



**AUTHOR(S):**

**TITLE:**

**YEAR:**

**Publisher citation:**

**OpenAIR citation:**

**Publisher copyright statement:**

This is the \_\_\_\_\_ version of an article originally published by \_\_\_\_\_  
in \_\_\_\_\_  
(ISSN \_\_\_\_\_; eISSN \_\_\_\_\_).

**OpenAIR takedown statement:**

Section 6 of the "Repository policy for OpenAIR @ RGU" (available from <http://www.rgu.ac.uk/staff-and-current-students/library/library-policies/repository-policies>) provides guidance on the criteria under which RGU will consider withdrawing material from OpenAIR. If you believe that this item is subject to any of these criteria, or for any other reason should not be held on OpenAIR, then please contact [openair-help@rgu.ac.uk](mailto:openair-help@rgu.ac.uk) with the details of the item and the nature of your complaint.

This publication is distributed under a CC \_\_\_\_\_ license.  
\_\_\_\_\_



# *Technology and innovation in adapting architectonic tradition aiming for a sustainable future in the middle east*



**Isra'a S. Fardous**

*Scott Sutherland School of Architecture  
and Built Environment  
Robert Gordon University,  
Aberdeen, Scotland*  
i.s.a.k.fardous@rgu.ac.uk



**Amar Bennadji**

*Scott Sutherland School of Architecture  
and Built Environment  
Robert Gordon University,  
Aberdeen, Scotland*  
a.bennadji@rgu.ac.uk

impact on the society and the individual, attributing to their development form an essential relationship. Another trigger is how traditional features of buildings adapted to technology, can be described as better living standards in indoor environments. Aforementioned collaboration will require a consideration of functional parameters. The research will accumulate daylighting performance in relation to ATA through the level of comfort, privacy, and technology. Bennadji (2003), implies that the effect of the amount of daylight on sociocultural needs of the habitant is worth noting.

This exploration will emphasize the consideration of occupants and their social needs, and human emotions; Alkahlidi (2012), states that traditional architecture in the Arab World represents a living witness for the perseverance of this architecture to the local environment.

## **RESEARCH OBJECTIVES**

### **1. Objectives**

The research is aimed to assess different buildings that either dealt or neglected traditional features and their adaptation to technology and innovation as well as its psychological response with emphasis on the environmental aspect. The second aim is to demonstrate the legitimate use of Arabic traditional architectonic features in the ME. Arabic is defined for its particular identification and geographical orientation of the study. The third aim is to measure environmental data related to daylighting performance, over daylight parameter in different building typologies. Taib and Rasdi (2012)

## **INTRODUCTION**

With relation to the communities' shift in the ME from being mainly concerned of adapting and maintaining quality of life correlated with ATA, towards global trends adaptation, the presence of ATA has been a significant feature in private and public buildings. This investigation will highlight the socio-psychological, physical and behavioral effects that have emerged as builders seek to better contemporary living standards. The indicated paradigm will impact the well-being of individuals, while they remain attached to their culture. In Dr. Gerda's Thesis (2000), she stated that a place attachment is a valuable element that has an

denoted out that using technology in buildings has to respect their relation to a particular context, together with attain what the occupants desire. This will establish the impact of the adoption of ATA adapted to modern technology.

**2. Research Exploration**

This research attempts to contribute to the environmental design to improve human well-being. For that, it will investigate the extent to which ATA with modern adaptation causes an alteration for the purpose of well-being for present and future generations.

This understanding will highlight the factors confining community acceptance, adoption and adaption to involving traditional features and technology, and how far will it influence their level of comfort. It also aims at defining an important design parameter relevant to the location of the study, which is daylight for visual impact. The idea is to measure how much does it have an influence on well-being? Also, what cultural influence can the technology bring to the community?

**METHOD**

**1. Research Method**

The paper is concerned with the study of Human-Environment interactions in relation to ATA, with an integration of cross-discipline methods. Moreover, this will address the frame-work of the research, with an explanation of the ATA as a primary factor, in facilitating better psychosocial and cultural influences. It also aims at identifying the capability of technological

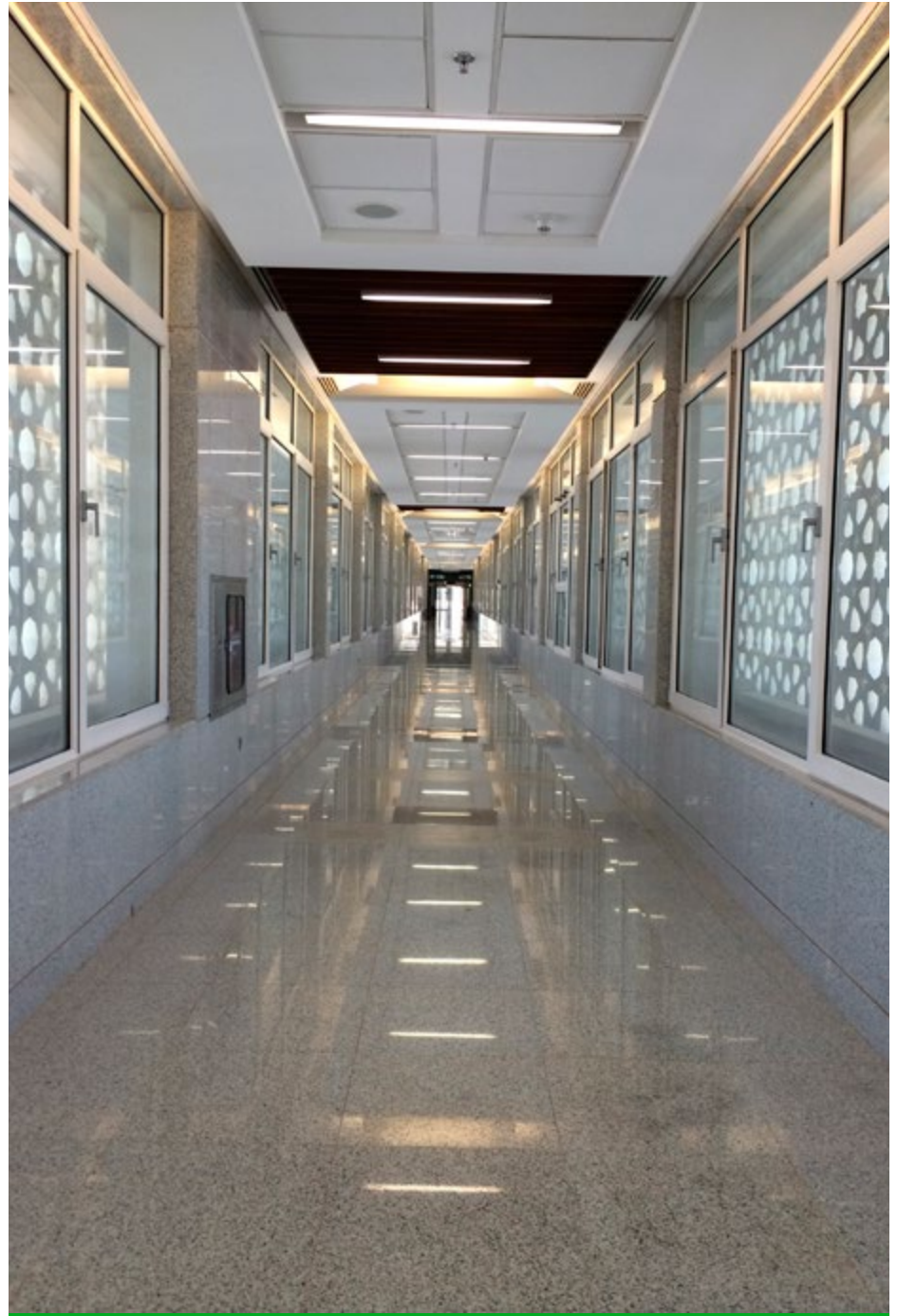


Figure 1: Contemporary Musharrabia hall, By Author.

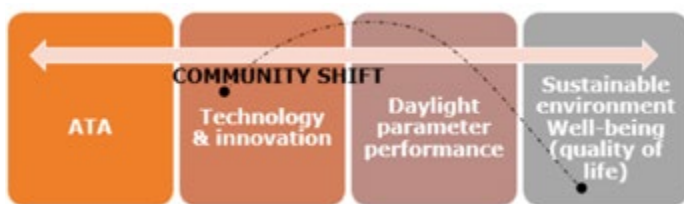


Figure 2: ATA shifting Community.



Figure 3: Three pillars toward human comfort.



Figure 4-a: traditional building.



Figure 4-b: modern building.

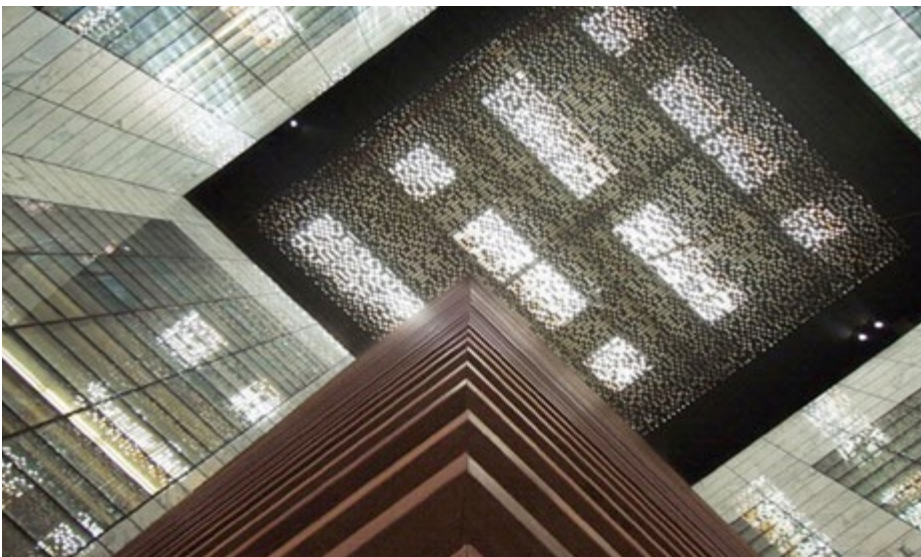


Figure 4-c: contemporary traditional building.

adaptation. The chosen methodology is scientific, objective, and experimental. However, to employ a hybrid approach, data should bring the set of findings together for the complete research progress, Bryman, (2007).

## 2. Methodology Development

Layer 1- First layer will form the structure and theory of the research.

Layer 2- Second layer will implement a structured and semi structured questionnaire. For the present paper, we will only cover the pilot study, an observational arrangement with 35 students participating in a class assignment. This will build the main survey, considering the perspective of the experts in the design field and a selected sample from the general public was taken into account. This phase will verify the level of acceptance and realization of cultural adaptation with technology for well-been.

Layer 3- the researcher will measure and monitor indoor environmental quality, through the building performance in particular “daylighting performance”, on the typology of three different spaces in term of the use of traditional features traditional, transitional, and modern building, through case-study analysis. This will be completed with particular attention to the sustainable hybrid communities.

The layers of the project will be correlated in order to conduct a set of studies and experimental study using the space as a unit of analysis. This correlation will narrow down the intersected findings of the divergent themes into guidelines upon the traditional architectonic features for sustainable environment. The significant issue in the utilization of blended methods is that the results cannot be just regarded as purely quantitative and qualitative arrangements, and rather need extensive analysis, Bryman (2007).

## STRATEGY AND DESIGN POTENTIAL

The first step requires a pilot study to confirm the methodology process. The developed questionnaire form was distributed to students on a random

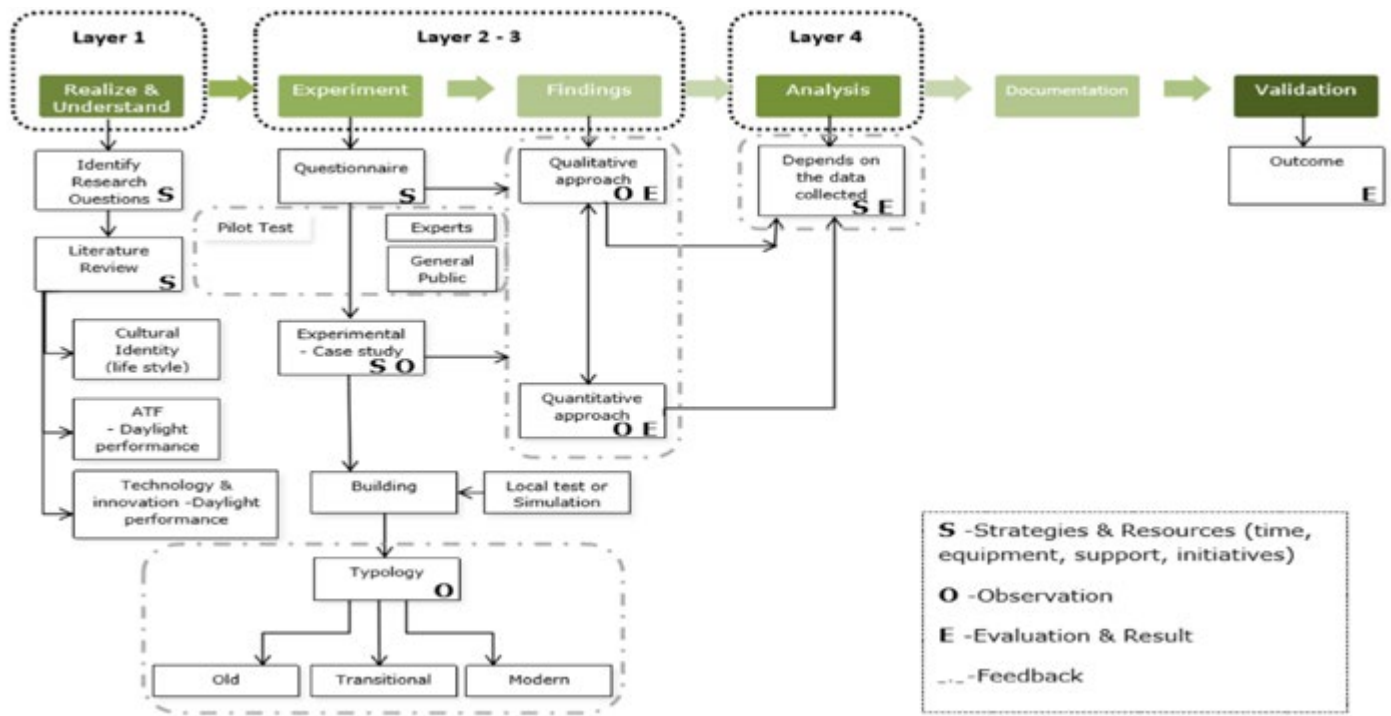


Figure 5: Data collection model.



Table 1-2. How to achieve traditional representation, with features.

sample in similar academic enrolment. Therefore, this will establish initial findings for more convincing results of the study. Level of knowledge on Arabic traditional features was tested extensively within the survey. As well, we asked about the barriers for traditional architecture to be accessible not only as an embellishment but as an integral part of the indoor envelope, with an impact on visual and tangible aspects towards occupant’s well-being. The language parameter was important in relation to cultural considerations, in addition to its importance in providing confidence while expressing ourselves.

**IMPLEMENTATION ANALYSIS AND FINDINGS**

The undertaken arrangement was collected from 140 participants. The indicated questionnaire had English and Arabic formats. The majority (over 40%) responded to the Arabic version. This is because it is considerably familiar and easier to understand as well as it is encouraging and in direct contact to their knowhow. Educational level among participants was significant as it impacts the use of traditional features in our built environment.

When participants are asked about the representation of participants

place of residence, they had to display visual illustration for clear answers. About half of the participants revealed that they have modern places, whilst a smaller group were keen to ensure that they follow modern trends with respect to the traditional impact that will induce emotional aspects. A smaller group forming only 13% still have ambitions to use pure traditional architecture. The greater change in building trend highlights striking data; traditional features are mostly not affordable, traditional artisans and crafts are either no longer available in an appropriate level, or was seen as an outdated trend.



Figure 6: Traditional extension.

People were asked to make decisions on questions directed to deal with their knowledge and their feelings. The intended approach is to examine people’s responses to traditional presence that can importantly contribute for a better quality of life. Through the study a strong devotion was towards the method of mixed trends which support the research objectives progress. The first chart for general public considered traditional features has to be separated from the rest of the house not as an integral part. The largest percentage is for those who had traditional extension to their houses as a symbolic “Masmak”.

The second table is based on personal overviews. It mentioned the use of large windows, and traditional courtyard, which addresses the importance and reliance on daylighting for health and emotional aspects. The strong impact was for the use of traditional features in a modern adaptation after explanation, eventually the majority of people (39%) needed to have the modern life style. A small group (5%) indicted the Musharrabia feature. Another set of questions was displayed using non-parametric statistics via Likert- type scale, to analyze occupant’s opinions and attitude and to what extent they

agree or disagree. Responses were related to the traditional settlement over modern technology. The criteria was more generalized for future research on selected controlled samples. The first category was in relation to the level of awareness, on ATA and its impact on both individual and public level.

Almost half of the participants had neutral responses; some were not very clear with the topic or somewhat they had an idea, and nearly 40% agreed on having a clear understanding about traditional features and how it impacts the occupant’s well-being, whereas those who disagreed had the lowest percentage. Therefore, this highlights the need to increase the awareness of the population on ATA and its positive impact. The remaining bars in the chart above show that more than half of the survey members agreed on the importance of the presence of traditional trend in relation to city identity, as only 12% of respondents disagreed. In contrast, the largest number of participants had no opinion, and 15 % think that it should not be an obligation to adopt this trend for just knowing its benefit.

The second category is for occupant’s point of view a

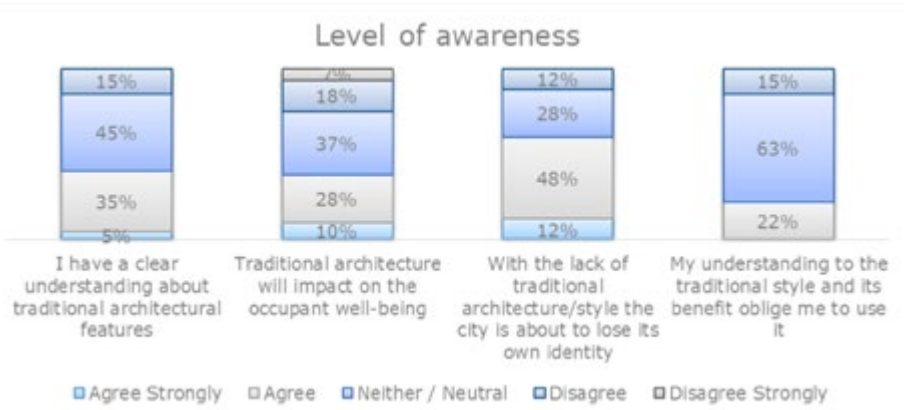


Table 3. Stacked bar chart, Level of agreement on the level of awareness.

Major differences can be seen in respondent's opinions; over 70% reaching up to 80% agreed on the suitability of traditional features for indoor spaces rather than a way to build in particular for the sake of privacy. It is clearly seen that traditional adaptation with modern technology is more accepted to alter with a higher percentage considering the presence of culture in a society reflecting the population own self-esteem. Overall data prove that people are keen to explore new lifestyle patterns. The initial results confirm the need of greater potential from experts to lead the society toward taking decisions for occupant's comfort and well-being. In conclusion, this controlled randomized investigation will guide the researcher for further investigation. Most of the statements were agreed upon. As for the respondent's age and gender, it has been found that older people realize the effect of hybrid societies on the environment and on the occupant well-being, whereas younger participants highlights on the importance of the increasing of global trend between adoption an adaption.

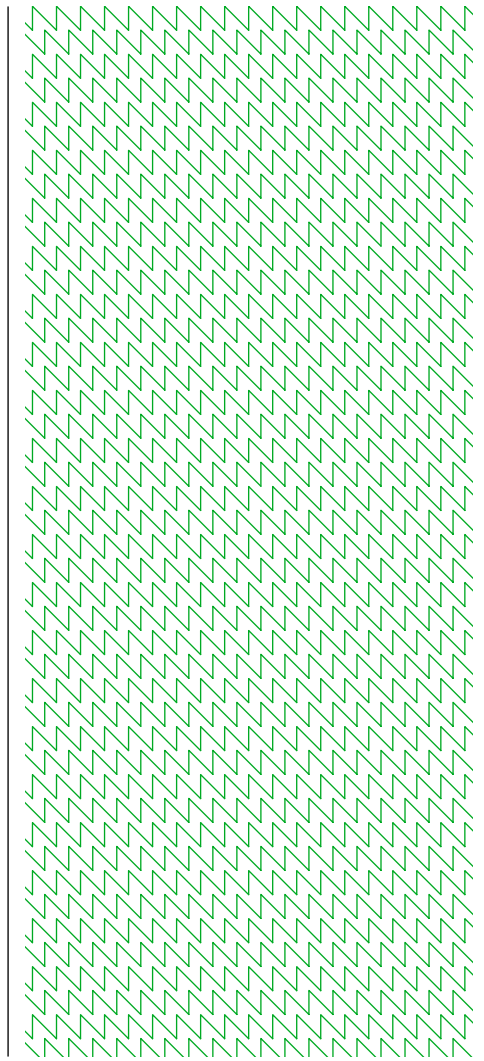
## CONCLUSIONS

This study aimed at studying the traditional architecture in the ME and identified that it will continue to be an important vector for human well-being, a necessity to improve society, and a conductor to the indoor envelope experience. Therefore, this will highlight the current considerations resulting in an overwhelming modern status. Also, underlining on the lack of academic teaching concerning traditional adaption and adoption to reach proper indoor environmental conditions.

This paper contributes to the subject-mater knowledge and increases the awareness of environmental and psychological factors in relation to cultural values. We focused on a daily parameter that cannot be induced by alternatives. The impact of the combination of architectonic features and modern technology related to daylighting performance to cause sense of pleasure will be subject for further investigation.

## ACKNOWLEDGMENTS

My sincere gratitude to my principle supervisor and supervisory team, my parents, my sisters and my husband, for their support.



## References

- Abdelsalam, T., & Rihan, G. M. (2013). The impact of sustainability trends on housing design identity of arab cities. *HBRC Journal*, 9(2), 159-172.
- Ali, M. K. (1989). *The use of Precedents in Contemporary Arab Architecture: Case Studies*; Rasem Badran and Henning Larsen,
- Alkhalidi, A. (2013). Sustainable application of interior spaces in traditional houses of the united arab emirates. *Procedia-Social and Behavioral Sciences*, 102, 288-299.
- Asfour, K., Herrle, P., & Schmitz, S. (2009). Identity in the arab region: Architects and projects from egypt, iraq, jordan, saudi arabia, kuwait and qatar. *Constructing Identity in Contemporary Architecture: Case Studies from the South*, 12, 151.
- Belakehal, A., Aoul, K. T., & Bennadji, A. (2004). Sunlighting and daylighting strategies in the traditional urban spaces and buildings of the hot arid regions. *Renewable Energy*, 29(5), 687-702.
- Belakehal, A., Tabet Aoul, K., & Bennadji, A. (2003). An evaluation method for daylighting quality in buildings under clear sunny skies. Third Conference of the EPUK (*Environmental Psychology in the UK Network*), pp. 23-25.
- Benkari, N. (2013). The "Sustainability" paradigm in architectural education in UAE. *Procedia-Social and Behavioral Sciences*, 102, 601-610.
- Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research*, 1(1), 8-22.
- Chen, C. (2011). Quantitative methodology: Appropriate use in research for blind baseball ergonomics and safety design. *The Journal of Human Resource and Adult Learning*, 9(4), 6.
- Davies, A., & Laing, R. (2003). Images and stated preference: Do people need to be told what the attributes are or do they notice them anyway? *Proceedings of the 3rd Environmental Psychology in the UK Conference*, June, the Robert Gordon University, Aberdeen,
- Heiberger, R. M., & Robbins, N. B. (2014). Design of diverging stacked bar charts for likert scales and other applications. *J.Stat.Softw.*, 57, 1-32.
- Horayangkura, V. (2012). Incorporating environment-behavior knowledge into the design process: An elusive challenge for architects in the 21st century. *Procedia-Social and Behavioral Sciences*, 50, 30-41.
- Jean M. Converse, & Stanley Presser. (1986). *Survey questions: Handcrafting the standardized questionnaire* Sage.
- Mahmud, S. A., Ahmad, A. S., & Abdullah, A. M. (2012). Lifestyle orientation and the residential environment: An exploratory review. *Procedia-Social and Behavioral Sciences*, 49, 304-309.
- Massam, B. H. (2002). Quality of life: Public planning and private living. *Progress in Planning*, 58(3), 141-227.
- Novakova, M., & Foltinova, E. (2014). The Ordinary-Everyday-Commonplace as a reference of cultural identity. *Procedia-Social and Behavioral Sciences*, 122, 114-118.
- Ruggiero, F., Florensa, R. S., & Dimundo, A. (2009). Re-interpretation of traditional architecture for visual comfort. *Building and Environment*, 44(9), 1886-1891.
- Taib, M. Z. M., & Rasdi, M. T. (2012). Islamic architecture evolution: Perception and behaviour. *Procedia-Social and Behavioral Sciences*, 49, 293-303.
- TANG ART DESIGN & INFORMATION GROUP LIMITED. 2012. *The Rise of Innovative Architecture---Leading in Future through Bionics, Green Concept, High Technology and Originality*. China: Hunan Fine Arts Publishing House.
- Trafimow, D. (2004). Attitude measurement. In C. D. Spielberger (Ed.), *Encyclopedia of applied psychology* (pp. 233-243). New York: Elsevier.