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The Impact of Bioengineering on Raising the Efficiency of Architectural Design

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ABSTRACT: Energy is inextricably linked to man, the main engine for him, and without it, life stops. because several sources provide energy to man and help him perform his vital functions, there is a kind of thin energy that runs in seven centers and is associated with various physical organs called "chakra".The vision of bio-geometry is that architecture and interior design are the formative languages of the vacuum it uses Human beings, whether for living, working, healing, or other purposes. The quality of the spaces is also affected by the quality of the air in the place in addition to the different shapes and angles present and used in the design It is a science that cares about the impact of geometric shapes and angles on man's bioenergy and provides solutions to its effects. Negativity and benefiting from the positive effect of it thus allows us to know how to pure pollution existing architecture, here you have to differentiate between bio-geometric and symbolic Allen bio geometric is an attempt to decompose Power codes

KEYWORDS: Bioengineering, bioGeomtry ,energy

I. INTRODUCTION

The acquisition of knowledge in the field of biophilic design encompasses a framework aimed at attaining regulated energy. Biophilic design, as a contemporary discipline, endeavors to furnish humankind with methods of comfort and foster harmony with the natural environment, leading to holistic well-being across all dimensions, ranging from the material to the spiritual realm. An eminent objective of this discipline is to establish both internal and external equilibrium in tandem with the environment, facilitated by the restoration of equilibrium between the cosmic energy system, terrestrial energies, and human energy. Research conducted in the scientific domain substantiates the presence of regulated energy, which biogeometry fervently aspires to actualize, within the core of all morphological configurations. Consequently, the center assumes a pivotal role as the nucleus of power and dominion for any given structure. Center points operate as mediators disseminating regulated power to procure equilibrium ,as delineated in Fig (1).

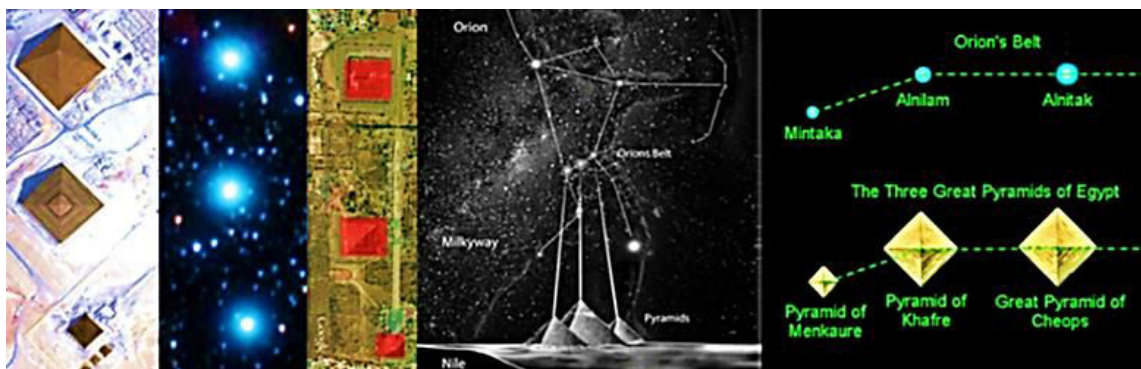


Fig (1)

II. RELATED WORK

The discipline of biogeometry and its ramifications for creating architecturally sound and comfortable spaces. The researcher contemplates how to leverage these scientific principles to derive novel formulations and employ them within and beyond architectural contexts to achieve qualitative balance, especially in light of the emergence of imperceptible influences that imperil human health and disrupt energetic equilibrium. In the concluding sections of the research paper, the author has formulated the following recommendations:

To attain qualitative balance in design, the utilization of energy elements such as concentration, rotation, interplay, and repetition, along with incorporating numerals, shapes, coordination, angles, and fundamental axes in construction, is imperative. Furthermore, the paper explores various strategies for effectively introducing and harnessing energy in different architectural domains (**Khaled and eman 2020**)

The researcher's inquiry revolves around the utilization of biometric applications in interstitial design. Specifically, they ponder whether the methodology of energy science engenders innovative design concepts for both metal structures and architectural ceramics. Additionally, they seek to determine whether the proposed biometric approach affords a comprehensive integration, encompassing both design and cognitive aspects, between the disciplines of metal construction and ceramics.

Moreover, the researcher puts forth a well-defined methodology to harness the potential of biometric science in the realms of metal structure design and architectural ceramics. Their work elucidates the pivotal aspects of energy science when incorporated in metal structures, as well as providing the requisite guidelines for integrating biometric principles into architectural ceramics design. Finally, the research culminates in the formulation of a meticulously crafted design plan for metal structures and architectural ceramics, harmonizing the employment of biometric shapes with fundamental design elements. (**Waleed and Shimaa, 2019**)

The researcher ponders the manner in which the principles of biophilic design can be delineated through the lens of Ancient Egyptian civilization. Within this context, the selection of a site, be it a temple, tomb, or any other edifice, was not left to the caprice of chance. The primary objective of the researcher is to discern the underlying principles and scientific tenets of biophilic design. Through their diligent inquiry, the research has successfully delineated several imperatives concerning the utilization of energy within the realm of design:

- The means by which a structure can be oriented to facilitate the seamless transference of energy from a more potent entity to a comparably weaker one.
- The method for achieving equilibrium across the entirety of the cosmic system by virtue of the rhythmic oscillations of biometric energy.
- The hierarchical arrangement of the golden structure, thereby giving rise to a sustained and harmonious energy output. (**Haseen , Reham and Olaa, 2016**)

The scholar ponders the potentiality of leveraging interior design as a means to govern affirmative energy, while inquiring into the plausibility of regulating the internal milieu. The researcher's primary objective is to illuminate the scientific conception of energy's impact on the psychological and emotional well-being of spatial occupants, with the ultimate aim of proffering recommendations that underscore the imperativeness of interior design through the lens of energy:

- Extending the scope of inquiry within the realm of academia, particularly within the purview of universities.
- Exploring the manifold applications of biogeometry within the realm of design and furniture craftsmanship.
- Scrutinizing the intrinsic values and vitalistic energy embedded within the very fabric of spatial design and its arrangement, to engender a state of harmonious equilibrium., (**Abear, 2015**)

The researcher poses inquiries regarding the essence of vital energy and its implications for design within residential spaces, while also exploring the potential for human detection of energetic imbalances in their surroundings. The overarching aim is to establish a framework for harmonizing the relationship between architectural design and the qualitative domain of energy sciences. The following deductions can be drawn:

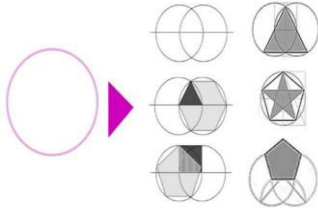
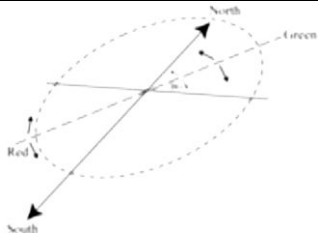
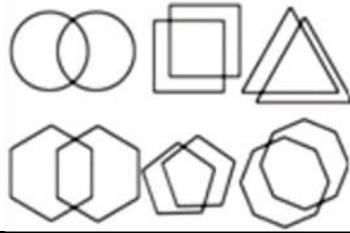
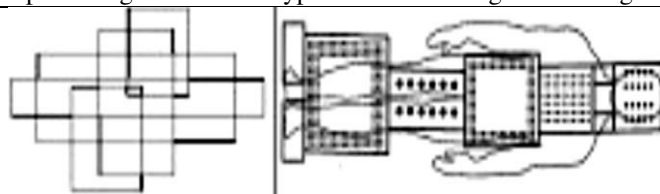
It is imperative to ascertain the specific artistic studies pertaining to each site and evaluate the Earth's suitability for housing construction. Additionally, the researcher has identified key variables in design and planning, and has discerned the profound impact of Earth's energetic forces on architectural manifestations., (**Dalia,2010**).

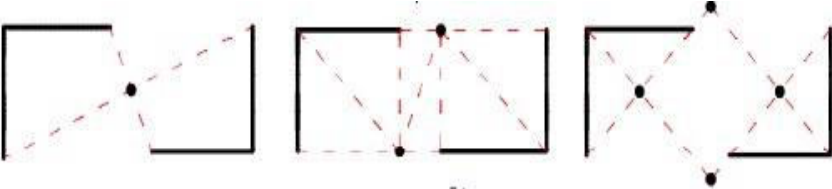
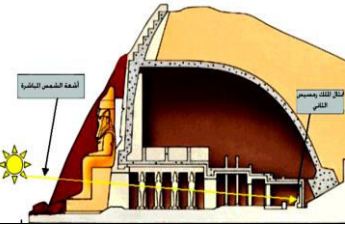
III. METHODOLOGY

Formation foundations using Biogeometric

In the field of bio-geometry, there are several elements that affect its composition and have an impact on the concept of organized energy, such as rhythm, proportion, orientation, center connection, symmetrical and asymmetrical balance, and interaction. These elements, individually or collectively, work to create a type of organized

energy within the formation, which positively influences its content. This adds a new dimension to the effect of different formations based on the principles of biomimicry on the energy of the space, thereby bringing balance to the users of this space.

Table 2-2 Explain	
<p>Rotation</p>	<ul style="list-style-type: none"> Rotating a square around its center creates a star-shaped formation that emits energy to all parts of the structure and the surrounding space.  <p>Fig (a) : Rotating a square around its center creates</p>
<p>Movement</p>	<p>Rotation and rhythm in the formation generate movement that works to generate and rejuvenate the energy of the shape and distribute it.</p>
<p>Bio Geometry Color Placement</p>	<p>Each color has its own specific vibrational energy, which affects the space it occupies. The quality of the energy present in the space changes and transforms into organized energy according to the position of the color.</p>  <p>Fig (b): Each color has its own specific vibrational energy</p>
<p>Shifting</p>	<p>When motion is introduced to a shape through repetition, the clear and organized repetition process within engineering designs generates a type of motion within the shape. Any motion requires determining the direction and speed, which can be achieved by repeating design elements or structural elements.</p>  <p>Fig (c): motion is introduced to a shape</p>
<p>transparency</p>	<p>Compound shapes, where some shapes appear above others as composite images, give a type of motion in the depth direction. Each shape represents a place, and their composition on top of each other represents motion in the time direction. This composition gives rise to a type of motion that generates organized energy.</p>  <p>Fig (d) : Compound shapes</p>
<p>Balancing</p>	<p>Humans need balance in their lives, and ancient Egyptian architects built their temples based on the principles of energy and astronomy.</p>

	
	<p>Fig (e) : balance in their lives</p>
<p>the Design connection to the Sky</p>	<ul style="list-style-type: none"> • biotechnology uses organized energy points on Earth to connect with compatible points in the sky, creating a three-dimensional network that strengthens earthly forces. • The ancient Egyptians used this method to design their sacred buildings, such as the Great Pyramid..  <p>Fig (f) The ancient Egyptians used this method to design their sacred buildings, such as the Great Pyramid..</p>
<p>Ratio</p>	<p>The use of the golden ratio and sacred geometry through the golden spiral generates organized energy, enabling the discovery of specific types of energy based on the different shapes and angles used. Each angle has a unique effect on humans based on its wavelength, which corresponds to its shape and color.</p>
<p>Displacement</p>	<ul style="list-style-type: none"> • When abstract units with a circular shape are transferred and moved vertically, the presence of an axis passing through their centers creates a rhythm between the mass of the repeated element and the surrounding space of the elements. • This rhythm helps to distribute organized energy. • The displacement is achieved through the adjacency of geometric shapes that are symmetrical and adjacent to each other around an imaginary axis.
<p>Material</p>	<p>When natural materials are used, they help facilitate a smooth and regular flow of energy.</p>
<p>Rhythm</p>	<ul style="list-style-type: none"> • The regular repetition of symmetrical geometric elements creates a rhythm that organizes the flow of energy.
<p>Fig (2): Biological engineering is a process that uses principles rooted in physics Source: From research preparations, compiled b⁽⁵⁾ (4) (3) (2) (1).</p>	

- Biological engineering is a process that uses principles rooted in physics, specifically polarity, colors, musical notes, and other elements.,This approach relies on the practical application of bioengineering, involving exploration of the earth's energy networks and the identification of power points through the use of meticulously designed string devices that adhere to color scale and the law of resonance.One of the fundamental principles of biological engineering is the principle of rotation.
- The circle is a fundamental shape that has historically served as a powerful tool of creativity across various civilizations.
- The center of rotation is the focal point for the spatial growth from which formations and shapes emerge.
- Living organisms also exhibit a shared tendency for formation based on this central arrangement.
- The principle of rotation further manifests in the arrangement of formation elements around either a real or an imaginary axis.
- The axis acts as a conduit, attracting and disbursing energy throughout the spatial domain. AND Multiple rotational points can be present within a single formation.
- A clockwise rotational motion amplifies positive energy, while its counterclockwise counterpart weakens energy within the given space.

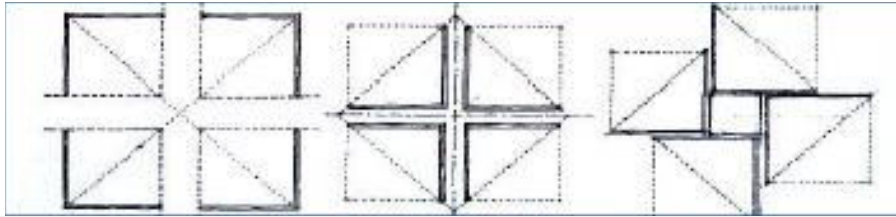


Fig (3): Rotation of shapes around the center or an imaginary axis -(eman shiaha)



Fig (4) :The interaction between mass and space-(eman shiaha)

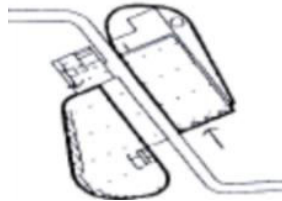


Fig (5): Rotation around an imaginary axis, but counterclockwise-(eman shiaha)

The concept of radiative design facilitates rotational movement, regardless of the angular ratios or center positions. These radiations effectively disseminate positive energy from the central point, transmitting it to other constituent parts and elements of the configuration. Consequently, this design technique achieves a state of positive equilibrium at both the partial and comprehensive levels. It serves as a formative value that serves the purpose of a central focal point, around which the remaining elements harmoniously revolve and over which they exert influence⁶.

Regarding the principle of interaction, it finds utility in the manipulation of masses and voids. It represents a significant method employed in energy-based shaping processes. For example, when a structural mass integrates with a vegetative mass, the resulting interaction, coupled with the presence of multiple centers, intensifies the positive energy. This is especially attributable to the vital and dynamic nature conferred by the vegetation element. Ideally, a proportionate and equitable interplay between positive and negative aspects is preferable. It enhances the efficacy of positive energy. In the following model, an illustrative example provides insights into the application of biogeometric principles in design⁷.



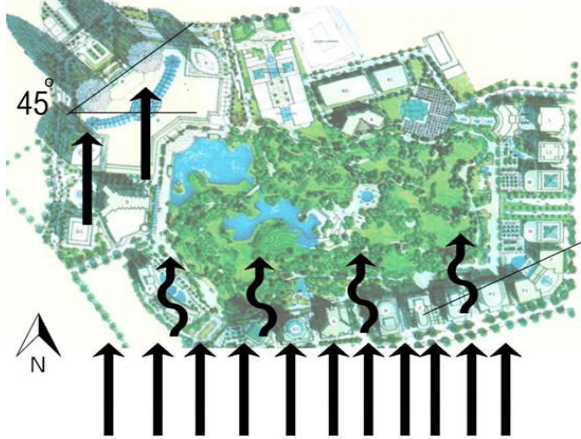
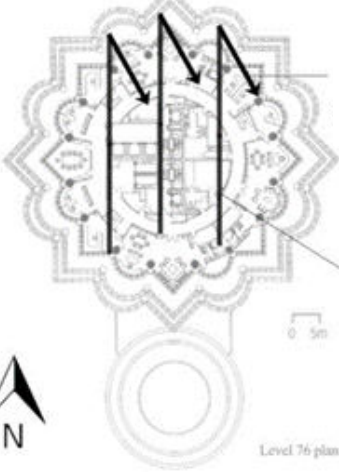
• Fig (6) An example of the application of biogeometry principles in design-

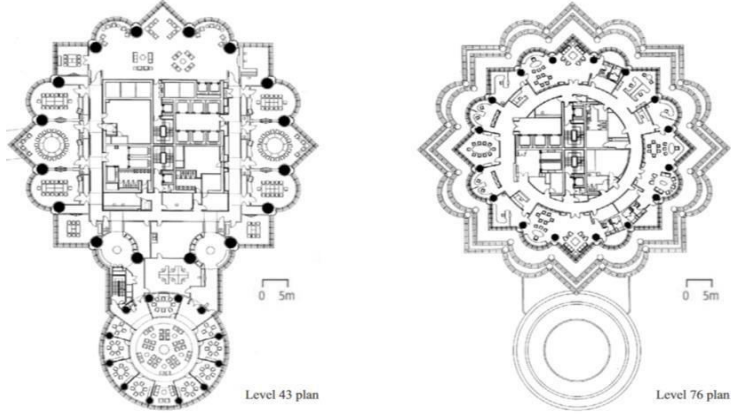
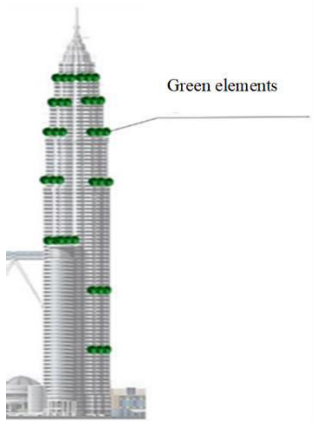
IV. EXPERIMENTAL RESULTS

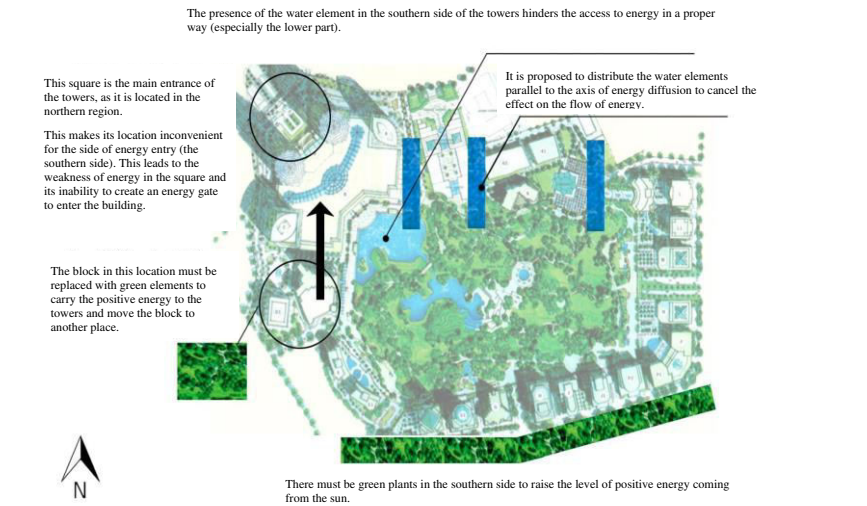
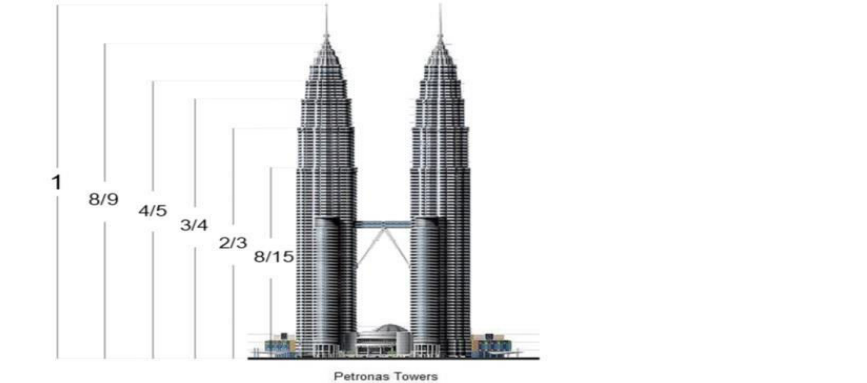
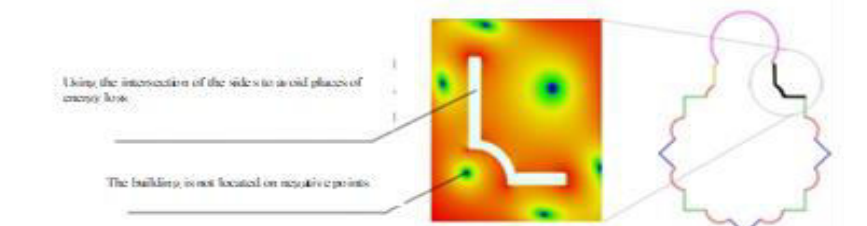
Malaysia is one of the East Asian countries that has been heavily influenced by architecture related to energy science. This is due to its proximity to China, which is considered the center of Feng Shui science, which has spread around the world in the modern era. The design of the Petronas Twin Towers is considered one of the most important designs of high-rise buildings in the recent past. The design formed an architectural icon that reflected the cultural and civilizational features of Malaysia



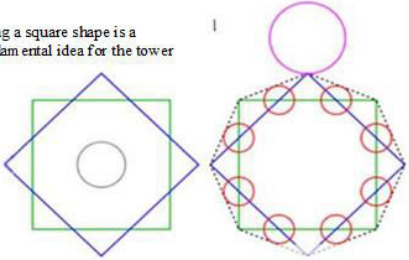
Fig (7): General site and perspective shot of Petronas Tower project in Malaysia⁽⁸⁾

	design variables	Petronas towers
Directio	Use of energy penetrating from the south	<p>The placement of the towers at a 45-degree angle to the north-south axis allows each tower to be exposed to the southern energy without one of them hindering the energy coming to the other tower.</p>  <p>Fig (a): The towers were placed at an angle of 45 degrees relative to the north-south axis, which gave each tower a direct facing to the south (i.e., neither tower blocked the other from the south). Therefore, the Petronas Twin Towers can be considered to have achieved the property of benefiting from the ground's southern energy</p>
	Avoid contraction and avoid places of energy loss	 <p>Fig (b): As a result of the towers' geometric shape, the reduction of reflected</p>

		<p>energy inside the voids was avoided. If the walls that define the voids were perpendicular to the direction of energy propagation, the energy would have been zero.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Rotation and Centrality</p>	<p>Use the $L=2H$ module to utilize emitted energy</p>	 <p>Level 43 plan Level 76 plan</p> <p>Fig (18): From the study of the section and the height of the floor, which is approximately $3H$, and from observing the scale of the internal voids of the tower in each section, it is noted that the dimensions of the voids are $L \leq 3$, which makes all the voids exposed to the energy emitted by the walls that define the voids. There are no areas free of emitted energy</p>
	<p>Allow solar radiation to renew and draw the energy of the space</p>	<p>Skyscrapers are buildings that allow sunlight to enter their voids due to the linear shape of the tower and the ease of the sun reaching the voids located in the area opposite the sun-facing facade, especially since most towers are fully covered in glass. The Petronas Twin Towers project is one of the projects that allows the sun to enter the depth of its voids, especially since the shape of the energy section allows its voids to be exposed to the sun in a peripheral manner.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Rhythm and Repetition</p>	<p>Use green elements (trees) to increase the amount of energy</p>	 <p>Green elements</p> <p>Fig (c): The green elements were not used in the project in a proper way from the perspective of the bio-design system. For the entire project, trees should have been placed in the southern area, and green elements should have been placed in the southern side of the towers. For the towers, some spaces should have been allocated for green elements to describe the positive impact of energy in the longitudinal level as well</p>

	<p>Use water elements to activate and renew the movement of energy</p>	<p>The presence of the water element in the southern side of the towers hinders the access to energy in a proper way (especially the lower part).</p>  <p>Fig (d): The main water element was placed on the southern side of the towers, which caused a disruption in the flow of energy and a decrease in its quantity. It was necessary to place the elements in parallel shapes to the axis of energy propagation (south-north), which reduces the negative impact of the water element on the buildings</p>
<p>Balance and Offset</p>	<p>Use energy ratios</p>	 <p>Fig (e): The use of energy ratios is one of the most important energy influences that the energy design system is based on. It is considered the most influential and effective influence. By studying the proportions of the towers, it was observed that most of the energy ratios were used in the design process. This allows the towers to form an ideal linear antenna for energy with ideal effects for humans, which leads to an increase in energy levels</p>
	<p>Use appropriate color diversity</p>	<p>A study of the color currents of the voids within the tower revealed the use of only red and brown colors, and the use of color diversity that leads to energy balance within the void was not considered.</p>
<p>Movement and Interpenetration</p>	<p>Use energy angles</p>	 <p>Fig (f): A chord of a circle was adopted instead of an angle to avoid energy loss at the corners. As shown, it is noted that the 90-degree angle plays a major role in determining the overall shape of the section as a result of the use of energy shapes.</p>

Use energy shapes



Using a square shape is a fundamental idea for the tower

Fig (g): The designer adopted the repetition of the square shape to represent Islamic decoration as a transmission of the cultural and intellectual heritage of Malaysia on the one hand, and to achieve a balance of energy in the voids within the tower on the other hand (considering that the square shape is considered one of the shapes that balance energy in feng shui).

Energy volumes

Since the section was raised horizontally, no volume of energy volumes was adopted

	building		Petronas towers					variables	
	design variables		building	open	entrans	corridors	Furniture	investigate	not investigate
Directio	Use of energy penetrating from the south	investigate	●	●	●	●	●	4	1
	Avoid contraction and avoid places of energy loss	not investigate	●	●	●	●	●	5	0
Rotation and Centrality	Use the L-2H module to utilize emitted energy	investigate	●	●	●	●	●	5	0
	Allow solar radiation to renew and draw the energy of the space	not investigate	●	●	●	●	●	5	0
Rhythm and Repetition	Use green elements (trees) to increase the amount of energy	investigate	●	●	●	●	●	0	5
	Use water elements to activate and renew the movement of energy	not investigate	●	●	●	●	●	4	1
	Study the courtyards, corridors, and entrances to activate energy	investigate	●	●	●	●	●	1	4
Balance and Offset	Use energy ratios	investigate	●	●	●	●	●	4	1
	Use energy dimensions	not investigate	●	●	●	●	●	3	3
	Use appropriate color diversity	investigate	●	●	●	●	●	5	0
	Use appropriate color diversity	not investigate	●	●	●	●	●	5	0
Movement and Interpenetration	Use energy angles	investigate	●	●	●	●	●	3	2
	Use energy shapes	not investigate	●	●	●	●	●	3	2
	Use energy shapes	investigate	●	●	●	●	●	3	2
	Energy volumes	not investigate	●	●	●	●	●	2	3
total	investigate		8	10	9	9	7	44	21
	not investigate		5	3	4	4	6		

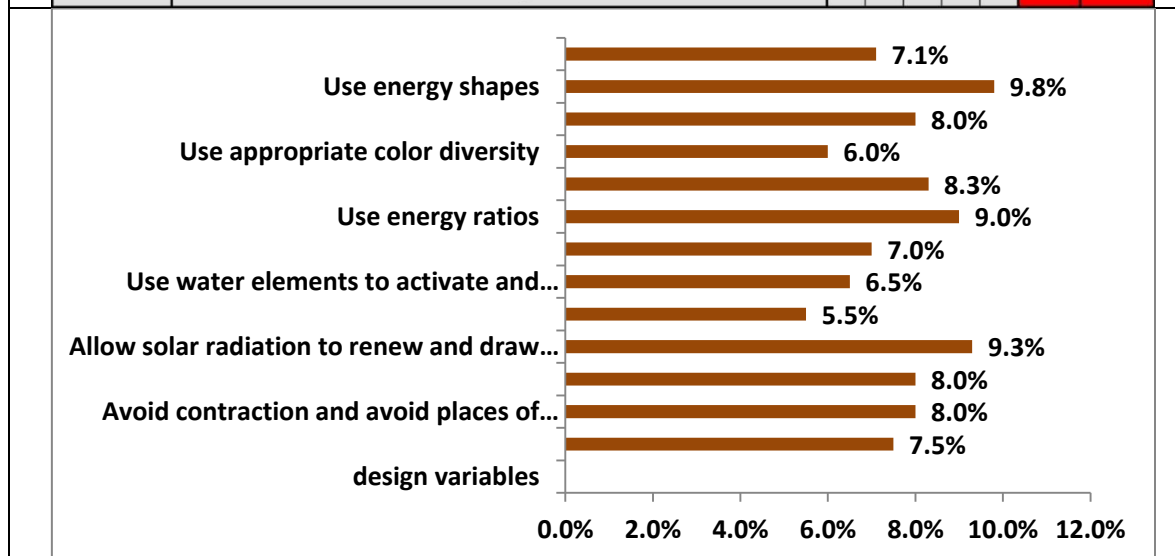


Fig (8): explain Petronas towers – sours: DESIGN OF THE WORLD'S TALLEST BUILDINGS–PETRONAS TWIN TOWERS AT- CHARLES. H.

V. CONCLUSION

colors, proportions, dimensions, angles, shapes, and volumes have the ability to achieve a state of harmony with the energy centers that they interact with by multiples of wavelengths from an energy perspective. The elements that have these energetic qualities emit energy (either reflected or charged) that can affect one of the human energy centers and thus stimulate and activate this center and the physiological and psychological states associated with it. Therefore, the correct use of these energetic values leads to the ability to control energy in space

REFERENCES

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- [1] Alabd, Kholoud. (2022). Study Physical Forces of Universe to Find Design Language of Shape and Color for Controlling Body Energy and Increasing its Adaptation to the Modern Life. *Journal of Design Sciences and Applied Arts*. DOI: 10.21608/JDSAA.2022.96837.1134.
 - [2] Swedan, Abber (2015). Albeogaomitri Use as Influential on the State of Consciousness of the User in Interior Design to Improve the Mood inside the Vacuum DOI: 10.21608/maut.2015.107053
 - [3] Ebrahim, Waleed (2019) , A Proposed Methodology to benefit from the BioGeometry Science in design"Application on Metal Constructions and Architectural Ceramics -Inter disciplinary Study, DOI: 10.12816/mjaf.2019.10771.1174
 - [4] mohammed, doaa (2021), The foundations of design and its relationship to human energy , DOI: 10.21608/seaf.2021.145678
 - [5] Sawy, Mohammed (2021) , Interior design in Islamic civilization from the perspective of biomorphic engineering ,DOI: 10.21608/maut.2021.199900,
 - [6] Kozłowski, M., & Marciak-koźłowska, J. (2015). Schumann Resonance and Brain Waves: A Quantum Description. *Neuroquantology*, 13, 196-204. DOI:10.14704/NQ.2015.13.2.795
 - [7] Al-Nabawi, Hussein K., Hashem, Ola A., & Ali, Rehab M. M. (2016). Fundamentals of biophilic design inspired by Ancient Egyptian civilization. *International Design Journal*, 6(3), 297-301, DOI: 10.21608/IDJ.2016.90857.
 - [8] DESIGN OF THE WORLD'S TALLEST BUILDINGS– PETRONAS TWIN TOWERS AT- CHARLES. H.
 - [9] <http://www.fengshuitoday.com/feng-shui-of-bank-of-china-tower-hong-kong>.
 - [10] HTTP://W02N.BLOGSPOT.COM/2014_08_01_ARCHIVE.HTML
 - [11] <http://www.ancient-code.com/25-facts-about-the-great-pyramid-of-giza>
 - [12] www.ABSBA.com.
 - [13] www.bau-biologieusa.com.
 - [14] www.Biogeometry.org.



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