



## Architectural Engineering

# Patterns: The crime that has become the haven in architectural practice

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## ARTICLE INFO

### Article history:

Received 23 February 2019

Revised 5 August 2019

Accepted 5 December 2019

Available online 30 December 2019

### Keywords:

Patterns

Ornaments

Message conveyor

Identity

## ABSTRACT

This paper discusses patterns' progress and their presence in architecture throughout the 20th century until today, traveling through its controversial opinions and identifying its meaning and importance. Through descriptive and critical analysis approaches, patterns' roles in contemporary architecture and the meanings they hold and deliver to the public are criticized. Finally, a critical review of how architects are dealing with patterns nowadays is carried out, discussing the effect of patterns on the quality of creativity in the architectural practice and the messages it delivers accordingly.

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## 1. Introduction

The term "patterns" discussed in this paper includes ornaments and ornamental patterns used in architecture. These patterns refer to the repeated or sequential motif design that is used in buildings whether interiorly or exteriorly. Simple man-made patterns may be based on repetition and periodicity; however, this is not the case with all patterns and certainly not with most natural ones. In his seminal book *The Self-Made Tapestry: Pattern Formation in Nature*, Philip Ball describes patterns as 'arrays of units that are similar but not necessarily identical, and which repeat but not necessarily regularly or with a well-defined symmetry' [3]. Patterns are any repeated element in a certain sequence or hierarchy. It could be meant as an ornament or as a functional element. Patterns define many cultures and regions through its physical features although it might, sometimes, seem similar.

The border line between patterns and ornament is blurred. Ornaments are becoming more abstract and patterns are turning more figurative. Abandoning plain repetitions, patterns in the same surface are changing in forms and sizes. Formulating its shapes

according to the overall product or for functional purposes generated different reasons and motives for its presence. But since ornaments are, most of the time, a repetition of a certain unit, and as patterns usually end up with something decorative, this paper suggests that "ornaments" is a subset of "patterns".

The paper addresses the value of patterns in nowadays buildings and how they affect the architectural industry and urban image of the city. Although patterns are hailed upon in today's architectural literature, it is misused in many ways and there is no real criticism to warn against the effects or consequences of this misuse. This paper is an argumentative review that discusses, through descriptive and critical analysis, how patterns have invaded the buildings industry and the meanings it conveys to the public, whether with or without the intention of its architects.

## 2. Evolution of patterns

Patterns have been used since the first ages of architecture. It has been present throughout recorded time, revealing human desires, activities, and beliefs [1]. Usually it was used as inscriptions for telling a story or describing an incident or for aesthetic purposes. Salingaros defines patterns in his article "The Patterns of Architecture" saying: "A pattern is a discovered organization of space, and also a coherent merging of geometry with human actions" [17]. It covered the walls of temples and the caps of columns in ancient architecture, whether colored or engraved. These patterns ranged between being ornaments, symbols or writings. They were either explicit in meanings or implicit. That is to say, it was either clear and represented what was shown or had other

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Peer review under responsibility of Ain Shams University.



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**Fig. 1.** Falling Water Villa, Frank Lloyd Wright, 1939, Pennsylvania, USA.

hidden meanings, that were based on agreement or learned through experience. Patterns reflected cultures and styles in its era. It narrated the places' histories and helped in differentiating between various civilizations.

Patterns introduced the idea of geometric proportions as it was the outcome of using modules or grids in design. Dabbour states that "Geometric proportions in architectural patterns represent a design language, as words do in a spoken language." [5]. They represented principles of design; order, symmetry, rhythm, scaling, repetition, and hierarchy. They appeared either as architectural elements or as architectural decorations. Some design elements were repeated in a patterned manner; such as columns, arches, niches or windows. These repeated elements were most of the time integrated in the architectural design that it was impossible to separate them apart. The decorative patterns were most of the time ornaments that were either excessive or essential. Building materials such as bricks or stones played a key role in creating playful patterns, either as decorations or for defining architectural elements. Buildings always had some sort of patterns in its architecture according to the prevailing style, theory, and taste, whether as architectural elements or as decorations.

Over decades, patterns became a major component in architecture. It developed steps toward being functional in addition to being aesthetical ornaments. It developed from being two dimensional to three dimensional, from being merely decorative to

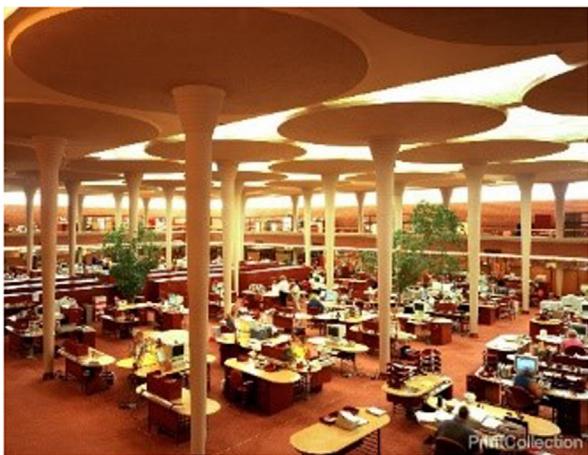


**Fig. 3.** Marine Civic Center, Frank Lloyd Wright, 1957, California, USA.

functional, from being vivid drawings to geometrical to abstract to rational, from being loved to exaggerated to criminalized to accepted, from being superficial to significant, from being morphological to metaphorical, from being rigid to smart ...etc. However, it stayed as it has always been; a message conveyor, a political, social and economic indicator.



**Fig. 4.** Notre Dame du Haut chapel, Le Corbusier, 1955, France.



**Fig. 2.** The Johnson Wax Headquarters, Frank Lloyd Wright, (1950), Wisconsin, USA.



**Fig. 5.** AT&T Building, Philip Johnson, 1984, New York, USA.



**Fig. 6.** Piazza d'italia, Charles Moore, 1978, New Orleans, USA.



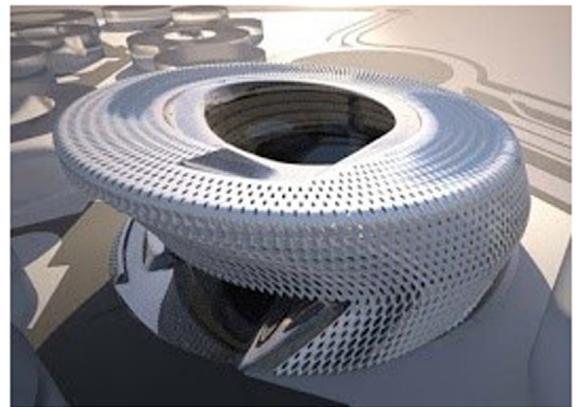
**Fig. 7.** Portland Building, Micheal Graves, 1982, Oregon, USA.



**Fig. 9.** Koizumi Sangyo Head-quarters Building, Peter Eisenman, 1990,Tokyo,Japan.



**Fig. 8.** Parc de LA Villette, Bernard Tschumi, 1987, Paris, France.



**Fig. 10.** Civil Courts of Justice in Madrid, Zaha Hadid, 2007-TBC, Madrid, Spain.

With the theorizing of architecture, patterns developed to be an issue of study. Historians, theorists, philosophers and architects began to give more meanings to those drawings and proposed different guidelines to control its applications or theorize its

meanings. They categorized patterns and described them according to their shapes, forms, materials, techniques, and textures. They were given names and related to other disciplines to emphasize their importance.

### 3. The refusal wave at the beginning of the 20th century

With the rise of Modernism at the end of the 19th century and the beginning of the 20th century, Adolf Loose and other critics rejected the excessive use of ornaments that was dominant in the previous centuries in the architectural styles of Baroque, Rococo, Victorian and Art Nouveau due to its irrelevancy to the cultural and technological context defining that time. As Furján stated in her article about Adolf Loos and his point of view towards ornaments, “In ‘Ornament and Crime’ ornament was not just a cultural but also an economic problem, ‘a crime against the national economy.’ . . . In a highly productive nation, ornament is no longer a natural product, and therefore represents backwardness and even a degenerative tendency” [7]. Opinions of Adolf Loos were the major topic in many researches and books to criticize his points of view and their impact on architecture at its time and later. “Loos’s critique of ornament is not merely rooted in a wish to avoid waste of labor and loss of economic value, but also in an attempt to avoid the rapid ageing processes of certain ‘ornamental’ object designs” [18]. Other critics and architects, such as Le Corbusier, considered ornaments a means of hiding the faults in buildings, whether in its construction or the covering materials. Another opinion also stated that this led to “the formation of viewpoints that consider ornament as an obstacle to the perception of the beauty of pure form” [2].

Still, those same architects used patterns that were naturally present in the textures of the natural materials like wood, marble or stone, instead of physical ornaments. The fact that Modernism rejected ornaments has produced, in some cases, great architecture and architects who focused more on attaining creative forms that stood out, as masterpieces. Away from functionalism and universal styles that standardized all forms of buildings, Organic Architecture and Cubism were the path to creative iconic architecture. Architects like Frank Lloyd Wright used repetitive patterns in his Villas with the duplicated platforms and the exposed stones textures Fig. 1. In the Johnson Wax Headquarters (1950), he introduced the mushroom columns creating a pattern in the ceiling Fig. 2. He also designed the patterned dome in the Guggenheim Museum (1959), and in Marine Civic Center (1957) he used the repetition and scaling of arches Fig. 3. All these buildings showed the tendency to use naturally produced patterns embedded in elements of design, in construction, in masses or in the interiors.

Le Corbusier in his Ronchamp Chapel (1955), which is considered one of the most important buildings in the 20th century, had patterned different sized windows. He also used stained glass with different colors to create patterns of light in the interiors Fig. 4. Due to the pioneers of Modern architecture’s success and the manifesto of Loos ‘Ornament is a Crime’, it seemed that an unwritten law was followed by all architects of that era. At the same time, Minimalist Architecture adopted the same ideology, where “The basic geometric forms, elements without decoration, simple materials and the repetitions of structures represent a sense of order and essential quality” [14]. Also, Mies Van der Rohe’s “Less is more” and Buckminster Fuller’s “Doing more with less” in Modernism seemed to reduce the bond between patterns and its users. Just as Heathcote stated in his article in The Architectural Review “Minimalism may symbolize luxury, but it could be time to re-familiarize ourselves with our decorative roots” [9].

### 4. The applause wave for patterns

The postmodern ideology came more open and accepting for using patterns and ornaments. Robert Venturi called for the return of ornaments in his book “Complexities and Contradictions”. In his opinion:



**Fig. 11.** King Abdullah Petroleum Studies and Research Center, Zaha Hadid, 2009–2017, Riyadh, KSA.



**Fig. 12.** Islamic Cultural Center, Paolo Portoghesi, 1994, Rome, Italy.

“Modern architecture uses expressive ornament and shuns explicit symbolic ornament... all of the simplistic modern façades are in fact a type of ornament. They turn the building into an ornamented whole” [16].



**Fig. 13.** The Institute du Monde Arabe, Jean Nouvel, 1987, Paris.

Phillip Johnson's AT&T building (1984), entitled as the first Post-modern building, stood with its decorative pediment at the top and huge arched entrance, challenging all the glass boxes beside it Fig. 5. However, patterns came back to architecture in an abstract manner. It appeared as more simple forms of classical ornaments, strips of masonry and implementation of colors whether in the interiors or exteriors of buildings. This was so apparent in Charles Moore's piazza d'italia in the City of New Orleans (1978) Fig. 6 and James Sterling's Neue Staatsgalerie in Stuttgart (1984). In Portland Building (1982) by Micheal Graves, the abstracted pediment and columns caps stood with the uniform distributed square windows, mixing uniform patterns with abstracted classical ornaments Fig. 7. Graves explained his architecture: it's "a symbolic gesture, an attempt to re-establish a language of architecture and values that are not a part of modernist homogeneity" [12].

The Deconstructivist architecture came as an approach with no intention to refer to any kind of patterns and especially ornaments. One of the major themes of Deconstruction style is the defamiliarization. It transfers the feeling of dislocation and alienation to the users. However, when patterns were used, they were referred to as a source of dispersion and confusion. The point grid in Bernard Tschumi's largest Deconstructive building [10] was used for decentralization Fig. 8. Each point or 'folie', as Tschumi named them, should create its own center. Derrida, the God Father of Deconstructivism in philosophy, escaped any kind of similar repetition. Cuddon states that "For Derrida, iterability does not simply signify repetition as in 'reiteration'; rather, every iteration is an alteration, or a modification of the same" [4]. Scaling and self-similarity became tools to play with grids or any unit to conceal any compatibility and deconstruct any continuous rhythm such as in Peter Eisenman's work in Koizumi Sangyo Corporation Headquarters Building in Tokyo (1990) Fig. 9. The intended fragmentation of units and grids aimed to create chaos, disruption and instability.

After the glare of Deconstruction architecture has faded, many architects were driven to more organic curvilinear and coherent forms. These forms were characterized by being parametric in character. The term 'Parametric' originated from mathematics. Parametric design became one of the most widely used modeling processes today for generating a wide array of similar yet complex geometrical patterns efficiently. Computer aided design (CAD), computer aided manufacturing (CAM) facilitated creativity in such buildings that allowed architects to innovate and create stunning patterned geometries. Slowly and with a steady pace, patterns began to creep back into buildings, playing many roles and functions and constituting a huge portion of the essence of the buildings. They gave each building its unique identity and architects manipulated the forms of patterns to show their creativity through its manipulation. Patrik Schumacher announced the birth of a new era of parametric architecture, where pattern "becomes an innovative and powerful register of articulation, providing amplification of surface difference and correlation, ultimately resulting in dynamic, high-performance ornamentation" [19]. This could be clearly seen in many buildings including Civil Courts of Justice in Madrid by Zaha Hadid, that had a spiral form with patterns undulating along with the mass, and responding to environmental conditions, Fig. 10. Another building for Zaha Hadid is the King Abdullah Petroleum studies research center (KAPSARC) where patterns form the mass itself and cover it according to environmental requirements, Fig. 11.

Although Parametricism has achieved tremendous success in producing interesting architecture that has grasped attention worldwide, it raised a certain issue concerning the used patterns. Buildings with parametric design flow in design blending with the landscape and interiors, with an exterior façade divided into units that continue covering the dynamic mass and flow paramet-



(a)



(b)

**Fig. 14.** (a) KAPSARC mosque, HOK architects, 2014, Riyadh, Saudi Arabia, (b) Using patterns in the interiors of the mosque.

rically contributing to the sense of motion in the building. Patterns have become the main element evoking meanings in buildings and the conveyor of most messages sent by the architect. It is the same role played since ages but in a contemporary and essential vision. Using parametricism has turned out to be the new ordering principle.

Thus, a hundred years changed points of views of critics from refusal and denial to acceptance and applause.

## 5. Significances of patterns

Patterns were mostly used in the ornamentation process for buildings, but actually they meant more than that. It was a way of communication between architecture and the public. Just as Liotta & Belfiore stated (2012):

Patterns are much more than something to be confused with just ornament ... Pattern as style, detail, ornament, adornment, embellishment and structure was deeply influenced by religion, geometry and math's as well as the arts, design and crafts [11].

Patterns were mainly found in parts of buildings that needed to be in emphasis, whether to mask specific parts or to focus on certain features in it. They were also a result of repetition of certain elements. In both cases, nations were presented by their patterns. The inscriptions of every culture told a specific tale about a



(a)



(a)



(b)



(b)

**Fig. 15.** (a) The Louvre Museum, Jean Nouvel, (2017) Abu Dhabi, UAE (b) The patterned dome in the Louvre museum in Abu Dhabi, casting shadows in the interiors,

context. Each culture developed its own patterns that became a symbol of its identity. It has become a key role for patterns to refer to and emphasize the culture it belonged to. Picon describes the role of inscriptions and writings “Hebrew, Arabic or Chinese characters talk to us, even if we do not speak the languages” [15]. Patterns developed to be the official representative for many places and have become so definite that each city in a country could develop its own specific patterns. Although patterns were used as an element for beautification, yet they became elements of definition for assorted styles in architecture. They categorized countries, regions and different eras.

Patterns are also becoming more and more involved in the ecological synergy of buildings. They have become, not only limited to cultural edifices, but expanded to most types of public buildings. They are playing environmental role in controlling temperature and energy exchange through the outer envelope of buildings carrying glass curtain walls, and controlling light amounts penetrating into the interiors.

In addition, patterns are carrying on its structural responsibility in buildings by giving an aesthetic dimension to the boring structural elements. They also organize those elements in a consistent,

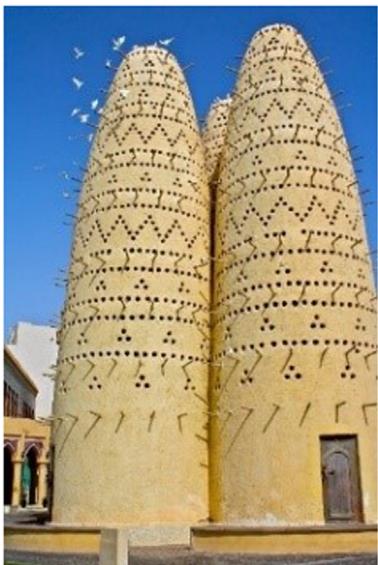
**Fig 16.** (a) The National Museum of Qatar, Jean Nouvel, (2008-), Qatar (b) The veins patterns in the National Museum of Qatar, Jean Nouvel, Qatar.



**Fig. 17.** Doha 9 High Rise Office Tower, Jean Nouvel, 2012, Qatar.



**Fig. 18.** Barcelona Skyscraper, Jean Nouvel, 2005, Barcelona, Spain.



**Fig. 19.** The traditional pigeons' towers with its solids and voids.



**Fig. 20.** The Gherkin, Norman Foster, 2003, London, UK.

regular manner correlating between the form of the building and its elements of structure.

Obviously, digital fabrication and technological advances are the reason for the ability of producing patterns that have definite forms and shapes and could be manipulated to produce different semiotic interactions whether dynamism or enclosure or any message needed to be delivered by the architect. Patterns varied between being ornamental and being functional conveying an economical signal about the richness of the building and the wealth of its owner. Although contemporary patterns cannot be significantly identified and are not iconic themselves, unlike the Roman orders or the Islamic patterns, they create iconic buildings when used correctly and aesthetically. These iconic buildings continue to create and identify iconic cities. Patterns in a certain building can give their city its singularity and uniqueness. Elshater et al. confirm that one of the main elements that identify a city is its architectural façades. "...this problem of singularity/similarity can be documented in three aspects. The first is the architectural design based on the image of the city, the art of the city, and visual thinking. It



**Fig. 21.** Metallic struts appear as gigantic rails in Doha High rise ofice tower.

deals with the city on the level of individual buildings (and façades) as symbols, or icons that remain over time as signs of uniqueness (landmarks or urban artefacts)" [6].

The issue of identity is debatable, however, it cannot be denied that, in some cases in the world of globalization, identity is a crucial architectural target that refers to the context of the building. Patterns are the most common and reliable source of cultural transfer and expression. Moussavi declares in her book "The Function of Ornament" that ornaments create sensations and effects that relate many buildings of the twentieth century to its cultures. "...They build expressions out of an internal order that overcome the need to communicate through a common language, .... It is paradoxically in this way that building expressions remain resilient in time" [13].

It is apparent that the identity message is the instantly perceived message by viewers in a building, especially if it is distinct and readable. That is why, it should be held as the most significant and vital dimension in patterns creation and should be given greater attention, as it could give a superficial, if not wrong, message to the viewer.

## 6. Critical analysis of buildings using patterns

Many renowned architects have designed buildings for the Islamic communities or countries abroad and referred to them with their patterns, including cultural buildings such as the Islamic Cultural Center in Rome by the architect Paolo Portoghesi, Fig. 12 and the Institute du Monde Arabe in Paris designed by Jean Nouvel, Fig. 13. In the first building, the repeated columns carrying the woven arches and the inscribed patterns in the dome and on the walls were the features that related the building to its function and targeted users. In the second building, the main façade covered with lens-like mashrabya patterned windows were the reference element to the function and users of the building. Most buildings that represent Arab countries are adorned with the traditional or Islamic patterns to link it with its origin.

It has become the job of the architect to design the already known patterns in a contemporary vision. Parametric design has contributed intensely to this job. Architects utilize different techniques and strategies to contemporize the old patterns such as repeating then fading, or overlapping or turning them into a more abstract version. However abstract the designer wants to present the patterns, or whatever modernized vision he wants to impose, patterns' identity always dominate the building. A rich example is the KAPSARC mosque designed by HOK architects. Overlaying various sized patterns braced the abstract glass cubed building and the stand-alone minaret, Fig. 14-a. In addition, the interiors had different layered patterns with different scales, Fig. 14-b. This identifies how a foreign architect psychologically perceives and expresses the function and the context.

When architects design public buildings in the Middle East, they prefer to refer to the identity of the country or its history, even if the building had no relation, in function, with that reference. This issue is eccentric, as those same architects, when designing in other countries, are not that keen about referring to the identity. It is a matter of how dominant the culture of the place is, and how much richness it adds to the value of the building.

Jean Nouvel covered his design for the Louvre Museum in Abu Dhabi (2017) with a huge dome perforated with Islamic patterns to cast shadows all over the place, giving a strong reference to the culture and serving as a new icon in competence with the nearby icons in the Saadiyyate cultural district, Fig. 15-a,b. In the National Museum of Qatar, the same architect used a simple veins pattern on the masses inspired from the desert rose Fig. 16-b. The buildings mass already consisted of different oriented discs



**Fig. 22.** Units of patterns are not perceived aesthetically from the inside.

clashing and interlocking with each other creating a unique and unexpected pattern itself Fig. 16-a. That is why the discs were covered with patterns strengthening and complementing to the idea of the rose.

However, in Doha 9 High Rise Office Tower (2012), a debatable issue could be detected, Figs. 17, 18. Jean Nouvel inspired the form of the tower from the traditional pigeon towers in Aldoha, Fig. 19,



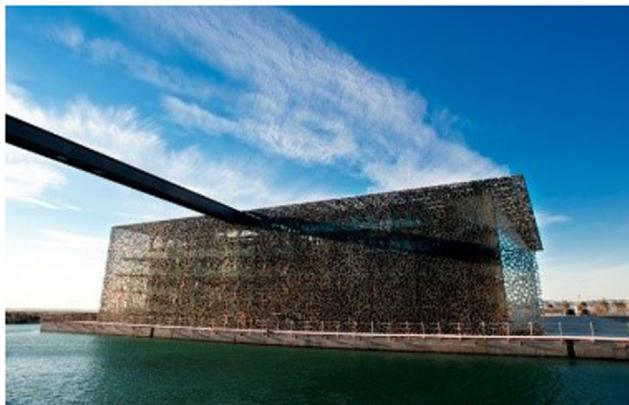
**Fig. 23.** The Library of Birmingham, Mecanoo, 2013, UK.



**Fig. 24.** The shadows of patterns in the interior of the Library of Birmingham.



**Fig. 25.** (a) Tripoli Congress Center, Tabanlioglu Architects, 2010, Libya, (b) Playing with surfaces, materials and scaled patterns in the facades, (c) Patterns inspired from the context, nearby trees (d) Playing with surfaces, materials and scaled patterns in the interiors.



(a)

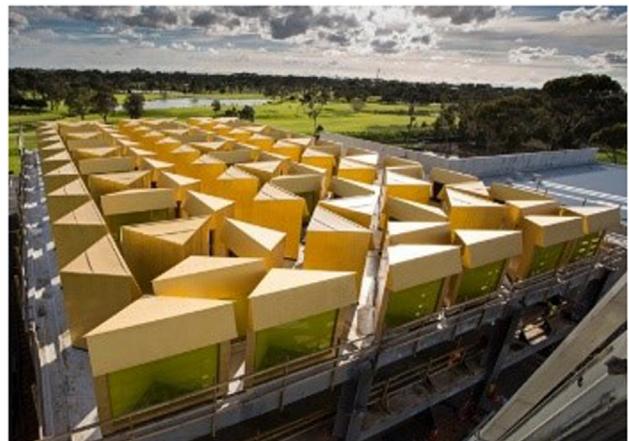


(b)

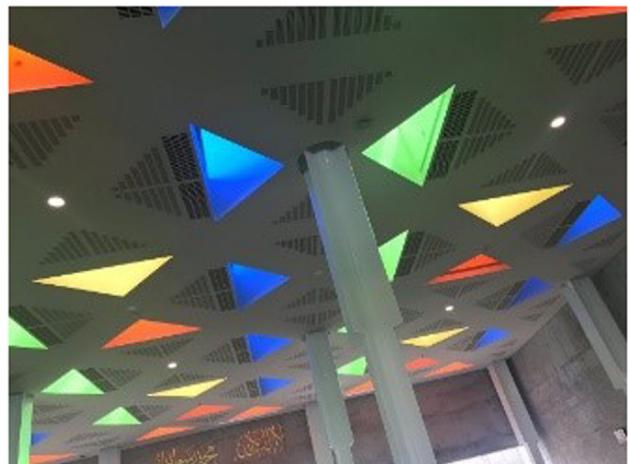
**Fig. 26.** (a) Musée des Civilisations d'Europe et de Méditerranée, Rudy Ricciotti, 2013, Marseille, France, (b) Patterns used in the museum casting shadows.

yet the existence of the Gherkin tower inaugurated in (2004) in London for the master architect Norman Foster was not put in mind, Fig. 20, as both forms bared a significant resemblance. In addition, it took a similar form to Nouvel's tower in Barcelona that he built in 2005, Fig. 18. Despite all the prizes that the Doha building achieved, the sustainable measures conducted, and its structural brilliance, the building still had a form problem. Nouvel depended on wrapping the building with the interlocking geometrical patterns inspired from the Islamic architecture to deliver the message of identity without paying attention to certain aesthetic values. The pigeons' towers had solids and voids, different patterns, slightly tapered ends and material texture that added to its beauty. It was supposed to be linking the viewers to an old era and evoking their emotions and restoring their past memories. However, the new tower looked like a still, static bulky bullet with no dynamic effects, except when retrieved at night seeing the different lights distributed among the tower from the inside. In addition, the used pattern is nearly the same as the one he used in the Louvre in Abu Dhabi.

Another very negative point in using these patterned wraps for the façades is that it rarely happens that architects adjust the proportions of the patterns to be perceived aesthetically by viewers from the inside, Fig. 21 with the same aesthetic proportions as from the outside. These metallic struts appear as gigantic rails



(a)



(b)

**Fig. 27.** (a) The triangular patterned mass, The Islamic center, Glenn Murcutt, 2016, Melbourne, Australia, (b) The colors in the internal ceiling.

especially when perceived from small spaces. The patterns lose their aesthetic value as some of its elements are not complete from the perception of the internal viewer. This could be seen in an office in the Doha tower, Fig. 22.

It has been noticed lately that many architects tend to cover their masses with patterns as if wrapping them, failing to recall the main message that patterns deliver: identity. Different geometric shapes are doing the job of filling the gap of façades design and giving a unique look to the building, differentiating it from the surrounding context, without taking into consideration the function of the building or its location or what the pattern itself is referring to. In the Library of Birmingham by Mecanoo architects, circles are covering the whole building with no reference to the function or context or even integrating the pattern in the interior design, except through the shadows casted by these patterns, Fig. 23. The metal struts appear huge from the inside especially in the reading area that jail the people inside and might disturb them with the shadows while reading, Fig. 24. In spite of the vivid fantastic experience inside the library, the design of the struts wrapping the façades have become the matter of the architects' preference or taste.

Another identity-telling patterns came in Tripoli Congress Center for Tabanlioglu Architects, but this time, identity was referring



(a)



(b)

**Fig. 28.** The water cube, The PTW architects, 2008, Beijing, China.



(a)



(b)

**Fig. 29.** John Lewis Department store, Foreign Office Architects, 2007, Leicester, UK.

to the surrounding trees context, Fig. 25-a. In addition, the walls had some patterns to control the diffusion of daylight into the interiors. So, the building's wrap had dual function: relating to the surrounding context and integrating with it, in addition to the environmental goals, Fig. 25-c. The architects succeeded in utilizing the patterns with appropriate scale when perceived from the interiors or the exteriors. The mass showed no complexity as it came as a clear box incubating all the functions and spaces. This box is wrapped with an aesthetically and functionally appealing mesh to create its façades design. They also played with surfaces in the façades with different scaled patterns and glass Fig. 25-b. These planes were also used in the interiors to create dynamic feeling in the interiors Fig. 25-d. Furthermore, a digital screen was used in the exteriors to give that dynamic effect.

Fig. 26-a,b shows the Musée des Civilisations d'Europe et de Méditerranée, in Marseille. Although this building has many stories to tell, the architect chose the square shape for his plans, the scaled cubes for his form and covered it from two sides with a patterned screen. In spite of the technology used in this screen and the beauty of the patterns used especially with the light effects at night, glittering like the waves it is standing upon, and the shadows casted by these patterns on the floor to mingle with the waves surrounding it, the building architecture itself is so simple. The repetition of wrapping pure shaped architecture buildings with patterned screens might kill the enthusiasm of discovering the unexpected in such a supposedly iconic building.

Dealing with patterns has become, in some cases, so superficial that it reached playing, interchangeably, with its elements in sizes, colors or even extruding them thinking it will express a certain culture or community, leading to losing the essence of patterns and their meaning.

In the Islamic center in Melbourne, the architect chose the unit of the triangle, and repeated it, forming the main mass of the building, and forming, what could be named as, a "patterned mass" Fig. 27-a. Inside the building, the architect merged between the colors present in the stained glass in many buildings related to the architecture of Muslims, and the triangle also present as a traditional pattern in the traditional architecture of some Islamic countries. That merge released an output that took the building away from its spiritual and contextual message it was supposed to deliver, Fig. 27-b.

Architects might use patterns inspired from the function of the building to refer to it such as the PTW architects who used a hexagonal shaped meshed pattern in their project, the water cube. The mesh referred to water bubbles covered with the ETFE materials that played an environmental role as well, Fig. 28-a,b. It was like an airbag cushions with tubes that were used to heat the water for the swimming pools inside. Another example is John Lewis Department store in Leicester, where the building is wrapped with a perforated mesh inspired from the fabrics in the store and the Indian Saris of the majority of the population in the city, Fig. 29-a,b. The meshed screen referred to the translucent fabric sold in the store. The patterns work as ornaments for the viewers,



(a)



(b)

**Fig. 30.** (a) Ravensbourne College, Foreign Office Architects, 2010, London, UK. (b) The used pattern.

but it is not definite that the viewers correlate between the patterns and the message they were supposed to convey.

Another example of how patterned exteriors are becoming so inexplicable or encoded, decreasing the building's architecture quality is the Ravensbourne College by Foreign Office Architects in London. This building is wrapped by colored aluminum tiles perforated with circular windows, Fig. 30-a.

"These patterns on the tiles are inspired from the Gothic roses and flower patterns.... They were not used as an imitation of Nature but as an abstract construction" [20]. The patterns gave no reference to the function of the building which is a college of digital Media and design. Although the designers intended to push the boundaries of innovation through using cutting edge technology, the first impact of the building on its viewers did not imply this idea. On the contrary it recalled traditional art notion that could not even be connected with London, Fig. 30-b. This patterned façade also affected the interiors that turned out to be very simple with no creative experiences. In addition, there was no caring about the rhythm and scale or positioning of the circular windows in some spaces in the interiors according to its relation to the ceiling and false ceiling, Fig. 31-a & 31-b. The screen wrapping the



(a)



(b)

**Fig. 31.** (a) Workshops interiors, Ravensbourne College. (b) Lounges interiors, Ravensbourne College.



**Fig. 32.** Georges-Freche School of Hotel Management, 2012, France.

building made the architects ignore the proportions and the interior quality.

Wrapping facades with window-shaped patterns have given architects the opportunity to go for free form plans with sculptural masses. This lead, in some cases, to incomprehensible forms that were intended to be fluid. The patterned windows were distributed



**Fig. 33.** Twisted bridge, wrapped with triangular patterns.



**Fig. 35.** Patterns in the interiors, Georges-Freche School of Hotel Management.



**Fig. 34.** Classes interiors, Georges-Freche School of Hotel Management.

on the form with no definite hierarchy or rhythm according to internal spaces needs for openings. This is clearly shown in the Georges-Freche School of Hotel Management for Massimiliano and Doriana Fuksas. The triangular pattern was chosen for covering the sculptural mass of the school, with no identity reference, just for its flexibility in shaping the aluminum sheets covering the façades, [Figs. 32, 33](#). Although the architects succeeded in creating an iconic sculptural mass in the neighborhood, the major problem was the windows perception from inside the building. It seemed, in some spaces, so scattered and dispersed with no apparent hierarchy. Another repeated problem was the scale of the openings and their position compared to the height of each space, [Fig. 34](#). In some spaces, the windows were either cut by the false ceiling with no completed pattern unit or awkwardly winded to flow with the sculptural nature of the walls [Fig. 35](#). The plans of the building showed an undefined shape that seemed to flow to form the sculptural mass, [Fig. 36](#).

Sometimes architects use patterns that reflect their intended concept in their buildings. They use them as a tool to clarify the ideas they have in their minds. This happened in the bird's nest stadium in Beijing (2008), where the architects in Herzog & de Meuron tried to wrap the vessel-shaped building with gigantic struts, that were also used as structural elements, to accentuate on the conceptual message of gathering people within one space to do different functions, [Fig. 37-a,b](#). In another building in "the wintergarden shopping center" in Brisbane, the architects expressed the vivid life of winter in an abstract layered façades wrapping the center. The

abstract patterns were interlocking, colorful and included elements of nature in an abstract way, [Fig. 38](#). Whether the used patterns are appreciated by the viewers or not, the intentions of the architects were clear. They wanted to emphasize their architectural concepts in a readable way to the ordinary viewer. Afterwards, the building is criticized architecturally, as an overall, including the patterns wrapping them as they are integrated in the buildings' architectural ideology and not a separate component.

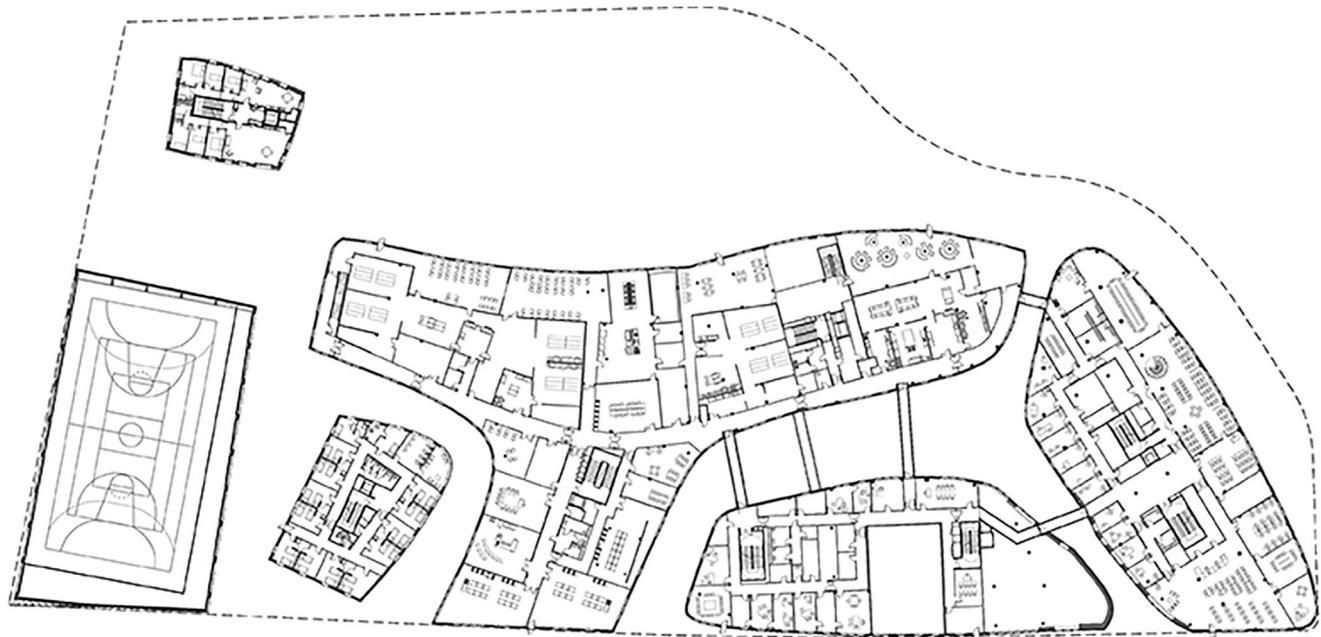
If criteria are to be put for the success of using patterns in wrapping buildings, it has to include uncompromising the mass architecture and the patterns' visual impact on the viewers. The patterns scale should be perceived correctly and aesthetically from the interiors as well as the exteriors. Patterns in any building must be put when needed and not used as a haven for the façades design. It has to have a mission to fulfill whether in referring to identity or for environmental or structural purposes.

Patterns have various ways of categorization, ornaments, and ornamental patterns are considered as subcategories. As Gleiniger states, "Ornament is derived from the concepts of pattern and pattern formation" [8]. However, the contemporary patterns in the building's exteriors are either reflecting the identity through referring to its place, context, and function or even to its logo, or have certain targets that were the intentions of the architect from the beginning of the design process. These targets could also be divided into environmental targets or structural ones, [Fig. 39](#). The architect makes designing the wrapping patterns in the mass his main job, that the plans have simple shapes and act as containers for all the elements of the architectural program. Designing of forms and masses to produce complex creative masses has been compromised to the favor of the complexity of the chosen pattern.

In the following [Table 1](#) the criteria are assessed in the previously discussed buildings, which used patterns, according to the explanation of the architectural concepts upon the words of their own architects and according to critical explanation in renowned architectural journals.

It is important to emphasize that this is not judging the success or failure of the chosen buildings, but it is just critical opinion about the role of the pattern elements in them without going through the buildings functional, structural or aesthetical aspects.

It is apparent that many buildings are adopting using irrelevant patterns to form its façades without having any deep insight into more efficient and meaningful façades. Patterns are returning to be just ornaments that are only decorating the buildings' exteriors with no meanings or significance. If this case continues and prevails, it is expected that a criminalization manifesto will appear to hinder that tendency and return architects to their creative path.



**Fig. 36.** Level 1 floor plan, Georges-Freche School of Hotel Management, Massimiliano and Doriana Fuksas, 2012, Montpellier, France.



(a)



(a)



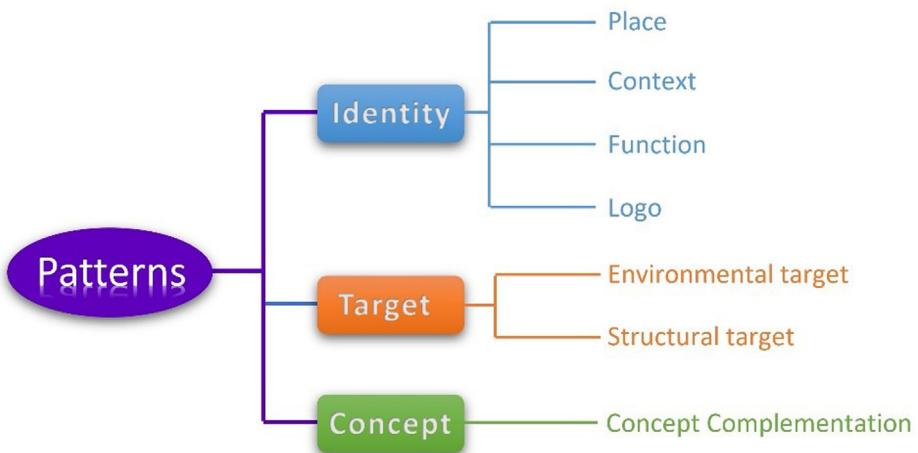
(b)



(b)

**Fig. 37.** (a) Bird's Nest, Herzog & de Meuron, 2008, Beijing, China, (b) Gigantic structural struts forming the patterns wrapping the huge vessel.

**Fig. 38.** (a) Wintergarden shopping center, Studio 505, 2012, Brisbane, Australia (b) Layered colored complex patterns wrapping the façade.

**Fig. 39.** Patterns classification according to intended aim.

**Table 1**  
Evaluating different buildings according to the role of their patterns.

Building	Identity		Target	
	Related to Function/ logo	Related to Place/ Context	Environ-mental target	Structural target
Islamic Cultural Center, Rome, Paolo Portoghesi, 1994	✓	✓	—	✓
The Institute du Monde Arabe, Paris, Jean Nouvel, 1987	✓	✓	✓	—
KASARC mosque, Riyadh Saudi Arabia, 2014	✓	✓	—	—
The Louvre Museum, Abu Dhabi, UAE, 2017	—	✓	✓	—
The National Museum of Qatar, Qatar, 2008	—	✓	✓	—
Doha 9 High Rise Office Tower, Qatar, 2012	—	✓	✓	—
The Library of Birmingham, UK, 2013	—	—	—	—
Tripoli Congress Center, Libya, 2010	—	✓	✓	—
Musée des Civilisations d'Europe et de Méditerranée, France, 2013	—	✓	—	—
The Islamic center, Melbourne, Australia, 2016	—	✓	—	—
The water cube, The PTW architects, Beijing, China, 2008	✓	—	✓	✓
John Lewis Department store, Leicester, UK, 2007	✓	—	—	—
Ravensbourne College, Foreign Office Architects, 2010, London, UK.	—	—	—	—
Georges-Freche School of Hotel Management, Montpellier, France, 2012	—	—	—	—

**Table 2**  
SWOT analysis of Using Patterns in Contemporary Architecture.

Strength	<ul style="list-style-type: none"> <li>Link the building with its context or origin</li> <li>Express the intended concept of the building</li> <li>Might be used as an environmental control system</li> <li>Might contribute to give an aesthetic value to the structural system</li> </ul>
Weakness	<ul style="list-style-type: none"> <li>Might be irrelevant to any aspect of the project</li> <li>Might convey a wrong message</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>Give the building a unique character that might elevate it to be a landmark in its area.</li> </ul>
Threats	<ul style="list-style-type: none"> <li>Decrease in quality of architecture and design ideas</li> <li>Repetition of prototype of buildings with basic forms wrapped with a mesh of patterns</li> </ul>

Conducting SWOT analysis on using patterns in buildings facades in contemporary architecture might highlight the effect of patterns if it used in the correct or wrong ways, [Table 2](#).

## 7. Conclusion and discussion

Patterns are present by default in nature and are present in buildings whether intentionally or unintentionally. They could be looked at as experience, giving indications and sending messages

to help users live the architectural enclosure. They introduce the idea of hierarchy and organization. It is the outcome of using modules or grids in design. Patterns are any repeated element in a certain sequence or hierarchy. It could be meant as an ornament or as a functional element. They define many cultures and regions, in spite of being sometimes, somehow similar. Size, hierarchy, color and orientation seem to play important roles in delineating its specific source.

Patterns have always been criticized as a tool in architectural design. Passing by different eras, it has been adopted, attacked, refused, applauded to, criticized, and recommended. It has taken various forms, shapes and done different functions whether aesthetical or structural. It appears nowadays that it has become the haven for many architects to escape other elements of architectural design.

It cannot be ignored that the digital technological progress has given architects the chance to innovate in conveying their intended messages through patterns. It allowed them to make infinite dynamic configurations of dynamic shapes serving messages of identity, or achieving its environmental functions, broadening their springs of concepts. However, in some cases, patterns are diffused in buildings due to the easiness of its generation through digital tools neglecting its meanings or roles or even the messages it is supposed to convey for the sake of covering the building with

something extraordinary to be iconized. The building loses its impression after a while leaving it meaningless. It seems like a rush in using digital tools to produce unprecedented shapes competing with other motifs without caring about its expression quality.

Patterns have become a wrapping tool or a packaging method for some architects ignoring their role in creating an interacting humane building, ignoring the users' perception from the inside, and leaving the user wondering about the meaning of the gigantic struts or crosspieces covering the windows.

In some cases, patterns fulfil the job completing the design of masses allowing different experiences to be seen and lived by the users, implementing the message conveyed through masses and integrating with its concept. In such buildings, patterns seem to be a part of the building's idea and they become irreplaceable or indispensable, communicating with the user internally and externally.

Patterns, in its mesh role, give the architect the chance to play with light and shades inside the building. If well studied, it could be a means of increasing the interior quality experience.

In some cases, as a proof that architects look to patterns as a haven, architects tend to emphasize the dynamic character of their façades through implanting screens for advertisements that keep changing views as a way of keeping users' attention. Of course, this is the worst case of escaping designing. In other more skilled cases, architects tend to digitalize their facades by applying patterns of lighting dynamically to enhance the three-dimensional experience of architecture rather than flattening it, encouraging an interactive relationship with the users and viewers. Creating vivid changeable patterns may offer different experiences for the viewers but still, it has to be engaged with the main function of the building and add to its aesthetic values.

Patterns should not be a reflection of the wishes and tastes of the architect without paying attention to its role as a message conveyor. It could also contribute to explaining or accentuating on the architectural concept of the building.

The greatest fear is to look in the streets and find that buildings have been altered into geometric forms with patterns. Releasing very abstract, with no soul architecture, losing the humane bond that has been engaging users with their buildings after the international style era. Buildings will be coined with the patterns wrapping them overlooking the function or the experience engaged with it.

It might come out that when patterns were used as ornaments, they meant much more and added values to architecture than when it became the only expression that the building emits. The quality of the exterior architecture and even interiors decreased as the main target became choosing the pattern that will be used to wrap the façades, which ended up most of the time plain, and single layered. The forms are becoming more and more simple, shallow or shapeless not putting much effort in its impression on the viewers.

More research is needed highlighting the threats of using meaningless patterns and their effect on the perception of the users of the building and its interior architecture. In addition, patterns' role in defining the image of the city should be studied with comparative analysis between the architects' and the inhabitants' perceptions.

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