

**Military Technical College  
Kobry El-Kobbah,  
Cairo, Egypt**



**8<sup>th</sup> International Conference  
on Civil and Architecture  
Engineering  
ICCAE-8-2010**

**Architecture and Media -“ Media Facades ”**

*By*

Ashraf M. Abdel-Mohsen \*

Zaid Ibrahim Zaid M. \*\*

**Abstract:**

This paper research will discuss the new technology appeared by the end of 20<sup>th</sup> century and developed quickly in 21<sup>st</sup> century .This technology embedding media and architecture through technology which is called “*Mediatecture*” or media facades. The research will discuss the historical background of this technology then it will be presenting the shifts in technology and how it’s effecting on the appearance of buildings through two main examples “*Times Square*” and “*Shibuya Crossing*”. Therefore thus research will introduce the classification of media facades by the technical categories mechanical media facades and electronic media facades. Finally the research will suggest and demonstrate for architects and designers the first thoughts when designing media facades.

**Keywords:**

Media Facades, Media, Architecture, Mediatecture, Technical Category,

---

\* Associate Professor of Architecture, Department of Architecture, Faculty of Engineering, Ain Shams University, Cairo, Egypt

\*\* Department of Architecture, Faculty of Engineering, Ain Shams University, Cairo, Egypt

## **1. Introduction:**

Globalization has seen many of the-world's major cities entering a constant competition for cultural, creative and commercial supremacy. These cities strive to achieve desirability and quality of life, opportunities for work and wealth, cultural richness and diversity. As with almost every aspect of life in the 21<sup>st</sup> century, the digital domain is playing a key role in upgrading cities to a new level of advancement. Unlike the web revolution, the digitization of cities has a very physical nature. The buildings, public squares, transport hubs, and parks need the right digital infrastructure to thrive/ Media facades are a vital component in this upgrading process - active, interactive, mechanical, optical, electronic. Dull grey concrete is brought to vibrant life, new media begins to course through the veins of urbanism, and finally the city starts to externalize one of Japanese architect. Toyo Ito's key themes: communication, networks, information layers

## **2.The Pre-history of Media and Architecture:**

When and where did designers or a group of architects for the first time design a media facade? Although we can consider the glass windows was a form in mediaeval churches, for instance, already projected an image illuminated from behind by the sun, and could therefore be considered as a kind of back projection facade. However, this research is not concerned with the technology of media facades illuminated by daylight, this history of media facades starts at a time when architects and designers for the first time considered the application of a TV screen as a building component on an external wall. The following examples will present this history and giving good conclusion about it.

### **2.1-Centre Pompidou, Paris, France 1970:**

In 1971, the competition for the Centre Pompidou was announced by the French president Georges Pompidou. A total of 681 projects were entered in the competition by architects from all over the world. The brief asked for a cultural centre incorporating a museum and a creative centre that would be modern and evolve continually. The jury appointed to judge the designs for the museum included, among others, Oscar Niemeyer and Phillip Johnson.



**Figure (1):** Centre Pompidou, main plaza in front of building



**Figure (2):** Centre Pompidou viewed from a distance in an urban context

The partnership of Renzo Piano, Richard Rogers and Gianfranco Franchini won the competition with their idea of opening a large gathering space, creating an open-ended mega structure that would address the city and stand out from within. In addition, the main facade included a giant screen displaying electronic messages about events at the centre or cultural and political news. But in the six years that passed by between competition and the inauguration the energetic figure of Pompidou had disappeared. Numerous changes, such as shelving plans for the mobile floors and even for the large screen, made during the construction process had the effect of annulling the initial aims of the designers and relegating them to the level of simple metaphorical statements, such as the colored pipes on the outside representing communication with the building's environment.

**2.2-Blade Runner, Movie, 1982:**

"Blade Runner" is an influential 1982 science fiction film directed by Ridley Scott from a screenplay written by Hampton Fancher and David Peoples, adapted from the novel "Do Androids Dream of Electric Sheep" by Philip K. Dick. Here the film becomes a precursor of media in architecture. The film depicts a dystopian Los Angeles in November 2019 In which genetically manufactured beings called replicants, physically identical to adult humans, are used for dangerous and degrading work in Earth's "off-world colonies". In different scenes in the movie the main character travels via a flying object or transporter through this dystopian Los Angeles.

Video covered buildings were first foretold in Blade Runner. As the movie unfolded across its futuristic city-state, film viewers were able to glimpse several examples of video screens attached to buildings and integrated within the city's skyline



**Figure (3):** Blade Runner Scene from Movie, 1982 with the media façade



**Figure (4):** Blade Runner Scene from Movie, 1982 media with different media content

**2.3-Tower of Winds, Yokohama, Japan 1986:**

The 1986 completed Tower of Winds in Yokohama, Japan, designed by the Japanese architect Toyo Ito, is another precursor of media and architecture, and according to the Hohlwelt homepage it was one of the earliest forms of interactive architecture. During the day, the Tower of Winds is a 21 m tall opaque object, grey and blending in with department stores, banks and office buildings, its surface clad with acrylic reflective plates and enclosed in a perforated aluminum cylinder with an ellipsoidal base. But as the sun goes down, it becomes a sensual device recording the transitory state of the city around it. A series of three different lights were installed within the cylinder, in the air space between the perforated aluminum plates and the external surface. The three light types used are 1280 mini-lamps and 12 neon rings, vertically and evenly spaced around the tower, and 30 flood lights situated on the ground and directed upwards to illuminate the tower, 26 of them situated inside the tower. The tower has two main functions; housing water tank facilities and providing ventilation for an underground shopping center attached to the nearby Yokohama train station.



**Figure (5)** Tower of Winds – Toyo Ito, 1986 with different media content



**Figure (6):** Tower of Winds – Toyo Ito, 1986 with two more media contents

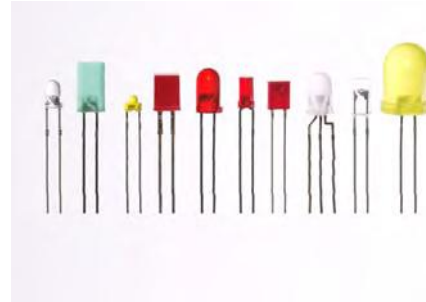
These three examples were selected from the early beginnings of embedding media in architecture. One of them, the Tower of Winds, was completed using technologies available at the time of its construction and design to illuminate the tower. Although technically not a media facade, it offered new concepts in terms of controlling the lights by environmental influences. The other two, Centre Pompidou and the architecture in the movie "Blade Runner", were not completed or were not meant to be built at all but they nevertheless have established a train of thought of how media, in these examples television screens, could become a part of architecture when the technology needed to build such projects became widely available. The media facades in both unrealized projects document a process of creative imagination where systems can be envisaged, but not built at that time. Centre Pompidou and "Blade Runner" were visionary because they were designed at a time when electronic components capable of displaying media content were at an early stage of development. Nonetheless, the designers of both projects were thinking of possibilities of how to include technologically advanced elements. They used the available technologies and when looking at these technologies imagined ways to alter such existing technologies, to create something new.

### **3. Shifts in the Appearance of Buildings Through Shifts in Technology:**

Technology for media facades has improved and the technology required back in the 1970s is now more affordable. Cost issues that Piano, Rogers and Franchini faced in realizing the original proposal for the media elements on the facade of the Centre Pompidou, would no longer apply today. Indeed, if the Centre Pompidou screen had been built as planned, the technology for displaying information such as computer screens or televisions would have been outdated by now and would most likely be exhibited on the inside of a museum as examples of contemporary technology, rather than on the outside.



**Figure (7)** Fluorescent tubes as they are used for illuminated facades



**Figure (8):** Various LEDs, the shown LEDs are mainly used as electronic component but could be used as well for media facades

An examination of the changes in computer monitors from 1971 to the present day reveals the evolution display technology has undergone since then. The shift from the monochrome CRT computer displays using a green "P1" phosphor screen, better known as "green screens", to analogue RGB monitors, to LCD screens has happened in the space of just 30 years.



**Figure (9)** High definition television as used as entertainment electronics



**Figure (10):** Flat screen plasma display in comparison to a HD television



**Figure (11):** LCD Pane, as example for a transmissive display

**3.1- Times Square, New York, USA:**

Times Square is well known for its extensive use of media. Anthony Townsend calls Times Square, "perhaps the quintessential example of a digital urban environment. Its history gives a good overview of how media has been used and how development in media technology has been adopted at Times Square. At the end of the 19th century, New York City had expanded up to 42<sup>nd</sup> street and the area was becoming the centre of the city's social scene. In 1904, the New York Times built the Times Tower on 43<sup>rd</sup> street just off Broadway to replace their premises downtown, The square facing the building was called the Longacre square, but was soon renamed Times Square. The name is now used for the area between 40<sup>th</sup> and 53<sup>rd</sup> street and 6<sup>th</sup> and 9<sup>th</sup> avenue. The inauguration of the Times' new headquarters was celebrated with a fireworks display, starting a New Year's Eve tradition which continues today. The first famous ball towering from the Times Square's rooftop pole was held on New Year's Eve 1907.



**Figure (12)** New York Times Square. 1952



**Figure (13):** New York Times Square approximately. 1975



**Figure (14):** New York Times Square. 2007

Video-zing a building's cladding is a phenomenon that began in Times Square in the late 1990s. There are at least half dozen skyscrapers that represent the beginning development of media facades as an architectural design concept. The first real world instance of video cladding was introduced In Times Square in 1996 with the NASDAQ Market site Building which was covered with a ten-story video wall.

**3.2- Shibuya Crossing, Tokyo, Japan:**

“No discussion of digitally mediated urban space could be complete without including Shibuya Crossing in Tokyo”. This statement by Anthony Townsend shows the importance and the influence of Shibuya crossing, not only as an inspiration for futuristic visions such as Ridley Scott’s Blade Runner. Shibuya is a suburb in Tokyo located approximately 3 kilometers south of Shinjuku, another major centre within Tokyo, and is a similar gigantic commercial area focused on a huge train station. Shibuya Station is one of the busiest stops along the Yamanote rail loop, one of the major train lines around the centre of the city.

Like Shinjuku Station, it is a major transfer point for commuters between the suburbs and the city, as well as a popular destination for thousands and thousands of workers, students, shoppers, and others who disembark there every day and enter the surrounding neighborhood. As is typical of large train station-centered commercial districts in Japan, including Shinjuku, the Spatial structure of Shibuya includes various specialized sub districts: i.e. an area of department stores and other retailing; an area of banks and office buildings; several specialized areas of restaurants, coffee shops, and other eating and drinking places; a large night time entertainment zone (and some smaller ones); and a quiet district of love hotels.



*Figure (15): Shibuya Crossing, Tokyo, Japan (2000)*



*Figure (16): Shibuya Crossing, Tokyo, Japan (2008)*

The sub district of Shibuya given to retailing is especially large and, if the rate of expansion of its leading stores is any indicator, extremely profitable. Two major department store chains dominate the trade. One is the huge Tokyo chain, which also owns the train line leaving Shibuya towards Yokohama and indeed built the train station that is included in the department store, and the other chain is Seibu. In addition to the flagstaff stores, which themselves are opulent multi-level consumer showcases, they have, between them, at least 15 giant branch stores within a few blocks.

Two general characteristics distinguish Shibuya, one demographic and the other cultural. The key demographic point is that a disproportionate fraction of the district's users are young. The second distinguishing point is that Shibuya is extraordinarily trendy. Its young shoppers come to see and be seen, being attentive to the minutest detail of fashion and in step with whatever is hot, and sometimes it seems no matter what the cost.

#### **4. Classification of Media Facades By Technical Category:**

The first step towards this classification would be to distinguish between those facades with a mechanical component and electronic ones. To be more precise, a distinction can be made between those facades which communicate with their environment using mechanical components, such as moving parts of a facade, and those which use light and color to communicate an image, text or graphic. We can thus distinguish between: mechanical media facades (the appearance of the facade is changed by hydraulic, pneumatic or -engine-driven mechanisms), and electronic media facades (the appearance of the facade is changed using light and color).

##### **4.1-Mechanical Media Facades:**

Change building parts kinetically to transform the facade or, in the case of kinetic architecture, even large parts of the building. Santiago Calatrava uses this technique in some of his projects. However, since kinetic architecture has become a field of interest in its own right.

##### **4.2-Electronic Media Facades:**

The second category, electronic media facades, is far bigger and is to be found in most contemporary built examples. It will therefore form the focus of this book. The communication of an image via an electronic medium can be further sub-classified to reflect the range of technologies available. There are essentially three electronic media that can be used to transport a text, graphic or image;



- Projector technology (e.g. CRT, LCD, DIP projectors)
- Illuminant technology (e.g. fluorescent lamps/halogen lamps)
- Display technology (e.g. LED, TFT, LCD plasma)

How then are these three sub-categories of electronic media technology and mechanical technology used in a media facade context?

#### **4.2.1-Projector Category:**

Projection facade technology uses a facade as a projection screen, with the projector on another building. Rear projection facades technology uses a projector behind a translucent projection surface to project images.

#### **4.2.2-Illuminant Category:**

Window raster animate of technology uses existing window grids on buildings.

When animated with a lamp, each window functions as a single pixel. Low- resolution messages or animations reminiscent of early computer games-are possible. Illuminated facade technology uses dimmable neon tubes or light bulbs to display low-resolution black and white moving images.

#### **4.2.3-Display Category:**

Pixel based display technology uses LED technology or other screen technologies such as TFT or LCD plasma. With this technology, the facade functions as a large screen. There are several systems available produced by various companies. Voxel facades technology uses a 3D matrix of LEDs to allow a 3D representation of media content.

### **5.First Thoughts When Designing a Media Facades:**

After specifying the technology of a media facade and therefore its visual appearance, the following points need to be considered. The list below contains thoughts or guidelines that need to be considered before designing a media facade. They are in no specific order as they rank equally in importance:

One of the first questions that need to be considered when deciding what I kind of media facade to use is whether it is to be an indoor or outdoor facade. This may seem trivial and is an easy question to answer, but since certain systems cannot be used in an exterior environment, this point needs to be considered at the outset when selecting a system.

- What media content is to-be Displayed on the facade? As discussed above when examining the difference between light architecture and media architecture, the following options could be available:
  - Illumination only (which would not be a media facade in the sense of this book)
  - Text and/or graphic with a low resolution
  - Text and/or graphic with a high resolution
  - Specially produced video - here one has to bear in mind that a screen with a video standard format, such as 3:4 or 16:9, will not always be available. In such cases, the video will have to be re-rendered and adjusted for the screen.
  - Pre-produced videos, such as existing advertisements or live media content such as soccer games, may require a high resolution and a certain aspect ratio.
- What is the budget? Media facades with a high resolution cost more than similar systems with a lower resolution. Early contact to a consultant or manufacturer of media facades will allow a solution to be found that is suitable for the needs and requirements of the client within their budget.
- The aspect ratio of the facade can be roughly defined as distance of the screen to the beholder equals the distance of LED to LED (a distance of 3 meters would mean distance LED to LED equals 3 mm). This is a rule of thumb that can help to roughly define the aspect ratio of the facade.
- What kind of installation is required? Fixed display or mobile unit?
- The size of the facade. While some systems can be stacked together to create a large or giant screen, others cannot be added together due to the way they function or are constructed.
- When will the media facade mainly be used? During the day or at night? Due to the level of brightness, some systems might be suitable for only day or nighttime or both.
- The previous point gains in importance with an exterior facade as its orientation to the sun also needs to be considered. The brightness the chosen system can offer has to be even higher when the system is exposed to direct sunlight.
- Viewing angle. Not all system allow a 180° viewing angle, and allow only a clear view of the media content displayed on the facade from certain positions.

- Should the facade allow a close-up view? Depending on the resolution, some facades are not suitable for a close-up view. Because the resolution is too low, the media content can only be seen from a certain distance.
- Power consumption of the facade. Some systems need a large amount of electricity to run, especially when they are in use around the clock.
- Construction of the facade or the substructure of the media facade. The substructure may dictate the type of system, i.e. if the substructure is made of glass a transparent media facade system might be more suitable than one which covers the facade.
- Where exactly is the media facade located? Is the media facade potentially exposed to damage by vandalism such as graffiti or scratches? Being impact resistant is important for all media facades that can be accessed by the public. Media facades located at street level are a case in point.
- Protection from scratching is also an issue when the facade is to be used as floor covering and not just on the wall. In this case, the system should be able to bear loads as well.
- Having load-bearing capacity is also important if the media facade should be able to support itself without an extra substructure to carry the weight of the media facade system.
- How the media facade can be cleaned at a later stage is important because dust and other pollutants on the media facade can cause a loss of brightness. The available cleaning system of the facade should therefore be suitable for the media facade as well.
- Fire resistance. Not all media facade systems comply with the local fire regulations.
- Should one part of the media facade be defect, the question of how the media facade can be repaired is a crucial one.
- In connection with the previous point, the useful life of a product influences when the media facade system may need to be repaired or even replaced with a newer system.

Careful consideration of these points at a very early stage in the design process and a discussion of these requirements with a consultant or manufacturer of media facades will ensure the success of a project.

## **6. Conclusions:**

The merge of architecture and digital media led to a new discipline: “*Mediatecture*”. This term doesn’t refer solely to architecture and media, but defines the synergy of different technologies: building, illumination, engineering, etc. Creative use of those technologies takes the concept of architectural design steps ahead, practically opening new windows to the future, leaping from traditional buildings to multimedia buildings: more functional, more stylish, more interactive and even more controllable. Illumination, among other factors, plays an important role in this revolution.

Media facades are always integrated in an architectural and urban context, which implies significant challenges and responsibilities. The integration of media facades with architectural structures produces a new type of architecture – *media architecture* – which accentuates not only the building but also the urban space. The outcome is only a fusion of the experiences offered by a multidisciplinary team starting from the planning stage of such projects, technical and design competences in new fields of activity. This multidisciplinary team must be represented in the: facade specialists, display and computing experts, media design and visualization specialists. Traditionally the principal responsibility has been vested with the architect, who still determines to a large extent the appearance of the building and its urban impact, but has now become the manager of a team managing the development of content.

For years, signs have appeared on building walls and roofs. More recently, vinyl wraps have scaled alpine heights as they cover building walls. Now, LED video screens can completely cover building facades and present kaleidoscopic images that dance across the building. Built as part of the building's cladding, or "skin," dynamic video screens have given architects a new theme that enables them to "display" buildings' corporate identities on a large scope.

## **References:**

- [1] Eisenman, Peter, “Visions Unfolding: Architecture in the Age of Electronic Media”, in: Papadakes, Andreas (ed.), *Architectural Design: Japanese Architecture II Profile* No. 99 (1992), (Academy Group Ltd., 1992).
- [2] Flew, Terry, *New media: an introduction*, (South Melbourne: Oxford University Press, 2005).
- [3] Ito, Toyo, “A Garden of Microchips – the architectural image of the microelectronic age” Vol. 123, (Aachen: ARCH+ Verlag, September 1994).
- [4] Manovich, Lev, *The Language of New Media*, (Cambridge, U.S.A.: MIT Press, 2001).  
-, *The poetics of urban media surfaces*,  
[http://www.firstmonday.org/issues/special11\\_2/manovich/index.html](http://www.firstmonday.org/issues/special11_2/manovich/index.html), (Accessed March 2007).
- [5] Puglisi, Luigi Prestinenzza, *Hyper architecture - Spaces in the Electronic Age*, The IT Revolution Series, (Basel: Birkhaeuser – publisher for architecture, 1999).
- [6] Schneider, Ulrich, *Toyo Ito: Rethinking the relationship between architecture and the media*, (London: Art Books International, 1999).
- [7] Sharp, Dennis, *Twentieth Century Architecture: A Visual History*, (London: Images Publishing, 2007).
- [8] Townsend, Anthony, “Digitally mediated urban space: New lessons for design”, *Praxis Issue 6 Journal of writing and Building*, Praxis inc, (Cambridge, MA 2004).
- [9] Wahl, Alexander, *Wandelbare (mediale) Gebaeudefassaden*,  
<http://www.alexanderwahl.de/dateien/medienfassaden/medienfassaden.html>,  
(Accessed March 2005).