Statically Analytical Study of Factors Affecting Real Estate Valuation of Residential Units

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Abstract

Real estate valuation and associated variables is one of the most important dynamics factors which affected in the Egyptian real estate market, especially within the framework of many variables that occur and effect on the price of the real estate and thus the mechanism of valuation in the Egyptian real estate market, so this study will try to identify the most influential variables in this field and try to determine them in mathematical equation acceptable.

Keywords: Real Estate –Residential –Valuation – Variables – Statically.

1. INTRODUCTION

The study examines the various factors influencing the Egyptian real estate market and the different reciprocal relations between them in order to obtain the most accurate real estate valuation based on scientific methods. The basic hypothesis of the research focused on the effect of these factors on the Egyptian real estate market according to their relative weights on the Egyptian real estate market can be linked through a statistical equation of the first class.

The research represents the theoretical approach and the basic concepts of specialization. T0he research also contains the entrance to the problems of the Egyptian real estate market and the Egyptian attempts to create a real estate appraisal model that does not depend on personal valuation but depends on mathematical equations.

The study dealt with various international experiences, both from developing countries or developed countries. in addition to monitoring the Egyptian real estate market through 450 case study in 5 regions in two governorates through 71 variables, An advanced statistical program, SPSS, was used to link these variables.

2. BACKGROUND

Research focuses mainly on factors influencing the real estate valuation in a period of in (2018-2019), which may be considered as a continuation of previous researches, where the cross-sectional method is adopted. The research includes four main axes.

- Research Field: Where the research deals with the most important factors and variables that affect the real estate valuation.

- The theoretical part: includes a historical study of the real estate market and study the current situation with the aim of presenting a vision and future solutions for real estate valuation in Egypt.

- Field Area: The research includes some areas within the Arab Republic of Egypt, two governorates (Cairo –Giza).

- The practical part: The study includes (urban - social environmental - economic - legislative) characteristics each includes many variables.

2.1 Research Objectives

The research aims basically to focus on factors most influential and the exclusion of factors least influential in the field of real state valuation in the Egyptian society and overcome the perception purely theoretical (descriptive). And to look at a pilot planning based on the mathematical analysis which explains accurate results. Sustainability of resources is achieved through the appropriate use of land use when real value is known

2.2 Research problem

- Lack of studies that valuate real estate scientifically.

- The need to identify factors which affect valuation process in a simplified equation that facilitates organizations work.

- The lack of studies that deal with the quantitative valuation in Egypt systematically, and based on data that may not be the most recent.

- The need to identify these factors in a simplified format that facilitates the work of research organizations that may be assisted by persons with intermediate or non-specialized qualifications or non-

specialists in the complex fields. Therefore, in order to reach satisfactory results and serve the Egyptian society, and achievable in less time, effort and cost.

2.4 Research goals

The objectives of this research are divided into direct and indirect goal. Some of them can be mentioned as follows:

Indirect Goals: The main objective of this study can be summarized as follows:

- Emphasize the importance of methodological work according to the principles of statistical analysis and not according to personal desires and thus reach objective goals.

- Facilitating work on government and private entities that act as real estate appraisers.

- Sustainability of resources is achieved through the appropriate use of land use when real value is known

2.4.1 Direct Goals

- Monitoring the most influential factors on the value of any residential property in Egypt and exclude the least influential factors.

- Exclude factors affecting the price of residential real estate in the current situation, which may differ from any previous study as the dynamics of the real estate market impose very rapid changes, which may reflect the results and the output of any research, and therefore the results of any previous study may not be accurate And may lead to wrong results if used at the moment.

- Obtain a mathematical formula (linear equation of the first degree) to facilitate the work to arrive at the results of an error acceptable to save time and effort, as it will not be necessary to study a large number of variables. As will lead the results of the study, and thus provide the effort during the work of statistical censuses and the speed of updating results commensurate with the changes that may occur.

2.5 Research Hypothesis

Research assumes that there is a factor or a group of factors that are the most influential on the price of the real estate in a given area. This factor can be reached and determined in a statistical mathematical way.

A linear mathematical equation of the first degree can be reached by an acceptable error rate which links the price of the real estate with the most influential variable. And this equation represented like:

$$Y = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + \varepsilon$$

B_0 = constant

B_1 , B_2 ,…. The amount of change that occurs in y when x increases by one unit

ε the amount of random error.

3 GROWTH OF VALUATION PROFFESSION

The valuation profession is an old industry that has started since the existence of human, but it was not done professionally. In Egypt, valuation profession takes place professionally and began in a legal form in the creation of Law no.100 of year 1957.

Although the law sought to codify and regulate the profession of valuation, it was limited only to movables, goods and machinery only and did not address the process of valuation of real estate, land and residential units.

There was no scientific curriculum, rules, foundations or charter for the profession, which is based on the valuation process, which means the possibility of conflict or manipulation of what is written within the reports of valuation.

3.1   Steps towards successful real estate valuation

Cooperation with Cairo University to establish a real estate appraisal center to provide training courses to create international professional cadres in the real estate valuation, and then trainers pass exams with score not less than 75%[10].

4. REAL ESTATE MARKET ANALYSES

The efficient market is characterized by :

 - The products are interchangeable.

 - There are enough buyers and sellers.

 - Product information is available.

 - Government intervention is weak and negligible.

 - Prices are often stable.

 - Easy availability and transportation of the product.

5. METHODS OF VALUATION

The valuation process is applied in order to form a well-supported opinion based on analysis of the relevant public and private data. Valuators develop a specific opinion on the value of real estate assets with special procedures that reflect one of the three distinct methods of data analysis[10].

 - Cost Method

 - Income capitalization method

 - Comparative Method

6. INTERNATIONAL EXPERIENCES

In the context of efforts to make the real estate valuation process more efficient and with a high degree of confidence .it was important to study what other countries had done to create a system that relies not on personal valuation but on factors that can be introduced in the valuation process.

In this part, some of the international experiences will be explained and analyzed .some of these cases have included many factors influencing the valuation process and others have focused on only one element and analyzing it into several elements. Through research, the researcher will monitor, analyze and test these elements in line with the Egyptian real estate market.

6.1   The Effect of landscape on Estimate the Value of a Real Estate ″Applied to two Japanese cities″ .

Methodology: A three-step approach was developed:

- First, a scheme was designed, based on data were collected via surveys of sample sites and their surrounding areas.

- Secondly, critical factors of landscape valuation were extracted by employing a principal component analysis.

- Finally, a hedonic approach was adopted to examine if the principal components of urban landscapes were significant determinants of real estate prices.

Sample sites were designated for residential uses , including 'low-level residential zones' , 'medium- residential zones', 'high -residential zones' (samples was chosen to be mixed types of residential uses).Located in residential maps so that detailed data on the environments and landscapes of the surrounding areas could be collected by survey. Finally, the number of samples with complete data was 272. Among the sample, the largest was 876 m^2 and the smallest 45.66 m^2, with an average of 260.8 m^2. The databases for the two samples were carefully constructed.

Data include detailed information on sample, including.

- Their (sizes, shapes, the width and direction of the roads in front of the sites)

- Accessibility to public transportation

- The environmental attributes of the neighborhoods

- The indices of 'chome' [1] building density

- Gross floor-to-area ratio

- Population density

- Structure system

- Vacant sites

- Sites used for parking

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[1] the Japanese name for a city block, which usually constitutes the smallest unit of a census .

- Houses without gate-walls

- Continuity of external walls

6.1.1 The Result of the Study

The negative effects of population density and presence facilities were reasonable. The property prices differed could be explained by the conviction that higher places provide better protection .

The analyses showed that the proposed method is effective for valuating urban landscape amenities standardized survey, principal component analysis and hedonic analysis.

6.2 The Effect of Urban Factors on Estimate The Value of A Real Estate ″Applied to Case of Rwanda″ .

The study seeks to determine factors affecting the value of residential real estate price. The study uses 36 variables including structural, environmental and neighborhood attributes from the 2010-2011 survey data on income, expenditures and living conditions for the Rwandan. With the use of the semi-log form of the hedonic price model and the survey data, factors of urban properties are determined and quantitative estimates of the Willingness-to-pay.

Methodology: Hedonic Pricing model for the Rwandan Housing Market. The Rwandan housing market can be expressed by the following linear equation, which contains a bundle of structural, neighborhood, and environmental attributes:

$$P= f (Xs, Xn, Xe ……..Xk)   (1)$$

Where P is the market price of the house, and Xs, Xn, Xe, Xk are respectively structural, neighborhood, and environmental characteristics respectively, as well as k attributes. The partial derivative of the equation, with respect to each housing attribute, provides information on the implicit price of housing characteristics.

For this study, two functional forms of the hedonic price models are used to find the determinants of urban land market values. The two functional forms test the relationship between property prices and the selected housing characteristics, namely the linear (Eq.3) and the semi- logarithmic functional forms (Eq.4). When the relationship is assumed to be linear, the estimated equation is expressed as:

$$P=X\beta +\varepsilon   (3)$$

Where P is the estimated price of the property, and the vectors Xs, Xn, Xe are correspondingly for structural, neighborhood, and environmental attributes collapsed into a larger vector X.

The semi-log model allows the value added to vary proportionally with the size and quality of the home.

$$LnP=X\beta +\varepsilon   (4)$$

Where Ln P is the natural log of property price, X is the collapsed vector for housing attributes, and ε is the error term.

6.2.1 Selection of model variables.

Explanatory variables chosen for this study are given as: 10 variables relate to housing structural characteristics, 20 variables for environmental and housing amenities, 5 variables to neighborhood characteristics. Thus, total of 35 variables are selected.

6.2.2 Study Result

- Real estate value rise by the existence of environmental amenities.

- Real estate located in an unplanned urban area decreases by about 15 %. Property located in low-income people- decreases by 51.4%.

- These results suggest that quality and location of the neighborhood could be important factors influencing housing prices

6.3   The analysis of urban feature that effect on price in residential areas: Istanbul, Turkey

In this context, 13 neighborhoods of Istanbul were selected from various districts with random sampling method[8].

- These neighborhoods include mostly residential areas.
- The types of the houses are not similar to each other in terms of form, height and density.
- The housing values are different despite some of the house types are similar.

6.3.1 Regression Analysis

A regression analysis [3] was made by using all the data gathered from the case areas and they were evaluated in the scope of the designed method. In the regression analysis, land values were used as dependent variables and all the data, gathered for the city, was used as independent variables. In the regression analysis, the parameters which define the land values in residential areas were mentioned.

In the proposed model, variables were used for the regression analysis to understand exactly what were the most effective parameters on values .the data which was generated for the parameters of (accessibility, Visual and environmental quality, security, Street/density relationship and space syntax).

The accessibility concept was studied in the 13 selected neighborhoods. The analyses show that the most relevant parameters were the distance from the sea and the distance from the city center. The next relevant parameters were the distance values from the sport areas, entertainment zones and cultural zones. It is also confirmed that the least relevant

parameter was the distance from the retail centers where daily needs are met.

This research could be helpful for the real estate sector actors in decision making processes. Investors, home owners, brokers, valuators could use this model to evaluate the current situation and helping to define house prices. On the wide perspective local governments decisions on different scales could have wider effect.

6.4   Usage of location analysis software in the valuation of real estate properties applied to Oradea city.

The study analyzed both the economic factors[2]: based on the International Valuation Standards and also the locational factors of a real estate and identified the common factors which are used in methods and which can provide solutions in real estate valuation.

In order to valuate a residential real estate, the spatial decision support system must fulfil two types of analyses:

- An analyses regarding the physical and social environment of the property.

- A financial assessment of the properties. While the financial assessment of the property can be done with hedonic regression methods, or based mainly on the experience of the expert, to analyze the physical and social environment is taking in consideration the following indicators:

- Physical factor: Slope and aspect of the land, vegetation, parks, rivers, natural parks, agricultural potential, landscape, soil conditions.

- Social factors: commercial areas, schools and nurseries, hospital and health centers, entertainment possibilities theaters, leisure areas, car parks, open areas, criminality, neighborhood .

- Infrastructure factors: road network, public transportation stops, railway stations, supplied basis services (sewage, water pipelines, electricity, gas, central heating, internet, cable, so on)

- Environmental factors: auto traffic pollution and noise, industry pollution, railway noise, airplane noise, pollutions caused by animal breeding.

- Economic factors: price trends, taxes.

- Legal factors: permitted type of functionality, permitted number of floors, permitted construction area.

6.5 UK Valuation Standards

These standards are national association valuation standards in the UK[4]. They supplement, expand or amend the global valuation standards so that they meet UK statutory or regulatory requirements.

6.6 RICS Valuation Professional Standards

The aim is to engender confidence and to provide assurance to, clients and users, that a valuation provided by an RICS-qualified valuer anywhere in the world will be undertaken to the highest professional standards overall , the valuation will provide[5].

- Credible and consistent valuation opinions by suitably trained values with appropriate qualification and adequate experience.

- Independence, objectivity and transparency in the value's approach.

- Clarity regarding the basis of value, including any assumptions or material considerations to be taken into account.

6.7 International Valuation Standards Council(IVSC)

The purpose of IVSC [16] standards is to provide users with assessment services by a qualified valuator with the highest professional standards. It also assures users that the valuation is independent, objective and consistent with internationally recognized.

6.8 The Egyptian Standards for Real Estate Valuation

The Egyptian Standards for Real Estate Valuation is the first national criteria for real estate appraisal in Egypt. The first standards in line with international standards for real estate valuation.

6.8.1 Objectives

- Enhance the performance of the real estate appraisal and preparation of the valuation report, and verify that valuation experts are committed to the highest levels of impartiality and non-conflict of interest.

- Raise the level of performance of the profession and maintain the interests of workers in the field of real estate appraisal consolidation and confirmation the credibility of their work towards all parties concerned with real estate valuation.

7. SAMLES AND DATA COLLECTED

Survey has been done in a specific area (Cairo -Giza) and in a specific time (2017-2018). Regions have similar characteristics. These areas have been studied accurately and real estate prices have been collected to extract factors that affect the variation in real estate prices. (Residential buildings only)

Variables can be summarized as follows:

- Monitoring and analyzing the objectives of the field study.

- Selection of study samples by identifying the areas to be monitored and studied.

- Select variables.

- Analysis of data related to variables studied.

- Monitoring, summarizing and extracting the most important result and recommendations.

7.1 Geographical distribution of case studies:

The governorates of the Arab Republic of Egypt were selected from Greater Cairo governorates, representing 450 cases.

7.2 Variables selection

The study started with the definition of 77 variables, including variables (economic, urban, social, and environmental). Using the statistical program, the most effective and influential variable have been chosen so that we can address all the different axes of

- Economic variables.

- Urban variables.

- Social variables.

- Environmental variables.

Table1. Test of Homogeneity of Variances

Price	Test of Homogeneity of Variances		
Levene Statistic	Df_1	Df_2	Sig.
21.728	4	405	0

The test found that there is a difference between the groups in terms of prices and this difference is statistically significant between regions. The value of

$F= 8.55$ calculated at significance level for the homogeneity test between groups using (Le vin test) found a lack of homogeneity between the regions in terms of prices .

Table2. Total Variance Explanation

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.12	58.861	58.861	4.12	58.861	58.861	3.816	54.513	54.513
2	1.12	16.025	74.886	1.12	16.025	74.886	1.42	20.37	74.886
3	0.74	10.663	85.549						
4	0.35	5.091	90.639						
5	0.31	4.437	95.077						
6	0.18	2.643	97.72						
7	0.16	2.28	100						
Extraction Method: Principal Component Analysis.									

In Table 2 total factors (urban, landscape, environmental, physical and market characteristics) explained (74.88 %). The first factor which contained (urban, landscape, environmental, and physical) characteristics explained (54.5%) of prices differences and the second factor (market characteristics) explained (20.37%).

7.1 Fifth Settlement

- The fifth assembly is one of the clusters of the new city of Cairo and consists of several neighborhoods.

- The 90th Street is one of the largest streets, which is the central axis of the city of New Cairo, which contains financial and administrative centers and commercial activities serving the city. The fifth assembly is one of the fastest growing areas in terms of the rate of construction in Egypt, and is characterized by villas and shortness and urban diversity of the Roman and Islamic and Paranoiac and modern.

In Table 3 the independent variables (urban, landscape, environmental, market, policy) characteristics explained 26.4% of the change in price.

Table3. Model Summary a,c for the first case study (fifth settlement area)

Model Summarya,c									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.521b	0.272	0.264	19192	0.272	36.59	1	98	0
a. area_1 = fifth settlement									
b. Predictors: (Constant), Landscape									
c. Dependent Variable: price									

The table shows that the independent variables (urban feature, landscape characteristics, environmental characteristics, market characteristics, market characteristics, kind of glomeration, policy) explain 26.4% of the change of the real estate price.

Table 4. Coefficient analysis for fifth settlement

Coefficients[a,b]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3457672	956240.7		-3.616	0		
	Landscape	3855146	637267.2	0.521	6.049	0	1	1
b. Dependent Variable: price								

Table 4 shows the value of the correlation coefficient of the model and the explanatory capacity of the model when the variable is introduced gradually. We find that the landscape characteristics were the most important variables in the explanatory power of the difference in real estate prices, reaching 2920.0L.E. landscape characteristics explain 52.1%.The equation was as follows:

$$Y= -3457672.483 + 0.521X1 \qquad (5)$$

7.2 Al Maadi

One of the most famous areas in Cairo, located in the south of the city on Nile river, . the neighborhood "old Maadi" is one of the most expensive residential areas in Egypt.

In Table 5 the independent variables explained 63.5% of the change ratio.

(Physical characteristics) explain 61.2% of the change and (policy characteristics) explain the 2.3% of the change in real estate price.

Table5. Model Summary a,c for Maadi area

Model Summary[a,d]									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.782b	0.612	0.608	3482942.612	0.612	148.356	1	94	0.000
2	.797c	0.635	0.627	3397846.460	0.023	5.767	1	93	0.018
a. area_1 = maadi									
b. Predictors: (Constant), physical characteristics									
c. Predictors: (Constant), physical characteristics, policy characteristics									

The table 5 shows that the independent variables account for 63.5% of the change ratio. Physical characteristics explain 61.2%of the change and explain the characteristics of 2.3% of the change.

Table6. Model Summary a,c for Maadi area

Coefficientsa,b								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-11039578.045	1273892.716		-8.666	0.000		
	physical characteristics	5119767.115	420337.645	0.782	12.180	0.000	1.000	1.000
2	(Constant)	-5228407.322	2720274.468		-1.922	0.058		
	physical characteristics	6980892.604	876784.522	1.067	7.962	0.000	0.219	4.572
	policy characteristics	-3996942.713	1664344.744	-0.322	-2.402	0.018	0.219	4.572
b. Dependent Variable: price								

Table 6 shows the value of the model correlation coefficient and the explanatory capacity of the model when the variable is introduced gradually. We find that the physical characteristics were the most important variables in the explanatory power of the difference in unit prices . physical characteristics explain 10.6% of the unit price changes.

Policy characteristics explain 3.2% of price changes. The equation was as follows:

$$Y = -5228407.322 +1.067 \, x_1 + (-0.322) \, x_2 \qquad (6)$$

7.3 Al Mokattam District

Al Mokattam is linked to Al-Nasr Street and Salah Salem Street. An internal road project «Uptown compound » .it is located on the highest mountain Mokattam in Cairo.

Table7. Model Summary [a,c]   for Mokattam

Model Summarya,d									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.315b	0.099	0.082	4424161.937	0.099	5.933	1	54	0.018
2	.496c	0.246	0.218	4084576.254	0.147	10.352	1	53	0.002
b. Predictors: (Constant), Landscape									
c. Predictors: (Constant), Landscape, environmental characteristics									

Table 7 shows that the independent variables (Landscape characteristics, environmental characteristics) explain 21.8%of the variance. Landscape characteristics explain 9.9% of the change and environmental characteristics explains 14.7% of the change.

Table8. Coefficient analysis for Mokattam

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3157179.4	2331839.084		-1.354	0.181		
	Landscape	3171809.2	1302230.289	0.315	2.436	0.018	1.000	1.000
2	(Constant)	2050634.9	2693443.710		0.761	0.450		
	Landscape	8986027.0	2170475.404	0.891	4.140	0.000	0.307	3.259
	environmental characteristics	-6032550.3	1874927.193	-0.693	-3.217	0.002	0.307	3.259

a. area_1 = Mokattam

b. Dependent Variable: price

Table (8) shows that Landscape Characteristics was the most important variable in the explanatory power of the difference in unit prices , physical characteristics explain 89.1%

Environmental characteristics explain 69.3% of the change.

The equation was as follows:

$$Y = 2050634.931 + 0.891X_1 + (-0.693) x_2 \quad (7)$$

7.4 Al Ahram Gardens

Located in Giza Governorate, Egypt, 1 km from the Shooting Club in the Pyramids - Hotel Area - in front of the Pyramids, rises from the sea level 180 meters and 60 meters from the Nile River. new tourist area ,in front of the Museum of civilization. Table 9 shows that policy variable explained 28.8% of the change in price in Al haram Gardens area.

Table9. Model Summary a,c for Al harm Gardens area

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.537b	0.288	0.279	1667903.0	0.288	31.95	1	79	0.00

Table10. Coefficient analysis for Al harm Gardens

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VI
1	(Constant)	-4724036.3	1061883.		-4.4	0.00		
	policy	3023569.55	534900.1	0.537	5.65	0.00	1.000	1.0

From the previous table we can get a linear equation of the first degree Eq. (7) which represents the predicted price in Al harm Gardens:

$$Y=-4724036.371+0.537X_1 \qquad (8)$$

7.5 Sheraton

In Table (11) the environmental characteristics, (policy characteristics) explain 67.8%of the percentage of change,(policy characteristics)explain 60.4% of the change and (environmental characteristics) explain 7.4% of the change.

Located in Cairo governorate next to Cairo International Airport, and it contains several residential communities.

Table11. Model Summary a,c   for Sheraton area

Model Summary a,d									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.777	0.604	0.599	622776.418	0.604	114.29	1	75	0.000
2	.824	0.678	0.670	564965.559	0.074	17.134	1	74	0.000

Table 12 shows that policy characteristics were the most important variables in the explanatory power of the difference in unit prices, policy characteristics explain 46.2% while environmental characteristics explain 41.7% of unit price changes

Table12. Coefficient analysis for Sheraton

Coefficients a,b								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Toleranc	VIF
1	(Constant)	-4135654.7	506481.8		-8.165	0.0		
	policy	2821113.3	263879.1	0.777	10.691	0.0	1.0	1.0
2	(Constant)	-4700143.4	479277.0		-9.807	0.0		
	policy	1675555.8	365915.3	0.462	4.579	0.00	0.428	2.3
	environmental	1181523.5	285436.7	0.417	4.139	0.00	0.428	2.3

From the previous table we can get a linear equation of the first degree Eq. (8) was as follows:

$$Y=-4700143.494+0.462X_1+0.417X_2 \qquad (9)$$

7.3 Model Equations for Studied Areas

Through the practical part it was found that there is a difference in the factors affecting the price of residential real estate in the studied areas. Therefore, the study obtained a linear equation for each region separately to obtain the price of residential real estate. Table 13 shows total model equation for the five areas results from previous analysis.

Table 13. Model Equations for Studied Areas

Area	Equation	R^2
Fifth Settlement	$Y=-3457672.483+0.521X_1$	0.264
AL Maadi	$Y=-5228407.322+1.067X_1+(-0.322)X_2$	0.627
Mokattam	$Y=2050634.931+0.891X_1+(-0.693)X_2$	0.218
Al Haram Gardens	$Y=-4724036.371+0.537X_1$	0.288
Sheraton	$Y=-4700143.494+0.462X_1+0.417X_2$	0.678

8. STATICAL METHODS USED

The Statistical Package for Social Science (SPSS) statistical program was used to perform the necessary database collected and analyzes to reach the final models. This was done through main stages:

- Monitoring variables: through the classification of the database in the matrix

- Descriptive method: through the study of several main axes:

  - Mean

  - Std. Deviation

  - Confidence

  - Max. & Min. value of data

- Statistical analysis of research is conducted through three main types of analyzes:

  - ANOVA Analysis

  - Correlation Coefficients

  - Stepwise multiple regression models

8.1 Correlation analysis

This analysis monitors the indicators of the degree to which variables are correlated. Where the coefficient of correlation is between (1 + 1.0). If the reference is negative, there is a reverse correlation and if positive, there is a direct correlation.The value indicates strength and if less than zero, the extraction is weak and if zero is not devised and if it is 0, 5 or 0.6 the average correlation and from 0.7 to less than 1 the correlation is strong and if = 1 is a complete correlation.

8.2 Regression Analysis

Stepwise performs the test step by step. This statistical analysis estimates the relationship between two or more variables to predict the value of one variable when other changes. And ends with the development of developed models and the introduction of variables with strong correlation and the exclusion of low-impact variables to reach a developer model to achieve the most effective management of the real estate market.

9. VALIDATION OF HYPOTHESIS

The hypothetical analytical approach was used to validate the two basic hypotheses by a statistical program developed by SPSS .After all the variables were monitored through the theoretical thought in the first five chapters and then the classification was made to measure these variables and their relation to the different vocabulary in the selected samples.

9.1 Validation of the first hypothesis

That a sophisticated model of the various factors and variables that affect the real estate market according to the relative weights of each variable and the degree of their association with other determinants of each other helps in managing the real estate market and directing the research problem. Where the relative weight of each variable varies according to the prevailing economic situation in the country.

A descriptive analysis of the different variables was performed and the relationship between the variables was examined.

These relationships were collected then analyzed and the following axes were identified.

- The relationship between variables.

- The effect of each variable separately on the unit price.

- The relative weights of these variables and their ranking according to their impact on the real estate market. This proves the first hypothesis.

9.2 Validation of the second hypothesis

The housing values are different despite some of the house types are similar and it is possible to achieve balance by introducing a sophisticated model that includes all the different elements.

10. CONCLUSIONS

- There was a close correlation between recreation areas (in the fifth assembly area), as well as the presence of hospitals (in the Mokattam area) and the presence of centers to meet the needs of the day (in the gardens of Al-Ahram and Sheraton) A natural result is explained by many factors, including the difference in population composition in these areas and the interest of each category of the populations of the agent is different from the other category, for example offers and densities of streets in the area of Maadi is not different in terms of meaning of the existence of recreational areas in the assembly area because the streets in the area of Maadi Entertainment areas for its residents.

- The results of the study correspond to the prevailing planning statement (the planning areas are the lungs of the cities). Thus, the Egyptian society, like other communities, is interested in the open areas as proved by the results of the study

- Areas with the most affluent demographics are interested in recreational areas while the middle-income areas such as Al-Ahram Gardens are more interested in the areas of daily needs

- The presence of universities is a common factor in all areas of Cairo and significantly affects the prices of real estate.

- It was also found that the presence of primary schools is an influential factor in the disparity in real estate prices in Cairo

- It was also found that the proximity (metro station) significantly affect the prices except for the assembly point of the absence of a metro is a logical result.

- The fifth assembly area is a high income area and there is more than one car per family which explains the effect of large parking spaces on the value of the property.

11. RECOMMENDATIONS

- The study recommends similar studies using the analytical statistical model in other areas inside and outside Cairo

- When starting to establish new urban areas, it is preferable to take into account (shopping mall - areas to meet daily needs) considering that it is one of the most influential factors in order to achieve sustainability.

- It is recommended to conduct questionnaires in the new areas to know what the colonists need and take into account in any design process.

- In the existing areas, it is recommended to take into consideration the results of the study in the process of replacement and renewal of existing areas so that the factors that affect positively.

- The study recommends using the methods of modern statistical analysis when conducting any study in order to obtain objective results not controlled by self-planned.

- The study recommends real estate appraisers using the equations reached by the study when undertaking any real estate valuation process to obtain accurate results and objectivity

- It is recommended to follow the same methodology that was in any area not covered by this study.

- The study recommends the creation of a comprehensive map of Egypt so that each region contains a model of real estate prices in these areas, which is beneficial in the terms of taxes calculation and all financial transactions.

- The study recommends that investors use the results of this research when conducting feasibility studies for their investment projects.

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