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## BIOMIMICRY IN RELATION WITH ISLAMIC VALUE

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### Abstract

This paper explore the relationship between biomimicry and Islamic value especially in the context of ecosystem. Human activity directly and indirectly is, our conscious action to refine our environment. The method used in this paper is Kawakita Jiro method and various literature review to achieve the conceptual framework for further research investigation. Humankind value was brought to the attention as the crucial part to preserve the environment thus the utilization of biomimicry can assist better comprehension in humanity. Therefore, this study aims to perceive the correlation of the human's belief is part of the value to develop a healthy environment. This include biomimicry as one source of inspiration used in nature. It helps the human to enhance well-being by connecting to the nature or the element which remind us of nature.

**Keywords:** Nature-inspired design, Islamic value, Human-nature relationship

### INTRODUCTION

Human impact through the built environment caused directly and indirectly changes to our biodiversity, ecosystems and natural resources. Harm has been done to our environment on global scale by numerous act of human. According to UN Global Scientific Advisory Panel, Professor Odeh Al-Jayyousi pointed out that the environmental challenges as a measure for a moral and ethical crisis for Islamic vision.

Alqur'an is ultimate guide for the Islamic community which brought upon the belief that Allah is the sole Creator and Sustainer of the universe. The earth planet is given by the Creator with the wholesome environment which make the perfect natural ecosystem. Animals and plants are magnificent creature created by Allah to preserve the continuation of the environment. These two creations play a crucial role in the preservation of the ecosystem on earth (Rusdi and Omar, 2017). Alqur'an shows concern to it by give the names of some chapters in Quran such as : surah al-Baqarah, al-Fil, al-Tin, al - An'am, al-Naml, al-Nahl and al-Ankabut. According to Alqur'an ;surah Luqman 31:10.

He created the heavens without pillars that you see and has cast into the earth firmly set mountains, lest it should shift with you, and dispersed therein from every creature. And We sent down rain from the sky and made grow therein [plants] of every noble kind.

Human being advantageous the natural environment and interfered most of each other as they are in loop to form an ecosystem is considered as a fundamental part of faith in Islam. According to Ozdemir (1992). Throughout the history, (Benyus, 1997) as the researcher community seek opportunity in the environment to finally finding its way in biomimicry which are an advanced to achieve a sustainable future. In Islam, beauty is a quality of the divine. It deliberate on two main criteria involving the perfect proportion and the luminosity, encompassing both outer and inner parts of things, animal and humans.

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The authentic saying of Prophet Muhammad which was narrated by Al-Boukhari:

*“Allah is beautiful and loves beauty.”*

Designer and creator used their profundity in the Alqur’an as a method to develop a new approach to art characterised by the independence and interdependence of its formulative elements. The presence and the attributes is the key of the divine Creator rather on His creatures.

*“when the verses of the Beneficent are recited unto them, they fall down prostrate in adoration and tears.”*

Therefore the author note that benefit of nature in the build environment for the people’s well being bring out the experiences, reflect and stimulate bond with nature physically or emotionally according to Kellert (2008). This paper supports Klein ( 2009) that focusing on calculative method without meditate on the complex relationship between human and environment are not adequate for achieving a more realistic sustainability. Furthermore, the objective of this paper to explore the relationship between the understanding of biomimicry and Islamic value.

## **LITERATURE REVIEW**

### **Biomimicry**

Janine Benyus is a scientist and author of the first to overview the term of of Biomimicry in her book *Biomimicry: Innovation Inspired by Nature*. The term of ‘Biomimicry comes from the Greek word bios, meaning life, and mimesis, meaning to imitate. Various definitions are used interchangeably in literature for biomimicry and related strategies referred by other scholars as Biomorphic, Biophilia, Bionics and Bio-inspired design. Benyus emphasized to imitate nature to ensure a more maintainable future. As a matter of fact Benyus (2008) stated that, designer need to incorporate biological knowledge as necessary for full emulation of natures engages at three levels of mimicry: form, process as if in people,nature and built environment, and ecosystem.

Imitation from the nature have been widely used in industry such in art design, architecture, interior design, industrial design and more disciplines which takes each of the imitation has their own levels interpretation. Benyus and other scientists (“Borrowing”, 2007, p. 32; Post, 2007, p. 28). working with biomimicry certainly argued that merely mimicking natural form misses the point. Benyus later pointed that full emulation of nature engages at least three levels of mimicry ; form, process and ecosystem.

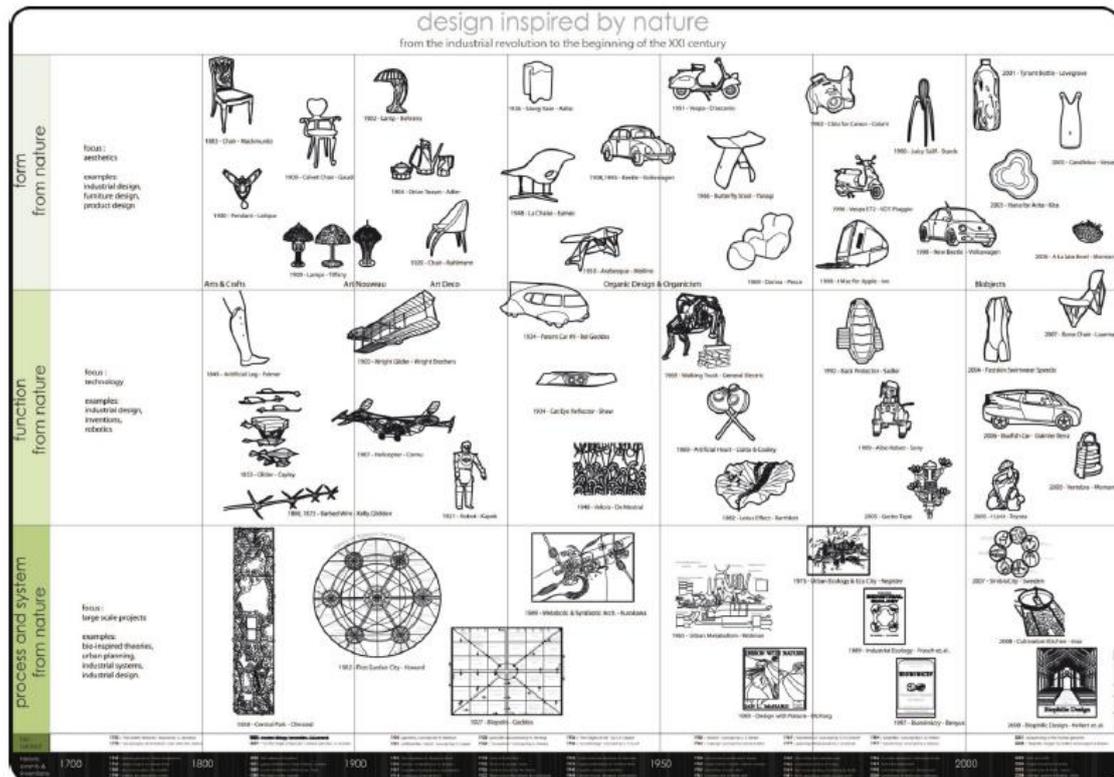


Figure 1 Visual summary of Bio-Inspired Design Examples: 1) form 2) function 3) process and system from nature

The need to identify of recurring deficiency is important regarding our environmental design. The three level entails shown in figure 1 :

**Biomimicry as a form** – Environmental design which inspired by natural form and the varying degree in which demonstrate either in image-based engagement or more grounded interpretation of natural form.

**Biomimicry as an ecosystem** – perspective of seeing the nature as a whole.

**Biomimicry as a process** – sense of the wholeness in many conventional design approaches.

### Islamic Value as in Ecosystem

Islam has gigantic connotation with regard to every aspect of human life. It defines without a doubt the purpose of life, the universe and the relationship among the Creator (God), man and universe. The intellectual, social, economic, -ethical and aesthetic features of Islamic religion make it distinct from worlds” other great religions (Yeler, 2015). Thus, religion inspires a human being and penetrates every activity of his life. The physical world or Nature provided man a deep feeling as well as a means to ecstasy. It is a crucial aspiration for the artist to create something and direct people to lead an ideal life.

This article were measure that to reassure that God has Asmaul Husna is part of faith in God Almighty (Azizi, 2014). There are indicator to inscribe in believing Allah’s name :

- Name of God everything is beautiful. Meaning, the names of God are all in the perfection of beauty, because it implies that nature is perfect, no flaws whatsoever. For example, God called ar-Rahman, the merciful God broad, and loves His believers or unbelievers.
- The names of God should be set based on the postulate, not by reason. Because faith in God's name is included in faith in God. In this issue may not be known by the sense without the argument of shara’
- The names of God and the nature of the show entirely contained in its meaning, as well as its effects if it is the nature of muta’addi (having objects).
- The names of Allah are not limited to a certain number.

Islam is a religion that teach all of us to be caliph of Allah to preserve good in Allah creation to keep the greatness of what Allah provide to us. It's a need as a Muslim to allow their inner core to be contact with Allah and reflecting with the opportunity given and start to appreciate the environment. Hereby that the author concluded that a strong relation with God leads to virtuous conduct.

Biomimicry provide some of major benefit for community. Firstly, its propose spiritual development as it is an area that enables us to meditate and appreciate God's creation as shown in Figure 2. Throughout the blessing of the Creator from the creation, we as a human must perceive that nothing is superfluous in nature: everything in nature has a purpose and a function.

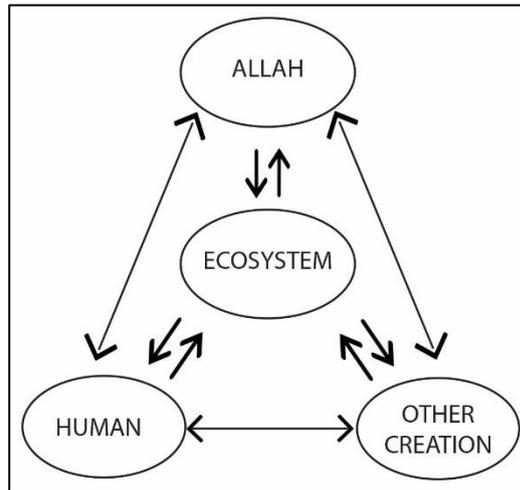


Figure 2 : Diagram of ecosystem

Ecology as in ecosystem was interpreted as the study of the interaction between living organisms and their environment. Its distributed and abundance of biotic, living-organism-related, and abiotic, non living or physical, factors. Following Seamon (2006) ecology is not only science but can also refer to a world view that highlight the relationship, interconnections, and environmental wholeness that are different from the sum of the their environmental parts.

Therefore, this article support K. Mona (2002) that the relationship among the human and cultural environment is one of the factor to determine man's beliefs, habits, traditions, thoughts and culture. Based on the earlier studies, below is the article that have been review that extract the keyword to form the conceptual framework for further research investigation. The article had been finalised from the various article to propose the main keyword that relate each of them. Table 1 show that the keyword that been selected from the reference of previous author.

Table 1 The extract keyword from literature review.

Keywords	Biomimicry	Design	Spiritual Value	Human-nature relationship
Author				
A. Alawad, Y. Mahgoub, 2014	/		/	
B. Bulduk, 2012		/		/
D. Attia		/	/	
G. Yeler, 2015	/	/		
J. Collado-Ruano, 2015	/			/

M. Haque, D. Naamane, F. Shehu et al.			/	/
M. Nkandu, H. Alibaba, 2018	/	/		
M. Root-Bernstein, R. Ladle, 2010	/	/		
M. Shahvali, A. Abedi-Sarvestani			/	/
M. Torabi			/	
M. Torabi, T. Hananee, 2011		/	/	
N. Sayuti, C. Hoyos, E. Bonollo, 2015	/	/		
N. Volstad, C. Boks, 2012	/	/		
Z. Shahrman, L. Rafeah, A. Mohamad Hariri et al., 2018		/	/	

## RESEARCH METHODOLOGY

This research conducted desktop study from the literature review and preliminary interview with few designer which expertise in fashion design, industrial designer, furniture designer and also an architect. The KJ method was used to lead the findings to classify and store the data from an earlier investigation. The KJ method was developed by Kawakita Jiro (KJ) and also called a “Affinity Diagram” from several adaptation (Cheng, 2014).

The KJ method applied with four steps which include the label making, label grouping, chart making and lastly is the explanation. The first step is label-making which sorted down the keywords and circumstance from the literature review and the interview. Table 2 shows the keywords that have been listed from the research and have been arranged by alphabetical order.

**Table 2** Label making

Aesthetically appeal	Design decisions	Fairness	Inspiration tool	Socioeconomic
Animal behaviour	Design functionally	Future humanity	Interdisciplinary research	Specific characteristic
Arabesque	Design practice	Geometric shapes	Islamic values	Sustainable design solutions
Arabic calligraphy	Design thinking	Geometrical feature	Lifestyle	Sustainable development
Awareness	Eco-ethic	God-human-nature relationship	Local values	Sustainable product development
Balanced energy	Ecological	Golden geometric spiral shapes	Long-lasting effect	Textures and purpose of textures within nature
Bio-inspired	Ecological	Golden ratio	Nature awareness	Thinking skills

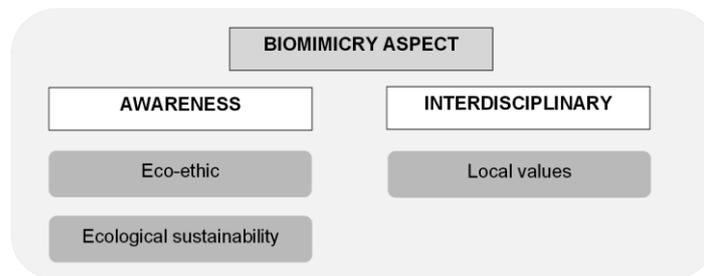
design	sustainability			
Biomimesis	Ecology	Golden spiral shape	Nature conservation	Transdisciplinary
Biophilic design	Ecology product	Holistic approach	Positive/arranging energy	Urban design
Communicative value	Elements of design(shape, texture, colour, material, light)	Holistic Islamic view	Reciprocity	Values
Conservation design	Environmental	Human behaviour	Reductive view	Visual culture
Creative thinking	Environmental ethics	Human values	Reflective thinking	Visual quality
Critical thinking	Equality	Human values	Self-reflection	Vitality

Then, table 3 show the step 2 which is the label grouping. The label grouping come out form the keywords before but in group coordinate with the close feature.

**Table 3** Label grouping

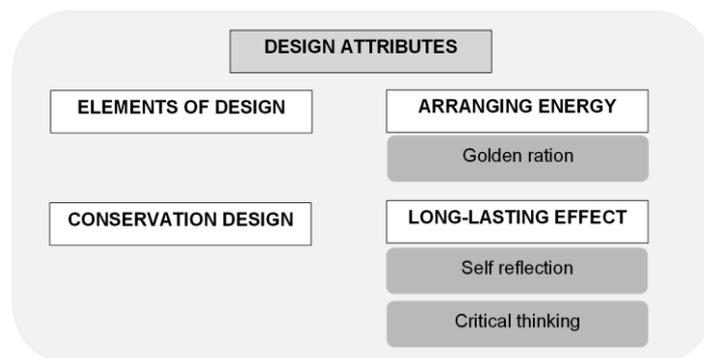
BIOMIMICRY ASPECT	DESIGN ATTRIBUTES		SPIRITUAL VALUE	HUMAN-NATURE RELATIONSHIP
Animal behaviour	Aesthetically appeal	Golden geometric spiral shapes	Equality	Future humanity
Awareness	Arabesque	Golden ratio	Fairness	Holistic approach
Bio-inspired design	Arabic calligraphy	Golden spiral shape	Holistic Islamic view	Human behaviour
Biomimesis	Balanced energy	Long-lasting effect	Islamic values	Human values
Biophilic design	Communicative value	Positive/arranging energy	Lifestyle	Nature awareness
Eco-ethic	Conservation design	Reflective thinking	Vitality	Nature conservation
Ecological	Creative thinking	Self-reflection		Reciprocity
Ecological sustainability	Critical thinking	Thinking skills		Textures and purpose of textures within nature
Ecology	Design decisions	Transdisciplinary		Visual culture
Ecology product	Design functionally	Urban design		Visual quality
Inspiration tool	Design practice			
Interdisciplinary research	Design thinking			
Local values	Elements of design(shape, texture, color, material, light)			
Reductive view	Environmental			
Sustainable design solutions	Environmental ethics			
Sustainable development	Geometric shapes			
Sustainable product development	Geometrical feature			

Following the next step, the keywords selected have been developed into varying classification following the group construct before. Figure 3 shows the affinity diagram derives from the biomimicry aspect and divided with two relations which is awareness and interdisciplinary. Figure 4 shows the affinity diagram of the design attributes which divided by 4 classifications; elements of design, conservation design, arranging energy and long-lasting effect. Next figure 5 shows the affinity diagram of spiritual value that been divided into three part to be considered which is holistic Islamic value, lifestyle and vitality. Then figure 6 show the affinity diagram of human—nature relationship and have been classified into two part; holistic approach and future humanity.



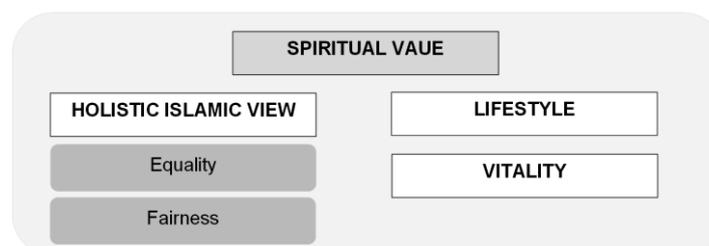
**Figure 3** Affinity diagram of Biomimicry Aspect

Biomimicry aspect is one of the important qualifications that bring out the deeper understanding throughout this study. It brings the awareness for the people how important and valuable the nature to sustain the sustainability of our ecosystem. Besides, it needs the indirect support of the local values as one of the contribution of the god gift to us.



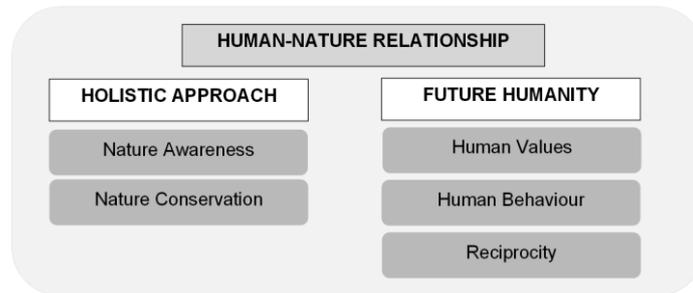
**Figure 4** Affinity diagram of Design Attributes

As a designer, design knowledge contribution is very crucial as it give connection shift of idea to help make the better environment and future. Nowadays, design that give valuable effect and self-mediation is demanded in industry thus the positive energy flow from such design is significant.



**Figure 5** Affinity diagram of Spiritual Value

Every Muslim that practicing Islam really appreciate the high hold of the spiritual value that given to us through god. Even some people living by totally different lifestyle, it doesn't make a Muslim less contribute to the equality and fairness to the community.

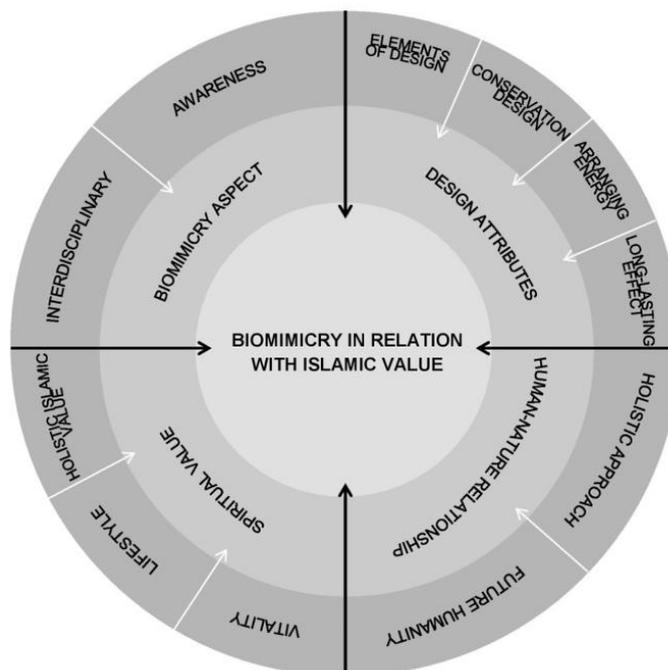


**Figure 6** Affinity diagram of Human-nature Relationship

Lastly and most importantly, we as a human were given a role to undertake the responsibility to preserve and maintain the environment as it should be for the future generation. Humankind must come with assistance to provide the authentic vision of the environment.

## DISCUSSION

The conceptual framework for this research has been developed through desktop study through numerous literature reviews. KJ method helped sorted down and analysed the data collected through the concept of keywords. From the 65 keywords, only a few have been carefully selected to form the conceptual framework. This study obtained 4 component as shown in figure 7 which is biomimicry aspect, design attributes, spiritual value and lastly, is a human-nature relationship.



**Figure 7** Conceptual Framework of Biomimicry In Relation With Islamic Value

Further understanding in conceptual framework helps the author to continue the further research of this study. The first component of the conceptual framework is the biomimicry aspect. The part has been

divided by two which is the interdisciplinary and awareness. Interdisciplinary cooperation brings the research to improve the ecological goals hence the awareness to the used of nature. It also shows the conservation design in design attributes is important to highlight the behaviour of the animal and how it can inspire human to produce the product design. Long-lasting effect skills also affected the researcher which brought into the self-reflection and critical thinking for the designer and more innovative design. Furthermore, holistic Islamic value must be considered as it one of the belief systems which affected the lifestyle of a person in the community. The development of a holistic approach to nature can bring human behaviour and human value to investigate the visual culture of our community hence the future humanity of nature. This study is significant as the deeper learning in the biomimicry can contribute further understanding in Islamic view for the environment. Therefore, improvising the human and nature relationship in design development and innovation in biomimicry aspect can further recognition in the aspects of human life, cultural and develop a distinct style of Islam.

## CONCLUSION

This article conducted desktop study to examine the relationship between biomimicry and Islamic value. It shows that biomimicry is one of the approaches evolving the nature as it should be and the design of nature is something designer can learn from. The attraction to observe and learn nature environment is found in both revealed and hidden messages in all its forms. In conclusion, further encountered in biomimicry in relation with the Creator can contribute to another experience and lessons in our environment.

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