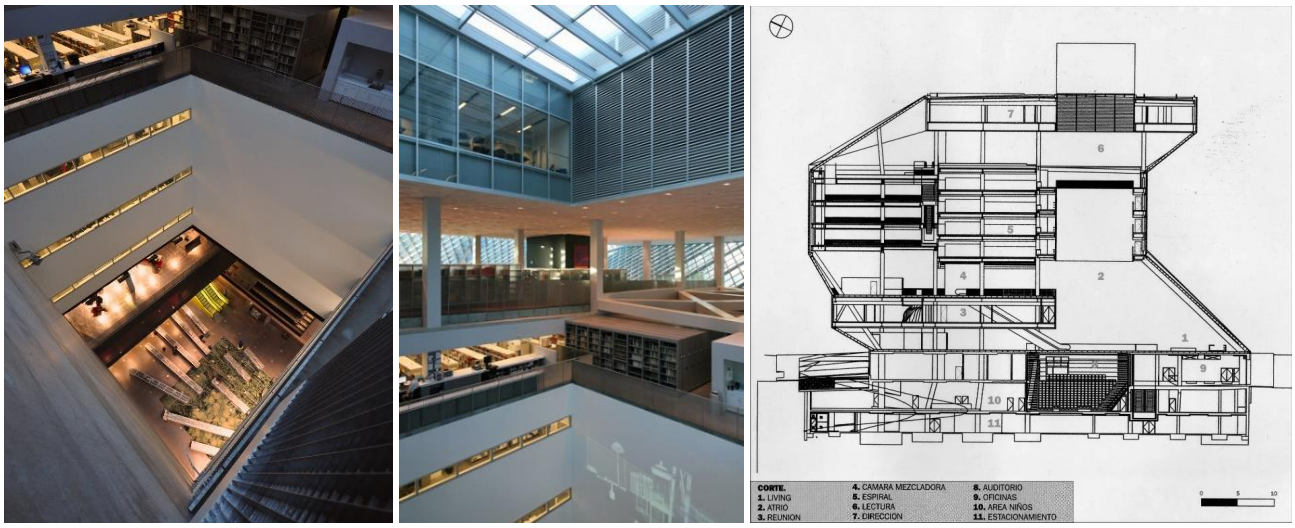

Figure 1. Atrium of the Seattle Central Library which uses vertical space to enhance the stack effect (https://en.wikiarquitectura.com/building/seattle-public-library, 2024)

2) Orientation and positioning

The orientation of an atrium affects its solar gain and exposure to prevailing winds, which are vital for passive solar heating and natural cooling, respectively. An atrium positioned to take advantage of prevailing winds can significantly enhance natural ventilation, while its orientation towards the sun can be optimized to maximize or minimize solar heat gain depending on the climate [5]. South-facing atriums in the Northern Hemisphere, for example, can capture more winter sunlight, reducing heating demands.

Figure 2. The crystal in London positioned to maximize solar gain while minimizing overheating (Archdaily, 2024).

3) Glazing and openings

The type, placement, and amount of glazing in an atrium affect both light entry and thermal performance. Large glazed areas can lead to high solar gains, which might be beneficial in colder climates but detrimental in warmer ones. The use of advanced glazing materials and dynamic shading systems can help modulate this solar gain to maintain comfortable temperatures and reduce reliance on mechanical ventilation and air conditioning [2]. Additionally, the size and location of openings such as windows and vents are crucial for optimizing natural ventilation by facilitating efficient airflow paths.

Figure 3. The Eden Project in the UK uses ETFE foil cushions allowing high light transmittance and insulation (Archdaily, 2024).

4) Material properties

The materials used in atrium construction impact its thermal mass, which in turn affects the atrium's thermal stability. High thermal mass materials can absorb and store heat during the day and release it slowly overnight, helping to stabilize temperature fluctuations and reduce peak heating or cooling loads. Reflective materials, on the other hand, can reduce unwanted solar heat gain, helping keep the atrium cool in sunnier climates [4].

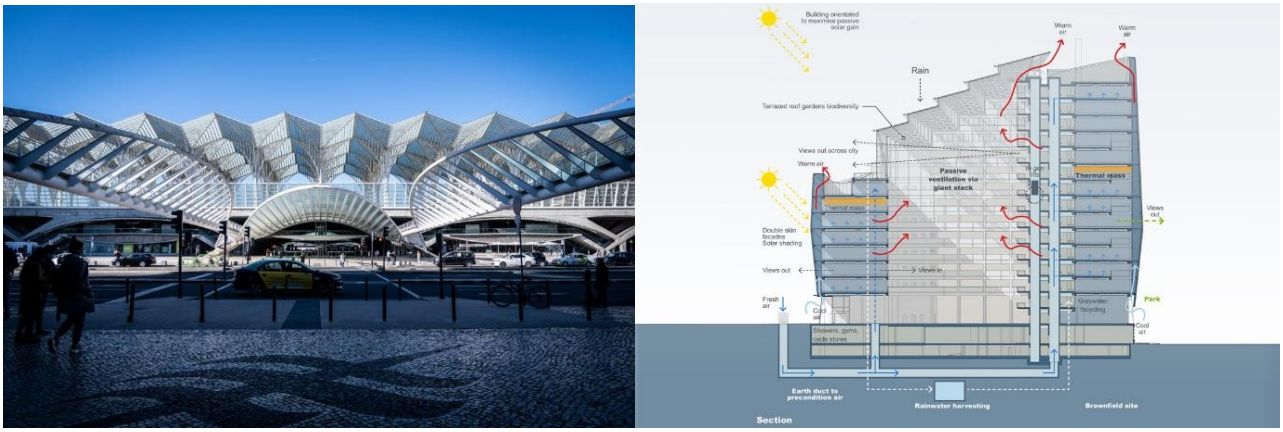

Figure 4. The Gare do Oriente in Lisbon utilizes high thermal mass materials for temperature regulation.

5) Internal configuration

The layout and configuration of the atrium space, including the placement of interior elements such as plants, water features, and furnishings, can also influence airflow patterns and thermal comfort. Vegetation, for example, can improve air quality and humidity levels, contributing to thermal comfort. Water features can provide evaporative cooling, which is especially beneficial in arid environments [7].

6) Interaction with building systems

An atrium's integration with other building systems like heating, ventilation, and air conditioning (HVAC) systems impacts its environmental performance. Properly designed, an atrium can reduce the load on these systems by providing passive heating, cooling, and ventilation. However, if not well-integrated, it can lead to increased energy consumption due to heat loss or gain through the atrium space.

7) Environmental exposure

External environmental factors such as local climate, seasonal variations, and surrounding urban morphology also affect atrium performance. For instance, in a densely built area, wind patterns may be disrupted, reducing the potential for natural ventilation. Climate considerations dictate the design strategies for both thermal comfort and energy efficiency, necessitating a tailored approach based on local environmental conditions.

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METHODOLOGY

This study adopts a structured approach to examine the influence of atrium physical characteristics on natural ventilation within buildings, specifically focusing on bureaucratic buildings in Tehran's climate. The methodology integrates a comparative analysis of three distinct atrium configurations, each selected to represent a different interaction with natural ventilation processes:

- Vertical atriums promoting stack effects: These atriums leverage vertical design to enhance natural ventilation through the stack effect, where warmer air rises and exits, drawing cooler air from lower levels.
- Horizontal atriums facilitating cross ventilation: This form utilizes a broader, more horizontal layout to maximize the movement of air across the atrium, capitalizing on cross ventilation techniques.
- Atriums with varying glazing areas and materials: These atriums are analyzed for their ability to manage solar gain and light penetration, which significantly affect internal temperature gradients and air movement patterns.

The evaluation of each atrium type is based on a set of predefined effective factors that influence natural ventilation:

- Geometry and size: Assessing how the dimensions and overall shape of the atrium impact air flow and ventilation efficiency.
- Orientation: Examining the alignment of the atrium with respect to prevalent wind directions and solar paths to understand its influence on natural ventilation and light access.
- Material specifications: Investigating the materials used in atrium construction, focusing on their thermal properties and how they affect the building's overall energy performance.
- Internal configuration: Evaluating the layout and arrangement of internal elements such as plants, water features, furniture, and partitions, which can alter airflow patterns and influence ventilation effectiveness.

To conduct this analysis, each atrium configuration is modeled and simulated using advanced Computational Fluid Dynamics (CFD) software. The simulations are designed to replicate typical environmental conditions in Tehran, providing a realistic scenario for assessing the performance of each atrium type. Airflow patterns, temperature gradients, and ventilation rates are closely monitored and recorded. Following data collection through simulation, the results are compiled and compared across the three atrium types. This comparative analysis helps to elucidate the relative effectiveness of each atrium design in promoting natural ventilation under the specific climatic conditions of Tehran. The findings from this study aim to provide actionable insights into the optimal design of atriums for enhancing natural ventilation in bureaucratic buildings, contributing to more sustainable architectural practices in urban settings.

RESULTS

To conduct an in-depth analysis of the impact of atrium geometry and size on natural ventilation, we will evaluate three distinct atrium designs, each chosen to represent different architectural approaches:

1. Vertical Atriums Promoting Stack Effects
2. Horizontal Atriums Facilitating Cross Ventilation
3. Atriums with Varying Glazing Areas and Materials

1) Geometry and size

The geometry and size of an atrium significantly influence its ability to facilitate natural ventilation. Vertical atriums are effective in promoting stack effects due to their height, while horizontal atriums enhance cross ventilation due to their expansive width. Atriums with varying glazing areas utilize their adaptive geometries to balance light penetration with thermal comfort, affecting air movement patterns. Each design requires careful consideration of local climatic conditions to optimize their natural ventilation capabilities effectively.

Each of these atrium types is measured based on the "Geometry and Size" component. This component is crucial as it directly influences the effectiveness of natural ventilation mechanisms such as the stack effect and cross ventilation, as well as the control of solar gain and light penetration.

Table 2. Geometry and size analysis table

Atrium type	Common dimensions	Geometric characteristics	Impact on ventilation
Vertical atriums	Height: 20-30 meters Width: 10-15 meters	Tall and narrow, often spanning multiple floors	Enhances stack effect by promoting vertical air movement, facilitating efficient upward air flow
Horizontal atriums	Width: 20-30 meters Depth: 10-20 meters	Broad and flat, single or double height	Maximizes cross ventilation by allowing air to flow laterally across the space
Atriums with varying glazing areas	Variable dimensions depending on building design	Incorporates extensive glazing, often irregular shapes	Adjusts solar gain and light penetration, influencing thermal layers and air movement patterns

Vertical atriums promoting stack effects

These atriums are typically tall, stretching over several floors, with a narrower base that expands slightly at higher levels. The significant height of these atriums harnesses the stack effect, where warmer air rises and exits through the top, naturally pulling cooler air from lower openings or adjacent spaces. The vertical expansion enhances natural ventilation by capitalizing on the temperature differentials between different heights. The taller the atrium, the more pronounced the stack effect, resulting in more effective natural ventilation.

Figure 5. Horizontal atriums

Horizontal atriums facilitating cross ventilation: Horizontal atriums are generally wider than they are tall, creating a large, open area that facilitates the movement of air from one side to the other. These are often found in single or double-story buildings where the atrium can stretch across the building's width. The broad, open design allows for enhanced cross ventilation, especially when openings are aligned with prevailing wind directions. This setup is ideal in climates where breezes are a reliable and consistent feature, as it allows for efficient air exchange across the atrium's entire area.

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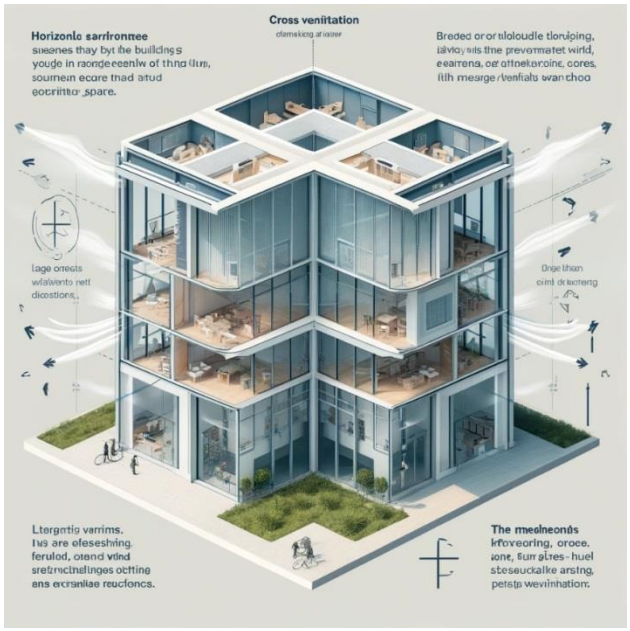

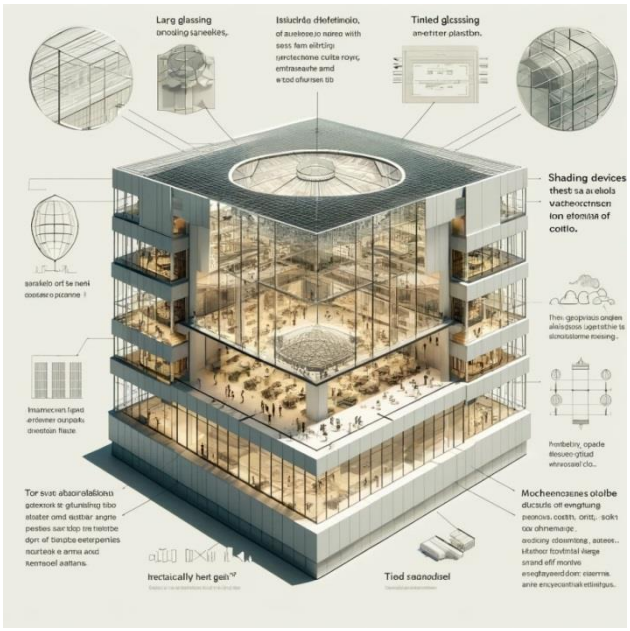

Atriums with varying glazing areas and materials: The size and shape can vary significantly, often designed to be adaptive to the building's overall architectural style. These atriums may have asymmetrical shapes, with varying heights and widths to accommodate extensive glazing areas. The use of glazing impacts internal thermal dynamics significantly. Large glazed areas can introduce substantial amounts of natural light, potentially increasing solar heat gain. However, with the right materials and strategic placement (e.g., shading devices, tinted glazing), these atriums can also manage heat accumulation while still promoting adequate ventilation through mechanically operable windows and vents.

2) Orientation

To analyze the orientation component of three different atrium types—vertical atriums that promote stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials—we focus on how each design aligns with prevalent wind directions and solar paths. This analysis helps understand the influence on natural ventilation and light access, crucial for optimizing environmental efficiency and indoor comfort. The orientation of an atrium is a critical factor that significantly impacts its effectiveness in natural ventilation and light management. Each type of atrium has a specific orientation strategy that optimizes its functionality: vertical atriums utilize the stack effect, horizontal atriums enhance cross ventilation, and atriums with varied glazing optimize solar gain and light access. Properly aligning these structures with natural environmental forces such as wind and sunlight can dramatically improve building sustainability and occupant comfort.

Table 3. Orientation analysis table

Atrium Type	Orientation Strategy	Influence on Natural Ventilation	Influence on Light Access
Vertical atriums promoting stack effects	Aligned with prevailing wind directions for optimal air intake.	Enhances stack effect by allowing air to enter from windward side and exit leeward.	Orientation may vary to maximize or minimize solar gain depending on climate needs.
Horizontal atriums facilitating cross ventilation	Aligned perpendicular to prevailing winds to maximize cross-flow.	Maximizes lateral air movement across the atrium, enhancing air exchange rates.	Generally optimized to reduce direct solar exposure to prevent overheating.
Atriums with varying glazing areas and materials	Specifically oriented to capture optimal sunlight throughout the year.	Orientation facilitates controlled ventilation through operable windows and vents.	Maximizes light penetration while managing heat gain through strategic glazing.

Vertical atriums promoting stack effects: Vertical atriums are strategically oriented to capitalize on prevailing wind directions and enhance the natural stack effect. This alignment facilitates the entry of cooler air from the windward side, while allowing warmer air to exit through leeward openings or vents placed at higher levels [6]. The effectiveness of the stack effect is greatly dependent on the correct orientation, which can dramatically enhance natural ventilation. This mechanism leverages temperature differentials between the indoor and outdoor environments to create a continuous flow of air, cooling and ventilating the building without relying on mechanical systems [4].

Horizontal Atriums Facilitating Cross Ventilation: Horizontal atriums are specifically aligned perpendicular to prevalent wind directions, maximizing the potential for cross ventilation. This setup allows wind to flow directly through the atrium, driving air across its full extent and significantly improving ventilation rates [5]. This orientation is vital for enhancing natural cross ventilation, which can effectively maintain air freshness and reduce the reliance on artificial cooling systems. It proves particularly beneficial in climates where breezes are consistent and reliable, providing a sustainable method to keep indoor environments comfortable [2].

3) Atriums with Varying Glazing Areas and Materials: These atriums are meticulously oriented to optimize sunlight capture throughout the year. Their design incorporates extensive and variable glazing areas to maximize winter sunlight while avoiding excessive summer heat, aligning with solar paths to optimize light and heat management [7]. The strategic orientation, combined with the use of adaptive glazing technologies, allows these atriums to control solar gain effectively. This approach not only maximizes natural light access but also enhances thermal comfort by balancing indoor climate conditions, facilitating passive solar heating when necessary, and minimizing the risks of overheating [5].

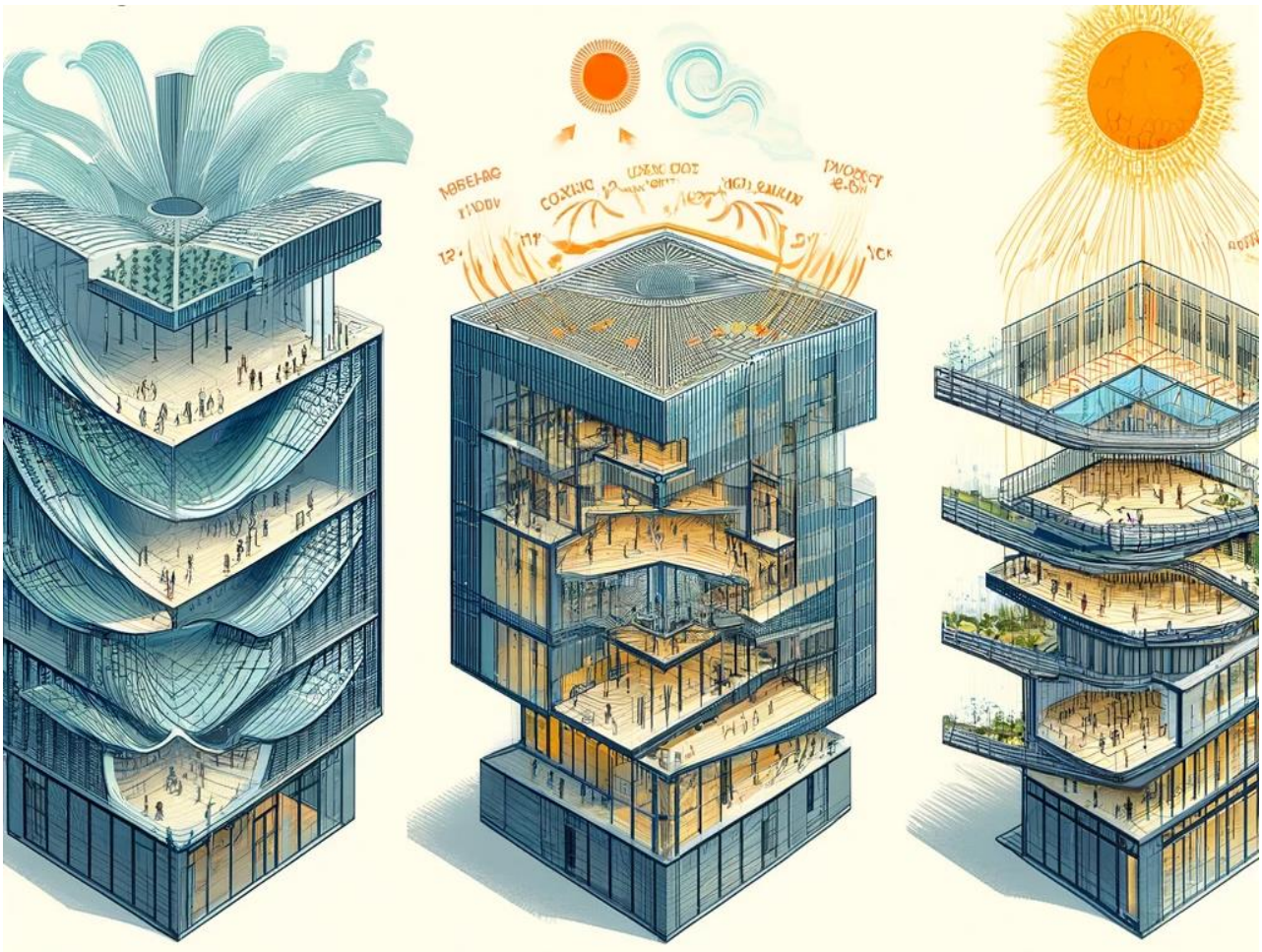

Figure 5. The orientation component of three different atrium types

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Material specifications

To thoroughly evaluate the impact of different material types across three atrium designs, we will extend the analysis to include three material scenarios for each atrium type: high thermal mass, low thermal mass, and advanced glazing materials. This comprehensive approach allows us to assess how each material influences the natural ventilation and energy performance of vertical atriums, horizontal atriums, and atriums with varying glazing areas.

Table . Extended Material Specifications Analysis

Atrium type	Material scenario	Material used	Thermal properties	Impact on ventilation and energy performance
Vertical Atriums Promoting Stack Effects	High Thermal Mass	Concrete, Brick	Concrete: 1.7 W/m·K, Brick: 0.7 W/m·K	Enhances thermal inertia, stabilizing indoor temperatures and bolstering the stack effect.
	Low Thermal Mass	Wood, Gypsum	Wood: 0.12 W/m·K, Gypsum: 0.17 W/m·K	Quicker temperature adjustments, less effective in sustaining the stack effect.
	Advanced Glazing	Low-E glass, Tinted glass	Low-E Glass: 0.96 W/m·K, Tinted Glass: 0.95 W/m·K	Controls solar gain, minimizing impact on stack effect but improving light and heat management.
Horizontal Atriums Facilitating Cross Ventilation	High Thermal Mass	Concrete, Brick	Concrete: 1.7 W/m·K, Brick: 0.7 W/m·K	Slower response to temperature changes, potentially dampening rapid ventilation effects.
	Low Thermal Mass	Wood, Gypsum	Wood: 0.12 W/m·K, Gypsum: 0.17 W/m·K	Supports rapid air temperature changes, enhancing cross ventilation effectiveness.
	Advanced Glazing	Low-E glass, Tinted glass	Low-E Glass: 0.96 W/m·K, Tinted Glass: 0.95 W/m·K	Reduces unwanted heat gains, optimal for managing solar impact in ventilated spaces.
Atriums with Varying Glazing Areas and Materials	High Thermal Mass	Concrete, Brick	Concrete: 1.7 W/m·K, Brick: 0.7 W/m·K	Poor suitability for atriums reliant on glazing; excessive mass could hinder light penetration.
	Low Thermal Mass	Wood, Gypsum	Wood: 0.12 W/m·K, Gypsum: 0.17 W/m·K	Inadequate for managing significant solar gains typical in such atriums.
	Advanced Glazing	Low-E glass, Tinted glass	Low-E Glass: 0.96 W/m·K, Tinted Glass: 0.95 W/m·K	Maximizes benefits of solar management and light penetration, enhancing overall energy efficiency.

Vertical atriums promoting stack effects:

- **High thermal mass**: Concrete and brick, which are high in thermal mass, are optimal for vertical atriums as they stabilize temperature fluctuations throughout the day, enhancing the stack effect. The effectiveness of these materials in sustaining natural ventilation through temperature regulation is well-documented [6]. These materials absorb heat during the day and release it slowly at night, enhancing the natural cooling effect [4].
- **Low thermal mass**: Materials like wood and gypsum adjust temperatures quickly but do not support sustained natural stack ventilation as effectively as high thermal mass materials. Their rapid response to temperature changes can disrupt the continuous airflow necessary for an effective stack effect.
- **Advanced glazing**: Although primarily used to manage solar gain and light, advanced glazing materials like Low-E and tinted glass can also contribute to temperature control within vertical atriums, albeit their impact on enhancing stack effects directly is less significant compared to high thermal mass materials [5].

Horizontal atriums facilitating cross ventilation:

- **High thermal mass**: These materials may inhibit the atrium's ability to respond quickly to changes in external temperature, potentially

reducing the efficiency of cross ventilation [2]. High thermal mass is less favorable in settings where quick adaptation to temperature variations is crucial for maintaining effective ventilation.

- **Low thermal mass**: Wood and gypsum are particularly suited for horizontal atriums where rapid air temperature changes are beneficial. Their low thermal mass aids in quicker heat dissipation, facilitating effective cross ventilation, a crucial aspect in maintaining air freshness and reducing reliance on mechanical cooling systems [5].
- **Advanced glazing**: Implementing advanced glazing in horizontal atriums helps control solar gain without compromising the effectiveness of cross ventilation. These materials are essential in atriums with significant window areas, balancing light penetration with thermal comfort [7].

Atriums with varying glazing areas and materials:

- **High thermal mass**: Not generally recommended for atriums that rely heavily on managing light and solar heat due to their potential to obstruct the intricate light and heat dynamics desired in such designs [4].
- **Low thermal mass**: These materials often fail to provide adequate thermal control in environments with substantial solar exposure, which can lead to overheating issues, making them less suitable for atriums designed to optimize solar gain [6].
- **Advanced glazing**: The best choice for managing solar gains while ensuring maximum light penetration, enhancing both comfort and energy efficiency. The strategic use of Low-E and tinted glass materials optimizes environmental control within the atrium, supporting passive solar heating when necessary and minimizing overheating risks [5].

The selection of materials for atrium construction must align with the specific environmental strategies and intended use of each atrium type. While high thermal mass materials are beneficial for vertical atriums utilizing stack effects for natural ventilation, horizontal atriums benefit from low thermal mass materials to enhance their responsiveness to temperature variations conducive to effective cross ventilation. For atriums focusing on optimizing light and heat through glazing, advanced glazing materials offer the most benefits, balancing energy efficiency with environmental comfort. This nuanced approach to material selection is crucial for optimizing atrium design to achieve sustainable building performance and occupant comfort.

4) Internal configurations

To comprehensively assess the internal configurations of three atrium designs—vertical atriums promoting stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials—each model will be analyzed across three different configuration scenarios: minimalistic settings with plants and water features, low partitions with mobile furniture, and high-density furniture arrangements. This expanded analysis allows us to evaluate how various arrangements influence airflow patterns and overall ventilation effectiveness within each atrium type.

The configuration of internal elements significantly impacts the natural ventilation capabilities and environmental efficiency of atriums. Research has consistently shown that the choice and arrangement of these elements can either enhance or impede the natural ventilation processes:

1. **Vertical atriums**: The stack effect is best supported by minimalistic configurations that incorporate natural elements like plants and water features, which help to cool and humidify the air, facilitating its upward movement [4]. Overcrowding these spaces with furniture can obstruct this airflow, significantly diminishing the effectiveness of natural stack-driven ventilation [6].
2. **Horizontal atriums**: Cross ventilation is maximized in scenarios where interior barriers are minimized. Low partitions and mobile furniture allow for the quick reconfiguration of space to best capture and utilize prevailing winds for effective ventilation [5]. Conversely, high-density furniture setups can act as barriers to airflow, reducing the overall ventilation efficacy [2].
3. **Atriums with varying glazing areas**: These atriums benefit from configurations that optimize light penetration and minimize shadowing, which are crucial for managing both solar gain and interior climate. Minimalistic setups are typically most effective, as they prevent obstruction of glazed areas and promote efficient air and light flow [7].

In conclusion, the internal configuration of an atrium not only affects its aesthetic and functional qualities but also plays a critical role in its environmental performance. Understanding the interaction between atrium design, internal configuration, and environmental factors is essential for optimizing building sustainability and occupant comfort.

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Table 4. Expanded internal configuration analysis table

Atrium type	Configuration scenario	Key elements	Impact on ventilation effectiveness
Vertical Atriums Promoting Stack Effects	Minimalistic with plants and water features	Plants at base, water features, minimal furniture	Enhances the stack effect by cooling and humidifying incoming air, aiding upward air movement [4].
	Low Partitions with mobile furniture	Mobile furniture, low partitions	Allows for adaptable space usage without significant interruption to airflow, potentially less effective than minimalistic settings in promoting stack effects [5].
	High-density furniture	Compact furniture arrangements	May obstruct airflow, reducing the effectiveness of the stack effect by limiting air movement [6].
Horizontal Atriums Facilitating Cross Ventilation	Minimalistic with plants and water features	Sparse furniture, strategic plant placement	Provides unobstructed pathways for air, enhancing cross ventilation effectiveness, though less impactful than low partitions [2].
	Low partitions with mobile furniture	Modular furniture, reconfigurable partitions	Optimizes airflow by allowing for configuration adjustments according to ventilation needs, maximally enhancing cross ventilation [7].
	High-density furniture	Dense furniture layouts	Can impede air movement and reduce ventilation efficiency by creating physical barriers [5].
Atriums with Varying Glazing Areas and Materials	Minimalistic with plants and water features	Minimal furniture, decorative plants	Facilitates optimal light penetration and thermal management without compromising ventilation pathways [6].
	Low partitions with mobile furniture	Low impact furniture, easily movable	Enhances space flexibility while maintaining clear lines for ventilation and light penetration, slightly less effective than minimalistic settings [4].
	High-density furniture	High-density, static furniture setups	Reduces the effectiveness of natural light utilization and can obstruct ventilation flows, detracting from environmental efficiency [5].

5) Discussion of atrium designs and optimization

The analysis of three atrium models—vertical vestibules promoting stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials—across four components (geometry and size, orientation, material specifications, and internal configuration) reveals significant insights into the effectiveness of each design in terms of natural ventilation and energy performance.

The dimensions and shape of an atrium critically impact its ventilation efficiency. Vertical atriums, with their tall and narrow design, effectively utilize the stack effect to facilitate natural ventilation. This design is optimal for buildings where vertical space is available, and it efficiently moves air vertically due to temperature gradients [4]. Horizontal atriums, being wider, are excellent for facilitating cross ventilation, especially when aligned with prevailing wind directions [5]. Atriums with varying glazing areas optimize light and thermal management but require careful consideration of size and shape to prevent excessive solar gain [4].

The alignment of an atrium with respect to wind and solar paths is crucial for maximizing its natural ventilation capabilities. Vertical atriums oriented to exploit wind directions enhance the stack effect, providing efficient cooling and ventilation [6]. Horizontal atriums benefit from an orientation that aligns with prevailing winds, maximizing cross ventilation. Atriums with varying glazing areas need to be oriented to balance sunlight exposure throughout the year, optimizing both heat gain in winter and shade in summer [2].

Material choice affects the atrium's thermal behavior and overall energy performance. High thermal mass materials like concrete and brick are beneficial in vertical atriums, as they stabilize temperature fluctuations and enhance the stack effect [6]. In contrast, low thermal mass materials such as wood and gypsum are preferable in horizontal atriums for their ability to quickly adjust to temperature changes, facilitating better air movement [5]. Advanced glazing materials are crucial in atriums with extensive glazed areas, managing solar gain while ensuring sufficient natural light [7].

The layout of internal elements significantly influences airflow patterns and ventilation effectiveness. Minimalistic designs with strategically placed plants and water features are most effective in vertical atriums, supporting the upward air movement essential for the stack effect [4]. Horizontal atriums benefit from flexible furniture arrangements and low partitions that allow for easy adaptation to changing ventilation needs. Atriums with variable glazing require configurations that do not obstruct light paths, optimizing environmental control and user comfort [5].

Integrating the results from the analysis, the most optimized atrium design would be:

- **Geometry and size**: A vertical atrium with a tall and slender profile is most effective for promoting natural stack effects, especially in urban settings where footprint limitations necessitate vertical expansion.
- **Orientation**: Such an atrium should be oriented to capitalize on prevailing wind directions for optimal air intake and solar paths for balancing heat throughout the day.
- **Material specifications**: Utilizing high thermal mass materials at the base (concrete or brick) combined with advanced glazing systems higher up can manage both temperature stability and light penetration effectively.
- **Internal configuration**: A minimalistic internal layout enhanced with natural elements like plants at the base to cool and humidify incoming air, combined with minimal furniture to avoid obstruction would be ideal.

Given the comprehensive analysis and comparison with findings from other researchers, a vertical atrium designed with high thermal mass materials at the base, advanced glazing, and a minimalistic internal configuration, oriented to make full use of natural wind and solar benefits, emerges as the most effective physical form. This configuration optimally leverages the natural environment to enhance both ventilation effectiveness and energy efficiency, making it a sustainable architectural solution for contemporary building designs.

CONCLUSION

This research has undertaken a detailed analysis of three distinct atrium designs: vertical atriums promoting stack effects, horizontal atriums facilitating cross ventilation, and atriums with varying glazing areas and materials. The goal was to ascertain how different physical forms and configurations influence natural ventilation and energy performance in buildings. Through an integrated examination of geometry and size, orientation, material specifications, and internal configuration, we have derived key insights that align with and expand upon findings from existing literature.

The analysis began with an assessment of geometry and size, where it was established that vertical atriums exploit the stack effect through their elevated heights, making them particularly effective in urban environments where space is at a premium. In contrast, horizontal atriums, with their expansive widths, excel in enhancing cross ventilation, especially in settings where wind patterns are consistent and reliable. Atriums with variable glazing are tailored to optimize light and thermal dynamics, requiring careful consideration of size and shape to manage solar gain effectively throughout the year.

Orientation emerged as a critical factor in maximizing the natural ventilation capabilities of atriums. Vertical atriums oriented to capture prevailing winds augment the stack effect, providing efficient cooling and ventilation without the reliance on mechanical systems. Horizontal atriums gain maximum benefit from an alignment perpendicular to prevailing winds, thereby enhancing air exchange and reducing energy consumption. Atriums with extensive glazing need to balance sun exposure to harness passive solar heating in the winter while avoiding overheating in the summer, necessitating a strategic orientation that aligns with solar paths.

The choice of materials plays a pivotal role in influencing the atrium's thermal behavior and overall energy efficiency. High thermal mass materials like concrete and brick are preferred in vertical atriums for stabilizing temperature fluctuations and enhancing the stack effect. Conversely, low thermal mass materials such as wood and gypsum are advantageous in horizontal atriums due to their ability to quickly adjust to temperature changes, supporting effective ventilation. Advanced glazing materials in atriums with variable glazing optimize light penetration and manage heat gain, critical for maintaining comfortable and energy-efficient interior environments.

Internal configuration was found to significantly impact airflow patterns and ventilation effectiveness. Minimalistic designs with strategically placed plants and water features were most effective in vertical atriums, supporting upward air movement essential for the stack effect. Horizontal atriums benefit from flexible furniture arrangements that allow for adaptation to ventilation needs, while atriums with variable glazing require configurations that do not obstruct light paths, optimizing environmental control and user comfort.

Integrating these findings, the most optimized atrium design is a vertical atrium that utilizes high thermal mass materials at the base to stabilize indoor temperatures, combined with advanced glazing systems higher up to manage light and heat. Such an atrium should be oriented to maximize the benefits of prevailing winds and solar exposure, with a minimalistic internal configuration that enhances the natural stack effect. This design leverages the natural environment to enhance both ventilation effectiveness and energy efficiency, making it a sustainable architectural solution for modern urban settings.

This research not only aligns with existing studies that underscore the importance of thoughtful atrium design in building sustainability [2, 4, 5] but also extends these discussions by providing a comprehensive framework that architects and designers can use to optimize atriums for specific environmental conditions. As buildings increasingly become focal points for sustainability, the strategic design of atriums as explored in this study offers a

viable path toward enhancing building performance while reducing environmental impact.

DECLARATIONS

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Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The author declares that there is no competing interest.

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STUDY OF MYSTICAL CONCEPTS AT FARSHCHIAN CULTURAL COMPLEX OF ISFAHAN WITH THE SEMANTIC VIEW

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ABSTRACT: Architectural works can be viewed in different aspects. But so far in two respects has been paid more attention to these works. First, as one of the Seven Arts as a result of the author's artistic creativity (aesthetics) and the second, from the respect of scientific and technical (the highest degree of objectivity). Entire attention to the two mentioned dimensions prevents us from the rest of important aspects of our architectural work analysis. This paper, based on the study of the role of the meaning component in creation place sense and in direction of answering to the questions related to that: the meaning component in each species, including "existing meanings in human's mind and "the existing meaning in places", make what levels and degrees, is formed that in this regard, the study of " mystical concepts at cultural complex of Isfahan Farshchian" with the semantic view frame in relation of architecture and the world of mysticism" is intended as the main objective of this research. In this study, with the documentary approach by referring to authentic texts, such as the types of the related books, publications and valid scientific research site and analysis of information, the evidence has been presented which indicates the meanings in the minds of human and places through sensory experiences is received and form perception arising awareness through the five senses and then the feeling is associated with perception and lead to a full understanding and significant perceptions. Based on all performed analyses based on the recognition of semantic signs in construction and examines limits of the dependence of form and content in architecture, this result is obtained that it interpretation of the hidden code in the architecture, results in a sense of place that is done according to individual perceptions. However, efforts to achieve the society to comprehensive and fundamental meaning of a work, despite the fluidity of construction meaning and attention to importance of the works criticism should also be accepted.

KEYWORDS: Fluidity of building semantic, Mentality complementary objectivity, Comprehensive sense, Morphology of architecture work, Relation of the architecture and mysticism

INTRODUCTION

The process of perceiving architectural work occurs in three stages: at first, the work demonstration is received by sensory perception, and then the initial data are analysed in the brain to become changed to understandable data for rational systems. This secondary information eventually led to the formation of meaning at different levels and its attribution to the architectural effect [1].

In this view, any kind of mental / emotional / narrative and everything that happens in the world of subjectivity occur after the art form. So the artist techniques is in shaping the material that art work is made of it that creates the aesthetic form or shape and ultimately leads to the formation of meaning [2].

Also extraction of semantic aspects among perceptions of series of audience and applying a set vocabulary with limited semantic dimension reduces the possibility of errors in individual perception world (limited to one person) and the ambiguity of expression [3, 4].

Thus, designers are able to achieve a pattern language that is derived from human collective unconscious and over the years has survived, creating an eternal and timeless way to increase human interactions with architectural works and from the rest of the factors affecting the area and architectural styles, simply use as the timely and special [5]. Difference in nature of subject and content as well as qualitative understanding art form are Introduction to analyse the relationship between form and content. Each person's mental structure is the result of interaction of mind potential forces, namely the senses that are called mentality. Mind's interaction with certain objects, leads to different perceptions of the same object. So understanding ratios on the basis of the different components is realized and relative understanding is actualized.

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But the fact that how this mentality can be agreed upon by the set architecture audience, is a question that in a certain sense a more and more limited set of characters after the call is concluded; a set of properties that is adapted with the encompassing sensory perception of the work [6].

Examination of the relationship between form and content in artwork is the fundamental basis of the critics and includes other trends, such as aesthetic criticism, thematic criticism, mythological criticism, sociological and psychological criticism [7].

The building beyond the solid volume, containing a collection of semantic codes. The building is an implicative phenomenon like a poem, novel, or painting. Although the creators of the building engraved their meanings codes in it, until its confrontation, according to its own, possesses any meaning. Meaning is the result of confrontation of people with the building and use of space. Also, according to the different fields of social, cultural, and ... the people, the building meaning is different [8, 9].

This article is an attempt to develop a semantic approach in the form of architecture, which with attributive methods and analysing authentic texts attract attention to the building non-physical dimensions, deal with building as a text, and attention to plural meanings, antonyms, and endless. At the end, we try with analysis of employed symbolic signs in the Farshchian cultural complex; explain the quality of semantic perception and Semantic perspective.

1. Hermeneutic understanding of meaning in architecture

Meaning is one of the key concepts that its using in linguistics discussions, philosophy and art, especially in architecture is very common; Therefore, it can be considered one of the most important underlying concepts in architecture .According to Schultz, every person born within the semantic system and its semantic meaning through the symbolic manifestations becomes understandable .it is in this system that man with building reveals the meanings so architecture is part of the existence meaning history [10]. The meaning of each building in the term "text" is as a hidden reality that needs to be revealed. The text implication on meaning is performed in the light of action "interpretation". Indeed, the text begins to speak by interpretation and reveals its internal. The text implication on meaning is associated with implication rules or semantic knowledge, but the lever that effectively makes the system work is interpretation that arises from the interpreter. Semantics knowledge is related to the language, but is the interpretation of what text finder does and through it, make effective implications that result of semantics knowledge. So interpretation means "understanding" understanding is the meaning and content of each text.

Interpretation is obtained from analysis of formal and semantic models and interpreted level of importance of findings for text interpretation [11].

Dithery, one of the hermeneutics great thinkers, knows the understanding "the issue of life,". In his view, understanding is part of the internal elements in the flow of human life; Because people are repeatedly placed in different social situations and it is necessary to interpret these situations and events that take place so they can take action. Therefore, the understanding cannot be separated from the sense of being human [12].

What conducts interpretation in this level and the hermeneutics scholars are taken into consideration is examination of two main questions that is the direct process of meaning understanding. These two question are:

Pre understanding the interpreter: the rise of new insights such understanding is always based on the individual's knowledge. No interpreter cannot create own knowledge from nonexistence and to give it shape. In fact, a person who wants to know more about the subject has a series of brief prior knowledge. Understanding humans understand where humans on one hand know something about the subject and the other hand, know that doesn't know anything about the topic. This combined knowledge is the starting point. The other fact that reveals the interpreter for understanding is that understanding begins with a question and asking a question isn't possible without pre understanding. One must know what the question is about. If pre understanding about the question does not exist, the question neither makes sense nor the existence.

In fact, the beginning of human cognition is not to question, but also is pre-understanding that there is about questions. In this way, the pre knowledge provides background of the understanding. This is what Heidegger is called" pre structure" understanding. The pre structure, according to Figure 1, has three stages in which understanding must be placed in the background: First, there should be a clearer understanding of the whole situation, which Heidegger calls "pre possess". At this stage, before any particular object becomes apparent, there is background understanding from the whole of relevant activities. But having the general perception, this does not mean that a particular feature can be turned on. Therefore, before anything becomes clear we should move to the second stage or "preview". In this stage suitable methods for clearing everything become specified. But for that something completely becomes obvious specific concepts should exist that in their body beginning the interpretation might be possible. So the third step is necessary that is "pre perception". At this stage, the appropriate method is conceptually perceived [4, 7, 13].

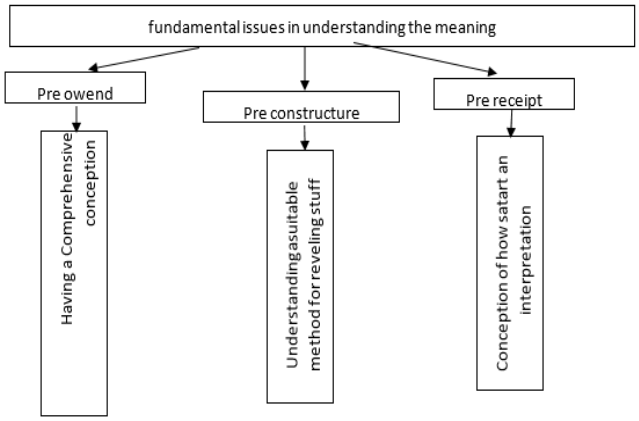


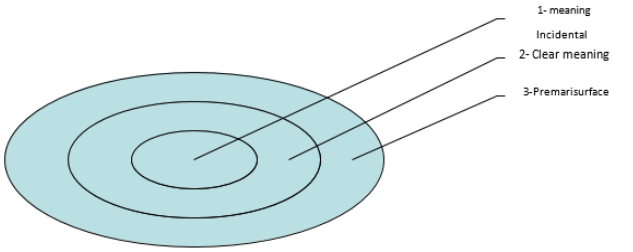
Figure 1. Pre structures of understanding from Heidegger's view (Source: authors)

1. Perception of existing meanings in the place and creating symbolic and valuable meanings from the place

What this study emphasizes is providing a means to understand the existing meanings in the location and the creation of symbolic and valuable meanings in mind. In this regard Bourdieu believes that every phenomenon, in both primary and secondary, shows the meanings. In the first level the main characteristics of phenomena such as colours, shapes and structures are renewed and in the secondary level, they include a symbolic meaning. Another version of the classification of environment meanings, two levels of meanings refers to two levels of environment meaning such as “explicit" and "implicit”. Echo by submitting this division knows explicit mining (the main point) indication of the main performance and the essential meaning of a symbol, and etc. He introduced notes implicit as a second etc. Function and symbolic in nature and considers it a clear meaning beyond. In fact, the implications of what he saw as a reference to the abstract characteristics of subjects as well as a clear meaning, association and transmitted [1].

This perceived hierarchy of meanings in the place marked in Figure 2. According to Vykstrvm, meaning performance ready designer to communicate with the user in the form of sending a clear message to the intermediary product, in addition, the interplay between products and users will facilitate and provide opportunities for self-expression. For example, a toothed wheel turn tells me to press the button, the kettle and the pot until the water is bending or chair I say, people are invited to sit [14].

But from the viewpoint of modern hermeneutic interpretation, interpretation from the viewpoint of modern readers is bound to tradition and language. Therefore, it is not a final effect that has no meaning because there is always more exposure to new interpretations. New audiences’ effect in accordance with its own time horizon and meaning are faced with melting horizon audiences with historical horizon effect. The works themselves generally have a few meanings. For these two reasons, do not tell artworks merely a narrative; they are vital goals for which it is made to throw together and lifestyles that are full of ideological implications, evoke [15].



1. Primary surface: including main: Qualities of phenomenon’s like: color, shape and construer;

2. Clear meaning: main function or available function of a subject: Main meaning of a simple, object or a construction

3. Implicit meaning: secondly functional symbolic nature and gets further from the clear meanings: A mention to the abstract qualities of a subject the will be associated and transferred with a clear meaning.

Figure 2. The hierarchy of perception of the meanings in the place (source: authors)

In fact, connotation is a mental process that is associated with meanings that must be understood. This is the meaning inherent in it, but through a metaphorical connection can be made. For example, so-called minarets, according to its literal meaning, "lighting place” or venue for the fire. But on the second level of meaning, "lighting place" is conducting his relationship with Zoroastrians' furnace towers. In this connection, the basis for the symbolic associations in the mosques minarets as a manifestation of divine light, they were active [4, 6].

Although the fire did not have minarets, it refers to connotations meaning light, to achieve the profitability of a system value. As also mentioned in the Holy Quran to his family for the greater good of Moses, the manifestation of divine light as "fire" refers to (Alqsas / 29). Since the conception creates from something, meaning happens after understanding and meaning after the understanding (understandable) is carried out. The different interpretations by different understandings because each reader has a set of (Having-Fore), Preview (Foreseeing) and (Fore-conception), understanding experience. Different understanding necessarily is with backgrounds with finders that form and realize the multiple meanings of the unique phenomena [15, 2].

Place structure and internal and external dialectic

Accordingly, Ralph set of relationships in the hierarchy of seven from the experience of the person in one place is classified as follows:

1. Being external as existence, where the place has an unrealistic and unpleasant sense for humans and although with certain human values, a person can’t be its environment characters and existence meaning in it.

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2. Being external as objective, which is deep separation of person and place, so that the person feels themselves apart from the location.

3. "External factors, which are often considered accidental or incidental, serve as background elements. These elements can be useful for contextual understanding, but they may also potentially undermine existing operations."

4. Being internal with a mediator, in which spaces have the ability to intervene around affected people because of the indirect and mediated experience, will be considered.

5. Internal behavior, which the person consciously focuses a place for the person knows, the more attention the details of what shape it.

6. Being internal as emotional, which experienced a sense of place through conscious effort is trying to accept a place, feel them and know and respect the symbols as well as identify with the place the way it will happen and perceive it deeper.

Being internal as existence; In this experience a person senses a feeling of "being in place" and the response was to place without conscious experiences. This is a person belonging to both deep and complete identification with the place itself.

Figure 3. Hierarchy of experience of person presence in place from the perspective of Ralph (Source: authors)

Another proposed classification in this field is provided by Roland Barthes, in which he introduces three degrees of meaning as follows:

First grade, provide information, which is presenting a semiotic meaning that it finds its duty to investigate.

Second grade, with implications Gray, creates a symbolic meaning that the semiotic science of psychoanalysis, economics and knowledge of the demo.

Third grade, that it "meaning numbness or dull" is called, with the addition of the meanings is as much as two degrees could not handle. Thus, the degree of meaning can be difficult to define.

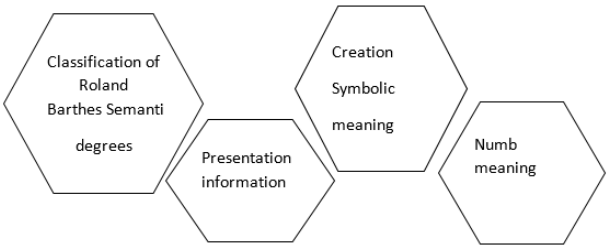

Figure 4. Semantic degrees-Roland Barthes:

In addition to the proposed classifications, Charles Morris also believes that the psychological approach has two levels of meaning. He's levels of meaning as sub classifications.

1. Reference level, in which the true meaning refers to and relies more on external factors.
2. The level of value, which means to raise the level of coordination between meaning and value systems governing access points, mainly on factors such as the observer's mind, focused within the human [3].

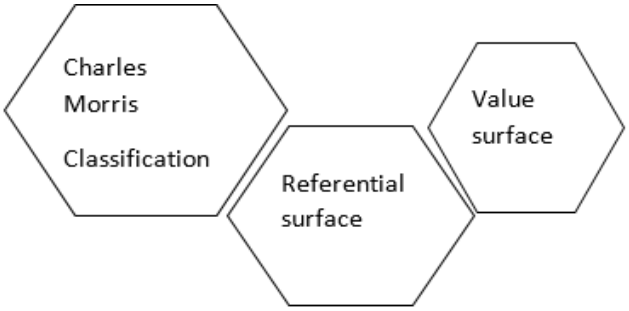

Figure 5. Level of meaning-Charles Morris)

Perception process and semantic levels of architecture work

The process of perceiving a work of architecture occurs in three stages: firstly, sensory perception received protests caused by the human senses are involved in fulfilling it. And this is particularly true among all those of similar sensory organs. For example, the color purple in the retina is irritated that people create, among all persons are equal. In the second stage, on the stage of data analysis, rational and understandable information devices are produced. In this analysis, some of the data that are foreign to stop individual cognitive apparatus and sensuous perception is selective. At the third stage, the second stage of rational analysis information is embedded in it and leads to their formation at different levels of meaning and attributing it to architecture work [12].

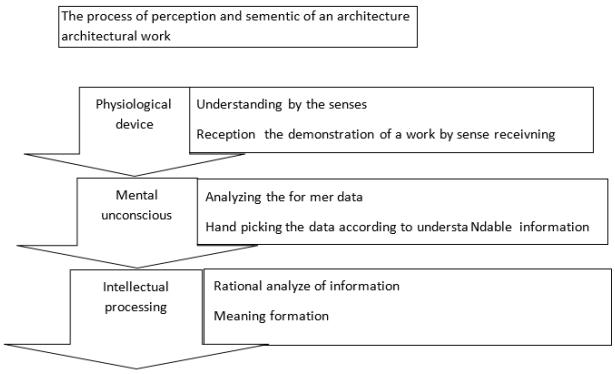

Figure 6. The process of perception and semantic levels of architecture work:

The first step is related to the human physiological function device but the fact that man (without knowing what it does) between the retina and stimulates the emotional impact of what he sees differences imposes, indicates that sensory data from other resources for correction of vision influenced [1, 4, 16]. The involuntary resources to Hall, "The world perceptions," which sets mental reserves during their lives. factors that Cavani psychological beliefs such as "Freud" and "Young" are stored in the realm of the human unconscious that makes it difficult to understand all meaning by the mind of the audience and to be returned to an individual interpretation [17].

It can be concluded that in the second stage of perception data received from an architectural work manipulated and pushed for certain that he wants unconscious after that time the underlying mental processes alone perception of visual sense of the work and make sense of the meaning of the first reaction that comes (in three stages). The first step will display the related intellectual perception of a direct and immediate, non-discursive mind after seeing the architectural work is shaped like triangles or complexity of a shape. After the audience understand that it contains symbols and hidden meanings in his mind. As a new sense, reference semantics are very diverse and are responsible for many problems of perception and reaction architects predict when users are facing their buildings. After receiving the visual, three-step reaction that occurs to that effect in the interpretation of works from the perspective of the audience will have a significant impact. We are responsible for the thoughts and feelings of emotional meaning, the meaning of the judgment on the value and meaning prescribed by the audience to encourage certain behaviors [7].

As in the present criticism, the criticizer analyzes the work from own critical perspective, to achieve this comprehensiveness and address these challenges, the extraction of semantic nuances among the audience-picked selection is a suitable solution. Why is that such a clause within the meaning of the perception of a person and has more expansion. If we can achieve such a comprehensive mental abstraction we sure that is meant to provide architectural work is the objective reality. Therefore, it has the potential to cause the same stimulation as a stimulant subjective in the sense that when facing a work of architecture in audience perceptions occurred.

1. Define the comprehensive meaning

The comprehensive meaning of the architecture work is the rational means that the processing of sensory excitement everyone shared the same excitement with the effects of lead exposure. To achieve such a sense of research, "Henry Sanofi" in the field of environmental psychology as "recognizing the visual environment" have used help [18].

1. Basis of criticism, interpretation and understanding of the art works

"Havardky Gill" said: "The work of art is completed only by the critic and his successive layers to understand the" inner secret "opens its opening. But this process is complete destruction at the expense of the outer layer, the effect is beauty all [12].

Formalism, in cash artworks approach is that instead of focusing on content, asserting the primacy and importance as an object or face shape and form. And the source of attraction that has caused the audience enthusiasm over the work of art, the shape of the Hillenbrand [19].

"Kozenz hovy" has said: " true conversation [the art work] is barrier and dismissive of the mentality [20, 21].

Klayobl" English criticism of formalism and the owning the theory of "significant form" believed that "the artist must not reproduce." Any of semantic analysis will be possible only through morphology. Review backgrounds understand swelling, possible access to content to make smooth. Sunrise, a phenomenon that occurs as a natural, every day repeats. With the invention of imaginative and beautiful forms in the form of short, repetitive narrative of the incident and expressed in the form of innovative manner is expressed. Art, in the form and according to aesthetic values and how to configure their words, those come to life. No matter the subject of narration [11].

1. Architecture, art with the approach to the sky

(Architectural art that is pushed from the earth to the sky): To build each house, the palace and the temple required glue and by removing bricks from the earth and the sky went together. Mesopotamian ziggurat, pyramids, Mayan temples, pagodas and Astvpahay the main directions, the sky's the Far East, have gone up. Each of these buildings was considered the link between heaven and earth. Build sacred buildings, thinking there Bnashdn the center of the earth and the sky in a kind of transition from their land [1].

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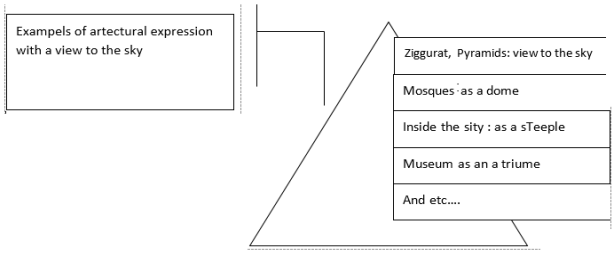

Figure 7. Examples of architectural expression with a view to the sky

Understanding the mystical concepts in architecture

- Literally meaning 'mysticism' that is a place called the original things (dictionaries Dehkhoda). School of mystical connection with architectural monuments so deep and wide that it is impossible to separate the architecture of mysticism. This paper is a qualitative study and analyzes the importance of the art of spiritual and mystical concepts in architectural manifestation of cultural complexes FARSHCHIAN be examined. Architecture is more than the other arts that could attract motivation and passion for excellence and immortality thoughts fly into the sky and soar and the presence of other worlds in the realm of human life and culture have to be watched. Architecture in setting up integrated feature of spirit of an element and the ratio of the current situation and feel that their human environment in which they lived in the world and has an important roleVaz·hr artistic feeling, emotion, thought, the human spirit has been familiar [1, 11].

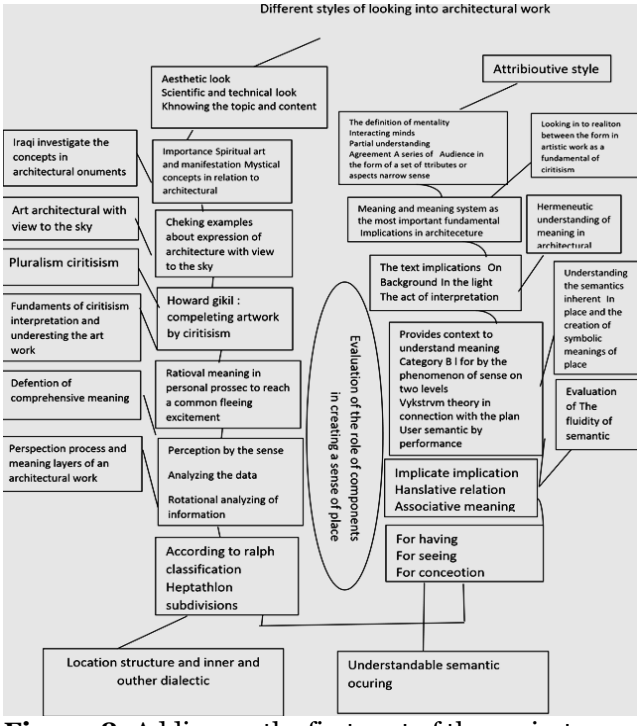

Figure 8. Adding up the first part of the project

Sample of mysticism pattern in contemporary architecture

Case Study: "Cultural Complex of Isfahan FARSHCHIAN, work of architect, Farhad Ahmadi

"Cultural Complex of Isfahan FARSHCHIAN architectural work, Farhad Ahmadi and the formation of the physical building, but also in search of the roots of the formation of the graft body and the meaning and quality of this relationship in the world of mysticism. Ahmadi says that in those years the young architect was influenced by great masters such as Nader Ardalan Iranian architecture and Kamran Diba such a concept-oriented architecture has been followed with mystical tendencies [8].

The basic idea is in its own center and poor soil similar to the supernatural atmosphere. Complete Space and transcendent and timeless [9].

Center of film culture of (cultural complex FARSHCHIAN) which is designed in the late sixties refers, in an area of 10.1000 square meters; adjacent to the river at the site of the tissue is relatively new built (Figure 9 and 10) starting point and the initial idea Special structures represents tents during festivals is considered [22].

Farhad Ahmadi [13] architect of this collection says: "I think the project of this kind arises: if sip of the sky, of the cosmos Center project, where the octagonal symbol of heaven, earth, forum falls, just like a stone across water wave creates form or manifestation of cosmic material effect actually stepped waves that create progressive learning that moves toward the sky. In fact, it is a kind of courtship or engagement between heaven and earth, the cosmos or the world of form with the world of Ideas. The diameters of the cosmic universe, earth and man have taken place; that has landed his life, his human link between periodic or infinite space feels. - Recovery of crystallized material form and value concepts in our architectural form [5, 6].

Figures 9 & 10. Left "ARSHCHIAN Cultural Complex, Esfahan: http://www.jmmj84.blogfa.com/post-10.aspx

Architecture for image reconstruction worthy of paradise, on the road to using language to convey the spiritual message Vastary symbolic world of mysticism. In fact, he takes my reflection in their existence: whether one is aware of them or not, symbols that are not made by human hands but she changed it [14]. The application is the density of land uses concentration decreases from the center to the

outside. In other words, empty space in the center of the project and its place in the halls and its effect on the edges of the transparent material have. Building through seven gates has been stressed that the scale is connected to the surrounding environment. In fact, after the first space in the basic pattern of connection, transmission and receipt are. They may reference clever use of seven gates and emphasis on the seven gates of paradise, conceptual metaphor finds such a world, a reflection of the world of dust in the universe. "Astyrlyn originated from the perspective of the symbolic aspects in Iranian architecture in the world of physical fitness or seen in the kingdom of heaven [23].

Overall organization-what in the index set, powerful geometry and symmetry of its composition (Figures 4-6). In other words geometry as a unifying factor applied to all fundamental architectural elements such as space, form, surface, color and material systematized [10, 24].

Water and light are combined as elements of identity and space-based architectural beauty in the pool house is laid out. The pool house is a temple of Anahita (goddess of water) sealed (Goddess of Light) is all architecture works the traditional mixture of water and light in this space. The central octagonal space in addition to the location in the center of the project is to set a starting point for the visitors and users as well. Strong geometry, the presence of water and the combination of the light from the transparent bridge the space their own ends and passes through the center of social events and important (Figures 4 and 5). Another important element was emphasized in the design is the bridge (Figure 6). Similarly, the bus and separator element innocence and evil here, also, has come to the aid of meaning oriented architecture, earthy crossing or passing water purity and transparently transferred to the main space [25]. In Figures 7, 10 and 11 following the basic pattern of connectivity, transmission and receipt symbolically, man with the entry of the gate (connection) and passing the bridge (transfer) to reach the empty central space that reaches toward the sky at the rise in contact (Figures 7, 10 and 11).

In Figure 12 the architect with non-use of special or specific color has added its architectural space purity. What color is used as Disappearance spectral color that is combined with light and color creates a beautiful Nazrpdyd mind. Another point of building a strong relationship with the mystical world shows that: "In mystical thought, according to a stray such a piece that is placed on the surface but is included in the urban context" (Figure 12). Low building height and bulk storage spaces inside the Earth, proper location of entrances around the project, Open adjacent side street for pedestrian entry, places to sit along the waterfront (15, 16 Number of images), Accounted for more than half the level for free use of public projects And the use of natural and artificial elements into caller. The center has become an urban space worthy of the adjacent river [26].

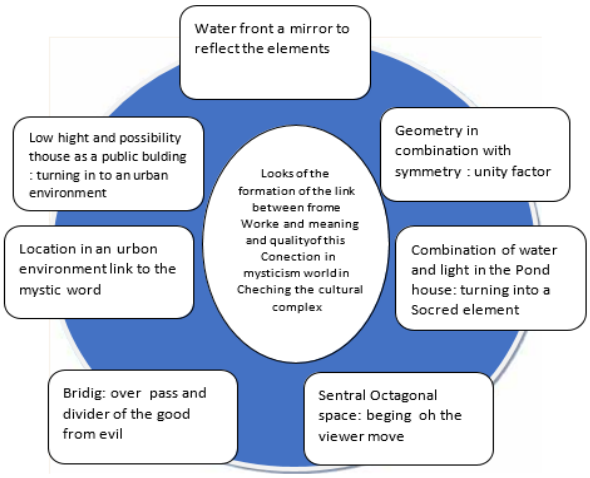

Figure 11. Formation of body and content link in the complex body Farshchian

RESULTS

In general summation of all arguments, indicate that two kinds of meaning, the first type consists of "the meaning of the human mind" and influenced by the values and cultural factors - social, the latter including the "sense of place and" relevant to It can be classified according to Gifford mentioned meanings regarding factors affecting the perception, in the form of personal factors (human and meaning in her mind) and physical (location, environmental characteristics and meanings in the place) and culture (beliefs, cultural values social) classified. Later in the process, meaning the human mind and the senses in place, through sensory experiences received the next stage point involves the perception of the senses forms. After the formation of the consciousness of sensory experiences, higher stages of feeling associated with perception lead to full and deeper recognition and in fact perception becomes meaningful. Here it is clear that human perception is based on three factors affecting the Gifford according to the classification (personal factors, physical and cultural) and through them, it is possible to perceive the meaning of place, including various aspects of personal, physical and social achievement. However, the influence of factors such as the perceived meanings of values and attitudes, culture, individual and collective identity, social interactions, physical structure and spatial qualities, character and location can achieve different dimensions. These kinds of factors are associated with different factors affecting perception as well. So finally all aspects of inferential sense of place through the scenarios and force measurement, evaluation and interpretation are followed and comprehensive understanding of the meaning of place, leading to the formation of a sense of place are humans [8].

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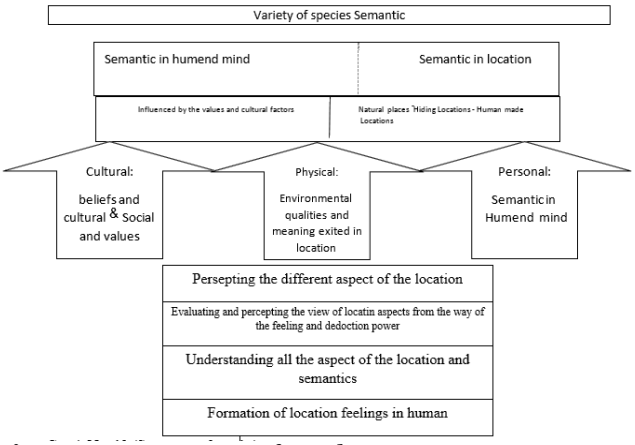

Figure 12. Summary of results

DISCUSSION

Understanding the contacts of a building, such as cultural centers FARSHCHIAN, the effect Farhad Ahmadi moment happens that a person has been dealing with this complex, for example, the water element in the architecture, valves for light, geometric shapes, bridges, and ... the most used visual elements which is kind of unique understanding of the elements in our minds institutionalized. But what, in our interpretation of the cultural complex, fundamental and as a key architectural terms the meaning of the words, namely: water and architecture, valves for light, geometric shapes, bridges and so on. The water is a mirror for reflection, a mirror with honesty and water purity, clean it brings, is an axiom of life, the subconscious We are institutionalized or valves for light, which presumably what subsequently, in mind, the input light is God and heaven. The use of the geometric shape of a triangle, the symbol of boundless wisdom, born in containing the fire element is that its essence and a bridge used to transport But it convey what? Move where to where? The purpose of this transfer is whether the emphasis on the use of the water element in the complex can be indicative of something? Why intake valves have been light on vertical walls with high altitude, and water and purity of divine light and rise towards the sky, triangle and infinity, the bridge will be responsible for passing on something? Here the interpreter to understand the exact meaning and content recognition, trying to somehow relate between signs and meanings perceived on the current knowledge, mystical and divine concepts to be daisy-chained together, these concepts in mind, a harvest content from the audience to create. Is that even the number of entrance gates, embodied and commentators' clever use of the seven gates and focus on them, pointed to the seven gates of paradise treats as well as a bus bridge to cross the evil and achieve a place holy, and God to rise up, visualize it. Of course, this issue cannot be ignored that interpretation is different from everybody else, but all concepts are ingrained in the minds of all people, in spite of differences, based on a proven concept, as previously our knowledge, are used to interpret .After familiarity with data and facilities necessary linguistic, cultural and social in which and attention to the situation of the author, it has brought in that position, the rule required for the comprehensive understanding of the meaning in architecture, especially elements and architectural landmarks is important.

Study of the symbolized symptom used in FARSHCHIAN cultural complex of Isfahan, the work of Farhad Ahmadi

Figure 13. Water, a mirror to reflect. (The author)

Figure 14. Use of geometric forms and traditional triangle (The author)

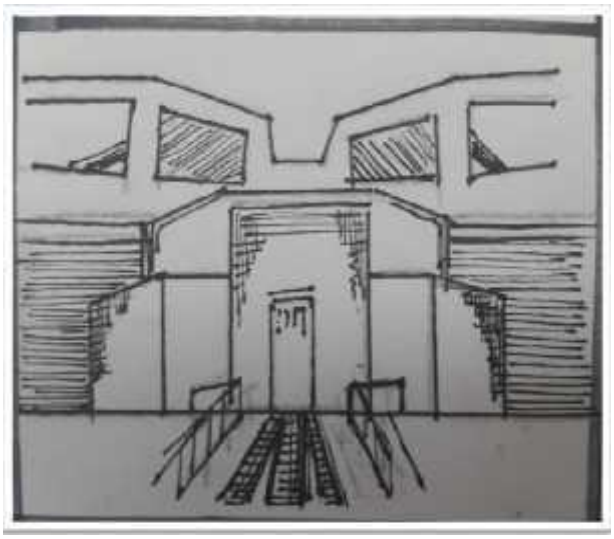

Figure 15. Shamse-traditional geometry symbol. (The author)

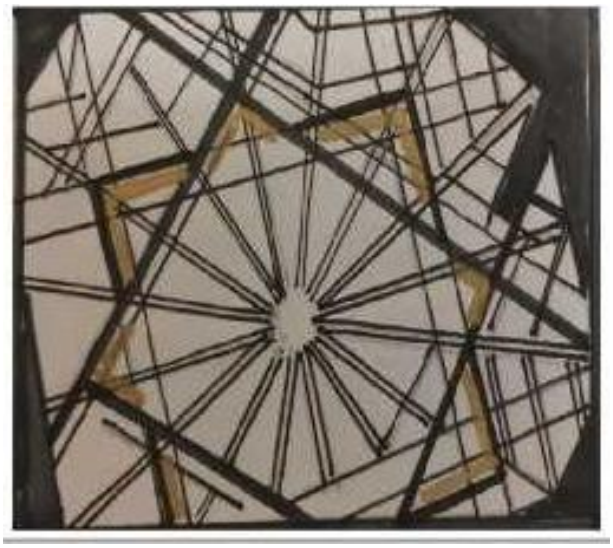

Figure 16. Symmetry (The author)

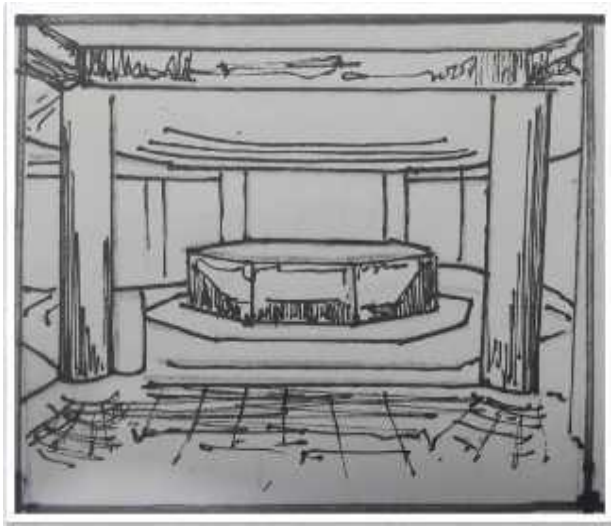

Figure 17. Spring house. (The author)

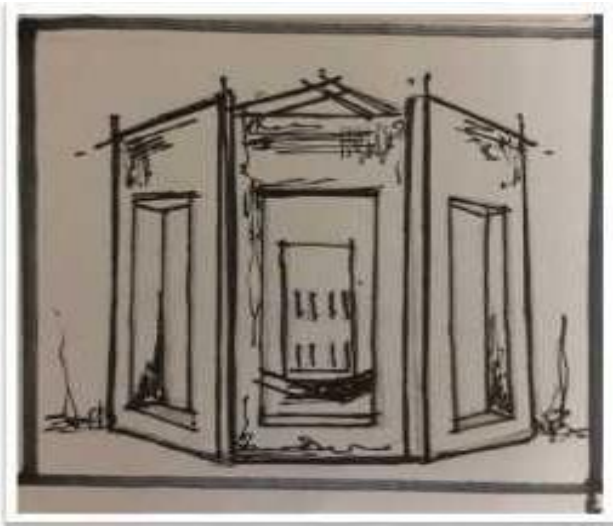

Figure 18. Octagonal lobby. (The author)

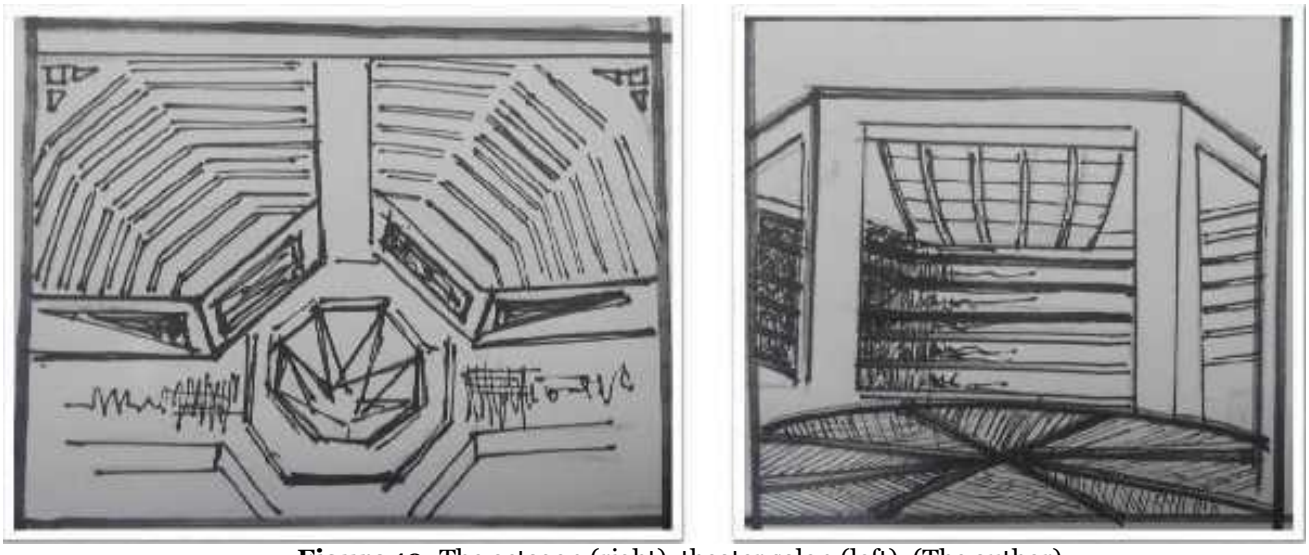

Figure 19. The octagon (right), theater salon (left). (The author)

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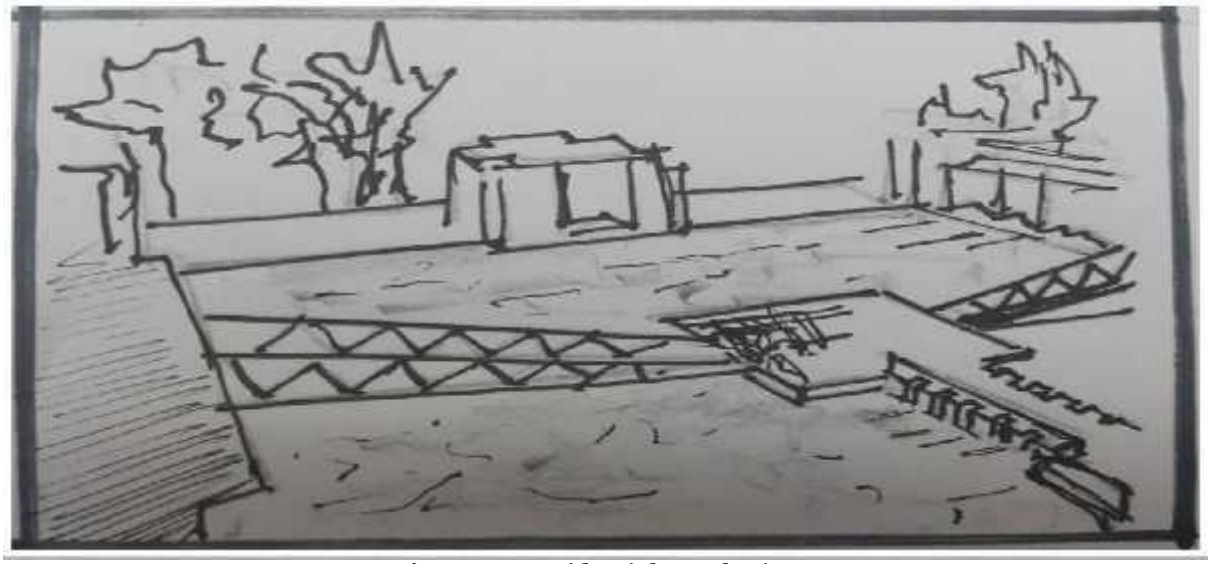

Figure 20. Bridge (The author)

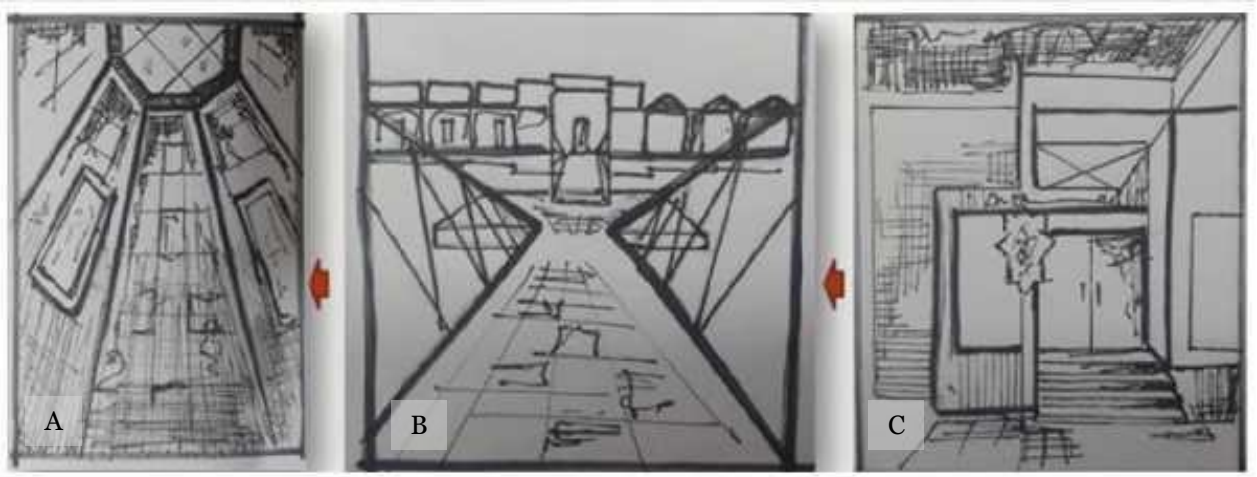

Figure 21. A: entering the gate connection; B: crossing the bridge; C: getting to the central space depleted rise. (The author)

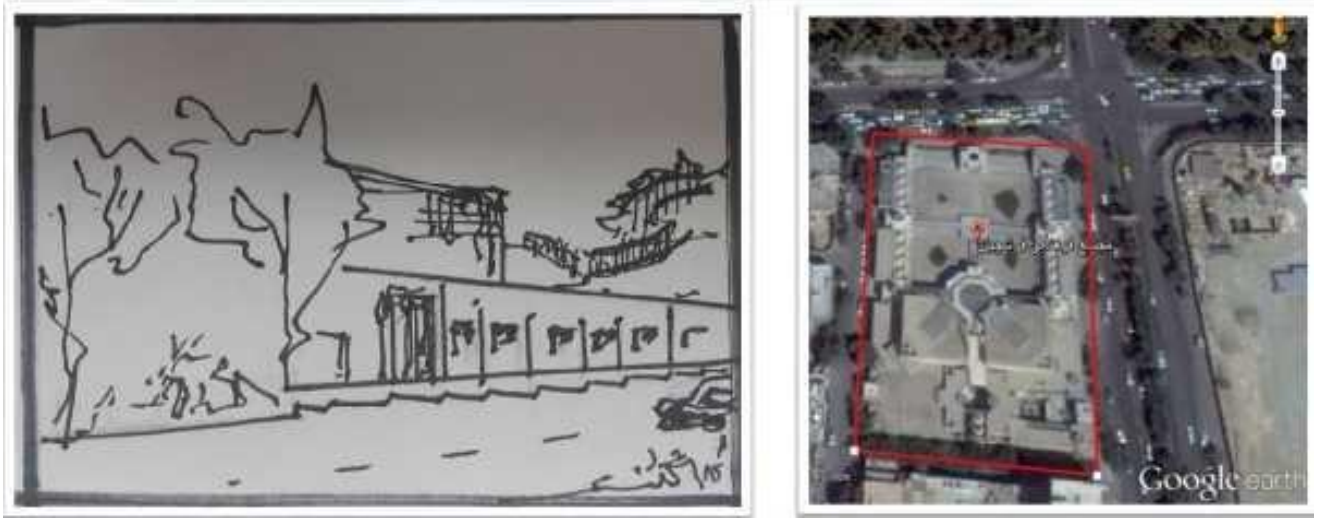

Figure 22. Placement Farshchian complex into the urban texture (right): Google Earth and Farshchian complex adjacent to the street (left). (The author)

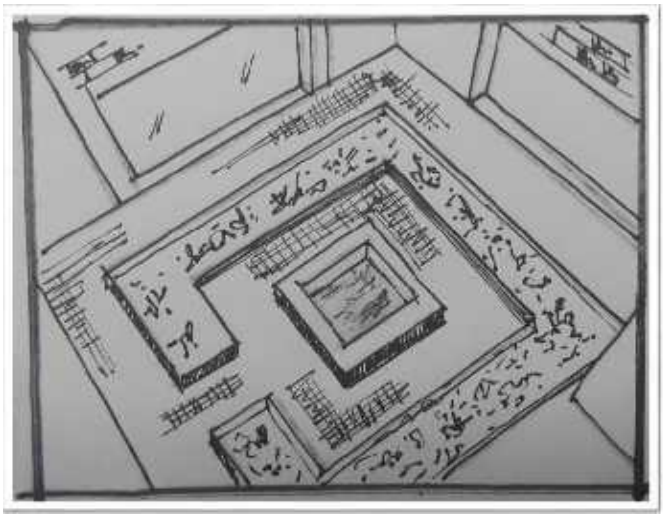

Figure 23. Sitting platforms (The author)

Figure 24. Backyard Central (The author)

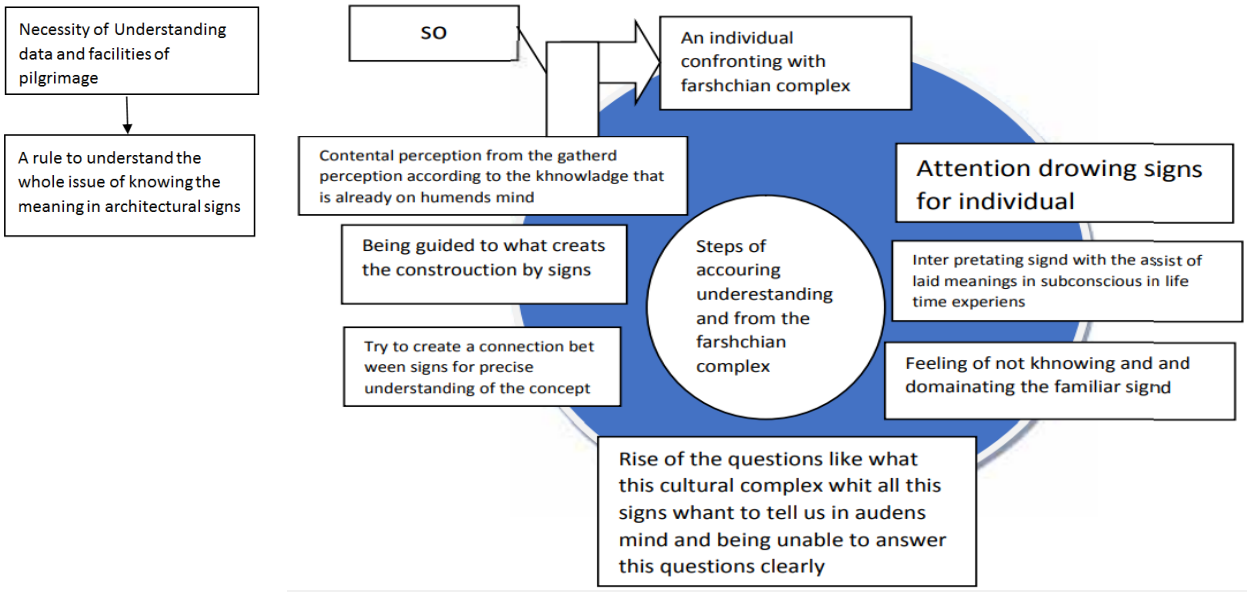

Figure 26. Summing up the discussion.

CONCLUSION

Based on all performed analyses based on the recognition of semantic signs in building and reviews range of the dependence of form and content in architecture, the result is that interpretation of the hidden code in the architecture, leading to the formation of a sense of place that through one of the dimensions and cognitive factors, it become understandable that is done by individual perceptions, so the "existence meanings in the place" based on their explicit and effecting by physical dimension, includes "immediate meanings _ primitive" of the place. And "meanings in the mind of man" are based on implicit and being influenced by personal and social dimensions, including "functional meanings, valuable meanings and symbolic meanings and". the other outcome of this study, is presentation of the evidence to show this subject, that achieving the community to the comprehensive and fundamental meaning of a work, Despite the fluidity of meaning, by extracting joint meaning from perceptions of set of audience society, leads thinking of public opinion for a unanimous perception of a work, Of course, criticism should be accepted in the works, Because the backgrounds of human understanding, Possibility to achieve the meaning or content to make smooth, and this is the process of criticism of the work by critics that lead to completion of art work with the opening of the inner layers. The method in this study to examine the role of "the meaning" dual perception dimension, focusing on aspects of content in terms of the meaning of "instantly and explicit" is investigation of mystical concepts in cultural complexes of FARSHCHIAN in the form of a symbol, have been

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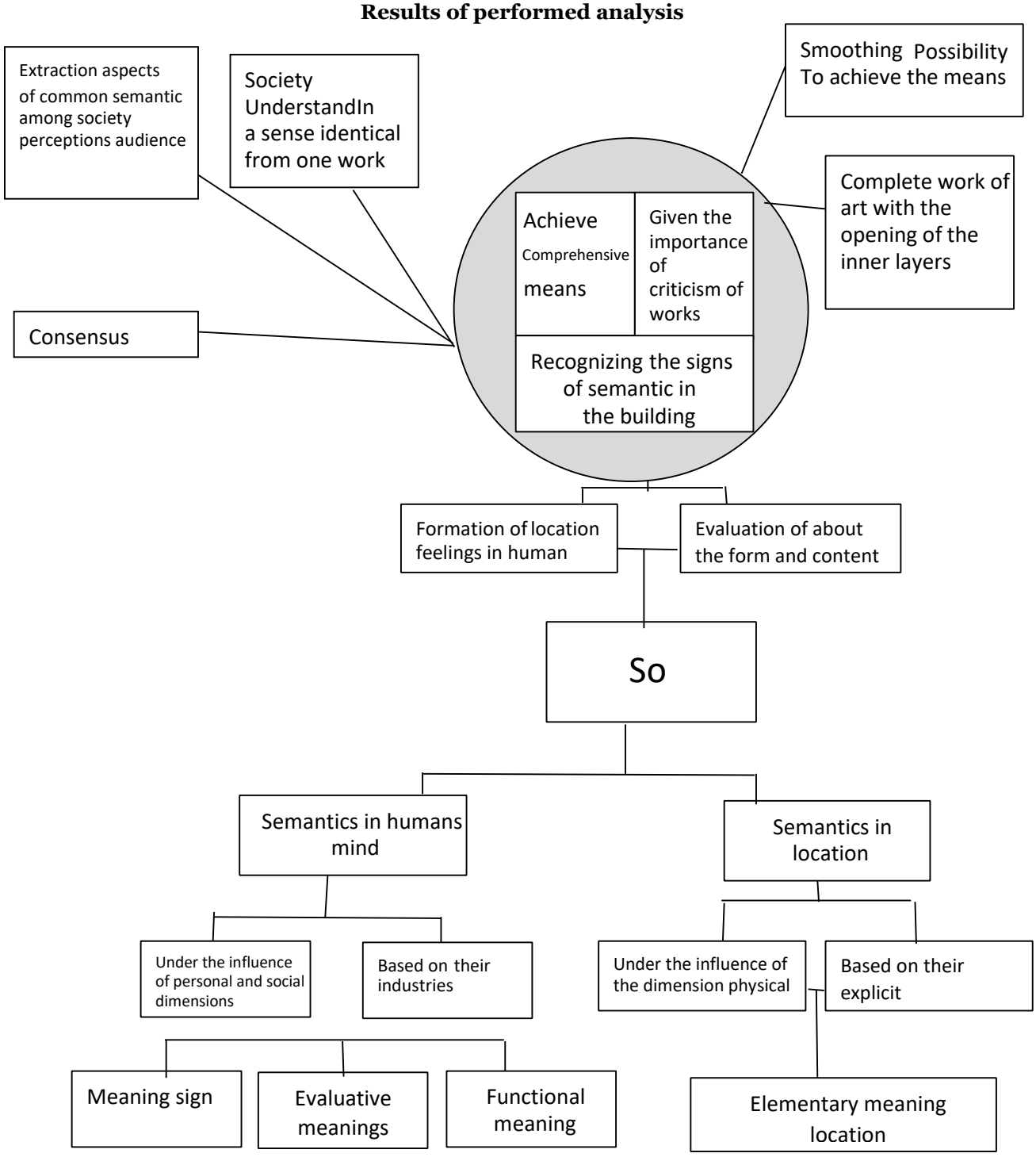
revealed. With the process adaptation and assessment of signs on the monument to such a process for understanding the effects of semantic components in symptoms may develop. FARSHCHIAN audience understanding of the cultural complex, occurs in the moment of confrontation with the work that person realizes familiar signs, but feels, does not know everything about these symptoms and everything that know is understanding arising of this elements that is created during life in his mind and since the audience asks that these signs and meanings "are indicative of what?" he leads to study of what the creator wanted his audience to understand and with the effort creates a syntactic relationship between signs and meanings such perception of it, that according to the mystical and divine pre knowledge such as chain to create a content perception from conclusion of this concept in audience mind

Results of performed analysis



DECLARATIONS

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Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The author declares that there is no competing interest.

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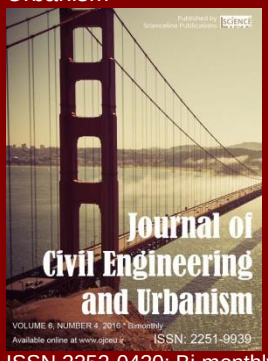

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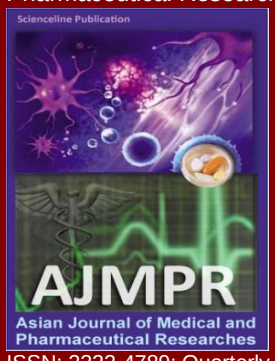

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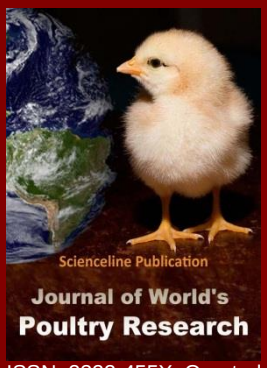

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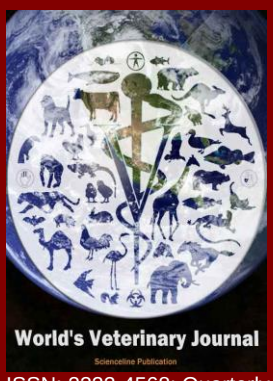

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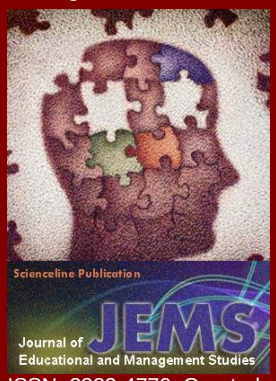

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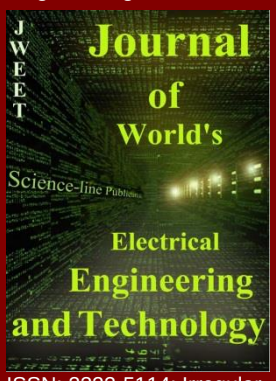

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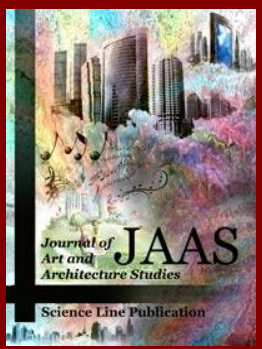

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