



## Sustainable Outdoor Advertising: The Importance of Digital Screens in Urban Sustainability and in Out-of-Home Advertising

Jennifer García Carrizo<sup>1</sup>

Recibido: 15 de junio de 2023 / Aceptado: 18 de septiembre de 2023

**Abstract.** This research explores the influence of digital out-of-home advertising (DOOH advertising) on public spaces from multiple angles, including aesthetic, social, symbolic, and environmental perspectives. It proposes a model of sustainable implementation for DOOH advertising based on five pillars: 1) urban integration and adaptation to the context, 2) shared value, 3) long-term sustainability, 4) reduced ecological impact, and 5) cultural and symbolic significance. All of this needs to be addressed in a systemic way and through a perspective of corporate citizenship. In addition, this work analyses the importance of digital out-of-home advertising in urban areas and studies the effects that digital screens have on public space taking into account their aesthetic, social and symbolic function, their capacity to generate an innovative image and their importance in the sustainability of public spaces as a facilitator of citizen engagement and social gatherings.

**Keywords:** Digital out-of-home advertising (DOOH advertising), city, sustainability, public screens, digital screens, communication.

### [es] Publicidad exterior sostenible: la importancia de las pantallas digitales en la sostenibilidad urbana y en la publicidad exterior

**Resumen.** Esta investigación ahonda en la influencia de la publicidad digital exterior (digital out-of-home advertising, DOOH advertising) sostenible en la ciudad desde diferentes perspectivas medioambientales, estéticas, sociales y simbólicas. Presenta un modelo de implementación sostenible de la misma en espacios urbanos, basado en cinco pilares: 1) la integración urbana y adaptación al contexto, 2) el valor compartido, 3) la sostenibilidad a largo plazo, 4) la reducción del impacto ecológico, y 5) la importancia cultural y simbólica. Todo ello, abordado de forma sistémica y una perspectiva de ciudadanía corporativa. Además, analiza la importancia de la publicidad exterior digital (DOOH) en las áreas urbanas y estudia los efectos que las pantallas digitales tienen en el espacio público, considerando su función estética, social y simbólica, su capacidad de generación de una imagen innovadora y su importancia en la sostenibilidad de los espacios públicos como elemento facilitador de la atracción y del encuentro ciudadano.

**Palabras clave:** Publicidad exterior digital, ciudad, sostenibilidad, pantallas públicas, pantallas digitales, comunicación.

**Sumario:** 1. Introduction. 2. Digital out-of-home advertising: effects on the city. 2.1. Aesthetic, symbolic and social functions. 2.2. Innovation and long-term sustainability. 2.3. The fifth screen for

<sup>1</sup> Universidad Rey Juan Carlos (España)

E-mail: [jennifergarciacarrizo@gmail.com](mailto:jennifergarciacarrizo@gmail.com)

ORCID: <https://orcid.org/0000-0002-0264-1931>

Jennifer García Carrizo is supported by a Juan de la Cierva-Formación fellowship (FJC2020-044083-I) funded by MCIN/AEI /10.13039/501100011033 and by the European Union NextGenerationEU/PRTR.

improving citizens' engagement. 2.4. Capacity to join crows in the urban space thanks to their audio-visualization. 3. The importance of sustainable digital out-of-home advertising. 4. Creating a model for implementing sustainable digital out-of-home advertising in urban spaces. 4.1. Integration and adaptation to the urban and social environment. 4.2. Shared value. 4.3. Long-term sustainability. 4.4. Reduced ecological impact. 4.5. Cultural and symbolic significance. 4.6. Systemic approach. 5. Conclusions and discussion. Bibliografía.

**Cómo citar:** García Carrizo, J. (2023). Sustainable Outdoor Advertising: the importance of digital screens in urban sustainability and in out-of-home advertising. *Área Abierta. Revista de comunicación audiovisual y publicitaria* 23(3), 109-202. <https://dx.doi.org/10.5209/arab.91360>

## 1. Introduction

The number of digital screens in Spain has increased from several hundreds to more than 17.000 units in the last year, and from 5 or 6 digital marketing companies to more than 30 companies. In addition, according to the PwC report for the 2021-2025 period, it is estimated that by 2025 the investment in digital out-of-home advertising (DOOH advertising) will exceed 30 +% of the total investment in out-of-home advertising (OOH advertising) (Santos, 2023).

The *Out Of Home Advertising Association of America* has presented the *2023 U.S. Media Advertising Effectiveness Analysis*, which represents an aggregation of publicly available studies on advertising recall from 2017 to 2022. This study shows that OOH ads produce significantly greater advertising recall among consumers compared to live and streaming television, podcasts and radio, press and online performances –figure 1–. This applies to both print and digital formats (Fandiño, 2023).

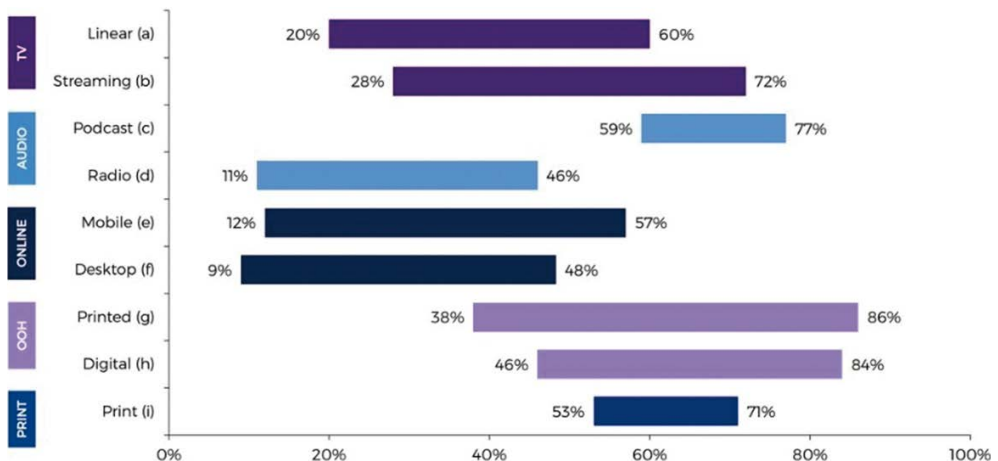


Figure 1. Advertising effectiveness. Recall comparison analysis. [Source: Fandiño, 2023]

In addition, according to a recent study carried out by the artificial intelligence platform [Alfi](#) in the United States, the United Kingdom, France, Germany and Asia, 65 % of the advertising executives consulted predict that DOOH advertising will

grow exponentially to reach a volume of between 50.000 and 55.000 million dollars in 2026. 30 % report an even more uncompromising optimism and augurs even more than 55.000 million dollars. Along the same lines, 93 % of executives believe that the pandemic has accelerated digitalisation and has somehow laid the foundation for the frantic growth of [DOOH](#) advertising (Lastra, 2021).

Therefore, all the data shows that DOOH advertising, although called “the new kid on the block” (Roux, 2018), is not exactly a child anymore. It has indeed gained significant prominence as a promising marketing communication platform. Its growth rates are remarkable not only in developed markets but also in emerging markets. However, it is worth noting that studies on DOOH advertising have often been limited to a few leading authors, particularly from developed markets.

The limitation of studies on DOOH advertising to a handful of authors from developed markets can be attributed to several factors. Firstly, DOOH advertising is a relatively newer form of advertising compared to traditional channels, and research takes time to catch up with industry trends. Secondly, the rapid evolution and technological advancements in the DOOH industry make it a challenging subject to study comprehensively.

Still, as DOOH advertising continues to gain traction and become an integral part of marketing strategies, it is important to expand research efforts to include diverse perspectives and experiences from both developed and emerging markets. This would provide a more comprehensive understanding of the effectiveness, impact, and best practices of DOOH advertising across different contexts.

By broadening the scope of studies on DOOH advertising, researchers can explore its implications for various industries, target audiences, and cultural contexts. This would contribute to the advancement of knowledge and enable marketers to make informed decisions when incorporating DOOH advertising into their marketing campaigns.

In conclusion, while studies on DOOH advertising have been limited to a few leading authors (Taylor, 2015; Jiang et al., 2017; García Carrizo, 2017a; Roux, 2018; Mposi et al., 2020; Mršić, 2022;), the increasing prominence and growth rates of this marketing communication platform warrant further research that encompasses a broader range of perspectives, including both developed and emerging markets. Expanding the knowledge base on DOOH advertising will provide valuable insights for practitioners and contribute to its continued success and effectiveness as a marketing tool (Roux, 2018).

The present work considers DOOH advertising in the context of the city, with its object of study being the set of digital screens that have progressively conquered the city as their advertising media. That being said, the objectives of this research are 1- to analyse the effects and the functions of the implementation of the aforesaid digital screens, 2- to delve into the importance of implementing sustainable digital out-of-home advertising and 3- to establish a model for implementing sustainable digital out-of-home advertising in urban areas.

An extensive literature review was conducted utilizing the Scopus, Web of Science, and Google Scholar databases. The review encompassed various keywords, including “digital out-of-home advertising”, “sustainable advertising”, “urban effects”, “contemporary city and advertising”, among others. Furthermore, the study involved a comprehensive analysis of relevant international examples of out-of-home advertising, with a particular emphasis on digital screens. Noteworthy ex-

amples include Gran Vía and Callao in Madrid –Spain–, Les Champs-Élysées in Paris –France–, Piccadilly Circus in London –United Kingdom–, Times Square in New York –United States–, Starfield Coex Mall in Seoul –South Korea–, Ximen in Taipei –Taiwan–, Dōtonbori in Osaka and Kabukichō, Shibuya, and Akihabara in Tokyo –Japan–. Finally to establish a sustainable advertising model, the study drew upon existing sustainable frameworks (Chekima et al., 2016; Khorshidvand et al., 2021; Gaspar Ferreira & Fernandes, 2022), ultimately grounding the proposed model in the framework previously established by Olcese, Rodríguez, and Alfaro in 2008.

## 2. Digital Out-of-Home Advertising: Effects on the City

### 2.1. *Aesthetic, Symbolic and Social Functions*

DOOH screens play three fundamental functions in the city: aesthetic, cultural-symbolic and social. As for the aesthetic function, it is important to note that DOOH advertising screens embellish the urban landscape by wrapping and adorning it. The presence of these commercial screens, along with other elements that dress the city, is crucial to prevent it from being empty and exposed, revealing iron structures that grab attention. In Lipovetsky & Serroy's words, the lack of luxury displayed by advertising in this scenario favours ugliness and monotony (Olivares, 2009).

Therefore, it can be said that these digital screens embellish the city by hiding, for example, old facades covered by tarps that are in the process of remodelling. These elements also fulfill a social function in the city, which will be explored in detail later.

Additionally, digital screens play a cultural and symbolic role (García Carrizo, 2016a,c). Thanks to them, spaces of tourist interest can be created that become symbols and landmarks in large cities, such as the iconic billboards of Picadilly Circus in London, and those in Times Square in New York or Las Vegas (Marchán & Rodríguez, 2006). These cases acquire such an importance and symbolism for the inhabitants of these cities that the possibility of them being eliminated awakens nostalgia and a desire to preserve them as part of the urban imaginary (Salcedo, 2011).

In addition, these symbols generate desirable places for visitors by creating landmarks through everchanging advertising messages. In this way, advertising contributes to making the city a dream world for outsiders, making it an object of desire and enjoyment that must be visited to live it fully (Baladrón, 2007).

Finally, regarding the social function of digital advertising screens in the city, it is important to emphasise that it is one of the functions that give it greater legitimacy. It is through urban furniture that OOH collaborates with the organisations and administrations of the different cities where it is developed, in addition to meeting a commercial objective. This makes it possible to provide the city with a series of services that have a positive impact on the well-being of citizens (Pacheco, 2004). The system of concessions of urban furniture for advertising purposes obliges the contracting companies to build, acquire, supply, install, maintain and clean the various elements that are part of the urban furniture. In this way, the city can be relieved of these tasks while receiving an annual fee in the form of money or a variety of services related to the improvement of public hygiene and the preservation of the environment, such as cleaning facades or collecting canine waste.

Marta Pacheco (2004) establishes three social functions of urban furniture for advertising purposes (pp. 122-129). On the one hand, it provides comfort to citizens by covering needs that could be considered basic, such as protecting them from inclement weather or providing a waiting area, as do the marquees of bus shelters. In addition, street furniture provides relevant information to citizens, such as maps, which often dedicate one of their faces to advertising and the other to city maps or other informative documents. Urban furniture for advertising purposes also contributes to the environmental conservation and the cleanliness of the city. For instance, it facilitates the installation of glass or battery containers on different advertising formats, and takes care of the removal of graffiti from the facades of emblematic buildings of the city, as in the case of companies such as Cemusa.

The functions and effects of OOH advertising can be appreciated both in traditional and digital forms. However, digital displays have specific effects on urban spaces that distinguish them from traditional ones. These effects include the association of an innovative image and the ability to generate greater citizen engagement.

Digital screens are perceived as modern and avant-garde elements in urban spaces. Their ability to display dynamic, interactive and up-to-date content allows them to capture people's attention more effectively. Incorporating audiovisual elements, animations and touch technology into digital displays creates a more immersive and engaging experience for viewers (García Carrizo, 2017b). In addition, digital displays offer the possibility to customise and adapt advertising content in real-time, allowing for more relevant and targeted communication to specific audiences in public spaces (Iruzubieta, 2011). This increases the likelihood of generating interest and citizen participation. Another prominent effect of digital screens is their ability to encourage interaction and engagement in the viewers. By using interactive technologies, such as touch screens or QR codes, people can interact directly with advertising, access additional information, participate in promotions or share content on social media. This active interaction generates a greater emotional connection between the brand and the target audience.

In short, traditional and digital out-of-home advertising –OOH and DOOH advertising, respectively– share functions and effects in the city, providing specific elements that make them stand out, such as the innovative image they suggest and the ability to generate greater engagement with citizens. These aspects contribute to enriching urban experience and creating a more dynamic and participatory relationship between advertising and its environment, as outlined in the following sections.

## *2.2. Innovation and Long-Term Sustainability*

Despite the high initial investment necessary to incorporate digital screens, this type of OOH advertising has been prominently implemented in recent years in different spaces of cities. And, despite a high price compared to traditional advertising formats, it seems that its long-term advantages are convincing advertisers, who consider that the investment can be amortised thanks to the autonomy of digital screen and the high long-term economic savings of up to 80 and 90 % of the energy that these offer due to the reduction of repairs and greater energy efficiency (Muñiz, 2013). As well, advertisers believe that the investment is worth because digital screens allow a better view of the advertising message under various weather and lighting circum-

stances, reducing energy dissipation, posing a lower risk to the environment and being resistant to water and the effects of the sun (Gomez & Puentes, 2011).

Apart from these advantages, the latest IAB report (2023) on the state of digital signage in Spain reports that consumers very favourably value DOOH advertising compared to other media. 74.9 % of consumers consider that DOOH advertising is more impactful, 68.8 % consider that it has more creative content, 65.9 % that it provides more up-to-date content and 62.3 % that it encourages more purchases (IAB, 2023). In fact, consumers believe that DOOH advertising is more impactful, less annoying, more effective at incentivising purchase and has more creative and innovative content than media such as the TV, the press, the internet or the radio (IAB, 2023).

Besides, 91 % of Spaniards consider that the use of digital screens for advertising communicates an image of modernity and innovation, 84 % consider these screens original and different and 83 % are attracted to them. In addition, 82 % consider them entertaining and 64 % understand them as a way of doing ecological communication, which results in 87 % considering that brands that use this kind of OOH advertising are innovative. Furthermore, 82 % of the consumers believe that brands using this advertising technique improve their image as a brand; 73 %, that this type of advertising is more easily recalled and; 58 %, that brands advertised this way are more environmentally friendly. It is also noteworthy that Spaniards conceive establishments having a digital showcase as important (IAB, 2015).

For all this, considering the advantages and contributions that DOOH advertising makes to the brands that implement it, it can be said that the main reason why different brands use it is for saving costs, at the same time that they generate values around them related to environmental sustainability and innovation that improve their image and brand reputation.

### *2.3. The Fifth Screen for Improving Citizens' Engagement*

Digital advertising screens arise as a kind of fifth screen that, on the one hand, has allowed OOH advertising to be digitised, and, on the other hand, aims to create a visual connection between the messages it emits and those that are delivered to us daily through other screens (Kelsen, 2010). In this way, these screens intend to generate a connection and a screen-screen dialogue, which is essential to attract the attention of passersby, who increasingly remain oblivious to what happens around them, absorbed by the screen of their smartphones.

To grab the passerbys' attention, digital advertising screens use dynamic content, implementing HD videos and interactive content that aim to influence the buying process and provide useful information (Kelsen, 2010). Digital screens seek to attract the attention of the new *flâneur* by offering him/her information or an interactive experience that can be enjoyed, in many cases, thanks to his/her most precious object of desire, the mobile phone. This is how it achieves a connection with passersby and a screen to screen communication, which is fundamental to attracting the attention of current consumers since, much of the relationships that they establish with the world are through mobile phones (Lipovetsky & Serroy, 2009).

This interactivity was also somehow present in the more traditional out-of-home –OOH– advertising through invitations to connect to social networks, use technologies such as Bluetooth or scan promotional codes or QR (AIMC, 2015). But thanks

to the digitization of OOH advertising, its level of complexity has become completely different, allowing to apply the use of other technologies such as tactile sensors, augmented reality, contactless *NFC* or different motion sensors. All of this comes along with the possibility of providing a real-time response to the messages sent by passersby (IAB, 2023). This enables, for example, to carry out advertising actions in which the public is asked to send a sentence through an email and become the protagonist of the content projected on a public screen. In this sense, the sophistication of the technical characteristics of these digital devices allows citizen participation, which opens a new field of possibilities for interactivity (Pacheco, 2007).

Interactivity not only brings added value to DOOH advertising but also to the city and urban spaces themselves. The possibilities are endless; everything depends on the imagination of the advertiser: from the most rudimentary actions, such as the projection of static content, to the implementation of dynamic and interactive content even with a double educational and advertising purpose (García Canlini, 2008).

The large number of screens that have sneaked into the city, and not only in it but in all areas of our life, have transformed it, changing our relationship with information: screens have become an instrument of communication in our relationship with the world. "Living is increasingly becoming stuck to the screen and connected to the network" (García G. Besné, 2012).

#### *2.4. Capacity to Join Crows in the Urban Space Thanks to Their Audio-Visualization*

Digital screens offer other possibilities that go beyond interaction such as the fact that, through them, dynamic content can be inserted. This allows for shows and events using these public screens, not only happening in sports stadiums or large concerts, but also in squares and different urban spaces. In this sense, public screens manage to excite crowds all around urban areas (Roberts, 2006). This has resulted in their use not strictly being focused on advertising. With the organisation of shows using digital screens, different urban spaces are being helped to become revitalized, especially because, as Roberts (2006) states, public screens go crazy with shows, and shows go crazy with public screens.

It is the fact that digital screens allow the incorporation of dynamic content that makes them appealing and useful in events. This way, out-of-home advertising becomes audio-visual, together with the entire city, which also becomes a giant audio-visual screen (García Carrizo, 2016b) in which all kinds of visual content can be inserted and in some cases even sound (Muñiz, 2013).

### **3. The Importance of Sustainable Digital Out-of-Home Advertising**

According to the European Commission (2014), only in Europe, there are about 2-8 million billboards, and this number continues to grow. Alarmingly, 6M m<sup>2</sup> of poster paper is discarded every two weeks without proper recycling. The ink used in OOH advertising is harmful to the environment, and the toxic glue used exacerbates the negative impact. Polluting effects also come from the electricity consumption associated with them, and the use of non-recycled papers on billboards or PVC vinyl, which is harmful to the environment (Verde Nieto, 2008) Conse-

quently, OOH advertising has devastating consequences for the environment, and can be regarded a pollutant within the urban space. This is a problem for which a solution is needed.

Moreover, OOH advertising has deleterious consequences on urban environments, subsequently exerting adverse repercussions on the welfare of the populace. These repercussions manifest as health-related predicaments, including heightened levels of stress, disturbances in mental and emotional equilibrium, and impaired concentration while operating vehicles (Olivares, 2009).

The excessive presence of advertising messages has a profound impact on the urban fabric and architectural integrity of urban spaces. It distorts the very essence of the urban landscape by encroaching upon it through a multitude of urban furniture elements and obscuring building facades with overlapping posters. This relentless intrusion contributes to the degradation of structures through the installation of unsightly metallic frameworks. Consequently, the uncontrolled proliferation of OOH advertising engenders an altered image and physiognomy of the urban environment due to the accumulation of raw materials, products, and waste (Montesinos, 2013).

All these factors significantly influence urban spaces and, consequently, their reputation along with that of the city itself. The overwhelming presence of OOH advertising conveys a sense of negligence, pollution, aesthetic decay, and ultimately, an unsustainable city (Olivares, 2009). Consequently, pollution has emerged as a significant determinant of the urban landscape's quality, as well as the perception and image of cities, ultimately impacting their reputation (Villafañe, 2008). Thus, the implementation of sustainable practices in OOH advertising within cities becomes imperative (García Carrizo, 2014), and this research precisely focuses on that aspect.

OOH advertising encompasses promotional messages displayed in both urban and rural settings. Its defining characteristic is its presence in public spaces, whether on the streets—outdoor advertising—or within enclosed areas like the metro (indoor advertising) (Pacheco, 2000; Jornet, 2008).

The uncontrolled, excessive, and disorganized use of advertising channels in urban areas results in an overwhelming amount of information, causing the messages to lose their effectiveness and go unnoticed by the target audience. Consequently, relevant public institutions must establish regulations governing this practice. Such regulations should prioritize responsible and sustainable management to shape OOH advertising aligned with the city's objectives and promote sustainability.

Sustainable out-of-home advertising refers to the implementation of DOOH advertisement practices within the city, generating social and environmental benefits for society while delivering economic and reputational value to advertisers. This approach ensures the longevity of out-of-home advertising and creates shared value for all stakeholders involved. Sustainable out-of-home advertising goes beyond merely raising awareness about environmental values. Instead, it integrates these values into its practices by employing environmentally responsible, recyclable, and eco-friendly displays that harmoniously blend with the surrounding environment. Thus, it places emphasis not only on the content of the advertisement—what is communicated—but also on the format and placement of the ad (how and where it is communicated). In this context, DOOH advertising is a friendly alternative to traditional displays.



#### 4. Creating a Model for Implementing Sustainable Digital Out-of-Home Advertising in Urban Spaces

To define the attributes of sustainable out-of-home advertising, we can refer to the framework presented in the *Responsible and Sustainable Business Manual* (2008), written by Olcese, Rodríguez and Alfaro. This model outlines key principles that businesses should follow to gain legitimacy and justify their operations in society: environmental consciousness, value creation, long-term perspective, innovative capacity, and community engagement. These principles can be applied both to OOH and DOOH advertising in order to foster sustainable practices. By adhering to these guidelines, advertisers and other stakeholders involved in the advertising network, such as media agencies and urban furniture companies, can develop sustainable out-of-home advertising that aligns with the following five pillars: 1- urban integration and adaptation to the context, 2- shared value, 3- long-term sustainability, 4- reduced ecological impact, and 5- cultural and symbolic significance. All of this should be approached systemically and with a corporate citizenship perspective.

##### 4.1. *Integration and Adaptation to the Urban and Social Environment*

Regarding integration and adaptation to the urban environment, it is essential to ensure that sustainable out-of-home advertising takes into account the specific requirements of the public spaces and architectural landscapes it is placed in and plays an aesthetic role in them. Urban furniture should be purposefully designed and created to harmonize and blend with the surrounding environment, considering factors such as the size of buildings, existing advertising formats, and appropriate materials. This integration aims to maintain the integrity of the urban space and prevent any distortions or disruptions to it (Pacheco, 2007).

To achieve this, various companies, like Clear Channel, employ a diverse range of architects and urban designers, such as the French architect and designer Christian Biecher (Control Publicidad, 2019). Besides, historically, JCDecaux has trusted its designs to famous architects:

In 1992, the Group called on Lord Norman Foster, the first internationally renowned designer to work with the Group's teams to design a model for a bus shelter for the UK. This launched JCDecaux's policy of collaborating with the best urban designers in the world. Then, in 1994, Jean-Michel Wilmotte designed new street furniture for the Champs-Élysées. In 1997, JCDecaux won the City of Sydney's call for tenders in preparation for the 2000 Olympic Games with a range designed by Philip Cox, an Australian architect who successfully captured the spirit of the Australian city in his models. [...] JCDecaux later called on Patrick Jouin to design the Vélib bicycle docking stations Senior billboard panels and Paris MUPis in 2005, then automatic public toilets in 2009 (JCDecaux, 2023).

This grants the companies the ability to provide a diverse range of advertising formats, customized to suit the unique characteristics of each particular site. For instance, different designs are utilized in historical city centres, where more traditional elements are preferred, compared to new urban areas that embrace a dynamic and modern ambience, often featuring innovative materials and bold stylistic designs.

In this sense, architects play a crucial role in the design and development of urban furniture. As experts in spatial planning and design, they are tasked with creating functional, aesthetically pleasing, and sustainable furniture pieces that enhance the urban environment. The design of urban furniture goes beyond its mere practicality. Architects understand the importance of integrating furniture seamlessly into the existing urban fabric. Their expertise allows them to create pieces that not only serve their intended purpose but also contribute to the overall aesthetic appeal of public spaces.

One of the primary objectives of architects designing urban furniture is to create a sense of place. By carefully selecting materials, colours, and forms, they can establish a cohesive and harmonious visual language that reflects the character and identity of the surrounding area. Whether it's a park bench, a bus shelter, or a public plaza seating arrangement, architects strive to ensure that the furniture enhances the unique qualities of the urban environment. Besides, architects are responsible for addressing the needs and preferences of the users. They consider factors such as comfort, ergonomics, and accessibility when designing urban furniture. Designing inclusive and user-friendly elements ensures that everyone, regardless of age, ability, or background, can comfortably utilize and enjoy public spaces.

It is also important to highlight the incorporation of advertising into urban electrical substations, which represents a significant advancement in the integration of advertising in urban infrastructure. TWELCON, a pioneering Spanish company, has developed innovative wrapping for these centers that facilitate the incorporation of out-of-home advertising –Figure 2–. Not only do these covers provide a safer environment compared to conventional structures, but they also offer additional benefits such as the integration of 3G, 4G, and 5G coverage antennas, promoting connectivity within cities (J. García Fuentes, personal communication, June 9, 2023).



Figure 2. Out-of-home advertising incorporated into urban electrical substations through its innovative cover designed by TWELCON. [Source: [www.twelcon.com](http://www.twelcon.com)]

The integration of advertising into urban electrical substations through these wrappings presents new opportunities for promoting brands and engaging with the public. By utilizing the exterior surfaces of these urban substations, advertisers can effectively reach a large audience, as these locations often attract significant foot traffic and serve as central hubs for various activities and services. This innovative

approach to out-of-home advertising demonstrates the potential for creating visually appealing and functional structures that serve both advertising purposes and community needs.

Furthermore, climate considerations should also be considered when implementing DOOH. For example, in rainy cities like Birmingham –UK–, the design of bus shelters differs from those in cities with less frequent rainfall, such as Seville –Spain–.

Similarly, regional preferences should be considered when implementing advertising screens. In Oslo –Norway–, where wood is traditionally used in the construction of buildings and is part of the national identity, bus marquee seats are made out of wood. This not only associates national elements with the advertising formats, contributing to the city’s identity but also provides a warmer seating option compared to metal seats, which is particularly relevant in the cold Nordic temperatures.

In this sense, Haeusler (2009) points out that each continent has specific considerations for implementing DOOH in urban areas. For instance, Asia readily embraces densely, artificially illuminated spaces, which has eased the implementation of large digital screens here. This is also true in America, where large-format screens, and interactive ones at the street level, prevail, especially because of advertising saturation acceptance. In contrast, Europe tends to favour smaller, more intimate screens with which to interact from a short distance –e.g. by touching the screens–. This inclination in Europe demonstrates a greater not to distort public spaces and a stronger dedication to incorporating screens and advertising formats seamlessly into the fabric of the urban environment. Also according to Haeusler (2009), the implementation of digital screens in Africa faces challenges due to the lack of regulation, technological development, and climate conditions on the continent. However, some urban spaces have managed to install high-quality digital displays, albeit at a considerable cost. Similarly, in the Middle East, cities like Abu Dhabi, Dubai, and Doha encounter issues related to extreme external temperatures in desert areas. The LED technology used in screens can only function up to 60 °C, and the intense sunlight increases the screen’s brightness, raising its operating temperature. Additionally, sandstorms can damage the screen’s materials. Finally, in the region of Oceania, digital installations are often found in temporary settings and predominantly employed during nocturnal festivities.

In short, when designing any urban advertising format, it is crucial to consider the physical space that surrounds it (Pop & Toft, 2016). The architecture should embrace the advertising installations, acknowledging their permanent presence, even when not in use.

#### *4.2. Shared Value*

In terms of creating shared value, sustainable out-of-home advertising should provide social and environmental benefits to society, while also delivering economic and reputational value to the advertiser (Sander et al., 2021). It goes beyond raising awareness about environmental values and incorporates those values into its practices. This includes using environmentally responsible, recyclable, and eco-friendly displays that seamlessly integrate with the environment. Sustainable out-of-home advertising should generate value for the city, its inhabitants, and the advertiser, ensuring a mutually beneficial relationship (Sheth & Parvatiyar, 2020). For example,

out-of-home advertising displays like bus shelters can integrate informational and environmental functions alongside advertising. They can provide information to public transport users, offer protection from weather conditions, and incorporate features like glass container installations or attached recycling bins to contribute to environmental conservation and city cleanliness. The objective is to establish a symbiotic value that brings advantages to both the community and the advertiser, cultivating a harmonious connection with both the environment and society (Verleye et al., 2023).

#### *4.3. Long-Term Sustainability*

Sustainability –in the long term– is another key aspect that architects prioritize in urban furniture design. With increasing concerns about the environment, architects aim to create furniture that minimizes its ecological footprint. They incorporate sustainable materials, employ energy-efficient manufacturing processes, and consider the lifecycle of the furniture to reduce waste and promote longevity. Additionally, they explore innovative solutions, such as incorporating renewable energy sources or integrating green infrastructure elements into furniture design.

In this sense, advertising format designers should have long-term considerations, ensuring longevity and positive impact. Advertising formats should be designed and implemented with durability, maintenance, and adaptability in mind to minimise waste and resource consumption.

#### *4.4. Reduced Ecological Impact*

Out-of-home advertising should aim to minimise its negative environmental impact. This involves using materials, technologies, and practices that reduce energy consumption, minimise waste generation, and avoid the use of toxic substances. The ecological footprint should be minimised throughout the entire lifecycle of the advertising displays. To achieve sustainable out-of-home advertising, it is necessary to reduce its ecological footprint. This objective can be achieved by channeling resources into research and development initiatives undertaken by DOOH companies. It involves using natural resources, and renewable energies, and managing advertising waste effectively. The use of recycled materials in the construction of out-of-home ads and displays is also crucial. Implementing eco-design principles and using materials with positive effects on the environment, such as air purifying capabilities, can further contribute to reducing pollution and environmental impact. Employing ecological products throughout the entire advertising process, from manufacturing to maintenance and cleanliness, is essential. This includes, for instance, using ecological fuels, low-consumption vehicles, and non-polluting energy sources for employee travel.

#### *4.5. Cultural and Symbolic Significance*

Finally, cultural and symbolic aspects play a significant function within the city's fabric. This has the obvious implication that sustainable out-of-home advertising should fulfill a cultural and symbolic function in the city too, contributing to its identity and reputation. The design and placement of advertising displays should

consider regional tastes, climate conditions, and the desired perception of the city. It should reflect and respect the cultural and architectural characteristics of the urban environment. Out-of-home advertising plays a significant role in reflecting and interacting with the cultural and societal environment in which it is located. It should align with the customs, traditions, ethical and religious values, and political ideas of the community. Out-of-home advertising can contribute to the cultural and symbolic function of a city by becoming landmarks and symbols that hold meaning for its inhabitants. It is important to recall already mentioned examples, such as the billboards and DOOH in Picadilly Circus (London), Times Square in New York or Las Vegas (USA), which have acquired immense influence and symbolism in their respective cities. Their removal would evoke nostalgia as they are considered part of the urban imagery. Advertisements can shape spaces of desire for visitors and transform a city into a dream world that is desired and enjoyed.

#### *4.6. Systemic Approach*

Sustainable DOOH and OOH advertising requires a systemic approach that considers these five foundations as an entire implementation process. This also includes the design, production, preparation, distribution, and maintenance of out-of-home ads. The goal is for out-of-home advertising to harmoniously coexist with urban and public spaces and remain a valuable and sustainable element within them, contributing to a responsible and environmentally conscious urban landscape and promoting corporate citizenship.

### **5. Conclusions and Discussion**

Digital screens have a significant impact on public spaces, influencing their aesthetic, social, and symbolic functions. These screens can generate innovative images, create visually engaging experiences, and facilitate citizen engagement and social gatherings. Besides, the dynamic nature of digital screens allows for the adaptation of advertising content to suit different contexts and occasions, enhancing the vibrancy and vitality of public spaces (Šuklje & Ruchinskaya, 2019).

The proliferation of Out-of-Home –OOH– advertising poses a multifaceted challenge, with significant environmental, urban, and societal consequences (European Commission, 2011). The staggering number of billboards and the wasteful disposal of poster paper, coupled with the use of environmentally harmful inks and glues, reflect an alarming disregard for the environment. Additionally, the energy consumption associated with these advertisements and the use of non-recyclable materials further exacerbate the environmental impact (Khamis, 2020).

Beyond environmental concerns, OOH advertising has adverse effects on urban spaces and the well-being of city dwellers. It disrupts the architectural integrity of urban environments, encroaches upon public spaces, and alters the perception of cities, portraying them as polluted and aesthetically degraded (Portella, 2014).

To address these challenges, the implementation of sustainable practices in OOH advertising is imperative (Breva et al., 2023). Sustainable OOH advertising, particularly through Digital Out-of-Home –DOOH– practices, offers a solution that not only promotes environmental responsibility but also enhances the effectiveness of

advertising messages. It aligns advertising with the broader objectives of cities, fostering sustainability, and enhancing the overall urban landscape.

This research sheds light on the significance of sustainable advertising in urban environments. It emphasizes the need to carefully configure DOOH advertising sustainably, considering five essential pillars: 1- urban integration and adaptation to the context, 2- shared value, 3- long-term sustainability, 4- reduced ecological impact, and 5- cultural and symbolic significance. By systemically addressing these pillars and adopting a perspective of corporate citizenship, the model of sustainable implementation presented in this research offers valuable insights into the role of DOOH advertising in urban spaces.

The first pillar, urban integration and adaptation, underscores the importance of seamlessly incorporating DOOH advertising into the urban fabric. It involves designing advertising installations that complement the existing built environment, blend harmoniously with surrounding architecture and landscapes, and enhance the overall aesthetic appeal of the city. By integrating DOOH advertising into the urban context, it becomes an integral part of the urban experience, enhancing the visual quality and functionality of public spaces (Carmona et al., 2010).

Shared value, the second pillar, highlights the importance of creating value for both advertisers and society as a whole. This concept aligns with the idea of shared value put forth by Porter and Kramer (2011), which emphasizes that businesses should go beyond generating profits and actively contribute to addressing societal challenges. By incorporating shared value into the configuration of DOOH advertising, it becomes a tool for enhancing public spaces, promoting community well-being, and fostering mutually beneficial relationships between advertisers and the public.

Long-term sustainability recognizes the need to consider the environmental, economic, and social impacts of DOOH advertising over time. Sustainable development principles, as defined by the World Commission on Environment and Development (1987), emphasize the responsible use of resources to meet present needs without compromising the ability of future generations to meet their own needs. By adopting sustainable practices in the design, installation, and operation of DOOH advertising, it becomes possible to minimize negative environmental impacts and ensure the longevity of advertising structures.

Ecological impact reduction, the fourth pillar, emphasizes the need to minimize the environmental footprint of DOOH advertising. This can be achieved through various measures such as using energy-efficient screens, incorporating renewable energy sources, and adopting sustainable materials and production processes. By reducing energy consumption, minimizing waste generation, and considering the end-of-life disposal of advertising structures, it becomes possible to mitigate the ecological impact of DOOH advertising and contribute to broader sustainability goals (European Commission, 2020).

The fifth pillar, cultural and symbolic importance of DOOH advertising, highlights the significance of aligning advertising with the cultural context and heritage of the city. This approach acknowledges that urban spaces carry cultural and symbolic meanings that should be respected and enhanced by advertising installations. By integrating DOOH advertising in a way that is sensitive to the local culture and identity, it becomes a means of expressing and reinforcing cultural values, contributing to a sense of place, and fostering community pride (Carmona et al., 2010).

In conclusion, this research highlights the importance of configuring sustainable DOOH advertising in urban spaces based on the pillars of shared value, long-term sustainability, cultural and symbolic importance, ecological impact reduction, and urban integration and adaptation. By systemically considering these pillars and adopting a perspective of corporate citizenship, advertisers can contribute to the creation of sustainable and vibrant cities. The effects of digital screens on public space, including their aesthetic, social, and symbolic functions, further reinforce the significance of integrating DOOH advertising as a facilitator of citizen engagement and social gatherings. By embracing sustainability and considering the broader social and environmental implications, DOOH advertising can become a valuable asset in the sustainable development of urban areas.

## Bibliography

- AIMC (2015). *Resumen general de resultados EGM. Abril 2014 a Marzo 2015*. Madrid: AIMC.
- Baladrón, A. J. (2007). Reflexiones sobre la omnipresencia publicitaria en el contexto urbano: la ciudad anuncio. In Baladrón, A., Martínez, E. & Pacheco Rueda, M. (dirs.): *Publicidad y ciudad. La comunicación publicitaria y lo urbano: perspectivas y aportaciones* (pp. 75-93). Comunicación Social.
- Breva, E., Olivares, F. & Benlloch, M.T. (2023). Sustainable outdoor advertising: a professional point of view from Spain. *Communication Today*, 14(1), 101-115. <https://doi.org/10.34135/communicationtoday.2023.Vol.14.No.1.7>
- Carmona, M., Heath, T., Oc, T., Tiesdell, S. (2010). *Public places, urban spaces. the dimensions of urban design*. Routledge. <https://doi.org/10.4324/9780080515427>
- Control Publicidad (2019). *Clear Channel gana el contrato de mobiliario urbano de París*. <https://controlpublicidad.com/agencias-publicidad/clear-channel-gana-el-contrato-de-mobiliario-urbano-de-paris/>
- Chekima, B., Chekima, S., Syed Khalid Wafa, S. A. W., Igau, O. A., & Sondoh Jr, S. L. (2016). Sustainable consumption: the effects of knowledge, cultural values, environmental advertising, and demographics. *International Journal of Sustainable Development & World Ecology*, 23(2), 210-220. <https://doi.org/10.1080/13504509.2015.1114043>
- European Commission (2011). *Reducing billboard advertising waste*. <https://cordis.europa.eu/article/id/92567-reducing-billboard-advertising-waste>
- European Commission (2014). *The New Eco-friendly Advertising Tool Which Gives an Alternative Real-Time Outdoor Advertising Media for SMEs. Reducing billboard advertising waste*. <https://cordis.europa.eu/article/id/92567-reducing-billboard-advertising-waste>
- European Commission (2020). Energy-efficient digital outdoor billboards for sustainable advertising. Disruptive digital reflective display enables energy-efficient profitable outdoor advertising. <https://cordis.europa.eu/article/id/415856-disruptive-digital-reflective-display-enables-energy-efficient-profitable-outdoor-advertising>
- Fandiño, P. (2023). *Según la OAAA y el EGM, la publicidad de exterior crece entre los consumidores en comparación con otros canales de comunicación*. [www.programaticaly.com/portada/la-publicidad-oooh-crece-entre-los-consumidores-en-comparacin-con-otros-canales-de-comunicacin-segn-la-oaaa-y-el-egm](http://www.programaticaly.com/portada/la-publicidad-oooh-crece-entre-los-consumidores-en-comparacin-con-otros-canales-de-comunicacin-segn-la-oaaa-y-el-egm)
- García Canclini, N. (2008). Libros, pantallas y audiencias: ¿qué está cambiando? *Comunicar. Revista científica iberoamericana de comunicación y educación* 15 (30), 27-32. <https://doi.org/10.3916/c30-2008-01-004>

- García Carrizo, J. (2014). La ciudad postmoderna como escenario de la comunicación publicitaria: ¿integración o contaminación visual publicitaria? Hacia una publicidad outdoors sostenible. *ARTE Y CIUDAD. Revista De Investigación*, (6). <https://doi.org/10.22530/ayc.2015.N6.244>
- García Carrizo, J. (2016a). Ciudad y comunicación: efectos y funciones de las pantallas digitales publicitarias en la Gran Vía madrileña. *Revista Prisma Social* 16, 597-649. <https://revistaprismasocial.es/article/view/1267>
- García Carrizo, J. (2016b). Ciudad y Comunicación: Publicidad Exterior Sostenible y Pantallas Digitales Urbanas. In Tur-Viñes, V., García-Medina, I. & Hidalgo-Marí, T. (Coords.), *Creative Industries Global Conference* (11-23). Colección Mundo Digital de la Revista Mediterránea de Comunicación 12, Universidad de Alicante. <http://eprints.uclm.es/46466/>
- García Carrizo, J. (2017a). Publicidad exterior sostenible: una propuesta de implementación en la ciudad. *Arte y ciudad. Revista de investigación* 11, 137-156. <https://doi.org/10.22530/ayc.2017.N11.408>
- García Carrizo, J. (2016c). *Ciudad y pantallas digitales publicitarias: motivos, funciones y efectos de su implantación*. In M. CHAVES MARTIN (ed.), *Ciudad y Comunicación* (281-291). Universidad Complutense de Madrid. <https://eprints.uclm.es/id/eprint/39754/>
- García Carrizo, J. (2017b). Pantallas digitales publicitarias en la ciudad: un nuevo idioma visual para interactuar con las audiencias en publicidad digital. In V.V.A.A. *Reality and screen, a postmodern mirror* (pp. 171-182). Universitat Ramon Llull. <https://eprints.uclm.es/id/eprint/45130/>
- García G. Besné, M. T., (2012). Pantalla total: espacio relacional del mundo contemporáneo. *Culturales*, VIII(15), 135-154. [www.redalyc.org/articulo.oa?id=69424430006](http://www.redalyc.org/articulo.oa?id=69424430006)
- Gaspar Ferreira, A., & Fernandes, M. E. (2022). Sustainable advertising or ecolabels: Which is the best for your brand and for consumers' environmental consciousness? *Journal of Marketing Theory and Practice*, 30(1), 20-36. <https://doi.org/10.1080/10696679.2021.1882864>
- Gómez, B. & Puentes, B. (2010). Publicidad exterior. Del papel al LED. *Telos* 82, enero-marzo, 1-16. <https://telos.fundaciontelefonica.com/archivo/numero082/publicidad-exterior-del-papel-al-led/?output=pdf>
- Haeusler, M. H. (2009). *Media Facades: History, Technology and Media Content*. Avedition.
- IAB (2015). *III Estudio Anual IAB Spain Digital Signage: Informe de Resultados Abril de 2015*. [www.scribd.com/document/270521729/III-Estudio-Anual-de-Digital-Signage-2015](http://www.scribd.com/document/270521729/III-Estudio-Anual-de-Digital-Signage-2015)
- IAB (2023). *Estudio Anual DOOH 2023*. <https://iabspain.es/estudio/estudio-doooh-2023/>
- Iruzubieta, G. (2011). *Libro Blanco del Digital Signage: la cuarta pantalla. Cuadernos de Comunicación Interactiva de IAB y Revista de la Comunicación Interactiva y el Marketing Digital Interactive*. Edipo.
- JCDecaux (2023). *Design and urban beautification at the heart of JCDecaux's development strategy*. [www.jcdecaux.com/blog/design-and-urban-beautification-heart-jcdecaux-development-strategy](http://www.jcdecaux.com/blog/design-and-urban-beautification-heart-jcdecaux-development-strategy)
- Jiang, F. Z., Thilakarathna, K., Hassan, M., Ji, Y., & Seneviratne, A. (2017, April). Efficient content distribution in Dooh advertising networks exploiting urban geo-social connectivity. In *Proceedings of the 26th International Conference on World Wide Web Companion* (1363-1370). <https://doi.org/10.1145/3041021.3051156>
- Jornet, L. (2007). *Aceptación social del mobiliario urbano como servicio público y soporte publicitario*. Universitat Ramon Llull.



- Kelsen, K. (2010). *Unleashing the Power of Digital Signage: Content Strategies for the 5th Screen*. Focal Press.
- Khamis, S. (2020). *Branding Diversity: New Advertising and Cultural Strategies*. Routledge.
- Khorshidvand, B., Soleimani, H., Sibdari, S., & Esfahani, M. M. S. (2021). Developing a two-stage model for a sustainable closed-loop supply chain with pricing and advertising decisions. *Journal of Cleaner Production*, 309, 127165. <https://doi.org/10.1016/j.jclepro.2021.127165>
- Kramer, M. R., & Porter, M. (2011). Creating shared value. *Harvard Business Review* 89, 62-77. [www.communitylivingbc.ca/wp-content/uploads/2018/05/Creating-Shared-Value.pdf](http://www.communitylivingbc.ca/wp-content/uploads/2018/05/Creating-Shared-Value.pdf)
- Lastra, E. (2021). *El boom de la DOOH: la publicidad exterior digital dará la campanada en los años venideros*. [www.marketingdirecto.com/marketing-general/publicidad/boom-doo-h-publicidad-exterior-digital-dara-campanada](http://www.marketingdirecto.com/marketing-general/publicidad/boom-doo-h-publicidad-exterior-digital-dara-campanada)
- Lipovetsky, G., y J. Serroy (2009). *La pantalla global. Cultura mediática y cine en la era hipermoderna*. Anagrama.
- Marchán, S. & Rodríguez, R. (2006). *Las Vegas: resplandor pop y simulaciones posmodernas, 1905-2005*. Akal.
- Montesinos, S. (2013). *Contaminación visual*. [www.tinyurl.com/p2d445h](http://www.tinyurl.com/p2d445h)
- Mposi, Z. S., Roux, T., & Van zyl, D. (2020). Towards a conceptual framework for contemporary digital out-of-home advertising media. *Journal of Global Business and Technology*, 16(2), 18-30.
- Mršić, L. (2022). Impact of Artificial Intelligence on DOOH Advertising: Message-Persuasion Level Enhancement Using Illusion Board and Personalized Insights. In *Intelligent Computing & Optimization: Proceedings of the 5th International Conference on Intelligent Computing and Optimization 2022 (ICO2022)* (pp. 142-151). Springer International Publishing.
- Muñiz, J.A. (2013). En torno a la audiovisualización de la comunicación publicitaria. *Revista Pangea*, 4, 245-262. <https://doi.org/10.52203/pangea.v4i1.60>
- Olcese, A., Rodríguez, M.A. & Alfaro, J. (2008). *Manual De la empresa responsable y sostenible*. McGraw-Hill.
- Olivares, F. (2009). “Cidade limpa” y la contaminación publicitaria en la ciudad”. *Revistas de Estudios de la Comunicación Zer* 14, (26), 253-275.
- Pacheco, M. (2007). Publicidad y falsedad en el paisaje urbano: hacia una convivencia sostenible. In Méndiz, A. & Cristófol, C. (coords.): *Falsedad y comunicación: publicidad engañosa, información falsa, imagen manipulada* (pp. 75-84). Universidad de Málaga.
- Pacheco, M. (2000). *Cuatro décadas de publicidad exterior en España*. Ediciones de las Ciencias Sociales.
- Pacheco, M. (2004). La función social de la publicidad exterior. In Eguizábal, R. (ed.): *La comunicación publicitaria* (pp. 117-134). Comunicación Social Ediciones y Publicaciones.
- Pop, S. & Toft, T. (2016). *What Urban Media Art Can Do: Why, When Where and How? Avedition*.
- Portella, A. (2014). *Visual Pollution. Advertising, Signage and Environmental Quality*. Routledge.
- Roberts, K. (2006). *Sisomo el futuro en pantalla*. Urano.
- Roux, T. (2018). Industry perspectives on digital out-of-home advertising in South Africa. *Communicare: Journal for Communication Sciences in Southern Africa*, 37(1), 17-37. <https://hdl.handle.net/10520/EJC-10573becf7>

- Salcedo, J. (2011). *Publicidad urbana de gran formato en Santiago*. Pontificia Universidad Católica de Chile.
- Sander, F., Föhl, U., Walter, N. & Demmer, V. (2021). Green or social? An analysis of environmental and social sustainability advertising and its impact on brand personality, credibility and attitude. *Journal of Brand Management*, 28, 429-445. <https://doi.org/10.1057/s41262-021-00236-8>
- Santos, C. (2023). *El futuro ha llegado al DOOH...y las predicciones se cumplieron*. <https://ipmark.com/el-futuro-ha-llegado-al-doooh-y-las-predicciones-se-cumplieron/>
- Sheth, J. N., & Parvatiyar, A. (2021). Sustainable Marketing: Market-Driving, Not Market-Driven. *Journal of Macromarketing*, 41(1), 150-165. <https://doi.org/10.1177/0276146720961836>
- Šuklje Erjavec, I. & Ruchinskaya, T. (2019). A Spotlight of Co-creation and Inclusiveness of Public Open Spaces. In V.V.A.A., *CyberParks – The Interface Between People, Places and Technology* (pp. 209-223). Springer. [https://doi.org/10.1007/978-3-030-13417-4\\_17](https://doi.org/10.1007/978-3-030-13417-4_17)
- Taylor, C. R. (2015). Creating win-win situations via advertising: new developments in digital out-of-home advertising. *International Journal of Advertising*, 34(2), 177-180. <https://doi.org/10.1080/02650487.2015.1021132>
- Verde Nieto, D. (2008). *The Advertising Industry, Sustainability and the Bottom Line*. [www.environmentalleader.com/2008/09/the-advertising-industry-sustainability-and-the-bottom-line/#ixzz3kZoL5ToB](http://www.environmentalleader.com/2008/09/the-advertising-industry-sustainability-and-the-bottom-line/#ixzz3kZoL5ToB)
- Verleye, G., De Ruyck, A., Vermeulen, W., & Schoenaers, I. (2023). Credibility of green advertising: six elements that drive credibility in green advertising. *Frontiers in Communication*, 8, 1056020. <https://doi.org/10.3389/fcomm.2023.1056020>
- Villafañe, J. (2008). *La ciudad reputada*. [www.villafane.info/files/pdf/ciudad\\_reputada.pdf](http://www.villafane.info/files/pdf/ciudad_reputada.pdf)
- World Commission on Environment and Development (1987). *Report of the World Commission on Environment and Development*. United Nations. <https://digitallibrary.un.org/record/139811>