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ASSESSMENT OF SMARTING IMPACT IN URBAN SERVICES IN THE INFORMATION AGE FOR DEVELOPING A SUSTAINABLE CITY

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ABSTRACT
Cities are at the highest level as the manifestation of a new form of life in the age of communication and the fourth wave, which is interpreted as a virtual movement, and the maximum concentration of social and economic services Therefore, it is necessary to find new serving methods and technologies. IT is one of the most important strategic tools in the management and administration of human beings. Cities are the major contexts, for the use of IT applications. With growing urbanization and its complications and considering the consequences of modernization and industry on urban life, attending the innovative and intelligent components, which is one of the most important priorities for planners and policy- makers, is essential. In Citizen Relationship Management, the main objective is to understand the needs and demands of citizens and to make efforts to improve services and increase their satisfaction level. This paper presents an Assessment of smarting impact of Urban Services in the Information Age for the development of a sustainable city in zone 2 of Tehran municipality, and seeks to consider the impact of smart urban services on quality of life in cities and what positive and negative consequences this process will have. In this regard, the reduction in environmental pollution, the use of fossil fuels, costs, waste of time, and the trips within cities are considered as positive results and difficulty of using electronic means, lack of access to information technology tools, less security and pressure on networking infrastructure can be considered as negative results. The population of this research includes residents of Zone 2, in Tehran. In this study descriptive, inferential method, Chi-Square test and Pearson correlation coefficient were used. The results showed that the hypotheses of this study were approved and smart urban services in Iran have been improving the quality of life for the residents of Zone 2. The results indicated the benefits and advantages of electronic processes in the field of civil services to promote the advancement of human welfare in a city like Tehran and will be considered protection of resources and the environment. These activities reflect the principles of sustainable development for the purpose of reducing the environmental and ecological issues in cities, which strengthen and enhance a sense of active citizenship participation in urban management.

Keywords: Virtual Movement, Information Technology, Strategic Tool, the Smart Areas, Sustainable Development

INTRODUCTION
With increasing human population, cities were consequently populated and for this reason, the construction increased and cities and towns were enlarged up and many cities became the metropolis. Thus, the necessity of the proposed institutional management of municipal affairs was noticed. The institution which is known as the city hall became one of the most strategic points of the city. With the advent of information technology in human life, it entered a new phase (Mohammadi, 2010)

Cities,as the origin of human civilization, have always been of interest to theorists of different science. Complex environment of the city has forced thoughtful people to escape from the problems and deficiencies in reaching exalted idea of the reform and development of new urban structures. In the third millennium, information technology is induced as the main axis of the development of world order and the achievements are so involved with the people's lives that the lack of attention to it creates the great confusion in society and people's welfare. Modern information and communication technologies play a key role in the economic, social and political factors that cannot be ignored (Kiani, 2011).

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The city as a living organism and dynamic system in the development of human societies has undergone major changes as a source of scientific developments in its growth process. Today, the electronic city idea with an emphasis on creating virtual environments by taking advantage of advances in information technology and geographic information systems (GIS), is interested by managers and urban theorists. In this regard, electronic and managerial role is very important in the optimal future growth of the city with the combination of remote sensing data (Molazadehand, 2009).

The concept of smart city implies structures, systems and identity of oases to which telecommunications technology gives life. In these biological complexes, communication and common activities are mainly virtualized. Consequently, the form of geometric forms and spaces, find new perceptions and concepts. Urban planners and designers, are not only faced with new things and phenomena in the process of building, especially designed residential neighborhoods and the network of roads and public places, but they are also making progress to virtualized the framework of the process (Behzadfar, 2003).

Restoring the size and direction of urban development is done by strategic planning and designing, based on modern methods and technological world. Planning and designing strategies based on the new generation of mobile communications and broadband network is based on the fourth generation (LTE) centralized integrated information system and intelligent infrastructure utilities (Wu, 2007).

The biggest challenges to electronic participation in cities in developing countries are, respectively, poor infrastructure, lack of knowledge of cyberspace, the problems of inconsistency and lack of preparedness of organizations providing services in urban areas and network security issues (Bailey and Ngwenyama, 2011).

Establishment and development of electronic and interactive services in urban municipalities will bring numerous benefits in the field of urban management. According to the policies of strengthening the powers of the municipalities in the areas of administration and objectives of the central district and neighborhood -oriented urban management, the municipalities' key role and the need for a comprehensive and strategic planning to establish and develop interactive services in the electronics municipality can be realized (NejadJavadipoor, 2008).

Evaluation and modification of electronic services in cities is a structured method which including the continuous assessment, reform Feedback, electronic infrastructure readiness, administrative cooperation and willingness of citizens are the main elements of assessment and timely correction of electronic services in cities (Pazalos, 2012).

The effects of applying electronic municipalities, adopting and implementing appropriate strategies in transportation area is one of the most important factors in improving urban sustainable development. Thus, by using the general model of strategic management and implementation of elements, concepts and theories of this management approach, we can provide a practical approach about management of the transport network to act especially in times of disaster (Pak, 2009).

The importance of using new technologies in the field of civil service and the move towards a process referred to as smart service activities is of great importance in metropolitan cities, especially in a city like Tehran, where the population has grown sharply in the past two decades, and physical development of the city has imposed many problems to its residents. The present study seeks to review the consequences of intelligent utilities on the lives of the citizens of District 2 in Tehran and to answer this basic question whether desirable smart utilities improve the quality of life of citizens or not.

Research Objectives

- Evaluation of the positive and negative impacts of smart utilities on citizens' lives
- Evaluation of the Barriers of smart urban services and offering suggestions on improving performance
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MATERIALS AND METHODS

Research Methodology

The method used in the present study is practical based on the nature and objectives and a library and field survey research because data are collected through questionnaires and interviews. In the Descriptive part, the data collection tools include related books, articles, official documents, researches, interviews

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and other writings, as well as information in electronic databases. In the survey part, data are collected through questionnaires and interviews. In order to analyze the data obtained, Chi- square test, and Pearson correlation coefficient were used.

The Region under Study

Zone 2 Municipality of Tehran is mathematically located at the latitude 51 29 35 North and longitude 35 42 26 East. The area is divided into 9 districts and 30 district councils and 14 audit neighborhoods. The main function of the area includes residential - Roads and Highways - landscaping and other uses. Alborz Mountains in the extreme north is the most obvious natural element. The southern slopes of the Alborz Mountains cover urban and rural complexes of Farhzad and Darakeh. Other elements include Farhzad and Darakeh River, Koye Nasr North Hills, Large green spaces such as Pardisan parks and Tarasht Gardens. Much of the construction in the area is done immediately because of the rapid growth in the past two decades, which is still current. The older portion of the region that includes Azadi Street margin goes back to the 40s decade. Farhzad and Darakeh villages in the north and Tarasht in the south of region are among the old settlements of the region which form the historic landscape of the area. The area covers 64 square kilometers, and it is about 10 percent of the total area of Tehran. The population of the region until 2011 is estimated around 650000 people (Municipality Handbook of zone 2, 2010).

Research Model

The pattern and conceptual model of this study are examined for achieving the objectives. The positive and negative implications of intelligent utilities are mentioned in this pattern.
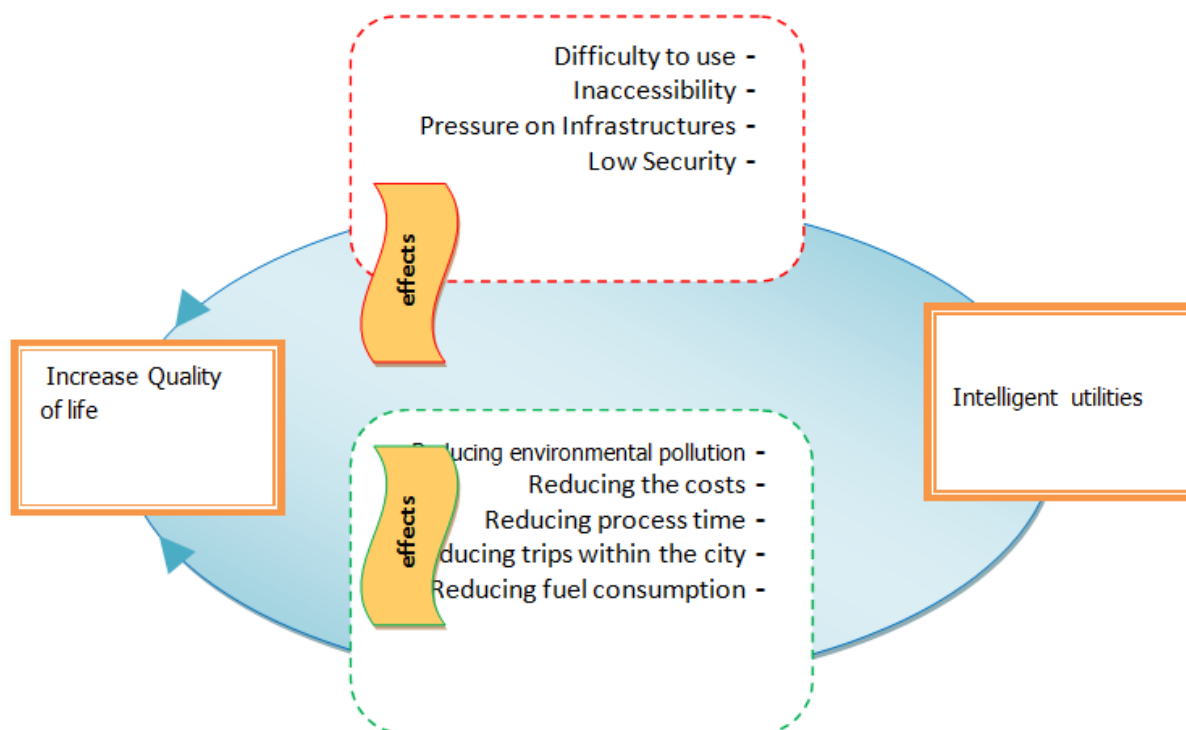

Figure 1: Model of the study (Source: Intelligent ambivalent pattern in developing counties, Atkins and Wallace, 2005)

RESULTS AND DISCUSSION

Research Findings

The population studied consists of a collection of individuals or entities that have at least one common trait. The population of the study, as mentioned in the title, is the inhabitants of the municipality of Tehran zone 2. The population was about 650,000 persons, based on the data provided on Tehran Municipality site in 2011.

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In this paper the positive and negative impacts of intelligent utilities on the quality of life is assessed. The research studies the effect of urban intelligent utilities on environmental pollution, energy consumption, costs, processing time and trips within city, difficulty to use electronic methods, lack of access to information technology tools, security and networking infrastructure.

To achieve this important, the presence or absence of a relationship between these factors, using Chi - square test is measured and then Pearson correlation coefficient is used to obtain the intensity of relationship.

The first sub-hypothesis: Urban intelligent utilities impact on reducing environmental pollution.

To investigate this hypothesis, the chi-square test and Pearson correlation coefficient between the variables in intelligent utilities and environmental pollution is used.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.0101230 and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the first hypothesis is confirmed and there is a significant relationship between urban intelligent services and environmental pollution.

Interpretation of the correlation coefficient: The correlation coefficient between the urban intelligent utilities and environmental pollution equals to 0/245 that with regard to the level of significance 0.000, the correlation coefficient at 0.99 is significant. Correlation values indicate that there is a positive correlation between severities of variables. In other words, the most urban intelligent utilities, the less environmental pollution we will have.

The second sub-hypothesis: Urban intelligent utilities impact on reducing energy consumption.

According to the chi-square test statistic calculated 0.0068 and also due to the level of significance 0.000, we conclude that the relationship is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the second hypothesis is confirmed and there is a significant relationship between the urban intelligent utilities and energy consumption.

Interpretation: The correlation coefficient between the urban intelligent utilities and energy consumption is equal to 0.341 which with regard to the level of significance 0.000, correlation coefficient is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, the more urban intelligent services are, the more energy consumption we will have.

The third sub-hypothesis: Urban intelligent utilities impact on reducing cost.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.0128222and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the third hypothesis is confirmed and there is a significant relationship between urban intelligent services and reducing costs.

Interpretation: The correlation coefficient between the urban intelligent utilities and costs is equal to 0.355which with regard to the level of significance 0.000; correlation coefficient is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, costs will be reduced and it will have a positive impact on reducing.

The fourth sub-hypothesis: Urban intelligent utilities impact on reducing processing time.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.0377and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the fourth hypothesis is confirmed and there is a significant relationship between urban intelligent services and reducing processing time.

Interpretation: The correlation coefficient between the urban intelligent utilities and processing time is equal to 0.455,which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, processing time will be reduced and itwill affect time savings.

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The fifth sub-hypothesis: Urban intelligent utilities impact on reducing trips within the city.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.038856and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the fifth hypothesis is confirmed and there is a significant relationship between urban intelligent services and reducing trips within the city.

Interpretation: The correlation coefficient between the urban intelligent utilities and trips within the city is equal to 0.276, which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, trips within the city will be reduced.

The sixth sub-hypothesis: Urban intelligent utilities impact on difficulty to use electronic methods.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.017573and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the sixth hypothesis is confirmed and there is a significant relationship between urban intelligent services and difficulty to use electronic methods.

Interpretation: The correlation coefficient between the urban intelligent utilities and difficulty to use electronic methods is equal to 0.385,which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, it will be more difficult to use electronic methods and difficulties in using these methods including the lack of adequate familiarity with computer and Internet software will follow.

The seventh sub-hypothesis: Urban intelligent utilities cause lack of access to information technology tools.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.0455and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the seventh hypothesis is confirmed and there is a significant relationship between urban intelligent services and information technology tools.

Interpretation: The correlation coefficient between the urban intelligent utilities and information technology tools is equal to 0.37, which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, due to the intelligent use of information technology tools, the possibility of access to these tools will be less.

The eighth sub-hypothesis: Urban intelligent utilities reduce information security.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.000124and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the eighth hypothesis is confirmed and there is a significant relationship between urban intelligent services and information security.

Interpretation: The correlation coefficient between the urban intelligent utilities and information security is equal to 0.49, which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, information security is reduced.

The ninth sub-hypothesis: Urban intelligent utilities cause pressure on networks infrastructure.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.000101and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the ninth hypothesis is confirmed and there is a significant relationship between urban intelligent services and pressure on networks infrastructure.

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Interpretation: The correlation coefficient between the urban intelligent utilities and networks infrastructure is equal to 0.25, which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, pressure on networks infrastructure will increase.

The tenth sub-hypothesis: Urban intelligent utilities increase quality of life.

Chi-square test interpretation: According to the chi-square test statistic is calculated 0.0068and also, due to the level of significance 0.000 it is concluded that the correlation is significant at the 0.99 confidence because the value of the maximum error is less than 0.05. Therefore the tenth hypothesis is confirmed and there is a significant relationship between urban intelligent services and quality of life.

Interpretation: The correlation coefficient between the urban intelligent utilities and quality of life is equal to 0.35,which with regard to the level of significance 0.000; correlation coefficient, is significant at 0.99. Correlation values indicate that a strong positive correlation exists between the severities of variables. In other words, as the urban intelligent services grow, the quality of life will increase.

Generally in the following table Chi-square and Pearson correlation coefficients, between variables of intelligent utilities and the hypotheses are stated. So, urban intelligent utilities affect reducing energy consumption, reducing processing time, reducing trips within the city, difficulties to use electronic methods, reducing information security, pressure on networks infrastructure and increase in quality of life. And there is a significant relation between these variables and urban intelligent utilities; because the value of the maximum error is less than 0.05. Therefore, all hypotheses are confirmed.

Table 1: Evaluation of Chi- square tests and Pearson correlation coefficient between variables of intelligent utilities and the hypothesis

Research Hypothesis	Value of Chi-square statistics	Pearson correlation coefficient	df	Sig.	Results
Reduction in environmental pollution	0.0101230	0.245	16	0.000	+
Reduction in energy consumption	0.0068	0.341	16	0.000	+
Reduction in costs	0.0128222	0.355	16	0.000	+
Reduction in processing time	0.0377	0.455	16	0.000	+
Reduction in trips within the city	0.038856	0.276	16	0.000	+
Difficulty to use	0.017573	0.385	16	0.000	+
Inaccessibility	0.0455	0.37	16	0.000	+
Information security reduction	0.000124	0.49	16	0.000	+
pressure on networks infrastructure	0.000101	0.25	16	0.000	+
Increase in quality of life	0.30068	0.35	16	0.000	+

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Conclusion

Regarding every city in Iran, given the conditions prevailing in the city, including the geographic, political, cultural, social and economic situations, could be involved in the establishment of the country or city. An electronic city has always had a series of defined administrative models and principles which are determined by specific organizations. Therefore the electronic cities cannot be considered without their orientations; because this is necessary for an electronic city. Overcrowding and congestion of large populations and the difference of night and day population, in cities such as Tehran accompanied by widespread pollution, light, sound , air and space, and the traffic and time, has become the source of choice to alleviate the pain of living in these cities.

The main problem in these cities is population mobility. Population movement, including the movement by the vehicles or the crowded shopping centers and administrative or welfare services in cities are the main causes of urban issues including humanitarian issues or urban accidents in large cities. With the advent of industry, communications, computer and communications network then the Internet connections, a new space came to cities, which is known as virtual city. The advent of virtual cities reduces the moving of the population in real cities. In fact, dividing the atmosphere of the city in real space and virtual space, is a motion control of the urban population, that tries to rationalize the process of moving and provide a calmer and cheaper city with more urban and psychological security for the citizens. In Tehran, by vitalizing urban affairs, many of the problems caused by massive population movement are resolved. According to some estimates, the difference of day and night population in Tehran is nearly three million people or about 700 thousand cars (by counting the cars). By vitalizing the city atmosphere, this difference will be significantly reduced and the movement of urban population is also controlled.

Recommendation of the Study

In the developed world today, the most productivity is gained using updated technology in the city and its components. Recently, various technologies are used in order to provide greater comfort and security and cost savings, especially in energy consumption benefit. Solving the problems to respond to man- made and non-synthetic issues have always been on the agenda of international and regional organizations. Choosing the optimal strategy and review mechanisms should be based on today's scientific developments in order to design the development track and prospects to be based on the future facts. Of course it cannot be said that in order to solve complex problems of cities relying on ICT is merely sufficient, but it is important as one of the possible solutions that places a lot of features in front of, architects, urban planners and designers.

In this study, the following suggestions are offered as practical suggestions:

• Increasing in e-democracy: increasing communication and interaction between authorities and citizens and even citizens with each other and enhancing the capabilities and features of virtual cities speeds up the citizens' interactions in digital municipality to reach a smart city.

• Reducing the digital gap: One of the important measures of Tehran municipality to achieve its vision is to reduce the digital divide in the community. Municipalities can overcome this important with giving facilities to low-income persons and the disabled, and presenting comprehensive information on all sectors of society.

• Advertising, cultural and educational trainings for the citizens to use the portal of the municipality, in order to receive modern urban services.

• Increasing the appropriate information portals at different levels of urban management and continuous updating of the information.

• Partnership with the education section and using researches and studies to evaluate their actions in the field of Information Technology.

• Facilitate and provide the opportunities for commercialization of innovations and researches and the intellectual property protection.

• Development of technologies and systems for information security management to protect information resources against viruses and unauthorized individuals involved in the network.

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