MASS VALUATION ACTIVITIES CONDUCTED BY GENERAL DIRECTORATE OF LAND REGISTRY AND CADASTRE IN TURKEY

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ABSTRACT

This is a summary on the paper on mass valuation activities conducted by General directorate of Land Registry and Cadastre (TKGM) with the support of International Bank for Reconstruction and Development in Turkey within the scope of the Property Valuation component of Land Registry and Cadastre Modernization Project. Mass valuation is as "Mass appraisal is the process of valuing a group of properties as of a given date and using common data, standardized methods, and statistical testing" by the International Association of Assessing Officers (Standard on Mass Appraisal of Real Property 2013). Mass valuation implementations are realized for various purposes in the world, the aim of this project is a pilot implementation in two chosen municipalities for mass valuation with taxation purpose and policy development on this issue. In this study, mass valuation process is explained in terms of its objectives, preparatory studies (such as pilot area selection, preparation of reports on mass valuation especially for capacity building since this kind of valuation is made for the first time in Republic of Turkey), data assembly studies, model building activities, how to deal with various challenges and making conclusions through the necessary comparisons.

Key Words: mass valuation, property valuation for taxation, Turkey

ÖZET

Bu bildiri Dünya Bankası tarafından desteklenen Tapu ve Kadastro Modernizasyon Projesi Gayrimenkul Değerleme bileşeni kapsamında yürütülen küme değerleme faaliyetlerinden oluşmaktadır. Küme değerleme uygulamaları dünyada çeşitli amaçlar için gerçekleştirilmekte olup, bizim bu projedeki amacımız seçilen iki belediyede vergilendirme ve bu konuda politika geliştirmedir. Bu çalışmada, küme değerleme süreci, hazırlık çalışmaları (pilot bölge belirlenmesi, bu tür değerleme Türkiye Cumhuriyeti'nde ilk kez yapılacağından kapasite geliştirme için küme değerleme raporlarının hazırlanması vb.), veri derleme çalışmaları, model oluşturma faaliyetleri ve çeşitli zorlukların nasıl aşılacağı bakımından açıklanmıştır.

INTRODUCTION

The agreement, concerning the loan valued at 135.000.000.000 Euro, signed between the Republic of Turkey and International Bank for Reconstruction and Development on June 9, 2008, for financing of the Land Registry and Cadastre Modernization Project (TKMP) to be

applied by the General Directorate of Land Registry and Cadastre (TKGM), the Ministry of Public Works and Settlement in order to increase the efficiency and quality of the land registry and cadastral services, was entered into force by publishing on the Official Journal no 26956 and dated 03/08/2008.

The Project consists of the following parts:

1. Cadastre and Land Registry Renovation and Updating
2. Improved Service Delivery
3. Human Resources and Institutional Development
4. Property Valuation
5. Project Management

In this study, activities carried out by TKGM in the scope of the fourth component "Property Valuation" will be explained and evaluated the results of the this component.

Within the property valuation component, it is aimed to submit knowledge to the decision-makers with regard to the real estate valuation activities in our country in order to develop the country policy concerning this subject, by underlying the need for changes in the governing structure, establishing the standards in the valuation studies conducted for various purposes and also a database in which the valuation studies are kept centrally.

The Project Appraisal Document-PAD no. 43174-TR and dated 07/04/2008, prepared for the TKMP by the World Bank Sustainable Development Department is the first document prepared after the feasibility report of the project. The objects of the real estate valuation component were specified according to the survey study-report themed "mass valuation" published in 2002 by the United Nations Economic Commission for Europe (UNECE Report 2002). It is highlighted in the PAD that there are some deficiencies in the institutional structuring, professional capacity and standards except for the valuation studies conducted pursuant to the Capital Markets Law. In this document, the Real Estate Valuation Component was divided into 3 sub-components indicated in the Loan Agreement as follows:

1. Policy Development
2. Pilot Implementation
3. Capacity Building (www.woldbank.org.tr, 2008).

The objectives of these sub-components defined concerning the "Property Valuation Component" were listed in the loan agreement as follows:

1. Development of policy and institutional options for property valuation function in the Republic of Turkey consistent with the European practices.
2. Development of guidelines and piloting of mass property valuation for local property taxation in two selected municipalities.
3. Provision of training for the development of core capacities for property valuation within TKGM and other central government agencies and in the municipal governments, carrying out seminars and workshops, and postgraduate training of selected individuals from government and stakeholder agencies and selected universities (www.woldbank.org.tr, 2008).

In this project, mass valuation is realized for residential properties and for lands without improvements.

PREPARATORY STUDIES

3 main activities were realized to achieve the objectives of property valuation component:

Pilot Area Selection

TKGM valuation team started the pilot area selection studies at the beginning of 2012. In the Project Appraisal Document (PAD) the selection criteria were specified as follows;

- The municipalities are willing to cooperate,
- Including the different real estate types as urban and rural,
- Availability of an active real estate market,
- Presence of the renewed cadastral data,
- Including the data concerning the land use and building.

It was decided by the TKGM administration to be performed one of the pilot applications in Istanbul and the other in Ankara. The pilot areas were specified as Fatih Municipality in Istanbul and Mamak Municipality in Ankara.

Fatih Municipality has a comprehensive urban information system presenting detailed information via e-government gateway and websites, won awards in several competitions and this had an importance in selecting Fatih as pilot area. In addition, a wide variety of real estate types such as urban transformation areas, old and new buildings for residential purpose, various commercial properties, public buildings, historical structures are available in Fatih Municipality.

Mamak Municipality presents the scanned samples of a part of the zoning archive documents to all users' open access within the urban information system. For this reason, it was thought that the data collection studies could be easily realized in Mamak. The sales mobility belonging to the last 4 years in Fatih and Mamak was looked during the pilot area selection and the relevant information are shown in Figure 3 and Figure 4 (TKGM 2013).

Figure 1: Fatih Municipality

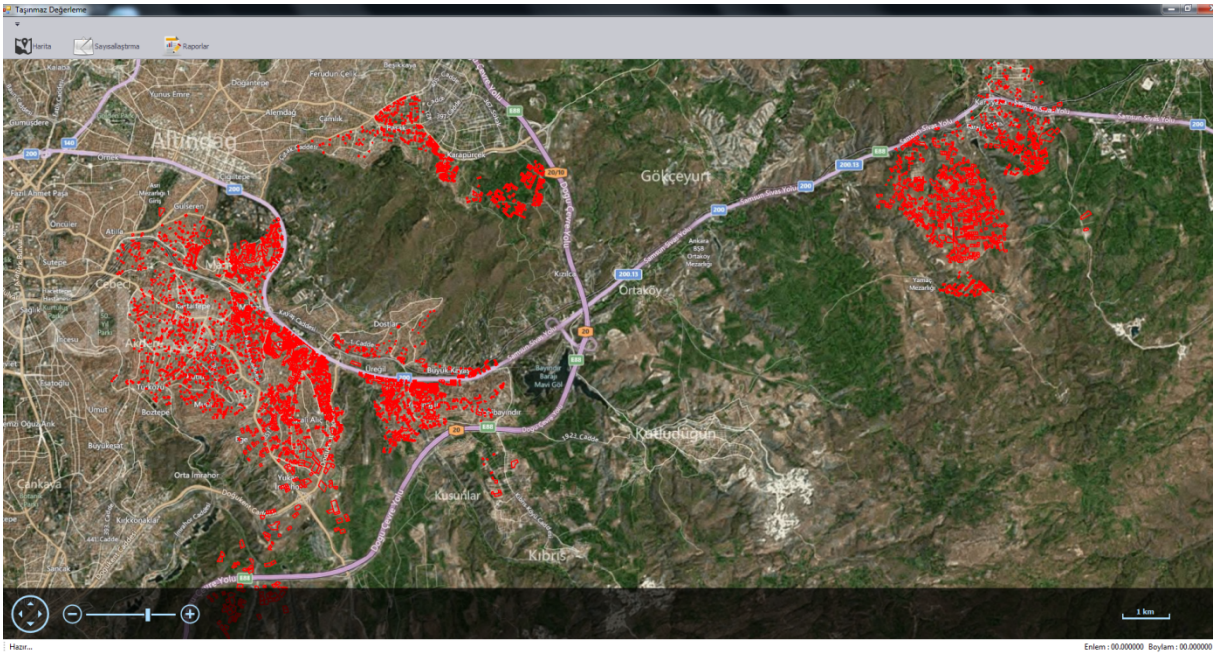

Figure 2: Mamak Municipality

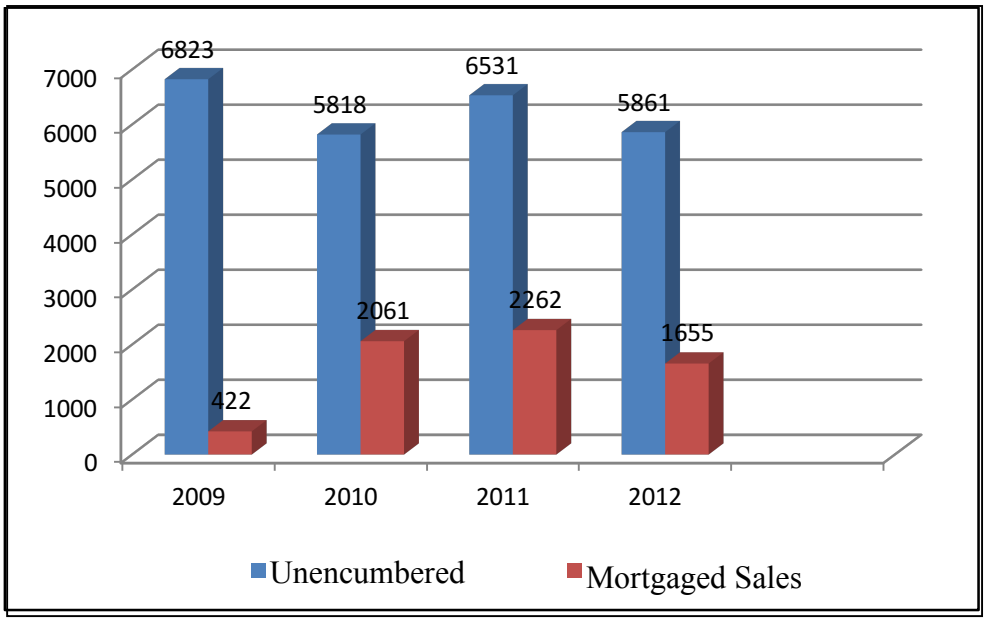

Figure 3: Sales Volume in Fatih

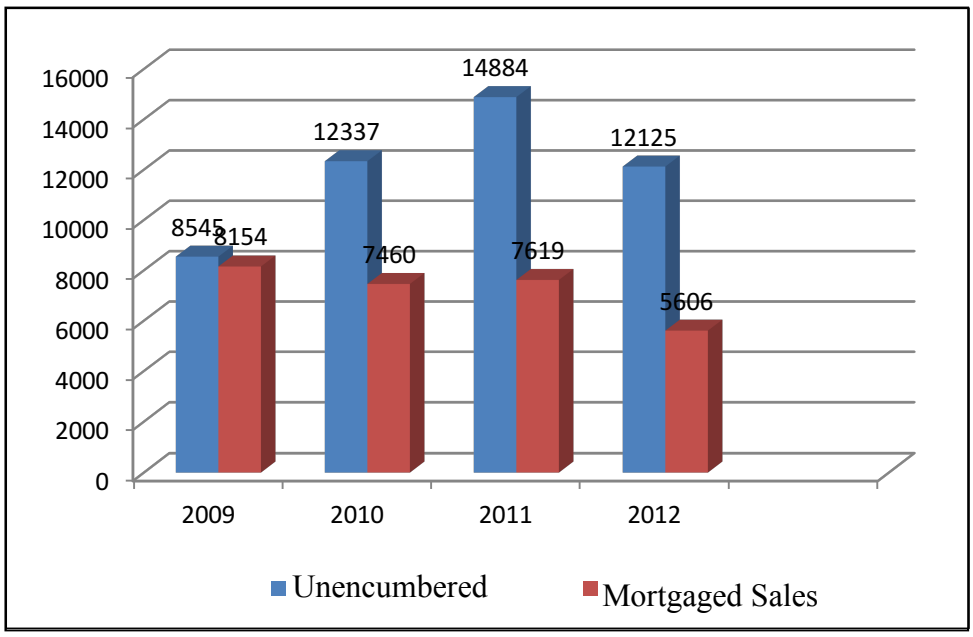

Figure 4: Sales Volume in Mamak

The protocols on data sharing were signed with Fatih and Mamak municipalities in the mid of 2013.

Recruitment of International Consultants

Due to the fact that the mass real estate valuation studies for taxation purpose will be institutionally realized for the first time in our country within the scope of this project, two international consultants were recruited (Richard Almy from USA and Aivar Tomson from Estonia).

Reports prepared within the scope of the component

In 2011, following reports prepared by favour of the commissions within the scope of the component:

- Determination of the Parameters and Standard Building Commission Report
- Setting Parameters and Standards Committee Report
- Building Legal Infrastructure Committee Report

In addition, some other reports prepared in order to support especially the pilot implementation studies.
TKGM Valuation Unit staff made a study visit to Finland and Estonia to see their mass valuation systems and to get benefits their experiences. At the end of this visit a comprehensive report was prepared.

A detailed pilot action report was prepared by TKGM staff in collaboration with international consultants to determine the road map of pilot studies step by step.

Since such a comprehensive pilot implementation as it was expected includes various risks and challenges, a risk assessment report was prepared to indicate the risks to be probably faced during the pilot, their impacts and solution offers for them.

As mass valuation is based on statistical analyses and modelling activities, data is one of the core elements of the implementation and data accuracy and reliability are the key issues of data management. For this reason the data quality control report was prepared for the purpose of the control of the data accuracy and consistency which were delivered to the Administration by the contractors in consequence of the data collection work in pilot.

Since mass valuation is realized for the first time in Turkey, experienced staff or knowledge on this issue was not sufficient enough. It is clear that mass valuation needs various disciplines to work cooperatively, such as cadastre, statistics, taxation, law, valuation, GIS etc. Relevant literature was reviewed comprehensively and a literature review report was prepared.

DATA NEEDS

The mass valuation is defined by the International Association of Assessing Officers – IAAO located in the USA as "Mass appraisal is the systematic appraisal of grouped properties using standardized procedures and statistical testing" (Standard on Mass Appraisal of Real Property, 2013).

In order to be performed mass valuation by using the statistical methods, first of all, it is necessary that the variables to be used in the analyses to be determined completely and correctly in the selected pilot areas.

Indicators of Value

In general, values of the real estates, recorded during the transactions at Land Registry Directorates, are not the real sales prices and moreover they are below of them. Although it is compulsory according to the Charges Law no 492 that the seller and buyer declare the realized price information while the fee amount to be paid in the sale transaction is calculated, due to the fact that the rule of indicating the value based on the real estate tax as the lower limit to be declared, the current value of the real estate is generally declared as the purchase and sale price. In addition to this, although the realized price is equal to the recorded price in the sales realized by decree of court, it doesn't reflect the market value. The recorded value may be different from the market value in situations such as joint-sales or the sale of the real estates located in protected areas, for the reasons such as pre-emption right or exemption from charge. Because of these and similar reasons, an important problem was aroused: What sources will correct and reliable value/price information be obtained from?

While literature review report was preparing, it was understood when faced with similar situations in some other countries, property values are obtained from various sources such as valuation reports prepared for mortgage loans or several field works like asking price; however it was observed that most of the countries try to form databases in which the price information can be kept correctly.

Because of the reasons mentioned above, following sources were used as the indicators of value in property valuation component:

1. Pursuant to the capital market legislation, the real estate valuation companies, in the list of the Capital Markets Board, generate annually about 700.000 valuation reports, most of them are generated for the mortgage financing system. Valuation reports prepared in Fatih and Mamak between 2011-2013 2011 were requested from the Appraisers Association of Turkey (TDUB) in order to be analyzed and used as the dependent variable in mass valuation after some corrections. Due to the fact that there is not a database in which the valuation report information are kept centrally, The Board of Directors of TDUB requested from the member companies a certain number of valuation reports, and then the collected data were sent to TKGM.
2. A survey study was made in Fatih and Mamak Land Registry Directorates and the real prices was asked to the sellers/buyers during the transactions by informing their declarations would be used for the project, not for any official purposes.
3. Asking price

Data Sources for Independent Variables

Due to the fact the mass valuation study conducted within the TKMP Property Valuation component is a "Pilot Implementation", all the factors were tried to be considered and collected the data from different sources for each variable. While deciding what dependent variables should be included, sources listed below were reviewed for this purpose :

- Determination of the Parameters and Standard Building Commission Report
- Valuation reports
- International standards concerning mass valuation
- International mass valuation implementations
- Academic studies
- Field work
- Questionnaires at several symposiums
- Variables in the advertisements of real estate agencies

Data concerning the independent variables for the properties selected in the pilot implementation areas were obtained mainly from TAKBIS (Land Registry and Cadastre Information System), Land Registry Offices, and Municipalities and also from the field.

Independent variables were collected with the data collection forms titled as below :

- Form A- TAKBIS Information- Definitive Data (Cover Form)
- Form B- Parcel Detail-Parcel Zoning Detail
- Form C- Distances
- Form D- Structure Detail
- Form E- Individual Unit Detail.

While data collection forms filled out, some information was obtained from archives of the relevant municipalities and land registry offices and also from the field. Needed documents, considering data for independent variables, were scanned in the archives and photos of the

properties were taken from different angles. By visiting all the parcels, data was controlled on the field by comparing the current situations and official records.

Form C wasn't used for data collection since all the distances were calculated via GIS.

Data was collected through the paper forms (via GIS for Form C), entered the data collected into the digitizing tables, and smartened the digitizing tables as to be kept together with the data collected. The smartening studies performed by the contractor were mostly realized to as the updating of the database.

Although nearly 80 different attribute information of the properties was collected and digitised, some data was not used in the modelling studies since they were descriptive information for the related properties, whereas the others were collected for the purposes of collecting all of the information as much as possible about the properties, ensuring the consistency and accuracy for the difficulties encountered during the collection thereof and the information collected and providing information that may be needed in other possible studies during the application due to the fact that the project was a pilot application.

Data Assembly

It was planned to carry out the data collection, analysis, modelling, rate study and information system formation work steps within the scope of only one tender in the first planning of the pilot application to be realized within the scope of the Real Estate Valuation Component and it was decided to be carried out these studies by the TKGM valuation team in order to be built the institutional capacity in analysis and modelling together with the employment of the international consultant and the international assistant consultant. Thus, it was aimed that the service procurement to be realized for the pilot application is only for data collection and smartening operation and the analysis and modelling studies are performed by the TKGM valuation team. The agreements were signed with both companies at the beginning of October 2013 and data collection was completed in April 2014.

In this project, approximately 2.000 residential properties and 400 lands without improvement were used for model building activities for each pilot area and values of approximately 40.000 properties were estimated with these models. During the data collection studies, a midterm evaluation workshop was held with the participation of universities and stakeholders to get their evaluations and suggestions in Istanbul.

MASS VALUATION MODEL BUILDING APPROACHES

Because of the need to accommodate local circumstances and the many decisions involved, and here is no single approach to model building. Different models can produce equally valid results as long as the statistical tools have been used properly. Moreover, there is an art to modeling, and different modelers may approach a problem somewhat differently based on their experience and preferences. Within the scope of the capacity building, it was decided that model building studies should be realized by TKGM Valuation Unit with the support of consultants.

However Multiple Regression Analysis method, which is most commonly used especially for mass valuation in the world, was planned to be used in studies conducted with respect to the property valuation component; it was determined that the techniques based on especially artificial intelligence applications delivered more successful results than the Multiple Regression Analysis did in the studies conducted. For this reason, the methods used in the pilot application studies conducted in Fatih and Mamak are listed below:

1. Multiple Regression Analysis
2. Artificial Neural Networks
3. Decision Trees
4. Linear Modelling.

Values of the properties were estimated with the models for each method and compared the known values (IOVs). By making statistical tests and ratio analysis, the average estimation success of the models is at around %80. Raito analysis are made according to the (International Association of Assessing Officers) standards- Standard on Ratio Studies and COD (coefficient of dispersion) and PRD (price-related differential) values are in the needed intervals (Standard on Ratio Studies 2013).

Estimated values by using mass valuation methods were compared with the values registered in TAKBIS (If chosen properties were sold in last three years) , which are the declared values by the sellers/buyers during the transactions. These declarations mostly equal to the current value registered at municipalities as stated before. Estimated values by using mass valuation methods were also compared with the tax values registered at municipalities. The comparisons show that; values estimated with models are three times higher in Fatih and two times higher in Mamak than officially registered values.

CONCLUSION

According to the OECD records, rates of taxes taken from real estate to the gross domestic product (GDP) of some member countries are shown below (see Chart 1). Although this rate is under the average rate of OECD countries in Turkey, it is above of the rate in other countries such as Netherlands, Spain, Denmark, UK etc. conducting mass valuation implementations successfully (OECD 2014).

According to the working paper titled “Taxing Immovable Property – Revenue Potential and Implementation Challenges” prepared by IMF, rates of real estate taxes revenue to the GDP is shown below (see Chart 2). In OECD countries, developing and transition countries, and other countries, share of real estate taxes is showing increase in GDP (OECD 2014).

In Turkey, revaluation activities for taxation are carried out by commissions established according to the legislation in every four years. Since the commission members are not professional valuation experts, revaluation rates are determined by multiplying with an unscientific rate with older ones. On the other hand, single property valuation is not convenient for taxation purpose since it is not possible to gain any advantages in terms of time and costs. Therefore, mass valuation studies based on the mathematical models, statistical methods and artificial intelligence algorithms are preferred to calculate the property values in the world recently.

	2005	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Australia	2,6	2,7	2,6	2,2	2,5	2,4	2,3	..
Chile	1,3	1,2	1,1	1,2	0,8	0,7	0,8	0,9
Denmark	1,9	1,9	1,9	2,0	1,9	1,9	1,9	1,8
Finland	1,2	1,1	1,1	1,1	1,1	1,2	1,1	1,2
France	3,4	3,5	3,5	3,3	3,4	3,7	3,7	3,9
Germany	0,9	0,9	0,9	0,9	0,9	0,8	0,9	0,9
Greece	1,3	1,7	1,7	1,8	1,5	1,0	1,8	2,0
Israel	3,3	3,1	3,2	3,1	3,0	3,1	3,1	2,9
Japan	2,6	2,6	2,6	2,7	2,7	2,7	2,8	2,7
Korea	2,9	3,3	3,4	3,2	3,0	2,9	3,0	2,8
Mexico	0,3	0,3	0,3	0,3	0,3	0,3	0,3	..
Netherlands	2,0	1,8	1,8	1,7	1,5	1,5	1,3	..
Spain	3,0	3,2	3,0	2,3	2,0	2,1	1,9	2,0
Switzerland	2,2	2,2	2,2	2,1	2,1	2,1	2,0	2,0
Turkey	*0,8*	*0,9*	*0,9*	*0,9*	*0,9*	*1,1*	*1,1*	*1,2*
UK	4,3	4,5	4,5	4,2	4,2	4,2	4,2	4,2
USA	2,9	3,0	3,0	3,1	3,2	3,1	3,0	3,0
OECD Average	1,9	1,9	1,9	1,8	1,8	1,8	1,8	..

Chart 1: Rates of taxes taken from real estate to the GDP of some OECD countries

	1970s	1980s	1990s	2000s
OECD Countries	1.24	1.31	1.44	2.12
(Number of Countries)	(16)	(18)	(16)	(18)
Developing Countries	0.42	0.36	0.42	0.60
(Number of Countries)	(20)	(27)	(23)	(29)
Transition Countries	0.34	0.59	0.54	0.68
(Number of Countries)	(1)	(4)	(20)	(18)
All Countries	0.77	0.73	0.75	1.04
(Number of Countries)	(37)	(49)	(59)	(65)

Chart 2: Rates of real estate taxes revenue to the GDP

Building the mass valuation system in Turkey will not only provide calculating the property values in parallel with market value, but also it makes property market more transparent.

Mass valuation implementations need a system in which property prices during the transactions have to be registered accurately. On the other hand, official registers at the Land Registry Offices are not real prices because of the buyers/sellers' deceptive statements (apart from the exclusions such as REITs etc.). Besides this, title deed fees are quite high in Turkey.

The basic component of the mass valuation system is value/price information. According to the TAKBIS records, there are approximately 56.2 million parcels and 15.2 million properties (individual units) in Turkey and 2.1 million property transactions were made in 2013. Especially in metropolitan cities, most of the transactions are made through the real estate agencies. As in Netherlands, information such as asking price, accurate price, asking rental, marketing duration etc. can be registered in a database integrated to TAKBİS with the help of voluntary real estate agencies by making them integrated to this system. In addition, every year averagely 700.000 valuation reports are prepared every year by the licensed valuation companies mostly for mortgage purpose. These valuation reports with the property attributes and values should be registered in this same system as well. Thus price/value data from different sources can be registered on a common database and can be used for model building purpose in mass valuation system.

It can be ensured that accurate prices can be declared during the transactions with various incentives such as reducing the title deed fees etc. After the system established, declared values during the transactions can be compared to the estimated values by mass valuation system, and accuracy and consistency tests can be done.

The second component of mass valuation system is property attributes that have effects on property value. In Turkey, information regarding mentioned attributes are registered at several institutions in different formats. Therefore, data regarding these attributes can be provided by data sharing between the institutions.

Third component of mass valuation system is sufficient workforce. Property valuation is accepted as a multidisciplinary science. Mass valuation for taxation purpose should be conducted by full time personnel from various disciplines such as survey/agriculture/civil engineers, city planners, architects, economists, statisticians, data managers etc.

A system for real estate valuation is planned in Medium Term Program of 2014-2017 and 10th Development Plan of Turkey. Mass valuation system will not only increase the success of the real estate valuation for taxation purpose, but also accomplishing the goals stated in Medium Term Program and 10th Development Plan of Turkey will be easier through increasing the quality of the data that the system would need and making possible sharing the data with other parties. Mass valuation, as one of the components of an active and effective real estate management system, will make an important contribution to sustainable development.

Within the scope of this project, the total amount of resources used in the preparation and implementation stages of the pilot implementation was 1.300.000 Turkish Liras. Accordingly, the unit cost in the mass valuation application was nearly 25 TL (if 1 USD is calculated as 2,2 TL, 11.4 USD). As it is stated above, it is thought that unit costs will decrease by increasing the quality of the data and making easier the data sharing. In Turkey recurrent taxes (like real estate tax, environment tax etc.) taken from the properties approximately 3,9 billion Turkish Liras in total (General Directorate of Public Accounts 2013). According to the results of TKMP, it is concluded that without changing real estate tax rates, when tax value will come close up to the market value, this revenue will increase at least 2,5 times.

REFERENCES

General Directorate of Public Accounts, 2013, https://portal.muhasebat.gov.tr/mgmportal/faces/anasayfa?_afrLoop=23744477380756164&_afrWindowMode=0&_adf.ctrl-state=4ax8ejoq5_4, Turkey.

OECD, 2014. http://www.oecd-ilibrary.org/taxation

Standard on Mass Appraisal of Real Property, 2013, International Association of Assessing Officers (IAAO), Kansas City, Missouri, USA

Standard on Ratio Studies, 2013, International Association of Assessing Officers (IAAO), Kansas City, Missouri, USA.

TKGM, General Directorate of Land Registry and Cadastre, 2013, http://uygulamalar.tkgm.gov.tr/ybs/ybs/Tapuistatistik_Arsiv/2013/12_Aralik_2013/TapuIstatistik.htm, Turkey.

UNECE Report, 2002, The Report of Workshop on Mass Valuation Systems of Land (Real Estate) for Taxation Purposes, Committee on Human Settlements, United Nation Economic Commission for Europe, Geneva.

www.worldbank.org/projects/P106284/turkey-land-registration-cadastre-modernization-project?lang=en, 2008, TKMP Loan Agreement.

DETERMINATION OF NOMINAL VALUE BY FUZZY ANALYTIC HIERARCHIC PROCESS WEIGHTS

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ABSTRACT

Although the accurate property appraisal standards have been designated in the developed countries, different research and analyzing studies are performed by developing new methods or correlating existed methods. Today, developing information technologies allow collecting thousands of data in the computers and evaluating them by using various analysis methods. It is not possible to limit the number of the factors that affect the real-estate value definitely. Therefore, a "nominal" value may be created per each real estate by combining the factors affect the real estates based on the areas. Decision makers may find intermittent assessment safer than the assessment, which contain definite values in general. For that reason, in order to represent the blurs in minds and judgments of people in the paired comparisons, verbal assessments should be expressed in blurred figures. Defining the blurred preferences of the people in the problems that contain too many factors, sub-factors and alternatives may be performed by using fuzzy analytic hierarchic process (AHP). Verbal assessments made for the fuzzy AHP may be expresses by triangle fuzzy figures and therefore weights are (w) calculated by basic arithmetic operations. In this study, factor weights that affect the real estate values have been calculated by using fuzzy AHP and multiplied by the factor points of the real estate and thus, nominal value of each real estate have been found. Nominal values obtained have been assessed by Inverse Distance Weighting (IDW) interpolation technique through the ArcGIS program and thus, nominal value maps have been created.

Key words: Nominal value, Fuzzy Analytic Hierarchic Process, Weight

INTRODUCTION

All the people are decision makers, as a basis. Everything people encountered in their lives is the result of some decision taken by either consciously or not. However, information gathered may assist to make good decisions (T. L. Saaty, 2008). Science that solves the decision-making problems encountered in the business managements by using numerical solution method is called as numerical solutions. Numerical solutions, in other words, Operational Research (OR) allows making best decisions in the problems encountered related to using the limited sources (Taha, 1982; Tekin, 2008).

When the assessment of many criterions is the case in a problem of decision-making, such decision-making circumstances are examined under multi-criteria decision-making model (Timor, 2011). As the multi-criteria decision-making techniques allow the assessment of too many criterions and alternatives all together and simultaneously, it provides significant advantages that ease the decision-making accurately when the complex character of the problems encountered during the practice (Baysal and Tecim, 2006). In particular, assessments by using verbal variables lead blurring due to uncertainties in the colloquial language. Decision-making based on the fuzzy figures are important in such blurred situations. Verbal and numeric data may exist together in the assignment of the real estate values and decision should be made based on such data.

Many of the developed countries have formed standard methods for the assessment of the real estates owned. However, developed countries try to develop different approaches related to real estate assessment due to unsteady situation of the real estate development market. Real estate prices are in constant change under the global/local competition and market conditions, appraisers and academicians try to reach certain results by following such changes (Bostancı, 2008). In this study, factor weights that affect the real estate values have been defined by using fuzzy AHP and thus, nominal values have been found.

DETERMINATION OF NOMINAL VALUE

Certainly, it is not possible to limit the number of the factors that affect the real-estate value definitely. In this context, it is hard to assess the value of a real estate definitely, as well. Current value may be the base of the value distribution as well as the values related to one or more variables, which may be obtained by scoring.

Number of the factors that affect the real-estate value cannot be limited definitely. While an assessment operation to be performed on the location basis, a "nominal" value may be created per each real estate by combining the factors that affect the real estate. It may be possible to express the factors that affect the real estate by a numerical variable nominally, depending on the degree of effect of each (*www.yarbis1.yildiz.edu.tr)*.

In this context, nominal value of each real estate may be defined by the [1] equality (Yomralıoğlu, 1993). Such equality represents the total value of each real estate. This equality represents the total value of each real estate. Variable "P" in this formula represents the factors that affect the real estate. “P” is the effect of the factor which the value has been assessed to the real estate. “P” point value may be between 1–10 or 1–100. Each factor affects the value of the real estate in different weights, weight coefficients have been shown as "w" in the [1] formula (Yomralıoğlu et al, 2007).

$$N_i = \sum_{j=1}^{k} (P_{ji} * w_j) \qquad (1)$$

N : *Total nominal value*
P : *Factor value (Point)*
w : *Factor weight*

With this method, it has been aimed to find the specific value of the real estate by using the changes of the factors used in assessment methods based on points as well as the environmental effects (Erbil, 2014).

FUZZY ANALYTIC HIERARCHIC PROCESS (FUZZY AHP)

Fuzzy AHP, which is one of the techniques used to solve the multi-criteria decision-making on the problems, is a multi-criteria fuzzy decision- making method that supports the qualitative and quantitative and sub criterions grant the decision simultaneously. Fuzzy AHP is a suitable approach to the solution of the decision-making problems that contain blur or verbal uncertainty by using fuzzy scales with low, medium and high values. It uses fuzzy groups, affiliation functions and fuzzy figures to obtain the synthesis of relative weights.

While using the method, factors and alternatives have been compared pairwisely and assessments of the people related to the blur or uncertainty have been reflected to the decision process (Öztürk and Başkaya, 2012). Fuzzy importance sclae used in fuzzy AHP is shown in Table 1.

Table 1. Fuzzy importance scale in fuzzy AHP

Pairwise comparison preferences	**Importance scale**	**Correlations of the importance scale**
Equally important	(1,1,1)	(1,1,1)
Intermediate	(1,2,3)	(1/3,1/2,1)
Little more important	(2,3,4)	(1/4,1/3,1/2)
Intermediate	(3,4,5)	(1/5,1/4,1/3)
More important	(4,5,6)	(1/6,1/5,1/4)
Intermediate	(5,6,7)	(1/7,1/6,1/5)
Much more important	(6,7,8)	(1/8,1/7,1/6)
Intermediate	(7,8,9)	(1/9,1/8,1/7)
Highly important	(8,9,9)	(1/9,1/9,1/8)

If, $X = \{x_1,,x_2,\ldots,x_n\}$ criterion (object) group, $U = \{u_1,u_2,\ldots,u_m\}$ aim (target) group. According to the Chang (1992) method, each object is handled to realize an aim. Thus, M widened analysis value matrix is obtained by using pairwise comparison, which are as follows:

$$M_{g_i}^1, M_{g_i}^2, \ldots, M_{g_i}^m; \quad i = 1,2,\ldots,n$$

M (j = 1,2, ..., m) value parameters are *l, m* and *u,* which are triangle fuzzy figures.

Step 1: Fuzzy artificial greatness value may be described as:

$$S_i = \sum_{j=1}^{m} M_{g_i}^j \otimes \left[\sum_{i=1}^{n} \sum_{j=1}^{m} M_{g_i}^j \right]^{-1} \qquad (2)$$

Step 2: $M_2 = (l_2, m_2, u_2) \geq M_1 = (l_1, m_1, u_1)$ probability level may be described as:

$$V = M_2 \geq M_1 = \begin{cases} 1 & ; \quad eğer\ m_2 \geq m_1 \\ 0 & ; \quad eğer\ l_1 \geq u_2 \\ \dfrac{l_1 - u_2}{(m_2 - u_2)(m_1 - l_1)} & ; \quad diğer\ hallerde \end{cases} \qquad (3)$$

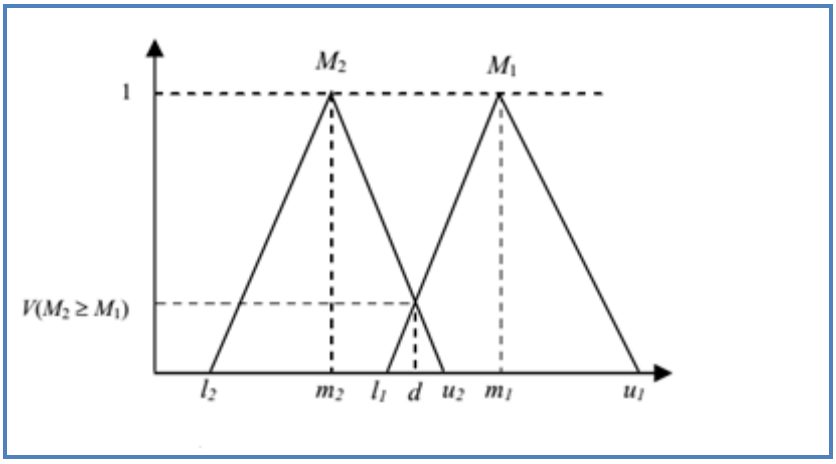

Figure 1. M_1 and M_2 intersection status (Çanlı and Kandakoğlu, 2007)

Step 3: Finding the weight vector,

$$V(M \geq M_1, M_2, ..., M_k) = V[(M \geq M_1) ve (M \geq M_2) ve ... ve (M \geq M_k)$$
$$= \min V(M \geq M_i),\ i = 1, 2, ..., k \qquad (4)$$

Here $k=1,2, ..., n$ and for $k \neq i$

$$d'(A_i) = \min V(S_i \geq S_k) \qquad (5)$$

$$W' = (d'(A_1),\ d'(A_2),\ ...\ , d'(A_n))^T \qquad (6)$$

Step 4: Finding the normalized weight vector

$$W = (d(A_1),\ d(A_2),\ ...\ , d(A_n))^T \qquad (7)$$

May be calculated, W is not a fuzzy figure.

APPLICATION

In order to practice the Nominal Assessment (NA) by using fuzzy AHP, data related to the residential features of 570 apartment houses located at approximately 20 avenues of Melikgazi town, Kayseri city collected in 2 months have been studied. Area of study and the location of the houses have been shown in Figure 2 in point basis.

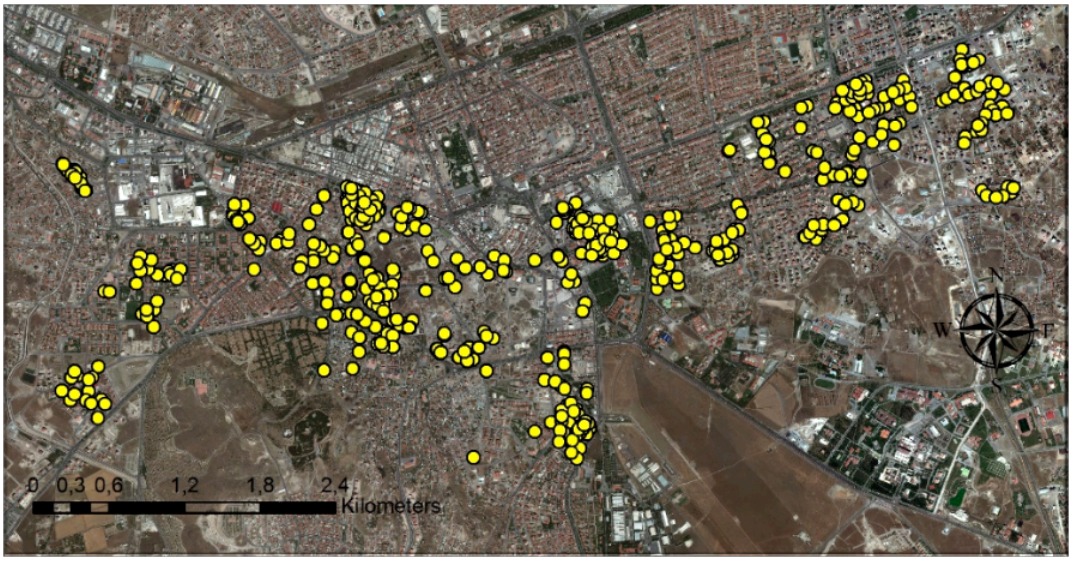

Figure 2. Melikgazi Town, location map of 570 houses

Data related to the houses has been collected under 20 factors. Such factors have been scored by surveying the experienced realtors in Kayseri according to the Importance Scale of Saaty between 1 to 9 and averaged therefore, average factor points have been obtained as shown in Table 2.

Table 2: Factor points according to the Saaty's AHP importance scale

S.N.	Factors	EML.-1	EML.-2	EML.-3	EML.-4	EML.-5	EML.-6	EML.-7	EML.-8	EML.-9	EML.-10	Average
1	Property's date	5	8	8	8	5	8	7	7	8	6	7
2	Property's exterior façade	8	8	7	8	9	9	8	9	9	7	8.2
3	Property's area	7	6	3	8	7	8	7	9	8	1	6.4
4	Number of rooms	5	8	8	8	7	6	8	9	1	1	6.1
5	Number of bathrooms	5	6	1	7	5	3	4	2	5	1	3.9
6	View	8	8	1	7	5	7	9	5	6	7	7.3
7	Whether in the complex	7	3	1	7	9	8	9	7	5	8	6.4
8	Car park	7	3	1	7	8	8	8	5	5	5	5.7
9	Security system	8	3	1	7	5	5	7	9	8	6	5.9
10	Road width of the main entrance	8	5	1	6	5	7	7	8	6	4	5.7
11	Floor of the property	6	6	5	7	7	8	8	8	8	4	6.7
12	Distance to school	8	8	3	6	8	7	6	7	5	3	6.1
13	Construction quality of exterior	9	8	1	8	8	8	9	8	7	5	7.1
14	Heating type	6	8	3	7	8	7	9	9	5	4	6.6
15	Fuel type	6	6	3	7	5	8	8	9	4	4	6
16	Maintenance fee	5	8	1	6	8	8	6	8	3	2	5.5
17	Rental income	9	8	2	7	8	4	7	5	8	8	6.6
18	Distance to the city center	6	6	1	7	8	7	7	7	5	7	6.1
19	Distance to the shopping center	4	3	1	6	8	6	8	6	6	5	5.3
20	Topographical structure of the land	5	3	1	3	5	8	9	5	4	4	4.7

"Fuzzy Importance Scale" shown in table 1 has been applied on the average factor points obtained from the questionnaire average; each factor has been compared pair wisely with the other, then matrix of M values, of which the parameters are *l, m* and *u* as triangle fuzzy figure has been found using Chang's (1992) widened analysis method (Table 3).

Table 3. Matrix of M values of the first 10 factors according to the fuzzy importance scale

		C1			C2			C3			C4			C5			C6			C7			C8			C9			C10		
	Factors	KYAS			KCEPHE			KALAN			ODASAY			BANSAY			MANZARA			SİYON			OTOPARK			GÜVENLİK			BGYOLGEN		
C1	Property's date	1.00	1.00	1.00	0.25	0.33	0.50	1.00	2.00	3.00	1.00	2.00	3.00	4.00	5.00	6.00	1.00	1.00	1.00	1.00	2.00	3.00	2.00	3.00	4.00	2.00	3.00	4.00	3.00	4.00	5.00
C2	Property's exterior façade	2.00	3.00	4.00	1.00	1.00	1.00	3.00	4.00	5.00	3.00	4.00	5.00	5.00	6.00	7.00	2.00	3.00	4.00	3.00	4.00	5.00	4.00	5.00	6.00	3.00	4.00	5.00	4.00	5.00	6.00
C3	Property's area	0.33	0.50	1.00	0.20	0.25	0.33	1.00	1.00	1.00	1.00	1.00	1.00	3.00	4.00	5.00	0.33	0.50	1.00	1.00	1.00	1.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00
C4	Number of rooms	0.33	0.50	1.00	0.20	0.25	0.33	1.00	1.00	1.00	1.00	1.00	1.00	3.00	4.00	5.00	0.33	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	3.00	1.00	2.00	3.00
C5	Number of bathrooms	0.17	0.20	0.25	0.14	0.17	0.20	0.20	0.25	0.33	0.20	0.25	0.33	1.00	1.00	1.00	0.17	0.20	0.25	0.20	0.25	0.33	0.25	0.33	0.50	0.25	0.33	0.50	0.25	0.33	0.50
C6	View	1.00	1.00	1.00	0.25	0.33	0.50	1.00	2.00	3.00	1.00	2.00	3.00	4.00	5.00	6.00	1.00	1.00	1.00	1.00	2.00	3.00	2.00	3.00	4.00	2.00	3.00	4.00	2.00	3.00	4.00
C7	Whether in the complex	0.33	0.50	1.00	0.20	0.25	0.33	1.00	1.00	1.00	1.00	1.00	1.00	3.00	4.00	5.00	0.33	0.50	1.00	1.00	1.00	1.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00
C8	Car park	0.25	0.33	0.50	0.17	0.20	0.25	0.33	0.50	1.00	1.00	1.00	1.00	2.00	3.00	4.00	0.25	0.33	0.50	0.33	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C9	Security system	0.25	0.33	0.50	0.20	0.25	0.33	0.33	0.50	1.00	0.33	0.50	1.00	2.00	3.00	4.00	0.25	0.33	0.50	0.33	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C10	Road width of the main entrance	0.20	0.25	0.33	0.17	0.20	0.25	0.33	0.50	1.00	0.33	0.50	1.00	2.00	3.00	4.00	0.25	0.33	0.50	0.33	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Step 1 has been used in the Chang's (1992) widened analysis method and fuzzy artificial greatness value matrix has been calculated by using equation 2 and Microsoft Excel tables (Table 4)

Table 4. Fuzzy artificial greatness values

Sc1	35,25	50,33	65,50		0,0013	0,0017	0,0024		0,046	0,087	0,157
Sc2	61,00	80,00	99,00		0,0013	0,0017	0,0024		0,079	0,138	0,237
Sc3	20,20	28,75	38,33		0,0013	0,0017	0,0024		0,026	0,049	0,092
Sc4	20,20	27,75	36,33		0,0013	0,0017	0,0024		0,026	0,048	0,087
Sc5	5,13	6,35	8,78		0,0013	0,0017	0,0024		0,007	0,011	0,021
Sc6	32,25	48,33	64,50		0,0013	0,0017	0,0024		0,042	0,083	0,155
Sc7	20,20	28,75	38,33		0,0013	0,0017	0,0024		0,026	0,049	0,092
Sc8	13,25	16,70	22,75		0,0013	0,0017	0,0024		0,017	0,029	0,055
Sc9	12,62	16,25	22,83		0,0013	0,0017	0,0024		0,016	0,028	0,055
Sc10	12,53	16,12	22,58		0,0013	0,0017	0,0024		0,016	0,028	0,054
Sc11	20,87	29,25	38,33		0,0013	0,0017	0,0024		0,027	0,050	0,092
Sc12	20,12	28,58	37,83		0,0013	0,0017	0,0024		0,026	0,049	0,091
Sc13	32,25	48,33	64,50		0,0013	0,0017	0,0024		0,042	0,083	0,155
Sc14	20,20	28,75	38,33		0,0013	0,0017	0,0024		0,026	0,049	0,092
Sc15	19,12	27,58	36,83		0,0013	0,0017	0,0024		0,025	0,047	0,088
Sc16	12,53	16,12	22,58		0,0013	0,0017	0,0024		0,016	0,028	0,054
Sc17	20,20	28,75	38,33		0,0013	0,0017	0,0024		0,026	0,049	0,092
Sc18	20,12	28,58	37,83		0,0013	0,0017	0,0024		0,026	0,049	0,091
Sc19	12,52	16,08	21,83		0,0013	0,0017	0,0024		0,016	0,028	0,052
Sc20	6,70	9,52	15,08	*	0,0013	0,0017	0,0024	=	0,009	0,016	0,036
∑	417,24	580,88	770,45								
1/∑	0,0024	0,0017	0,0013								

Fuzzy artificial greatness values obtained per each factor have been pairwise compared by using the equation 3 and intersection probability of the factors have been calculated (Table 5).

Table 5. Intersection probability of the factors

Factors	$V(M_2 \geq M_1)$	Sc1	Sc2	Sc3	Sc4	Sc5	Sc6	Sc7	Sc8	Sc9	Sc10	Sc11	Sc12	Sc13	Sc14	Sc15	Sc16	Sc17	Sc18	Sc19	Sc20	
Property's date	Sc1		1.000	0.554	0.515	0.000	0.969	0.554	0.132	0.133	0.124	0.498	0.483	0.969	0.493	0.455	0.124	0.493	0.545	0.100	0.000	
Property's exterior façade	Sc2	0.604		0.126	0.081	0.000	0.580	0.126	0.000	0.000	0.000	0.127	0.115	0.580	0.126	0.092	0.000	0.126	0.115	0.000	0.000	
Property's area	Sc3	1.000	1.000		0.972	0.000	1.000	1.000	0.577	0.570	0.562	1.000	0.996	1.000	1.000	0.969	0.562	1.000	0.996	0.545	0.231	
Number of rooms	Sc4	1.000	1.000	1.000		0.000	1.000	1.000	0.598	0.590	0.582	1.000	1.000	1.000	1.000	0.995	0.582	1.000	1.000	0.565	0.240	
Number of bathrooms	Sc5	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
View	Sc6	1.000	1.000	0.597	0.561	0.000		0.597	0.189	0.189	0.181	0.604	0.589	1.000	0.597	0.565	0.181	0.597	0.589	0.159	0.000	
Whether in the complex	Sc7	1.000	1.000	1.000	0.972	0.000	1.000		0.577	0.570	0.562	1.000	0.996	1.000	1.000	0.969	0.562	1.000	0.996	0.545	0.231	
Car park	Sc8	1.000	1.000	1.000	1.000	0.178	1.000	1.000		0.980	0.974	1.000	1.000	1.000	1.000	1.000	0.974	1.000	1.000	0.971	0.605	
Security system	Sc9	1.000	1.000	1.000	1.000	0.215	1.000	1.000	1.000		0.994	1.000	1.000	1.000	1.000	1.000	0.994	1.000	1.000	0.992	0.630	
Road width of the main entrance	Sc10	1.000	1.000	1.000	1.000	0.221	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.636	
Floor of the property	Sc11	1.000	1.000	0.987	0.959	0.000	1.000	0.987	0.559	0.553	0.545		0.982	1.000	0.987	0.955	0.545	0.987	0.982	0.527	0.211	
Distance to school	Sc12	1.000	1.000	1.000	0.977	0.000	1.000	1.000	0.581	0.574	0.566	1.000		1.000	1.000	0.973	0.566	1.000	1.000	0.549	0.234	
Construction quality of exterior	Sc13	1.000	1.000	0.597	0.561	0.000	1.000	0.597	0.189	0.189	0.181	0.604	0.589		0.597	0.565	0.181	0.597	0.589	0.159	0.000	
Heating type	Sc14	1.000	1.000	1.000	0.972	0.000	1.000	1.000	0.577	0.570	0.562	1.000	0.996	1.000		0.969	0.562	1.000	0.996	0.545	0.231	
Fuel type	Sc15	1.000	1.000	1.000	1.000	0.000	1.000	1.000	0.613	0.605	0.598	1.000	1.000	1.000	1.000		0.598	1.000	1.000	0.582	0.267	
Maintenance fee	Sc16	1.000	1.000	1.000	1.000	0.221	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	0.998	0.636	
Rental income	Sc17	1.000	1.000	1.000	0.972	0.000	1.000	1.000	0.577	0.570	0.562	1.000	0.996	1.000	1.000	0.969	0.562		0.996	0.545	0.231	
Distance to the city center	Sc18	1.000	1.000	1.000	0.977	0.000	1.000	1.000	0.581	0.574	0.566	1.000	1.000	1.000	1.000	0.973	0.566	1.000		0.549	0.234	
Distance to the shopping center	Sc19	1.000	1.000	1.000	1.000	0.223	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		0.638	
Topographical structure of the land	Sc20	1.000	1.000	1.000	1.000	0.694	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
	MinV(M2≥M	0.604	1.000	0.126	0.081	0.000	0.580	0.126	0.000	0.000	0.000	0.127	0.115	0.580	0.126	0.092	0.000	0.126	0.115	0.000	0.000	3.798
	W	0.159	0.263	0.033	0.021	0.000	0.153	0.033	0.000	0.000	0.000	0.033	0.030	0.153	0.033	0.024	0.000	0.033	0.030	0.000	0.000	1.000

In the widened analysis method, the minimum value, which has been found by pairwise comparison of the factors and the intersection probability status obtained by using equation 5 is the weight vector of such factor. Minimum value of each factor in the fuzzy weight vector is divided by total minimum value and thus, the normalized weight vector, which has been shown as equation 7, is calculated (Table 6).

Table 6. Normalized weight vector

Factor name	Code	Weight vector not normalized	Weight vector normalized
Property's date	Sc1	0.604	0.159
Property's exterior façade	Sc2	1.000	0.263
Property's area	Sc3	0.126	0.033
Number of rooms	Sc4	0.081	0.021
Number of bathrooms	Sc5	0.000	0.000
View	Sc6	0.580	0.153
Whether in the complex	Sc7	0.126	0.033
Car park	Sc8	0.000	0.000
Security system	Sc9	0.000	0.000
Road width of the main entrance	Sc10	0.000	0.000
Floor of the property	Sc11	0.127	0.033
Distance to school	Sc12	0.115	0.030
Construction quality of exterior	Sc13	0.580	0.153
Heating type	Sc14	0.126	0.033
Fuel type	Sc15	0.092	0.024
Maintenance fee	Sc16	0.000	0.000
Rental income	Sc17	0.126	0.033
Distance to the city center	Sc18	0.115	0.030
Distance to the shopping center	Sc19	0.000	0.000
Topographical structure of the land	Sc20	0.000	0.000
Total		**3.798**	**1.000**

Weights obtained by using fuzzy AHP have been applied to the data collected for 570 houses and nominal value (NV) of the first 10 houses has been found on 10 as follows (Table 7).

Table 7. NV points for the first 10 houses

ID	DK0D	District	Street	X	Y	Total point	NV (Fuzzy AHP)	NV2 (Av.Meth)
704	HUN36	HUNAT	Uçak Sok.	4287722.04	456003.09	161	9.271	8.184
775	GLT36	Gültepe	Sht.Mustafa Simsek Blv	4287618.07	456787.28	156	9.127	7.917
867	MEL18	MELİKGAZİ	KIZILIRMAK CD.	4288467.00	458219.00	165	9.060	8.286
988	ANA13	Mevlana	Mehmet Akif Ersoy	4285447.90	461154.26	146	9.044	7.441
761	GLT02	Gültepe	M.Kemal Paşa Blv	4287043.85	456646.45	159	9.023	8.048
358	YEN21	YENİKÖY	Susam Sok.	4287017.96	452254.88	144	9.023	7.397
415	ÇOR10	çorakçılar	Fulya Sok.	4287319.61	453927.76	149	8.941	7.622
1030	ANA19	Mevlana	75. Yil	4285771.22	461647.18	131	8.889	6.800
1027	ANA56	Mevlana	Mehmet Timucin	4286142.14	461621.12	135	8.875	6.956

Considering each real-estate as a point layer, NV map created by using Kriging interpolation Method in the ArcGIS Geostatistical Analyze module shown in Figure 3.

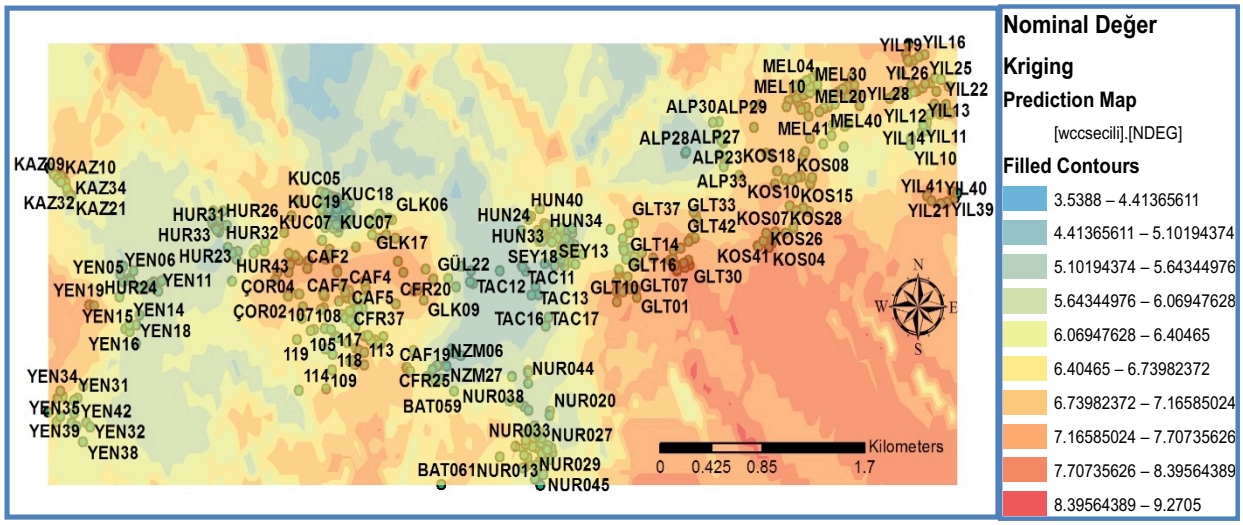

Figure 3. NV map created by using Kriging interpolation method based on fuzzy AHP weights

Köşk District and Gültepe District have been found as the most valuable avenues according to the nominal appraisal map created by using fuzzy AHP weights when the Property feature table is examined. It may be stated as compatible with the actual sales value when compared.

RESULTS AND RECOMMENDATIONS

1. In this study, questionnaire points obtained from 10 realtors have been converted into fuzzy figures according to the fuzzy AHP importance scale and factor weights have been obtained by using the fuzzy AHP method for the purpose of nominal appraisal. Accuracy of

the factor points to be obtained from the realtors through questionnaire will allow creating both weight and nominal value maps accurately.
2. Verbal and quantitative data should be evaluated together in the real-estate appraisal area. It is observed that fuzzy decision-making methods are practicable for the cases verbal and quantitative data are used together.
3. Questionnaire average points obtained from 10 realtors have been expressed not by the certain figures but by the linguistic variety under the fuzzy group logic due to fuzzy logic used.
4. Nominal appraisal points obtained shall be multiplied by the average nominal unit price to be obtained from the area in order to calculate the estimated sales value.
5. Different nominal value maps may be created by applying different interpolation techniques on the real-estate values obtained by using nominal appraisal method. Interpolation methods may be verified by using estimated errors (root mean square error, etc).
6. Factor weights may also be used in the real-estate appraisal problems to be obtained by different decision-making methods (Fuzzy Entropy, Fuzzy Dematel).

REFERENCES

Baysal, G. and Tecim, V. (2006). Katı atık depolama sahası uygunluk analizinin coğrafi bilgi sistemleri (CBS) tabanlı çok kriterli karar yöntemleri ile uygulaması. 4. Coğrafi Bilgi Sistemleri Bilişim Günleri. Fatih Üniversitesi. İstanbul.

Bostancı, B. (2008) Forecasting analysis on real estate development and application of housing area model in İstanbul. Yıldız Technical University, *Ph.D. Thesis*, Istanbul, 217 pages.

Chang, D.Y., (1992). Extent Analysis and Synthetic Decision, Optimization Techniques and Applications, World Scientific, Singapore, Vol. 1p. 352.

Çanlı, H., Kandakoğlu, A. (2007) Hava gücü mukayesesi için Bulanık AHP modeli, Havacılık ve Uzay Teknolojileri Dergisi, 3(1), 71-82.

Erbil, E.H., (2014) Taşınmaz Mal Değerleme Amaçlı Coğrafi Bilgi Sistemi Tasarımı, 5. Uzaktan Algılama, CBS Sempozyumu (UZAL-CBS 2014), 14-17 Ekim 2014, İstanbul.

Öztürk B.A. and Başkaya Z., (2012) Bulanık Analitik Hiyerarşi Süreci ile Bir Ekmek Fabrikasında Un Tedarikçisinin Seçimi, Business and Economics Research Journal 3(1), 131-159.

Saaty, T.L., (2008) Decision Making With the Analy tic Hierarchy Process, In te rnatio nal Journal of . Services Sciences, Vol. 1, No. 1.

Taha, H.A., (1982) Operations Research- An Introduction, Macmillan Publishing Co. New York.

Tekin, M. (2008) Sayısal Yöntemler, Selçuk Üniversitesi İktisadi ve İdari Bilimler Fakültesi, Konya.

Timor, M. (2011) Analitik Hiyerarşi Prosesi, İstanbul: Türkmen Kitabevi.

Yomralioglu, T. (1993) The Investigation of a Value-based Urban Land Readjustment Model and its Implementation Using Geographical Information Systems, PhD. Thesis, Dep. of Surveying University of Newcastle upon Tyne, UK.

Yomralıoğlu, T., Nişanci R. and Uzun B. (2007) Raster Tabanlı Nominal Değerleme yöntemine dayalı arsa-arazi düzenlemesi uygulaması, TMMOB Harita ve Kadastro Mühendisleri Odası, 11. Türkiye Harita Bilimsel ve Teknik Kurultayı, 2 – 6 Nisan 2007, Ankara.

http://www.yarbis1.yildiz.edu.tr/web/userCourseMaterials/hudemir_24efafad4d113f95c5a3ba0356d2564a.ppt (Accessed Date:02.03.2015)

LOCATION PROFILING IN CADASTRE FOR PROPERTY VALUE INTELLIGENCE

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ABSTRACT

Property Value Intelligence is a systematic function of locational, physical, legal and economic factors. Popular with professional valuers, assessors, appraisers. surveyors, engineers, accountants, land administrators, registrars, realtors, developers , investors, policy makers, law makers, tax officials, legal practitioners, and favoured by the courts, the process involves the analysis of properties with scientific procedures in order to isolate and quantify individual influences on property value. It is argued that geographical influences on value are handled implicitly during this process. This paper demonstrates that the spatial analysis of property data enhances the valuer's understanding of locational influences on property value. In order to examine the effect of location on retail property value in particular, legal and economic factors were held constant. Differences in value attributable to physical characteristics were reconciled using an 'intelligent' interface capable of undertaking simple comparison method analysis. Any remaining differences in value were attributed to locational factors. The paper demonstrates that it was then possible to display comparable evidence on a map and shade each property according to its locational value. This aids the valuer in the selection of comparable evidence based on locational criteria. The value information enhance the right to fair value with land and non land properties over resources and productive assets help shape the degree of empowerment ,autonomy and the scope of economic, social & political participation of people. Property value Intelligence is scientific practice where property value information is a right and it includes process, analytics and valuation methods where property value information are the products of them to present in a useful manner as to make available for the user needs. Property Value Intelligence has different approaches to use property information and property value information and for presenting value listing by property classes in a timely manner.

Key words: Location Profiling, Property Value Intelligence (PVI)/ PVIS, Property Value Data (PVD), Property Value Cadastre.

INTRODUCTION

Beginning Stories

The situations as depicted in the following three stories represent the realities of land use mechanisms and management issues in relation to modern property value information and its impact on economy and society.

Scenario --1

Around twenty two years ago a study team sought my assistance to guide them for visiting the site of devastating river erosion of the Padma, one of the largest rivers of Bangladesh at the Tongibari sub-district only forty kilometers south to the capital city Dhaka. I hear the roaring sound and felt stormy river breeze. The sun was still not prepared to set down. There was no crowd near the river bank. An old woman was sitting there alone. When I approach to her I witnessed that she remained unmoved.

I saw her eyes were full of tears. I could not dare to ask her any question at that moments. After a while I tried to ask her some how on the tragedy caused to her by that time. She thought me as someone to help her and turned her eyes with a mood of hopes. She told the tragic events caused to her in the last couple of days and how she lost her only residential house and property and turned to a helpless beggar over night. She pointed by her finger a long distance where her house was standing some times earlier. I followed her and there was nothing but big moving waves and strong river currents of unlimited water flows of cruel Padma and she fell in deep silence again.

Scenario --2

The name the of the island is Bhola, southest district of Bangladesh, surrounded by the rivers Meghna, Elisha, Tetulia and the Bay of Bengal. I served there for several years. A larger part of Mirjakalu bazar, a rich business centre under Burhanuddin , sub-disrict was fallen into the large river Meghna in the month of april. Parties reported about the sudden fall of property values which became lower than the determined land values based on previous year.

And people became unable to comply with registration requirements and compelled to be reluctant to register there transfer deeds in time as there was no rule or provision to consider such situation. As a result they lost their legal rights and security over their purchased property, the money they spent and the government lost its revenue.

Scenario --3

“This is not a road or pukka street, it is an embankment” said the school girl wearing white and blue school dress in reply to my question when I asked her about the location and open green space in front full of water hyacinth in a deep pond. It was a river, people called her Arial Kha, a large business centre, a river port, police station, hospital, post office, registry office, government rest house and municipality office building –all are there by the river bank. The river now turned its flow and some char land became visible.

The low land are still not fully usable. But some parties occupied the tiny portion adjacent to the road side and opened some temporary shops by hanging sheds on bamboo. This made the significant rise of the property value which has to be applicable for the entire area. In this situation parties have to suffer for several years. They are continuously complaining but no way to escape. Parties of major portion of the area are being deprived year after year from their legal rights of secure tenure and at the same time government is loosing revenue due to

lacking of timely actions, policy making and implementation of justified property values appropriate to property classes, situation and location as well.

Background

According to statistics, in developed countries, the value of land and real estates together with mortgages on properties is about 60-65 % of the national asset. The land and property related activities, including property developments, generating about the 30-35 % of the GDP. The value of mortgages on properties in developed countries is 30-35 % of the GDP.

About fifty per cent of the occupation of expanding cities in developing countries is informal, people have no secure tenure (Bathurst Declaration) In these countries it is absolutely essential to improve the security of tenure providing appropriate tools for registration of informal or customary tenure.

The implementation of sustainable development (economy, society, and environment) is also one of the main topics worlds wide in developed and developing countries as well. There have been many changes related to land and properties during the last decade, resulted new challenges to be solved. These changes very much effected the developed, transition and developing countries (András Osskó).

During these years the concepts, principles and definitions of land, land utilization types, land qualities, land suitability classification and land evaluation procedures were already specified but in some circles the notion of a single, overall "land quality" in the sense of health-of-land has come to the fore.

The total capital we strive to sustain within and between generations consists of separate components:

- the natural capital (the land, the water, the air, genetic material, ecosystems, etc.);
- the human capital (knowledge, science, culture, health, nutrition);
- the institutional capital (schools, universities, research facilities, infrastructure);
- the social capital (democracy, good governance, civil rights, equity, social harmony).

Philosophy

Philosophers saw that nothing less than the establishment of liberty and the abolition of poverty among population by the confirmation of human laws to the natural order intended by the Creator. They saw that there is but one source on which men can draw for all their material needs and that is land and property as the Wealth Generation Cycle-central to the political economy with value for production, wealth generation, capital accumulation and making money for power(shown in diagram -1) and there is one means by which land can be made to yield to their desires by labor. All real wealth, they therefore saw, is the result or product of the application of labor to land and property.

In order to have value, an object must satisfy some human want, and it must exist in a quantity which is insufficient wholly to satisfy all desire for it. In explaining value, economists emphasize on the cost theories of value and the utility theories as classical theory,

derived from Adam Smith, logically developed by Ricardo, and substantially completed by Senior, Carey, John Stuart Mill, and Cairnes.

According to this theory, market value is determined by demand and supply, being fixed at the point where the former just equals the latter. Value increases directly with increase in demand, inversely with increase in supply (other conditions remaining the same).

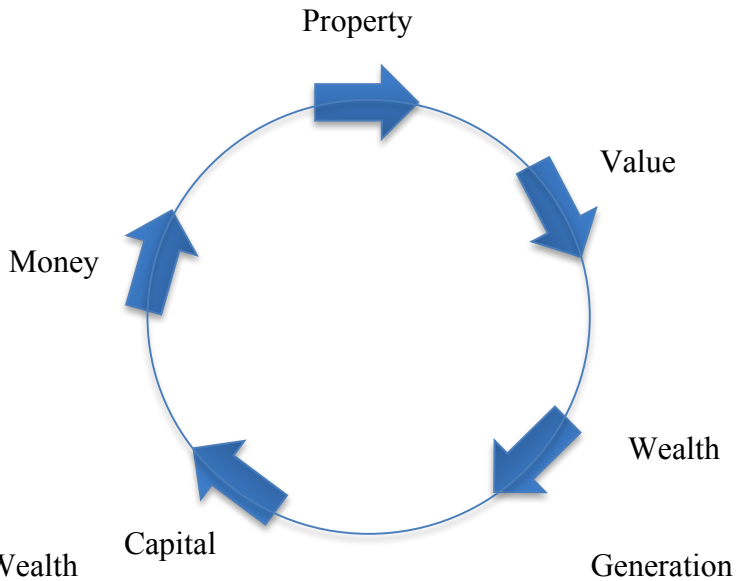

Diagram-1 : The Wealth Generation Cycle

Property

The property as an institution, when limited to its essential elements, consists in the recognition, in each person, of a right to the exclusive disposal of what he or she have produced by their own exertions, or received, either by gift or by fair agreement, without force or fraud, from those who produced it. The foundation of the whole is, the right of the producers to what they themselves have produced. Private property as an institution does not owe its origin to any of those considerations of utility, which plead for the maintenance of it when established in economic terms, such as "raw material of the earth" and "gift of nature" for land; "industry" for labor, and "valuable qualities" for productive powers.

Value of Property

Value from valoir, from Latin .valere, to be strong, able. In political economy, a word that is most commonly used to designate the power of a commodity to command other commodities in exchange. The term is applied, however, to several other conceptions. The potential capacity of an object to meet human needs is sometimes called value — 'value in use,' in the terminology of the classical economists. In modern scientific economics, the term 'utility' has for the most use of the word value. Another meaning which the term value conveys is the significance of an object to an individual as the indispensable condition of a certain satisfaction.

Value in this sense of the term is frequently called 'subjective value,' to distinguish it from

'objective' or 'exchange' value. Subjective value is of two kinds, 'subjective use value,' where the importance of an object is gauged by the direct satisfaction to be obtained through its consumption, and 'subjective exchange value,' where the importance of an object is gauged by the satisfaction it will yield indirectly, through exchange.

Value at a given time represents the monetary worth of property, goods, or services to buyers and sellers. To avoid confusion, appraisers do not use the word value alone; instead they refer to "market value", "use value", "investment value", "assessed value'', or other specific kinds of value. Market value is the focus of most real-property appraisal assignments and its estimation is the purpose of most appraisals.

A distinction is usually made between 'market value' and 'normal' or 'natural value.' Market value is the purchasing power of a commodity in the open market on a given day; normal or natural value is the value which would prevail if competitive forces worked without friction. Market values fluctuate widely from day to day; normal values change, if at all, only with changes in the fundamental conditions of production and consumption.

The word 'price' is often used as synonymous with 'exchange value.' Economists define price as the power of a commodity to command money in exchange; value ('exchange' or 'objective') is the power of a commodity to command in exchange commodities in general.

Real Property And Property Markets

Real property is defined by statute to include land, structures and improvements on land, certain mobile homes and machinery and equipment affixed to the land. The constitutional subclasses of real property and their assessed value percentages are as follows: industrial and commercial property, residential property, farm property, and public utility property. Some public utility property is assessed at the lower industrial and commercial percentage pursuant to law.

A real-estate market is the interaction of individuals who exchange real-property rights for other assets, such as money. Specific real-estate markets are defined on the basis of property type, location, income-producing potential, typical investor characteristics, typical tenant characteristics, or other attributes recognized by those participating in the exchange of real property.

These real estate-related expenditures are directly linked to the price of goods and services in competitive markets. For example, the costs of roofing materials, masonry, architectural plans, and rented scaffolding are determined by the interaction of supply and demand in specific areas and are subject to the influence of social, economic, governmental, and environmental forces.

Totals of real property assessments include assessments of land, structures and improvements along with most mobile homes and machinery and equipment affixed to realty.

Locational Property Value : Factors and Indicators

PROPERTY PROFILES

Defining

Property Profiles provides a wealth of information useful to understanding a subject property's makeup to research and find properties by address, owner name, legal description or parcel identification number.

Property Profiles returns all pertinent property and owner information for any property. Other reports available include Comparable Market Analysis (CMA), Nearby Neighbors, Subdivision Statistics, Nearby Schools and Businesses, Demographics Sketch Vectors, Aerial Images and Parcel Maps.

Wherever in the world businesses, investors and second home buyers look to acquire property, local jurisdictional laws, procedures and risks must be considered. Most active real estate markets have a system for organizing and recording property purchases; however, those systems vary widely.

Combine search criteria on location, general property characteristics, mortgage date and amount, sale date and amount, land information (value, acreage, square feet), legal information and miscellaneous characteristics as well as many other fields. All search results may be downloaded or printed directly to labels.

Residential and commercial real estate professionals can call up, layer picture-quality aerial images, and create tangible property information maps. Whether a company is building a manufacturing plant or a natural gas pipeline, developing an industrial park or resort community, or simply expanding its present facilities, protecting a real estate investment is crucial to a company's financial security and shareholders' peace of mind. No matter what the political or legal climate, property owners around the world benefit from the financial indemnification that a title policy provides.

The Unique Feature of Properties

1. Market Position
2. Rental Demand
3. Upcoming Supply--Research to mitigate the risk of oversupply
4. Growth Drivers--Infrastructure and development expenditure
5. Affordability
6. Rental Income
7. Property Type
8. Quality Tenants--Profiles of quality tenants for the area
9.Tenant Expectations--Inclusions that attract desirable tenants
10. Property Management Fees--Local Property Management fee
11. Most Desirable Location within the Suburb--Locations to target or avoid
12. Screening Developers--Identifying quality local developers and builders
13. Product Quality
14. Product Suitability--Ability to supply product that matches the market demand

15. Property Valuation
16. Property Inclusions-- property that meets demand expectations
17. Fixed Priced Contract--Contract terms that mitigate unexpected costs
18- Minimum Deposit
19. Settlement Terms--Settlement terms that minimise cash commitments
20- Capped Holding Costs--Contract terms that fix maximum holding costs
21. Passive Involvement
22. Community Evaluation
23. Site Inspection--Personal site inspection---
24. Property Design.
25. Client's Expectations

Transportation is an important function of government which would facilitate the creation of a compact city, where people can easily find the facilities they desire for education, commerce, religion and recreation. Good land use, with the freedom of individuals to achieve the highest and best use of land, would ensure a desirable community. A compact city would reduce the need to invade the wilderness and devastate the environment.

Tangible personal property is defined as "goods, chattels, and other articles of value which are capable of manual or physical possession and certain machinery and equipment, separate and apart from any real property.

For purposes of assessment, tangible personal property has the following three sub classifications and rates of assessment: industrial and commercial property, public utility property, and all other tangible personal property. Some public utility personal property is assessed at the lower industrial and commercial rate.

Indicators and Factors that Influence Land Value

The physical attributes of land include quality of location, fertility and climate; convenience to shopping, schools and parks; availability of water, sewers, utilities and public transportation; absence of bad smells, smoke and noise; and patterns of land use, frontage, depth, topography, streets and lot sizes.

The legal or governmental forces include the type and amount of taxation, zoning and building laws, planning and restrictions.

The social factors include population growth or decline, changes in family sizes, typical ages, attitudes toward law and order, prestige and education levels. The economic forces include value and income levels, growth and new construction, vacancy and availability of land. It is the influences of these forces, expressed independently and in relationship to one another, that help the people and the assessor measure value.

The FAO Council definition of sustainable development given in the introduction might be an acceptable starting point to identify issues and indicators. Based on this definition alone (and there are many others), indicators, each of which may integrate more than one variable, would be needed to track:

- the resource endowment, including its abundance, diversity and resilience;;
- the environment, for example by reference to its pristine condition
- the technology in terms of capacity as well as environmental-friendliness;
- the institutions, e.g., fishing rights, enforcement system;
- the human benefits, e.g., food, employment, income;;
- the economics of exploitation, e.g., costs, revenues, prices
- the social context, e.g., social cohesion, participation, compliance.

BENEFITS: GOVERNANCE, TAXATION AND JUSTICE

Governance And Its Impact on Property Value

Law required standard valuation methods for industrial and commercial property based on acquisition cost less straight line depreciation. In the absence of better evidence, fixed rates of allowable depreciation must be used depending on how the property is categorized.

Securing Fair Value and Justice by Using Location Profiles

While the major argument for raising public revenue from land rent and natural resources is because it is equitable and fair, it is also the most efficient method of raising the revenue which is needed for public facilities and services. Land is visible, can't be hidden and its valuation is less intrusive than valuations of income and sales. Taxes on labor and capital cause people to consider alternative options, including working with less effort, which produces less real goods.

Adjustments for Use and Location

Adjustments for additional attributes and deficiencies could be made for each individual site, after the base market value had been estimated by the comparative method. The experience from a comparative city could be borrowed and tested in the local area to verify the results.

Land Use and its Locational Value : Valuation and Evaluation

"Land", the "functions of land", "land evaluation", "land qualities", "sustainability", "resilience", etc. need to be defined carefully to avoid confusion and to assure effective cooperation between international institutions and national planning entities that deal with the assessment of changes in land conditions.
The holistic concept of Land was already recognized in the Framework for Land Evaluation FAO 1995.

- land is the basis for many life support systems, through production of biomass that provides food, fodder, fibre, fuel, timber and other biotic materials for human use, either directly or through animal husbandry including aquaculture and inland and coastal fishery (the production function);
- a property is an attribute that already gives a degree of information on the value of the land type;
- a land quality (or limitation) is a complex attribute of land which acts in a manner distinct from the actions of other land qualities in its influence on the suitability of land for a

specified kind of use.

Framework For Land Evaluation And Land Qualities

- The many functions of Land:
- production function
- biotic environmental function
- climate-regulative function
- hydrologic function
- storage function
- waste and pollution control function
- living space function
- archive or heritage function
- connective space function

IAS/IFRS Standards for Property Value

Major IAS and IFRS standards and their application areas are as follow : a. IAS2 applies for Inventories, b. IAS11applies for Construction Contracts, c. IAS16 applies for Property, Plant and Equipment, d. IAS17 applies for Leases, e. IAS40 applies for Investment Property, f. IAS41 applies for Agriculture and g. IFRS6 applies for Exploration for and Evaluation of Mineral Resources.

Property Registration: Central To Property Value Applications

Registration systems fulfill a good variety of human needs such as legal validation of all types of agreed, documented, signed and executed contracts, documents and deeds of any transaction, statement, terms and conditions for making basis of evidence , delivery of information like certificates, licenses , searches, inspections, from the original documents , reports ; preservation and protection of databases , administration and supervision of records and registries, archival security management, geographic and land information (GIS and LIS), like parcels (khatians), cartographic maps (manual or digital), ICT and public sector information (PSI), collection of public revenue e.g-, stamp duty, registration fees, gain tax, VAT, local government taxes, court fees , fines etc (Razzak. Dr. M.A 2008).

The system also includes development issues like sustainable development, sustainable land management (SLM), regulatory reform, land value taxation (LVT), valuation techniques and approaches, assessment, accounts, and determination mechanisms with a set of technological, procedural and technical arrangements to provide appropriate services in practice.

The conceptual framework of land registration includes a set of complex terms, components, and situations such as laws, systems , institutions and activities; such as land revenue, land tenancy, land rights, land valuation ,land transfer, land tax, land litigation and land reform etc. To explore such components, their interrelationships and impacts on public finance, a closure look into the definitive structure seems to be more important .

Land registration is the “process of determining, recording and disseminating information

about the ownership, value and use of land when implementing land management policies"(UNECE Land Administration Guidelines) " Ownership" should be seen as a broad concept of land tenure within various jurisdictions (statutory, customary, informal, etc.), "land" includes constructions at subsurface level, ground level and above land level (e.g. buildings).

The formal registration system has evolved for more than three centuries into an approach that is being used to varying degrees in the modern civilized nations. While registration plays a crucial role in ensuring each country's right to information, public sector information (PSI), property transfer, evidence, transparency and tax system throughout the world.

It considers the main segments and registration related issues in international comparisons such as public finance factors like valuation, land value taxation (LVT), income tax, inheritance and gift taxes, capital gains tax, value added tax, stamp duty, registration fees, property transfer tax, wealth tax, records and archives, digital information database like SDI, records of rights (ROR), LIS, GIS, PSI, standards and related issues.

Property Registration evolves the central and vital part of the entire system which ensures legal base of ownership with human and judicial support toward making a just, accountable and transparent society. At the same time it contributes a significant revenue share to the public finance and overall economic, social and national development.

Land Registration And Information Systems

The evolution of cadastres, LAS, SDIs, and land markets shows that the traditional concept of cadastral parcels representing the built environmental landscape is being replaced by a complex arrangement of over-lapping tenures reflecting a wide range of rights, restrictions and responsibilities, and that a new range of complex commodities, building on this trend is emerging.

Land Registration In Spatially Enabling Government

For modern governments at all stages of development, one question is how best to integrate these processes, especially to offer them in an Internet enabled e-Government environment.In some jurisdictions, title registries may offer some protection to registered owners and/or mortgagees. In others, purchasers may have to rely on legal opinions based on excerpts from official title records. In all cases, for an investor or mortgagor to have true peace of mind about a property acquisition, a fundamental concern should be to secure "good title."

E-Government

Technically, digital land-information products offer considerably more possibilities for perfect reproduction and fast, inexpensive and easy distribution. Customers want to be served in a professional way, user-friendly tools, information that is timely, up-to-date, reliable, complete, accurate, relevant, if necessary customised, well-integrated with other relevant data sets of other suppliers, good value for money and systems that are compatible with the customer's working procedures.
Spatial Information,

Cadastre as The Fundamental Layer of Information
Easy Mechanism of Spatial Enablement
National Land Information Policy
Interoperability of Spatial Information
Interoperability of All Government Information
E-Government Service Delivery
Use of "Place" To Organise Information, Services And Activities.
Electronic Conveyancing--

IMPLEMENTATION, APPLICATIONS AND INNOVATION

Developing Smart Property Value Cadastre

Interactive maps and databases, including Property Value Information Systems (PVIS) create successful and functional platforms of Property Value Intelligence in practice comprised of a set of property value data bases. These are as follow : i) Market Value Database (MVD) , ii)Assessed and Apprised Value Data (AVD), iii) Price Value Database (PVD), iv) Cost Value Data (CVD),v) Rated Value Databases (RVD), vi) The Real Property Value Database (RPVD),vii)Hope or Future Value Database (HVD),viii) Best And Highest Use Value Database(BUVD), ix) Assumption and Special Assumption Value Database (ASVD), x)Alternative Use Value Database (AUVD), xi) Forced Sale Value Database (FSVD), xii)Transaction Costs Database (TCD), xiii) Tax Bases Databases (TBD) ,xiv) Synergistic Value or Marriage Value Database (SVD) , xv) Investment Value Database (IVD), xvi)Mortgage Lending Value (MLVD) Database , xvii) Insurable Security Value Database (ISVD) Depreciated Replacement Cost (DRCD) Database . xviii) Trade Related Property Value Database(TRPVD),xix) Development Property Value Database (DPVD), xx) The Existing Asset Value Database (EAVD) , xxi) Green Value Database (GVD) , xxii)Degraded Property Value Database (DPVD), xxiii) Added Value Database etc.

Integrating Profiled Location Data Using Geospatial Business Intelligence with PVI

A data warehouse is a subject oriented, non-volatile, integrated, time variant collection of data in support of management's decisions. Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining and predictive analytics. What is geospatial data and geospatial analytics? When people refer to geospatial data, they are often describing address-related data (a specific address, point of interest, ZIP code, and so on). This data can be matched to a specific latitude and longitude using a process known as geocoding.

Geocodes for addresses and points of interest can also be integrated with other data sources to enhance analysis in dashboards, visualizations, and more advanced modeling. The Geo Database is a collection of geographic datasets, works in concert with ArcGIS software to provide a rich framework for modeling attributes, spatial and temporal relationships, and transactions. Best practices for data modeling and analysis by addressing spatial integrity, attribute integrity, work flow, and scaling. It clarifies geographic data modeling concepts of the geo-database information models.

Geospatial data, sometimes referred to as location data or simply spatial data, is emerging as an important source of information both in traditional and in big data analytics. Geospatial data and geographic information systems (GIS) software are being integrated with other analytics products to enable analytics that utilize location and geographic information. Such analytics are also moving past mapping to more sophisticated use cases such as advanced visualization and predictive analytics. Geospatial data sources include:a). Global positioning system (GPS) data and b). Remote sensing data.

Database Deployment Software and Applications

Organizations store feature data in a structured file format such as Autodesk spatial data file (SDF) or SHP. With SDF, organizations benefit from the power of a spatial database without the cost or management overhead. Then organizations can easily extend the reach of their information by using a web mapping application such as Autodesk Map Guide Enterprise to deliver powerful, easy-to-use online maps and related information to audiences of all sizes.

"With Topobase and Oracle Spatial, we no longer have to maintain multiple data sets, and we have reduced the risk of data entry errors. Autodesk Geospatial makes it easy for engineers and designers to manage and share mapping data—such as regional scale data sets, cadastral information, and utility network data including pipelines, transformers, and valves. Additionally, teams can import and export data sets from many different CAD and GIS file formats—such as ESRI Shapefiles , MapInfo TAB files, MicroStation DGN, and raster data from multiple coordinate systems—and combine it with DWG files and have the information overlay properly.

Organizations share spatial data with other departments and applications, making spatial data a central part of its IT ecosystem. In this stage, GIS data and functionality get woven into other business systems, integrating with assessor databases, permitting systems, ERP systems, and more. The spatial application server supplies geospatial intelligence and data to these other applications. Autodesk, resellers, partners, and system integrators build powerful solutions to meet the organization's specific business goals and processes.

Autodesk Topobase provides sophisticated solution modules that make it easy for organizations to establish and manage the database deployment. By moving up the geospatial value chain, organizations increasingly leverage their geospatial data for a variety of business functions. organizations gain the ability to organize data effectively, implement real-world coordinate systems, and work with larger data sets. They deliver increased scalability and security, ability to complete long transactions, and integration with other systems.

Organizations need to move from a file-based environment using DWG, SHP, or SDF to a spatial database environment using the full functionality of a relational database management system (RDBMS). With an RDBMS, hundreds or even thousands of people can create, edit, and manage the same data. With a full RDBMS, organizations get more scalability, as well as added security and the ability to create more sophisticated data models.

Using Data Access Technology, Autodesk Geospatial products work natively with spatial data

stored in Oracle, Microsoft SQL Server and MySQL, as well as with ESRI's ArcSDE middleware. As a result, organizations are able to fully use the security, scalability, sophisticated data models, and multi-user read/write power of an RDBMS. AutoCAD Map 3D provides tools that make data and schema migration from SDF or SHP files to a full-scale RDBMS easy.

CONCLUSION

This has been devoted to materialize the vision toward achieving the location based property value information intelligence as an easy and accessible platform for prompt decision making at all levels of public, private, business and economic sectors. Incessant research efforts are also vital to enrich the system in practice. Our pragmatic optimism invites the practitioners' communities to move forward as to find the solutions to put in practice with a shared, consorted and a well communicated network in the near future.

REFERENCES

Netzer, Dick (1998): Land Value Taxation: Can It and Will It Work Today? Cambridge, MA: Lincoln Institute of Land Policy.

Razzak, Dr. Mohammed Abdur (2011):Registration and Information Systems : Toward an Empirical Development in Bangladesh. AHDPH, Dhaka. Amazon.com

Stoter, J. (2004), 3D Cadastres, PhD TU Delft, the Netherlands

United Nations/Federation of International Surveyors (1999 Bathurst Declaration on Land Administration for Sustainable Development(1999) Bathurst

UN (1996), Land Administration Guidelines, New York, Geneva

UN (2001), Inventory of land administration systems in Europe and North America, London

UN Habitat (2004), Pro Poor Land Management, Nairobi

van der Molen, P. (2004) et al, "Remarks and Observations related to the further development of the Core Cadastral Domain Model", Proceedings FIG/COST Workshop on 'Standardisation in the Cadastral Domain, Bamberg Germany

PROCEDURE OF REAL ESTATE ACQUISITION BY FOREIGNERS IN TURKEY

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ABSTRACT

Since 2002, there has been renewed concern in Turkey about purchases of properties by foreign citizens, reflected in numerous amendments and cancellation decisions about such purchases by the Supreme Court and a number of state agencies. The frequent changes have created uncertainty and insecurity for purchasers, especially real estate investors. Despite the instability, foreign investment in single-family homes, residences, development parcels, and multifamily apartments has propped up the real estate market in Turkey for the past 12 years. Foreigners have presented demand for real estate, especially along the southern and western coasts of Turkey, and almost 60% of foreign sales countrywide have been in the Aegean and Mediterranean regions. In addition, home sales in the Black Sea region have increased recently. The largest increase in home sales, 424%, occurred in Trabzon. As well, the diversity of foreign nationals acquiring immovable property in Turkey has grown. Despite the confusion created by changes made almost every two years to Regulation no. 2644 in section 35 of the Land Registry Law, foreign demand in the Turkish real estate market continues to grow. The current law concerning real estate acquisitions by foreigners shows that Turkey, in the process of harmonization with the European Union, does not have an overly restrictive policy on this issue. The aims of this paper are to examine trends in the foreign real estate market; to analyze the type, quantity, and quality of property acquisitions; and, finally, to investigate the current situation of residential property investment by foreigners in Turkey. To achieve these aims, legal changes have been examined, existing procedures detailed, statistics about real estate purchases and sales collected and analyzed, and basic procedures regarding with foreign property acquisitions compiled. This research has demonstrated that recent legal changes have increased demand in the Turkish foreign real-estate sector and return expectation in the real estate and public corporation sectors.
Key words: residential property, foreign investment, Turkey

INTRODUCTION

Whether public, private, or something in between, property rights are a social, cultural*, and* economic base laying crucial groundwork for market economies. Within newly minted market economies, it becomes possible—even necessary—to recalibrate intuition toward land and other forms of property as commodities to be bought and sold in an international market (Tesser, 2004). Also, arising out of technological advances, coupled with the liberalization of capital markets worldwide that allow for efficient movement of capital between countries. Besides every nation, from past to present, has certain restrictions concerning the acquisition of land in the sense of absolute ownership by foreigners.

(Uzun and Yomralioglu, 2007). However the removal of foreign ownership restrictions in many countries, a policy encouraged both by the Organization for Economic Cooperation and Development (OECD) and the European Union, made it easier for people to invest in foreign real estate markets (HPI, 2009).Turkey as a developing country, a member of OECD and candidate of EU, has made a series arrangement in terms of foreign investment on residential property. Turkey is an attractive country in the international land market because of both its geography (with large coastal area and the Mediterranean climate) and its rapidly developing economy. Particularly in recent years, individuals and companies have started to be interested in purchasing real estate in Turkey and this combined with Turkey being accepted as an EU candidate country attention is being paid to the process of real estate purchase by non Turkish nationals and companies (Uzun and Yavuz, 2013). Since 2002, there has been renewed concern in Turkey about purchases of properties by foreign citizens, reflected in numerous amendments and cancellation decisions about such purchases by the Supreme Court and a number of state agencies. Despite the frequent changes, foreign direct investment (FDI) rose from just over US$1 billion in the early 2000s to an average of US$13 billion in the 2008–13 period in Turkey. Foreign investors have started to play a role in the residential market and Turkey's foreign property market has been growing from strength to strength (WB, 2014). Foreign investment in single-family homes, condos, and multifamily apartments, holiday homes, investment and retirement properties have been propping up the real estate market in in Turkey. Foreigners have presented demand for real estate, especially along the southern and western coasts of Turkey, and almost 60% of foreign sales countrywide have been in the Aegean and Mediterranean regions. Especially coastal regions have been increasingly popular with British and German buyers over the past ten years. However Turkish properties have been attracted by various nationals and the distribution of the regions or cities where foreigners dealth with, have been dispersed as heterogeneous. Despite the confusion created by changes made almost every two years to Regulation no. 2644 in section 35 of the Land Registry Law, foreign demand in the Turkish real estate market continues to grow. The current law concerning real estate acquisitions by foreigners shows that Turkey, in the process of harmonization with the European Union, does not have an overly restrictive policy on this issue. The aims of this paper are to examine trends in the foreign real estate market; to analyze the type, quantity, and quality of property acquisitions; and, finally, to investigate the current situation of residential property investment by foreigners in Turkey. To achieve these aims, legal changes have been examined, existing procedures detailed, statistics about real estate purchases and sales collected and analyzed, and basic procedures regarding with foreign property acquisitions compiled. This research has demonstrated that recent legal changes have increased demand in the Turkish foreign real-estate sector and return expectation in the real estate and public corporation sectors.

LEGAL ASPECTS OF PROPERTY ACQUISITION BY FOREIGNERS IN TURKEY

With reference to the history of foreign investments in Turkey's property sector, it is observed that land legislation and foreign ownerships rules have been amended several times in the last three decades. In other words, the development of policy on foreign acquisition of Turkish properties has been inconsistent.

Juridical Amendments on Title Deed Law (No:2644)

In our country, the fundamental regulation concerning the real estate acquisition by foreign real persons was made with Land Registry Act numbered 2644, dated December 22nd, 1934. 35th and 36th articles of this act regulates the real estate acquisition by foreigners in our country. But today, these articles have been revoked by the Constitutional Court for different reasons and they have constantly been amended by the legislator.

*The first amendment was made with the Act numbered 3029 and dated June 21st, 1984, but these new items were cancelled with the decision of Constitutional Court dated June 13th, 1985.

* The second amendment was made with the Act numbered 3278 and dated April 22nd, 1986 and two articles were added. However, these new items were cancelled with the decision of Constitutional Court dated October 9th, 1986.

*The third amendment was made with the act numbered 4.4916 which entered into force after being published in Official Gazette dated June 3rd, 2003 and 87th article and 36th article of the village law numbered 442 were repealed. However, this amendment was revoked with the the decision of Constitutional Court dated March 14th, 2005.

*The fourth amendment was made with the Act numbered 5444 and dated December 29th, 2005 and a temporary article was added to the 35th article. The new modification was partially cancelled with the decision of Constitutional Court dated April 11th, 2007.

* The fifth amendment was made with the Act numbered 5782 and dated July 3rd, 2008. This initiative which created uncertainty in terms of quantity and area of the acquired property was cancelled with the decision of Constitutional Court dated May 12th, 2011.

*The sixth amendment was made with the Act numbered 6302 and dated May 3rd, 2012. 35th article of Land Registry Act (no. 2644) has been rearranged.

Cancellation decisions given almost every two years and amendments made in spite of these decisions indicate that the situation is not legally stable. Nevertheless, the amendment made on 2012 allowed foreign natural or legal persons to acquire immovables in Turkey more easily.

The Title Deed Law in Force (Law No:2644, Sections: 35 &36)

In accordance with the Article 35 of the Land Registry Law No. 2644, amended by Law No. 6302, which entered into force on 18 May 2012. According to the law;

- The condition of reciprocity for foreigners who wish to buy property in Turkey is abolished, restrictions for foreigners acquiring property in Turkey have been eased with the enactment of the "Reciprocity Law" in 2012.
- The citizens of 183 nations can own property in Turkey. With the new regulation, citizens of neighbouring countries, such as the United Arab Emirates, Middle Eastern countries such as Iraq, Azerbaijan, who were not allowed to acquire real estate in Turkey are now able to do so. However, even though they are on the list, citizens of countries who share a border with Turkey cannot acquire property in border provinces (GYODER, 2014).
- The limit on the size of land able to be bought by foreigners increased to 30 hectares.

The law also increases the limit on the size of land foreign buyers can purchase from two-and-a-half hectares of vacant land to 30 hectares, and buyers will have to comply with a condition to provide plans for the construction of a house on the land before they make the purchase.

- Foreign individuals and businesses are required to submit their project proposals for

vacant plots of land to The Ministry of Environment and Urbanization within two years of purchasing the land. If the ministry approves the project, it will be forwarded to the local land registry office for monitoring.

- The Cabinet will also be able to increase the 30-hectare limit on property purchase to 60 hectares as it deems acceptable.
- The law allows for the purchase of up to 10 percent of the total area of towns densely populated by foreigners.

The law in force since 2012, has led to a real estate boom. Such that, according to the Real Estate Investing Partners Association (GYODER) said that ‘’96,000 housing units were sold in the first quarter of 2012, 5.5 percent more than a year ago’’. Following the enactment of the reciprocity law, sales of real estate to foreigners marked an increase in the last two quarters of 2012, and reached USD 2.64 billion (GYODER, 2014).

The Ministry of Environment and Urbanization announced that real estate sales to foreigners increased from 2% to 5-6% in the last ten months of 2013.

In terms of the real estate prices; while the prices in prime coastal areas typically range from €1,200-€2,600 per sq metre in 2008, the price has risen up to range from $6000-$7000 per sq metre in 2015 .

THE MAIN PROCESS OF FOREIGN-PROPERTY ACQUISITION IN TURKEY

The responsibility of all types of land registry and cadastre processes concerning the acquisition by foreigners of real estates in Turkey belongs to the Directorship of Foreign Affairs Office of the General Directorate of Land Registry and Cadastre (GDLRC). Foreign individuals and legal entities who want to acquire real estate in Turkey must apply to the Directorship of Land Registry in the location of the mentioned real estate.

Figure 1 shows the process of real estate acquisition by a foreigner. The process has been starting with the application phase.

The Council of Ministers may, if the interests of the country requires so, determine or limit the acquisition of real estate and limited real rights by foreign natural persons in terms of country, person, geographic area, time, number, percentage, type, quality, surface area; or stop in whole or in part; or prohibit all together.

The decision on the citizens of what countries can acquire what kind of property is left to the Council of Ministers. The Council of Ministers allow citizens of almost all the United Nations Member States to acquire immovables in Turkey. With the new regulation, citizens of countries, such as the United Arab Emirates, Middle Eastern countries such as Iraq, Azerbaijan are now able to do acquire immovables (GYODER, 2014).
The quantity, ratio and floor area of the property: There is no limitation in the quantity for the foreign people. But persons with foreign nationality can buy maximum 30 hectares of property in Turkey and The Cabinet will also be able to increase the 30-hectare limit on property purchase to 60 hectares as it deems acceptable. Persons with foreign nationality can acquire property in a district/town up to 10 % of the total area of the said district/town.

***Type and quality*:** Foreign natural persons can acquire plot/land (empty), plot/land (building, dwelling), tourist facilities, workplaces and independent units (housing) through sales, inheritance, court decision and cadastre. These real estates can be used for dwelling, business/trade, entertainment/meeting, school/education, hospital/treatment, warehouse/bonded warehouse/storage, embassies, military, factory, religious, hotel and agricultural purposes.

***Restricted areas for sales*:** It is prohibited for foreign natural persons to acquire property in military prohibition and security zones and special security zones, independent sections militarily restricted for foreign acquisition and strategic areas (water protection basins, protected areas, flora-fauna areas etc.).

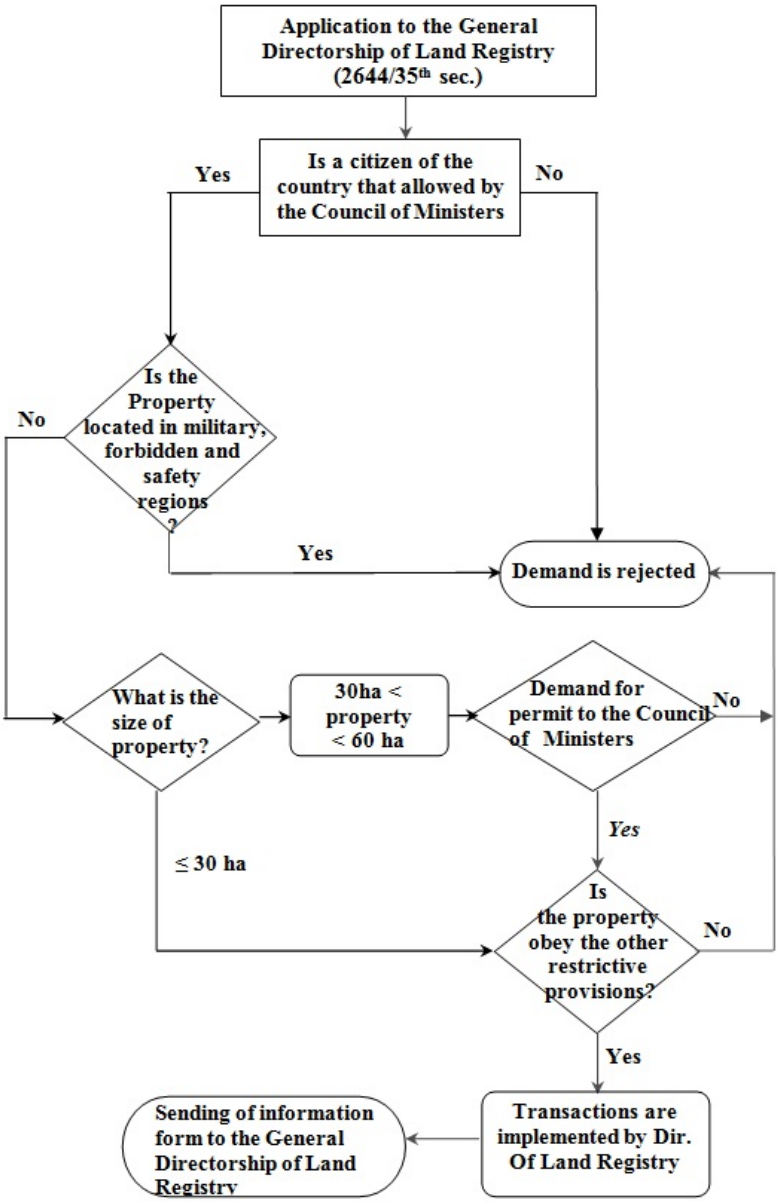

Fig. 1. The process of real estate acquisition by a foreigner in Turkey (adapted from Uzun and Yomralioglu, 2007)

THE PROFILE OF REAL ESTATE ACQUISITION BY FOREIGNERS IN TURKEY

The country is growing in popularity as a retirement destination, with many being lured by the warmer climate, lower costs of living, excellent property value, the natural beauty, the low-cost airlines, its young population, the opening to the East, and offerings of coastal vacation properties. So, the country has been attracted by various foreign citizens.

According to data from the first 8 months of 2014, nations who acquired the most real estate were the German and the English. They mostly prefer Aegean and Mediterranean Regions. (as seen from Table 1 and Table 2).

Considering the provinces in which foreigners acquired land, these are usually coastal areas that with natural, cultural and historical characteristics and advanced socio-economically and in terms of tourism.

Considering the nationalities of foreigner who acquire property, they are usually citizens of EU Member States with high national income per capita. However, as an exception in recent years, the Gulf countries as well show an interest in immovables in our country. Such that, according to the latest data, the amount of real estate acquired by the Gulf countries showed an increase of 167 percent per square meter compared to 2013.Investors from the Gulf countries acquired 735 thousand square meters of real estate in 2013, while this number was close to 2 million square meters in 2014. Istanbul, Yalova, Sakarya, Bursa, Kocaeli and Trabzon stand out as the provinces preferred by Arabs. Especially in Trabzon, real estate sales to foreigners showed an increase of 424 percent compared to the previous year. In this region where mostly Kuwaitis purchase fields, hazelnut groves and housing, house prices significantly increased.

Table 1. Acquisition of foreign property according to the cities in Turkey

	Not subjected to condominium		**Subjected to condominium**			**Total**		
City Name	Master property parcel number	Floor space of the main property (m^2)	Condominium ownership parcel number	Condominium ownership number	Floor space of condominium ownership (m^2)	Total parcel number	Floor space of total share (m^2)	Total person number
Muğla	2.672	3.306.801	3.551	14.572	3.376.262	6.223	6.683.063	22.924
Antalya	2.139	1.803.539	6.400	39.088	4.087.224	8.539	5.890.762	52.212
Hatay	341	1.769.869	7	13	194	348	1.770.063	220
İzmir	1.316	1.264.042	1.497	2.167	279.157	2.813	1.543.199	3.528
İstanbul	2.237	1.249.054	5.821	11.981	828.421	8.058	2.077.475	14.004
Aydin	1.245	1.156.231	2.741	13.016	1.736.984	3.986	2.893.215	19.857
Yalova	545	736.675	499	1.076	89.413	1.044	826.089	1.245
Konya	66	673.220	57	70	8.959	123	682.179	89
Adana	140	590.151	82	116	10.386	222	600.537	167
Amasya	79	509.519	4	4	146	83	509.665	16

Table 2. Acquisition of foreign property according to the countries in Turkey

	Not subjected to condominium		Subjected to condominium			Total		
Country Name	Master property parcel number	Floor space of the main property (m^2)	Condominium ownership parcel number	Condominium ownership number	Floor space of condominium ownership (m^2)	Total parcel number	Floor space of total share (m^2)	Total person number
Germany	3.523	4.565.431	4.946	8.841	1.091.930	8.469	5.657.361	12.638
England	3.315	2.699.102	6.675	23.322	3.935.932	9.990	6.635.034	36.984
Greece	1.040	305.154	639	1.077	36.211	1.679	341.365	2.277
Holland	770	1.186.053	1.627	3.867	619.276	2.397	1.805.329	5.551
Saudi Arabia	456	1.417.361	589	1.715	202.773	1.045	1.620.134	1.601
France	452	687.827	704	846	103.993	1.156	791.821	1.397
Austria	428	653.084	465	543	55.532	893	708.616	848
Turkish Republic of Northern Cyprus	425	777.033	1.035	1.249	114.198	1.460	891.231	1.513
USA	401	397.412	809	1.000	122.027	1.210	519.439	1249
Italy	292	150.856	492	647	63.282	784	214.138	960

CONCLUSIONS

From the period before the republic up to today, the acquisition of immovable property by foreigners in our country has been allowed with various agreements and laws. Sometimes the rights granted were withdrawn and gaps formed about permissions. That said, in our country, the fundamental regulation concerning the real estate acquisition by foreign real persons was made with Land Registry Act numbered 2644, dated December 22nd, 1934. Over the years, 35th and 36th articles were amended according to needs and sometimes the said articles were revoked by the Constitutional Court. Since 1984, there have been five cancellation decision have been given in total. In spite of this, 35th an 36th articles were amended each and every time.

While there has not been any changes concerning the military security zones and strategic areas that cannot be acquired by foreigners, the maximum surface area that can be acquired bt a foreign real person has been reduced to 2.5 hectares from 30 hectares and then again increased to 30 hectares. In addition, while it was not allowed that the total surface area of property acquired by foreigners exceeded 10 percent of the total planned area in a province and district, the recent regulation does not allow it to exceed 10 percent of the total surface area of a province or district. Also, the most important change is the removal of the principle of reciprocity. In this way, citizens of the countries that do not conform to this principle were not able to acquire property in our country, after 2012, citizens of approximately 183 countries were granted real estate acquisition right. As a result;

It is observed that different applications were preferred in different periods in Turkey concerning the type, surface area and location of property acquirable by foreigners, the determined acquisition quantity did not have a rational ground, and opinions concerning acquisition restrictions were not created based on impact assessment efforts in our country.

*Legislation and applications concerning real estate acquisition by foreigners is a very dynamic area and changes in this area take place very often.
*It was preferred to facilitate property acquisition for citizens of several countries.
*While there used to be a high demand for the Mediterranean and Aegean coasts by the European Union countries, the Black Sea coasts begun to be favored by the Gulf countries.
*In addition to goals set in development programmes; the removal of restrictions on property acquisition by foreigners and facilities provided to foreigners in in real estate market by OECD and EU member states may be shown among the reasons for constant changes and expansion of acquisition boundaries. As a EU candidate, Turkey has also been affected by these expansions within certain rules.
*Legal regulations made so far show that, as is the case in all the countries in the international unions of which Turkey is a member, foreigners are granted more rights concerning property acquisition and as a result of this, foreign direct real estate investment's contribution to the economy increased to approximately 13.3 billion dollars according to the data from the Central Bank between 2000 and 2013.
*Although these legal regulations have a positive return in terms of economy, international relations and international real estate trade, it is evident that measures related to social, cultural and economical changes caused by foreigners who purchase these properties are not taken. Such that, the increase in the price of a commodity results in a decrease in the demand for it according to the law of demand. However, in cases where the average income is high, for example, for citizens of foreign countries with an annual income of $37.849, this model becomes different. It seems unlikely that Turkish citizens with an average annual income of $13.464 can adopt to these market conditions.
Some suggestions could be made for the solution of above mentioned problems;
*In order to prevent cancellations of the Constitutional Court, the quantity, surface area and location restrictions concerning the real estate acquirable by foreigners must be rationally determined.
*In provinces where the residential area is scarce, such as provinces in the Eastern Black Sea Region, the proportion of real estate to be sold must be as low as possible. In other words, a certain sales limit must be set for each province.
*Due to the absence of a population limit, there is a danger of resident population to become the minority, especially in the touristic settlements. Regional population assessments must be made to prevent this.
*As in other developed countries, in order to prevent the commercial use of real estate sold to foreigners as hotels, hostels and timeshare, it must be compulsory for dwellers to provide identity statement to the local law enforcement. The use of immovable property as off-record commercial property must be thus prevented.
*The ratio of ten percent will cause majority of the residential/livable areas to be owned by foreigners, particularly in provinces where they are limited. For example; it has been identified that this was the case for provinces such as Trabzon, Rize, Ordu, Gumushane. Essentially, before including this provision in the law, a technical study must be conducted

regarding the relationship between provincial area and residential area. In this case, the ratio in question should be residential area rather than the surface area of the province.
*Formation of a department consisting of experts that will directly examine and follow this issue must be considered on a provincial basis within governorships.
* In the context of land management, an information system integrated with land registry that involves all the national resources related to land, types of land use based on the development plan, military forbidden zones, military security zones, special security zones that limit the land acquisition and conversion, areas required to be protected due to reasons related to irrigation, energy, agriculture, mining, sit, faith or cultural properties, special conservation areas with flora-fauna characteristics, public real estate presence and real estate owned by foreign natural or legal persons is inevitably needed.

REFERENCES

GYODER, 2014. Gayrimenkul ve Gayrimenkul Yatırım Ortaklığı Derneği, 2014 Yılı Üç Çeyrek Verileri ile Gayrimenkul Sektörü, Gayrimenkul ve Gayrimenkul Yatırım Ortaklığı Derneği İktisadi İşletmesi, İstanbul (in Turkish).

Availablefrom:http://www.gyoder.org.tr/img/mccontent/20141209154141_25912014_yili_3_ceyrek_verileri_ile_gayrimenkul_sektoru.pdf (accessed 15.03.15).

HPI, 2009. Housing Price Indices, A World Wide Overview Of Real Estate Prices in Recent Years, Research Division of the National Association of REALTORS, Washington.

Available from: http://www.realtor.org/sites/default/files/reports/2009/world-wide-overview-real-estate-prices-recent-years-2009-08.pdf (accessed 22.02.15).

Tesser, L.M., 2004. East-Central Europe's new security concern:foreign land ownership, Communist and Post-Communist Studies 37 213–239.

Uzun B. and Yavuz A., 2003. Avrupa Birliği'ne Uyum Sürecinde Yabancıı Uyrukluların Türkiye'de Taşınmaz Mal Edinimi, 9. Türkiye Harita Bilimsel ve Teknik Kurultayı,101-110, Ankara (in Turkish).

Uzun B. And Yomralioglu T., 2007. Türkiye'de Yabancıların Taşınmaz Edinimi: Arazi Yönetimi Bağlamında Bir İnceleme, TMMOB Harita ve Kadastro Mühendisleri Odası 11. Türkiye Harita Bilimsel ve Teknik Kurultayı, Ankara(in Turkish).

WB, 2014. World Bank Group – Turkey Partnership: Country Program Snapshot,

Available from: http://www.worldbank.org/content/dam/Worldbank/document/eca/Turkey-Snapshot.pdf (accessed 13.01.15).