DIGITAL ARTEFACTS AND HERITAGE PRESERVATION

Introduction

In 2007, the governor of Makkah Prince Khalid Al-Faisal met with a group of architects, urban designers and urban developers in a gathering organised by the Saudi Society for Urban Science. The prince launched the slogan “Makkah into the First World” announcing the departure from the current practice of urban development to more innovative practice that would transform Makkah into an ideal city. Since then, huge traditional areas were demolished to construct skyscrapers. This demolishing of traditional buildings around the Holy Mosque has spread a perception of a loss of identity. Majdi Hariri (2008) previous academic at Umm Al-Qura University, stated that: “all traditional buildings [having been] demolished there is nothing left to represent our identity.” Thamer Al-Harbi (2008), another academic at Umm Al-Qura University, stated: “There is no identity in Makkah except for the attempts of some buildings to develop some traditional elements.” Jamal Al-Houshabi (2008), a religious scholar and editor of Makkah Journal, contended that: “Identity in Makkah should be gained from its religious function as a pilgrims’ centre, and this has not been reflected.”

Fakhri Daghistani (2008), head of the Establishment of Motawifs of Pilgrims of Turkey and Muslims of America, Europe and Australia, who seemed surprised when he was invited to describe his childhood in Al-Shamiyah, one of the most famous traditional neighbourhoods in Makkah, responded: “Is there anything left at all to talk about?”

While some argue for preserving traditional buildings others urge for building skyscrapers. Both groups underestimate the possibility of technology in preserving the cultural heritage of Makkah. This paper argues that it’s possible to develop a modern architecture based on traditional one. 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; 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 roushan has been selected as the most

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1 Al-Faisal, Khalid 2008. Interview with Prince Khalid Al-Faisal, interview by the author, 16 March.
2 Hariri, Majdi. 2008. Interview of Majdi Hariri, interview by the author, 23 March. Majdi Hariri was previous academic at Umm Al-Quran University, Makkah.
3 Al-Harbi, Thamer. 2008. Interview of Thamer Al-Harbi, interview by the author 21 April. When he was interviewed, Al-Harbi was Head of the Institute of the Custodian of the Two Holy Mosques for Hajj Research.
5 Daghistani, Fakhri 2008. Interview with Fakhri Daghistani, interview by the author 16 July, Daghistani is a civil engineer and a retired building contractor.
significant artefact that can represent the identity of Makkah not by mimicking its physical form, rather by understanding its digital representation. *Roushan* as an artefact can be digitally represented; the methods in which the *rousshan* analysed and then stored according to its algorism. The representation of the artefacts, which is the *rousshan* in this case, becomes the arena for research and architectural design. By understanding both historical artefacts and heritage buildings as systems that can be represented in virtual space, it is possible to transform them into novel architecture that is responsive reflecting identity in emergent construction.

Having graduated from the department of Islamic architecture, Um Al-Qura University, in Makkah, the hope in this paper is to introduce the approach to the department in which preserving the heritage architecture of this sacred city can be initiated. 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. The personal involvement in the process of configuring space, in the design studio, faculty of architecture, design and planning, the University of Sydney, 2005 as a master student, raised the possibility to experience architecture throughout virtual representation of heritage artefact. This paper does not suggest scripts for digital architecture, it rather, proposes a process that can be adopted and developed for future architectural design. 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.

**Roushan, concepts, ideas and principles**

Traditional houses in Makkah gained their beauty from the fusion of different cultures where *rousshan* reflect the most important element in them. Techniques and experience from eastern and western Islamic world fused in the Makkah has created this unique hybrid architecture. The timber used in the constructions of the *rousshan* was generally brought from the Indonesian island of Java and the craftsmen were in the main from India; their Indian decorating techniques are obvious. The term *rousshan* means the source of light in the Persian language. Although the *rousshan* originated from the Egyptian *Mashrabiya*, the size and proportion between them are totally different. A *Roushan* usually covers a large opening in the house (up to three levels) while the *Mashrabiya* cover one and in some cases two levels. Pilgrims’ activities shaped the unique spatial quality of Makkah: this is what differentiates the *rousshan* from the *Mashrabiya*. Given that the streets of Makkah are crowded most of the time, especially during the Hajj season, the large projection of the *rousshan* enable for better connection between the in/outside spaces.

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8 The screens that characterised the *Roushan* were responded to the region climatic, social and religious needs. They allow natural light and ventilation while protecting the privacy of residents. Privacy is highly valued in Islamic society.

9 T. Hijazi, Al Heraf Al yadwiyah fi Makkah, [Handicrafts in Makkah] ( Makkah, Custodian of the Two Holy Mosques Institute for Hajj Research, 1993)


Figure 1: Facade of traditional houses in Makkah notice the Roushans covering most of the facade; source: The Institution of the Custodian of the two Holy Masques for Hajj Research Centre.

However, the influenced of western modernity by the late 20C, projected one of the major challenges in constructing identity in Makkah. In 1986, Makkah Construction and Development Company (MCDCo), was the first giant company that built a mega scale project in Makkah: modern hotel and apartments unites stand on the podium of commercial and small business users. The podium featured number of arches while the hotel and other apartments featured roushans. This practice in particular was an attempt to legitimise the company's action, what also rendered the roushans to be the representation of local identity. The question is that: how does the reproduction of historic images, elements and forms could lead to modern urban development? The roushans had no function, but symbolic representation as they started to overlook streets full of automobiles rather than streets full of people.

By 2001, when the stakeholders at the MCDCo invested in Jabal Omar which targeted capacity are 34,500 pilgrims, architecture schools in Saudi University were invited besides architectural firms to offer their visions. It is possible to notice the absence of the traditional roushans. Most of the criticism was regarding adopting skyscrapers in developing Makkah.13 Eight years later, Al-Shamiyah Urban Development Company started its urban development scheme by the focus on mid-rise development.14 However, the company still negotiating buildings’ heights with the authority. The construction of skyscrapers in Makkah has become the practice for urban development.15 In order to build more skyscrapers, huge numbers of traditional buildings were demolished. Drawing from above observation it is possible to argue that the process that invented the roushans many centuries ago was replaced by producing its form. While that process depended on reflecting meanings and values, the reproductions of roushans in the late 80s and 90s communicate only the meaning of being modern, without communicating strong values. The rest of this paper explores a new approach in the design process in which inventing the new can be reality.

15 Ibid.
Digital Artefacts

Cities and the representations of cities have been shaped by globalisation. The influence of mass media and telecommunications has changed the perceptions and experiences of spaces and places in cities. Elizabeth Grosz (2001) argues that culture is an evolutionary effect: it re-generates itself in order to ensure the survival of the species.16 Central to the process of perception and experience is the interface that define the relation between virtual and reality. This approach requires dealing with heritage in a constructive mode in a process called deconstruction by Muhammad Abed Al-Jabiri (1991). He suggested deconstructing the relationship that from the subject to transform them into separate entities is the only way to transfer the possibilities into realities by regrouping them again in a new fusion.17

Elizabeth Grosz (2001) explains the relation between the “virtual” and the “real” where the “possible” lays is central to the relation.18 For Grosz (2001) 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. But 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.19 In fact, the real and virtual must be in a dynamic state of formation in order to be receptive to change, the balance between.20

In order to take these relations, of virtual, real and possible, to the stage of implementation, Dagmar Reinhardt (2005) stated that “computational software programs such as AutoCAD, Catia and Maya, Rhino, 3DStudioMax

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19 Ibid.
20 Ibid.
or FormZ, support an acceleration of development and visualisation. 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 Reinhardt (2005) 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) suggested 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. Reinhardt (2005) 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.

Farshid Mousavi in the Function of Form, 2000, argued that throughout the history of architecture the production of form has been determined by: a) top-down methods, where single principle determined the whole and b) 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. Mousavi (2000) suggested 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 the site, climate, local tools and techniques. By using computational techniques Mousavi (2000) selected some historical forms and through repeating them and examining their variations, capacities and climate conditions in virtual representation, she raised the potential to invent the new. A new form based on studying the system of historic forms and then produced them. Mousavi (2000) reflect alternative use of virtuality in the design process. 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.

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

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22 Ibid.
26 Ibid.
27 Ibid.
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. I analysed the conceptual framework of the 1999 movie The Matrix which is one of the revolutionary movies not only in term of the SCIFI narrative, and special effects; but, rather 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. Then, the perception of the virtual environment as an extension of reality creates the potentials to change the roles in that virtual environment. Perception is the key to change.

Figure 3: The representation of the images in the virtual environment; courtesy of the author.

I based my design process on the above principles. This required the building of 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. That was the second stage of the design process. 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 use is determined by the sore of information projected in the environment. The result was, after all, an interactive design that can be fixable 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; An environment of representations that shapes the real by an inspiration from the virtual.

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

**The Roushan for Architectural Preservation**

Having explored the notion of virtual reality as a model for designing process, I will provide an example of implementing the process by using the roushan as tool of representation. The roushan as an artefact can be an interface between reality and the virtual environment in the design process. The aim is to departure from modelling the roushan, to employ the principle of virtual representation in the design process. 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, I suggests, 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 as noted before in this paper.
The second stage is provided the 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 connections. 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 where an interdisciplinary approach is required. 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 is 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; which are the same principles that enabled its form to be reality in the past. But, these new principles are governing the virtual in order to produce the future.

**Conclusion**

This paper argued for adopting a new approach in the architectural design process which has the potential to invent new traditions to shape both the present and the future. 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 (2002) tested the validity of his project by documenting part of the heritage buildings in Makkah using (DBMS, CAD, or GIS) software. Data warehousing, according to Koshak (2002), “is a technique initially developed for business applications, but is equally useful for urban design.”

This paper extended the notion to engage designers in more interactive design process where the line between virtual and reality is blurred. Only of we think of architecture as a product of culture and culture is shaped by both cultural fusion and telecommunications, then it is possible to think of the future based on the past. Enormous artefacts have been found in the antique stores in Makkah. The possibility of transforming heritage into reality is relay on the ability to move from traditional way of thinking towards a rational thinking that represent the current time with view towards the future.

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