

Places and Technologies 2015

KEEPING UP WITH TECHNOLOGIES TO MAKE HEALTHY PLACES

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BOOK OF CONFERENCE PROCEEDINGS

A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential.
Health Promotion Glossary (1998)

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**KEEPING UP WITH
TECHNOLOGIES TO MAKE HEALTHY PLACES**

BOOK OF CONFERENCE PROCEEDINGS

Editors:

Alenka Fikfak, Eva Vaništa Lazarević,
Nataša Fikfak, Milena Vukmirović, Peter Gabrijelčič

Nova Gorica, Slovenia



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MEDIA ARCHITECTURE AND SUSTAINABLE ENVIRONMENT

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ABSTRACT

Being the integral part of a building, street or infrastructure, media contents shape the appearance of modern cities and affect the way their inhabitants act. The objective of this paper is to analyze the forms of communication that make the media contents useful. The communication between mediafacades and their environment is achieved by applying various sources of artificial light and mechanical systems. There are numerous advantages regarding media facades and their impact on certain buildings, city areas and regions. However, these façades are regarded to be the result of great technological achievements in the field of architecture and other spheres; therefore, certain problems are inevitably come across. This paper deals with the challenges in the media architecture and its interaction with cities and people as well as the users of media objects. Sustainability, visual and light comfort, visual and light pollution in cities, exaggerated importance ascribed to the perception of information technologies and architectural marketing focused on 'healthy life in cities' are some of the topics included in this paper. One of the significant aspects that is to be considered carefully is appropriate 'positioning' of media contents within a city, since there is a potential problem of excessive application of media contents in urban environment. This paper explores the ways in which everyday functioning in a city (noise, street lights, etc.) can affect the audio-visual qualities of media facades. Also, this work presents the methods of integrating the principles of sustainable architecture in the field of media architecture. Whenever it is possible, the principle of energy efficiency should be included in media-architecture design of new structures and remodeling of some old structures. Environmentally-aware development and reductions in energy consumption are the most important goals

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to be achieved in the field of media façade designs, regarding the phases of construction and media structures.

Keywords: *media architecture, media facades, light pollution, healthy places*

INTRODUCTION

One of the most significant changes in the world of modern design and architecture is the appearance of new, hybrid forms of media and technology mixtures in order to introduce digital aspects into the physical world of architecture. Media facades, as a new form of architectural expression, were created in order to fulfill the needs of urban communication (Wirth, A. 2001). Media facades with artificial lights represent a new 'infrastructure' of modern cities and it 'makes our cities vibrant and our streets safer' and also leads to excessive illumination of modern cities and increase in energy consumption, since it is an inevitable part of all media facades. The contents and message of media facades are of great significance for promoting cultural and social values within a local community as well as for media architecture adaptability. There is a great number of issues to be dealt with regarding the media architecture sustainability in modern cities. Some of the most important ones are:

1. Cultural sustainability
2. Health sustainability ("light pollution")
3. Energy sustainability

CULTURAL SUSTAINABILITY AND MEDIA FACADES

Architecture is a new medium for presenting the information regarding advertizing, culture and art, since it is regarded to be an easily available form of communication in modern cities. LevManovich² points out that cultural practice (texts, graphics, photographs, music and film) has been increasingly transferred to architecture through the digital forms by digital media in the sphere of media architecture.

Development of a city and culture of a community can be stimulated and improved through the existence of specific interactions within media architecture. Media facades are very important for the social sphere of the city development, considering their ability to inspire and renew social contacts and direct them toward the urban dialogues. Media facades can promote some positive local cultural and artistic values.

² LevManovich, in his works *Software Takes Command (2008)*, *Soft Cinema: Navigating the Database (2005)* and *Language of New Media (2001)* offers a detailed analysis and history of the media.



One of the good examples of improving the social sphere can be crime prevention within the marginal city zones, where the interactive projects of dynamic illumination of media facades reveal the capacity of media architecture to create "liveability, safety and visibility of city streets."³

On the other hand, the modern architecture is currently dealing with the challenges of mass culture elements – the forms of subculture within urban environments through media architecture. Repetition, homogenization, commercialization of cultural values and their reproductive character is very common, since the elements of marketing easily affect the architectural media objects. Although media facades do not always imply the affirmative participation of the media into the architecture of a facility, it does not necessarily mean that media facades can be equated with the phenomenon of commercialization in architecture. There is a risk of exaggerated significance of information technologies and marketing in the field of architecture. Along with another risk, the perception of a structure through media contents only, it can seriously endanger the sustainability of media architecture.

In order to create a proper balance between commercial, marketing interests and importance of cultural motivation in the process of media architecture implementation, there are a few suggestions to be pointed out:

- Total integration of media contents, elements and facades;
- The communication that dominates the space surrounding a media façade should result from the latest technologies, urban and architectural space and active participation of the users through different social relations that are supposed to improve the existing ones;
- Contents and programming models are to be adapted to the function of the existing facility

HEALTH SUSTAINABILITY- LIGHT POLLUTION AND MEDIA FACADES

Too many facilities with dynamic illumination of media facades in some city areas have led to the excessive consumption of artificial light and 'light pollution'. There are various forms of the light pollution⁴ and they are harmful for human health and environmental quality.⁵ When it comes to electronic media facades this issue is of great importance, since these types of facades require larger sources of artificial lights. Therefore, some crucial aspects are to be taken into consideration.

³ See *Interactive lighting preventing crime through environmental design*, Wellington, New Zealand on <http://www.newscenter.philips.com/main/standard/news/backgrounders/2014/20141110-media-backgrounder-citypeoplelight-2014.wpd#.VRCVqPyG-ul>.

⁴ See more details about definition and forms of light pollution at Djokic, L., pp. 133-140.

⁵ See Effects on animal and human health and psychology, Steven Lockley, Harvard Medical School, CfDS handbook "Blinded by the Light?". Chapter 4, "Human health implications of light pollution".



The main issue is an apparent competitiveness of media contents within urban spaces as well as the feeling of being disoriented. This is especially visible at the cities of the Far East and the USA (Tokyo, Hong Kong, Las Vegas, etc.). These cities are endangered by chaotic media facades displaying commercial contents.

Changeability and dynamics of artificial light is very important for media architecture, especially for interactive media architecture. Dynamism in media architecture is based on the modern city dynamism. A proper, well-balanced, moderate dynamic process of illumination is good for our senses. Otherwise, it can initiate some negative psychological consequences. Excessive dynamism included in the media facade functioning can damage human health – it can especially be harmful for the people who are exposed to these types of sensations for a long period of time.

Changeability in light intensity of media facades and the application of a changeable colour spectrum, especially at night, can disrupt the factors of light comfort in the surroundings. Based on a wide variety of examples, it is apparent that the application of media facades is limited to certain urban environments only. They can be dominant in some central city zones, where business activities and trade represent the usual activities. Media facades are often designed in business and sports centres (stadiums), outside the city central zones, so that they do not disrupt the light comfort of the residential facilities.

If a media facade is inappropriately located, it can have a negative effect on the traffic flows in the city, thus endangering human health as well. Media facade must be easily perceived by pedestrians and other users of the city traffic. The European Union countries impose a specific regulation that controls and limits the application of mobile video presentations within public areas in the middle of an intensive traffic flow.

A special issue that requires attention is a potential risk for the users of interior areas, due to the reflection created by a part of media facade light. When it comes to light comfort aspects, it is necessary to control the intensity of light and neutralizing effects of the flash in accordance with the changeable conditions of media facades. The colour of light within media facades is regarded to be a significant parameter to consider in the light comfort aspect, because it affects a realistic perception of all the colours in the interior space. Therefore, it is an important segment to be taken into consideration so that the final result would be the creation of a healthy environment that meets psychological and aesthetic requirements.

Besides the light comfort and all its aspects, it is necessary to provide a visual comfort as well, that is – the connection between users and outdoor environment, an unobstructed view from the inside. Media facades should not be a barrier



disrupting this interaction. If so, there would be a feeling of seclusion and discomfort within the interior space.

In order to create a healthy environment and prevent some unfavourable effects of the artificial light involved in media facades, the following suggestions are to be followed:

The lights included in the media facade should not be directed toward the visible part of the sky;

City zones should be protected from light pollution; the implementation and location of media facades should be carefully selected and monitored within urban environments;

Visual sequences presented through these media facades should be a 'logical visual continuity', so that the whole building could be easily perceived as a unity; this is possible to be realized by applying the latest digital technologies and a specific type of media programming;

The light comfort of the surrounding facilities should also be provided by carefully selecting and locating the media contents within the facades of the facilities; or, a media façade could be applied to only those facades that are easily perceived;

The local regulations⁶ on media facades should be imposed, just like the world's countries have been dealing with lately;

The location of media facades should be carefully chosen, taking into consideration the areas of roundabouts and traffic intersection known for intensive traffic flows;

The facades having the front projectors, the facade animation realized by raster graphics as well as the media facade having steel meshes with reflected lights inward, are to be applied only in certain cases – carefully chosen buildings, or/and at certain times of day, or/and under specific conditions (for a very short period of time, or using the flexible curtains, if possible).

ENERGY SUSTAINABILITY AND MEDIA FACADES

Energy efficiency in media architecture includes the planned and implemented measures in order to obtain the minimum electric energy consumption and analyze the application of renewable resources in the field of media facades.

⁶ In June 2009, the *American Medical Association* developed a policy in support of control of light pollution. Since 2011 Croatia has applied the Law on Light Pollution, see at http://narodne-novine.nn.hr/clanci/sluzbeni/2011_10_114_2221.html.



Active systems of solar radiation involve the application of photovoltaic elements for accumulation, distribution, energy saving and then generating electric energy in order to use it for the purpose of building lighting. The main objective is to calculate the precise amount of electric energy required for media façade powering, using PV element within the facility itself. Such solutions are usually rather expensive and require enormous initial investments. Thus, the ratio of energy efficiency and investment optimization is currently unfavourable. In other words, saving energy is technically possible but it is still not cost-effective, since the period of cost-effective investments are too long, which is not correlated with warranty periods and PV system lifetime. It is of crucial importance to implement PV systems, whenever it is possible, in order to correspond to façades in all aspects (technical, aesthetic and functional).

PV elements can be integrated in media facades (Fig. 1.a-c)⁷:

- thin-layer, completely flexible, semi-transparent or non-transparent PV foils on transparent (curtain wall, windows, parapet glass or brisolei) or non-transparent façade zones.
- lamella-like PV concentrator system integrated into the space between the panes of the insulating glass units offers the shading effect and direct protection from solar radiation
- PV modules in the areas of facades having an additional substructure for module support

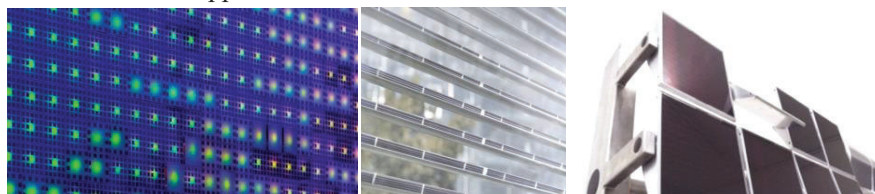


Figure 1.a: Greenpix, arch. Ove Arup, Beijing, China, 2008.
(Source: <http://www.greenpix.org/>).

Figure 1.b: Lamella-like PV concentrator system into glass.
(Source: <http://www.onlyglass.de/>).

Figure 1.c: Solar display for a self-powered media façade, Linz, Austria.
(Source: <http://www.domresearchlab.com/>).

Oliver Ebert (ag4 media façade GmbH) points out green media facades, regarding them to be a Corporative architecture innovation, the work of Corporative communication and social responsibility strategies. Green media facades are based on potential applications of renewable and energy-saving technologies, as well as

⁷ INTEGRATING PHOTOVOLTAICS INTO MEDIA FACADES, Conference Proceedings of the 9th ENERGY FORUM, pp. 13.



on media contents that is to present a specific, social responsibility and awareness in relation to environment and local communities.

Besides the renewable solar energy needed for media façade functioning, there are other alternative sources that can be used as potential generators for operating mechanical-electronic media façades. Wind energy is also regarded as suitable, since it is used as an actuator of mechanical elements and it creates a constantly different dynamic perception of an architectural object in motion.

CONCLUSION

Media technologies are being developed as an integral part of modern cities, and together with media architecture they shape the urban design and environmental quality. Although media facades are regarded as a significant potential of a modern city, the increasing number of these facades leads to various issues regarding the effects of media architecture on social and cultural development and energy resources and environmental protection from the light pollution. This paper includes the suggestions aimed at overcoming the obstacles of media façade implementation in a modern city and realizing the sustainable development of media architecture, while paying special attention to social responsibilities, health protection, safety and environmental quality.

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