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EXAMINATION OF GEOGRAPHIC INFORMATION SYSTEMS AND GEODESIGN TECHNOLOGIES IN URBANIZM STUDIES IN TURKEY

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Abstract

Hijrah, a turning point in terms of Muslims' time and space identifications, has also begun a new process in which perceptions of life. After Hijrah, Yesrib became a city, and a host to the Mohammedi urbanization process. It is possible that Madinah may be the role model of cities because of the reason and scope that it contains. In Islam, the concepts of urban and urbanization have an important meaning with correct ontology. The first condition for the correct definition of property and ownership is that the truth about creatures and things is known in this onthology. If we look to our society to examine the place of the perception of property and ownership in the urban settings, we can see the rapid social change. In this paper the correct ontology on the property is summarized for the understanding of the concepts of urban and urbanization. Meanwhile GIS and Geodesign methodologies, which are important tools of approachs to urban texture, are examined in Turkey under this ontology.

Keywords: Coğrafi Bilgi Sistemleri, Geotasarım, Şehir, Şehirleşme

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Özet

Müslümanların zaman ve mekân algısı açısından bir dönüm noktası olan Hicret müslümanların hayat algısı açısından da yeni bir sürecin başlamasına vesile olmuştur. Hicretten sonra Medine bir şehir olarak Muhammedi anlayışa uygun bir şehirleşmeye ev sahipliği yapmıştır. Medine bu anlamda taşıdığı misyon itibariyle diğer şehirlere rol model olmaktadır. Doğru algıyla bakıldığında İslam'da şehir, şehirli ve şehirleşme kavramları çok önem taşımaktadır. Bu algıda, mülkün ve mülkiyetin doğru tanımlanmasının ilk koşulu, yaratılanlar anlamında eşyanın hakikatının bilinmesidir. Kentsel uygulamlarda mülk ve mülkiyet algısının yerini incelemek için toplumumuza baktığımızda hızlı toplumsal değişimi görebiliriz. Bu anlamda bu bildiride mülkiyete doğru bakış nasıl omalıdır ışığı altında kent kentli ve kentleşme kavramlarına bakış anlatılmıştır. Bunun yanında CBS ve Geotasarım kavramlarının bu anlayış ışığında Türkiye'de nasıl kullanılabileceğine ilişkin uygulamalar anltılmıştır.

Anahtar Kelimeler: Geographical Information Systems, Geodesign, Urban, Urbanization

1. INTRODUCTION

Different civilisations have established their aesthetic and cultural marks on cities based on their acquired ideologies. Since our main point of view is those cities built by Islamic societies, we can note that many good virtues and intellectual activities are produced in these cities, such as science, lore, and decency. In addition, living in a community is of great importance for fertility, trust, solidarity, consultation, awareness building, positive communication and interaction. Human beings can be free and individual may be members of a congregation or an entity. From the outset, life is largely social and people are encouraged to live together. In the Qur'an, many verses emphasise collective living in cities and include warnings and disapproval for those living around cities (Tevbe, 97).

Civilization development criteria are more evident with cities and city life measures. Even though the founders of new cities and civilisations came from villages, deserts or from other civilised societies, they constructed a new culture and civilisation in the cities. The concept of civilisation refers to a developmental phase in terms of cities and societies, and it constitutes an integrity that is different from the physical unity of the homeland. The construction of this integrity began in the urban settlements, and many scientists agree that in the first years of Islam, being an urbanite meant living in the Medina City (Kılıç, 2017). In his book on Medinetü'l Fazilla, Farabi (2001) describes concepts such as the virtuous city, where inhabitants can find peace, happiness and satisfaction. Farabi's *'happiness/satisfied'* concept is important and his idea of '*access to happiness'* mentions creating a vision of a world that aims to achieve happiness in all its cities and that works together as one ideal nation (Farabi, 2001). Surat (verse) al-Fajr (27-30) points out in its verses, that as it is the satisfied people who are invited to heaven, our cities should include environments for those who want happiness and satisfaction. It is also important for the international community to contribute towards achieving this goal, and to consider the impact of globalisation and how to '*think globally and act regionally'*. If the international community really cares about the target of family love and peace, the globalising world should make them reconsider, and ensure that this aim takes precedence over the ambition to earn money (Dundar, 2016).

The islamic civilisation movement began with the advent of Resulullah (Prophet Mohammad peace be upon him-SAV) and the understanding of the faith, the deeds and his communion with ashabah (sincere friends). This movement started in the Medina City and subsequently in the cities of Baghdad, Damascus, Cairo, Kurtuba, Kufe, Basra, Isfahan, Shiraz, Diyarbakir, Cisre, Hasankehf, Tillo, Darende, Konya, Kayseri, Bursa, Ankara and Istanbul. Such cities have become centres of Islamic civilisation, knowledge, wisdom and art. Through the interaction of space and humanity, the people of these cities have improved their environment immeasurably. One of the most important issues to be addressed is the perspectives of these people towards their cities and their environment. Today, Muslim countries are experiencing difficulties achieving their historical backgrounds, because of the

biased perceptions of society. In this sense, this article refers to the ontology and methodology of the "touching" with regard to the city, as to how it should be for us to understand them.

2. POSSESSION/ OWNERSHIP PERCEPTION AND URBANISM

The construction of the correct basis for the concept of the property is clarified in the Qur'an and the Sunnah as explained in Surat (verse) al-Kahf (32-42). The first condition for the correct definition of property and ownership is that the truth about creatures and things is known. For this reason, it is necessary to perceive the fact of Sunnatullah and Tawhid, to feel and acknowledge this fact, and even to experience it at a deeper level.

People who cannot explain and understand concepts such as human, earth, property and ownership, may have spent their lives in different forms of philosophy and management, such as capitalism, communism, socialism with a wrong vision in regards to division of land and property. Because of the misunderstanding of these concepts, this has led to injustice, turbulence and world wars, which prove that Angels were right as told in the Qur'an-Bakara (30), as follows.

> '*And when your lord said to Angels I'll make upon the earth a successive authority they said will you place upon it one who causes corruption therein and sheds blood while we declare your praise and sanctify you.'* This line; *'Indeed I know which you do not know'*,

indicates that the wisdom that God's caliph has the potential to achieve satisfaction, and that the caliph will fulfil this social mission despite the bloodshed (A'raf, 128; Kasas, 83).

Wisdom means the capacity to judge correctly in matters relating to life and conduct, which is not noticed at first glance. It is a hidden cause and unseen knowledge to most people, with a soundness of judgement in the choice of means and ends. In order to achieve wisdom, knowledge has to be applied in the right way, as for most people hidden causes and unseen knowledge prevent them from acting according to the words. Wisdom is usually mentioned in the Qur'an as both "book and wisdom". Wisdom is the knowledge and status that includes the grace to perceive the system and order of Allah, and has been given as a favor to the Nebi, Resul and those selected by Allah. Wisdom is at such a level that only wise men can understand and declare it (Baqarah, 151, 269; Ali imran 58,164). In this sense, Allah (God) is the absolute possessor of property and savings. Mankind is the caliph of Allah, who accepts Allah's offer, and works in the world on his behalf. Mankind who makes preferences using the title of 'caliph' in the name of Allah, are awarded/penalised according to the choices. In brief, mankind is confronted with this verse (Ar Rum, 41) in the face of the forgotten and corrupted perception of trust, which was loaded as caliph.

"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so he may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]" (Ar Rum, 41).

If we look to our society to examine the place of the perception of property and ownership in the urban settings, we can see the rapid social change. First, the expression used for the city administration was the 'şehremaneti/ city-custody' and 'şehremini/city-trustworthy" was also used for city administrators. It is possible to see world traces of mind, which sees cities as a 'trust' as we have mentioned, not to establish a dominance over cities. In other words, 'şehremaneti' is a name that does not forget our perception that "This life is a test, like everything else, cities are entrusted to us, and we can pass through the examination successfully when we behave properly to this trust". It is important that what this term has brought to us is that the administrators should be both well-assured and trustworthy. The changes in the concepts recently attributed to city administrators and city managers (mayor, special provincial administration, council) reflect the forgotten and changing ontology and accompanying perception (Şahin, 2014).

When people imagine a life according to their notions and beliefs, they organise their surroundings accordingly, so Islamic cities emerged as a product of the efforts of the Muslim people to regulate their environment, to realise it to match their knowledge, and to change it in accordance with the evolution in their understanding (Demirci, 2003). In the last 50-60 years, as a result of wrong policies in the world, our mosques and foundation-bedestens have been abandoned in the cities and in different regions of Turkey. They have been transformed into asphalt and concrete masses far from any aesthetic understanding, with increasing exhaust fumes from vehicle traffic, an increase in noise, and high crime rates. These negative transformations are expressed in concepts such as the changed city, the ignored city, the wicked city and the dignified city. (Al Farabi/ Alpharabius). It can be argued that in these new urbanisations, the concept of neighbourhood has not been considered. The prevalence of distorted urbanisations in large cities has turned the people who grew up in such a social environment into 'crude' human forms, as emphasised in the Qur'an. This took place, not just in the big cities, but also in the small cities' settlement areas. For example, Afyonkarahisar, (Turkey) is mentioned by Evliya Çelebi in his Book of Travel (17th Century) when it is said

'There is a spirit in this city and a person will see his heart when he enters this city'.

Today, the Çavuşbaş district of Afyonkarahisar takes 15th place in the country's most dangerous and impenetrable neighbourhoods. In short, in this context, we are faced with the truth of the verse of Rum (41)

> *"Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness]."*

since the forgotten and corrupted sense of trust that is loaded as a caliph. The way of getting rid of this situation is to cognize the correct perception and the revealing of the righteous behaviors, according to that perception, which is recommended and is praiseworthy for believers (Beyyine 7).

In Islam, cities are known to be beautiful, because they are established by an advanced vision based on tewhid, not only in terms of the characteristics of cities related to power, strength and physical possibilities. The beauty of Islamic cities also reflects the beauty of the Sunnatullah rules that were expressed and built by the believers (Dündar, 2015). Pouring concrete does not mean to build cities. The intention behind the building is important and has a meaning. The concept of urban transformation emerges as a tool to intervene in cities and to display a *'righteous deed*. Urban transformation applications need to be applied in the light of this ontology. Unfortunately, when we look at the applications of urban transformation, instead of city planning by reducing density or improving the city landscape, we see increase in the number of vertical structures, the use of concrete and high unearned income (rent). When considered from the point of view that urban transformation practices are a legal tool for good deeds based on the ontology mentioned, the definition of a "*righteous deed*" becomes clear. In this context, a good act-"the righteous deed"- is the reflection of the rules and regulations in the Qur'an and sunnetullah in the form of legislation, laws and regulations that will develop the earth and cities as a result of an awareness of the above mentioned ontology.

3. IMPLEMENTING THE RIGHTEOUS DEEDS: GIVING SPIRIT TO CITIES WITH GIS AND GEODESIGN APPLICATIONS

Urban transformation is an effective tool for physical and social interventions as a means of improving and regulating all types of property that are contrary to the spirit of the city and which contribute to the deterioration of their physical and social structures (Akkar, 2006). Ülger (2010) remarks that comprehensive and integrated strategies are applied in order to improve the social, physical, environmental and economic conditions of collapsed and deteriorating urban spaces, and states that legal possession is arranged according to the new zoning plan data. There was rapid migration to the cities when they became attractive due to industrialisation and economic, educational and business opportunities. Any homogeneity in the social, cultural and economic life of the city was abolished and its incongruities increased. Uncontrolled and unplanned settlements due to immigration make it necessary to re-observe and improve the physical, social and residential conditions of the buildings inhabited by the population of an increasingly differentiated population. Urban

transformation can be regarded as an integral and specific process of land development in the above-mentioned ontology. To develop this process, we need to realise;

- A new law,
- Urban design and development plan change,
- Application methods defined by law,

According to this method, an application regulation describes how to implement urban transformation applications (Ülger, 2010).

Laws, regulations and plans will be developed in relation to the changes and implementation of new methods and the concept of geodesign will be emphasised as a method of applying zonal plan changes. The implementation of the design (the soul to be sought), in urban transformation, requires planning and a consideration of the physical and social parameters related to the city and human life combined.

The parameters include spatial data based on the population structure, distribution, education, health, social, economic and cultural levels. The existing situation must be correctly depicted and modelled, and accurate and coherent zonal plans, immovable values, ownership information, infrastructure, social facilities, etc., must be collected and analysed. Geographic information systems (GIS) are the most effective tools for storing, visualising, analysing and presenting collected spatial data. GIS is a management system and decision support tool in which spatial and attribute data is collected, stored, modelled, analysed and presented to solve space-related problems. The concept of urban/city information systems (CIS) is used for the expression of GIS applications in an urban scale. CIS is used for the storage, analysis and integrated management of the spatial data related to a city to solve spatial problems in an urban dimension (Erdoğan, 2014). In terms of government of Turkey, it has been realised that geographic and urban information systems are a series of tools that facilitate the efficient provision of urban services. Therefore, establishing CIS is also defined in municipal law as a responsibility of city administrators.

GIS is a system used throughout the world for managing information related to geographic space. It automates cartographic processes, presents information layers in map format, and provides visualisations of the earth. Geodesign is also an efficient design and planning tool, and a set of processes with advanced functions for determining, analysing and interpreting all kinds of natural and artificial environmental events. To reveal the human-induced changes in the world requires a methodology that includes planning and design processes, and technologies that integrate them. Geodesign has emerged as the tool to do this. The word '*geodesign'* is formed by the combination of the words 'geo' and 'design', where 'geo' is an abbreviation of the word geographic, and describes the geography and areas of interest that covers everything above the earth's surface, while 'design' refers to the process of making appropriate interventions in relation to the geographical situation. GIS is

used as a platform in "Geodesign" for viewing and superimposing thematic layers on geographical information to determine correct or incorrect results for land use, using the precept of designing with nature. Pioneering work by McHarg helped to establish a significant basis for environmental planning, and for the use of GIS in Geodesign (Akpinar, 2014; Dangermond, 2010). This methodology brings together science, design and technology, offers alternative scenarios for the future, and allows designers to quickly collaborate, evaluate, make decisions and reach conclusions. Dangermond (2010) was one of the first researchers to use geodesign and described it as follows: "Cities are the places where we spend most of our lives. They have become human-made ecosystems, with living and non-living components at the primary level. New approaches to recognise, manage and design cities as living spaces for modern citizens is required. GIS technology is used to manage natural ecosystems throughout the process, including mapping and analysing".

Carl Steinitz is a pioneer of the geodesign approach using a conceptual framework and developing implementation procedures. Along with his colleagues at Harvard University, he has been working in the field of conceptual frameworks, design strategies and techniques for more than 30 years as part of landscape planning studies and the creation of the concept of geodesign. Steinitz emphasises the influence of geography on design, and says that geographical design means geodesigns. He first developed the model known as 'A Framework for Landscape Planning' as 'The Steinitz Framework for GeoDesign' (Steinitz, 2012). This framework is based on the application of six procedures relating to the entire landscape or environmental planning process. When we examine the framework of Steinitz's Geodesign process, the first three procedures involve the process of the assessment of the current situation based on existing geographical conditions, and the first question is how to define the earth/system. This process is carried out by dividing geography into data inventory layers using GIS. The second question is how the geography system works. Here, GIS is used to combine data with the spatial analysis model, which enables the identification of geographic processes. The third question is how to change the geographical system when all factors are considered, and compliance and capacity modelling using GIS helps answer this. The next three procedures involve the intervention process regarding how the environment should be. In other words, how to change the content determined in these procedures, what the potential consequences of such changes are, and whether or not the contents should be changed (Çabuk et al., 2012). The fourth question in the second stage is what alternative scenarios there are in the design of a city's future, and drafts of possibilities must be prepared. Then, the user is asked how the changes will be effected, how the results can be quickly assessed, and how GIS can be used to assess the effects of alternatives. The final decision is made by considering how the geography should be changed. At this point, such issues as politics and values need to be included in the decision-making process. Geodesign incorporates all six stages and provides a fast and adaptable process for system intervention for a more sustainable future (Steinitz, 1995; 2012).

4. CONCLUSION AND RECOMMENDATIONS

Man has always felt the power to dominate himself, others and his surroundings and has used this power at every opportunity. However, it is a matter of debate whether or not the world can really be understood by mankind. When we look at the images that make up the physical appearance of the world's assets, the source of all of them, including man, is soil, and when we look at the earth, we see minerals. What distinguishes man from other beings on earth, however, is the ability to transform himself and nature by using the technology and tools he has invented as 'caliphs'. For this reason, humans are solely responsible for environmental and urban problems. Today, everywhere pollution is caused by human intervenion; groundwater, rivers, seas, lakes, air, water, light, sounds and cities are all polluted. Almost everywhere in the World, and in every living thing, there are traces of industrial chemicals, most of which are toxic. As in every period of history, today man continues to approach nature from his own selfish viewpoint, to further his own life, and there are only a few people with foresight and advanced thoughts who can escape from this way.

Anyone who is perceived everything on earth as being siblings, and saw themselves as vital to the protection of the environment and wildlife from existing and potential problems. Everyone who recognised this association with the natural world developed relations with it that were not dominating. Many scientists and researchers have expressed similar ideas when making spatial decisions, plans and designs, and in every type of relationship between nature and geography, where people are the chief actors who govern the process. Conscious of this, especially after the 1950's, there has been some research into specimens compatible with nature, and the concept of geodesign that was adhered to since the creation of mankind, but forgotten or ignored due to technological developments, is now, since 2000, is mentioned more frequently in planning and design platforms. Geodesign, supported by GIS, is emerging as an important tool in urban applications in order to resurrect and renew the ontology due to the increasing incidence of disasters and urban and environmental problems. Thanks to the technology we have today, it is possible for design to benefit nature and cause less environmental damage. The ontology specified is important in terms of sustaining this understanding using the geodesign methodology. This methodology, proposed by Carl Steinitz, is a recursive methodology involving six stages, in which '*correctness'* is analysed by discussing the previous stage at each stage of the process. Geodesign provides a participatory planning and design approach that considers technology, geographical knowledge and expert knowledge in a controlled manner. These features make assessment easier, promote collaboration, and geo-planning produces a result using a pluralistic approach to planning and design.

In geodesign it is important to be able to relate the entire design environment to other spatial data in the city or geography, to make the necessary analyses and models, to simulate

the effects of the designs, and to manage all these activities in a continuous and updatable manner (Çabuk, 2014). Such a framework is useful in establishing and managing design rules in a design library, and for establishing a more efficient geodesign platform by examining experts from different disciplines within the framework of the library rules understanding.

Recently, cities have experienced the negative effects of global climate change. Inappropriate constructions for disasters such as earthquakes, floods, fires, as well as the degeneracy of the physical, social and residential conditions of buildings, are all caused by the abandonment of the mentioned ontology in our cities. When transforming the urban environment, it is important that physical design and planning is carried out in a healthier manner using geographical information technologies and geodesign methodology processes for a sustainable future. The use of geographical information technologies and the geodesign methodology allow urban decision makers to make better decisions about issues that are relevant to the city in such a way as to reduce the problems caused by urbanisation, as the traditional design model is stagnant. Geodesign has emerged as a planning and design methodology that identifies the physical and social factors through geographical layers using GIS technology that contributes to the development and sustainability of our country.

In summary, the hejira that, as Muslims, we accept as a milestone in terms of identification of time and place, has institutionalised the urbanisation process. For this reason, the Medina City is considered a role model for a city that changed the way people live. 'Şehir'-city is also a name of Resullulah (SAV) should become an eco-system and adhere to good practice in communication, relationships, sustainability, education, culture, health, law, science and technology, enterprise, production and the environment. The city should not only be a place defined by its large population, geography and climate. Belief, education, health and communicationall of which are meaningful to people in terms of justice, accuracy, environment, universality, transparency, updatability and sustainability must be as objective criterias in cities. Cities should be environments in which technology and communication are objects, not subjects, and should be developed by balancing the emotions of 'self' and 'we'. We cannot create a happy and peaceful place for inhabitants if the environment fosters a life style based on a philosophy that prefers one to the other and people who see only 'me' or 'us' and prefer individuality to sociality. All stakeholders in a city, not just human beings, but also the inanimate objects such as stones and soil etc. are part of a happiness orchestra. Foresight is important for those who want to rebuild the earth and for those to smash it. GIS and geodesign methodologies are important tools for preserving cities and humanity in their original pure state and make it possible to appropriately evaluate and measure time and space and to produce data that allows us to make predictions. (This paper was presented as oral presentation in the 6th International GAP Engineering Conference – GAP2018).

REFERENCES

Akkar, Z. M. (2006). Kentsel Dönüşüm Üzerine Batı'daki Kavramlar, Tanımlar, Süreçler ve Türkiye, Planlama, TMMOB Şehir Plancıları Odası Yayını, Sayı:2.

Akpınar, A., (2014). Geodesign: A new Process in Landscape, Turkish Journal of Forestry Türkiye Ormancılık Dergisi, (15): 189-195.

Aslan, Recep. (2017). On Domestic Wildlife and Ecology: A Letter Analysis, Yaban Hayatı ve Ekolojiyi İçselleştirmek Üzerine Bir Mektup Analizi. Dergi Ayrıntı. 4. 19-24.

Çabuk, S. N., Ersoy, M., Çabuk, A., Hocaoğlu, T., (2012). Improve The Planet: Geodesign and GIS. 6. Mühendislik Ölçmeleri Sempozyumu, Afyon.

Çabuk, SN., (2014). Design with GIS: Geodesign, Electronic Journal of Map Technologies 6(1);37-54.

Dangermond, J., (2010). Designing Our Future. In: Esri (Ed.), Changing Geography by Design: Selected Readings in GeoDesign, Esri, Redlands, CA, Redlands, CA: ESRI.

Demirci, M., (2003). İslam'da Şehir Ve Şehrin Sosyal Dinamikleri, İstem, Yıl:1, Sayı:2, 129-146.

Dündar Y., (2015). Happinies Management, ISBN: 978-605-87210-9-8

Dündar Y., (2016). Are You God, ISBN: 978-605-88309-8-1

Erdoğan, S., (2014). Computer Aided Mapping and Geographical Information Systems, Afyonkarahisar Press.

Fârâbî, (2001). el-Medinetü'l Fâzıla, Millî Eğitim Bakanlığı Yayınları: 1152 Bilim Ve Kültür Eserleri Dizisi: 280.

Kılıç, ME., (2017). City or Village? 16 Nisan 2017, Yenişafak.

Steinitz, C., (1995). A Framework for Landscape Planning Practice and Education. Process Architecture, 127.

Steinitz, C., (2012). A Framework for Geodesign: Changing Geography by Design. Esri Press.

Şahin, Y., (2014). "Belediye Başkanı'ndan"Şehrin Emini"ne Şehir ve Düşünce, (4) 34-38.

Ülger, N. E., (2010). "Türkiye'de Arsa Düzenlemeleri ve Kentsel Dönüşüm", Nobel Yayınları, Ankara.