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Research Article

THE THIRD MILLENNIUM ELECTRONIC CITY EMPHASIZING GIS, THE FUNDAMENTAL BASIS OF ELECTRONIC MUNICIPALITY

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ABSTRACT
City is considered to be the source of human civilization, that's why many science theorists have paid lots of attention to it. If we divide the process of human civilization into three revolutions: 1- agricultural 2- industrial and 3- informational, then we can say that these revolutions were the main factors in changing this process. Following development of communication, information and technology as well as globalization and removing the traditional borders and distances, creating the virtual world in cities and providing an efficient sample of electronic city based on the capabilities of Geographical information system (GIS) have been highlighted. Nowadays, electronic city has been noted by urban planners and managers. One of the concepts vastly noted in all societies especially in developed countries is the concept of electronic city, electronic citizen and electronic government. An electronic citizen experiences a new life in an electronic city using the advantages of electronic government, a life which is smooth, modern and highly-rated. When urbanization surpasses urbanism, cities grow fast and citizens enjoy security, welfare and comfort, then urban managers need to utilize information technology and GIS for creating virtual environment and electronic city. This research is to explicate a framework of electronic city as well as defining its goals and advantages through using Geographical Information System' (GIS) capabilities.

Keywords: *Electronic City, Electronic Municipality, Electronic Citizen, GIS*

INTRODUCTION
In the process of developing human societies, scientific changes have an important role in human civilization. After industrial revolution and urban development, many problems have been made in urban environment, so that the feedback of industry and population density have formed the different theories in the fields of science, especially urban science (Pour Mohammad, 2003). Thus, some points of view based on creating virtual environment through technology of information are discussed in the form of electronic teaching, electronic commerce, electronic city and electronic government whose base is using IT capabilities in the form of internet and Geographical Information System (GIS) for providing facilitating services for citizens (Oppenheim, 2006). Projects of electronic municipality have been reinforced by some problems of modern cities such as traffic, air pollution, lack of comfort, waste of time and lack of integrity in services.
The prospect of creating a virtual environment for providing 24 hour services and the need for reducing the costs related to transportation time, incidents and crowd create a model in the form of electronic municipality.

RESULTS AND DISCUSSION
Discussion
Electronic City
The electronic city means the possibility of citizens' access to offices, different required information and city services and facilities for administrative, banking, and welfare affairs through a stable, trustable,

secure and confidential method which is followed by reduction of cost and time and marked with high quality (Jalali, 2001).

The model of electronic city is composed of three general factors whose collaboration leads to creating virtual environment to live an electronic life. Lack of each factor which separately is the main frame of electronic city, can bring electronic city problems. A model of electronic city can include following items: electronic life, electronic organization and electronic government (Jalali, 2005). In fact, an electronic city is where the urban affairs including providing different governmental and private organizations services are done in round-the-clock mode with high security and quality using municipality integrated IT tools which can lead to save of time, resources, facilities and an increase in providing accurate services (Bani Bid Hendi and Mohammad Nezhad, 2006). The birth time of electronic city goes back to the end of 20th century when the world was involved in great events which caused vast changes in people's life system. At that time, human being did his best to improve his life system. That was when internet emerged and internet systems stepped into detailed parts of his life. In past decades, information was transformed to different parts of world using mentioned methods.

(ICT) or the Information and Communication Technology has caused a great revolution in all fields of human life, leading the world moving toward an informational society where knowledge plays a basic role. In modern world, the style of life has changed in developed countries and many of them try to provide a new life style named electronic style for people through a proper culturalization. Information technology can lead to an easier distribution of agricultural products in shorter time, presentation of more agreeable hygiene facilities and transformation of knowledge to different parts in the shortest time, in which it has turned to be a global village through geographical information system and technology development. Therefore, Geographical Information System (GIS) has created some phenomena such as electronic government, electronic socializing, electronic commerce, and electronic city and so on which are one of the most interesting topics in electronic cities.

The electronic city is a city where all citizens' affaires such as governmental and private services are collected in round-the-clock mode, all the week days with better quality and accessibility through using information based on ICT system.

Advantages of Using ICT in City or Electronic City

The most common functions of ICT and electronic city are as follows:

1- Efficient use of time

2-Reduction of stress and life pressure in metropolitans

3-Providing high-quality internet services for citizens, improving their life's conditions and their awareness of urban process

4- Facilitating services and city process

5-Reduction of urban traffic and air pollution due to reduction of commuting time

6-Saving time, an efficient use of energy and basic planning in city

Nowadays, business and other actions are electronically done in electronic cities. Electronic commerce in electronic cities can make businessmen to have international trade communication and absorb a large number of customers in the shortest time. The communication among government, agencies and people is easily done in an electronic city.

You imagine a working day when you waste one hour in traffic, one hour for doing banking operations, two or three hours for buying needed stuff, and then you will have a busy and stressful day, so we can understand that a great part of our life has been wasted just due to repeated work or in long queues. The informational system of electronic city meditation has been created to remove all these problems.

Electronic city is not an innovative invention, its lifelong isn't fragmental, but it is a reality which can have its position based on needs of society and if today we fall behind this technology, then tomorrow we must start with high costs. The electronic city is a way to enter the society of global information and to adapt to the desirable life in global village.

In order to easily understand this subject, we analyze a working day in an electronic city.

When sun rises, you get up and before going out, receive a full report from you electronic secretary about urban systems such as security system, house facilities, traffic, weather conditions. Before contacting with your neighbor, you can connect to various favorite networks and be informed about the most recent news of even the most desolate locations. While leaving the house, you can check house buying system which is able to automatically check house available budget and order the required items, and then after buying, it can pay the costs automatically with no need to go to ATM bank.

Now ready to leave the house as you receive the latest news about traffic and choose the most uncrowded way to get to your workplace and while driving, the electronic secretory can check messages, data, meetings and routines and plan your activities.

In electronic city system, traffic is not that much possible as if a smart traffic controlling system controls traffic letting you spends less time behind traffic light. In addition, cars are equipped with smart system in which there would be the minimum of urban offences. There would be fewer accidents and if in any case it happens your car automatically sends a message to events center. A GPS location defines an accurate image and location of accident, transfers the information of incident to police station and the injured are delivered to hospital in the shortest time. It is interesting to know that when ambulance is on the way to the location, it automatically sends some messages to traffic lights in order not to waste time on the way to hospital; in addition the conditions of the injured are sent to hospital to provide necessary equipment for him.

While going to workplace, Smart entry and exit management system controls your information and register attendance's time when you are busy or have meetings there is no need to leave your workplace. Video conference system records your attendance for all meetings. When you are at rest, smart buying representative can search your stuff based on your own interest and suggest you the best ones to select. There is no need to attend studying location to check the status of courses, course selection and scores, you can also check your children's function of education through site and contact with teachers if needed.

If you decide to go to gas station to fill up your car, you can easily find the nearest gas station using GPS smart system and pay the cost through credit card.

In the case when your car is equipped with system checking gas consumption, it will be able to plan for fueling times.

When you arrive home, everything goes well, the air inside house is automatically adjusted by smart AC system and all things are done based on what it was planned.

You had a busy day in electronic city, did lots of things but didn't get involved in repeated things. Thus, you can spend more time to study, rest, have fun with friends and family members and enjoy your life.

So far, we got familiar with the advantages of GIS and electronic city. Some activities of electronic city are as follows:

1) Banking operations such as withdrawing, depositing, transferring money and a permanent access to it.
2) All administrative operations such as paying taxes, requesting passport, changing driving license.
3) Commercial exchanges such as buying and selling goods.
4) Spiritual activities such as access to favorite music and movies.
5) Amusing activities such as computer games and necessary information for visiting fantastic places.
6) Activities related to hygiene and medicine such as receiving up to date medical information and instructions, the address of medical centers, their facilities and clinics.
7) Activities related to booking ticket, hotel, guests houses and agencies.
8) Receiving daily news and information of different fields.
9) Information related to land agencies regarding buying, selling and renting houses.
10) Scientific activities, easy access to references and new writings, location of libraries.
11) Educational activities of schools, universities and other centers.
12) Political activities such as participating in election and analyzing political problems.
13) Religious programs such as checking praying times.
14) Job-seeking such as checking job opportunities and employment agencies.

15) Other activities such as program adaptation.

Regarding above items and the role of GIS in creating electronic cities, the position of citizens is presented under the title of electronic citizen. Because city has no meaning without citizen. Therefore, if citizens don't get ready to live a life in IT era, then the concept of electronic citizen won't have any meanings. Having electronic citizen is urgent for using more GIS and having an electronic city.

Electronic Citizen

Electronic citizens are those who possess some skills. An electronic citizen must have following abilities according to international standards:

1) Having computer literacy such as basic computer and windows
2) Being familiar with internet and mail
3) Knowing the techniques of searching data in websites
4) Having access to the recent economy, political, weather news
5) Finding goods and needed services from internet
6) Using electronic banking services
7) Receiving services from electronic government
8) Having the ability of trip planning, booking hotel, train or plane ticket
9) Having the ability to protect his family's security from internet harmful effects
10) Paying utilities' bill
11) Working from home and sending the results to the employer
12) Buying daily stuff such as book, CD from internet
13) Being familiar with online forms and knowing how to complete them
14) Receiving the latest medical findings from internet
15) Job-seeking through internet

The Importance of Creating an Electronic Government

The electronic government can emerge through creating an electronic city and citizens. Nowadays, people's expectations have caused government to be responsible for such needs, accordingly people request government to increase communication time, lengthen office working time, and provide high quality but cheaper services. Thus, the only factor which can answer people's request is electronic government. On the other hand, governments compete over different fields such as attracting capital, employment, skillful employees, tourists, etc., consequently they need new facilities which can be provided by electronic government.

The electronic government not only unites itself with society but also lets government focus on resources which are highly needed. It extends the culture of Self service and makes citizens able to help themselves as much as possible and prevent waste of time and costs.

The Features of Electronic Government

The aim of electronic government is providing better, low cost and more efficient services, but because each government establishes the system of electronic government based on the needs of society then we cannot define a certain standard for other features of such government.

The features of electronic government are generally as follows:

1) Being small: the electronic government cannot be that much extended so that it can prevent wasting capital and human forces. Therefore, it is better for extended governments to get divided into smaller and local ones.
2) Moral commitment: the electronic government must observe the informational privacy of citizens and moral commitment.
3) be responsible: the electronic government must be responsible to social, economic and political activities of what it is involved in, so that people can be aware of activities' process.
4) Be answerable: if the activities face problem, the electronic government must be able to answer to people.
5) Transparency: the electronic government must be transparent in matters related to citizens' affairs.

The Advantages of Electronic Government

Until a few years ago, people usually went to different organizations or offices to receive governmental services, but there happened some effective changes following technology and information development. The first step of creating the electronic government was founded through providing service kiosk (similar to what is used in banking network) and in the next steps, personal computers were notable in this matter.

The extension of electronic government clarifies that the most successful governments haven't used 20 percentage of available potentiality.

A quick access to information in governmental organizations is really important. Since administrative processes are usually repetitive, normal and based on principles, using computer can provide managers with unique facilities for on time collecting, controlling and reporting. Due to this matter, organizations started to invest in this field.

The first step in the process of creating an electronic government is the easy usage of information for people and all countries are in common in this matter. Some organizations created electronic collections enriched with different governmental information before creation of global network and they let citizen have access to these information. Todays, most of the organizations in western countries have independent internet site information of which can be hardly available to its organizations.

Challenges and obstacles of electronic government

The main obstacles of developing electronic government in countries can be presented in three items:

A- *Cultural Factors*

The studies show that the first step for extending an electronic government is not technology but the main problem is that whether the culture of society is ready to receive lots of changes or not? At first quick changes affect employees, then some of these employees agree or disagree these changes. On the other hand, people haven't got used to these changes yet and consider them inappropriate. Thus, the society must be clearly convinced that data transferring is secure enough and it perfectly observes people's privacy.

B- *Organizational Factor*

There is no reasonable administrative relation among administrative units due to lack of a proper electronic network and most of organizational managers have got used to this condition.

The method of decision from top to bottom is also involved in this matter.

C- *Lack of Resources*

There are some insufficiencies in establishing electronic government, as in America, a developed country, there is no lack of technology resources but professional human forces whether technically or administratively. Because it is new, there is no experienced force or administration to establish electronic government in society.

Generally speaking, regarding different cultures there are different obstacles on the way of establishing electronic government in different countries.

The Goals of Electronic Municipality

The goals of improving state services in municipality include simplifying the process of issuing permissions and presenting perfect, on time and fast information in a unit form for citizens. We can mention the process of receiving manufacturing license, work finishing document and a document of sport club, commercial tower or historical private building are some examples showing the processes of electronic municipality.

In such cases, urban managers are able to decide quickly through using GIS and GPS and other capabilities such as creating an information bank and fast analyses. Can we minimize the problems of banking operations' traffic, searching to buy and other routines through modeling GIS in an electronic city while leaving the house and going to workplace? Is there any way to overcome problems? Can we comfortably live in cities?

Regarding a comparison between electronic city and traditional one the answer to these questions is obvious. In the model presented for electronic city, we can automatically receive traffic report while

starting our car and choosing the best way to get to workplace. In an electronic city, the traffic is modelized and analyzed by smart controlling traffic systems.

When there is an accident in city, cars automatically send a message to the event center and define the exact location of the accident; when the injured are being transferred to the hospital by ambulance, they send messages to traffic lights in order to have the least stops in the way. The location of disabled, elderly and children is defined by GPS.

In an electronic city, administrative corruption is minimized; administrative corruption is obviously one of the present problems of world in most of the countries and organizations in which it increases as the contact between service providers and receivers increases.

In recent years, many municipalities have moved toward eradication of administrative corruption through Information technology system. In this case, the electronic municipality can minimize the administrative corruption through changing structures, simplifying rules and processes, re-engineering activities, transparency and an effective full-time relation with citizens. Here using other countries' models and experiences such as Korea's "O.P.E.N" can prevent unnecessary delays and avoid services which are unfairly provided (Zarandi, 2007). Robert Goltigar presents a formula for administrative corruption in which there is a direct relation between corruption and discrimination or monopoly and a reversed relation between corruption and answering (Madanchian, 2005).

The Different Steps of Electronic Municipality

In order to apply integrated system and electronic municipality, we must pass different steps. Here we mention Marand municipality where have applied the process of electronic municipality through creating appropriate substructures.

Different steps include:

Phase 1: Foundation

Phase 2: Culturalizaiton including: users' public and professional training, organization's engineering, installing substructures and process' semi-automation

Phase 3: Automation

Phase 4: Electronic commerce and government include: providing citizens and organizations various with services for electronic commerce and government

Phase 1 as the project basis includes the following items:

1- Organizing documents of land agencies

2- Providing numeral maps

3- The current situation of land agency and comparative plans and their adaptation

4- Collecting and matching principles

5- Recognizing and matching principles

GIS substructure of electronic city

GIS and GPS are designed for collecting, storing and analyzing data whose location is an important feature of it. GIS can help planners through simultaneous analysis of spatial and non-spatial (attribute) data. GIS system is a shortcut to planning deadlocks and a new spirit for city modeling. A summary of GIS function in electronic city is presented as follows:

1- Developing spatial data banks (urban and regional) for planning analysis

2- The combination of urban and regional planning models with space technology

3- Development of planning support systems

4- Facilitating public participation in the planning process, for example America's Department of Housing and Urban Development presented a plan named "Community 2000" in which families can place the model of their neighborhood on the map so that other citizens can see the users' changes; therefore, municipality suggests citizens to choose the appropriate plan as they observe the influence of user's change in this pattern (Saremi, 2007).

5- Among GIS other functions, we can refer to network analysis, spatial data analysis, city three dimensional analyses and neighboring, matching and modeling operations.

Conclusions

In an electronic city, GIS capabilities include usage capability, easy access, the ability of fast analysis, adaptability and 24-hour access. Other factors such as cost reduction, easy access, not being limited to time and place and service provision are those which attract urban managers' attention to the model of electronic city and the problems of metropolitan and intermediate cities justify the necessity of virtual environment. Creating a proper substructure, rules engineering and Institutionalizing the culture of urbanism will certainly pave the way to electronic city.

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