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Developing an analytical model to increase urban security from the Secured perspective by Designing (SBD) Approach using fuzzy AHP method (case study: region 17 of Tehran)

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Extended abstract

1-Introduction

Safety and security have been significant issues throughout history, from early prehistoric cave-dwelling societies to medieval and modern cities (P. Cozens, 2008). Crime is a part of our way of living. It is tied to the physical distribution of people and objects, to the routine activity patterns of daily life, and to the ways in which people perceive and use information about the environment (Brantingham & Brantingham, 1993).

Statistics show that there is a meaningful relationship between different districts and kind and repetition of crimes in Tehran, so that these districts can be categorized based on city safety (Rezvan, 2007)

In some regions unsafely is more likely due to environmental, social, economic and even occupational reasons. One of these areas is region 3 of district 17 in Tehran, which suffers from high population density, aggregation of deteriorated and compact areas, multiplicity of cross-regional land use, separation of the area by two railways (Tehran-Tabriz and Tehran- South), etc. Mentioned limitations along with other relevant factors, has created numerous problems such as low level of urban security in the area and feeling of insecurity among residents.

2- Theoretical bases

Secured by design is a UK based initiative which was devised in 1989, with the aim of countering the rise in household burglary, reducing crime through the design of the environment and encouraging urban designers to design out crime at the planning stage (Armitage, 2004). SBD also aims to achieve security for the building shell and to introduce appropriate internal and external design features that facilitate natural

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surveillance and create a sense of ownership and responsibility, in order to deter criminal and anti-social behavior within the cartilage of the business. New opportunity theories of crime and crime prevention measures such as situational crime prevention and crime prevention through environmental design largely affected the principles of SBD. These theories assume that crime is a response to opportunity, therefore removing the opportunity can reduce crime. An emphasis is also placed upon the role of the environment in creating or impeding these opportunities. The principles of SBD fall largely into the following categories:

Physical Security: SBD sets standards of physical security for each property and its boundaries (Armitage & Monchuk, 2009). The aim is to combine effective target hardening measures to the original building of the estate, not to create a fortress in which residents are constantly reminded of the risk of victimization.

Surveillance: Surveillance strategies are a design concept directed at keeping intruders under observation (Atlas). SBD estates are designed to achieve maximum natural surveillance without compromising the need for privacy (Armitage & Monchuk, 2009).

Access/Egress: Access/Egress control is a SBD concept focused on reducing opportunities for crime by denying access to potential targets and creating a heightened perception of risk in offenders. Access/Egress can include informal/natural (e.g. spatial definition), formal/organized (e.g. security personnel) and mechanical (e.g. locks and bolts) (P. M. Cozens, Saville, & Hillier, 2005).

Territoriality: Territoriality is a design concept directed at reinforcing notions of proprietary concern and a “sense of ownership” in legitimate users of space thereby reducing opportunities for offense by discouraging illegitimate users (P. M.

Cozens et al., 2005). SBD achieves territoriality, by ensuring a clear demarcation between public, semi-public, semi-private and private space (Armitage, 2004).

Management and Maintenance: SBD estates should have a programmed management system in place to maintain the area. In addition, management and maintenance is based on the fact that the presence of disorders such as vandalism, rubbish or criminal damage leads directly to more anti-social behavior (Wilson & Kelling, 1982).

3- Discussion

This study follows two targets: First, determining the relative importance of criteria and sub-criteria of SBD approach and second, evaluating urban security in four areas of the case study using the results of the previous step. The proposed fuzzy AHP model to achieve mentioned targets is composed of the following steps:

Step 1: Identify the criteria and sub-criteria of each principle of SBD approach. Step 2: Structure the AHP model hierarchically based on the criteria and sub-criteria identified at Step 1

Step 3: Determine the priorities of the main principles with respect to the goal by using pairwise comparison matrices (w_1). This scale is proposed by Kahraman et al. (Kahraman, 2008) and used for solving fuzzy decision making problems (Dagdeviren & Yüksel, 2008; Kahraman, Ertay, & Buyukozkan, 2006; Tolga, Demircan, & Kahraman, 2005) in the literature. Pairwise comparison matrices of the components imported in Microsoft Excel workspace developed for solving FAHP matrices.

Step 4: Determine the local weights of the criteria (w_2) and sub-criteria (w_3 (Local)) and alternatives.

Step 5: Calculate the global weights for the sub-criteria (w3 (Global)).

Step 6: Compute the overall weight of each alternative (area) and choose the best area.

4- Conclusion

This study has been proposed a hierarchical model to evaluate the rate of environmental security which decomposes the 5 principles of SBD into 12 criteria and 29 sub-criteria. To our best knowledge, this is the first time that factors affecting main principles of SBD are determined and prioritized. This may help urban designers to consider the most important factors affecting crime reduction in their designs and decision makings.

This model is based on determining the most important factors affecting 5 principles of SBD which can lead to urban security in the case study. For this purpose, fuzzy AHP method is adopted in order to assess the relative importance of the factors and sub factors of the model. This method has the ability to capture the vagueness of human thinking style and effectively solve multi-criteria decision making problems.

Results of applying the model in studied area (region 3 of district 17) show that in order to achieve urban security, 'physical security' is the most important principle. In addition, the most significant sub-criteria determined to be 'Good quality of public realm', 'Create defensible space' with importance weights of 0.116 and 0.110, respectively. Finally, evaluating quadratic areas of the case study revealed that area 4 and area 1 with weights of 0.404 and 0.096 respectively are the best and worst areas in terms of urban security.

5- Suggestions

Based on analyzing the results, guidelines have been suggested in order to promote urban security level:

- Protecting City equipments against vandalism and repairing or replacing them by municipality
- Replacement of population absorber land use to the areas with low surveillance and control
- Having coherent and continuous surveillance on entrances
- Improving physical environment and safety through enhancing facilities and services
- Increasing feeling of security among residents
- Continuous space use by citizens through environmental design strategies
- Defining special function to attract people and affect social activities

Key words: Urban Security, Secured by Design (SBD) approach, Region 17 of Tehran, Fuzzy Analytic Hierarchy Process (FAHP), Guidelines and Strategies.

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