Feasibility Study of Urban Smart Policy Using on Environmental Quality Upgrading (Case Study Foulad Shahr)

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Introduction

The topic of utilization and wise use of practical policies focused on the smart city is one of the current concerns of urban development management system. These concerns, given the wide-spread challenges of urbanization in Iran, are becoming more and more important. One of the most important parts of interest to smart city is the attention to smart and convenient management of urban development in order to allow the urban management to prevent from consequences and problems caused by uncontrolled horizontal urban sprawl, which leads to the loss of local communities, social segregation, increased cost of urban infrastructures and services, increased length and distance of urban trips, increased energy consumption, high cost of implementation of the public transportation system, use change of high quality agricultural land and gardens around the city, air pollution, and deterioration and pollution of water resources. In the context of sustainable urban growth and with emphasis on the development of the basis for the emergence of smart city, issues such as the fair distribution of land uses and "the compact city shape", in addition to maintaining and improving the quality of the environment, reducing the unnecessary traffic of citizens and the number of short intra-urban trips, they also present a proposed method for correcting the urban sprawl. The smart city is not an exquisite term, but in recent years, with the focus on using information and communication technology to create and integrate infrastructures and better services for citizens, this term has become very popular, and initiatives to make cities smart have come to fruition as a models of reducing local problems or overcoming common urban problems, and turning cities into a better place for livelihood and prosperous life, especially if executives and engineers had achieved the realization of a sustainable and green city. For this reason, most of the studies in relation to the smart city depict an idealistic and dreamy image from it, and write on the descriptions of smart transportation, smart mobility, smart environment, smart energy, smart security, and so on. The major goals of this project are "the identification and clarification of measures effective on improvement of environmental quality in urban neighborhoods of Fooladshahr in Isfahan". In this regard, a smart growth approach is proposed to reduce the adverse effects of environmental factors such as pollution, loss of land and its optimal use. Finally, the effects that adopting and applying this approach generally has on urban planning policies are investigated. According to our studies, the evaluation of the effects that the smart city

approach has had on environmental quality and the life of citizens in Fooladshar, considering all of its dimensions, was not complete, and requires reconsideration and a special attention to procedural indicators and dimensions.

Methodology

"Smart city" includes the subsets, subsystems and main components of a smart life, which itself includes eight key components of a smart city, which are smart governance, smart energy, smart citizens, smart building, smart mobility, smart infrastructure, smart technology and smart economy. In this project, due to the limitations, only four components of smart transportation, smart energy, smart infrastructure, and smart building were studied and the questionnaire method was used for this purpose. In this regard, a questionnaire was developed on awareness about the quality of the neighborhoods, and distributed in the planning site among the two groups of specialists at a maximum level and ordinary people at a minimum level. The questionnaires were then analyzed by SPSS software and the results were extracted. Based on the Cochran's formula, the population and the number of statistical samples were determined as 200, and 200 questionnaires were interviewed and completed within 3 days in the study area. Before entering the area and completing all questionnaires, the questionnaire's reliability was measured, for which 30 questionnaires were randomly asked from the residents as direct interview in order to resolve any ambiguity or deficiencies among the questions at the later stage. The Cronbach's alpha coefficient was used to determine the questionnaire's reliability. The Cronbach's alpha coefficient is one of the most common methods for measuring reliability or validity of questionnaires.

Hierarchical Multiple Regression (HMR):

This method is one of the main statistical analysis techniques used for analyzing the relationship between a single criterion or a dependent variable (a higher-level feature) and two or more independent variables (lower-level features) on real subjects (e.g., environmental quality in residential areas). In the method, the selection and structuring of criteria is usually done by the researcher. Then, using the top-down method, each macro criterion is broken down into smaller criteria until achieving the last level of value model. This level contains criteria that are quantifiable and provide the researcher with the most accurate information on the subject. At the evaluation stage, each of the higher-level criteria are regressed on the lower-level criteria to identify the independent and dependent variables.

Structural Equation Modeling (SEM):

Multiple regression analysis is one the most important statistical techniques for analyzing the relationship between a single criterion or a dependent variable (a higher-level index) and two or more predictors or independent variables (lower-level indices). In addition, multiple regression analysis is also used for forecasting. Since the concept of smart city refers to indices affecting each other and provision of value-added services, thus, the effect of these indices on each other and their services were studied. Then, the questionnaire and the data presented by the SEM diagram were analyzed at three levels

and their effect in each field was investigated. Then, descriptive statistics about the field research, carried out for this research in regards to the demographic characteristics of the present and responsive people, were presented in graphs, and then, the effects of smart city (first level) on improvement of urban condition and ultimately increasing energy consumption efficiency at the second level were studied using an appropriate statistical method through multiple regression model, and the effect of smart city on the factors improving the urban condition was evaluated. Then, the effect of each of these factors on third-level indices of the model was expressed. Finally, the effects of all three levels of the model were measured and analyzed using one sample t-test. At the end, the main issue, which is the effect of smart city on improvement of environment of urban neighborhoods, was investigated using Pearson correlation test. All the results were obtained using statistical methods and SPSS software.

Results and Discussion

As mentioned, this study was conducted to evaluate the feasibility of using smart city policies to improve urban neighborhood environments of Fooladshahr. Our study showed that the use of smart city policies would significantly improve urban neighborhood environments in Fooladshahr ($P<0.001$), and changing smart city policies very effectively and directly changes the environmental quality of urban neighborhoods ($P<0.001$, $r=0.954$). The results showed that using the capacity and capabilities available in smart city approach can help to improve the quality of residential environments.

The results of evaluating the effects of the smart city on the improvement of environmental quality of urban neighborhoods in the studied area showed that all 16 indices used in the third level of the model had significant effects on the smart city ($P<0.001$). Given the value obtained for the first level of the model, the overall effect of the smart city was assessed as "high" ($1<4.1640<5$).

According to our studies, so far, no comprehensive study has been conducted to examine the effects of the smart city approach on the life quality of citizens in Fooladshahr, and there is a need for a comprehensive study that focuses on revision and special attention to procedural dimensions and indices. Therefore, by considering all the factors of smart city, we studied its effects on the environmental quality and improvement of residents' comfort level with an urbanization perspective and showed that using smart city policies can help to improve the life quality in environments of urban neighborhoods in Fooladshahr.

Conclusion

The results of this project showed that using the capacity and capabilities available in the smart city approach can help to improve the quality of residential environments. To have a smart city, having a smart municipality and assisting the implementation of the designated plans are very important because the municipality is the best trustee to implement the concept of smart city. One of the ways of achieving this is the informatic understanding, including the informatic understanding of the current state of each metropolis in the fields of software, hardware, network, and human resources and the process of ICT changes in the relevant municipality. This understanding is accomplished

by two approaches; the first approach is the study and modeling of the main goals and tasks of the ICT organization and the current support processes, and the second approach is the examination of the informatic state and extent of ICT use in municipalities. In the documentary on this stage, the current informatic state in each municipality in the fields of software, hardware, network, website, internet services, and information security are documented to some extent.The challenges in a smart municipality can include ICT infrastructures, the integration of systems in the municipality, a proper and reliable statistical system, and the culture of using information technology and electronic (web-based) information and services by the public.

Keyword: Smart city, environmental quality of neighborhoods, urban infrastructure, systematic approach

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References
Persian Refrences:

- Sadeghi, Saeed, (2022), Investigating the Components of Smart City in Improving the Quality of Urban Life. (Study city: Babolsar), Iran Urbanization Magazine, 5(8), 69-82

- Dehghani, Mostafa, (2019),New approaches in urban planning , 22.

- Reza zade, Razieh. Abbas zadegan, Mostafa, (2008), Urban Designing, 38.

- Omidvar, Kamal, Biranvand zade, Mayam, (2009), "How the urban structure can affect the stability of the city in terms of air quality "Sepeh Scientific-Technical Journal, Geographical Organization of the Ministry of Defense and Armed Forces,(18) 71, 57-71.

- Behzadfar, Mostafa, (2003), Necessity and obstacles of smart city in Iran, fine arts, (15), 14-27.

- Biranvandzadeh, Maryam (2009). Feasibility of revitalization and organization of the old fabric of Khorramabad city. Master thesis, Yazd University.

- Jadid, Shahram (2011) Alireza Zakriazadeh, Smart Networks, first edition.

Latin Refrences:

- Toppeta, D., 2010, The Smart City Vision: How Innovation and ICT Can Build Smart, "liveable", Sustainable Cities." Think Innovation,.

- Lynch, Kevin, (1997), The Image of the City,52.

- Dixon, Michael J., 2012, How Smart Cities save Money (and the Planet), Harvard Business Review. HBR Blog Network.

- Jane Jacobs. (2009). Death and life of big American cities. Tehran: University of Tehran Printing and Publishing Institute.32-33

- Vanpoll,(1997), Regression Analysis, 30-46.

- Dunlop, H., 2012, The Role of ITC in Creating a Low-carbon City Region Economy, GE in Leeds City – UK,

- Ferraro S, 2014, Smart Cities, Analysis of a Strategic Plan Alessandra Bonol, CORRELATORE: Doct. Markus Helfert, Anno Accademico 20011/12, Sessione III

- Florida R. 2002, the rise of the creative class: and how it's transforming work, leisure, Community and everyday life, New York City, New York, Basic Books.

- Fujisu, 2012, Making Secure, Prosperous Society a Reality, Fujitsu, Web. Last Accessed 9 Feb. 2014. http://www.fujitsu.com/global/about/responsibility/feature/2012/smartcity/
- IBM, 2013, IBM's Smarter Cities Challenge, IBM Corporation, July 2013. Web. Last Accessed 9 Feb. 2014Report.pdf.
- IBM, 2014, India Needs Sustainable Cities, IBM SMARTER PLANET, Web. Last Accessed 6 Feb. 2014. http://www.ibm.com/smarterplanet/in/en/sustainable_cities/ideas/.
- Nijkamp P., Lombardi P., Giordano S., Caragliu A., Del Bo C., Deakin M., Kourtit K., 2011, An Advanced Triple-Helix Network Model for Smart Cities performance, Research Memorandum, 2011-45.
- Oracle, 2014, Solutions for Smart Cities, Oracle, Web. Last Accessed 9 Feb. 2014. http://www.oracle.com/us/ industries/public-sector/smart-cities.htm.
- Bradford's City Park, winner of the Academy of Urbanism's "Great Place" award for 2013

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