VIRTUAL REALITY: AN APPROACH FOR BUILDING MAKKAH'S ARCHITECTURAL IDENTITY

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Abstract. This paper explores a new approach in the architectural design process aiming to construct Makkah's architectural identity. Makkah, which is a city of unique sacred values, has been losing its battle to preserve it heritage buildings. Traditional districts with their heritage buildings have been cleared in order to construct skyscrapers to accommodate the increasing number of pilgrims. While some argue for preserving heritage buildings others insist in building more skyscrapers. Within these conflicting views, architects and urban designers use CAD software to document heritage buildings without informing the future architectural design process. This paper argues for adopting digital architecture as an approach for preserving the architectural heritage of Makkah by studying heritage buildings as systems that can be digitally represented in virtual world. This goes beyond the physical representation of heritage artefacts to investigate in depth the logic that guide the design process. The roushan, which is one of the unique heritage artefacts in Makkan's architecture can be an interface between reality and the virtual environment in the design process. This goes behind modeling the roushan, to employ the principle of virtual representation in the design process. The digital representation of heritage becomes the realm for research transforming the virtual into reality. The hope is to produce an architecture that is related to its local heritage, contemporary in design and responsive to its environment, as well as to advocate principles, references and techniques at the core of the design process, in an educational and professional context. In broader picture the goal is to achieve a city that is responsive to human activities adapted to changes, sustainable in physical forms and social relations and above all unique in design and identity.

1. Cities and the Body/Mind Relationships

In the *Matrix* 1999, Neo (Keanu Reeves) was trapped between two different worlds that of the real and the imagined. For him the practice of everyday life was nothing more than being a productive member in a society. The crucial moment was when Morpheus (Laurence Fishburne) offered to explain the difference between the real world and its virtual projection. Neo had to do was to choose between red or blue pill to either weak up from the virtual world that has been created by machines or to also weak up but without being able to remember that he ever met Morpheus. With some hesitation he chose the red pill and the second crucial moment was when he was introduced to the Matrix. A white environment that can be programmed to reflect whatever settings from a traditional Asian temple to the top of a modern city skyscraper. Only then, Neo started to realize that the Matrix was a virtual projection of reality. No doubt, the Matrix is one of the greatest movies not only because the

visual effects that convince the audiences of this virtual world but most importantly the philosophy behind the narrative. According to French philosopher, Jean Baudrillard (Ritzer, 1998), the world today is constructed by singes and symbols which dose not reflect the real world, rather only simulating it in a virtual format. In the movie, however, reality was a virtual projection of signs and symbols of the real world. This reality was difficult to be observed by Neo.

There is no better case to observe the confusion between these different world of the real and the virtual than Makkah. The King Abdul-Aziz Endowment, which is the largest concrete skyscrapers, was captured by an amateur camera from nearby green hills. The building appeared in the far horizon in a cloudy day. The green hills hide the urban fabric from the scene and only few slums appeared in the left-hand corner of the photograph. The authenticity of the photograph was questioned by many as such composition is hardly to be found in Makkah, which is known for its arid climate and sunny days most of the year. The photographer assures the authenticity of his photograph via his Facebook page and specified the location from where he captured the scene (Allihyani, 2012). It was possible to capture that real monument which contradicts the reality with its complex composition of slums and a skyscraper. The photograph is real but it did not reflect the reality of the site.

Skyscrapers, among many other manifestations of modern economy, have become the most valuable product to represent local identity. The image they represent to the world is of great value for the government. Baudrillard (Ritzer, 1998, p.4) claims that consumption has become a sign through affiliation with certain groups. This means that social relationships are restructured based on the possession of certain products. Based on the Marxist point of view, products and access to them determines the individual position in the society (Ritzer, 1998, p.7). In this sense, cities and the places and spaces in them are consumed visually. This can be observing in the cities of the Gulf Region. According to architectural historian, Ali A. Alraouf (2005), cities such as Dubai, Doha, Kuwait need to build skyscrapers not only to attract foreign investors, rather to attract tourists, employees and most importantly celebrities and superstars. The goal is to construct different urban qualities that project worlds of fantasy, the spectacular and the magical to global audiences (Alraouf, 2005).

In Makkah, architects, urban designers, investors and many other principal stakeholders compete to project an image of a modern city to the world. Since Prince Khalid Al-Faisal, the governor of Makkah, launched the slogan "Makkah into the First World," the competition extended to build the tallest, largest and perhaps the most luxurious hotels' room in the world. The most luxurious hotels' room must overlook the Kaʻaba, many stakeholders imagined (Albarqawi, 2013). This urban policy transformed the perceived image of Makkah, where the Kaʻaba has been the most important physical building, towards buildings skyscrapers. This urban practice in particular questions this sacred city's architectural identity. The question is how to ground architecture in the past and invent the new without either mimicking or depending on other cultures. This is because it does not make sense to reproduced architectural and/or urban forms that were produced in the past by using materials and standards of that time(Akbar, 1988). Some view 'Traditioning' as a creative process of reproducing whatever available forms without neither adhering the past nor adopting the modern (Abu-Lughod, 1992). However, there is no clear methods of selecting the appropriate forms that have the potential to be developed for modern society that has admiration to its past and tradition. In contrast, advocates of the notion of 'remaking' suggest making a clear differentiation between the conventional understanding of tradition that is fixed in the past, and the new tradition that emerged by modernity. This announces the end of norm of tradition and the emergence of tradition that can invent the new (AlSayyad, 2004). A

purpose of this the "tradition is (not) a modern" is a formula works to encourage an innovative process in dealing with architectural forms (Jacobs, 2004). This required a third space in term of Homi Bhabha (1994) wherein different elements encounter each other in attempt to create the new. But, the mechanism of inventing architectural forms, urban places and/or unique spatial quality remains somewhat arguable due to the discourse that constitutes binary position of modern and traditional. This suggest a partial presence of the colonial as the only source of knowledge, thus a total dependency him at any stage of development. The next portion of this paper is an approach to resolve the conflicting relationship between creative formation and heritage preservation of architectural identity in Makkah. This paper does not suggest scripts for digital architecture, it rather, proposes a process that can be adopted and developed for future architectural design.

Figure 4. Photograph of King Abdul-Aziz endowment by amateur photographer.

(Facebook page of Raeid Allihyani <http://www.skyscrapercity.com/showthread.php?t=1237079&page=9 > retrieved 2/3/2012)

2. The Virtual and the Real

Cities are evidence of human achievements. Elizabeth Grosz (2001) argues that culture is an evolutionary effect: it re-generates itself in order to ensure the survival of the species. Cities in this sense are fundamental to human existence. However, cities and the representations of cities have been shaped by globalization. The influence of media and digital communications has changed the perceptions and experiences of spaces and places in cities where the boundaries between real and virtual are almost blurred. Grosz (2001) explains the relation between the "virtual" and the "real" where the "possible" is central to the relation. The possible is a real, but its physical form has not completed yet; therefore there is wide range of potentials of "becoming." Ultimately the real can be seen as the final format of the possible. Grosz (2001) informed us that the real is negotiating its existence by the process of "differentiation" and "divergence" in the virtual which encompasses alternative variety of the real. In fact, the real and virtual must be in a dynamic state of formation in order to be receptive to change.

Farshid Mousavi provides an example in the Function of Form, 2000 in which the virtual can inform the real world. She argues that throughout the history of architecture the production of form has been determined by top-down methods, where single principle determined the whole and bottom-up methods, where principle determined the parts that create the whole. For Mousavi (2000) Greek architecture is example of the top-down while the Islamic architecture is example of the bottom-up. She suggests a transversal approach in which a base unit assembled a variety of causes and concern into a complex supramaterial whole. The base unit means there is no fixed of physicality, rather a responsive construction to site, climate, local tools and techniques. By using computational techniques, she selects some historical forms and through repeating them and examining their variations, capacities and climate conditions in virtual representation; and this raises the potential to invent the new. A new form based on studying the system of historic forms and then produced them. The main point here is that the virtual has become a space for representation in the design process, rather than a representation of static models. This mode of representation informs the future design where the possible is in the process of becoming.

In order to take these relationships of virtual, real and possible to the stage of implementation, Dagmar Reinhardt (2005) states that "computational software programs such as AutoCAD, Catia and Maya, Rhino, 3DStudioMax or FormZ, support an acceleration of development and visualizations." For Reinhardt (2005) architects uses this software for drafting work. They used them as tools while they can use them as a process for the design. She based the argument upon Deleuze's (1990) notion that "a code that passes through a medium is inflected by the medium's inherent method and techniques." Thus, any representation transforms the relationship between concept, form and material fact. Architecture as the subject of these representations may also depart from static conditions to become emergent, responsive and transformative in a real time presence. Reinhardt (2005) suggests an incorporative method that of Design Model and Media Rotation. The Design Model is a generative engine that drives idea and concept through different forms of representation at key moments in the design process, while the Media Rotation is the profiler generating the appearance of the idea or concept in various media. She sees the possibility of the approach in supporting architect's and designer's communication and collaborative sharing of principles, references and techniques at the core of the design process, in an educational and professional context. Architecture can be emergent because it is in an evolving process where representation is replaced by responsiveness in reality based on transforming the virtual. What is essential, here, is the principle in which this emergent architecture is produced.

3. Virtual Reality

In 2005, The PRECAST REALITY STUDIO, which was the first semester studio at the faculty of architecture, planning and design, The University of Sydney, aimed to examine a series of science fiction movies (*Blade Runner, Minority Report, Matrix, and 5th Element*.) The goal was to analyse these movies for their visionary capacity of future architecture. The Studio examined the generative processes shown in the *SCIFI* movies, in order to employ the environments used in these movies for future design process. The focus was upon spatial qualities and the representation of environment. In particular, the new role of space and the network systems that shaped it. One of the examples was the conceptual framework of the 1999 movie *The Matrix* which is one of the revolutionary movies in term of the projected

visionary environments. The relation between reality and virtuality in the movie was governed by the artefact that enables one to move from one environment to the other. Basic principle, however, is that all roles in reality applied in virtuality; But, with the possibility of modifying them. In order to modify the roles, an understanding of the real environment is required. Perception is the key to change. The perception of the virtual environment as an extension of reality creates the potentials to change the roles in that virtual environment.

Figure 5. The representation of the images in the virtual environment; courtesy of the authors.

The first design concept was based on the above idea. This required building a model of white environment that can be informed by different selected images from the movie. Since we perceive the message from images in form of colours, analysing these images according to their colours was essential. These different images have been taken and divided into three groups regarding the hue of colours. Each group has a map representing each colour. In all different settings, the colours were represented as coordinators working as an individual system. The intersections of the three systems determined the solid and voids, while the non-intersected areas determined transparency for visual communications between different levels in the building. The second stage was examining three figures in (virtual environment) the model: how they react, and communicate. Sequential scenarios has been generated and examined in virtual environment. Finally, the projection of information directs the experience of the environment, thus directing the movement. The movements can be intersected, connected and/or separated based on the program of the design. In other words, the building can be design for multi functions uses without any concern. The movement of each user is determined by the information projected in the environment. The result was an interactive design that can be flexible and serve multi functions. An emergent architecture based on experiencing space in an environment that cannot be termed real or virtual; an environment of possibilities and potentials hosts changes and modifications. That was the environment of representations which shapes the real by an inspiration from the virtual.

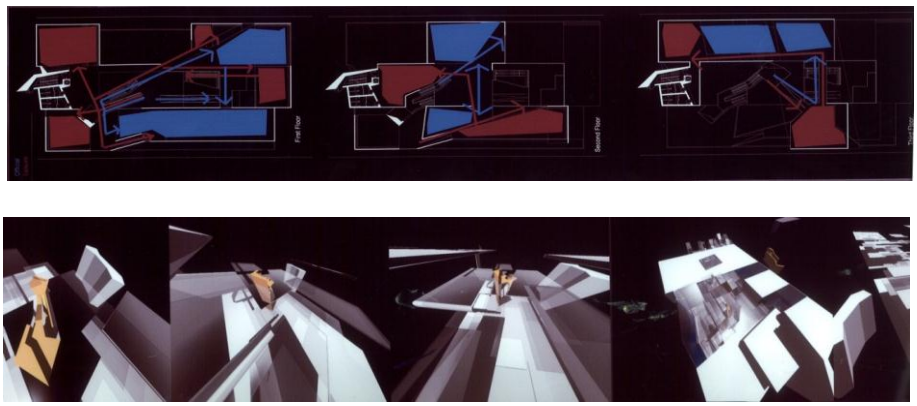

Figure 6. The design process; courtesy of the authors.

Another designing experiment was in 2007during The DESIGN MODELING LAB STUDIO, which was the second semester studio at the faculty of architecture, planning and design, The University of Sydney, aimed to examine the conceptual designs of any existing design. The goal was to abstract a Design Model strategies to develop several conceptual potentials, which transformed into a new designing concepts. The conceptual model of Carnegie Mellon Research Institute (CMRI) by Peter Eisenman was adopted and rebuilt. The concept of CMRI model was constructed from a matching of a couple of cubes. Every couple contains two cubes which there upper side have been twisted, while there based remain attached to the original cubes (Rossi, 1999).

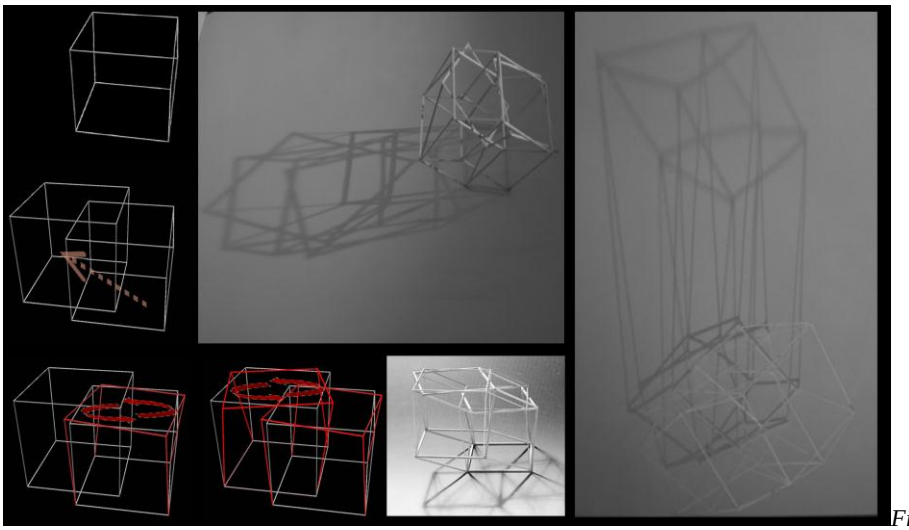

Figure 3. The remodeling of CMRI; courtesy of the authors.

The diagrams of CMRI are indicating its design principles, that explaining deformed a space that was created. Actually, Eisenman is using an outlines of oblique view of the couples of cubes. Then, he is duplicating and rotating and shifting it into a series of outlines which overlapping each other, within a proportion between a third to a half of an outline for each integrating. In addition, this overlapping is generating a series of spaces between them, which

Eisenman is tented to identified, in order to formulate the interior spaces of the design. Generally, this identification is a result of a space that has been generated of no more than one overlapping, with an ignorance of others which intersected it, unless if that interesting might generate a sub space within the overall pattern.

The intention was to examine the possibilities of the "spaces of between spaces." First approach was to tack the CMRI conceptual model, and rebuilding it with a flexible material, in order to deform. This deforming was a result of imposing a force in several directions, either as one imposition in a time, or even more than one. However, that was followed by identifying volumes of the generated three dimensions spaces as a whole space within the context, rather than in tow dimensions spaces. Another approach was creating a grid that was consisted of series of the CMRI model. Then, a force was imposed on the module – a conceptual model –, which was deformed as a result of this imposition. Consequently, a series of deformations was emerged in the module, since the elements of it are standing as a grid. After that, identification for spaces was applied, similarly to the first approach.

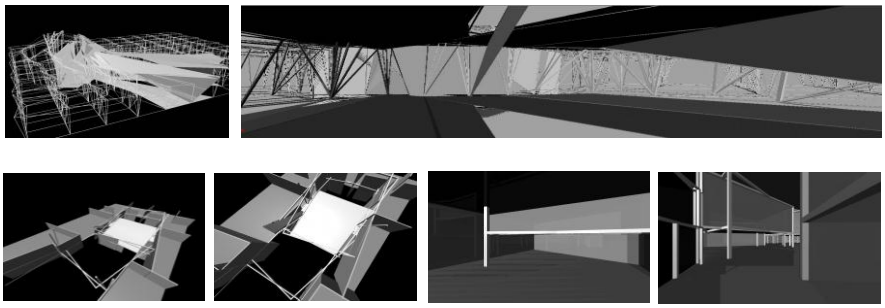

***Figure 4*. The design process; courtesy of the author.**

4. The Design Process

Having explored the notion of virtual reality as a model for designing process, an example of implementing the process by using the roushan as tool of representation is provided for the following reasons. Architectural historian, Sami Anqawi argues that Makkah's architectural style has been influenced and enriched by elements from other nearby and faraway cultures (Angawi, 1988). Only in Makkah did these elements come together, interact with each other and with local conditions, to produce Makkan architecture and the roushan is one of them. It is representative of the most important elements in traditional houses in Makkah therefore it is representing the city's architectural identity (Angawi, 1988). However, the process that invented roushans many centuries ago has been replaced by solely by the process of reproduction of its form. While the process depended upon the reflection of meanings and values, the reproductions of roushans in the late 1980s and 1990s communicated only the arguments that hybrid societies do not necessarily produce hybrid places.

There was a strategy in Makkah of attaching local elements to whatever was considered 'modern' to legitimise its presence. Kaki-Cola, which took its name from Coca-Cola, was a local distributer of the product in Makkah (albarqawi, 2013). The prefix 'Kaki', the family name of the local producer, sounded more neutral to Saudi ears than 'Coca.' In the new form,

its acceptance was not questioned. The same strategy was adopted by many urban development companies which attached roushans to tall modern buildings' façade. This strategy represented roushans as an ideal form that could represent identity. Most of the existing buildings had been renovated and roushans had been attached. The roushans, which were mass produced using modern materials, such as aluminium, fiberglass and steel sheets, covered almost half of the traditional houses in Makkah. But, they appeared much smaller hanging so far from the street activities. There seemed to be less meaning attached to them. In order to explain how both the roushan and skyscrapers have been perceived by locals, the analysis consider physical, psychological, social and spiritual needs.

Until the end of the twentieth century, pilgrims resided in the traditional Makkan houses. They physically shared some part of the house besides exchanging some of the customs and traditions with the locals. There was no discrimination regarding the socio-economic or even the political status of the pilgrims. However, there was a physical need for more space to accommodate the increasing number of pilgrims every year. The surrounding mountains provided only limited flat areas around the Holy Mosque. For this reason, the people of Makkah extended their houses vertically. Some houses were built on the surrounding hilltops, but with limited height up to two levels. The economic improvement of Saudi Arabia, which was made possible by the oil revenue of the 1970s, marked a major shift in Hajj accommodation patterns. Property owners received considerable compensation for their properties and became investors. This meant that they could purchase low and mid-rise properties located in the city's main wide streets. Location was important given that building heights depended upon the street width according to the municipality's regulations. Investors demolished the low and mid-rise buildings located in the main streets and constructed new buildings with more levels. The maximum height was up to ten levels; this would not exceed the Holy Mosque's minaret heights, a main principle in the urban planning of Makkah. These ten levels were enough to ensure profit. Land values dramatically increased because more levels meant more profitable vertical space to be rented and consumed by pilgrims during the Hajj season.

As tall buildings started to emerge in Makkah, the Holy Mosque's minarets determined the buildings' heights. Buildings should not exceed the Holy Mosque's minarets. At the time some urban devolvement companies were established and one of them was Makkah Construction and Development Company (MCDCo) in 1987, which built its complex exceeding the building height regulations. The apartment buildings that faced the Holy Mosque directly had twenty-three floors. This did not exceed the Holy Mosque's minaret heights. However, the other two buildings at the back were twenty-nine floors and Makkah's Hilton Hotel more than thirty floors. Compensation was paid to the MCDCo, which was asked to provide extra space for the Holy Mosque's plaza by increasing its setback from the Holy Mosque. This practice influenced people's perceptions of high-rise buildings as the key to urban development.

From the field of urban psychology, Mashary Al-Naim, argues that people refer to places that contain physical elements that represent their shared values and beliefs and symbolise their values as a social process, (Al-Naim, 2007). Identity, then, may be manifest in patterns of thought driven by principles according to and within a specific culture. This formation is described as long term process, which eventually constructs architectural symbols that embody meaning and reflect the values of that particular society. Al-Naim suggests that it can be fruitful to investigate people's perceptions of changes in their physical environment as a mode of inquiry linking urban transformation to their perceptions of identity.

By 1970, people started to move from the traditional environment around the Holy Mosque into new areas which were presented to them as modern new districts. In these districts, the gridded street patterns suggested the construction of autonomous buildings. The villa was the most desirable residential type. Al-Naim (2007) wrote:

The need to express meaning in architecture enabled the villa type to become the device for Saudis to express their social status as modern…The villa represented modernity and the people's attitude was based on the stylistic association that 'modern', as expressed in the modern villa style, is 'good', by virtue of being modern.

Ultimately, the villa-type was adopted by many Saudi families in these districts; there was no attempt to maintain any association with the past. The international style, that is, a white cube with a display of light and shadow, was the most dominant style. Glass and aluminium windows were the most favoured mediums for the openings. Housni Al-Taher mourned the loss of the roushans in the Al-Bilad newspaper:

They are with[out]…doubt the most beautiful and comfortable and glam[orous] in appearance, cheerful if seated within…not these windows which one cannot sit in…the roushans must be preserved for the future as they are the best that Islamic civilisation achieved in the blooming time.

In Makkah the relatively high income of individuals made the villas more desirable. It represented modernity in Saudi Arabia rather than the apartment blocks which emerged in other parts of the world.

In 1990s, people started to move to more distant areas; for example Al-Nawariyah, Al-Sharayi'a and Al-'Awali, along the axial roads. The municipal regulations contributed to setbacks on all sides. No clear instructions regarding the locations, size and direction of windows forced people to alter the facades of their villas. The irony is that people started to attach historical elements to their villas. Since the municipality did not approve any regulation regarding privacy, i.e. the opening of windows that overlooked neighbours' villas, the villa no longer enjoyed a high level of privacy. Its modernity was modified by the attachment of the traditional roushans.

Socially, the attachment of Roushans may be seen as a nostalgic attempt to communicate shared memories of society. Urban developer Majdi Hariri stated that:

We used to collect traditional elements, i.e. roushans; from the demolished houses in the central area...most of these Roushans were in good condition. Then we renovated them and used them in modern houses [Villas]…Roushans are priceless and there was a huge demand for them.

Hariri made a clear differentiation between the original roushan that can be kept as a priceless piece of art and the production of replicas. In effect, the roushans had no function other than symbolic representation. They were now starting to overlook streets full of cars rather than streets full of people. Architect and urban consultant Muhmad Al-Saqaf stated:

We embraced the Western culture and the car became dominating the urban plan policy…We need a working group to lay the foundations and criteria through which we can arrive at a concept of identity in terms of planning Makkah from economy, urban development to the general appearance of the city (Al-Saqaf interview, 2008).

The use of roushans in the home environment was not a practical solution. The setback of two metres from the sides allowed only limited space for installing them. All that could be seen were the neighbouring buildings, whereas in the past roushans functioned as mediators between the indoors and outdoors. They allowed women to observe the street and to communicate with others without being seen. The heavy cost of the roushans and their reduced function forced people to exclude them from their shared memories. Although there

was an attempt to develop them using different materials, such as aluminium, fibreglass and steel, their beauty was destroyed. Faisal Al-Shareef (1996) studied the relationship between culture, climate and physical design and concluded that Western architects and firms who are or were planning and designing for Saudi Arabia had very little knowledge of the culture and people of Arabia and Islam. He states that:

Most of the building elements of the Islamic and local traditional architecture are utilised only for decorative purposes…[F]ake imitations of some elements e.g. roushan, without understanding the essence behind their use in traditional designs usually create problems rather than solutions.

According to Hariri, the purpose of using roushans in modern villas in Makkah was ornamentation of the facades (Hariri interview, 2008). There was a total lack of any consideration for individuals' privacy. People altered the facades of their villas by adding metal sheets to increase the height of the villas' fences in order to provide more privacy. The passage of time had seen the roushans effaced from the publicly shared memory of Makkan society, in both Makkan's houses and the central area around the Holy Mosque.

According to architect, Nabeel Koshak (2002): "Documenting historic buildings is important…It preserves information for future generations to learn from the past." Koshak (2002) contribution of establishing digital archives of historical building in Makkah in remarkable using (DBMS, CAD, or GIS) software. The Data Warehousing, according to Koshak (2002), "is a technique initially developed for business applications, and is equally useful for urban design." But, his approach remained somewhat limited to modelling and documenting without suggesting future designing methods. Building on Koshak's (2002) model, this paper is extending the digital representation of artefacts to more pragmatic tool for design.

The main function of the roushan is to hinder the gaze of strangers in the streets, thus the residence; special women can practice their daily activities with high level of privacy. Therefore, the main structural frames of the roushan are vertical and horizontal timbers fill with horizontal pattern called "qalalib." The movement of the qalalib can be controlled only from inside according to the desirable degree of opening. By moving the qalalib vertically, women from inside can observe the activities in the streets without being seen and can communicate, to some extents, with the people in the streets while enjoying high level of privacy. Therefore the first stage in the design process is a virtual representation of the timberworks of the roushan according to the degree of privacy. While the openings in the lower levels are a subject to visual penetration, small spaces between the qalalib are needed. The openings in higher levels can be enlarged. The system of visual communication seems to be simple, but it is very important in Muslims society.

The second stage is providing natural light in the building. The roushan enables lights' penetration while protecting privacy. The vertical movement of the qalalib is a key in controlling the degree of the needed natural lights inside the house. But, natural lights changes according to the sun position and can be varied during the year according to different seasons. The qalalib in the roushan can be interactive, rather than static. The pattern can move with the sun position during the day to allow the needed natural lights. This means the need for qalalib that can move vertically and horizontally. The most suitable shape to achieve this type of control is the sphere. Designing a sphere shape of qalalib is a challenge due to the difficulties of manufacturing them; but, this would enable maximum control.

Finally the entire building can be represented as solid and void which determined the degree of communication (strong, medium and weak) between residents and others (people in the streets and neighbours in the other buildings.) Sight and hearing is essential here, as we

communicate with each other via dialogues and visual communications. This system in particular, is represented by transparency and sound proof materials. Here the building materials play the most important role in the design process. Finding a material which is transparent and sound proof seemed impossible. However, the nanotechnology opened up a new arena in the research process. What is essential here is the process suggesting that further research is recommended including literatures from other disciplines. These three systems are the representation of the roushan in the virtual environment. The virtual environment can be constructed by Maya, Rhino or 3DStudioMax due to their powerful visual representation and the flexibility to engage the designers in the design process. The result would be a design process where the principles are generated from traditions but, with the possibility to invent a new architecture. The roushan become the generator of principles. But, these new principles are governing the virtual in order to produce the future.

5. Rethinking Architectural Identity

Cities of the Gulf region are moving from the reality that they were consumer cities depending upon oil revues to build their infrastructure and services to be productive cities based on providing knowledge and education. 'Knowledge-based cities' has become the label of the 'after oil' urban development urbanization where sustainability is key to their realization. The powerful representation of architectural images is crucial for both advertising these cities globally and attracting global investors, and audiences. Creativity and invention are synonyms to the success of knowledge-based cities. The question is what sort of traditional forms have the ability to survive, thus informing the present and the future? And what modern, tall, iconic forms have the potential to provide a sustainable environment? The most important question is how to advocate a state of becoming where the possible exists between the virtual and the real, yet to be the future.

The hope in this paper is to introduce the approach to the department of Islamic architecture, Um Al-Qura University, Makkah, in which preserving the heritage architecture of this sacred city can be reality. As the department of Islamic architecture was found to be the leading institute in architecture not only at regional level but worldwide, it is important to reflect a multiple way of thinking. As pilgrims perform the Hajj and share the experience of this sacred place, the significance of preserving the traditional buildings in Makkah is increasing. It is not only because traditional houses represent the heritage of Makkah but because they also hold the heritage of all Muslims. Thus, it is important to think of Makkah with its roles in this globalised world which is perceived by millions throughout media. Koshak tested the validity of his project by documenting part of the heritage buildings in Makkah. This paper extended the notion to engage designers in more interactive design process where the line between virtual and reality is blurred. The possibility of transforming heritage into reality is relay on the ability to move to a new design paradigm that represent the current time with view towards the future. Knowledge-based cities need knowledge-based design paradigms for the success of their future.

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