Lighting Branding:

Lighting Architecture and Building Nocturnal City Identity

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Abstract: Despite the increasing knowledge about city branding and city identity, there is a fundamental gap in the understanding of city branding among professionals with respect to the relations between Quality of Life (QOL), Economic Improvement Districts (EIDs) and Lighting Branding (LB). This exploratory study is aimed to address this knowledge gap through in-depth interviews with 41 professionals. The results of the study suggest that the strategic potential of LB has positive effects on city nocturnal identity, QOL, and EIDs. In this study, these factors were analysed using ten types of different buildings separately. The findings of the study reveal that attention to the lighting of traditional and old buildings, recreational facilities, commercial buildings, and parks has the greatest effect on city identity. The findings of this research can be applied in planning an urban lighting master plan. The results emphasize the role of LB, lighting architecture, and nocturnal city identity in sustainable development as a determining factor in policy making.

1. INTRODUCTION

As city life is dynamic across two parts of a day, during daylight and the night, attention to creating city identity and city branding is important in each of the temporal sections separately. To recognize the reasons underlying the character of any place, understanding and promoting place identity is necessary ([Shao & Liu, 2018](#)). City branding, mainly developed from marketing strategies, is widely used for city marketing and promotion ([Riza, Doratli, & Fasli, 2012](#)). Similar to products, places are products whose identities and values must be designed and marketed as the products ([Kotler et al., 1999](#)). Finding or creating a unique image is one of the objectives of the city or place branding, so as to make the city differentiable from others ([Ashworth, G., 2009](#)). In this regard, city branding has been reported to be concerned with the establishment of culture and history, economic growth, and social development ([Zhang & Zhao, 2009](#); [Mahdavinejad et al., 2014](#)). City branding can influence the culture and

history, economic growth, and social development ([Zhang & Zhao, 2009](#)), therefore, urban policymakers are required to consider creating a nocturnal identity as a strategy.

Among other things, infrastructure and architecture, landscape, and environment can be involved in a saleable identity acceptable to all people ([Zhang & Zhao, 2009](#)). Accordingly, buildings influence the creation of city branding, so the lighting of buildings can be considered as one of the most important factors in creating a nocturnal city identity.

Increased marketing by governments and other bodies related to tourism, planning, and city management has resulted in more sophisticated applications of branding and marketing, including through social media ([Zhou & Wang, 2014](#)). On the other hand, previous studies have shown that city branding has important effects on worldwide competition and it has become an important part of urban governance ([Riza, Doratli, & Fasli, 2012](#)). In case of the global competition on the tourism, Quality of Life (QOL), and investments, cities apply place branding to develop a unique and attractive image and positive reputation. Studies suggest three main approaches for promotion of city branding: cultural mega-events, revival and promoting the heritage and construction of iconic buildings ([Hankinson, 2007](#); [Riza, Doratli, & Fasli, 2012](#)), among which, construction of applicable buildings has been extensively adopted by many cities in order to gain attention and attraction. This indicates that performance buildings have an undeniable effect on the city image. As a result, the identity and image of every building in the city has a significant effect on building the urban identity, in fact, buildings' images ultimately create a city's image.

According to the increased urbanization and the definition of 24-hour cities, city competition is divided into two parts: daily identifiable image and nocturnal identifiable image. It should also be noted that competition between cities in the night is strongly related to the concept of Lighting Branding (LB), briefly indicating the use of lighting as an element for the nocturnal branding of cities.

Studies on city branding have emerged from a plethora of the associated disciplines, and scholars have drawn meaningful parallels between place branding and the branding of products and services ([Parkerson & Saunders, 2005](#)), tourism management ([Dinnie, 2011](#)), urban regeneration ([Kokosalakis et al., 2006](#); [Tallon, 2013](#)), urban planning ([Van Assche & Costaglioli, 2012](#)), place marketing ([Dinnie et al., 2010](#); [Gertner, 2011](#)), urban governance and place management ([Ye & Björner, 2018](#)), economic ([Vanolo, 2015](#)), urban policy and governance ([Lucarelli & Olof Berg, 2011](#)), sustainable development ([Grubor & Milovanov, 2017](#)), culture ([Hassen & Giovanardi, 2018](#)) and city identity ([Riza, Doratli, & Fasli, 2012](#); [Ruzzier & De Chernatony, 2013](#); [Mindrut, Manolica, & Roman, 2015](#)).

The aim of this study is to determine the perceptions of LB, QOL, and Economic Improvement Districts (EIDs) as a concept for creating a nocturnal city identity. The specific research objectives are: a) Identify the role of QOL, LB, and EIDs in creating the city identity and recognizing their effects. Responding to the question, which criteria are more effective than others? b) Identify the role of different types of buildings in creating city identity, i.e. The lighting of which type of building is more effective in creating a lighting master plan for the city? and c) Identify the role of types of management of the buildings (state-private) in creating the city identity.

Using lighting for presenting existing buildings for renewal of attention is a suitable method of creating an identifiable night image of the city, and the main motive behind this attempt is creating an identifiable image. Thus,

lighting of performance buildings has a great contribution to the identifiable image of a city or place. The findings of this research can be used in planning an urban lighting master plan. The results of the study emphasize the role of LB, lighting architecture, and nocturnal city identity in sustainable development as a determining factor in policymaking. Thus, the present study focuses on nocturnal identity and LB in different types of buildings for the first time in city branding.

2. LITERATURE REVIEW

2.1 City Branding and City Identity

In this section, the importance of the issue of urban branding and its role in the formation of urban identity is studied. In the last decade, the attention on place marketing has changed to place branding ([Gertner, 2011](#); [Lucarelli & Olof Berg, 2011](#)). Given the unique characteristics of places, place brands and more enhanced definition of place brands are needed ([Braun et al., 2018](#)) which can be arranged and created by the presentation of buildings.

In fact, place branding has become one of the best-known applications of branding in the public sector ([Klijn, Eshuis, & Braun, 2012](#)), a city brand as such is based on the perceptions of different customer groups ([Merrilees, Miller, & Herington, 2012](#)) and these perceptions of a city can differ strongly, and residents and tourists might have different perceptions and interests ([Zenker & Beckmann, 2013](#)). Unfortunately, the academic underpinning is still poor, and city branding needs a more critical conceptualization ([Lucarelli & Brorström, 2013](#)). According to [Ashworth, G. J. and Voogd \(1990\)](#), place marketing could involve different types of places and different spatial scales. [Zenker and Beckmann \(2013\)](#) redefined the place brand in two parts: a) the place brand in general, and b) the place brand in communication, including three types of place brand communication, the first being the physical place, the second is traditional, and the third is the word-of-mouth place brand communication ([Braun et al., 2018](#)). The brand has a spectrum ranging from country to a building scale, and also as [Braun \(2012\)](#) argued, city branding could be applied to neighbourhoods, districts, tourist destinations, cities, rural areas, regions, and countries .

[Lucarelli and Olof Berg \(2011\)](#) interpreted place branding as a (relatively organic) process for the development and management of target audiences' perception behaviours and ultimately contributing to the development and sustainability of a place's distinct identity.

Therefore, creating city identity and city branding is carried out in two parts: daily and nocturnal parts, and on the other hand, the identity and brand of each building creating the city identity and brand. Throughout the day, the building is displayed by its façade, while lighting shows a new and different image of the building during the night. Using lighting for the existing buildings for renewal of attention is a suitable method to create an identifiable night image of the city. Thus, lighting of performance buildings provides a great contribution to the identifiable image of a city or place. Creating city branding is mainly based on three key attributes: image, uniqueness, and authenticity ([Riza, Doratli, & Fasli, 2012](#)). From a wide array of perspectives, place branding has been defined as involving spatial interpretations of places, including countries, regions, and cities, among others ([Kavaratzis, Mihalīs, Warnaby, & Ashworth, 2014](#); [Chan & Marafa,](#)

2013), emphasized on a hierarchy of city branding and city identity. Newly arrived firms upgrade buildings and attract building owners. Lighting master plans create the foundation for a harmonious townscape. Pleasant lighting promotes a sense of identity, provides a healthy condition for people, and encourages them to stay for a while. Incomers soon feel the sense of being at home and quickly build a relationship with their new environment and condition. A place soon becomes an attractive place to live, as well as an attractive holiday destination and an attractive business location; thereupon it transforms into a landmark.

2.2 LB as a City Branding Factor

Nowadays, there is competition between cities ([Riza, Doratli, & Fasli, 2012](#)), and they are aware of their brand's effect ([Merrilees, Miller, & Herington, 2012](#)) and thus try to conceptualize themselves in the form of brands ([Klijn, Eshuis, & Braun, 2012](#)). In terms such as Place Branding, Nation Branding, Destination Branding, and City Branding, one can see consistent growth over the previous decade. Place branding combines a variety of problems and issues with the study of urban management and public involvement in planning. It should be mentioned that urban planning is a policy-making process that works with multi-stakeholder partners and produces strategies based on skill-based and logical approaches. This paper aims to explore the potential of LB strategy as a mechanism in city planning.

One of the objectives of the city or place branding is to create a unique image, making the city differentiable from others ([Ashworth, G., 2009](#)). There is a definite link between city branding and city image ([Riza, Doratli, & Fasli, 2012](#)), and lighting creates a new urban image that is different from the most common image of the city throughout the day, and on the other hand, [Nikoudel, Mahdavinejad, and Vazifehdan \(2018\)](#) stated that artificial lighting at night can make an image of a building even more beautiful than it is in natural daylight, creating a unique city brand, which in turn helps to increase the city identity ([Riza, Doratli, & Fasli, 2012](#)), so lighting of buildings and LB is an important factor for creating a city image in order to define the new city branding.

[Lynch \(1960\)](#) defined identity and brand as "The extent to which a person can recognize or recall a place as being distinct from other places", so identity is a distinction which is obvious and visible at first sight, and it is strong enough to create an image in people's minds who have not even seen it before [Riza, Doratli, and Fasli \(2012\)](#), therefore, brand and identity increases recognition of a city. Lighting can have an important effect on creating a unique city image.

LB and lighting architecture have an important role in developing nocturnal city identity in sustainable development as a determining factor in creating a nocturnal city image. City branding is suggested as the appropriate way to describe and implement city marketing depending on the construction and management of the city's image, as it is accepted that city encounters comprehend the place through observing the images ([Kavaratzis, Michalis, 2004](#)). Therefore, in order to compete internationally, it is necessary to create an international and unique image of the city.

LB Strategy is an overall plan which clarifies the process of façade lighting of buildings for economic development. It provides a general framework for action: how to prioritize, make choices and allocate types of buildings. It will establish an agenda to develop a local area's brand,

economic, physical and social attributes, and also address the challenges it faces.

2.3 EIDs as a City Branding Factor

Although planners have generally described the development of architectural quality as an apolitical issue, a number of urban governments and political elites are starting to recognize the connection between urban design and broader economic policies.

[Healey et al. \(1997\)](#) summarize the interaction between spatial planning and socioeconomic growth by explaining the interaction between spatial planning and the dynamics of economic and social change in the urban region. Strategic planning in EIDs is a systematic approach in which a common direction is defined and allocating resources decisions are adopted to pursue this direction. It describes issues and how they can be resolved and implies forward-thinking and future anticipation.

The first scholarly studies really dedicated to place marketing have been carried out by regional economists and geographers ([Braun et al., 2018](#)). The use of city marketing and city branding has been growing steadily which fits into a wider trend of introducing commercial practices and private sector management styles in urban governance ([Klijn, Eshuis, & Braun, 2012](#)), so city branding has an important role in economic improvement.

[Paddison \(1993\)](#) viewed city marketing as an economic restructuring and urban regeneration factor. The application of place marketing has increased due to intensified competition between cities caused by globalization and the information technology revolution ([Van den Berg & Braun, 1999](#); [Klijn, Eshuis, & Braun, 2012](#); [Paddison, 1993](#)). It has been defined as a much more common practice in the public sector and, as a result, city branding has an important role in economic improvement.

Cities focusing on tourism marketing have received much more attention ([Braun et al., 2018](#)), on the other hand, older industrial cities are seeking to replace their industrial image by redeveloping their places and becoming more attractive to investors ([Short et al., 1993](#)). Creating place identity by increasing perceived image is an important method to form a destination competitive advantage in an increasingly tourism competitive environment ([Li et al., 2017](#)). The use of lighting as a form of spectacle and as a tourist attraction for economic improvement of cities is not a recent occurrence ([Edensor & Millington, 2009](#)). Yet in recent years, this trend has taken on an unprecedented relevance, and the use of lighting to attract tourists is now extending around the world ([Guo et al., 2011](#)).

[Park, Choi, and Lee \(2008\)](#) argue the economic effects of installing architectural outdoor lighting such as increasing tourist attraction. Urban nightlife is an important factor in attracting tourists ([Tutenges, 2012](#)). In fact, with the advent of urban nightlife, urban lighting improves the urban nightlife, which will attract tourists and, as a result, promote and cause economic improvement districts.

As another economic effect of installing architectural outdoor lighting, [Park, Choi, and Lee \(2008\)](#) mention the revitalization of commercial activity by the induced curiosity and increased advertising effects of a product and facility.

2.4 QOL as a City Branding Factor

Place brand finally causes so-called effects (attitude and behavioural). Research shows that place brand leads to higher general satisfaction ([Zenker, Petersen, & Aholt, 2013](#)), identification with the place ([Braun et al., 2018](#)), and place attachment ([Hernández et al., 2007](#)) resulting in creating an intention to stay at a place ([Zenker & Gollan, 2010](#)). Factors mentioned to be the measures of place quality ultimately improve the QOL. Iconic buildings account for a great ratio of the identifiable image of a city or place ([Jenks, 2005](#)). [Riza, Doratli, and Fasli \(2012\)](#) show that there is a relation between QOL and city image and, while discussing the image of the city from the city branding perspective, argue that city identity and city branding are linked together through the practice of place promotion tools for creating a unique image. The QOL issue is also associated with the place promotion and city marketing regarding the attraction of capital. It should also be noted that the restless competition between cities is strongly related to the concept of QOL, which can be briefly defined as a feeling of well-being, fulfilment, or satisfaction on the part of residents or visitors to a place, so the role of iconic artifacts is a new way to promote cities.

QOL represents the present level of happiness, satisfaction, and desire for life, including well-being and the level of advantage and pleasant experience. QOL represents how people perceive value primarily. Academically, it is an aspect of the sociology domain. In other definitions, urban QOL is mainly concerned with analysing urban living environments with consideration to physical (material) and non-physical (psychological and spiritual) necessities depending on the awareness, experiences, and psychological emotions created by interaction between citizens and the urban environment. The relative importance of each QOL indicator may change over time.

QOL is at the centre of contemporary urban planning and design concepts, such as New Urbanism, Smart Growth, and Sustainable Urbanism ([Khalil, 2012](#)). Priorities need to be identified however to direct efforts towards associated industries to gain better results for current communities. This research further demonstrates the importance of QOL in creating a city branding and also city identity and assigns its relative weight.

For the previous two centuries, strategic urban planning has dominated the field of urban planning. It aims to improve the efficiency of the city and ensure the planning and responsiveness of future development. Its dependence on participatory strategy enriches the process, encourages local ownership, and maintains its real implementation to a certain extent. The general goal of the process is to enhance the city's efficiency by adopting a strategic plan for urban development, and this can be seen as a method for improving the quality of life of urban dwellings ([Khalil, 2012](#)).

Research shows that urban planning is a process of guiding and controlling to increase the quality of the living environment ([Siu & Huang, 2015](#)). On the other hand, the image of a city or place created by its monumental or iconic architecture has effects on QOL so that it strongly influences the well-being and satisfaction of citizens and visitors ([Riza, Doratli, & Fasli, 2012](#)). So, to make an attractive image of a city, stimulation of active façades and activities is the most important factor ([Siu & Huang, 2015](#)).

Table 1. The criteria and their effects on creating a nocturnal city identity

ID	Contents on Effects of Lighting of a Building on City Branding	Criteria
A	Increasing brand city image	LB
B	Increasing city competitiveness	LB
C	Revitalization of commercial activity	EIDs
D	Increasing nightlife	QOL
E	Creation of added value as tourist attractions	EIDs
F	Increasing international image	LB
G	Increasing advertising effects of a product and facility	EIDs
H	Revitalization of commercial activity by induced curiosity	EIDs
I	Revitalization of culture and tradition	QOL
J	Creation of added events and plural memories	QOL
K	Increasing recognition	LB

Previous studies have showed that a city's night light environment can promote nightlife quality and service of the environment and improve QOL of the residents in terms of comfort, convenience, and safety (Ngesan & Karim, 2012). Buildings form an important part of the city's landscape and environment. As a result, attention to the buildings' lighting plays an important role in improving the nightlife and, consequently, improving the QOL.

It has been shown that attention and revival of culture and tradition has an effect on QOL and sense of well-being (Bell, 2005). The lighting of cultural buildings and heritage is one of the main ways for revitalization of urban culture and tradition. Development of local strategies aimed at improving the culture and identity would enhance appreciation of the environment (Chen & Liu, 2017). The lighting of cultural buildings and heritage is one of the main ways for revitalization of urban culture and tradition.

Figure 1. Progress of planning strategies of nocturnal city identity

Prior research shows that creating an urban event and plural memories is one of the factors contributing to creation of well-being and QOL ([Massam, 2002](#)). Events characterized by the installation into the public place of artistic lighting installations and the projections of holograms on buildings' façades have become an increasing feature of city entertainment and tourism and have produced fantastic urban landscapes, attracting millions of visitors yearly ([Edensor, 2015](#)). Therefore, lighting can be viewed as an event generating plural memories. Identity is always the exclusive and not reproducible way to present spaces and buildings, so identity is a particular image. Each city has a unique image and identity, consisting of memories that are either negative or positive; thus, it can be said that identity is also considered a memory. *Figure 1* shows the progression of planning strategies of a nocturnal city identity.

3. METHODOLOGY

The method and procedure of the current research are shown in *Figure 2*.

Figure 2. Research scope and procedure-Ref

First, the significance of creating a nocturnal city identity and LB was derived from analysis of the related research.

Then, its three main criteria, LB, QOL, and EIDs, were studied. Then, to determine their effects, three or four effects were specified with IDs ranging from A to K. As this paper was aimed at evaluating the effect of building lighting to create the city image in the night, in the following lines the effects of the buildings' lighting on city identity were derived from the literature review according to three criteria, and are shown in *Table 1*. Afterward, to indicate the influence of lighting of different buildings on creating identifiable nocturnal city image, according to previous research on lighting of façades ([Park, Choi, & Lee, 2008](#)), ten types of building have been identified, then through the interview with lighting designers and specialists, the influence of the lighting of different buildings was quantitatively evaluated. Next, quantitatively available measurement items were derived about the effects of buildings' lighting and relations between QOL, EIDs and LB, and the most effective types of building.

In addition, In order to determine the role of government managers and government policy makers as well as building owners in the use of building façade lighting and formation of urban nightlife and lighting branding, ten types of building are investigated based on all ten types of building and divided into two parts: private management and state management (as shown in Table 2). These are investigated to find out which of them is more effective in creating a nocturnal city identity.

Table 2. Type of building and their types of management

ID	Type of Building	Type of Management
1	Traditional old buildings	State Management
2	Bridge	State Management
3	Headquarter buildings	State Management
4	General office buildings	Private Management
5	Monument	State Management
6	Residential apartment buildings	Private Management
7	Public facilities	State Management
8	Recreation facilities	State Management
9	Commercial buildings	Private Management
10	Parks	State Management

3.1 Interviewee Profile and Interviewing Procedures

To determine the number of interviewees, the theoretical saturation technique was applied, and for this purpose, the experts were asked to introduce two experts in this field. This process continued until there was no new person to be introduced. According to this method, 41 subjects were included in this study. Detailed determinant information of the interviewed lighting designers and specialists is shown in Figure 3 (Interview questions No. 1-6).

Ages:	Twenties (26.8%)		Thirties (43.9%)		Forties (24.3%)	Fifties (5%)	
Sex:	Male (56%)			Female (44%)			
Achievement:	Bachelor (9.7%)	Master (56.3%)			Ph. D. (34%)		
A major field of study:	Architecture (60%)			Industrial design (15%)	Urban design (5%)	Landscape design (10%)	Electrical Eng. (10%)
Occupation:	Lighting Design (29.3%)		Professor (19.5%)	Lighting related jobs (51.2%)			
A work record:	Less than 1 years (2.4%)	1-3 years (26.8%)	3-5 years (36.5%)		More than 5 years (34.3%)		

Figure 3. Detailed determinant information of those interviewed

An interview was conducted for determining the degree of importance for lighting effects of each building type using a questionnaire. A total of 41 individuals completed the questionnaire in July 2018.

The questionnaire developed for lighting designers and specialists consists of 17 questions. Six questions (No. 1-6) are related to the respondents themselves, and another question (No. 7) is related to types of buildings anticipated to provide the greatest lighting effects on nocturnal city identity. The next questions (No. 8-17) are related to the degree of importance in relation to specific contents of lighting effects for each type of building. Evaluation of lighting effects on city identity in different building

types was measured by a 5-point Likert scale ranging from “very weak effectiveness” (1) to “very strong effectiveness” (5).

A statistical analysis was conducted on 41 copies of questionnaires using SPSS (Statistical Package for Social Science) software.

4. RESULTS AND DISCUSSION

This study can be used to design a master plan for urban lighting. The study findings reveal the role of LB as more of a determining factor in policymaking, lighting architecture and nocturnal city identity in sustainable development. While also, for the first time in city branding, the existing research focuses on nocturnal identification, and LB definition and its effects in different building types. This article aims to define how these three variables identify elements of city branding formation by analysing the relationships between QOL, LB and EIDs in ten building types. In addition, how they assign relative weights to the lighting of each building type via the procedure of prioritizing projects to achieve the future nocturnal vision of the city is also defined. The comparative analysis of various building types and the strategic planning process of the city lighting master plan present insights into the concept of lighting branding in the development area and how various stakeholders can define it.

For this purpose, the data analysis was done in two parts:

- 1- Analysis of the data in general and regardless of the type of building
- 2- Analysis of the data in partial and with respect to specifying the type of building

4.1 General Data Analysis

In this part, analysis of the data was done in general and regardless of the type of building. This analysis included three sections: sample statistics based on the mean of ranks, correlation between the effects of lighting, and analysis of three criteria (QOL, EIDs, and LB).

Figure 4. Results of question number 7

In the first section, the interviewed lighting designers and specialists were asked to choose three types among ten types of building with the most

beneficial effects to create a nocturnal identity of the city (Question No. 7). The analysis results of the building types anticipated to have the most important effects on city identity are shown in *Figure 4*. The result of the first section indicates that lighting of different types of building in an urban space has a distinct significance in the creation of urban brand from the point of view of the experts. The results showed that traditional and old buildings (21.13%), monuments (20.21%) and bridges (15.44%) are the most beneficial buildings for creation of nocturnal city image, followed by commercial buildings (13.82%) and so on.

Figure 5. The effect of buildings on creating a nocturnal city identity

In the second section, analysis of the data was done based on the means of scores according to each effect of lighting as shown in *Figure 5*. Based on this data, “increasing nightlife” was found to be the most effective effect of a building’s lighting with a mean ranking of (3.63) followed by “increasing recognition” (3.58) and “increasing brand city image” (3.55) with the means more than the others showing that attention to these factors is important in creating the nocturnal identity of a city.

Figure 6. Correlation between effects of criteria of buildings on creating a nocturnal city identity.

The correlations between the effects of lighting are presented in *Figure 6*. Most correlations between the effects were reported to be significant at the level of 0.01. All of the effects had positive correlations showing direct relations. The maximum correlation was found between G and H (0.90), and the minimum of them was about the relation between G and F (0.24). Due to the symmetry of the matrix, only the lower half of the matrix is needed.

Figure 7 shows the relations between QOL, EIDs, and LB. As shown in Figure 8, there were strongly direct and significant correlations between the three criteria and a model of the relations between the three criteria is shown.

These findings show that the lighting brand can be used as a planning strategy and design concept to create a better urban space that can raise people's continuous presence as well as improve and enhance the quality of urban life that has a significant impact on developing the region's economic index.

Figure 7. Correlation between criteria for creating a nocturnal city identity.

Figure 8. Results of the hypothesis of the article.

4.2 Analysis of the Data with Respect to the Specific Type of Building

In order to develop an urban lighting master plan, prioritizing urban building types based on significance in generating city identity and city branding are needed. To date, each building has tried to draw more attention by having more light than its neighbours, leading to the increase of city light warfare, light pollution, and urban nightlife chaos. The importance of lighting in shaping urban nightlife for each building type was studied in this research as well as discovery of the interaction between the three main factors (QOL, LB, and EIDs). The results of this research will help urban managers and urban designers to create an appropriate night vision by formulating legislation and creating a comprehensive lighting plan. The findings of this research will assist urban managers and urban designers.

In this part, analysis of the data was done separately for each type of building. This analysis included three sections: sample statistics based on the means of rank, correlation between the results of lighting effects, and analysis of the three criteria (QOL, EIDs, and LB). The means of ranks

related to type of buildings are shown in *Table 3*. According to this table, the four maximums of the ranks belonged to the traditional and old buildings (3.94), recreational facilities (3.85), commercial buildings (3.67) and parks (3.67), and this result is not similar to the result of question 7, which is shown in *Figure 4*.

Table 3. Effects of lighting of buildings on creating a nocturnal city identity in different building types

Building Types	A	B	C	D	E	F	G	H	I	J	K	Mean
Traditional old buildings	<u>4.31</u>	3.58	3.46	3.95	<u>4.65</u>	<u>4.46</u>	3.04	3.14	<u>4.19</u>	<u>4.39</u>	<u>4.22</u>	3.94
Bridge	<u>4.07</u>	3.58	2.68	3.65	3.70	3.63	2.78	2.43	2.68	3.34	3.43	3.27
Headquarter buildings	2.65	2.56	2.53	2.07	2.09	2.43	2.24	1.92	1.85	1.95	3.14	2.31
General office buildings	2.43	2.39	2.24	2.19	1.92	2.22	2.75	2.58	1.75	2.04	3.19	2.33
Monument	<u>4.46</u>	<u>4.31</u>	2.78	<u>4.14</u>	<u>4.02</u>	<u>4.02</u>	2.61	2.75	3.00	<u>4.14</u>	3.90	3.64
Residential apartment buildings	2.19	2.41	1.95	2.97	2.56	2.36	2.17	2.26	2.14	2.56	2.53	2.37
Public facilities	3.61	3.63	3.43	<u>4.17</u>	3.65	3.39	3.41	3.41	2.43	3.92	3.95	3.54
Recreation facilities	<u>4.14</u>	3.95	<u>4.12</u>	<u>4.46</u>	<u>4.36</u>	3.78	3.56	3.75	2.39	<u>4.07</u>	3.80	3.85
Commercial buildings	3.68	3.82	<u>4.46</u>	<u>4.09</u>	3.75	3.41	3.87	3.92	2.53	3.29	3.65	3.67
Parks	3.97	3.85	3.48	<u>4.61</u>	<u>4.14</u>	3.48	3.22	2.29	3.00	<u>4.41</u>	3.95	3.67

Table 4. Building types and their effects on creating a nocturnal city identity. Resource: The authors

ID	Effects of Lighting of Buildings on City Identity	Building Types
A	Increasing brand city image (LB)	Monument
B	Increasing city competitiveness (LB)	Monument
C	Revitalization of commercial activity (EIDs)	Commercial buildings
D	Increasing nightlife (QOL)	Parks
E	Creation of added value as tourist attractions (EIDs)	Traditional old buildings
F	Increasing international image (LB)	Traditional old buildings
G	Increasing advertising effects of a product and facility (EIDs)	Commercial buildings
H	Revitalization of commercial activity by induced curiosity (EIDs)	Commercial buildings
I	Revitalization of culture and tradition (QOL)	Traditional old buildings
J	Creation of added events and plural memories (QOL)	Parks
K	Increasing recognition (LB)	Traditional old buildings

Therefore, this finding can assist developers in designing urban master lighting to develop an optical hierarchy, construct identity, allow for visual harmony, and other features.

Generally, and regardless of EIDs and QOL factors, the interviewer chose traditional and old buildings, monuments and bridges, but the traditional and old buildings ranked first in the two sections. In general, according to *Table 4*, analysis results of the effects of different types of buildings on creating a nocturnal city identity, showed that monuments have maximum effect on “increasing brand city image” and “increasing city competitiveness”, and the commercial buildings have maximum effect on

“revitalization of commercial activity”, “increasing advertising effects of a product and facility” and “revitalization of commercial activity by the induced curiosity”.

Traditional old buildings were found to have maximum effect on “revitalization of culture and tradition”, “creation of added value as tourist attractions”, “increasing international image”, and “increasing recognition”, and parks were found to have maximum effect on “increasing nightlife” and “creation of added events and plural memories”. Thereupon, lighting of the monuments and traditional and old buildings has the highest effect on the LB and increases the QOL, the lighting of parks and traditional and old buildings is also effective to improve the EIDs, and the lighting of commercial buildings and traditional and old buildings is important. Attention to the lighting of traditional and old buildings is important to increase the QOL, EIDs, and LB. These results can help the urban policymakers regarding planning and zoning city lighting.

4.2.1 Traditional and Old Buildings

In this section, the effects of lighting of the traditional and old buildings in the creation of nocturnal city identity were investigated. As discussed in previous sections, these types of buildings play an important role in creating an identity. In fact, traditional and old buildings define the history and culture of a city or a country, therefore, it is important to pay attention to them. Accordingly, 2twoquestions are put forth: what is the greatest effect regarding lighting of this kind of building? And, which of the criteria plays an important role in enhancing the brand in such buildings?

Figure 9. The effect of buildings on creating a nocturnal city identity based on different building types

The means of ranking for traditional and old buildings are shown in Figure 9. As shown in Figure 10, lighting of traditional and old buildings can lead to “creation of added value as tourist attractions” (4.65), improving the EIDs and “increasing international image” (4.46),” recognition” (4.22) and “brand city image” (4.31), so it can develop the LB and city identity

resulting in “creation of added events and plural memories” (4.39), and “revitalization of culture and tradition” (4.19) and improving the QOL.

Figure 10. The effect of buildings on creating a nocturnal city identity based on different building types (Public Facilities- Recreation Facilities- Commercial BLDG- Park)

Figure 11. Correlation between effects of criteria on creating a nocturnal city identity based on different building types (Traditional and Old BLGD- Bridge- Headquarter BLDG- General Office BLDG- Monument- Residential Apartment BLDG)

Thereupon, the lighting of traditional and old buildings is important to create a nocturnal identity of the city. The effects related to the QOL (4.29) have maximum efficacy. Also, LB is important for creating nocturnal city identity (4.14). The correlations between the effects of lighting on city identity are shown in Figure 11. 30.9% of all correlations were found to be significant at the level of 0.01 showing a strong relation, and the maximum of them was related to the correlation between “increasing brand city image” and “increasing city competitiveness” (0.718). 10.9% of all correlations were found to be significant at the level of 0.05 indicating a weaker relation. The

other correlations were not significant. According to *Figure 13*, regarding this type of building, a relation was found between QOL and LB (0.52), EIDs and LB (0.50) as well as a relation between EIDs and LB (0.42). This highlights that lighting of this type of building has an important role in creating a nocturnal city identity.

4.2.2 Bridges

Bridges are considered as landmarks. As mentioned before, bridges were chosen by the interviewees (*Figure 4*). *Figure 9* shows the means of ranking for bridges. The results showed that lighting of the bridges can help to increase brand image (4.07), so designers can increase the LB through lighting of bridges. It was found to have a rather low rank in the other effects (less than 4). Considering the averages, the means of the city identity criteria are less than 4, but LB has the maximum mean (3.68) showing more effect than the other criteria. *Figure 11* shows the correlations between the effects of lighting on the city identity. As shown in *Figure 11*, 69.09% of all correlations were found to be significant at the level of 0.01 showing a strong relation, and 14.54% of all correlations were found to be significant at the level of 0.05. The maximum correlation was related to “increasing nightlife” and “creation of added value as tourist attractions” (0.82). According to *Figure 13*, regarding this type of building, relations were found between QOL and LB (0.74) and also EIDs (0.60), so lighting of a bridge has effects on creating a nocturnal city identity, and this result is similar to the results presented in *Figure 4*.

4.2.3 Headquarter Buildings

As mentioned earlier, this type of building has less importance and requires less attention compared to other types in creating a nocturnal city identity. *Figure 9* shows the means of ranking for headquarter buildings. This result proves that lighting of this type of building can seldom help to increase the nocturnal identity of the city compared to other types because all the means of ranking were less than 3, except for increasing recognition (3.14). Means of the criteria were less than 3 indicating low effects of this type of building, but the maximum of them was related to LB (2.70). *Figure 11* shows a correlation between some of the effects. As presented in *Figure 11*, 29.09% of all correlations were found to be significant at the level of 0.01, and 23.63% of the total correlations were significant at the level of 0.05.

According to *Figure 13*, regarding this type of building, a significant correlation was found between QOL and EID at the level of 0.01 (0.54).

4.2.4 General Office Buildings

In this section, the results related to the general office buildings are discussed. Previous sections showed that this type of building has a low effect on creating an identity. *Figure 9* shows the means of ranking regarding the effect of lighting, all the means were less than 3/20 and the maximum of them was related to “increasing recognition” (3.19). This result is similar to that of “headquarter buildings”, so it can be concluded that the effects of this type of building on identity are less than for other types. Regarding the means of criteria for general office buildings, LB was found to have a maximum effect (2.56) in this type.

The correlations between effects are shown in *Figure 11*. 43.63% of the total correlations were significant at the level of 0.01 and 16.36% of all correlations were significant at the level of 0.05. For this type of building, the correlations between effects were stronger than those in “headquarter buildings”. The correlations between the criteria for this type of building are shown in *Figure 13*, showing that all the correlations were significant at the level of 0.01, which is not similar to the results of “headquarter buildings”. The maximum of them was related to the correlation between LB and EIDs (0.62).

4.2.5 Monuments

According to the previous results, as expected, a monument has more effect in creating a nocturnal city identity because this type of building is recognized as a landmark.

Figure 9 shows the means of ranking for effects of lighting. Lighting of monuments was found to have greatest effects on city identity, so the lighting designer can “increase brand city image” (4.46), “increase city competition” (4.31), “increase nightlife” (4.14), “create the added events and plural memories” (4.14), “create added value as tourist attractions” (4.02), and “increase international image” (4.02) by lighting this type of building. For a monument, the maximum effect of the criteria was related to LB (4.17).

This result is equal to those presented in *Figure 4* as being chosen regardless of the effects of lighting on city identity.

According to *Figure 11*, 40% of the total correlations were significant at the level of 0.01 and 14.54% of all the correlations were significant at the level of 0.05. The maximum correlation was related to “increasing international image” and “creation of added events and plural memories” (0.72).

In general, according to *Figure 13*, correlations were significant at the level of 0.01. The maximum of them was related to LB and QOL (0.67).

Figure 12. Correlation between effects of criteria on creating a nocturnal city identity based on different building types (Public Facilities- Recreation Facilities- Commercial BLDG- Park)

4.2.6 Residential Apartment Buildings

In this section, the results related to the role of lighting in residential apartment buildings are discussed. According to the above-mentioned results

in the previous section (Figure 4), this type of building has little role in creating a nocturnal city identity; more detailed consideration of this issue is presented in the following. Figure 9 shows that all the means of ranking effects were less than 3. The most effective one was related to QOL (2.65). Although the means of ranking effects were found to be low, Figure 11 shows that 85.45% of the total correlations were significant at the level of 0.01, 7.27% of the total correlations were significant at the level of 0.05, and the maximum of them was related to “creation of added events and plural memories” and “revitalization of commercial activity by the induced curiosity”. In this type of building, the correlations between the criteria were significant at the level of 0.01 and the maximum of them was related to QOL and EIDs (0.86) (Figure 13). It should be remembered that all types of buildings are important for creating a nocturnal city identity and the designer should consider this while designing the lighting for them.

Figure 13. Criteria for creating a nocturnal city identity based on different building types (Traditional and Old BLDG- Bridge- Headquarter BLDG- General Office BLDG- Monument- Residential Apartment BLDG)

4.2.7 Public Facilities

Public facilities occupied the sixth position (8%) in the initial response as shown in Figure 4. Figure 10 shows the averages of the effects of this type of building in creating a nocturnal city identity. Accordingly, it has the most effect on increasing the nightlife (4.17). This result shows that lighting of this type of building can increase the nightlife and presence of people. Also, LB showed a maximum mean of ranking of 3.64. As shown in Figure 12, 60% of the total correlations were significant at the level of 0.01 and 14.54% of the total correlations were significant at the level of 0.05. The maximum of them was related to the correlation between “increasing brand city image” and “increasing city competitiveness” (0.83). Also, Figure 14 shows that all the correlations were significant at the level of 0.01 and the most effective one was related to QOL and LB.

Figure 14. Criteria for creating a nocturnal city identity based on different building types (Public Facilities- Recreation Facilities- Commercial BLDG- Park)

4.2.8 Recreation Facilities

Recreation facilities occupied the seventh position as shown in *Figure 4*, but *Figure 10* shows an influential effect on identity in favour of this type of building. Lighting of this type of building can “increase nightlife” (4.46), “create added value as tourist attractions” (4.36), “increase brand city image” (4.12), “revitalize commercial activity” (4.10) and “create added events and plural memories” (4.07). It was found that the maximum mean was related to LB (3.92).

Figure 12 shows that 61.81% of the total correlations were significant at the level of 0.01 and 14.54% of the correlations were significant at the level of 0.05. According to this, the maximum rank was related to the correlation between “increasing brand city image” and “increasing city competitiveness” (0.78). *Figure 14* also shows that all the correlations were strong, and the maximum was related to EIDs and QOL (0.78).

4.2.9 Commercial Buildings

Commercial buildings occupied the fourth position (16%) in the initial response as shown in *Figure 4*. As shown in *Figure 10*, this type of building has an important role in “revitalization of commercial activity” (4.46) and “increasing the nightlife” (4.09). The important role was found in favour of “EIDs” (4.08). According to *Figure 12*, 67.27% of the total correlations were significant at the level of 0.01 and 12.72% of the total correlations were significant at the level of 0.05. The maximum correlation was related to “increasing advertising effects of a product and facility” and “revitalization of commercial activity by the induced curiosity” (0.85). *Figure 14* shows that all the correlations were strong, and the maximum was related to the correlation between QOL and LB (0.87).

4.2.10 Parks

Parks occupied the fifth position (0.11%) as shown in *Figure 4*. According to *Figure 10*, lighting of parks can result in “increasing the nightlife” (4.61), “creation of added value as tourist attractions” (4.14) and “creation of added events and plural memories” (4.41). The maximum effect was related to QOL (3.86). *Figure 12* shows that 36.36% of the total

correlations were significant at the level of 0.01 and 10.90% of the total correlations were significant at the level of 0.05. The maximum correlation was related to “increasing the nightlife” and “creation of added events and plural memories” (0.80). *Figure 14* shows that there is only a strong correlation between QOL and LB (0.68).

5. CONCLUSIONS

Considering the competition between the cities in order to be more visible and to gain a higher reputation, attention to the creation of city image has attracted more attention than in the past, and the city identity has been divided into two main parts of night and day. In the night, the role of lighting around us is felt and it is believed that the lighting of urban space and buildings is an important factor in creation of night image and urban night identity. As such, city branding requires strategies that are appropriate for creating a nocturnal city identity. In this paper, the effects of three strategies for coping with the complexity of city image and enhancing city reputation were investigated. The first is LB strategy, namely, using lighting as an element of the nocturnal branding of cities with a communicated image matching with the identity. QOL is the second strategy, namely, a feeling of well-being or satisfaction on the part of the visitors to a place. The third one is EIDs, namely, concerns with the economic growth in the region through branding processes. It was hypothesized that these three strategies will positively influence city brand reputation (*Figure 8*).

This study can be used to design a master plan for urban lighting. The study findings revealed the role of LB as more of a determining factor in policymaking, lighting architecture and nocturnal city identity in sustainable development. Additionally, for the first time in city branding, the existing research focused on nocturnal identification, and LB definition and its effects in different building types.

Thereupon, lighting of a monument and traditional and old buildings was found to have the most effect on LB and QOL, the lighting of parks and traditional and old buildings was also found to be effective to improve the EIDs, and the lighting of commercial buildings and traditional and old buildings was also found to be important. So, attention to lighting of traditional and old buildings is important to increase QOL, EIDs, and LB.

City policymakers and urban designers must consider the important role of all three criteria, namely QOL, LB, and EIDs, in creating nocturnal city branding and consequently in creating nocturnal city identity.

Through lighting of the buildings, a new city image is formed, creating the LB as an important factor in formation of the city brand. The existence of good lighting in cities is a factor encouraging citizens and tourists to continue their presence in the city, promoting urban nightlife and increasing QOL and, consequently, with the continued presence of citizens at night, EIDs increase. On the other hand, creating LB is a factor for attracting tourists to upgrade the EIDs and QOL. These relations between the three criteria were confirmed in this research. Emphasizing nocturnal city identity in policymaking would make great progress in implementation of spatial planning to make a sustainable urban form.

It was found that the values of all types of building are not the same. As a result, designers should consider the existing buildings in the city in order to design a lighting master plan as a planning strategy and in designing the concepts. The result showed that the lighting of traditional and old buildings and monuments has the greatest effect on creating a nocturnal identity.

However, all types of building, in turn, play a role in creating a nocturnal city identity, so attention to lighting is important and designers need to consider the mentioned criteria for designing the lighting. The results of the study showed that the government has a more effective role in creating a nocturnal city identity, and EIDs was found as a stronger strategy in this regard. For designing a lighting master plan, designers should specify the lighting level of each building according to its usage and level of significance. In this paper, ten types of buildings have been studied and their significance has been identified in the formation of city identity and city brand.

These findings show that the lighting brand can be used as a planning strategy and design concept to create a better urban space that can raise people's continuous presence as well as improve and enhance the quality of urban life that has a significant impact on developing a region's economic index. This finding can assist developers in designing urban master lighting to establish a visual hierarchy, construct identity, allow for visual harmony, and other features, and it was found that the values of all types of building are not the same. As a result, designers should consider the existing buildings in the city in order to design a lighting master plan as a planning strategy and to develop relevant concepts. It has been identified that the government has a more active role in creating a nocturnal city identity, and EIDs was found as a stronger strategy in this regard. For designing a lighting master plan, the designer should specify the lighting level of each building according to its usage and level of significance.

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