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ROLE OF ARTIFICIAL LIGHTING IN EMPHASIZING THE ENTRANCE APPROACHES

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ROLE OF ARTIFICIAL LIGHTING IN EMPHASIZING THE ENTRANCE APPROACHES

Abstract

Building's entrance is metaphorically a threshold between two realms, the first is an outdoor exposed to climatic change, hazards, and environmental factors, while the second is controlled, monitored, and determined to certain functions. It plays an important role in enriching users' experience. Moreover, it is the first impression a visitor takes to evaluate a whole building. Architecturally, the entrance is a very special part in the elevation, distinguished and emphasized by different design approaches. One of these approaches is using lighting. There is a direct connection between recognition of a space and light assimilation in it. From sunset to dawn, the artificial lighting plays a role in drawing attention to texture, colours, and forms of external elevations, which supports architecture to achieve its purpose. This paper sheds the light on the problem of architects' failure to manage an entrance perception due to insufficient light integration, over illumination, or weak transition from space to another. Many architects consider the entrance as a challenging task, because they believe that it has a direct impact on visitors' perception. This paper, therefore, aims to propose design methods to emphasize the entrance of buildings at night through using the proper artificial lighting. To achieve this aim, the paper used a scientific methodology, based on tracing literature review about design of entrances, investigating ideas of entrances' emphasis, and then analysing four case studies trying to identify the different design approaches of their entrances and how the location, direction, and intensity of illumination became a part of their nocturnal architectural elevation. As a conclusion, techniques of lighting entrances contribute in perceiving architecture's true purpose and raise the aesthetic dimension of the building at night.

Keywords

Entrance Approach, Architectural Design, Artificial Light, Nocturnal Architecture, Transition, Perception

1. INTRODUCTION

A title to a book is what an entrance approach is to a project; a golden key into the building. The circulation starts with the outdoor environment and the entrance that leads users inside. An architect can choose one out of the wild variety of the approaches that construct an entrance and its path. These types include frontal, oblique, and spiral geometrical approaches in addition to the approaches of the different types of entrances. Emphasizing the entrance is applied through choosing different materials, colours, sizes, dimensions, and lights to construct a flushed, projected or a recessed one. Particularly focusing on the lights chosen for an entrance, this research discusses the various deviations it can impact an entrance through. Light is a portion of an electromagnetic spectrum that can be perceived by human eyes where the wavelength ranges between 380 and 780 nm. The light is either natural or artificial, and both types of light fit through architecture. The delightful effect of light adds to the project as links between space perception and the way light integrates with and enters this space. It also enhances the objects and elements put in the entrance and space. Once a person steps into the space, or passes by through walking by the street, the light used gives an impression to what this person might see or discover inside this building and predict its function. Architects use the lighting to show rhythm or make the building feel as if flying for instance. Furthermore, the direction of lights to the objects alters spaces and changes the feelings of people towards this particular entrance (Waldman, 2002). Architects may face a challenge of how to affect a visitor's perception through lighting the entrance. This paper sheds the light on the problem of architects' failure to manage an entrance perception due to insufficient light integration, over illumination, or weak transition from space to another. Several buildings around the world have extraordinary form aesthetics, values, and even high function efficiency, but unfortunately their architects miss-handled the proper design approaches of entrances, neglecting the role of artificial light in emphasizing the buildings' entrances. As shown in figure 1, a building's entrance can be emphasized through using certain types of lighting.



Fig.1: Entrance approach showing direction and guidance at MTY House, San Pedro Garza García, Mexico.

Source: www.Archdaily.com

This research aims to propose the proper design methods through a checklist of lighting units' intensities and its emphasis on the entrance. The proposed hypothesis suggests that the external lighting whether artificial or natural at an entrance and the path preceding has the main role in determining what is inside and how this building functions. In order to achieve the mentioned aim, this paper follows a scientific methodology, based on a desk-work method to introduce a literature review about the design of building's entrance, its approaches, tools, and giving similar examples of using artificial light in entrances. Then the paper concludes certain parameters of analysis to be used in analysing four case studies; two of them are (local) - Lebanese - and the other two are international. Respectively, these case studies are:

- Cluster H or The Backyard Hazmieh, designed by Bernard Mallat Architects (Lebanon)
- A-MUSE-UM, designed by Nadim Karam & Atelier Hapsitus (Lebanon)
- OCT Shenzhen Clubhouse by Richard Meier Architects (Hong Kong)
- Maina Panettoni by Gianni Arnaudo (Italy)

To support these analyses, the author used a field method by visiting the two local case studies, captured photographs, and held interviews with users of these projects. Analysing these case studies targeted identifying different design approaches of entrances and recognizing how the location, direction, and intensity of the artificial light became a part of the architectural elevation at night time.

2. LITERATURE REVIEW

“Architecture is the learned game correct and magnificent of forms assembled in the light.”

-Le Corbusier

“Light is a principal beauty in a building.”

-Thomas Fuller

The literature review depicts previous architectural attempts of designing an approach and what architects, experts, and pioneers have said about the matter. Then, it will give a historical background on the entrance approach emphasis and offer some examples where lighting was used to emphasize this aspect. Previous practices of using light in architecture have shown its importance and several advantages. When the right lighting is used effectively in areas heavily used by people, such as doorways and bus stops, they feel safer for all kinds of users. Moreover, lighting an area properly draws attention to its uniqueness and historical value if any. Using the right kind of light can create a sense of drama depending on its intensity, brightness and color (Martin, 2019).

According to previous readings, one of the important articles tackled the topic of nocturnal architecture. This article explained how the external light can change the perception of the outer elevation of a building. It indicated that certain typologies of architectural projects can employ the external light to draw a nocturnal image for their users (Nikoudel, F., Mahdavinejad, M., & Vazifehdan, J., 2018). Other articles focused on clarifying the role of artificial light in the internal spaces and studied its effect on users, function, and design efficiency. As an extension to such studies, this paper concentrates on the entrance-approaches of buildings and tries to formulate proper design methods to emphasize entrances through using artificial light. The literature review therefore introduces firstly the definition of entrance approach, presents a historical background of emphasizing the entrance-approach, explains its different geometrical types and ideas, and then highlights examples of buildings used light in their entrance approaches.

2.1 Definition of the Entrance Approach

An entrance approach is the transition space between the exterior of a project and its interior space. It is the threshold people have to penetrate to enter a certain space. It is meant to give the user a hint about what to expect to experience as they go inside the building. The degree of how the approach is located, design and how much it is articulated depends on the building's typology, capacity and of course the space building regulations allow in its area (Ching, 1943).

2.2 Historical Background of Entrance Approach Emphasis in Architecture

The first noticeable use of artificial light in architectural expression was by the Nazi German architect Albert Speer, whose work defined fascist architecture from the period from 1934 to 1941. Rallies at 'Lichtdom' or the Cathedral of light would assemble lights all around the space of assembly as shown in figure 2. It was the perfect physical translation of the Nazi part's thirst for domination and control. His work would be characterized by three words: big, concrete and composing (Weller, 2016)

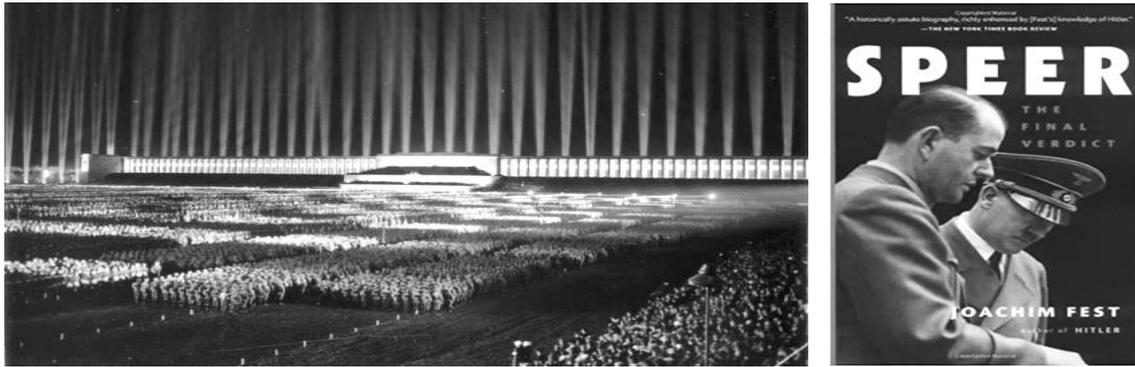


Fig.2: Nazi Rallies at the Cathedral of Light
Source: Commons/ German Federal Archive

Speer was professional in representing feelings of strength, power, and fear through implanting spots of artificial light in the bottom of elevations and entrances in particular. He employed these spotlights to embed the Nazi ideology of domination and control in all surroundings. After a while, architectural design in the periods ranging from 1950s to 1960s relied heavily on natural lighting by allowing large opening of fenestration with no further consideration for artificial lighting. This focus on many openings created problems like overheating and uncomfortable period. In the post-modernist era of the 1970s, design changed to focus on small openings that made interiors gloomy, but were contradicted by innovative practices by architects like James Stirling, whose buildings had functional and environmental problems but were preferred by users (Mansfield, 2017). After that, lighting research started going into a more environmental approach by taking into consideration factors such as energy efficiency and overturning the uniformity of lighting provision and pushing for more variety lighting. These developments were paralleled by emerging projects in Germany in 1990s after the collapse of the Berlin-Wall by signature architects' work like Norman Foster's Reichstag project that employed innovative employment of natural an artificial lighting design. New projects like that in cities with an already existing urban fabric and eventful history pushed designers to think of how to emphasize their work and make it stand out yet remain respectful to its context. The necessity for considering environmental considerations like energy saving also pushed designers to design considering sufficient use of natural light during the day to save energy and use artificial lighting at night to showcase what is important for the project's typology and users' comfort, thus focusing on the building's entrance approach as it is the project's first impression by users. Scientific lighting research joined by design considerations for architects also dictated the intensity of light used as expressed in the following diagram, shown in figure 3 (Mansfield, 2017).

Flow of light	$E : E_s$	Lighting applications
Noticeably strong	↑	Lighting for emphasis and display
	2.4	
Pleasantly strong	2.2	General lighting for formal communication
	2.0	
	1.8	
Pleasantly soft	1.6	General lighting for informal communication
	1.4	
	1.2	
Weak	↓	Lighting for soft shadow free effect
	1.0	

Fig.3: Assessing flow of light through vector
Source: Adapted from Cuttle

The necessity for considering environmental considerations like energy saving also pushed designers to design considering sufficient use of natural light during the day to save energy and use artificial lighting at night to showcase what is important for the project's typology and users' comfort, thus focusing on the building's entrance approach as it is the project's first impression by users. Scientific lighting research joined by design considerations for architects also dictated the intensity of light used as expressed in the following diagram, shown in figure 3 (Mansfield, 2017).

2.3 Geometrical Types of Entrance Approach

Building approaches mark the beginning of the user's experience intended by the architects. A well-designed building approach promises an exciting architectural adventure for targeted building users. There are various ways to design an effective building approach. The first step for an architect in designing a building approach starts with the pathway leading to the entrance.

The chosen type of pathway is a principal part of the project's circulation system, as it dictates what the hierarchy of what users are arranged to see, get involved in, and utilize the spaces inside a building. There are three main types of approaches:

2.3.1 Frontal approach

It leads directly to the entrance of the building within a straight path, and its visual goal is clear, as shown in figure 4. It may be the entire façade or an elaborated entrance (Millet, 2018).

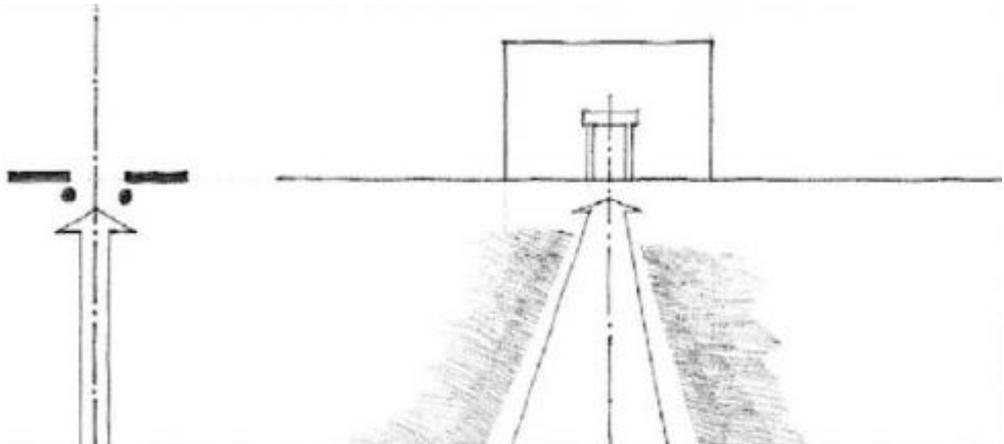


Fig.4: Frontal Approach
Source: Building Approach pdf by Shahul

2.3.2 Oblique approach

It upgrades the effect of the perspective on the frontal façade and form of building, as indicated in figure 5. The path can be redirected once, twice, and even more in order to delay and prolong the sequence of reaching the approach (Millet, 2018).

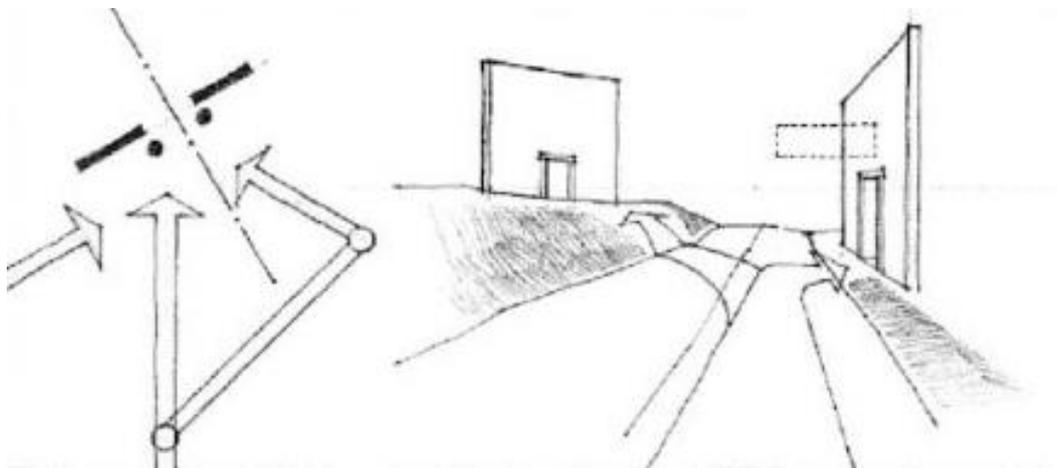


Fig.5: Oblique Approach
Source: Building Approach pdf by Shahul.

2.3.3 Spiral approach

It emphasizes the three-dimensional form of the building and prolongs the sequence of reaching the approach as one moves around its perimeter, shown in figure 6. The building can be viewed gradually during the approach or it can be totally hidden till the arrival point. This type is usually intended is et the user view the whole project and enjoy this journey before going inside (Millet, 2018).

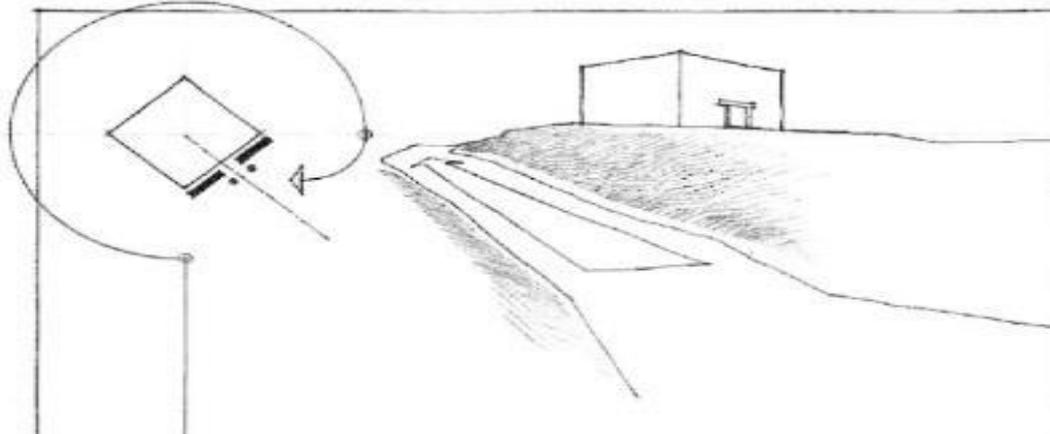


Fig.6: Spiral Approach
Source: Building Approach pdf by Shahul

2.4 Ideas to Emphasize the Building's Entrance

The entrance of a building is the threshold between the exterior environment and its interior space. It contributes to the overall identity of the building and plays a vital role in the first impression and the experience of the visitors. A building's entrance may lead to an entrance hall and then into further interior spaces. The entrance approach can be emphasized through different ways and ideas.

2.4.1 Integrating different building materials

The entrance may be signified by using a material that is different from the other parts of the building. This can make the entrance stand out in the elevation where it is emphasized and shown clearly. There are different options for using materials. For example, glass can be used for the entrance and stone on the remaining part of the façade, etc. Figure 7 is an example of the incorporation of a different material to emphasize the entrance (Chudinova, 2017).



Fig.7: Bianchini Office Building, Italy
Source: Archilovers

2.4.2 Using different colours

Changing the colour of an entrance clarifies the entrance for visitors and makes seem as if emerged from the main elevation as shown in figure 4 (Howard, 2013).

2.4.3 Using different style

Emphasizing the entrance can be done through changing its style than the façade's style, such as making the entrance ultra-modern while the whole façade is classic style.

2.4.4 Shaping the entrance form

The form of the building where the entrance is located has a strong visual emphasis for users approaching the building. When the architect creates a plane perpendicular to the path approach, the user entering the space is directed into the building in the best way as shown in figure 8.

Thus, an architect can distinguish the entrance through making it different in size, scale, volume, height, width, pattern, or even architectural style than the other parts of the elevation.

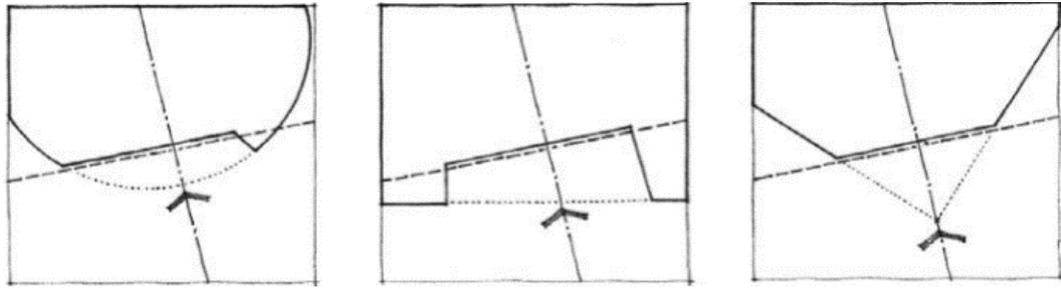


Fig.8: Three shots showing entrance form.
Source: Theory of Architecture - Slideshare Website

2.4.5 Entrance dimensions and location

Dimensions of the entrance in the elevation whether it is big or small, and its location whether it is centered or off-center, reinforces the entrance approach, as shown in figure 9. The perception of an entrance can be visually strengthened by making the opening low, wide, narrow, deep, or indirect where figure 10 explains this point.

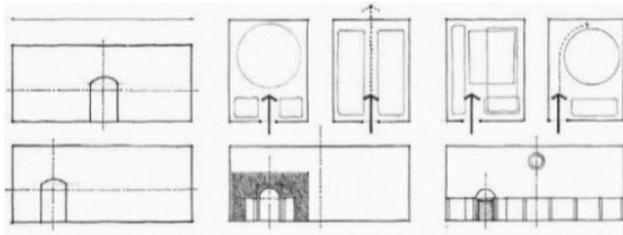


Fig.9: Diagrams showing location of the entrance with respect to façade
Source: Theory of Architecture SlideShare Website



Fig.10: Meijer building, USA.
Source: Beacon Journal Website

2.4.6 Structural elements and ornaments

Articulating the opening with ornamentation or decorative embellishment is another way to emphasize the entrance of a building, as shown in figure 11.



Fig.11: Entrance of Notre Dame Cathedral in Paris signs that centrality, axial arches, ornaments, structural and decorative elements are important way to emphasize the entrance approach
Source: Photographed by the author, 2015

2.4.7 Canopy

The canopy extended over the building's entrance gives significance and importance to the entrance and attracts passers to visit the building. As shown as in figure 12, a canopy can be static or kinetic, according to the function of the building, and its environmental treatment.



Fig.12: ME Building (Laboratory of Biomaterials) in EPFL Campus in Lausanne, Switzerland. It is an example of emphasizing the entrance approach by the design of a kinetic canopy, designed by Dominique Perrault Architecture - Source: Photographed by the author, 2019

2.4.8 Recessed entrance

The recessed entrance provides a shelter and a part of the exterior space around the building. It also acts as a foyer for people who can get to gather before entering the space (Howard, 2013).

2.4.9 Artificial lighting

The lighting design plays an important role in emphasizing and orienting users' view to the entrance approach. The chosen glow and intensity of lighting provide safety during night hours. So, the right type of artificial lighting and its position should be studied and chosen carefully. For instance, spotlights provide strong light source within an addition to a modern touch. However, walk-on floor lights have aesthetic role and direct visitors to the entrance (Millet, 2018).

After presenting different nine ideas to emphasize the entrance approach of a building, the paper concentrates on the last idea (using the artificial light) to be the main cornerstone of this study. In the following part, the paper highlights examples of using the artificial light in entrance approaches of buildings.

2.5 Examples of using Artificial Light in the Entrance Approach

The literature review presents two examples to recognize the ways of architects in emphasizing the entrance approach at night through using artificial light.

2.5.1 Galleries Lafayette department store in Metz, France

This project is a renovation to a building built in 1980s. In order to contrast its original preserved stone façade, the entrance is emphasized by a folding bright red glass canopy that runs along the three facades varying in height from 2.30 m at its lowest point till 11 m over the entrance. Red lighting is integrated with the canopy's structure and sustains the architectural gesture of reflecting the landscape of Metz during night hours, as shown in figures 13 and 14. As



Fig.13: Galleries Lafayette Department Store Entrance Lighting
Source: Archdaily

described by the architect, the use of red light in the canopy aims to appear:

- Radiant; showing the brightness of the staggering of the canopy elements at different elements.
- Graphic; underlines the folds reflected in the lower windows, emphasizing the effect of a suspended staggered veil.
- Dynamic; Disturbing the regularity of the facade by a vibration of the light to deconstruct the drawing of the canopy.

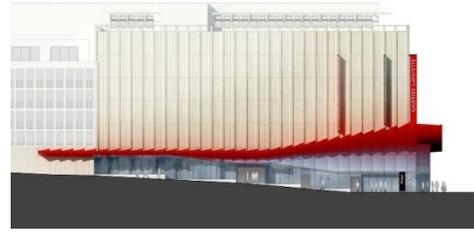


Fig.14: Galleries Elevation.
Source: ArchDaily

2.5.2 Hotel V in Dbayeh, Lebanon

The entrance of the hotel is situated between two protruded masses of different shapes. To the right, a cylindrical element articulated by solid vertical columns. To the left is a rectangular mass with alternating illuminated windows. The entrance in between articulated by lit frames set at three varying heights that absorb the user into the building.

Lights are also situated at the bottom of the steps which give the users a sense as if they are floating into the interior space of the building. The whole entrance approach is designed a different architectural language and seems to emerge from the building's mass to welcome the users inside as shown in figure 15.



Fig.15: Louis V Hotel Approach Downward Shot
Source: Booking Website

2.6 Parameters to analyse Artificial Light

Lighting design at the building entrances includes a combination of approaches based on the architect's design approach, the context of the project, the typology of the project. All these points aim to enhance visibility and give an idea about the role and significance of the building. The type of light says a lot to the architect's consideration for the environment and what the kind of lighting that suits the project. Illumination is the utilization of light to accomplish a practical or aesthetic stylish impact. The location of the lighting units, whether mounted on a vertical and horizontal vary according to what the architect wants to emphasize. As previously discussed, the degree of luminance depends of the building's design language, what its typology demands and the available means present at the time of designing and executing the project. Changes ought to be features to alter the visual adaption through for the duration of the day and night. Vertical brightening and surface radiance ought to be considered to make a lit entrance. Brightening divider luminaires ought to be considered to give visual intrigue and make an obvious signal to check the structure of entrance from a distance. The colour of light and its rendering are particularly important to privilege the mental impact the structure must reflect on the user (Millet, 2018). Finally, an important aspect that goes un-discussed is the color temperature. The color temperature can be defined as the temperature of an ideal black-body radiator that radiates light of a comparable color to that of the light source. This means that the color temperature is an indicator of the level of heat in the heat-up process within the lighting source at which an ideal black-body radiator can project a light in a certain color (Melander, 2017). Based on preceding points discussed, certain parameters are concluded and listed in table. Since this paper mainly focuses on artificial lighting design, the parameters listed in the table1 below guide this research.

Table 1: Parameters of Analysis of Artificial Light in emphasizing Entrance Approach

Finishing Materials	Type of Light	Light Units' Location at the entrance	Light Units' Illuminance	Colour of Light	Color Temperature	Entrance Approach
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3. METHODOLOGY

This paper tackles two topics: the lighting design and its emphasis on the entrance approach. To achieve the previous mentioned aim, it depends on four research methods; the inductive method, the analytical Method, the field method, and the comparative-analytical method. The first one was used to gather data about the selected case studies, depending on reading a variety of sources, providing images and necessary drawings and diagrams to enhance the explanation. The second was used to analyse this data, and represented it in sort of diagrams and charts. The third was a personal author experience in visiting two case studies in Lebanon, taking photographs and making interviews with projects' users. The fourth method was used essentially to compare between the case studies according to the parameters of analysis, mentioned in table 1.

In this context, the study uses these parameters in analysing the case studies, which were selected according to certain criteria. There criteria of selection were:

- Diverse functions, locations, and target users
- Completed projects within the last ten years
- Having emphasis on the entrance approach
- Different finishing materials
- Diverse types of lighting light units' specifications such as illuminance and colour temperature.

3.1 Case Study One: Cluster H - The Backyard, 2016

Project Title: Cluster H- The Backyard
 Location: Hazmieh- Beirut, Lebanon
 Architect: Bernard Mallat Architects
 Date of Opening: June 1, 2016

Cluster H “The Backyard” in Hazmieh, shown in figure 16, is a food and beverage cluster. As Beirut is in need of new public spaces, parks and infrastructure like this, the concept came up to the architect Bernard Mallat. It is an organized chaos that was meant to organize the crowd of Beirut. Figure 17 (a, b, c, and d) presents schematic sketches of the user’s experience in approach and walking through (Mallat, 2016).



Fig.16: Cluster-H-the-Backyard.
 Source: Photo of Īeva Saudargaitė

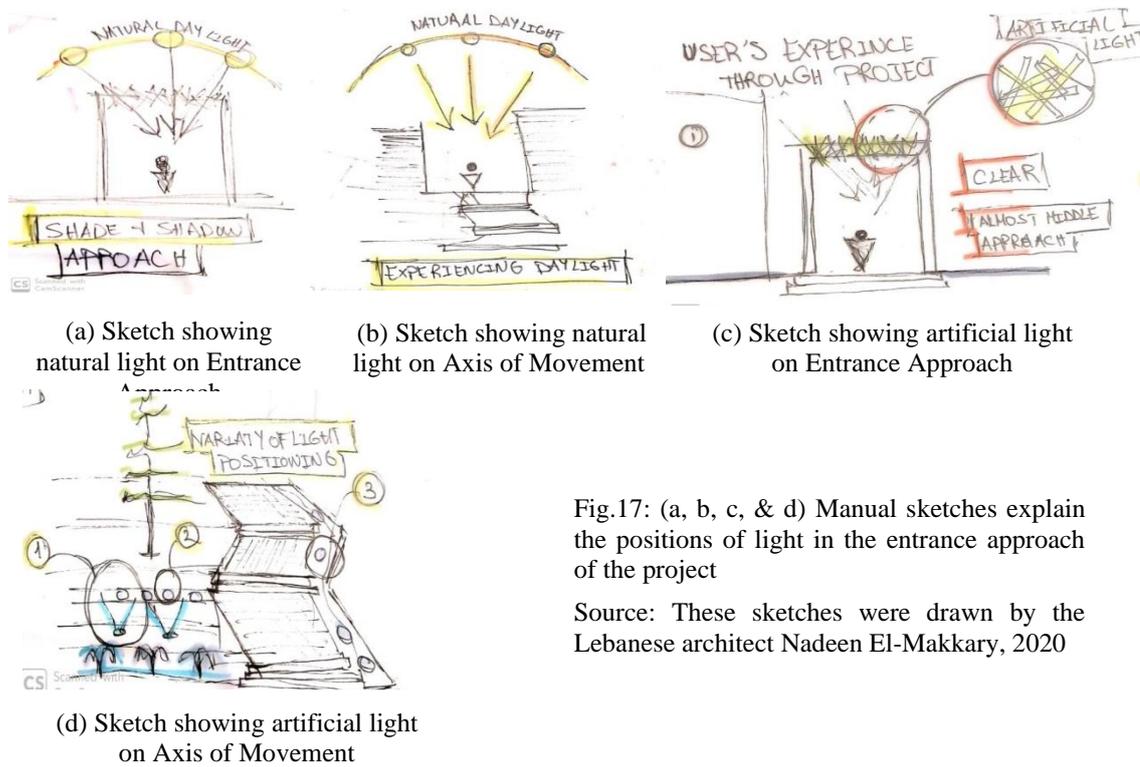


Fig.17: (a, b, c, & d) Manual sketches explain the positions of light in the entrance approach of the project

Source: These sketches were drawn by the Lebanese architect Nadeen El-Makkary, 2020

Based on the parameters concluded in table 1, the case study will be analysed detecting these parameters one by one as follows:

3.1.1 The finishing materials

In architecture usually steel rods which are used to hold the concrete formwork are sawed and plastered over. In the architectural concept of 'The Backyard', these steel rods are removed, cleaned, painted, and then replanted on the façade to form a hairy Cladding recycling some of the waste of the surfaces.

3.1.2 Type of light

As seen the type of lighting used is of temperature 5000k which is the temperature of daylight where they want the light they used to look as natural and warm as possible. Light sources with a colour temperature of 3000k: these light sources have a positive effect on humans when working a long time at the same place sitting still. As shown in figure 18, this type of light is emphasizing the entrance, pulling the user into the cluster as well as giving the feeling of coziness in the village style the design created (Mallat, 2016).



Fig.18: A nocturnal Perspective for 'The Backyard'

Source: Photo of Ieva Saudargaitė

3.1.3 Light units' location at the entrance

The technical areas are covered by vertical steel tubing louvers in this project extending occasionally to the planters as a custom lighting, shown in figure 19. Playful snake-panels on ceilings are used also above planters to illuminate the users' path. The roof terraces infuse some order to the ostensible unruliness by light caps and varied configurations of the tubes. Fireflies delineate the boundaries below the custom lights edging in the various hovering outlets.



Fig.19: Light units at the entrance approach

Source: Photo of Īeva Saudargaitė

3.1.4 Light units illuminance

The way the lighting design starts from the very beginning of the project on the entrance approach is very different from the surrounding context. As shown in figure 20, walking through the axis of the project, users move across the levels steps lit under giving them a floating sense with guiding lights on the edges of the path triggering the feeling of exploration throughout the project (Mallat, 2016).



Fig.20: Axis of Movement

Source: Photo of Īeva Saudargaitė - with analysis of the author

3.1.5 Colour of light

The colour of light used at the entrance approach is white and very close to the colour of the moon. This eye-catching colour attracts the visitors giving this project a unique look and an outstanding identity where it is iconic in relation with the surrounding. The lights on the edge of the pathways along the approach are dark blue in colour and are integrating with running water channels.

3.1.6 Colour temperature

The temperature of colours used are cool white (3100k-4500k) and daylight (4600k-6500k). Figure 21 shows the colour saturations of artificial light, directed towards English letters related to the purpose of the project.



Fig.21: The different colour saturations of artificial light

Source: Larsen, 2017

3.1.7 Entrance approach

As shown in figure 22, the type of approach is oblique approach on both the main and secondary entrances were they play an important role on attracting the user and enhancing the spirit of curiosity within them.

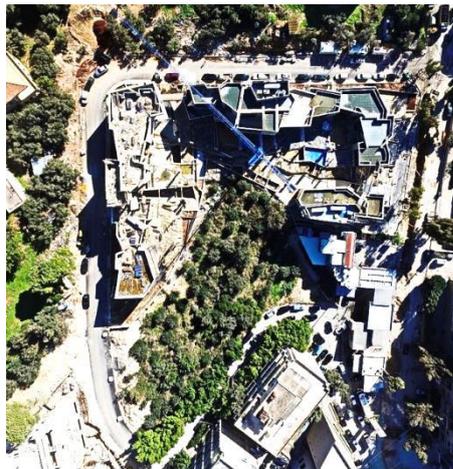


Fig.22: Entrance Approaches/ Main and S

Source: Bernard Mallat Architects Website

3.1.8 Interviews

After visiting this project, the following users and architects have been interviewed and asked to know their opinions as follows:

- *“I believe that emphasis of light has an important role on the architectural image of the building, and in this project it is used very well to isolate the project from the surrounding thus creating the spirit of the old Lebanese village in a new modern way right from the entrance.” – Rawan, Architect*
- *‘the positioning of the lighting on the ground is what makes me go there again and again, every time you go, the lighting lifts you and gives you the sense of flying in relation with the water element in a very harmonic way’ – Cireen, Interior Designer*
- *‘The way natural light enters every space gives you this weird feeling of being in a private place yet you are in a public one, and spending the whole day there makes you feel the idea of light being born and people interacting with it’. Mohammad, Architect*

After experiencing this project and detecting the important role of artificial light in emphasizing its entrance approach, the paper continues analysing the second case study as follows...

3.2 Case Study Two: A. MUSE.UM / Nadim Karam+ Atelier Hapsitus, 2019

Project Title: A.MUSE.UM.

Date of Opening: 2019.

Architect: Nadim Karam + Atelier Hapsitus.

Location: Daroun, Lebanon.

Located in the villages of Daroun, architect/artist Nadim Karam placed his atelier in order to reflect, create, and experiment. It is placed in between the landscape works in front of his own traditional Lebanese stone family residence (Karam, 2019).

3.2.1 Type of light

The Atelier lighting was under the supervision of Highlights SAL that provided consultation about the lighting used. Since the project is located in between the landscape contour lines, LED lights were used to emphasize the approach given directly to the entrance, shown in figure 23. Moreover, the LED lights used among the project directly give emphasis to the stairs located on the roof of the Atelier that lead to the traditional family residence house (Karam, 2019). It is important to note that natural light has a direct link to the entrance in which it has a direct visual connection with exploring space inside, shown in figs 24 & 25.



Fig.23: Nadim Karam + Atelier Hapsitus 2019
Source: ArchDaily Website

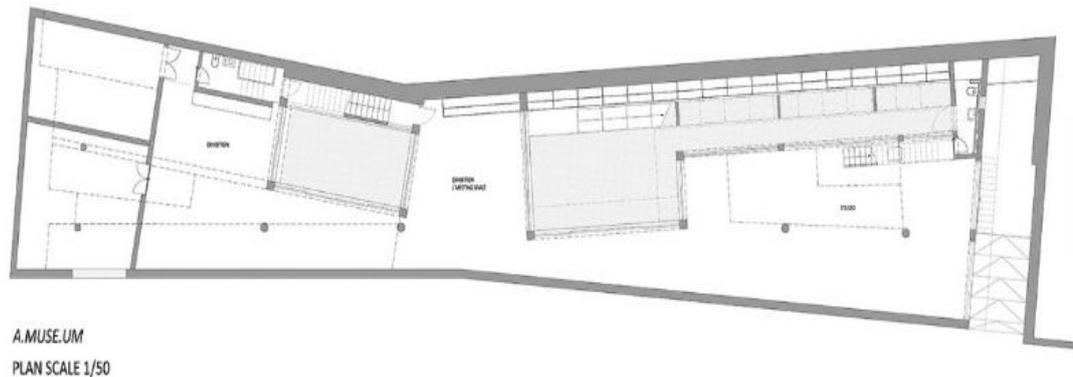


Fig.24: Plan - Source: ArchDaily Website

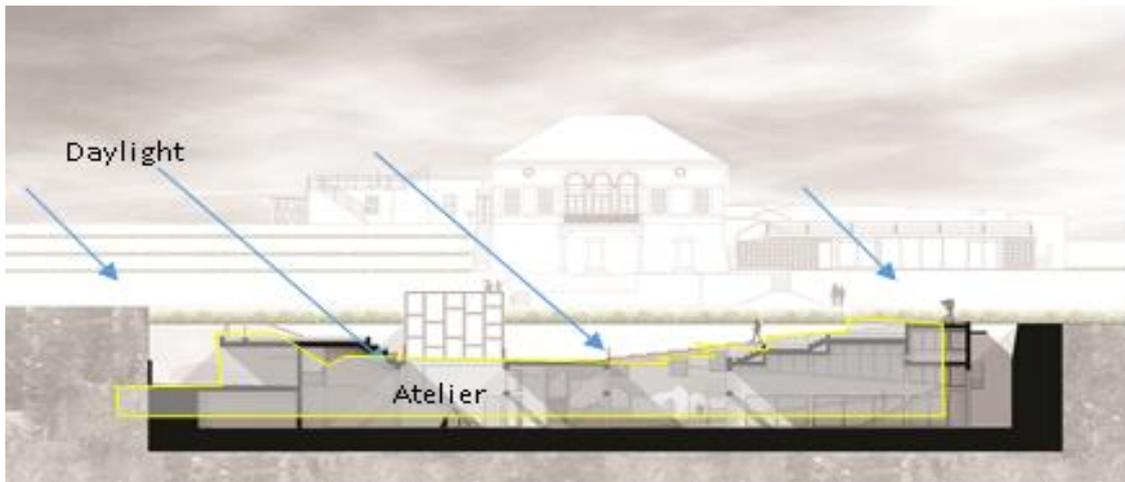


Fig.25: Section - Source: ArchDaily Website

3.2.2 Light units' location at the entrance

The light units are fixated horizontally on the ground till reaching the entrance giving an approach due to the fact that the entrance type is not direct, shown in figure 26.

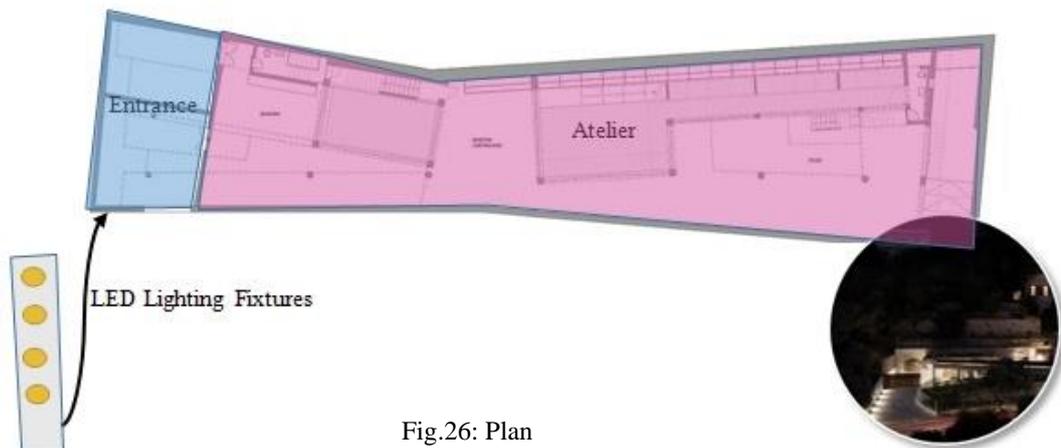


Fig.26: Plan

Source: ArchDaily Website with analysis of the author

3.2.3 Light units' luminance

The lighting used is of medium luminance in a way that the circulation ramps and stairs are easy to walk through and not eye irritating. LEDs gives them a much higher light intensity in one direction per given total light output, as shown in figure 27.

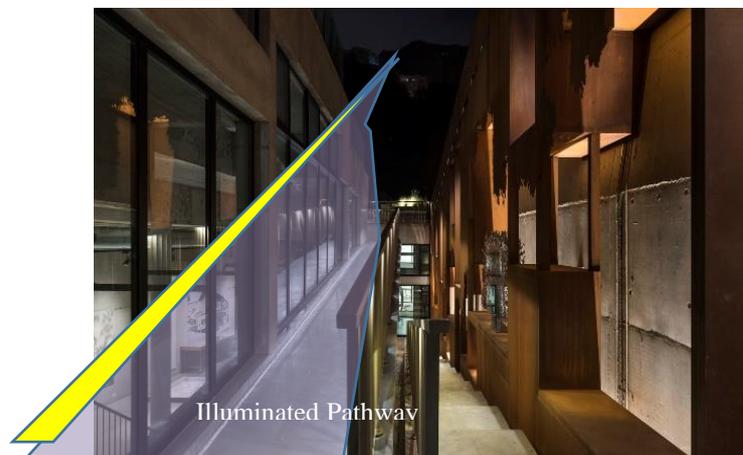


Fig.27: An Illuminated Interior

3.2.4 Colour of light

Yellow tones correspond to dusk and dawn, times when the body is generally more relaxed. This is why the lighting used at night is more of a dimmed yellow. It creates an atmosphere of calm circulation around the project and thus more comforting for the user’s eye. This might not add to the advantage that it is a working studio so at night might endorse more of a non-working environment (Caballero, 2019).

3.2.5 Temperature of light

At night, the lighting should ease the visitor from the dark outdoors into a warm interior light that will not overload their senses and help them relax. This is why a warmer temperature is used. Moreover, outdoor spaces are more prone to warmer light in order to enhance the visual appearance of the landscape elements (trees, bushes). Table 2 shows guidance to the colour temperature of light used in this project (Caballero, 2019).

Table 2: Guide to Colour Temperature Used - Source: Ledlightforyou

Color Temperature (KELVIN)	2000K - 3000K	3100K - 4500K	4600K - 6500K
Light Appearance	Warm White	Cool White	Daylight
Ambience	Cozy, calm, inviting, intimate	Bright, vibrant	Crisp, invigorating
Best for	Pendants, wall/coach lanterns, restaurant/commercial ambient lighting, residential recessed lighting, table & floor lamps	Basements, garages, work environments, task lighting	Display areas, security lighting, garages, task lighting

After experiencing this project and detecting the important role of artificial light in emphasizing its entrance approach, the paper continues analysing the third case study as follows...

3.3 Case Study Three: OCT Shenzhen Clubhouse/ Richard Meier& Partners, 2012

Project Title: OCT Shenzhen Clubhouse

Date of Opening: 2012.

Architect: Richard Meier & Partners

Location: Shenzhen, Hong Kong

Sited on a prominent island in the middle of the OCT harbor lake, the 118,400 sf OCT Shenzhen Clubhouse consists of two buildings occupying an artificial island on the southern edge of Shenzhen, a waterfront financial center north of Hong Kong. The Clubhouse provides a quiet oasis for guests and members with a restaurant, a multi-purpose area, as well as recreational facilities, a fitness center and a small exhibition gallery (Meier, 2012).



Fig.28: The entrance approach of OCT Clubhouse

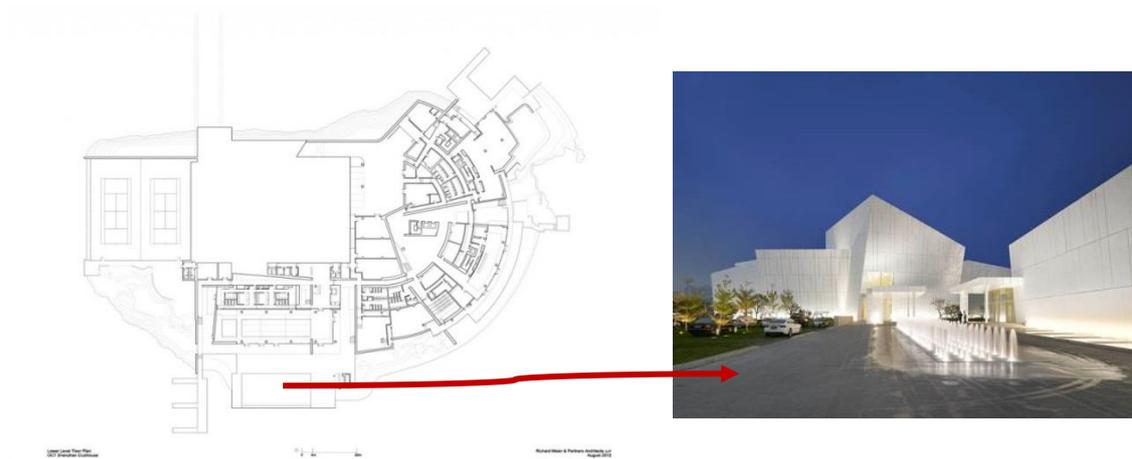


Fig.29: Location of entrance on the projects' plan.
Source: ArchDaily Website

3.3.1 Type of light

The firm's guiding principles of metal panel and mastery of natural light define the building. The shift of natural light throughout the day animates the interior of the clubhouse revealing different spaces and the crisp surfaces of the OCT Shenzhen Clubhouse. The dramatic planes and natural light shape the space and mark the passage of time and the presence of the sky. As night falls, luminaries are used to attract the users into the building as they are integrated with the water elements, placed below the entrance and the main building walls (Meier, 2012).

3.3.2 Light units' location at the entrance

The light units are fixated horizontally on the ground along the pathway leading to the entrance where each lighting unit is joined with a nearby small water fountain integrating the soothing natural sounds of flowing water accompanying the users approaching the direct entrance pathway chosen. At the entrance, units are placed horizontally beneath the entrance to further emphasize it. Lights are also placed across the folding planes of the massing to showcase its clean white colour, lightness and glow. Figure 29 shows the location of the entrance on the plan and the architect's lighting treatment (Grieco, 2012).

3.3.3 Light units' illuminance

Metal panels unite the buildings on the site as well as an interior space experience driven by natural daylight s shown below in figure 30. The natural luminance is directed to reflect across surfaces and its shifting angles reveal spaces during the passage of time. As for the light units, the luminance degree is high since the building's light colour demands a bright light colour to emphasize the planes and their movement (Grieco, 2012).

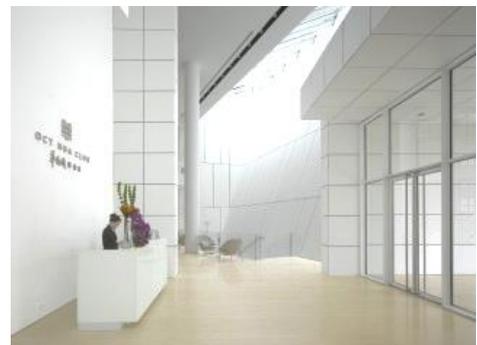


Fig.30: The interior space of the entrance hall
in OCT Clubhouse
Source: Courtesy by Roland Halbe, 2012

3.3.4 Colour of light

There are two colors observed in this project. At the entrance approach, the light color is white to emphasize the direct pathway to the entrance, the entrance door into the space and the building's planes shown from that angle of the project, seen in figures 31 & 32. From the other angles of the project, the color shifts to a warmer yellow giving the users a sense of coziness and a welcoming sense of coziness.

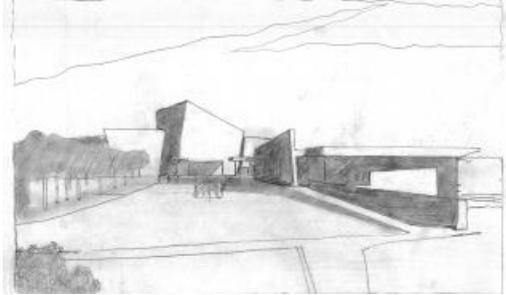


Fig.31: A Sketch of Richard Meier represents the entrance approach



Fig.32: Shifting the colour to a warmer yellow is deliberate

Source: Courtesy by Roland Halbe, 2012

3.3.5 Colour temperature of artificial light

The OCT Shenzhen Clubhouse demonstrates innovative composition of light and space, and challenges the usual fitness centre typologies. The dramatic planes and natural light shape the space, define the building and animate the interior spaces. The firm's signature guiding principles of the white metal panel and mastery of natural light highlight the building. The overlay of solid planes and clear voids create depth through a play of shades and shadow from skylights and vertical screens, shown in figure 33. The artificial lighting units have temperatures that vary between (3000k – 6000k) (Grieco, 2012).



Fig.33: The different color saturations of artificial light - Source: Larsen, 2017

After experiencing this project and detecting the important role of artificial light in emphasizing its entrance approach, the paper continues analysing the fourth case study as follows...

3.4 Case Study Four: Maina Panettoni / Maina Headquarters, 2014.

Project Title: Maina Panettoni / Maina Headquarters.

Date of Opening: 2014.

Architect: Gianni Arnaudo

Location: Fossano, Italy

A big red ribbon is a symbol for joy and cheerfulness both in the West and in the Orient. This is what “wraps” the completely extended Mania works to celebrate the fiftieth anniversary since the foundation of this industry in Fossano, Italy. It is called the new “house” of the Nocciolato bread and other specialties of the confectionery industry, shown in figure 34.



Fig.34 : Maina Panettoni perspective
Source: SIMES

3.4.1 Type of light

The lighting designers have looked after the complete lighting project that has dressed the innovative building by enhancing the volumes that come to life when illuminated and that validate the creative concept of the architect. While the sinuous unwinding of the staircase is emphasized by the light transpiring from the glass walls, the lighting requirement consisted of designing an adequate exterior lighting concept to emphasize the structure of the red ribbon. The ribbon takes shape starting from the red walls that wrap the building. The lighting designers chose the post mounted large beam diffusing twist luminaires. Artificial lighting at the entrance is used by the main headquarters. The entrance walkway was developed for grazing light effects in the range of walk-over luminaires, used for highlighting paths and façades. The minimalist design and low recessing depth make it possible to install discreetly in narrow niches. This linear entrance walkway was supplied with asymmetric optic and accented fluorescent lamps (Simes, 2018).



Fig.35: Maina Panettoni entrance
Approach - Source: SIMES

3.4.2 Light units' location at the entrance

The light units used in the project are under the entrance. The entrance approach is emphasized by light, in addition to In-ground asymmetric linear luminaires, seen in figure 36. Also there is a small pool of water in front of the main entrance; it is enhanced by immersion luminaires from mini pool (Simes, 2018).

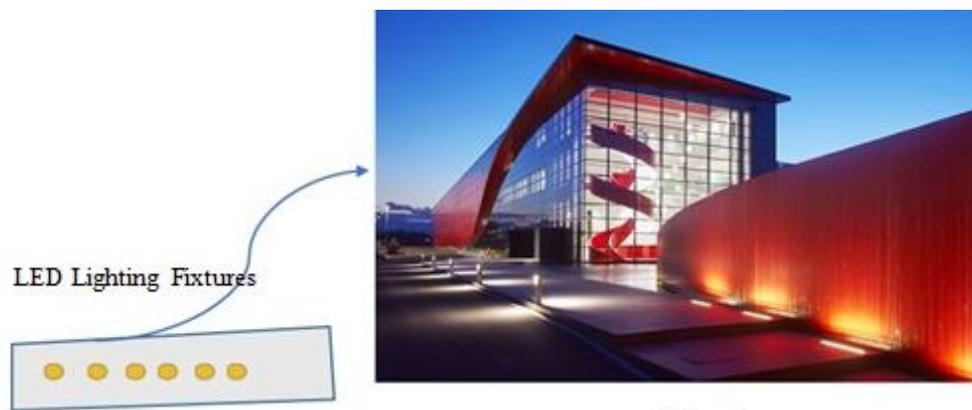


Fig.36: A 3D Shot of the entrance approach shows the LED lighting fixtures - Source: SIMES

3.4.3 Light units' illuminance

The SUIT luminaires in the interior behind the red wall mark the steps of the sidewalk that leads to the entrance hall of the reception. On the background is the office building with high vertical and narrow windows. LOFT wall luminaires that diffuse their light beam from the top down give rhythm to the alternation of the windows, creating a colonnade feeling (Simes, 2018).

3.4.4 Colour of light

The colour of light used at the entrance approach is white and very close to the colour of the moon. This eye-catching colour attracts the visitors giving this project a unique look and an outstanding identity where it is iconic in relation with the surrounding. The lights on the edge of the pathways along the approach are dark blue in colour and are integrating with running water channels.

3.4.5 Colour temperature of the artificial light

The colour of light used at the entrance approach is warm white (appearing reddish) and yellow. This colour attracts the visitors and passengers and is very eye-catching also gives this project a unique look and an outstanding identity (Simes, 2018). Also along the entrance, the lighting designer choice has focused for this architecture on diffusing light beams; they enhance the shapes without interfering at all with the structure. As shown in figure 37, the building is treated as if it were a sculpture, an art work, where light allows the lifelines of the colours to emerge against the shadows of the evening and with them, to bring their symbolic message of feast.



Fig.37: Vertical Lighting - Source: SIMES

After experiencing this project and detecting the important role of artificial light in emphasizing its entrance approach, the paper may hold an analytical comparison between the case studies as follows ...

3.5 Comparison Between the Four Case Studies

The following table presents an analytical comparison between the case studies, based on the parameters that were measured and detected previously.

Table 3: Comparative analysis between the four case studies

	Cluster H	A. MUSE.UM	OCT Shenzhen Clubhouse	Maina Panettoni
				
Type of Light	Satisfied (LED Lights, long life span; appropriate Direction of People's Movement)	Satisfied (LED Lights, long life span; appropriate Direction of People's Movement)	Satisfied (LED Lights, natural light, long life span; appropriate Direction of People's Movement)	Satisfied (LED Lights, natural light, long life span; appropriate Direction of People's Movement)
Light Units' Location at the Entrance	Satisfied (Clear pathway across the entrance)	Satisfied (Clear pathway across the entrance)	Satisfied (Clear pathway across the entrance)	Satisfied (Clear pathway across the entrance)
Light Units' Illuminance	Satisfied (Soothing and relaxing environment)	Satisfied (Soothing and relaxing environment)	Semi- satisfied (reveal spaces during the passage of time with more emphasis on day lighting)	Satisfied (reveal spaces during the passage of time with more emphasis on day lighting)
Color of Light	Semi-satisfied (since they are using cozy lighting and relaxing while it is a hyper place with activities)	Semi-satisfied (Due to the fact that yellow is a relaxing color and it is a working studio)	Semi - Satisfied (Not a high variation of colors of light used, they are within the range of white light colors)	Semi - Satisfied (Not a high variation of colors of light used, they are affected by the building's color)
Temperature of Light	Satisfied (Serves the outdoor landscape and the interior showcase of projects)	Satisfied (Serves the outdoor landscape and the interior showcase of projects)	Satisfied (define the building and animate the interior spaces)	Semi- Satisfied (the temperature varies slightly across the user's path)
The lit architectural elements of entrance approach	Sources emitting light from landscape, steel tube-louvers in the ceiling, light of roof terraces	Spotlights are fixed on the ground of the indirect pathway to the entrance	Horizontal elements, fixed at the bottom line of the entrance, as source of light + other elements are fixed with water features	Twisted Beam, spiral staircase, curtain wall, & entrance walkway

From this table, the paper may reach to certain findings as follows...

4. FINDINGS

According to the previous analyses, the four case studies shared using LED lights as they are environmentally responsible choices being both cost-efficient and energy-efficient signifying a positive awareness by the architects while executing their projects. They took advantage of natural light in their designs. All project installed floor-mounted lighting units to guide users through the approach to the entrance and at the project's entrance door. However, only project with an irregular massing like The Backyard and OCT Clubhouse where were the architects used wall-mounted lights to emphasize the different planes and shapes for users to enjoy the experience at night. Both of these cases also integrated light with water elements to give a further dramatic approach and journey for users.

As for light Units' luminance, the degree differs depending on the typology of the project and usage. In the OCT Shenzhen Clubhouse natural light was used to generate a specific spectrum of time for the user and special artificial lighting was restricted to the entrance approach and emphasizing its special features. Besides, in The Backyard and the Maina Headquarters are using strong luminance light sources to give a cheerful effect on the users. While the A.MUSE.UM uses low light luminance around the museum space to give the importance on the art that displayed rather than the space itself. Strong luminance treatments were for users approaching the new museum and the old building.

Warm light colours are heavily used in the projects OCT Shenzhen, A.MUSE.UM and the Maina Headquarters to give a calming cosy feeling and enough significance for the project's function, while the Backyard used both warm and cool colours so that they give exciting effect by showing the contrast. This difference showed a maturity of using the colours across different years. The temperature differs from a project depending on the type of the zones, from exterior into the interior in the project where it varies from cool to warm at close degrees.

5. DISCUSSION

Consequently, it is agreed that the supposed hypothesis that the external artificial lighting at the entrance could hint at the building's internal purpose. This paper followed a research methodology that began by describing the entrance approach with a thorough literature review explaining the history and ways of highlighting the entry into a building. The appropriate design of lighting joined by of meticulously using various materials, different colors, sizes and lengths and adding some structural elements or ornamentation may be used to highlight the entrance. The literature review also depicted previous light design attempts around the entrance and what architects, experts, and pioneers have said about the entrance approach throughout different time periods. Lighting is used for geographic orientations as lit focal points such as for major buildings and bridges as light can the ability to emphasize the significance of a place and provide safety. The first stage of the circulation system of a building is the path that always starts at the entrance approach of the building. In brief, light plays an important role in emphasizing building and building entrances through different methods. Each of type of light units, their location, color, illumination and temperature play a vital part in how users perceive building's approach. Each of the above examples discussed above shows the importance each of the following characteristics implies in different ways, whether in their presence or in their absence. Exterior artificial lighting in a project either provides illumination for the entirety of it or it highlights specific elements depending on the building's typology and architect's intentions. Tracking lighting is the perfect example of positional lighting. The shown table concludes a proposal for the proper design methods to emphasize the entrance approaches as follows:

Table 4: Proposed design methods to emphasize entrance approaches in different building typologies
Note: This table is a theoretical proposal for using certain architectural elements to emit artificial lighting to emphasize entrance approaches on certain typologies of buildings

Building Typology		Ideas to Emphasize Entrance Approaches	Proper Architectural Elements in Entrance Approaches to emit Artificial Light	Function of A. L. in Entrance
Residential Buildings	Villas	- Heighten the entrance remarkably, artificial light, different materials, different style, water & landscape features	- In the high-class residential buildings, bright lighting units can be fixed on or under canopies, beyond curtain walls, over structural elements at the entrance, light can be directed towards landscape, texture, pattern, crown of the entrance. - In the middle and low class residential buildings, horizontal lighting units can be fixed under the entrance elevation. Dim lighting can be fixed over the entrance. Landscape elements can be functioned to emit light on the entrance.	Decoration & Security
	Palaces	- Frontal piazza, remarkable height, different materials, artificial light, water, & landscape features		Decoration & Security
	Hotels	- Decorative entrance, artificial light, different colours, different materials, & canopies		Attraction & Entertainment
	Houses	- Intimate scale, porch, different colours, different materials, artificial light, landscape		Functionality & Security
	Orphanages	- Intimate scale, colourful entrance, soft surface materials, & artificial light		Functionality & Security

This table is continued in the next page

Building Typology		Ideas to Emphasize Entrance Approaches	Proper Architectural Elements in Entrance Approaches to emit Artificial Light	Function of A. L. in Entrance
Medical Facilities	Hospitals	- Lighting signage, logos, & texts to guide users in, differentiating colours, shaded car-drop-off, & transparent curtain walls	- Vertical panels, lit banners, lit signage, & lit hospitals' names can emphasize the main entrance. There are other entrances such as morgue, emergency, & service entrances can be lower emphasis with dimmer light. - Using lit elements behind curtain walls of entrance elevation can emphasize the entrance. - Fluorescent lighting with colourful light for signage is proper for pharmacies' entrance	Functionality & Guidance
	Outpatient Clinics / Medical Laboratories	- Differentiating the entrance's form, materials, & colours than the repetitive clinics / laboratories, & lighting the banner of the main entrance		Functionality & Guidance
	Pharmacies	- Artificial light is essential on signage & logo for guiding people to go it. Simplicity, directivity, & clarity		Attraction & Guidance
Educational Facilities	Kindergartens	- Intimate scale, colourful entrance, soft surface materials, & artificial light	- Colourful artificial light at night can remark entrances of educational facilities. Hiding vertical lightings behind stands can thrill users' experience - Dim light behind elements of staircases in the entrance - Lit Landscape elements can play a role in welcoming students - Recessed elements can accommodate lighting units. - Working hours of some libraries extend till night. Lighting curtain walls of their entrances, lighting landscape elements, and lighting the pathway to their entrances may enrich users' experience	Attraction & Entertainment
	Schools	- Colouring entrance, soft surface materials, artificial light, designing a unique innovative form welcoming students		Functionality & Guidance
	Faculties / Universities	- Heighten the entrance, glorifying its scale, expressing originality, differentiating its materials, attractive with playful form		Functionality & Guidance
	Lecture Halls / Laboratories	- Differentiating the entrance's form, materials, & colours than the repetitive laboratories, & lighting the banner of the main entrance		Functionality & Guidance
	Libraries	- Emphasizing entrance of a library can be through a symbolic form, manipulative artificial light, water features, landscape, distinguishing its scale, colour, level, or transparency		Attraction & Guidance
Office Buildings	Banks	- Lifting entrances of office buildings on a higher level than street-level is an important for security issues	- Recessed elements can accommodate lighting units. - Bright artificial light fixed on the entrance can play the role of a security-guard. - Vertical lighting can beautify the high-rise office buildings - Landscape elements can emit lighting to emphasize the entrance	Security & Defence
	Companies / Firms	- Lighting a bank's name or a firm's name can emphasize the entrance		Functionality & Guidance
	Governmental buildings	- Adding softscape elements or water features - Designing frontal piazza can be proper for some governmental buildings		Functionality & Security
Entertainment Facilities	Theatres / Operas	- Free forms can emphasize entrances of entertainment facilities - Distinguishing colours, materials, and scale - Attracting people by artificial light that remark logos & signage - Adding digital screens and kinetic light can attract people and emphasize entrances	- Twisted beams, structural elements, & unique forms can emit rays of colourful artificial light to emphasize the entrance - Suspended elements in the entrance hall can emit light-rays - Dim phosphoric light can attract people to go inside. It can be emitted from hidden-recessed panels or walls.	Attraction & Entertainment
	Cinemas			
	Amusement Parks			
	Restaurants / Cafés			
	Night-Clubs / Pubs			

This table is continued in the next page

Building Typology		Ideas to Emphasize Entrance Approaches	Proper Architectural Elements in Entrance Approaches to emit Artificial Light	Function of A. L. in Entrance
Cultural Facilities	Cultural Centres	<ul style="list-style-type: none"> - Deconstructive forms, distinguishing colours, materials, heights, and level can emphasize the entrance - Lighting the pathway of the entrance approach - Manipulating users' minds to reach the entrance can thrill their experience - Parametric elements, digital screens, & kinetic lights can emphasize the entrance 	<ul style="list-style-type: none"> - In such typology, architects have variety of methods - Artificial light can be a part of the design concept - Lighting pergolas, ceiling, suspended elements, layers, panels, openings, doors, & landscape can be deliberate - Lighting the pathway to the entrance can create storytelling environment. 	Attraction, A Part of the Concept, & Interaction with Users
	Galleries / Exhibitions			
	Museums			
	Pavilions			
	Memorials			
	City-Gates			
Commercial Facilities	Shopping Malls	<ul style="list-style-type: none"> - Welcoming scale can emphasize the entrance - Entrances" bright colours can attract people - Landscape elements with water features can emphasize the entrance - Adding panoramic elevators, digital screens, colourful artificial light can draw a welcoming image 	<ul style="list-style-type: none"> - The most important element in this typology is the artificial light - Spotting light on goods such as clothes, perfumes, chocolates, cigarettes, jewellery, candy, toys & electronic devices is tremendously vital for commercial issues. - Suspending tubes and bars that emit lights is crucial in the interior spaces, but for entrances, lighting curtain walls, using technological features, & colouring light coming from landscape elements can emphasize the entrance. 	Attraction, Guidance, Interaction with Users, & Security
	Markets			
	Souks			
	Shops			
Military & Security Facilities	Prisons	<ul style="list-style-type: none"> - Maximising scale, volume, & height is important to emphasize entrances of these buildings. - Strong artificial light is definitely crucial to secure, control, & surveillance circulation of users. - Technological features are important elements to emphasize entrances. 	<ul style="list-style-type: none"> - Structural elements (beams, columns, girders, & staircases) can emit artificial light in the entrance - Sources of light over fences, on the ground, & over the rooftops - In such typology, architects design bulky forms with limited narrow openings. Sources of light can be fixed on recessed walls or panels. 	Security, Control, & Defence
	Military Bases			
	Military Airports			
	Police Stations			
	Courts			
Transport Facilities	Bus Terminals	<ul style="list-style-type: none"> - Remarkable form, height, and scale can emphasize the entrance. These characteristics are essential for hosting the maximum number of people under wide span space. - Artificial light is used for guiding users. - Car / Van / Bus drop off - Canopies can emphasize entrances of these mega-structure buildings - Adding handicapped elements is essential in entrances 	<ul style="list-style-type: none"> - Signage, logos, & destinations are the elements emitting light to guide people. 	Guidance
	Railway Stations			
	Airports			
	Ports			
	Parking Garage			

This table is continued in the next page

Building Typology		Ideas to Emphasize Entrance Approaches	Proper Architectural Elements in Entrance Approaches to emit Artificial Light	Function of A. L. in Entrance
Sport Facilities	Stadiums	<ul style="list-style-type: none"> - Technological features such as digital screens, kinetic light on façade's cladding panels, & parametric elements can definitely emphasize the entrance elevation. - Distinguishing scale & colours - Adding handicapped elements is essential in entrances 	<ul style="list-style-type: none"> - Lit cladding panels - Suspended lit elements - Colourful light emitted from walls, curtain walls, & ceilings. 	Attraction, Entertainment, & Guidance
	Clubs			
	Gymnasiums			
Spiritual & Religious Facilities	Mosques	<ul style="list-style-type: none"> - Symbolic forms can emphasize the entrance of these buildings - Adding the spiritual dimension to the entrance can be done through distinguished structural elements, white colour, neutral colours, & transparency - Distinguishing scale & height - Entrances can be enriched with utopian touches (water features & landscape elements) - More integration with nature is important for mediation - Artificial light is not the most ideal in emphasis of entrances. The natural light is preferred to interact with heavenly entity. 	<ul style="list-style-type: none"> - Natural light is important to access entrance and spaces of these buildings to make users interact with heaven in direct connection. Openings, doors, windows, arches, & holes can be employed to draw natural light rays inside spaces. - Artificial light can be fixed in limited way in hidden places in the entrances. 	Symbolism & Spirituality Interaction for Natural Light
	Cathedrals / Churches / Chapels			
	Shrines			
	Graveyards			

According to these proposed design methods, architects can enrich users' experience, which raises buildings' values and aesthetic dimension. Through using simple architectural and landscape elements, sources can highlight a halo of light on users during their entering a building. From table 4, functions of artificial light in entrances are diverse according to the building typology. This paper did not concern with the electrical information regarding the wattage of lamps, type of lamps, and wiring system, while it focused on the design methods to emphasize the entrances using the artificial light from a theoretical perspective not technical one. As mentioned, methods vary between suspending sources of light from the ceiling, adjusting necks and lamps to be pointed at specific items. Consider mounting them on the walls, also. Special picture and mirror frames also have built-in lighting to highlight specific areas on a wall. Recessed lighting can be used in floors and ceilings to create vertical beams of light as opposed to an overall glow from central light fixtures hanging from a ceiling. Lighting needs to serve a purpose, and in every case study mentioned in the both natural and man-made lighting help with the illusion of space and for every type, colour, intensity, a new feeling arouses. The way in which a designer incorporates lighting into their project helps shape the mood of the user of the space as it has a great impact on their and perception and user experience. Employing good lighting can increase the brightness of a space and create ideal mood sets. The right lighting helps in adding elegance, sophistication and style to any project.

6. CONCLUSION

Upon completion of the study, this paper has arrived at the determination that applying the used research methodology was important to fulfil the required aim. By studying the cadenced examples of light, rhythmic patterns, their points and forms, their temperatures and colours, the study was able to gain an understanding of how it cooperates with individuals and their everyday rhythms, their realistic space requirements, and the essential physical treatment of space to promote the best impact for each space. As a result of the research, it has been discovered that in spite of the fact that the target for the task began as an effort to preserve a good physical link between man and

light, in spots where this relationship is as strong, the designer has to find elective strategies to preserve an advantageous interaction. The following points offer some guidelines for emerging designers approaching the lighting design of a building's entrance.

- Showing a beneficial use for illustrating the person's inherent interaction with rhythmic light.
- The approach to the building is clear to visitors and tourists throughout the day and night.
- The lighting should help people understand the function of a building.
- Different safety and weather protection must be taken into consideration.
- Different types of arrangements can be used to perceive different approaches.
- Lighting must be distinct between exterior and interior spaces.
- Different elements can be used with lighting to emphasize a building's approach like landscaping.

Eventually, techniques of lighting entrances contribute in perceiving architecture's true purpose and increase the aesthetic dimension of the building at night.

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