

EVALUATING THE VISUAL AND LIGHT POLLUTION FROM OUTDOOR ADVERTISING IN EGYPTIAN STREETS

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ABSTRACT

The advancement in lighting and its related technologies, rapid urbanization expansion, economic growth and misuse of available technologies have inevitably led to light pollution, which has become a global environmental issue. Humans light their nighttime environment for various reasons, including advertising, to facilitate transportation, orientation, and way finding. The aim of this research is double folded; first to evaluate the viewer's perception of the visual pollution caused by outdoor advertisement and second to assess its associated light pollution. A literature review of recent researches has been performed, analyzed and followed by the application of a survey questionnaire. The questionnaire aimed at identifying the viewer's perception of the visual and light pollution problems of both Salah Salem Street and Cairo-Suez highway road. The valid responses included 138 respondents representing different genders, age groups and backgrounds. The significance of this research comes from the fact that visual and light pollution resulting from outdoor advertisement is inevitable due to the vast urbanization growth resulting from the governmental mega projects being executed as part of Egypt's 2030 Vision. The results of this paper can aid decision makers and those involved in setting laws to control visual and light pollution resulting from outdoor advertisement.

KEYWORDS: Visual pollution, light pollution, outdoor advertisement lighting, urban streets, Egypt.

1. INTRODUCTION

This research examines a bi-fold problem. The visual pollution resulting from outdoor advertisement and the light pollution caused by its lighting at night. Advertising in public spaces is something most of us have individually experienced and notice every day. The quality of urban public space requires a balance between quantity, distribution and placement of the outdoor advertising. Consequently, it

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influences the urban visual quality [1]. In addition to being a visual pollution source on streets, paths overloaded with advertisements represent a safety hazard for driver and citizens' and may cause negative mental and physical effects [2]. It is worth mentioning that that advertisement regulations for billboards specific contents exist in most countries [3]. However, regulations related to quantity of advertising are limited and may be referred to hesitancy against public control of private information based on the argument of free speech.

In the meantime, one of the reasons behind light pollution include absence of legal requirements and lack of control over outdoor lighting. However, outdoor lighting can greatly enhance the outdoor environment by creating a delicate sense of place. It can add a perceived sense of security at night, extend the use of outdoor spaces into the evening, and enhance the nighttime experience for users of outdoor spaces [4].

Consequently, artificial lighting at night is seen as an irreplaceable tool for our society and its activities at nighttime. Unfortunately, this essential tool has negative side effects, which have only come to light in the past 10–20 years and rapidly increasing [5]. There are many sources that contribute to the light pollution. The advertisement and decorative lighting are a major contributor in light pollution [6]. Light trespass interferes with the sleeping patterns of humans in residential areas. In addition, excessive illumination from outdoor advertisement and decorative lighting can be seen as a source of visual discomfort to pedestrians. Furthermore, light pollution has a considerable impact on human health, wellbeing and ecological stability [7]. In cities, signage and advertisement lighting has three distinct forms, including internally illuminated signs, externally illuminated signs and self-luminous signs [8]. Externally illuminated signs can be seen as the main contributor to the light pollution. This can be attributed to the poor selection and aiming of the luminaires in some cases.

1.1 Research Problem

The issue of Egypt's light pollution resulting from outdoor lighting has been increasing rapidly. The energy losses from Cairo is nearly equal to that of Paris, a little lower than that of London and much higher than Amsterdam and Brussels [9]. Lighting of outdoor advertising in public spaces and urban streets can be seen as a major cause for the light pollution in Egypt as seen in Fig. 1.



Fig. 1. Outdoor advertising in Egypt by day and their lighting by night can be considered as a potential source for chaos, visual and light pollution.

Many factors aid in deepening the problem out of which: high level of illuminance used to attract the viewer's attention, high contrast levels between the billboards and their nighttime surroundings and finally the increased advertisement size and their exaggerated numbers. This can be attributed to the absence of regulations for outdoor lighting and its related policies and guidance in Egypt. It is worth mentioning that Egyptian law number 66 for year 1956 related to organizing the advertisements, specified issues related to advertisement type, dimensions, content, licensing, fees, etc. [10]. After examining the section related to lighting of outdoor advertisement, the aforementioned law only specified issues related to public safety such as wiring, electrical conduits, firefighting system, earthing system and distance from users. Law 66 and its amendments did not address issues related to visual and

light pollution resulting from the exterior lighting of outdoor advertisements. In the meantime, the National Organization of Urban Harmony (NOUH) issued in 2010 a detailed standard guideline related to the regulation of street signage and advertisements which addressed the visual pollution section. However, and similar to law number 66, the guidelines did not tackle the light pollution issue. It only specified aiming the luminaires away from drivers and usage of internal lighting technique [11].

1.2 Research Aim

This paper aims at evaluating the visual and light pollution in Egypt resulting from outdoor advertising, as this area has not yet been widely documented. Thus, the objective of this paper is twofold: Firstly how does the viewer perceive the outdoor advertisement? Is it a source of visual pollution by day?. Secondly how does the viewer sense the lighting of this type of advertisement and whether it is a cause light pollution by night?

2 METHODOLOGY

2.1 Study Area

The scope of this study focuses on the evaluation of two main spines in Cairo, Egypt as illustrated in Fig. 2. Salah Salem (SS) Street, which is a major street that passes through entire Cairo and connects the Eastern region with the Western zone of Cairo. In addition, it is surrounded with buildings on both sides, as it is located in a dense urban context. The second Spine is Cairo-Suez (C-S) highway road, which connects Cairo with all the new urban developments constructed to the East of Cairo. (C-S) highway starts at a moderate density context and eventually passes by a low-density context until reaching the desert.

2.2 Selection Criteria for Case Studies

The selection of the case studies was based on a number of factors to ensure that they represent various areas that may experience visual and light pollution resulting from outdoor advertisement as briefed below:

- High number of users from different backgrounds and for different purposes attract marketing agencies which in its role utilize big sized advertisement and high level of illumination at night to attract the attention of more potential customers;
- The different nature of the two selected spines where SS street is in the middle of Cairo and is defined by the surrounding buildings while C-S highway road connects between a number of cities and can be seen as less defined as it is a highway; and
- The level of contrast between the spine and its surrounding differs due to the different nature of each. The contrast on SS street can be seen as lower, which is a result of illuminating some of the surrounding buildings. Conversely, the level of contrast in C-S highway road is higher due to the scarcity of any type of surrounding lighting.

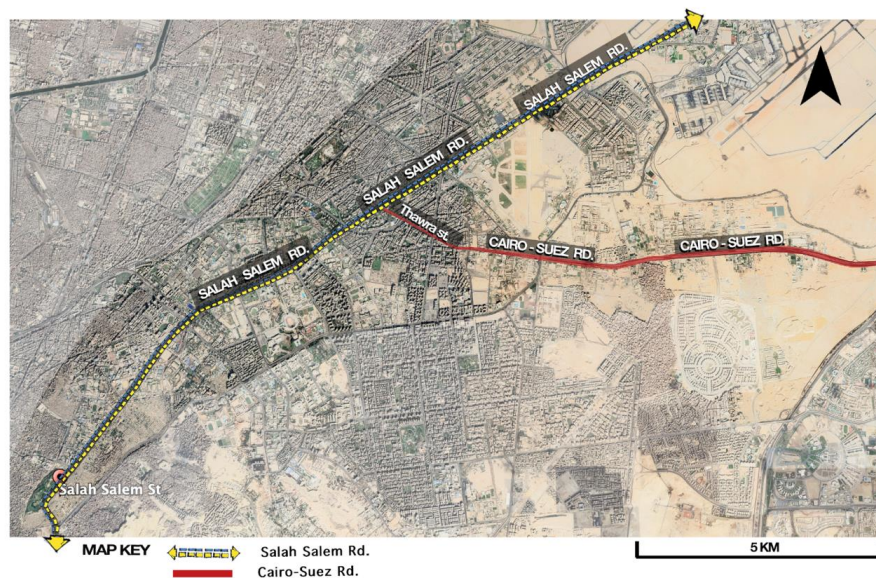


Fig. 2. Cairo map illustrating the two studied spines: Salah Salem Street and Cairo-Suez highway road.

2.3 Data Collection

This study conducted a structured field survey to obtain the required information about visual and light pollution caused by outdoor advertising and its impact on the society and on urban street users. Data was collected and questionnaires were filled electronically by participants via a web-based online survey application.

2.4 Sample Selection Technique

The sample selection technique applied in this paper involves using purposeful sampling. This has been used for the advantage of identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest [11]. This type of sampling technique was selected among random ones owing to its privileges in enhancing the willingness to participate, the ability to communicate experiences and opinions in an expressive manner [12], which was in turn reflected on the meaningfulness of the collected data. Thus, a sample of 150 participants was selected, with 138 valid responses; 90% response rate. The sample targeted urban planners, landscape/streetscape designers, construction managers, engineers and normal users from different backgrounds. The most common attributes among the selected sample were the following:

- Residents of Central and East Cairo;
- Daily/weekly usage of both selected routes;
- Gender diversity;
- Age groups diversity;
- Have background on visual pollution/light pollution phenomenon; and
- Doesn't have severe visual impairments.

2.5 Analysis Technique

The research adopted descriptive statistics, where the individual responses of a sample of 138 people were analyzed. Data collected was organized into meaningful form, summarized and presented in an informative way. The reason behind using descriptive statistics lies in the fact that it has the ability to simply describe what is or what the data shows. While in the case of inferential statistics, it is used to reach conclusions that extend beyond the immediate data alone [13]. Since there is no evidence that the topic has been examined in Egypt recently, the descriptive method would be more compatible in this case.

2.5.1 Types of variables

The research relied on qualitative variables in the design and the analysis of the survey, this included asking the respondents about their basic data (gender, occupation,

age, etc.). Regarding the visual and light pollution in the selected case studies, the respondents were asked to express their opinion either descriptively or through 5 points Likert scale rating questions.

2.5.2 Level of measurement

The level of data measurement included both nominal and ordinal levels. Nominal level includes observations of qualitative variables and recording them as labels or names. The nominal level was suitable to label data like the age, gender and occupation. Whereas ordinal level assumes that one classification is ranked higher than the other [13], this helped to rate some qualitative variables on a relative scale which facilitated comparison between the perceptions of respondents in both case studies.

3 LITERATURE REVIEW

In general, there is scarcity in researches discussing the different types of pollution resulting from outdoor advertisements. This can be referred to a number of reasons:

- The impact of this type of pollution is increasing remarkably day by day [1]. In addition, and unlike air and water pollution problems, for which there is a long track of research in the physical sciences, visual pollution is a physical and cultural study.
- Visual and light pollution are mainly aesthetic and are not as clear as other types of pollution such as water, air and noise pollution.
- Those types of pollution are a newly emerging problem that has aroused during the past few decades.

Nevertheless, the literature review is divided into two parts, the first reviews issues related to the visual pollution and the second focusses on the related light pollution.

3.1 Literature Related to Visual Pollution Resulting from Outdoor Advertisement

A paper examined whether outdoor advertisements are a source of visual pollution in Pakistan or not [2]. The paper pointed out that roadside advertisements, as

an exterior distractor, create an objective hazard for driving safety which is accountable for almost 10% of all accidents. The paper quantified the effect of billboards on drivers and residents through survey. The outcomes of this paper highlighted the negative effects of billboards and categorized it as being a major source of visual pollution.

Another study investigated the negative influence of outdoor advertising on the quality of life and the satisfaction of residents with public spaces in a busy urban street in Poland [14]. The study showed that visual pollution can be assessed by linking public opinion, collected through site surveys, to the number of visible advertisements. The paper found that streetscape views with more than seven visible outdoor advertisements created visual pollution in this case study. A third study assessed outdoor advertisement as a source of visual pollution [1]. The paper defined visual pollution and examined the scientific methodologies related to this phenomenon. In addition, the research investigated how visual pollution can be measured and mapped. Afterwards, a brief overview on the development of online mapping approaches was presented and the challenges facing WebGIS applications were outlined [15].

3.2 Literature Related to Light Pollution Resulting from Lighting of Outdoor Advertisement

A study investigated the influence of advertisement and decorative lighting on light pollution in Seoul [16]. Field measurements were carried out and the results indicated that advertisement lighting is a substantial contributor to the local light pollution issue in Seoul as 30% of this type of lighting exceeded the legal limits in the study area. The study proposed modifications to local light policies in which all advertisement and decorative lighting should be switched off at the established curfew time. Another paper studied the lighting environmental management zones in South Korea using field measurements [17]. The paper pointed out that lighting of outdoor advertisement in commercial districts played a major part in light pollution.

4 APPLICATION OF SURVEY QUESTIONNAIRE

A multidimensional survey in the form of a questionnaire was administered to evaluate the pollution caused by outdoor advertisements on both SS street and C-S

road. The three purposes of the questionnaire were to a) evaluate the visual pollution caused by outdoor advertisements in both spines, b) evaluate the resulting light pollution caused by outdoor advertisements both spines and c) compare between the resulting pollution on both spines as briefed in Table 1.

Table 1. The structure of the survey questionnaire and its objectives.

Section	Objectives
Section (I): General information section	To identify the participants' background and to evaluate whether the participant is familiar with the outdoor advertisement, visual and light pollution topics.
Section (II): Evaluation of the visual pollution caused by outdoor advertisements on SS Street	To determine the visual aspects related to the street and the user level of satisfaction.
Section (III): Evaluation of the light pollution caused by outdoor advertisements on SS Street	To assess the setting of the outdoor advertisement lighting and the associated light pollution.
Section (IV): Evaluation of the visual pollution caused by outdoor advertisements on C-S Road	To conclude the visual aspects related to the street and the user level of satisfaction.
Section (V): Evaluation of the light pollution caused by outdoor advertisements on C-S Road	To evaluate the setting of the outdoor advertisement lighting and the associated light pollution.
Section (VI): Comparison between the visual and light pollution on both spines	To compare the visual aspects related to the advertisements available on both case studies. In addition, to determine which street has a better lighting setting that leads to lower light pollution.

5 RESULTS AND FINDINGS

The following sections present a detailed statistical analysis of the participants' evaluation of the different aspects related to the questionnaire:

5.1 Analysis of the General Attributes about the Participant's Background

Regarding the gender of the participants, around 56% of the respondents were females and around 44% were males which reflects near distribution. In the meantime, the highest age group that participated were from 18-25 and 26-35 years representing 39% and 38.5% consecutively. Age groups from 36-45, 46-55 and above 55 were targeted but their response rate was much lower representing 19.5%, 0.7% and 2%. As for the place of residence for the participants, the majority were from Heliopolis,

Sheraton, Nasr City, New Cairo, El-Rehab, El-Shorouk and Madinet. Residents from other places such as Maadi, Mokattam, El-Zaytoun, 10th of Ramadan, Hadayek El-Koba, etc. participated as well.

Regarding the educational backgrounds of the participants, most participants were Engineers (60%) followed by Urban Planners (17.1%). Other participants with various backgrounds like (landscape architecture and construction managers) came as the third highest participation level with (12.9%). Participants with environmental Science backgrounds represented (8%). Other educational backgrounds with minimum participation level included Fine Arts, Social Sciences, Energy related, Economics, Marketing and Communication Science (2%). Concerning if the participants had any sort of visual impairment and what was its type, 27.5% of the participants had near sightedness. Meanwhile, majority of the participants were aware of visual and light pollution problems of which 93% were aware of the visual pollution and around 84% were aware of the light pollution problem. In general, and regarding the outdoor advertisement type, 72.5% preferred digital media advertisement, 23 % favored the printed type and 4.5% chosen both types. In addition, 65% of the participants' categorized the outdoor advertisement as a negative aspect in the exterior environment.

5.2 Evaluation of the Visual Pollution Caused by Outdoor Advertisements on Both Spines

This section evaluates how participants perceive the appearance of both streets due to the availability of advertisements and whether the existence of advertisements causes any discomfort. Furthermore, it assesses the satisfaction of respondents with the size, organization and number of outdoor advertisements on both spines.

Regarding the appearance of SS street, 50% of the participants were neutral regarding the effect of advertisement on the appearance of the street and 45.5% did not like the appearance of the street as a result of the negative effect of the advertisement. This can be attributed to the fact that 79.5% of the participants' felt that the outdoor advertisement caused discomfort on SS street. As for C-S road, 47% of the participants were neutral regarding its appearance, 37% did not like its appearance and 62% felt that the outdoor advertisement caused discomfort on C-S highway road. As a result,

outdoor advertisement caused discomfort on both spines but higher discomfort was sensed on SS street than that on C-S road.

Concerning the effect of the outdoor advertisement on the users of SS street, 44.5% felt disturbed, 24% thought that they were annoyed and 22% sensed complete discomfort. Participants used the following keywords to describe their experience on SS street: “chaotic, stacked, distracting and vulgar”. In the meantime, and concerning the effect of the advertisement on the users of C-S road, 40% felt disturbed, 26.5% thought that they were annoyed and 20.5% sensed complete discomfort. Participants did not use specific keywords to describe their experience on C-S road, consequently, SS street had a higher negative impact on its users than C-S road. Finally, and with regards to the degree of users’ satisfaction concerning the size, organization and number of advertisements, Fig. 3 illustrates the degree of users’ satisfaction on SS street and Fig. 4 illustrates the degree of users’ satisfaction on C-S road. Both figures reveal that users are dissatisfied with all of the aforementioned aspects related to the advertisements on both spines. By comparing both figures, a slightly lower dissatisfaction with the size, organization and number of advertisements can be sensed in case of C-S road than that of SS street.

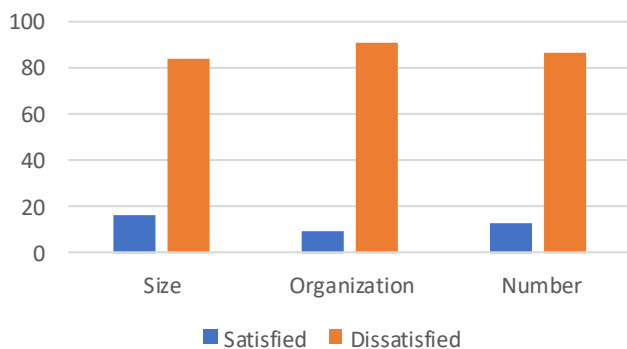


Fig. 3. Degree of users’ satisfaction with the different aspects of the advertisements on SS.

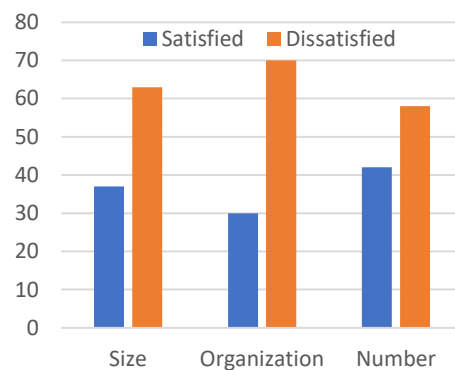


Fig. 4. Degree of users’ satisfaction with the different aspects of the advertisements on C-S.

5.3 Evaluation of the Light Pollution Caused by Lighting of Outdoor Advertisements on Both Spines

This section evaluates the contribution of the lighting of the outdoor advertisement to the light pollution problem. It examines the disturbance caused by the lighting at night and whether this type of lighting can be a source of glare.

Furthermore, it assesses the illumination level, contrast level between the advertisement and its surroundings and the aiming of the luminaires. Figure 5 illustrates the participants' feedback regarding the abovementioned aspects on SS street. Participants agreed that the lighting of the outdoor advertisement on the street contributed to the light pollution problem. In addition, the lighting disturbed participants by night. Furthermore, the lighting of the outdoor advertisement on the street caused glare. Moreover, respondents were not satisfied with the contrast level of the advertisement with its surroundings, the illumination level of the advertisement and the aiming of the light source (luminaires). In the meantime, Fig. 6 illustrates the participants' feedback regarding the abovementioned aspects on C-S road. Almost the same profile was shown in both spines. However, participants felt that the lighting of the outdoor advertisement contribution to the light pollution problem, disturbance by night and glare issues was slightly lower on C-S road than SS street. On the other hand, participants expressed a slightly higher dissatisfaction with the lighting related issues on SS street than C-S road. This can be attributed to complex and interconnected problem of having many light sources on SS street (street lighting, outdoor advertisement lighting, signage lighting, façade lighting, etc.).

5.4 Analysis of the Visual and Light Pollution Issues on Both Spines

This section compares between the contribution of the outdoor advertisement to the visual and light pollution issues on SS and C-S road. Table 2 reveals that participants considered that both spines were almost the same from the aesthetical point of view. Nevertheless, they perceived C-S road better in terms of: visual comfort, number, size and organization of advertisements. In addition, participants were satisfied with the illumination level of the advertisement and its contrast with its surroundings on C-S road. On the other hand, they sensed that the lighting of outdoor advertisement on SS street contributed more to the lighting pollution and it was more disturbing. However, participants identified that lighting of outdoor advertisement cause more glare on C-S road due to the wrong aiming of the luminaires.

EVALUATING THE VISUAL AND LIGHT POLLUTION FROM OUTDOOR

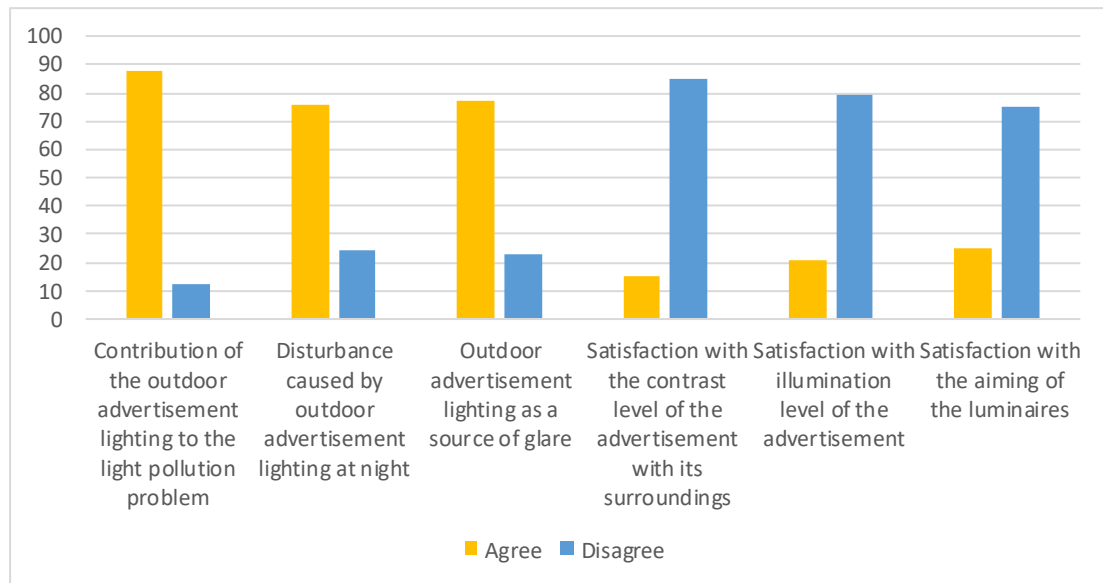


Fig. 5. Participants' feedback on the outdoor advertisement lighting aspects on SS street.

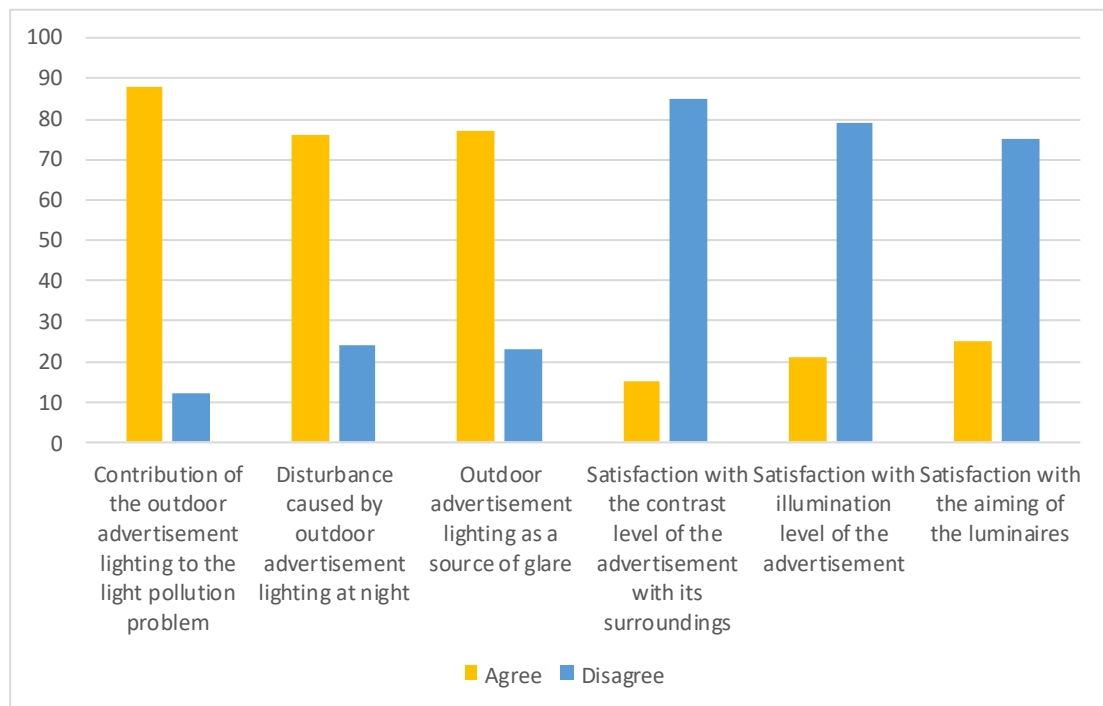


Fig. 6. Participants' feedback on the outdoor advertisement lighting aspects on C-S road.

Table 2. Participants' feedback on the visual and light pollution issues on both spines

	SS street	C-S road
Visually more appealing	49.5%	50.5%
Visual more comfortable	22%	58%
Number of Advertisement is more satisfactory	38%	62%
Advertisement is more organized	34%	66%
Size of Advertisement is more satisfactory	39%	61%

Table 2. Participants' feedback on the visual and light pollution issues on both spines, (Cont.).

	SS street	C-S road
Lighting of outdoor advertisement contribute more to the lighting pollution	65%	35%
Lighting of outdoor advertisement is more disturbing	60%	40%
Lighting of outdoor advertisement cause more glare	40.5%	59.5%
Satisfaction with the contrast between the advertisement lighting and its surroundings	41.5%	58.5%
Satisfaction with the illumination level of the advertisement	40.5%	59.5%

6 CONCLUSIONS

This paper assessed the visual and light pollution aspects resulting from outdoor advertisement in two main spines in Cairo, Egypt, namely: Salah Salem Street and Cairo-Suez highway road. Although both roads suffered from visual pollution problems, Cairo–Suez road was found to be visually more appealing. This could be explained in terms of the difference in the road context, where Salah Salem street is surrounded with residential towers and office buildings from both sides, whereas Cairo-Suez road is a high way that has limited number of buildings on some parts of it.

Also, it was evident that the light pollution problem was more obvious on Salah Salem Street, where according to some participants, Salah Salem Street is already well lit with the street lighting and advertisements add unnecessary excessive lighting to attract the user's attention to the various advertisements on the street. On the other hand, some respondents found the advertisements disturbing on Cairo-Suez road, however, they accepted it as a complementing source of lighting that balances the lack of an appropriate street lighting system.

Based on the descriptive analysis, of both the literature review sources and the responses of the purposeful sample of participants representing professionals and non-professionals users of both spines, the research extracted preliminary root causes that resulted in the classification of the outdoor advertisement as a negative aspect in the exterior environment. These root causes were categorized into 3 main categories: visual, environmental and social causes. Different categories can be summarized as follows:

6.1 Visual Causes for Classifying Outdoor Ads as a Negative Aspect in the Exterior Environment

- a. Outdoor advertisements cause loss of concentration and distraction to drivers which might result in accidents.
- b. It can be seen as forced elements in the natural environment.
- c. It affects negatively the environment by taking over the space dedicated for the trees.
- d. It obstructs the sidewalks causing hazards to pedestrians.
- e. It disturbs viewers through:
 - Blocking the sky view with large advertisements above the buildings thus tarnishing the skyline of the city;
 - Overtaking the image, beauty of the city and the different urban spaces by the large number, size, and small distance between the advertisement;
 - Inconsistent advertisement size, color, used fonts, language, distance between advertisements, position/location within the urban context, etc.;
 - Attracting the viewer's attention from other important elements in the site and surrounding environment; and
 - Disharmony with the surrounding facades and urban fabric.

6.2 Environmental Causes for Classifying Outdoor Ads as a Negative Aspect in the Exterior Environment

- a. High illumination levels required to attract the viewer's attention results in high contrast level with the surrounding causing glare.
- b. Light pollution resulting from the improper aiming of the luminaires used to light the advertisement leading to light trespass or skyglow.
- c. Night lighting of advertisement negatively impacts the natural elements (Flora and Fauna) within the surrounding environment.
- d. Increasing electrical consumption rate due to night lighting of advertisements thus consuming the natural resources through creating non-essential demands.

6.3 Social Causes for Classifying Outdoor Ads as a Negative Aspect in the Exterior Environment

- a. Problems with the content of the advertisement might lead to social problems since marketing provocative goods can increase the tension between different social classes
- b. Disregarding the social values can result in a distorted community.
- c. The mental and emotional influence of advertisement on people and their increasing consumption behavior.

7. RECOMMENDATIONS

Based on the analysis presented in this paper, the authors came up with a number of specific recommendations that target specific professional institutes or organizations. It is worth mentioning that the purposeful sample of the participants who shared in the survey questionnaire has guided the authors and added value to the recommendations. Consequently, the recommendations can be categorized as follows:

7.1 Recommendations to Urban Designers

- It is important to assess the quality of the urban streets in Egypt based on the aesthetic appearance of the street through visual impact assessment reports and the variety of the lighting systems available on or surrounding the street to provide residents with an appropriate visual environment.

7.2 Recommendations to the Governmental Entities and Local Authorities

- The government should optimize its laws and regulations to prohibit high levels of outdoor lighting, use of extreme contrast in outdoor advertisement, protect the rights of inhabitants and establish strict control measures and mechanisms to reduce or even control the light pollution.
- Visual assessment reports should be part of the licensing process for advertisement.
- Social studies regarding the advertisement content.
- Prohibiting advertisement on heritage sites such as old Islamic Cairo and downtown khedivial Cairo.

7.3 Recommendations to Egyptian Coding Institutes

- To establish visual and light pollution prevention standards and regulations by creating specific design guidelines for outdoor advertisement. In addition, strict laws and regulations should be established.

7.4 Recommendations to Designers of Advertisements

- Advertisements should be designed by a collaborative team of graphics designer, architects, lighting designers and sociologists to address the needs of both the consumer and the society.

7.5 Recommendations to Governmental Authorities

Table 3 illustrates the proposed technical guidelines that can be adopted by governmental authorities to minimize light pollution caused by advertisements.

Table 3. Proposed technical guidelines to minimize light pollution caused by outdoor advertisements.

Objective	Procedure
Establishing outdoor lighting environmental zones.	Analysing outdoor environmental zones.
	Classifying outdoor environmental zones from the lighting point of view.
	Establishing appropriate illumination levels according to the outdoor lighting environmental zones.
Establishing outdoor lighting codes.	Analysing available international lighting codes in terms of illumination levels and contrast.
	Adopting appropriate sections that matches the requirements of the Egyptian context.
	Adding additional sections according to the requirements of the Egyptian context and local environment.
Preparing Environmental Impact Assessment (EIA) reports.	Carrying out visual analysis.
	Carrying out outdoor lighting calculations using computer simulation software to check the illumination level during the design phase.
	Setting appropriate illumination levels according to the lighting environmental zones.
	Evaluating exterior contrast levels
Minimizing sky glow to improve sky visibility at night.	Using full cut-off luminaires.
	Testing the aiming of the luminaires.
	Regular checking of the aiming of the luminaires on site.

Table 3. Proposed technical guidelines to minimize light pollution caused by outdoor advertisements, (Cont.).

Objective	Procedure
Decreasing glare probability.	Using glare reduction accessories.
	Examining current contrast levels.
	Readjusting high contrast levels to match with the outdoor lighting codes.
Applying of regulations.	Including the environmental impact assessment reports as part of the project permits.
	Following-up the application of the regulations through governmental authorities.

8. RESEARCH LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Since this research has been based on descriptive analysis of the phenomenon, and sample was selected on purposeful selection technique, the generalization of the research outcomes is thus limited to the two selected case studies and other streets and roads with the same specifications in general. Thus, additional research needs to be carried out to examine the impact of each root cause or factor affecting the visual and light pollution of the advertisements in varies Cairene streets. Also, other factors related to the width of the street, traffic density, driving speed, and the existence/nonexistence of illumination on the street needs to be examined. Moreover, the application of the survey questionnaire can be enhanced to include other cohorts that might be affected by the problem tackled in this paper, including: various motorists (van drivers, transport car drivers, motorcycles drivers) and other users' groups. Assessing the impact of the outdoor advertisement on the identity of the urban space/fabric is a recommendation for further research.

DECLARATION OF CONFLICT OF INTERESTS

The authors have declared no conflict of interests.

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تقييم التلوث البصري والضوئي الناتج عن اللوحات الاعلانية فى شوارع المدن المصرية

يهدف البحث إلى تقييم إدراك المشاهد للتلوث البصري الناتج عن اللوحات الاعلانية وتقييم التلوث الضوئي المرتبط بها وقد أجرى تحليلاً شاملاً لمجموعة من الأوراق البحثية الحديثة التي تناولت المشكلة محل الدراسة وتبع ذلك إجراء استبيان ودراسة استقصائية لتحديد تصور المشاهد والتعرف على مشاكل التلوث البصري والضوئي في كلا من شارعي صلاح سالم وطريق القاهرة/السويس السريع. وقد شمل الاستبيان مشاركة ١٣٨ من مستخدمي تلك الطرق كعينة ممثلة لمختلف الأجناس والفئات العمرية والخلفيات العلمية ويمكن للنتائج مساعدة صانعي القرار والجهات المعنية بوضع قوانين لمكافحة التلوث البصري والضوئي الناتج عن الإعلانات الخارجية.