

THE LINK BETWEEN ABSTRACT SCULPTURE AND SCULPTURAL ABSTRACTIONS IN ARCHITECTURE

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Abstract

Sculpture and architecture share blurred lines in relatedness, and the elements of visual design. 'Form' and 'space' are undeniable features these two aspects of creative art have in common. In complementary terms, abstractions of architecture are visible and tangible and have been traced to sculptural abstractionism. Some architectural practitioners in the modern era have inculcated sculptural abstractions in their designs schemes as well as being sculptors in salient respects. Artists/sculptors create with abstraction technique and thus distill aesthetics of the subject without leaving a visual reference from the natural world. It is noted in this study that modern technology, inventions and innovations immensely aids the abstractionistic designs of some architects particularly the DE constructivists sustainably. This paper presents the use of descriptive and explanatory approaches for elucidation and thus espouse the nexus between abstract sculpture and sculptural abstractions in architecture.

Keywords: Sculpture, Architecture, Abstract, DE constructivist, Sculptural Abstractions

Introduction

The fascinating yet provocative employment of abstraction in architecture seems nascent, however, it is gaining rapid currency in its usage by some architects and its final outcome/s has added critical impetus to this genre of art in defining both buildings and the attendant environments such edifices are located. The phenomenon is surprisingly linked to fine artists, painters and particularly sculptors (whose creations are evident as form/s). Architecture shares 'form' a critical element of design as sculpture.

Pereira (2015) strongly states, “there are a number of definitions of abstract art. The real question is - is it really possible to have one, coherent abstract art definition that would include all complexities of this movement? But we could say that abstract artists use a visual language of shape, form, color, and line to create a composition which may exist with a degree of independence from visual references in the world”. Abstract art does not depict a person, place or thing in the natural world; or it does, but does not make any visual references. What is very important to mention when trying to define abstract art is the fact that abstract artists do not deal with the representational interpretation of a subject. They only communicate with the viewers in an attempt to understand “reality”. All types of abstract art share a common position – reality is subjective, and it’s up to a viewer to define it. Though abstraction/abstractionism seems nascent, yet it's usage has prehistoric antecedents. Ghom (2017) opines man’s relationship of art and architecture has always been through nature, starting with the cave man and progressing throughout the history of mankind. Abstraction process gives a way to see nature and how to extract beauty for art and architecture. The process is based on spirit of nature and how to interpret the shapes of flowers, trees, rivers, mountains or any natural thing for design inspiration.

Waldman (2012) asserts, “it seems likely that our brains have been equipped for abstraction for as long as we have been human. But how does prehistoric art help us understand this capacity—which today asserts itself everywhere from the walls of MoMA to the icons on our smartphones?” Paleontologists tend to link the development of modern human cognition to the rise of our ability to express ourselves as artists and historians through cave painting, sculptures, and other prehistoric art, Waldman further stressed.

Yakar (2016) emphasized that ever increasing records of painted or engraved nonfigurative and figurative motifs decorating major Paleolithic caves and rock shelters, and the monumental stone monuments, domestic or religious structures of the Early Neolithic period are enriching the universal corpus of abstract motifs and symbols. We could postulate that most signs and abstract motifs in prehistoric art inventories were meant to express and preserve mentally generated or culturally inherited spiritual notions in a locally developed enigmatic language of symbols.

Therefore, when speculating on the significance of certain abstract and naturalistic motifs encountered in prehistoric and ethnographic art inventories, each in its respective context, one could advance the view that some of them may have been abbreviated expressions of certain spiritual notions, perhaps even serving as visual metaphors, Yakar (2016). The foregoing creative inclinations of mankind from prehistoric period passing through Paleolithic and Neolithic periods to the modern era presents enormous corpus of the fact that abstractionism inculcated in various aspects of human development is not obscure, but has occurred and is still reoccurring in divers' ways and forms in sculpture and architecture as evinced in the following comments. Przybylek (n.d.) expressed, in the early 20th century, artists like Pablo Picasso and Constantin Brancusi began experimenting with different styles of art. They rejected the idea that all art had to rely on forms resembling objects or things and wanted a new way of creating art for the modern age. They abandoned realism in favor of abstraction, in which their art no longer was tied to subjects referencing the real world. Some artists specifically explored the use of different materials, while others searched for ways to convey their own thought processes and emotions.

Throughout the 20th and into the 21st century, artists continued to pursue abstraction. They made art from new materials like plastics, assembled sculptures from found objects (everyday objects given new meaning by being put into artwork, an idea that grew out of Duchamp's readymades), and created works of increasing size and weight, Przybylek additionally observed. Modern Sculpture (2021) comments that, "in the early modern period, moderate distortion was introduced to Western art. In the period ca. 1900-WWI (the rise of extreme distortion period), this trend advanced to heavy distortion and ultimately abstraction. The "rise of extreme distortion" was led by painters; abstraction was first achieved in painting, followed by sculpture shortly thereafter".

As sculpture gained abstractional currency in the modern era so does architecture. From early 20th century diverse creative movements sprang up, influenced by the industrial revolution, technology, politics, religion and even the second world war (WWII). Craven (2018) comments that, "during the 1920s and early 1930s, a group of avant-garde architects in Russia launched a movement to design buildings for the new socialist regime. Calling themselves constructivists, they believed that design began with construction. Their buildings emphasized abstract geometric shapes and functional machine parts".

In the summer of 1988, architect Philip Johnson was instrumental in organizing a Museum of Modern Art (MoMA) exhibit called "Deconstructivist Architecture." Johnson gathered works from seven architects (Eisenman, Gehry, Hadid, Koolhaas, Libeskind, Bernard Tschumi, and Coop Himmelblau) who "intentionally violate the cubes and right angles of modernism", Craven further observes. "This aspect of intentional violation of the cube and the right angles by the beforementioned architects and the outcomes of their respective designs are mostly akin to sculptural forms of some abstractionist sculptors like Constantin Brancusi, Marcel Duchamp, Jean Arp, Henry Moore, Barbara Hepworth amongst others". Ghom extrapolating on the advancement of the use of abstraction in architecture also enthused, the purpose of abstraction is to simplify nature, to extract primary logic for design expression. Through abstraction, the complex power of natural phenomenon can be stripped down, simplified, studied and shifted into dynamic design possibilities. The artist first distinguishes phenomena, or the appearance of things, and then through intuition recognizes design ideas. By a method of seeing, visualizing, sketching, and

abstracting, the process continues, in a series of stages, to extract a basic “design element.” The continuance of the abstraction stages leads to two basic design directions. The first design direction leads to an abstracted design element for two-dimensional design. The second design direction extends the abstraction process to a higher level for architecture and three-dimensional design.

Abstracting for architecture is a process by which something innate is revealed, whether willed or not. Abstraction is suggestive, oblique and symbolic. It is a dream, self-expression, and hopefully even true insight. The abstracted element is intuition that specifically links to an idea and to notion of actual design, that takes on reality as it is developed into building design (Stricker, cited in Ghom, 2017). While Ghom and Stricker may sound confident in their respective propositions, Jumelet (2013) opines that People tend to call something ‘abstract’ when a certain viewpoint confuses them. In fact, they express that they feel uncomfortable with a viewpoint presented when it does not match with the perceptions of reality that they are used to.

For the purpose of the involvement of abstraction to create a structural artifact such as architecture to blend with functionalism, where function should be paramount being an aspect of the three (3) cardinal principles of architecture, Jumelet strongly emphasized that in its essence, ‘abstract is good’, because knowing the fundamental structure of things helps us in our design process tremendously. In my opinion, for an architect it is mandatory to start from a functional view. However, people may perceive talking about functionality as very abstract, because they are not used to this kind of viewpoint. Although there is nothing abstract about functions, it might help to translate functional models into ‘artist impressions’. These artist impressions provide a constructional view on an abstraction level that appeals to people because they match with their ‘comfort zone’. That is the way to play with levels of abstraction and detail. In other words, making sense of this is an art; an art that is mastered by every good architect. It is pertinent at this juncture to point out that art and architecture are linked in many aspects. Odenthal (2016) states thusly, art and architecture have a deep connection that unites them through their design, their designer, and their individual meanings. Both are created using the same organizing principles, the same visual elements, and the same engagement of the senses. Art and architecture both have meaning. They are simultaneously expressive and communicative. The artist “shapes” an object to visually express a complex set of ideas, and the audience receives that expression. Architects create livable or usable spaces, but their architectural structures are also significant beyond their functionality. The formal qualities of artworks make them satisfying visual experiences, which adds considerable power to art. Size, scale, texture and value are all formal elements in art that contribute to a works meaning. Size, scale and value are formal elements in architecture that enhance the meaning of a building Odenthal further opines. Ghisleni (2021) emphasized that the idea of integration between art and architecture dates back to the very origin of the discipline, however, it took on a new meaning and social purpose during the Avant-Garde movement of the early twentieth century, becoming one of the most defining characteristics of Modernism.

Morgan (2014) being more emphatic states, in recent years, the connections between architecture, art, and design have, in many cases, become inextricably bound to another in a kind of symbiotic relationship. For some observers, architecture appears relevant to the twenty-first century only when it emulates an abstract sculptural presence. But for architecture to unite with sculpture in this way, the balance between its respective function and non-functional components requires the formative clarification of design.

Morgan continued to state, where architecture merges with art, and consequently, art with design, the structural joints and modular units that contain aspects of the structural whole and thus hold things in place may become too far-sighted, which means that attention to such functional details begins to move outside the central idea of

architecture rather than being integrated with it. Furthermore, the undeniable link between these two genres of creative expression could be discerned in the words of Davis (2005) who thus stressed, “architects are artists that communicate through space and form. Ideas are built in three dimensions that can be inhabited by others”. With the glaring foregoing introduction of the link/relationships between abstract sculpture and abstractions in architecture, the following themes would form the broad canvas upon which this study will further elucidate this paper's title and aims .

Aim of the Study

To study aims at investigating the relationships between abstraction in sculpture and sculptural abstractionism in architecture.

Objectives of the Study

The Objectives of the study include;

- (a) To verify the similarities/relationships between abstraction in sculpture and architecture,
- (b) to assess the provocations of abstract sculptural forms in architecture,
- (c) to examine some architects who are artists/sculptors and
- (d) to determine the future and sustainability of abstractionism in modern architecture.

The Similarities/Relationships Between Abstraction in Sculpture and Architecture

Sculpture and architecture are akin to each other in many ways, as creations of each discipline immediately convey form, both are evident as three -dimensional (3D). "In Relationship Between Sculpture and Architecture" (2018) the following comments were proffered, the lines between sculpture and architecture have always been blurred. Architecture, like sculpture, is concerned with three-dimensional form. Sculpture has long been closely related to architecture through its role as architectural decoration and the level of design. Both have a critical responsibility to address the physical space and consider tenets of form, scale and material. And although the central problem in the design of buildings is the organization of space rather than mass. There are styles of architecture that are effective largely through the quality and organization of their solid forms. Such as ancient styles of stone architecture, particularly Egyptian, Greek, and Mexican. These styles of stone architecture tend to treat their components in a sculptural manner. Moreover, most buildings viewed from the outside are compositions of masses.

Katie (2019) asserts, “from early Roman times when buildings were decorated with floral motifs and scrolled columns, to Art Nouveau architectural design featuring highly ornamental and organic details, the relationship between art and architecture has often been one of complementary collaboration”. Space one of the critical elements of art and design is a palpable phenomenon shared by sculpture and architecture though in subtly divers ways and forms. Esaak (2020) strongly opines that “space, as one of the classic seven elements of art, refers to the distances or areas around, between, and within components of a piece. Space can be positive or negative, open or closed, shallow or deep, and two-dimensional or three-dimensional. Sometimes space isn't explicitly presented within a piece, but the illusion of it is”. Esaak (2020) quoting the American architect Frank Lloyd Wright, “Space is the breath of art.” What Wright meant was that unlike many of the other elements of art, space is found in nearly every piece of art created. Painters imply space, photographers capture space, sculptors rely on space and form, and architects build space. It is a fundamental element in each of the visual arts Esaak continued to emphasize. Saulson (2013) comments that, “most people define architecture as a structure with some kind of function”. However, many times, a sculpture can be considered a piece of architecture even if it has no function. This is because both forms of art use several spatial and formal concepts. Several renowned artists, such as Richard Serra and Anish Kapoor, have endeavored to combine architecture

and sculpture, creating structures that serve an aesthetic purpose but exist on such large scales and include, such innovative structural designs that they are considered architectural phenomena.

Mirea (n.d.) observed that in his essay, Martin Heidegger (1889-1976) questions the nature of the space and the liaisons between the space and the sculpture. He identifies three types of spaces: space where one perceives the sculpture as an entity, the space enclosed within the sculpture, and the voids between the volumes. But in fact, he speaks about limits. When a sculptor sculpts, he defines his idea by taking out everything that doesn't serve. Is it not the same process in architecture? Doesn't an Architect sculpt the space until he finds the best solution to be inhabited. This different approach of both the sculptor and the architect of course are obvious, yet both practitioners have a meeting but in that they engage the application of space to gain genuine and tangible result in sphere of their professions.

During the Renaissance, painting, architecture and sculpture were intertwined. One cannot imagine the Sistine Chapel without its frescoes, only mere walls. One cannot imagine the Medici Chapels without its statues. Sculptures and frescoes were whispering about the possessor of the building, or about its purpose. Sculpture or painting was not a decoration. Everything was thought, designed, and perceived as a whole, spaces were experienced with the whole body, Mirea continued to emphasize.

Mirea elaborates withal, Jacques Herzog (1950) and Pierre de Meuron (1950) founded their own studio in 1978 after graduating from the Swiss Federal Institute of Technology (ETH), in Zurich, Switzerland, and in 2001 they were awarded the Pritzker Prize. They have a long history of collaboration with artists, such as, Rémy Zaugg (1943-2005), Helmut Federle (1944), Joseph Beuys (1921-1986) or Balthasar Burkard, Hannah Villiger, Margherita Spiluttini, and Thomas Ruff, with whom they collaborated with at the Venice Biennale in 1991. Their credo about architects and artists: "Over the years we've come to understand more and more that artists shouldn't do architecture and architects shouldn't do art. We have also understood that it's very important to fuse these things, to bring these things together. In many projects, we came to a point where we found it absolutely important and necessary to involve an artist to make the project better."

The Provocations of Abstract Sculptural Forms in Architecture

One wonders if indeed abstract sculptural forms have any influence on architects and consequently influence their design considerations and tangible outcomes. Weigel (2014) states provocations does exactly what it states; it provokes insight and a deeper thought into the creative process of designing for technical and aesthetic solutions for public spaces. Dutsev (2017) comments strongly, that "despite the multidimensionality of the art field of integration, there are two fundamental vectors of the existence of the factors of arts and the architecture-and-art system as a whole: functional and artistic-symbolic ones. In most cases, the first is connected to the direct use of the language of art by an architect...". The symbolic way implies the similarity of the language art systems and the perceptions thereof, relatedness on the level of techniques and consistent patterns of the architect's authorial style and has a much more subjective nature. Architecture is affected by both the elementary language pulse and the existing art system. With that, the art of architecture preconditions the birth of the architectural-artistic unity of fundamentally new integral nature, which is different from the features of the interaction members. Considering the artistic world of architectural creative work, we can speak about "fine arts", "graphics", ... The motif of motion is relevant for many architects: S. Calatrava, F. Gehry, Z. Hadid, O. Decq, M. Fuksas, the Coop Himmelblau (company), Asymptote, Morphosis, among others. The key positions of the architecture of artistic representation of the order and economy of expressive means was formed already in the twentieth century. R. Meyer, J. Sterling, D.

Chipperfield, A. Siza, S. Braunfels and others can be identified as its adherents mainly interpreting and refracting the line of modernism from the perspective of creative artistic temperament. The rootedness of their creative principles in the traditions of the 20th century plastic culture represented in painting, drawing, sculpture and the aesthetics of architecture itself is obvious in the context of art (Dutsev,2007). It is pertinent to note that the aforementioned "creative artistic temperament" and "the rootedness of their creative principles in the traditions of the 20th century plastic culture" in (architecture) was inspired by 'abstractions of sculpture'. The consummate expressiveness of architectural forms conveying sculptural abstractionism could be seen in some works of the foregoing practitioners of modern, postmodern, contemporary and deconstructivist architecture like Zaha Hadid, Daniel Libeskind, Santiago Calatrava and others with similar related creative inclinations and passions. Dustev observes withal interpretation of the laws of nature in the convergence of the activities of an engineer, scientist and artist characterizes the creative method of S. Calatrava and his concept of artistic structural, sculptural and bionic unity. Works of the master are filled with anthropomorphic and biomorphic structures, and series of sketches and dynamic models are devoted to the study of the natural plastics of the world of nature and man. Thus, the architectural image of the Eastern Station in Lisbon (1998) is determined by unique openwork "arches", the architectonics of which reveal natural patterns with a strong emotional and artistic message. The author's method was the most clearly used in the creation of the "Turning Torso" tower in Malmö (Sweden, 2005), based on anatomical sketches and the sculpture of the same name, made by the author. The "biomorphic structures" mentioned above are actually 'biomorphic sculptural forms' which bear expressions of abstractionism. It is pertinent to state at this juncture that abstractionism is the principle or the practice of creating abstract art (in Merriam- Webster dictionary, n.d.). Nimmer (n.d.) emphasized, abstraction literally means the distancing of an idea from objective referents. That means, in the visual arts, pulling a depiction away from any literal, representational reference points. In Britannica (n.d.) Abstract art, also called nonobjective art or nonrepresentational art, painting, sculpture, or graphic art in which the portrayal of things from the visible world plays little or no part. All art consists largely of elements that can be called abstract—elements of form, colour, line, tone, and texture. Olesberg (2014) opines that "architecture is instinctively deterministic, grounded in the aspiration to be complete, finite, permanent, settled and still; and the key to design has for long been located in what Wright referred to as the uncovering of 'the one big idea' – a single right solution to a complex set of problems". Characterizing innovations from Los Angeles in 1992, John Chase pointed to sculpture as a way to free architecture from those constraints, suggesting that when builders begin to build a formal language on the informal precedents of abstract sculpture and assemblage they can take on the liberating possibility of the indeterminate, making it clear that 'they could just as easily have been put together in other ways'.

Brent (2017) espoused the concept of sculptural abstraction in architecture in Daniel Libeskind's words as he quoted Duchamp, "Architecture is sculpture with plumbing." He talked about sculpture as pure architecture, pure spatial presentation... in art exhibition titled: "Figures Toward Abstraction: Sculptures 1910 to 1940". The exhibition was inspired by conversations about abstraction—its causes, meaning and forcefulness—between Libeskind and Luxeumbourg over many years. Libeskind chose to introduce the installation using the last stanza of a poem by Rainer MaBhattermse, "Archaic Torso of Apollo," in which Rainer meditates on the mutilated stone figure left behind when the gazing eyes, head, arms, thighs and legs of an ancient statue have been broken off from the entire body and the fragmented remains—an abstraction—come to incorporate the once-whole body with a new and ecstatic intensity. Kozlowski (2013) writing in her abstract noted that, "the great influence of expressionist sculpture on architecture is emphasized. Modern buildings often look like built monuments. Architects like Zaha Hadid and Frank Ghery can distance

themselves from their predecessors, but it seems to be evident that they unintentionally continue what was 'born' in the early twentieth century". Expressionist sculpture had a strong impact on architecture. Hans Poelzig's design of Grosses Schauspielhaus (1919) in Berlin is one huge monument. Hermann Finsterlin's buildings assumed the form of sculptural models only. Mendelsohn's design of Einsteinturm includes independent sculptures instead of an architectural model. Both Zaha Hadid and Frank Gehry's contemporary buildings are already constructed expressionist sculptures distinguished by their monumental scale, not by their form Kozłowski continued to stress. Explaining 'abstract expressionism' Kozłowski wrote, "it is difficult to define expressionist sculpture as a uniform style". The authors of *The Encyclopedia of Expressionism* tried to find two artistic trends making it easier to state its definition precisely. "One outlook prevailed among the German critics: sculpture revealed a considerable dose of openness to expressionism or rejected the existing conventions. According to the other outlook, expressionism means intensive expressiveness of forms going to such extremes as deformation and abstraction which results from an artist's inner need". Expressionist sculpture created by artists belonging to the Die Brücke group, remained under the influence of primitive art. "Aims of the abstract sculpture" (2016) opines that, "the abstract expressionists felt strongly about the importance of freedom". They aimed for people to see their pieces without memory or association. As artist Mark Rothko explained, "Instead of making cathedrals out of Christ, man or life, we make it out of ourselves, out of our own feelings. The image we produce is understood by anyone who looks at it without nostalgic glasses of history"

Some Architects Who Are Artists/Sculptors

Bhatt (n.d.) observes that "the development in modern building technology has caused the growth of spatial sculpture and many 20th-century sculptors can be said to have treated their work in an architectural manner. There has always been a blurry line between sculpture and architecture. Architecture and sculpture, both are concerned with three-dimensional form. Both disciplines have been closely related through their role as architectural decoration and the level of design with a critical responsibility to address the physical space and consider tenets of form, scale, and material. Architecture and sculptures spiel the components of the masses primarily. With so many parallels between the two art forms, many famous architects have also carved their niche as sculptors. The development in modern building technology has caused the growth of spatial sculpture and many 20th-century sculptors can be said to have treated their work in an architectural manner. Daniel Libeskind, Polish- American, Santiago Calatrava, Spanish, Le Corbusier, Swiss-French, Antoni Gaudi, Spanish, Gottfried Bohn, German and others numerous to mention are architects and sculptors. However, in this paper three out of the many would be investigated for the analogy of this work. They are Le Corbusier, Santiago Calatrava and Daniel Libeskind.

Le Corbusier:

Mueller (2004) opines that, "Le Corbusier was both artist and architect and the symbiosis between these dual roles contributed to his ability to think and create plastically". Le Corbusier (1887-1965) is considered by some to be the greatest architect of the 20th Century. Less publicly well known, although many have written about it, is his unwavering commitment to and prodigious production of art. Le Corbusier generated an impressive body of paintings, murals, ceramics and sketches, among other media. Examining his evolution as an artist provides significant insight into his architectural interests. Le Corbusier was not unusual for his era in being occupied with questions of the

interdisciplinary relationship between art and architecture, however, he is significant for his pursuit of multiple media, including architecture, as integrally symbiotic.

In the foregoing paragraph, the word "...create plastically" reveals the true blend of sculptural abstraction in architecture. Gerwing (2011) avers, "Plasticity" is not about plastics. However, it is about what plastics in a sense can do. As used by architects, plasticity is a term used to describe a rich, three-dimensional or sculptural presence of a building. When the form of a building exhibits a sculptural presence, even if that may be strictly made up of straight lines and boxes, we say that it has plasticity.

Le Corbusier, one of the most important and influential architects in history and a key figure in understanding 20th-century modernity and contemporary living, was a complete artist: architect, urban planner, painter, sculptor, and designer. His work in architecture and urban planning has been widely celebrated and critically acclaimed. Acknowledged as a spearhead of Modernist architecture, Le Corbusier abandoned his idea of Purism in the 1950s, and probably that is where his sculpture stems come from states Bhatt. Le Corbusier (n.d.) stressed, "behind a great architect, there is always a great artist". A paraphrased aphorism that could be properly applied to the work of Charles-Edouard Jeanneret, known to the public under the name of Le Corbusier, famous for its architectural work and urban planning even more than for his important artistic career. Forgetting or ignoring this last aspect, however, represents a serious error in the comprehension of one of the finest minds of the twentieth century. Le Corbusier indeed, even before being the visionary designer of cities and buildings, was a man of letters (as reported by his French identity card of 1930) and an artist devoted to painting, drawing and sculpture. Painter, draftsman, sculptor, and, even at the same time, architect: this is the indispensable intellectual background of Jeanneret, a fertile ground on which it gained an innovative conception of architecture and the organization of space.

Santiago Calatrava

Allen (2016) states that Santiago Calatrava—known for his gleaming white, sky-high designs—has captivated the globe with soaring structural feats since he began designing modern architecture as a student in Valencia, Spain. His style has been described as distinctly neo-Futurist for its innovative use of materials and sleek, forward-thinking aesthetic. But Calatrava's artistic sensibility hasn't been limited strictly to architecture—he is also an accomplished sculptor and painter, creating a body of work on a smaller scale that, in turn, informs his fluid, dreamlike buildings. Pires (2021) equally observes that Spanish-Swiss architect Santiago Calatrava is well known for his incredible soaring structures. He is one of those star architects who has a style so well defined that it is recognizable to people who may not necessarily consider themselves architecture lovers. Part of what defines Calatrava's unique style is the impressive structural capabilities of his buildings combined with their sculptural elegance. This makes a lot of sense since Calatrava is an architect, structural engineer, sculptor, and painter.

Calatrava was inspired by the work of Le Corbusier, one of the most influential architects who ever lived. From him, Calatrava learned that architecture could be an outlet that allowed him to combine the qualities of both art and architecture. After deciding to become a multidisciplinary designer, Calatrava studied architecture and urbanism before pursuing another degree in engineering. "I was determined to put to one side all that I had learned in architecture school," he said, "and to learn to draw and think like an engineer." It seems that this engineer thinking has followed him throughout his career, but it was always employed to elevate the design thinking of his architectural and artistic interests Pires further asserts.

Robinson (2014) wrote concerning the art exhibition, "Santiago Calatrava: Sculpture into Architecture", Santiago Calatrava interprets the practice of architecture as a combination of all the arts, and these thoughts are justified when seeing such sculpture. The

Spanish architect and structural engineer, who now resides in New York City, exhibited his artistic and architectural work at the New York Metropolitan Museum of Art in 2003. The exhibit was entitled "Santiago Calatrava: Sculpture into Architecture", and as the name suggests was based on the concept of architectural forms deriving from sculpture itself. This relationship is an intriguing one. It seems like Santiago's main aim is to explore the possibilities of space and construction, and although they might seem abstract and random the sculptures don't necessarily break the boundaries of architecture.

Sculpture is a medium for experimentation, where formal and spatial tests can be performed without architectural limitation. This trial and error method is the perfect way of testing both material and form, how they work in harmony Robinson withal comments on the works in S. Calatrava's exhibition.

Horsley (2006) reports that in an article in the October 31, 2005 edition of *The New Yorker* magazine, Paul Goldberger noted that "Calatrava's first high-rise apartment tower, in Malmö, Sweden, has been christened the Turning Torso," adding that "The title is a reference to a white marble sculpture, by Calatrava, of a human form in motion; in 1999, the five-foot-high work so captivated the building's developer that he hired Calatrava to stretch the piece into a skyscraper - even though the architect had not yet designed one. ""The fifty-four-story structure, which has views of Copenhagen from across the Øresund Strait, opens in November," Mr. Goldberger continued: "There are a hundred and forty-seven apartments - each of which has slanting windows, curving walls, and oddly shaped rooms - and all of them have been rented."

An article from Arch2o discussing "turning torso" (n.d.) states thusly, the concept developed much earlier within a sculpture of Calatrava. He abstracted the human movement into a stack of seven cubes twisting around a spinal core. The real scale of Turning Torso consists of nine cubes, each considered as an individual unit holding five consecutive floor slabs while dramatically spiraling in a whole right angle from toe to tip, encircling a structural nucleus.

Being the tallest tower of Scandinavia, the Turning Torso stands sculpturally to compose a poetic landmark with the skyline of Malmö, Sweden. The Spanish genius Santiago Calatrava infused movement to structure and carved out the spontaneously engineered artifact of white marble. The 190 meters high edifice is the second highest residential building in Europe and was planned to be exhibited in European housing Expo 2001. The building is situated in the western harbor of Malmö beside the Ribersborg beach, incorporating a picturesque view of Copenhagen along with the connection bridge between Sweden and Denmark "Turning Torso" succinctly expressed.

Daniel Libeskind

In the exhibition: *Figure Towards Abstraction*, 2017, New York City, Ben-Haim (2017) documents D. Libeskind's expressions thus, "Daniel Libeskind feels very connected to these figurative abstraction sculptures simply because he believes that all architecture is figurative. He further elaborated, "I mean home is a figure. It's an abstraction. A place is a figure. It's an abstraction". So I think architecture has kind of an echo in the work of these artists...were also a creator of space that architects themselves were inspired by. Whether it's a piece or Gonzalez or Giacometti, their influence has long been talked about in art but they had a huge influence on architecture.

Allen (2016) emphasized that Libeskind's "The Vanke Pavilion" in Milan was completed in 2015 as a temporary structure with exhibition space for that year's Expo Milan. Inspired by elements of Chinese food culture, the building forms a gently twisting abstract shape that is clad in metallic-finish ceramic tiles.

Sugumar(n.d.) noted that in Libeskind's early life and carrier, he had developed an obsessive interest in drawing and wanted to become an Artist, before turning to Architecture at 17, as

suggested by his mother. “Be an architect. Architecture is a trade, and an art form.” And then she said something that should gladden the heart of every architect: “You can always do art in architecture, but you can’t do architecture in art. You get two fish with the same hook.” – Dora Libeskind**.

In an interview in *The Talks* (2021) Libeskind responded thusly, when I was doing my series of drawings, that is how I really developed my architecture. Maybe they seemed abstract to people, maybe they seemed crazy, but to me they were architecture at the time. And they are still architecture, because I still use those drawings in my current work. Drawing was a path.

It is apt to point out that Libeskind actively sculpts and his abstract sculptures abound. "Daniel Libeskind Unveils Climate Change..." (n.d.) This spring, tapestry-like shrubbery and geometric flowerbeds will not be the only highlights at the Het Loo Palace's Dutch Baroque gardens. The palatial grounds in Apeldoorn, Netherlands recently opened a new climate change-inspired exhibit, 'The Garden of Earthly Worries,' featuring four monumental art installations designed by Polish-American architect Daniel Libeskind. The exhibit showcases the first-ever contemporary installations on show in the gardens of Paleis Het Loo, which dates back to the late 17th century. 'The Garden of Earthly Worries' opened April 2, 2019 and will remain on display at the palace until mid-2021.

Libeskind's versatility could be seen in multiple projects he has handled and still undertake. In Libeskind response to question and answer in *Metropolis* online magazine, Sharpe (2013) writes, with the recent launch of Cosentino's new ultra-compact architectural surface, Dekton, the company made an additional announcement. Architect Daniel Libeskind is working with Dekton to create *Beyond the Wall*, a permanent sculpture (30 feet high in height) at the Cosentino global headquarters in Almeria, Spain. *Beyond The Wall* shows Libeskind's unique approach to architecture as a language capable of narrating the story of the human soul; a hybrid and wide-ranging force, at once a narrative, a method, an art form, and a way of thinking about the world. Libeskind eloquently responded to Sharpe's questions withal, I think it will really be a microcosm of materials and sculpture and architecture, and of course a public element. It's significant about what it says about light, the earth, the sky, and the possibilities of movement. It's a microcosm of being able to think of the 21st-century city. It's really the spatial, tectonic, and material form of the 21st-century architecture. It's not just a sculpture. It's really an investigation of the dynamism of where I think architecture is moving. One of the most fascinating sculptures created by Libeskind that highlights abstractionism and conveys massive emotionality with accompanying artistic provocation is "Life Electric". Pozzoni (2015) comments effusively that Daniel Libeskind installs a contemporary stainless steel sculpture called "Life Electric" in Lake Como, Italy, which is the most visited touristic place in the world. Libeskind created a new techno-elegant structure in collaboration with the business association of Como - Amici di Como Studio Libeskind created *Life Electric*, a dazzling 16.5 meter. As it is well-known, this public monument, the first contemporary work ever to be installed in Como, is an homage to famed scientist Alexander Volta who hails from the city-and Como Lake houses many Hollywood film stars' and famous names' private residences including George Clooney, Tom Cruise, Madonna, Elton John, Chrissy Teigen-John Legend and Martine McCutcheon-Jack McManus. *Life Electric* was opened to the public on October 2, 2015. Additionally, Pozzoni documents, "It is an amazing honor to be able to give this work a home in one of the most beautiful places in the world—and a place very close to my heart," said Daniel Libeskind. "It is my hope this work will give the people of Como a new public space and expand the architectural language of the city". The installation located on a jetty off the shores of the Lake, the monument is locally crafted in stainless steel, polished to a mirror-finish to reflect the surrounding landscape. Both robust and ephemeral, the sculpture sits upon a stone pedestal fitted with a water feature to give the illusion that the work is floating, as well as rotunda seating that creates a new public space on the lake. The form of

this sculptural piece reaches both up towards the sky and arches down to the water, representing the two poles of energy—a nod to Volta’s invention of the battery—looks like a dancing architecture piece. The sculpture will allow for unique perspectives as the natural landscape and sunlight reflect in the dynamic form, which by night becomes an illuminated beacon.

The Future and Sustainability of Abstractionism in Modern Architecture.

Architecture is sustainable and has had a long history from the Paleolithic period up until the modern era. It has taken different forms and incorporated diverse materials and had and still has numerous practitioners who straddle the discipline/profession. However, the recent aspect of architecture which amalgamate sculptural abstraction or abstract expressionism is stirring provocations which trails it's modern and contemporary nascency. For instance the modern genre deconstructivism actively practiced by architects Daniel Libeskind , Zaha Hadid, Peter Eisenman, Frank Ghery, Rem koolhaas, Bernard Tsuchmi and Coop Himmelbau to mention a few have at it's heels an attendant criticism. The term Deconstructivism in contemporary architecture is opposed to the ordered rationality of Modernism and Postmodernism. Lansroth, (2015) alleged that those “weird-looking, distorted, almost impossible-to-comprehend buildings that make you wonder how anyone could design, let alone build such a construct, are actually part of a very specific, non-rectilinear approach to design, called – Deconstructivism”. Often described as one of the most visually striking and perplexing types of art ever developed, Deconstructivism is characterized by the use of fragmentation, manipulation of ideas of a structure’s surface or skin, redefinition of shapes and forms, and radical manifestation of complexity in a building. Plick (2016) observed that if you are passionate about architecture, you definitely had a moment at some point, no matter your level, from beginner enthusiast to Pritzker Prize winner, when you asked yourself, “What [expletive] is deconstructivist architecture?” (Quick side note: Microsoft Word keeps underlining the word “deconstructivist,” insisting that this word doesn’t exist. Which, somehow, actually makes complete sense). Deconstruction is a late 20th century philosophical movement primarily fathered by Derrida.

Murao, (2016) states that deconstructive architecture is “an architecture of disruption, dislocation, deflection, deviation and distortion, rather than of demolition, dismantling, decay, decomposition, or disintegration. It displays the structure instead of destroying it”.Deconstruction, according to Wigley, is a challenging of the values of harmony, unity and stability Murao continued to stress. The salient hallmarks of most deconstructive architecture underlies the concept of the integration of sculptural abstractionism in architectural pursuits.

In spite of it’s event oriented criticism of history, in the end, Deconstruction architecture has had a strong and lasting influence both in terms of methodological consideration in architecture and in public perception. A complicit step in the evolution from Modernism to Sustainability, Deconstruction and its moment will be remembered as a critical step in the transformation of design and engineering in the field as stated in "Deconstruction in Architecture" (n.d.). Writing on the sustainability of DE constructivist architecture, Alhefnawi (2017) avers that deconstructive architecture has a wide range of potentials that can contribute to sustainability of architecture. The structure system that has a profound effect on the form, mass, scale, and configuration can play an important role to shift the building mass from being a permanent structure that could not be used after the end of the events it was erected for, to a more interacting structure that corresponds to the future plannings considerations, to the surrounding environment, and has the possibility for dismantling or recycling in different locations.

Alhefnawi drew the aforementioned conclusion from the case studies he used from three architectural projects designed by three of the famous Deconstructivism architectural offices: Zaha Hadid, Kristoffer Tejlgaard, Benny Jepsen, and Carmody Groarke. The projects were presented and explored in terms of flexibility as a major sustainability imperative. Through the analytical approach, each project was allocated some points or scores based on their successful contributions to flexibility of the layouts. The availability of new materials afforded by modern technology makes it possible to sustain the works of deconstructive architects. "Deconstruction in Architecture" (n.d) comments that "reinforcement of Deconstruction's project was greatly enhanced by the rapidly transformative sector of new technology in construction materials and engineering systems. The market capitalization of 'creativity' in design (i.e. brand names in architecture) projected a significant future for the field through the global efforts of architects closely aligned, yet preceding the actual explosion of international development projects that led to a proliferation of deconstruction as a standard for cosmopolitan value. A strong pointer to the Sustainability of deconstructive architecture is opined below. Stouhi (2018) observes that "DE constructivist approach to the design created some of the world's most iconic and award-winning structures to date, influencing hundreds of up-and-coming architects". It is pertinent to comment that some countries have started taking the designs of deconstructive architects who of course integrates abstraction/ sculptural abstraction in their design schemes very seriously.

"The Impacts of DE constructivism" (2018) reported the importance of introducing DE constructivism as a new perspective to New Zealand building designs to create an innovative architecture with consideration of how it will impact New Zealand in the future. DE constructivism has been recognized as a movement that can revolutionize the world of architecture because it will evolve the style of buildings in New Zealand if performed in a beautiful manner, so it is prominent to keep an interest towards DE constructivism. DE constructivism is a different perspective towards the beauty of architecture and the way it will influence the current New Zealand architecture is by introducing a different approach to its architectural style.

DE constructivism is a post-modern architectural style that which expresses a futuristic architecture through its explosive aesthetic approach. It is a way of exploring new forms and volumes by composing unique designs to unleash infinite design possibilities by breaking the rules of current architecture through the defiance of geometric norms as a movement towards the future of architecture emphasized ("The Impacts of DE constructivism", 2018)

Conclusion

The nexus between abstract sculpture and abstraction in architecture is salient and traceable through history. Form (a critical element of design), is applied by the practitioners of both genres of art, and the sustainability of abstraction in sculpture and architectural abstractionism also tags along form in the design schemes of some architects. Abstraction in both sculpture and architecture have glaring precursors dating back to prehistoric times from whence humanity began to draw inferences from nature and proceeded to distill beauty for artistic and architectural purposes. Waldman (2012) aptly asserts, it seems likely that our brains have been equipped for abstraction for as long as we have been humans. The aspect of form that underlies sculpture as well as architecture seem to be a major factor that granted both disciplines the premise for expressions that are akin to each other. Sculpture and architecture through form equally gained prevalence in integrating abstraction or abstract expressionism to convey art factual exhibits from individual practitioners, cultures, cities and nations at different successive periods in history and in the progressive course of mankind's milieu. Architects and sculptors who inculcated abstractions in their designs added surprising values to architecture. DE constructivist architects like Frank Ghery,

Daniel Libeskind, Zaha Hadid, as well as sculptors like Constantin Brancusi, Henry Moore and Jean Arp to mention a few worked assiduously producing works that abound to give credence to the exposé of this paper. Though these creative personalities espoused and produced works that were provocative, their varied contributions to the accumulated corpora of this artistic genre constitutes quite a compendium that furnishes the sustainable continuity of abstractionism. It is pertinent to note that both sculptural abstraction and abstraction in architecture are sustainable. The availability of new materials granted by modern technology, invention and innovation aids both sculptural and architectural designs and productions.

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