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Research Article

EXPLAINING THE SECURITY LEVELS IN THE URBAN AREAS BASED ON THE LIGHTING AT NIGHT BY USING A REVERSE HIERARCHICAL ANALYSIS (CASE STUDY: KERMAN CITY)

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ABSTRACT
Excessive increase of crime in the world severely threats human society economically and socially. This study investigates the effect of indicators of urban spaces' lighting on areas' security. The research methodology is descriptive-analytical. Data were collected through field perceptions. The six indicators including the main road lighting, the amount of energy consumption for passages lighting, alley and sidewalks lighting, lighting resulting from urban signs, parks lighting and front of homes lighting are investigated to rank the security level. The coefficient of every parameter's effect on security quality of neighborhoods was calculated by using entropy weighting model and qualitative levels of each neighborhood was determined by using IHWP technique. According to these studies, indicators of passages and sidewalks lighting and lighting resulting from urban signs have had the highest coefficient of effect and the amount of energy consumption for passages lighting has allocated the Lowes's.

Keywords: *Security, Inverse Analytic Hierarchy, IHWP, Lighting and Illumination Indicators, Entropy Weighting Model*

INTRODUCTION
The population of cities in the world is increasing with average annual growth of 2%. At the beginning of 2000, about half of the world's population has lived in cities, which is expected that the urbanization ratio on the planet rise to 61% in 2030 (United Nation, 2008). This unrestrained growth has engaged residents of cities with numerous problems. Increasing urban crime and insecurity are the results of uncontrolled growth of cities and their unknown identity. Certainly, the location, time and incentive of offender are the main factors of the emergence of criminal behavior. Consideration of these factors can have a significant impact on the adoption of crime prevention policies and it seems that the role of the location (environment) is crucial than the others. Namely, spaces where there is no security sense are not actually used by citizens and undermine any attempt to provide other environmental qualities. Therefore, urban spaces need to be bright at night to maintain safety and security of environment. In this state, the most important issue refers to space lighting and visibility of people and other phenomena. The establishment of safety and security is one of the main objectives of lighting. Kerman city due to the historical background is one of the tourist-attracting cities in the country and also due to its unique geographic location welcomes temporary and permanent migrants in different time periods throughout the year. For these reasons, the necessity of studying and analyzing the security dimensions of city and improving the design quality to reduce the crime incidence areas is severely felt. This study aims to determine the security levels in some areas of Kerman as well as detecting the effect of various parameters of spaces lighting in incidence of crime and specifying the impact coefficient of each parameter on general security within some neighborhoods of Kerman city. According to the indicators mentioned in various sources, scores of indicators are specified for each locality with respect to the field perceptions. The entropy weighting method and also the inverse hierarchical multi-criteria analysis method are used for achieving the above objectives. Based on what was discussed, the research

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hypothesis can be stated that: New established urban localities that are mostly formed in the suburbs and in compulsory development of the city and without paying attention to the suitable design of essential urban infrastructures such as suitable lighting networks of the city have less security.

The Theoretical Foundations of the Effect of Lighting on Urban Environments' Security

Ulrich believes that the natural landscapes can help to reduce stress while artificial spaces of city not only prevent the stress reduction, but will also lead to the stress (Ulrich, 2002). But, it is important to know that many efforts are done to use natural elements which are visible only during the day. These elements are placed in the dark at night and due to the lack of lighting, they have hallucinatory shape or the excessive use of light and light pollution lead to the lack of the application of these elements. Therefore, in urban places lighting, lighting of natural elements such as plants, urban rivers, etc. should be considered in a way that reinforces a sense of relax in the space. Excessive use of color and light to nightly environmental stimuli in its own turn leads to the psychological stress for individuals. Thus, color should be used consciously and purposefully and with fundamental standards and principles and considering its psychological effects (Amin, 2008).

Revision Theory

In this theory, Kapalan about human intellectual fatigue argue that the urban areas because of the need to the direct attention have more mental fatigue than the natural environment and also this theory points to the reduction of complexity and many stimuli in urban landscape (United Nation. 2008). If the natural elements lighting to be done appropriately in urban spaces and with sufficient coherence and legibility, environmental stimuli will be used accurately and appropriately and totally, people will not be forced to apply the excessive attention to understand environment.

Taking Advantage of the Psychological Effects of Light

In the words of the World Health Organization, "Health does not only refer to the lack of illness but also it means the complete physical, social and mental health". The communication network of urban environments and urban spaces' qualities where people engage with them routinely are associated with human health (Amin, 2008). Proper lighting can meet the individual needs and also leads to the relative controlling of the location, increased sense of attendance in location and increased social interaction. Indulgence and wastage in lighting can have an important role in creating the emotional stress, increasing anxiety as well as the physical problems. On the other hand, a logic and proper lighting can contribute to create a quiet and attractive environment. It seems that by changing lighting in many places and spaces that are used not only the confusion of nightly landscape is reduced but also the health and comfort aspects of human are emphasized and consequently it has positive impact on modern humans' lifestyle (Amin, 2008).

Theory of the Relationship between Environmental Physical Characteristics and Security Sense

According to the Oscar Newman's theory, spaces with more possibility of visibility which provide a little chance of escape consequently provide less potential for criminal activity. Thus, for example, it is argued that walls and hedges can be considered as physical barriers and increase the insecurity sense while existence of sign that indicates people's supervision on the neighborhood can increase the sense of security. In general, women are afraid of victimization more than men. However, the gap between men and women is decreased with age enhancement (Lotfi,and Faraji, 2010).

Theory of Crime Prevention through Space Designing (CPTED)

This theory is influenced by the thoughts of Jeffrey (1971) and Jacobs (1961). This theory precisely investigates the urban form and fabric and its relation with urban crime. According to the National Institutes of Crime in the United States CPTED is defined "an appropriate design of the built environment that can reduce the fear of crime and improve the life quality" (Iranmanesh, 2005). According to this theory, architects and urban planners with available knowledge and experience and due to the capacity of the environmental construction begin to urban planning and designing to reduce the fear of crime and violation potential.

Ms. Jacobs emphasizes on the street more than any other factor in the creation of urban security and says: "If urban streets to be safe from savagery and fear, the city will be safe from the brutality and fear"

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(Jacobs, 2008). According to Ms. Jacobs factors like bright and crowded locations with careful eyes and big and broad sidewalks in which people's participation is high are effective in shaping the safe urban environment and also suggests variety of users for urban streets (Kalantari, 2001).

Background of Study

American theorist Jane Jacobs in the 60s decade with a book entitled "The life and death of American cities" is introduced as the first theorist in the field of security. She in one part of his book discuss about issues such as the need for safe spaces in the city, separation and diagnosis of public and private places and variety of users and mixing them together (Jacobs, 2008). In this regard, it can be pointed to the evaluation of the research results of seventy urban design programs about forty cities in the United States which is conducted by Michael South Worth (Southworth, 1989). Also, the study of urban designing qualities with "content analysis" method is conducted by John Punter and Matthew Carmona in various scales in seventy-three urban development plans of UK (Carmona *et al.*, 2002). Kapalan have also proposed a theory in 1989 that addresses the issue of human intellectual fatigue in urban environments and artifacts and introduced the legibility of urban environments as one way to alleviate this problem and in order to achieve this strategy, lighting of urban spaces at the nightly landscape has great importance (Kapalan and Kaplan, 1989). Iranmanesh (2005) in an article has investigated the utilization of the crime prevention principles through environmental design in Iran (Iranmanesh, 2005). Amin, in an article entitled "Urban lighting and its role in the design of therapeutic landscapes" concluded that the night landscape can have different effects on the citizens compared to the day landscape. Proper lighting can meet the individual needs and control the place relatively, increase the sense of attendance in the location and increase social interaction (Amin, 2008). Muradi in an article entitled "Security indicators in urban space" has introduced these indicators briefly. However, their effects and importance on the general security are not evaluated. Also, Kalantari in his PhD dissertation has investigated the geographical distribution of crime in Tehran city (Kalantari, 2001). Pakzad and Suri in a book entitled "Handbook of lighting in urban areas" have briefly studied the methods and techniques, and requirements of nighttime lighting (Pakzad and Suri, 2012). Lotfi and Adibi in separate article with an analytical approach have studied and analyzed the security levels in coastal cities of Iran and their effect on tourists' attraction in the tourism areas like Babolsar city (Adibi and Azimi, 2011; Lotfi and Faraji, 2010).

Variables of Study

The lighting design of urban spaces in order to create security can be studied from two functional and physical aspects.

Physical Aspects of Urban Lighting

Based on the physical view, brightening of the dark and hidden corners, defenseless spaces of the city, lighting of the intersections and active parts of spaces at night, illuminating the interior space of stores to create a feeling of being seen and also making the clear distinction between the public and private sectors are the most important actions to prevent the crime committing and to increase the feeling of security.

In order to study the physical aspects of lighting for providing security three following sub-indices are used:

- Main passages lighting
- Local street lighting and alleys and sidewalks
- The amount of energy consumption for passages lighting

Functional Aspects of Urban Spaces Lighting

Also, functional aspect emphasizes on the proper distribution of active and light areas in urban spaces, proper lighting of spaces in order to bring the Internal activity of commercial and recreational units like restaurants, coffee shop into the public areas and behavioral headquarters lighting which can provide this possibility to control urban environment greatly by attendance of individuals in these environment. In this regard, in order to study the functional aspects of lighting to provide security, the following three sub-indicators are used.

- Lighting induced by urban signs and routing boards, informing and advertising
- Lighting of parks, gardens, waterfront and urban spaces

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• Lighting caused by shops, banks and government and public buildings

In the modern world that most people spend their leisure time at night for recreation, using lighting for recreational purposes on the one hand contributes to the development of recreational spaces' utilization and on the other hand, can help to develop the quality and vitality of spaces and elements.

Areas' Lighting

Every area is located in one city and thereby gets some of its characteristics from it. Lighting in different parts of an area should follow the same rule that governs lighting of whole city. An area as it is considered as a part of a city simultaneously should has its own unique character in order to be distinguished easily all the time for inhabitants and other citizens (Ghasemi, 2004).

Lighting in the Pathways

Pathways are always predisposing various urban events such as urban transportation, trade, cultural exchanges, conducting religious ceremonies, expressing political votes, and roaming. With these interpretations, pathways should accept all social groups of citizens in different times (Pakzad and Suri, 2012). A large part of the attendance at night requires visual penetration into the realm of the routes. So, the illumination of intersections and the ways that reached to the path should be taken into consideration in nightly lighting.

MATERIALS AND METHODS

Methodology

The methodology of this study is descriptive - analytical which is done in some areas of Kerman city with survey and library research method. In this study, according to the conducted studies, light and lighting indicators affecting the environmental security are studied and evaluated. In this regard, the following six indicators are reviewed and rated:

• Main passage lighting

• Alleys, sidewalks, and local streets lighting

• The energy consumption amount for passages lighting

• Lighting induced by urban signs and routing boards, informing and advertising

• Parks, garden, waterfront and urban spaces lighting

• Lighting induced by shops, banks and governmental and public buildings

Scoring guide is adjusted by authors in Table 3 and scoring of localities is studied by 20 proficient urban design and electrical engineering experts. Mean of experts' views are collected in Table 4. It should be noted that the indicator of the energy consumption amount for passages lighting by library information extracted from the report of daily magazine of average pressure feeder of localities is calculated in sample days of each season in 2013. An example of reports can be seen in Table 2. However, the consumption amount of passages lighting according to Table 1 is about 3.2% which with calculation of the foregoing issues, the consumption amount of each locality will be calculated in day that by dividing it to the area of each locality the required information will be obtained in second paragraph of Table 3. After scoring by experts and extraction of the library data, the effect coefficient of each parameter on locality's security is calculated by using entropy weighting model and then the quality levels of each locality and ideal level are determined by using the Inverse Analytical Hierarchy Technique (IHWP). Thus, the input of this method is the numerical values of quality assessment indicators of each parameter in the studied area and localities and its output is tables and charts that are obtained according to the results and the quality desirability of each locality is rated according to the proposed indicators.

In this method, at first, weight of each indicator (the amount of the effect on the final quality) is determined by using the entropy model. Initially, the value of n is calculated by using equation (1) for per i and j. In this equation m refers to the number of studied areas:

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$$n_{ij} = \frac{r_{ij}}{\sum_{i=1}^{m} r_{ij}}; \forall j, i \quad (1)$$

The value of E_j symbol is obtained with placement of the relevant values in equation (2):

$$E_j = -\frac{1}{\ln m} \sum_{i=1}^{m} (n_{ij} \ln n_{ij}) \quad (2)$$

The deviation degree of the generated data for j[th] variable which is shown with d_j is calculated according to equation (3).

$$d_j = 1 - E_j \quad (3)$$

Weights calculation for all j is obtained according to the equation (4) by utilization of the existing indicators.

$$w_j = \frac{d_j}{\sum_{j=1}^{m} d_j} \quad (4)$$

After determining the weight of each indicator or the effect of each indicator on the w_j final quality, then inverse analytical hierarchy is used to determine the score of each locality from each indicator. Initially, the primary score of each indicator is calculated according to the equation (5) and the score for different classifications of each indicator can be calculated according to the equation (6). Finally, every locality has earned a score from every index that the sum of scores will determine the quality and desirability of the locality.

N = Number of classes for per indicator

J = points obtained for different categories of per indicator

i = number allocated to the various categories of per indicator

$$x = w'j / N \quad (5)$$

$$J = w'_j - (N - i)x \quad (6)$$

Identification and Analysis of the Studied Area

Kerman city is a developing city with a population of 534,441 people that are settled in an area of up to 5224/15814 hectares. Travel of 7814 foreign tourists and 86142 domestic tourists to this city in 2011 demonstrates the high potential of this city in tourist attraction and the creation of sensitivity to provide and improve environmental security (Statistics Centre, based on the latest results in 2011).

Table 1: The amount and percent of electricity consumption in Kerman province (Numbers are based on the million/ kWh)

		Domestic	General	Agriculture	Industrial	Other consumptions	Passages lighting	sum
2012	Company's Consumption	782	211	1.642	487	176	79	3.377
	Percent of Consumption	23.2	6.2	48.6	14.4	5.2	2.3	100

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Table 2: The sample of daily peak report of average pressure feeders

Daily peak report of average pressure feeders (2013)				
Affair	**Super Distribution Post**	**Feeder**	**Load (amperes)**	**Load (megawatts)**
Kerman	Shahab	Jamaran town	20	0.6
		Salsabil	45	1.36
		Iranmanesh town	110	3.32
	Kerman 1	Five hundred sets	45	1.36
		Allahabad town	25	0.75
		Taher Abad	105	3.16
	Zangi Abad	Motahari town	45	1.36
		Emam jomeh	25	0.75
		Bahonar town	65	1.96
	Tavakol Abad	Alghadir town	110	3.32
		Old tissue area	100	3.01
		Mahdiyeh	65	1.96
		Management	90	2.71

Identification of the Areas

This study tried to study the geographical areas which are dispersed on the city level in the form of various localities. In this regard, thirteen districts are studied that constitute about one third of the city's level. Iranmanesh town, Jamaran town, Salsabil, Motahari town, Bahonar town, Emam Jomeh, Pansad Dasghah, Allahabad town, Taherabad town, Alghadir town, old tissue area, Mahdiyeh, management are localities that have been studied.

Findings

Studied indices and also their weighting and valuation method are presented in Table 3. Based on what is proposed in the spectrum from zero to one, the value of one represents the most ideal type of urban design in which the willingness to commit the crime is minimized and the value of zero represents the worst kind of urban design.

Table 3: Guidelines for indices weighting spectrum

Raw	indicators	Weighting spectrum guide	Weight
1	Main passage lighting(Physical aspect)	The existence of light poles orderly and regularly and with appropriate intervals (healthy and sufficient)	1
		The existence of light poles orderly and regularly and with inappropriate intervals (healthy and insufficient)	0.75
		The existence of light poles irregularly and healthy with inappropriate intervals	0.5
		The existence of unhealthy and insufficient light poles with irregular intervals	0.25
		The lack of the existence of apprppriate light poles	0
2	The energy consumption amount for passages lighting (Physical aspect)	$2.25_{Kwhr/day/Km2}$<The energy consumption amount for <$3_{Kwhr/day/Km2}$ passages lighting	1
		The energy consumption amount for passages lighting≤$2.25_{Kwhr/day/Km2}$ $1.5_{Kwhr/day/Km2}$<	0.66
		The energy consumption amount for passages lighting ≤ $1.5_{Kwhr/day/Km2}$ $0.75_{Kwhr/day/Km2}$<	0.33
		$0_{Kwhr/day/Km2}$< The energy consumption amount for ≤$0.75_{Kwhr/day/Km2}$ passages lighting	0
3	Alleys, sidewalks, and local streets lighting(Physical aspect)	Appropriate and healthy electricity poles with complete benefiting from lighting in the existing apartemants	1
		Appropriate and healthy electricity poles with complete benefiting from lighting in the existing apartemants	0.75
		Appropriate and healthy electricity poles with inapproprite benefiting	0.5

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		from lighting in the existing apartemants	
		Inappropriate electricity poles with inapproprite benefiting from lighting in the existing apartemants	0.25
		The lack of the existence of the urban light poles and lack of getting benefit from lighting in the existing apartemants	0
4	Lighting induced by urban signs and routing boards (Functional aspect)	Appropriate utilization of lighting induced by mentioned issues and appropriate legibility	1
		Inappropriate utilization of lighting induced by mentioned issues and average legibility in passages	0.5
		Inappropriate utilization of lighting induced by mentioned issues and very bad legibility	0
5	Parks, garden, waterfront and urban spaces lighting (Functional aspect)	Adequate and appropriate lighting along with harmony and beauty	1
		Adequate lighting and relative appropriate benefiting from harmonious and beautiful lighting	0.66
		Insufficient lighting and lack of benefiting from lighting	0.33
		Very limited lighting and lack of benefiting from lighting	0
6	Lighting induced by shops, banks and governmental and public building (Functional aspect)	Proper lighting that leads to the identification of locality. (Full legibility)	1
		Complete lighting that does not leads to the identification of locality.	0.66
		Stunning and sever lighting that does not leads to the identification of locality.	0.33
		The lack of lighting and full dark spaces	0

20 proficient urban design and electrical engineering experts by using the scoring guidelines (Table 3) and by field and liberary studies gave score to each locality and mean scores are summarized in Table 4.

Table 4: Results of the acquired scores for each locality from each indicator

Index	First	Second	Third	Fourth	Fifth	Sixth
Name of locality	Main passages lighting	Energy consumption	Sub-passages lighting	lighting resulting from urban signs	Parks lighting	Lighting caused by different land users
Iranmanesh	0.213	0.66	0.356	0.189	0.345	0.107
Jamaran town	0.086	0.33	0.081	0.075	0.005	0.029
Salsabil	0.098	0.33	0.084	0.094	0.047	0.074
Motahari town	0.164	0.33	0.118	0.124	0.349	0.124
Bahonar town	0.741	1	0.614	0.489	0.684	0.697
Emam Jomeh	0.792	1	0.764	0.949	0.559	0.894
Pansad Dasghah	0.102	0.33	0.128	0.078	0.101	0.107
Allahabad town	0.027	0.33	0.011	0.005	0.000	0.009
Taherabad town	0.189	0.66	0.116	0.082	0.078	0.042
Alghadir town	0.351	0.66	0.272	0.410	0.212	0.357
old tissue area	0.316	1	0.208	0.108	0.032	0.142
Mahdiyeh	0.486	0.66	0.354	0.124	0.189	0.143
management	0.378	0.66	0.310	0.146	0.178	0.157
Total score	3.943	7.95	3.416	2.873	2.779	2.882

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Weighting and Investigating the Indices Studied in the Area

With regard to the scores obtained from field and library perceptions for each locality and indicator which is presented in Table 4, the calculation associated with the indicators weighting by using one to four equations are given in Table 5.

Table 5: Results of weighting calculations of entropy model

Number of indicator	First	Second	Third	Fourth	Fifth	Sixth
Relations of entropy model	Main passage lighting	Energy consumption	Sub-passage lighting	Lighting resulting from urban signs	Parks lighting	Lighting resulting from different land use
$k = -\frac{1}{\ln m}$	0.3898	0.3898	0.3898	0.3898	0.3898	0.3898
$E_j = -\frac{1}{\ln m}\sum_{i=1}^{m}(n_{ij}\ln n_{ij})$	0.815562	0.0878104	0.689739	0.7066099	0.7861020	0.814778
$d_j = 1 - E_j$	0.18443	0.121856	0.31026009	0.2933900	0.2138979	0.185221
$w_j = \frac{d_j}{\sum_{j=1}^{n} d_j}$	0.1408≅ 14%	0.09311 ≅9%	0.23700 ≅24%	0.22411 ≅23%	0.16339 ≅16%	0.14148 ≅14%

From these results it can be concluded that for example, main passages lighting can maximually influence 14% of security of locality and sub-passages lighting can affect 24% of areas' security. Now, according to the determined influence of each parameter (weight of indicator) the inverse hierarchical analysis can be completed by 5 and 6 equations for each indicator in the following tables. According to the Table 3, various classes and grades of scores are proposed for each indicator, for example, there are 5 classes in the main passages lighting in which Class A has the highest score and Class E has the lowest scores. In these tables J-column determines the score of each class.

Table 6: The score obtained from IHWP analysis for the main passages lighting indicators

Indicator	Grade (i)	w'_j	(x) $x = w'j / N$	(j 1) $J = w'_j - (N-i)x$
Main passages lighting	(5)A	(0.14)	(0.028)	0.14
	(4)B			0.112
	(3)C			0.084
	(2)D			0.056
	(1)E			0.028

Table 7: The obtained score from IHWP technique for the amount of energy consumption indicator

Indicator	Grade (i)	w'_j	(x) $x = w'j / N$	(j 2) $J = w'_j - (N-i)x$
Energy consumption	(4)A	(0.09)	(0.0225)	0.09
	(3)B			0.0675
	(2)C			0.045
	(1)D			0.0225

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Table 8: Score obtained from IHWP technique for indicator of sub-passages lighting

Indicator	Grade (i)	w_j'	(x) $x = w'j / N$	(j 3) $J = w_j' - (N-i)x$
Sub-passages lighting	(5)A	(0.24)	(0.048)	0.24
	(4)B			0.192
	(3)C			0.144
	(2)D			0.096
	(1)E			0.048

Table 9: Score obtained from IHWP technique for indicator of lighting caused by urban signs

Indicator	Grade (i)	w_j'	(x) $x = w'j / N$	(j 4) $J = w_j' - (N-i)x$
Lighting caused by urban signs	(3)A	(0.23)	(0.0766)	0.23
	(2)B			0.1533
	(1)C			0.0766

Table 10: Score of park lighting from IHWP analysis

Indicator	Grade (i)	w_j'	(x) $x = w'j / N$	(j 5) $J = w_j' - (N-i)x$
Park lighting	(4)A	(0.16)	(0.04)	0.16
	(3)B			0.12
	(2)C			0.08
	(1)D			0.04

Table 11: The obtained score from IHWP technique for lighting indicator caused by different uses

Indicator	Grade (i)	w_j'	(x) $x = w'j / N$	(j 6) $J = w_j' - (N-i)x$
Lighting caused by different land uses	(4)A	(0.14)	(0.035)	0.14
	(3)B			0.105
	(2)C			0.07
	(1)D			0.035

Weighting and Investigating the Studied Indices in the Area

According to the scores obtained in Table 5 and compared with the scoring categories in Tables 6 to 11, grade of scores and total score of each index is calculated for each locality which is shown in Table 12. For example, according to the Table 4, Iranmanesh town has achieved 0.213 score for indicator of main passages lighting and Table 3 indicates that this score is located in Class E, and based on the table 6, the score of Class E is 0.028. Likewise, each locality of each indicator will get a score that their sum will be the final score of locality (Table 12).

It is seen that if a locality of each indicator get the minimum score, it has a score equal to 0.25 and score 1 indicates the highest score (the ideal locality). Accordingly, the score and quality classification of localities can be divided into six score categories between 1 and 0.25 in the Table 13.

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Table 12: Grade of scores of each indicator for localities total scores

Name of locality	lighting caused by different land uses	Parks lighting	lighting resulting from urban signs	Sub-passages lighting	Energy consumption	Main passages lighting	Total score
Iranmanesh	D 0.035	B 0.12	B 0.1533	C 0.144	B 0.0675	E 0.028	0.5478
Jamaran town	C 0.07	D 0.04	C 0.0766	E 0.048	C 0.042	E 0.028	0.3046
Salsabil	D 0.035	D 0.04	C 0.0766	E 0.048	C 0.042	D 0.056	0.2976
Motahari town	D 0.035	C 0.127	B 0.1533	E 0.048	C 0.128	E 0.028	0.52
Bahonar town	B 0.105	A 0.16	B 0.1533	C 0.144	A 0.09	B 0.112	0.7643
Emam Jomeh	A 0.14	B 0.12	A 0.23	B 0.192	A 0.09	A 0.14	0.912
Pansad Dasghah	C 0.07	D 0.04	C 0.0766	E 0.048	C 0.042	E 0.028	0.3042
Allahabad town	D 0.035	D 0.04	C 0.0766	E 0.048	C 0.042	E 0.028	0.2696
Taherabad town	D 0.035	D 0.04	C 0.0766	E 0.05	B 0.064	D 0.056	0.3216
Alghadir town	B 0.105	C 0.08	B 0.1533	D 0.096	B 0.0675	D 0.056	0.5578
Old areas	D 0.035	D 0.04	C 0.0766	E 0.048	A 0.032	D 0.056	0.2876
Mahdiyeh	D 0.035	B 0.12	B 0.1533	D 0.096	B 0.0675	D 0.056	0.5278
Management	B	B	B	D	B	D	0.5978

Table 13: Spectrum of classification of scores and desirability of localities

Classification of results	0.876-1	0.751-0.875	0.626-0.75	0.501-0.625	0.376-0.5	0.25-0.375
The quality of the safety of localities according to the lighting indicators	Excellent environment	Good environment	Average environment	Poor environment	Unacceptable	Strongly inappropriate

Analyzing the Results of the Studied Area

With regard to the conducted comparison between Table 12 and 13, it can be seen that localities like old tissue area, Allahabad town and Taherabad district, Pansad Dasghah, Jamaran town have severely inappropriate environments in terms of security and according to the environment lighting indicators have very suitable conditions for crime commitment and based on the studied indicators, two areas of Emam Jomeh and Shahid Bahonar town are respectively the excellent and good environments in terms of safety and conditions for preventing the crime incidence. Also, with precise consideration of Table 5, it can be found that the indicators such as sub-passages lighting as well as the lighting caused by urban signs have

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more effects on quality and environmental security improvement of localities and urban spaces and reinforcement of these indicators can contribute to the space security improvement.

CONCLUSION

This study was based on the field studies on the localities of Kerman city and evaluated the relationship between the improvement of the urban environment and localities lighting and the improvement of urban spaces' quality and more security feeling among residents of that area. The result indicated that improving lighting quality of urban spaces and localities can improve the quality of space and quality enhancement leads to the more utilization of space and consequently this issue will lead to the security feeling in urban spaces. In addition, it is recommended that in future studies, the findings of this study to be compared with statistics of crime and delinquency of studied areas and also results of this study can be controlled by other analytical methods like Fuzzy multi-criteria method and or AHP analysis.

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