Geographical Evaluation of Real Estate Services Offices in the City of Abha - Saudi Arabia, A Geographical Study using Geographic Information Systems (GIS)

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Abstracts

Service geography is one of the branches of applied geography that has emerged as an applied intellectual interest to engage with the immediate direct needs of both urban and rural communities. The importance of studying services is due to their connection to economic planning, so geographical interest in them increases, as applied geography is based on a specific approach and philosophy of relevance or social benefit that focuses on the application of geographical knowledge and skills. To come up with solutions to real-world social, economic and environmental problems. The study focused on the use of geographic information systems in analyzing the geographic calendar of rental offices in the city of Abha, relying on the most important applied aspects of geographic information systems represented in spatial analysis. To reveal the characteristics of the spatial distribution of rental offices and their distribution pattern, and to evaluate the efficiency of their distribution according to the local standard. The study came out with a number of results and recommendations, and also verified the hypotheses assumed by the researchers.

Keywords: rental offices; Real estate offices; Abha; spatial variation; Applied Geography; Geographic information systems.

Introduction

Applied geography is based on a particular approach and philosophy of social relevance or utility which is based on the application of geographical knowledge and skills, to find solutions to real-world social, economic and environmental problems, a socially relevant approach to studying the relationship between person and their environments (Pacione, 2011, p.26). It is concerned with the problems that confront human society, both natural and human, as it is the added eye to decision makers and policy makers that govern the world at its various levels (Omar, 2015, p.

22). The applied trend in geographical studies constitutes one of the pillars of strengthening the relationship of geography with society and supports the interaction between it and other sciences (Ahmed and Sharaf, 2008, p. 10). Real estate services offices are defined as activities related to real estate, marketing, managing, selling, and renting it. These include: real estate marketing, property management, facilities management, real estate auctions, real estate advertisements, and real estate consultations and analyses. Real estate services offices are spread everywhere, most of which are informal. Its work consists of providing real estate services such as (real estate marketing - evaluation and valuation - implementation of contracting contracts, construction, maintenance and management of properties, residential and commercial complexes - management of real estate marketing operations, etc.). The real estate marketing service for others (buying/selling) comes at the forefront of the most active services in real estate offices as it is the most profitable among other services. The real estate office receives 2.5% per transaction from the total contract value, Although the percentage (2.5%) is statutory, it was approved by the Council of Ministers in 1398 AH, in the real estate offices organization regulations, in Paragraph (A) of Article Five of the same regulations, which stipulated that the sales commission is determined by agreement between the real estate office, seller, and buyer, the total commission must not exceed 2.5% of the contract value. However, there are those who consider it high compared to the modest service provided by the real estate office within a few minutes, which often does not exceed the time of filling out the sales or purchase contract.

Study area:

The city of Abha is located between latitudes 52° 10′ 18″ and 31° 20′ 18″ north, and between longitudes 59° 25′ 42″ and 30° 41′ 42″ east in southwest Saudi Arabia. Within the Asir Administrative Region, it is bordered to the east and northeast by Khamis Mushait Governorate, to the northwest by Tanomah Governorate, and to the west and southwest by Mahayil Governorate. The city of Abha is the capital of the Asir Region, and the emirate of the region and most of the government departments and institutions are concentrated in it. It is connected by a network of main roads with the cities of: Khamis Mushayt, Al-Namas, Ahad Rufaidah, and Jazan. The city of Abha consists of forty-five residential neighborhoods, according to the classification of the Asir Region Municipality, and occupies an area estimated at approximately 300.44 km^2, according to the official map approved by the Asir Region.

Study Question:

- Is there a fundamental difference in the distribution of real estate services offices at the level of the neighborhoods of the city of Abha?

- Research hypothesis: There is no fundamental difference in the distribution of real estate services offices at the level of the city's neighborhoods, that is, they are distributed efficiently in the study area.

- Alternative hypothesis: There are fundamental differences in real estate services offices at the level of the city's neighborhoods. That is, they are not distributed efficiently throughout the neighborhoods of the study area.

Study objectives:

This applied study is the researcher's participation in shedding light on the reasons for the spatial variation in the level of efficiency of distribution of real estate services offices in one of the cities of the Kingdom, in order to achieve many goals, the most prominent of which are the following:

- Revealing the characteristics of the spatial distribution of real estate services offices, and their distribution pattern.
- Identifying the scope of spatial concentration and distribution of real estate services offices in the city of Abha.
- Determine the spatial distribution pattern of real estate services offices, and their spacing pattern in the study area.

Study methods and approaches:

The study relied on the descriptive analytical inductive approach linked to the spatial analysis of the study phenomenon, in addition to using geographic information systems programs to analyze the spatial distribution of restaurants in the study area. The methodology is linked to the spatial analysis methods of geographic information systems programs through which raw data is converted into data of great benefit by relying on analytical methods and processes for collecting, measuring and classifying spatial data, the most prominent of which are matching, spatial and cartographic modeling, distance analysis, and others, in order to understand spatial patterns and variations.

The logical sequence for studying the topic is through addressing the following points:

First: The emergence of real estate services offices in Abha city

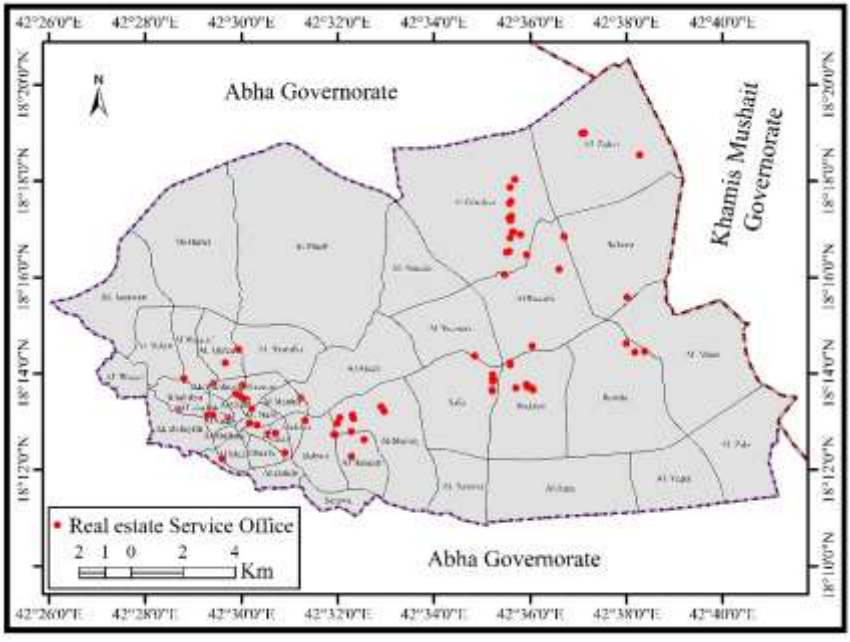
Real estate services offices are defined as activities related to real estate, marketing, management, selling, selling its benefits and renting it, including: real estate marketing, property management, facilities management, real estate auctions, real estate advertisements, real estate consultations and analyses.

Real estate services offices are spread everywhere, most of them are irregular, and the nature of their work is providing real estate services such as (marketing real estate to others - evaluation and valuation - implementing contracting contracts, construction, maintenance and management of properties and residential and commercial complexes - and managing real estate marketing operations, etc.).

The real estate marketing service for others (buy/sell) comes at the forefront of the most active services in real estate offices as it is the most profitable among other services, as the real estate office obtains 2.5% of the total contract value in a single transaction. Although the percentage (2.5%) is a regular one approved by the Council of Ministers since 1398 AH in the real estate offices regulation in paragraph (a) of Article Five of the same regulation, which stipulated that the sales commission be determined by agreement between the real estate office, the seller and the buyer and that the total commission not exceed 2.5% of the contract value, there are those who see it as high compared to the modest service provided by the real estate office in a few minutes that often do not exceed the time to fill out the sale or purchase contract.

Second: Geographical distribution of real estate services offices in Abha city and the influencing factors

Real estate services offices are spread across the residential neighborhoods of Abha city, which number 45 residential neighborhoods. Real estate services offices are concentrated in about 22 residential neighborhoods, representing 48.9% of the total residential neighborhoods, with 73 real estate services offices, distributed between the old residential neighborhoods in the southwest of the city, and the modern residential neighborhoods in the northeast of the city, as shown in Figure (1).



Source: Google Earth 2023 & Field Study 2023.

Fig. (1) Geographical Distribution of Real estate services offices in Abha city in 2023.

1- Numerical and relative distribution

(A) Numerical distribution

The numerical distribution of real estate services offices in residential neighborhoods in Abha city varies as shown in Table (1) and Figure (2). It is clear that: -

Al-Ghadeer neighborhood in the northeast of the city came in first place with about 14 offices, while Al-Badi and Al-Morouj neighborhoods included 8 offices for each neighborhood separately in the second place in the south of the city, while Al-Safa neighborhood occupied third place with 6 offices, and the neighborhoods of "Al Rawabi – Al Zahour – Al Nuzha – Al Rawdah" came in fourth place with 3 offices for each neighborhood, while the neighborhoods of

"Al Rabwa – Al Naseem – Al Qura – Al Wardatayn - Sultana – Al Qabil – Al Sadd" included 2 offices for each residential neighborhood, while the neighborhoods of "Al Manhal – Al Numan – Al Nusab – Al Faisaliyah - Downtown - Shamsan – Al Wasayef – Al Khasha – Al Khalidiyah – Al Shifa - Andalus" were concentrated in each residential neighborhood with only one office.

Table (1) Numbers and percentages of real estate services offices in residential neighborhoods in Abha city in 2023.

%	Number	Residential neighbourhood	S	%	Number	Residential neighbourhood	S
1.37	1	Khalidiya	24	19.18	14	Al Ghadeer	1
1.37	1	Al Shafa	25	10.96	8	Al Badee	2
1.37	1	Andalus	26	10.96	8	Al Murooj	3
-	-	Al Dhabab	27	8.22	6	Al Safa	4
-	-	Al Sinaiyah	28	4.11	3	Al Rawabi	5
-	-	Al Masif	29	4.11	3	Al Zahour	6
-	-	Al Muftaha	30	4.11	3	Al Nuzha	7
-	-	Al Sarawat	31	4.11	3	Al Rawda	8
-	-	Al Salamah	32	2.74	2	Al Rabwah	9
-	-	Al Areen	33	2.74	2	Al Naseem	10
-	-	Al Buhaira	34	2.74	2	Al Qarya	11
-	-	Dhra	35	2.74	2	Al Wardatain	12
-	-	Al Muntazah	36	2.74	2	Sultana	13
-	-	Al Azizia	37	2.74	2	Al Qabil	14
-	-	Al Ward	38	2.74	2	Al Sadd	15
-	-	Al Sharafiya	39	1.37	1	Al Manhal	16
-	-	Al Salam	40	1.37	1	Al Numan	17
-	-	Al Taawon	41	1.37	1	Al Nasb	18
-	-	Al Matar	42	1.37	1	Al Faisaliyah	19
-	-	Al Zahra	43	1.37	1	Downtown	20
-	-	Al Aqeeq	44	1.37	1	Shamsan	21
-	-	Al Yaqout	45	1.37	1	Al Wasayef	22
100	73	Total		1.37	1	Al Khasha	23

Source: Prepared by researchers based on Google Earth (Google Earth 2023) and the field study in 2023

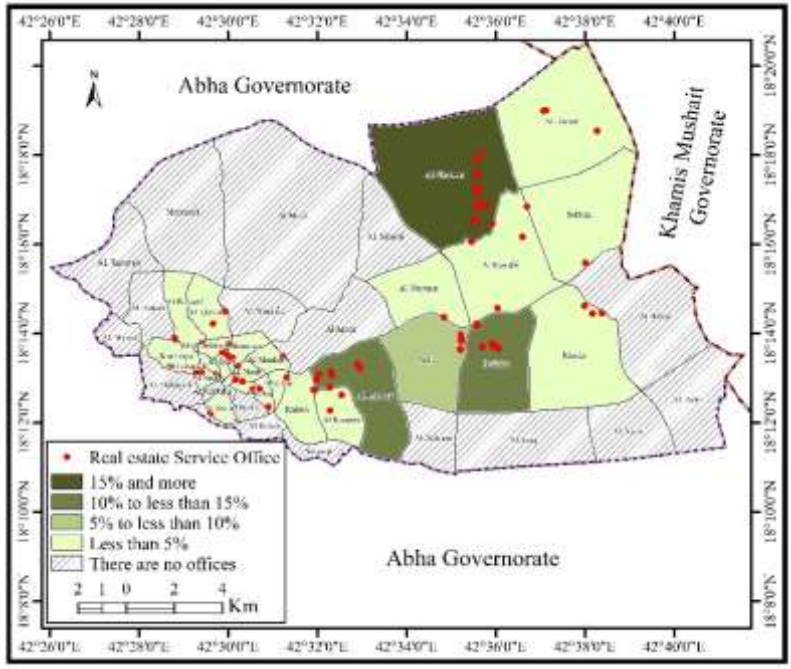
(A) Relative Distribution

From Table (2) and Figure (2), the relative distribution categories of real estate services offices in Abha City in 2023 can be divided as follows:

Table (2) Percentage distribution categories for real estate services offices in Abha city in 2023.

Real Estate Services Offices		Residential neighborhoods		Categories
%	Number	%	Number	
19.2	14	2.2	1	15% or more
21.9	16	4.4	2	10% for less than 15%
8.2	6	2.2	1	5% for less than 10%
50.7	37	48.9	22	Less than 5%
-	-	42.2	19	No offices

100	73	100	45	Total



Source: table (2).

.Figure (2) Percentage distribution of real estate services offices in Abha city in 2023 AD

- %15 or more of the total real estate services offices in the city and includes one residential neighborhood at a rate of 2.2% of the total residential neighborhoods in Abha city, with about 14 real estate services offices representing 19.2% of the total real estate services offices in the city.
- 10% for less than 15% and includes 2 residential neighborhoods at a rate of 4.4%, with 16 offices concentrated in them representing 21.9%.
- 5% for less than 10% and includes one residential neighborhood at a rate of 2.2% of the total residential neighborhoods in Abha city, with about 6 real estate services offices representing 8.2% of the total real estate services offices in the city.
- Less than 5% and includes 22 residential neighborhoods at a rate of 48.9%, with 37 offices concentrated in them representing 50.7%.
- There are no offices, the remaining 19 residential neighborhoods, at a rate of 42.2%, were devoid of real estate services offices in the city. The correlation coefficient between the number of residential neighborhoods and the number of real estate services offices in the city reached about 0.35, which is a weak positive correlation. Evidence of this is that less than half of the residential neighborhoods are devoid of real estate services offices in the city.

1- Quantitative characteristics of distribution

A- Lorenz curve

The Lorenz curve is one of the methods of measuring the relationship between the distribution of real estate services offices in the city and (the total area of the city - the urban area in residential neighborhoods - and the population of the city neighborhoods), as it attempts to identify the degree of a certain distribution's distance from the ideal. Figure (3) shows the Lorenz curve where the following can be identified: -

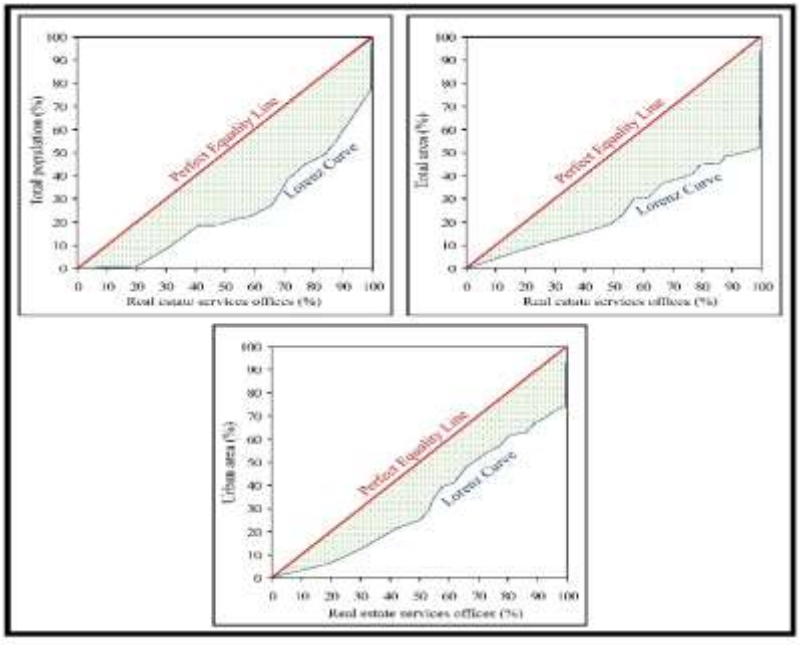


Figure (3) Lorenz curve for real estate services offices And (total area - urban area - .population) in Abha city in 2023

Figure (3) shows the asymmetry of the Lorenz curve for both the total area and the urban area as well as the population.

- Real estate services offices and the total area: About one-fifth of the offices are distributed over less than one-tenth of the area, while more than half (53.4%) of the offices are spread over about one-quarter of the area (23%) of the area, and three-quarters of the offices (76.7%) are spread over two-fifths of the area (39.4%), and 100% of the offices are spread over half the area (51%) of the area.
- Real estate services offices and the urban area: About one-third of the offices (30.1%) are distributed over less than one-tenth of the urban area (8.1%), while more than half (53.4%) of the offices are spread over about one-quarter of the urban area (20.6%) of

the urban area, and 100% of the offices are spread over three-quarters of the urban area (76.9%) of the urban area.

- Real estate services offices and population: About one-fifth of the offices (19.2%) are distributed among less than one-tenth of the population (6.4%), while more than half (53.4%) of the offices are spread among about one-third (33.1%) of the population, three-quarters of the offices (74%) are spread among more than half of the population (55.4%), and 100% of the offices are spread among three-quarters of the population (74.7%) of the population.

A- Relative importance: -

The relative importance of real estate services offices represents the distribution of the number of real estate services offices within residential neighborhoods, as well as their distribution over the total area and urban area, and the relationship of that to the population to know the places of abundance or deficiency in that service.

The relative importance of real estate services offices varied with their three indications among the residential neighborhoods in the city of Abha according to the total area, urban area and population as shown in Table.(3)

Table (3) The relative importance of real estate services offices (total area - urban area - population) in residential neighborhoods in Abha city in 2023.

Significantly the population number	Significantly the urban area	Significantly the total area	Residential neighbourhood	N
3.57	1.32	0.33	Shamsan	1
2.49	0.65	0.21	Al Nusub	2
2.36	0.66	0.28	Al Shifa	3
2.08	0.93	0.47	Al Rabwa	4
2.07	0.75	0.43	Al Naseem	5
1.90	0.87	0.52	Al Khalidiya	6
1.83	0.33	0.09	Al Khasha`	7
1.68	0.41	0.10	Al Faisaliah	8
1.59	0.67	0.32	Al Manhal	9
1.46	0.59	0.19	Al Andalus	10
1.40	0.87	0.40	Al Qura	11
1.14	2.14	1.82	Al Numan	12
1.05	0.30	0.10	Al Wardatayn	13
0.96	1.17	0.71	Al Wasayef	14
0.93	0.75	0.32	Al Morouj	15
0.84	0.33	0.07	Al Nuzha	16
0.80	0.20	0.06	Al Qabil	17
0.76	0.23	0.08	Al Sadd	18
0.71	0.63	0.33	Al Badi	19

0.71	0.24	0.05	Downtown	20
0.58	1.82	1.81	Sultana	21
0.42	1.73	1.33	Al Rawda	22
0.20	1.97	1.10	Al Rawabi	23
0.14	0.43	0.40	Al Safa	24
0.04	1.66	1.65	Al Zahour	25
0.03	0.33	0.42	Al Ghadeer	26
1	1	1		Total

❖In terms of the total area

The relative importance of real estate services offices in relation to the total area reflects their distribution over the area of Abha city as follows:

- Residential neighborhoods that received more than their share of real estate services offices, and this category was represented in the residential neighborhoods (Al Numan- Sultana – Al Zahour).

- Residential neighborhoods that received their share of real estate services offices and were represented in the residential neighborhoods (Al Rawdah – Al Rawabi).

- Residential neighborhoods that received less than their share of real estate services offices, and were represented in the residential neighborhoods (Al Wasayef – Al Khalidiyah – Al Rabwa – Al Naseem – Al Ghadeer – Al Safa - Al-Qura - Al-Badi - Shamsan – Al Morouj – Al Manhal – Al Shifa – Al Nusab - Andalusia – Al Faisaliah – Al Wardatayn – Al Khasha – Al Sadd – Al Nuzha – Al Qabil - Downtown).

-Residential neighborhoods devoid of real estate services offices, and the remaining residential neighborhoods, numbering 19 residential neighborhoods, at a rate of 42.2%, were devoid of real estate services offices in the city.

❖In terms of urban area

The relative importance of real estate services offices in relation to the urban area in Abha city showed several patterns as follows:

- Residential neighborhoods that received more than their share of real estate services offices, and this category was represented in the residential neighborhoods (Al Naaman - Sultana – Al Zahour – Al Rawabi – Al Rawdah).

- Residential neighborhoods that received their share of real estate services offices, and were represented in the residential neighborhoods (Shamsan – Al Wasayef).

- Residential neighborhoods that received less than their share of real estate services offices, and were represented in the residential neighborhoods (Al Khalidiya – Al Rabwa – Al Naseem – Al Ghadeer – Al Safa – Al Qura – Al Badi – Al Morouj – Al Manhal – Al Shafa – Al Nusab -

Andalusia – Al Faisaliah – Al Wardatayn – Al Khasha- Al Sadd – Al Nuzha – Al Qabil - Downtown).

- Residential neighborhoods devoid of real estate services offices, and the remaining residential neighborhoods, numbering 19 residential neighborhoods, at a rate of 42.2%, were devoid of real estate services offices in the city.

❖In terms of population

The relative importance of real estate services offices for the residents of the neighborhoods in Abha city varied as follows: -

- Residential neighborhoods that received more than their share of real estate services offices, and this category was represented in the residential neighborhoods (Shamsan – Al Nasb – Al Shafa – Al Rabwa – Al Naseem – Al Khalidiya – Al Khasha – Al Faisaliah – Al Manhal - Andalusia).

- Residential neighborhoods that received their share of real estate services offices, and were represented in the residential neighborhoods (Al Qura – Al Numan – Al Wardatayn – Al Wasayef).

- Residential neighborhoods that received less than their share of real estate services offices, and were represented in the residential neighborhoods (Al Morouj – Al Nuzha – Al Qabil – Al Sadd – Al Badi - Downtown - Sultana – Al Rawdah – Al Rawabi – Al Safa – Al Zahour – Al Ghadeer).

- Residential neighborhoods devoid of real estate services offices, and the remaining residential neighborhoods, numbering 19 residential neighborhoods, at a rate of 42.2%, were devoid of real estate services offices in the city.

1- Factors affecting the distribution

(a) Population

❖Numerical and relative distribution: -

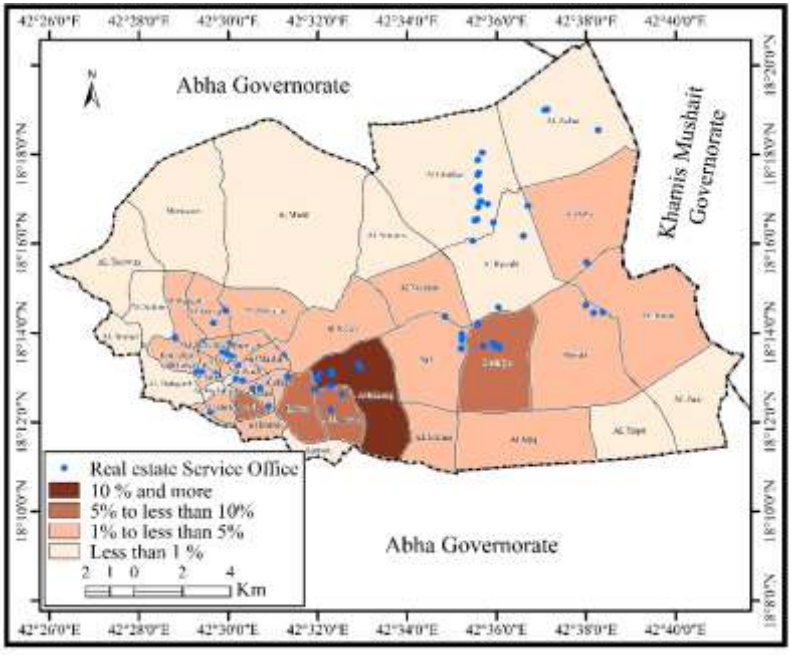
The population of Abha city reached 236,157 person, their distribution varies among residential neighborhoods as shown in Table (4), where Al Morouj neighborhood came in first place with about 23,999 person in the south of the city, and it is one of the old residential neighborhoods, followed by Al Badi neighborhood in second place with about 18,494 person, while Al Zahr neighborhood came in last place with about 108 person, and it is one of the newly established residential neighborhoods and is still under construction.

The population can be divided into several categories according to their percentage of the city's total and the share of each category of real estate services offices as shown in Table No. (4) and Figure No. (4).

Table (4) Percentage distribution categories of population and real estate services offices in Abha city in 2023.

Real Estate Services Offices	Residential neighborhoods	Population	Categories

%	Number	%	Number	%	person	(Total population)
11.0	8	2.2	1	10.2	23999	10% or more
16.4	12	8.9	4	24.7	58442	5% to less than 10%
43.8	32	55.6	25	58.0	137056	1% to less than 5%
28.8	21	33.3	15	7.1	16660	Less than 1%
100	73	100	45	100	236157	Total



Source: table (4).

Figure (4) Population Percentage distribution and real estate services offices in Abha city in 2023.

It is evident from the table and figure that:

- 10% or more of the population, represented in one residential neighborhood (Al Muruj), representing 10.2% of the total population and about 2.2% of the number of residential neighborhoods, and 11% of the total real estate services offices in the city of Abha are concentrated there.

- 5% for less than 10% of the population, represented by 4 residential neighborhoods (Al Badi – Al Rabwa – Al Naseem - Dhra), representing 24.7% of the total population and about 8.9% of the number of residential neighborhoods, and 16.4% of the total real estate services offices in Abha are concentrated in it.

- 1% for less than 5% of the population, represented by 25 residential neighborhoods, representing 58% of the total population and about 55.6% of the number of residential neighborhoods, and 43.8% of the total real estate services offices in Abha are concentrated in it.

- Less than 1% of the population, represented by 15 residential neighborhoods, representing 33.% of the number of residential neighborhoods, and 7.1% of the total population is concentrated in them, and about 28.8% of the total real estate services offices in Abha city. The correlation coefficient of the ranks between the population numbers according to the aforementioned categories and the number of residential neighborhoods reached 0.7, which is a strong correlation, while the correlation coefficient between the number of population and the number of real estate services offices reached 0.75, which is a strong correlation indicating the concentration of real estate services offices in populated areas.

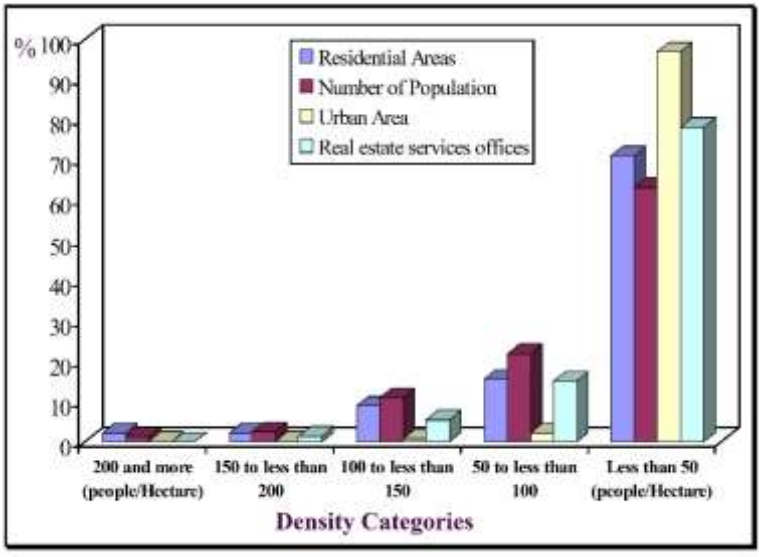
❖ Density distribution: -

• General density: -

Table (5) and Figure (5) show the categories of general population density and real estate services offices in Abha city in 2023 AD.

Table (5) Categories of general population density and real estate services offices in Abha city in 2023.

Real Estate Services Offices		Total area			Population		Residential neighborhoods		Population Density Categories
%	number	Hectare	%	Km^2	%	person	%	number	(P/ha)
0.0	0	15.5	0.1	0.15	1.3	3160	2.2	1	200 or more
1.4	1	37.2	0.1	0.37	2.5	5920	2.2	1	150 to less than 200
5.5	4	227.1	0.8	2.27	11.0	25968	8.9	4	100 to less than 150
15.1	11	647.8	2.2	6.48	21.9	51765	15.6	7	50 to less than 100
78.1	57	29116.0	96.9	291.16	63.2	149344	71.1	32	Less than 50
100	73	30043.61	100	300.44	100	236157	100	45	Total



Source: table (5).

.Figure (5) General population density and real estate services offices in Abha city in 2023

It is evident from the following table and figure: -

- Very high density category (200 or more person/ha). Al-Aziziya neighborhood came in first place with 2.2% of the total number of residential neighborhoods, and 1.3% of the total population is concentrated in it, about 0.10% of the total area, but it is devoid of real estate services offices.

- The high density category (150 to less than 200 person/hectare) and Al-Khasha district came in this category with a percentage of 2.2% of the total number of residential neighborhoods, and 2.5% of the total population is concentrated in it on about 0.10% of the total area, and 1.4% of the total real estate services offices in the city are spread in it.

- Medium density category (100 to less than 150 person/hectare) includes four residential neighborhoods (Al Faisaliah - Downtown - Dhra - Al-Qabil) in this category with a percentage of 8.9% of the total number of residential neighborhoods, and 11% of the total population is concentrated in it on about 0.8% of the total area, and 5.5% of the total real estate services offices in the city are spread in it.

- Low density category (50 to less than 100 person/hectare) includes seven residential neighborhoods with a percentage of 15.6% of the total number of residential neighborhoods, and 21.9% of the total population is concentrated in it on about 2.2% of the total area, and 15.1% of the total real estate services offices in the city are spread in it.

- The very low density category (less than 50 person/hectare) includes the remaining residential neighborhoods at a rate of 71.1% of the total number of residential neighborhoods, and 63.2%

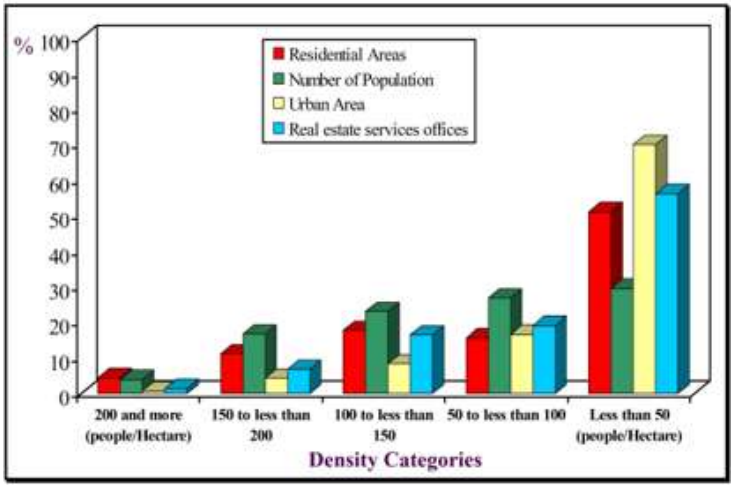
of the total population is concentrated in it, covering approximately 96.9% of the total area, and 78.1% of the total real estate services offices in the city are spread in it.

The rank correlation coefficient for the general density categories according to the aforementioned categories between the number of residential neighborhoods and the population reached 1.0, which is a perfect positive correlation. Likewise, between the number of residents and the total area, it achieved 1.0, which is a perfect positive correlation. While the correlation coefficient between the number of residents and the number of real estate services offices reached 0.98, and between the area and the number of real estate services offices reached 0.98, which is a perfect positive correlation indicating the concentration of real estate services offices in populated areas.

• Actual density: - Table (6) and Figure (6) show the categories of actual population density and real estate services offices in Abha city in 2023.

Table (6) Actual population density categories and real estate services offices in Abha city in 2023.

Real Estate Services Offices		Urban area			Population		Residential neighborhoods		Population density categories (p/ha)
%	number	Hectare	%	Km^2	%	person	%	number	
1.4	1	40.8	0.7	0.41	3.8	9080	4.4	2	200 or more
6.8	5	243.1	4.3	2.4	16.7	39363	11.1	5	150 to less than 200
16.4	12	467.8	8.3	4.7	23.1	54559	17.8	8	100 to less than 150
19.2	14	932.0	16.6	9.3	26.9	63482	15.6	7	50 to less than 100
56.2	41	3944.8	70.1	39.45	29.5	69673	51.1	23	Less than 50
100	73	5628.6	100	56.29	100	236157	100	45	Total



Source: table (6).

.Figure (6) Actual population density and real estate services offices in Abha city in 2023

It is evident from the following table and figure: -

- Very high density category (200 or more person/ha). Al Khasha' neighborhood came in first place, followed by Al Aziziyah neighborhood with 4.4% of the total number of residential neighborhoods. They contain 3.8% of the total population, spread over about 0.7% of the total area, and they comprise 1.4%. Among the real estate services offices.

- The high density category (150 to less than 200 person/hectare), and includes five residential neighborhoods (Al Faisaliah – Al Qabil - Dhra – Al Nasb – Al Shifa) with a percentage of 11.1% of the total number of residential neighborhoods, and 16.7% of the total population is concentrated in them, spread over about 4.3% of the total area, and 6.8% of the total real estate services offices in the city are concentrated in them.

- Medium density category (100 to less than 150 person/hectare), which includes eight residential neighborhoods in this category, representing 17.8% of the total number of residential neighborhoods, and 23.1% of the total population is concentrated in them, spread over about 8.3% of the total area, and 16.4% of the total real estate services offices in the city are concentrated in them.

- Low density category (50 to less than 100 person/hectare), which includes seven residential neighborhoods, representing 15.6% of the total number of residential neighborhoods, and 26.9% of the total population is concentrated in them, covering about 16.6% of the total area, and 19.2% of the total real estate services offices in the city are spread in them.

- Very low density category (less than 50 person/hectare), which includes the remaining residential neighborhoods, representing 51.5% of the total number of residential neighborhoods, and 29.5% of the total population is concentrated in them, covering about 70.1% of the total area, and 56.2% of the total real estate services offices in the city are spread in them.

The rank correlation coefficient for the actual density categories according to the aforementioned categories between the number of residential neighborhoods and the population reached 0.73, which is a strong positive correlation. Likewise, between the number of residents and the inhabited area, it achieved 0.66, which is a strong positive correlation. Meanwhile, the correlation coefficient between the number of residents and the number of real estate services offices reached 0.76, and between the area and the number of real estate services offices reached 0.98, which is a complete positive correlation indicating the concentration of real estate services offices in areas with urban density.

(A) Area Table (7) shows the categories of total area and real estate services offices in Abha City 2023 AD.

Table (7) Total area categories and real estate services offices in Abha city in 2023.

Real Estate Services Offices		Total area		Residential neighborhoods		Area categories (km^2)
%	number	%	Km^2	%	number	
23.3	17	26.4	79.36	6.7	3	20 or more
4.1	3	16.3	49.0	6.7	3	15 to less than 20
28.8	21	20.7	62.3	11.1	5	10 to less than 15

9.6	7	21.4	64.3	17.8	8	5 to less than 10
15.1	11	13.1	39.5	33.3	15	1 to less than 5
19.2	14	2.0	6.02	24.4	11	less than 1
100	73	100	300.44	100	45	Total

It is evident from the table that: -

- A very large area (20 km2 or more). Al Masif neighborhood came in first place (34.93 km2), followed by Al-Ghadir neighborhood in second place (24.08 km2), then Al Zuhur neighborhood (20.35 km2). They constitute 6.7% of the total number of residential neighborhoods, and about 26.4% of the total area contains 23.3% of the total real estate services offices in the city.

- A large area (15 to less than 20) and came in three residential neighborhoods (Airport - Rawda - Montazah) constituting 6.7% of the total number of residential neighborhoods, and occupying 16.3% of the total area, and containing 4.1% of the total real estate services offices in the city.

- Medium area (10 to less than 15) and came in five residential neighborhoods, constituting 11.1% of the total number of residential neighborhoods, occupying 20.7% of the total area, and containing 28.8% of the total real estate services offices in the city.

- Less than medium area (5 to less than 10) and came in eight residential neighborhoods, constituting 17.8% of the total number of residential neighborhoods, occupying 21.4% of the total area, and containing 9.6% of the total real estate services offices in the city.

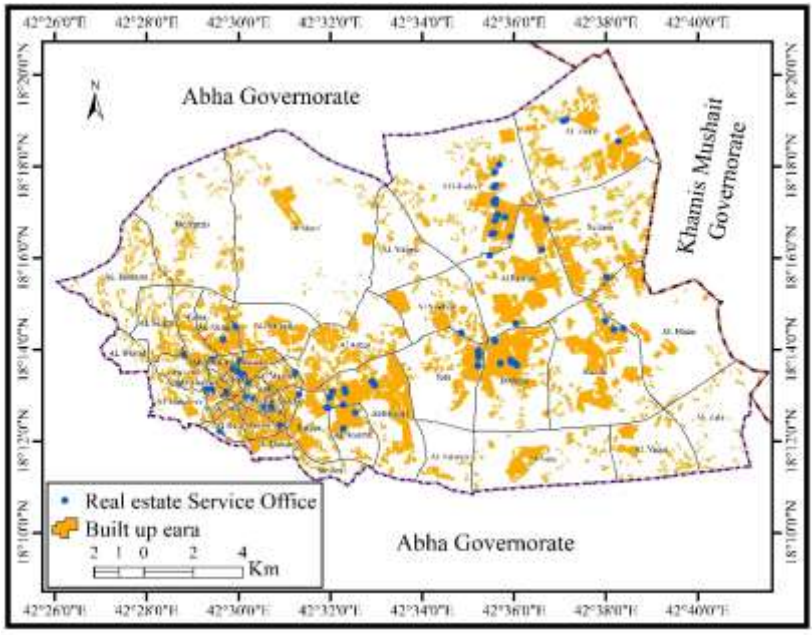
- Small area (1 to less than 5), and came in fifteen residential neighborhoods, constituting 33.3% of the total number of residential neighborhoods, occupying 13.1% of the total area, and containing 15.1% of the total real estate services offices in the city.

-Very small area (1 to less than 5) and came in eleven residential neighborhoods, constituting 24.4% of the total number of residential neighborhoods, occupying 2% of the total area, and containing 19.2% of the total real estate services offices in the city. The rank correlation coefficient for the area categories according to the aforementioned categories between the number of residential neighborhoods and the area achieved -0.63, which is a negative average correlation, while the correlation coefficient between the area and the number of real estate services offices reached 0.14, which is a very weak correlation, indicating the concentration of real estate services offices in some areas rather than others.

(A) Urbanization

The distribution of real estate services offices is linked to urban areas, as they provide services related to facilities, and the expansion of the urban area is one of the results of population growth, which necessitates increasing the number of real estate services offices, and redistributing them fairly in a manner consistent with the distribution of population and buildings.

Figure (7) and Table No. (8) show the geographical distribution of urbanization and real estate services offices in Abha City 2023.



Source: Google Earth 2023 & Field Study 2023.

Figure (7) Geographical Distribution of Real estate services offices and built up eara in Abha city in 2023.

Al Morouj district came in first place with an area of 4.63 km2, as it is one of the old residential districts. In second place is Al-Rawabi district with 4.56 km2, and in third place is Al Rawdah district with 4 km2, both of which are newly established and large districts. In the last places came Al Aziziyah district with 0.18 km2 and Al-Wurood district with 0.07 km2, both of which are small districts. From Table (9), the categories of urban area and real estate service offices in the residential districts of Abha city in 2023 can be divided into the following: -

Table (8) The built-up area of residential neighborhoods in Abha City in 2023.

%	Km^2	Residential neighbourhood	N	%	Km^2	Residential neighbourhood	N
1.29	0.73	Al Salam	24	8.22	4.63	Al Morouj	1
1.19	0.67	Khalidiya	25	8.10	4.56	Al Rawabi	2
1.17	0.66	Al Dhabab	26	7.11	4.00	Al Rawda	3
1.09	0.62	Al Buhaira	27	6.86	3.86	Al Badi	4
0.98	0.55	Al Taawun	28	6.81	3.83	Al Zohour	5
0.92	0.52	Al Manhal	29	6.37	3.59	Al Ghadeer	6
0.91	0.51	Al Shafa	30	4.98	2.80	Sultana	7
0.89	0.50	Al Nasb	31	4.09	2.30	Al Areen	8
0.81	0.46	Al Andalus	32	3.55	2.00	Al Safa	9
0.81	0.46	Al Wardatain	33	2.93	1.65	Al Numan	10

0.63	0.35	Al Sadd	34	2.56	1.44	Al Sharfiya	11
0.59	0.33	Al Sanaiya	35	2.55	1.43	Al Rabwa	12
0.57	0.32	Al Faisaliah	36	2.54	1.43	Al Matar	13
0.55	0.31	Al Qabil	37	2.39	1.34	Al Aqeeq	14
0.51	0.29	Al Muftaha	38	2.38	1.34	Al Qura	15
0.49	0.27	Al Salamah	39	2.07	1.16	Al Masif	16
0.48	0.27	Al Zahra	40	2.06	1.16	Al Naseem	17
0.45	0.25	Al Khashaa	41	1.81	1.02	Shamsan	18
0.33	0.19	Downtown	42	1.60	0.90	Al Wasayef	19
0.32	0.18	Al Sarawat	43	1.55	0.87	Al Yaqoot	20
0.27	0.15	Al Azizia	44	1.41	0.79	Dhra	21
0.13	0.07	Al Warda	45	1.37	0.77	Al Nuzha	22
100	56.29		Total	1.32	0.74	Al Muntazah	23

Source: Prepared by the researcher using the urban mass map using the computer - (Arc map 10.7) program.

Table (9) Categories of built-up area and real estate services offices in residential neighborhoods in Abha city in 2023.

Real Estate Services Offices		Urban area		Residential neighborhoods		Area categories (km^2)
%	number	%	Km^2	%	number	
19.2	14	23.4	13.19	6.7	3	4 or more
34.2	25	20.0	11.3	6.7	3	3 to less than 4
11.0	8	12.6	7.1	6.7	3	2 to less than 3
11.0	8	21.3	12.0	20.0	9	1 to less than 2
24.7	18	22.6	12.7	60.0	27	less than 1
100	73	100	56.29	100	45	Total

- A very large area (4 km2 or more) includes three residential neighborhoods, representing 6.7% of the total number of residential neighborhoods, and about 23.4% of the total urban area, and contains 19.2% of the total real estate services offices in the city.

- A large area (3 to less than 4) includes three residential neighborhoods, representing 6.7% of the total number of residential neighborhoods, and occupies about 20% of the total urban area, and contains 34.2% of the total real estate services offices in the city.

- A medium area (2 to less than 3) includes three residential neighborhoods, representing 6.7% of the total number of residential neighborhoods, and occupies about 12.6% of the total urban area, and contains 11% of the total real estate services offices in the city.

- A small area (1 to less than 2) includes nine residential neighborhoods, representing 20% of the total number of residential neighborhoods, and occupies about 21.3% of the total urban area, and contains 11% of the total real estate services offices in the city.

-A very small area (less than 1) and includes twenty-seven residential neighborhoods, which constitute 60% of the total number of residential neighborhoods, occupy about 22.6% of the total urban area, and contain 24.7% of the total real estate services offices in the city. The rank correlation coefficient for the urban area categories according to the aforementioned categories

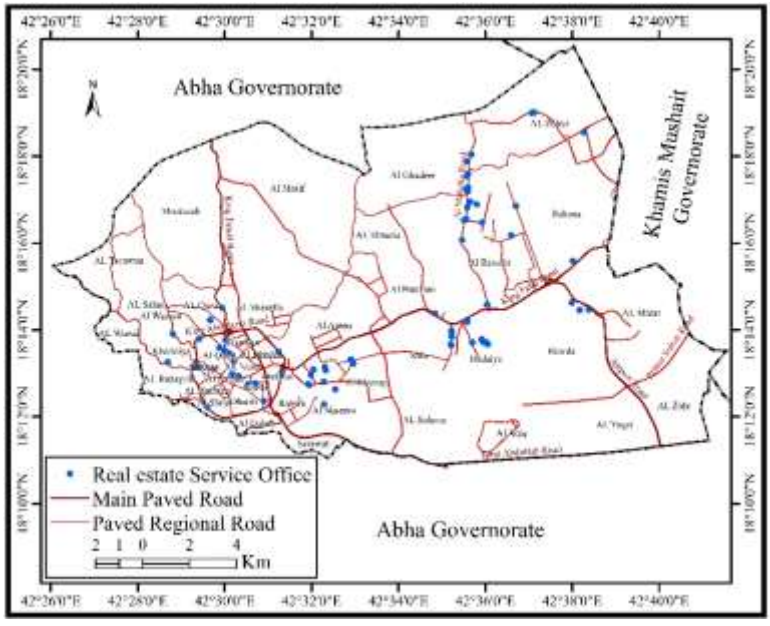
between the number of residential neighborhoods and the urban area reached 0.39, which is a weak correlation, while the correlation coefficient between the urban area and the number of real estate services offices reached 0.38, which is a very weak correlation, indicating the concentration of real estate services offices in some areas rather than others.

(a) Road network

The road network, the availability of appropriate means of transportation, and the distance in the city affect the access to services, as the paved road network contributes to shortening the journey time and ease of access, and its effect extends to facilitating the movement of cars.

The ease of access to service facilities is one of the most important factors that reflect the importance and efficiency of the service, which depends primarily on a planned and well-distributed road network.

The city of Abha is covered by a network of distinguished paved roads that connect it to neighboring areas and work to connect residential neighborhoods with each other, with real estate services offices distributed on its sides, as shown in Figure No. (8) and Table No.(10) .



Source: Google Earth 2023 & Field Study 2023.

Figure (8) Geographical Distribution of Real estate services offices And main roads & regional paved roads in Abha city in 2023.

Table (10) Real estate services offices and the paved main and regional road network in Abha city in 2023.

Real Estate Services Office		length		Pattern
%	number	%	Km	
21.9	16	29.8	70.6	Paved main road
78.1	57	70.2	166.7	Paved regional road
100	73	100	237.3	Total

The table and figure show that the total length of paved roads in the city reached 237.3 km, of which 70.6 km are main roads, representing 29.8% of the total length of paved roads in the city, distributed on its sides by about 16 real estate services offices, representing 21.9% of the total real estate services offices in the city. While the length of regional roads reached 166.7 km, representing 70.2% of the total length of paved roads in the city, distributed on them by 57 real estate services offices, representing 78.1% of the total real estate services offices in the city. Al Mahala Road, which extends from the north of the city to the south in the city center, came in first place in terms of the number of real estate services offices spread around it, with about 15 offices, representing 20.55% of the city's total. King Abdulaziz Road came in second place with about 6 offices, while King Fahd Road came in third place with about 5 offices. Al Bukhari Road came in the same number of 5 offices, as did Makkah Al Mukarramah Road with about 5 offices, while the rest of the offices were distributed on the main and regional roads in varying proportions.

1- Statistical analysis of the factors affecting the distribution

The factors affecting the distribution of real estate services offices in the city can be stated statistically as follows: -

❖ Correlation coefficient

Table No. (11) shows the Pearson correlation matrix between the factors affecting the distribution of real estate services offices in the city of Abha.

Table (11) Pearson's correlation coefficient for factors affecting real estate services offices in Abha city in 2023.

Average e of urban area in real estate services offices (km2 of urban space/office)	Average area of real estate services offices (km^2/office)	Average of the population in real estate services offices (person /office)	Actual density (persons /km2)	General population density (person/km2)	Urban area (km^2)	Population (person)	Total area (km^2)	Number of real estate services offices	Variables
								1	Number of real estate service offices
							1	0.35	Total area (km^2)

						1	0.20-	0.36	Number of population (person)
					1	0.33	0.60	0.67	Built-up area (km^2)
				1	0.39-	0.24	0.55-	0.10-	General density of population (person /km^2).
			1	0.92	0.47-	0.34	0.65-	0.15-	Actual density (person /km^2)
		1	0.55	0.43	0.13-	0.50	0.41-	0.04	Average of the population in real estate services offices (persons/office)
	1	0.15	0.29-	0.25-	0.61	0.003	0.32	0.26	Average of the area of real estate services offices (km^2/office)
1	0.93	0.42	0.14-	0.12-	0.58	0.18	0.16	0.26	Average of the urban area of real estate services offices (km^2 of urban space/office)

Source: Prepared by researchers, using the computer program SPSS 25.

The relationship between the city's real estate services offices and the built-up area (km2) was about 0.67, which is a strong positive correlation that confirms the association of offices with built-up areas, while it achieved a weak correlation between both the population number 0.36 and the total area 0.35, and it also achieved a very weak correlation with both the average share of the area of real estate services offices (km2/office) 0.26 and the average share of the built-up area of real estate services offices (km2 construction/office) 0.26, and it also achieved 0.04 with the average share of the population of real estate services offices (person/office), while it recorded a very weak negative correlation with both the actual density (person/km2) - 0.15 and the general population density (person/km2) - 0.10.

❖ Significance level

The value of the significance level is determined based on the value of the correlation coefficient: where the null hypothesis is accepted, which expresses the absence of a significant correlation between the variables $P = 0$, or the alternative hypothesis is accepted, which expresses the presence of a significant correlation between the variables $P \neq 0$. Thus, the value of the correlation coefficient clarifies and describes the nature of the relationship between the variables, either direct or inverse, weak or strong, or there is no correlation.

The statistical significance of the significance level falls into three levels, which are taken as a criterion for rejecting the null hypothesis and accepting the alternative hypothesis:

- Level one: Level less than 0.05

- Level two: Level less than 0.01

- Level three: Level less than 0.001

The third level is stronger in its significance than the first and second levels, and the second level is stronger than the first level only, while the third level is the lowest acceptable level of statistical significance.

Table No. (12) shows the level of significance among the factors affecting the distribution of real estate services offices in Abha city.

Table (12) Significance level of factors affecting real estate services in Abha city in 2023.

Average area of real estate services offices (km^2/office)	Average population of real estate services offices (persons/office)	Actual density (person/km^2)	General density of population .(person /km^2)	Built-up area (km^2)	Number of population (person)	Total area (km^2)	number of real estate service offices	Variables
							0.00910	Total area (km2)
						0.09910	0.00703	Population (persons)
					0.01303	0.00001	0.00000	Built-up area (km2)
				0.00394	0.05651	0.00004	0.24756	General population density persons/km2)
			0.00000	0.00061	0.01017	0.00000	0.16624	Actual density (persons/km2)
		0.00005	0.00173	0.20518	0.00022	0.00240	0.38676	Average population of real estate services offices (persons/office)
	0.16404	0.02460	0.04907	0.00001	0.49257	0.01656	0.03987	Average area of real estate services offices (persons/office)
0.000	0.00192	0.18393	0.22501	0.00002	0.11209	0.14537	0.04066	Average built-up area of real estate services offices (persons/office)

Source: Prepared by researchers, using the computer program SPSS 25.

The relationship between the city's real estate services offices and the built-up area was achieved (0.000) and expresses the presence of a significant significant correlation, which confirms the link between the offices and the built-up areas, while it achieved a moderately significant correlation between the population size of 0.00703 and the total area of 0.00910. It also achieved a correlation Very weak with both the average share of the urban area of real estate services offices (km2/office) being 0.03987 and the average share of the urban area of real estate services offices (km2 of buildings/office) being 0.04066, while a very weak correlation was recorded with both the actual density (person /km2) is 0.16624 and the general population density

(person/km2) is 0.24756, and it also achieved 0.38676 with the average share of the population from real estate services offices (person/km2).

❖ Determination coefficient (R Square)

The coefficient of determination is known as one of the complex statistical models for analyzing data, which explains the relationship between variables and the extent of their influence on each other. It is also known as the square of the correlation coefficient, symbolized by (R2) and its value ranges between (0 and 1) and the closer the value is to (1), the better the fit and vice versa, and negative values can result if expectations are not deduced according to the suitability of the model using the available data. This coefficient of determination helps in estimating future results or choosing hypotheses.

Table No. (14) shows the coefficient of determination (R Square) for the factors affecting real estate services offices in Abha city in 2023 AD.

Table (13) Coefficient of determination (R Square) for the factors affecting real estate services offices in Abha city in 2023.

Standard error	Corrected coefficient of determination	Determination coefficient	Correlation coefficient	variable
Std. Error of the Estimate	Adjusted R Square	R Square	R	
7.08	0.1026	0.123	0.35	Total area (km^2)
4727.74	0.1121	0.132	0.36	Population (person)
0.95	0.4402	0.453	0.67	Built-up area (km^2)
5035.75	0.0121-	0.011	0.10	General population density (person/km^2)
6281.73	0.0009-	0.022	0.15	Actual density (person/km^2)
2907.79	0.0213-	0.002	0.04	Average population of real estate services offices (person/office)
1.96	0.0481	0.070	0.26	Average area of real estate services offices (km^2/office)
0.46	0.0473	0.069	0.26	Average built-up area of real estate services offices (km^2 built-up/office)

Source: Prepared by researchers, using the computer program SPSS 25.

Table (14) shows that the independent variable (real estate services offices) achieved the highest coefficient of determination of 0.453 with the dependent variable (urban area), and the value of the corrected coefficient of determination reached 0.4402, while the standard error was recorded at 0.95. The values of the coefficient of determination decreased between the independent variable (real estate services offices) and the rest of the dependent variables, population 0.132, total area 0.123, average share of area from real estate services offices (km2/office) 0.070, and average share of urban area from real estate services offices (km2 urban area/office) 0.69, and the same is the case with the values of the corrected coefficient of determination, while some negative values were recorded with each of the average share of the population from real estate services offices (person/office), the general population density (person/km2), and the actual density (person/km2). Figure (9) shows the correlation between real estate services offices in

Abha city and each of the categories (number of residential neighborhoods - number of residents - total city area - urban area).

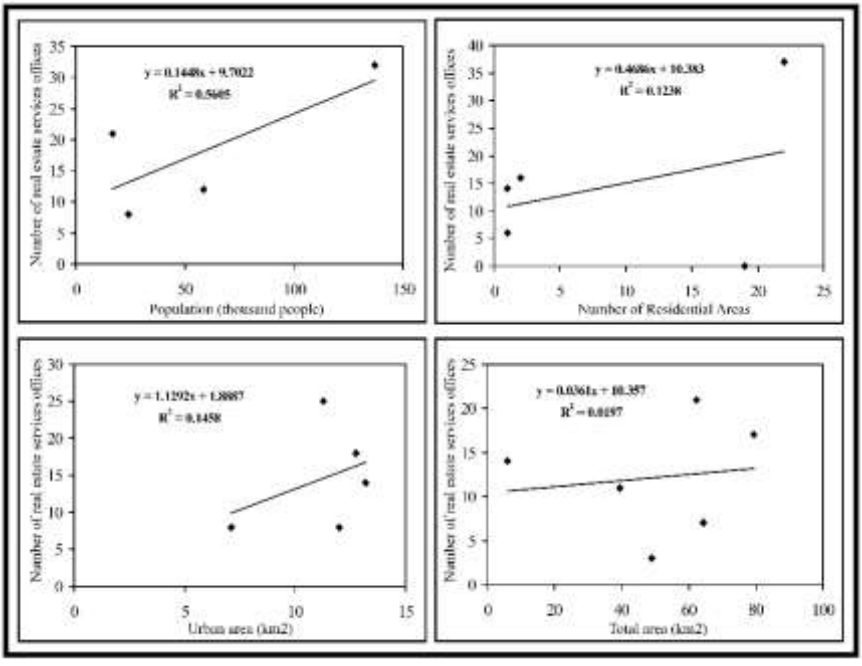


Figure (9) the relationship between real estate services offices and (number of Residential Areas - total area - urban area - population) in Abha city in 2023.

Third: Spatial analysis of the distribution of real estate services offices.

1- Measuring Geographic Distribution

A- The Mean Center.

B- Standard Distance.

C- Directional Distribution.

2- Analyzing Patterns:

Nearest Neighbor Analysis coefficient.

3- Measures of spatial proximity (geographic proximity analyses):

A- Allocation Areas to Center Analysis

B- Spread around the geometric center.

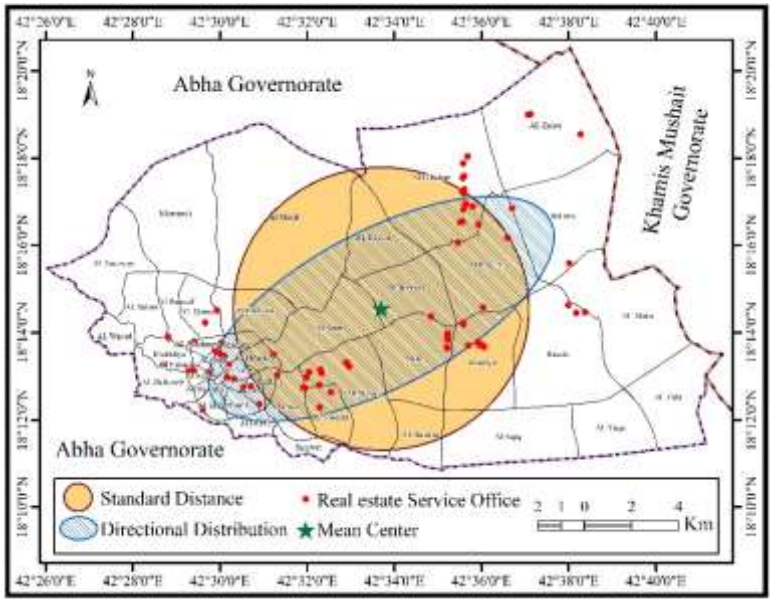
C- Average spacing.

1- Measuring Geographic Distribution

(A)The Mean Center.

It is used to calculate the arithmetic mean of non-spatial data to determine where the spatial mean of the phenomenon under study is located. It is called the simple spatial mean, which is the simplest of the ideal point distributions. It is an average of the values of a single digital data set. It is used for any phenomenon that can be represented by a point on the map. It represents the point around which the distribution of the phenomenon's components is equal, or the location of a sample taken spatially, and its description and spatial distribution in preparation for analysis and interpretation.

A network of squares covering the study area is drawn to measure the locations of the points according to their distribution on the "x- and y-axes" (x-y), which is called the ideal virtual focal point, given that this center represents the point around which the distribution of the phenomenon's components is equal. The spatial average tool is the equivalent for calculating The value of the arithmetic average of the spatial data, that is, it determines where the location is located, which is considered a geographical average of the locations of the phenomenon under study. It determines the geographical center of the real estate services offices in the city of Abha in the year 2023 AD, and the area separating it from other locations is less than the distance separating the locations. And anywhere else.



Source: Arc map 10.7.

Figure (10) Mean center, standard distance, and direction distribution of Real estate services offices in Abha city in 2023.

By analyzing Figure (10), the average geographical center of real estate services offices in the residential neighborhoods of Abha city in 2023 AD can be identified as follows: - The average geographical center of real estate services offices in Abha city is located in the city center in Al-Naaman neighborhood, at the intersection of latitude 32 ,'18 ´ 14 ˝ with longitude 41 ´ 33 ˝ ;'42This explains the concentration of the majority of real estate services offices in the densely built residential neighborhoods east and southwest of the city.

(A) Standard Distance

It is one of the most important measures of spatial dispersion of spatial distributions, and is similar in its concept to the standard deviation in calculating the distance between the average center and each point representing a mobile station in the study area; where the standard distance is split by squaring the values of the standard deviation on the x- and y-axes from their average, and is used to measure the extent of the phenomenon's spread around its geographical average center, and is also an indicator to know the extent of the divergence or convergence of the phenomenon's components, as it is the deviation of values from their arithmetic mean, which is a description of the dispersion of points around the average center; where the average center is not sufficient to complete the picture, and the comparison is clearer.

The standard distance value is represented by a circle whose center is the modified geographical location and is called the standard circle, such that the center of the circle is the location of the coordinates of the actual average center of the phenomenon (Central Feature). The more the circle shrinks, the more it indicates spatial concentration, and the wider the circle, the more it indicates spatial dispersion of the phenomenon (Daoud, 2012, pp. 41: 44). The standard distance is one of the measures of dispersion and spatial concentration that is similar in its structure to the standard deviation, and it is the most used to distribute locations around their average center. This method is one of the most prominent measures of spatial distributions, and it is used to measure the extent of the phenomenon's spread from its center (Al-Otaibi, Al-Taie, 2013, p. 138). From Figure (10), it is possible to identify the standard distance of real estate services offices in the residential neighborhoods of Abha city as follows: -

- The area of the standard circle of real estate services offices in the residential neighborhoods of Abha city occupied about 112.66 km2, which constitutes 37.5% of the total area of the city, which is 300.44 km2.

The basic model assumes that the standard circle contains 68% of the total points, but the reality indicated that the standard distance circle for real estate services offices included 41 offices, representing 56.2% of the total real estate services offices in the residential neighborhoods of the city of Abha, which indicates that the geographical distribution pattern The real estate services offices in the residential neighborhoods of the city of Abha have a semi-regular distribution pattern, as the higher the percentage, the more the distribution pattern tends towards a regular shape, while a lower percentage indicates its random distribution.

(B) Directional Distribution.

This tool is used to determine the general direction of the distribution of the spatial phenomenon's components, by drawing an oval shape, drawn at an angle of inclination that

determines the direction of distribution of the majority of the phenomenon's components in the study area to determine the extent of the phenomenon's spatial concentration or spread, so that its center is the location of the coordinates of the actual average center of the phenomenon, where the north direction is represented by an angle of (zero), the east direction by an angle of (90 degrees), the south direction by an angle of (180 degrees), and the west direction by an angle of (270 degrees); the more the shape shrinks, the more the phenomenon is spatially concentrated, and the wider the shape, the higher the standard distance value, and this indicates the spread of the phenomenon's distribution and its spatial dispersion, i.e. the distance of the circle is directly proportional to the degree of spread and spatial distribution (Daoud, 2012, pp. 41: 44).

The idea of the distribution direction is very close to the standard distance, and differs from it in that it is concerned with the concentration of the elements of the phenomenon and the direction of the distribution of the phenomenon, while the second is based on the degree of dispersion and the concentration of the phenomenon, and the eastern standard deviation and the northern standard deviation are calculated from the average center, and then the shape of the distribution direction of the phenomenon is determined in the study area, and the average center is the center of the oval shape for all points and each oval shape has two axes (X-Y) (Abdul Rahman, 2014, p. 11).

From the analysis of Figure (10), the distribution direction of real estate services offices in the residential neighborhoods of Abha city can be identified as follows: -

- The center of the oval shape came in line with the point of the average center, and its larger axis measures the value of the direction taken by most of the components of the phenomenon, as the length of its larger axis reached 7.8 km, and the length of its smaller axis is 3.3 km.

- The angle of the distribution direction was recorded at 59.7°

- The general direction of the distribution of real estate services offices in the residential neighborhoods of Abha city indicates from the west of the southwest to the northeast in the center of Abha city.

- The area of the oval shape reached 80.56 km2, representing 26.8% of the total area of the city.

It is concluded from the results of the indicators revealing the nature of the spatial distribution trends of real estate services offices in the residential neighborhoods of Abha city, that there is a clear concentration of these offices in the southwest of the city, such that they are clearly close to each other, and the general prevailing trend for the distribution of these machines of all types extends from west to east and vice versa in the directions of the city's expansion in terms of area and population.

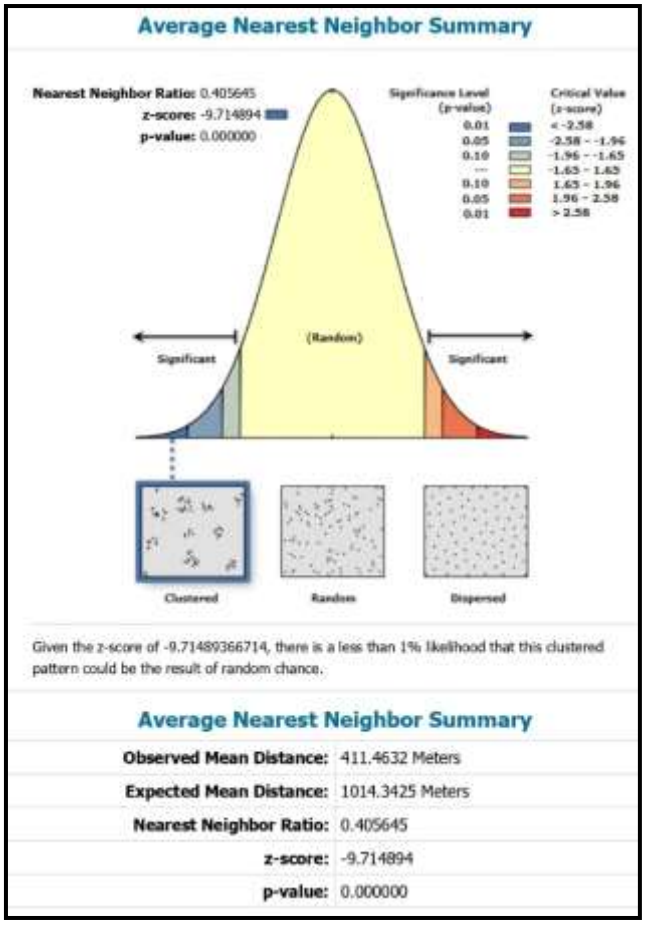
2- Analyzing Patterns: (Nearest Neighbor Analysis).

Studying the spatial pattern of the distribution of geographical phenomena using one of the quantitative analysis methods usually aims to reveal the way these phenomena are distributed, the nature of their spread, and their arrangement on the surface of the earth, whether they take a specific distribution pattern that tends towards regularity and symmetry or concentration and clustering or randomness that is due to the factor of chance or prior planning by the parties

responsible for the method of distributing them in a specific way. It also aims to achieve the justice that the population aspires to, and meet their needs in a way that reduces the time and effort spent in reaching them, especially with regard to services of various types, which must be distributed in a specific pattern that is consistent with the natural and human nature of the area.

The spatial distribution pattern of services in different areas is often affected by the area of the residential area, the shape of the area, the population size, the street network plan, the distribution pattern of other services, the historical development of the area, and the neighborhood relationship between different areas, thus contributing to the emergence of some patterns of service institution clusters (Mousilhi, 2007, p. 359).

Real estate services are one of the services whose distribution pattern is affected by area and distance, which are the two elements that are relied upon in most of the multiple neighborhood analysis measures, so that researchers can use the Nearest Neighbor Analysis that is most appropriate for their study, as a method of neighborhood relationship analysis, which the study used to reveal the current distribution pattern. This method is one of the most appropriate and powerful methods in analyzing the spatial patterns of the phenomenon, as it enters into the analysis of all sites in the studied area and their relationship to each other. On the other hand, it depends on the distances between the site and other sites closer to it, which helps to identify the distances traveled to reach the service, which in turn helps to accurately determine the characteristics of the distribution, which is (close (clustered), distant, or random (Al-Saleh, Al-Suryani, 1420 AH, p. 51). The GIS technology analyzes the average distance to the nearest neighbor, or what is sometimes called the neighborhood relationship, Average Nearest Neighbor Distance, the distance between the geographical location of all real estate services offices, and the geographical location of the real estate services offices closest to them. Then the average distances between all real estate services offices are calculated, after which the calculated average is divided by the expected average of the total distance between banking services. If the average calculated distance is less than the expected average, then its distribution is clustered. However, if the average calculated distance is more than the expected average of its random distribution, this means that the distribution of real estate services offices is a dispersed distribution Dispersed and in between, the distribution form is called a random distribution. In analyzing the geographical distribution pattern of real estate services offices in Abha city, the Spatial Analyst appendix was used in Arc GIS program and it was shown from Figure (11) that the clustered pattern dominates the geographical distribution of real estate services offices in Abha city, where the value of the nearest neighbor was recorded at 0.405645, which indicates the closeness of the distribution, although in an irregular form.



Source: Arc map 10.7.

Figure (11) Results of the neighborhood relationship analysis for real estate services offices in Abha according to the value of the nearest neighbor 2023.

2- Measures of spatial proximity (geographic proximity analyses): Proximity Analysis

A- Allocation Areas to Center

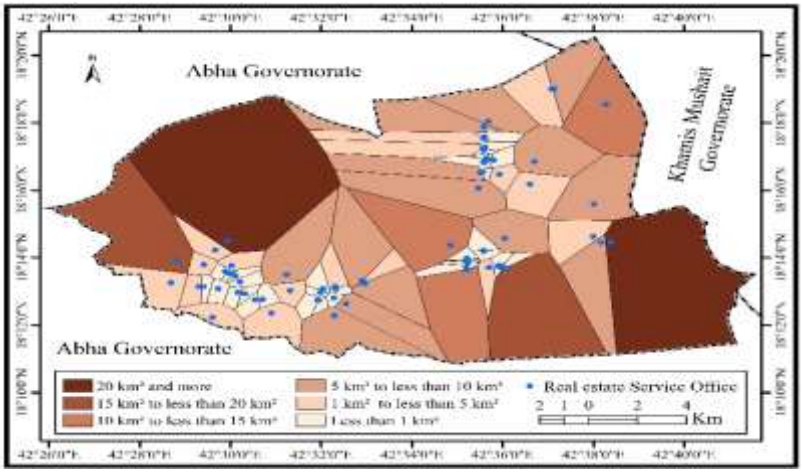
B- Spread around the geometric center.

C- Average spacing.

It is known as Proximity Analysis, and is used to determine the proximity of spatial features to each other. It will be processed through allocation areas, spread around the geometric center of the study area, analysis of the phenomenon's campus, and average spacing as follows: -

A - Allocation Areas to Center Analysis

It is known as the Thiessen polygon to determine the spatial allocation areas. This tool deals with point-type layers, as it studies wide areas through points only, and creates polygons, each polygon containing one point. The boundaries of this polygon depend on the points surrounding the point, as the distances between the point inside the polygon and the rest of the points closest to it are classified. This process is applied to all points in the layer (Al-Tayeb, 2017, p. 129). The importance of this analysis lies in determining the locations of facilities that provide services to a group of demand points that represent the population segment in a way that achieves the greatest degree of efficiency (Ayasra, 2017, pp. 39: 61). The location allocation model aims to represent the spatial relationship or spatial interaction between a group of demand points and a group of service centers with the aim of achieving the best compatibility of the spatial relationship or interaction between the two groups (Alshwesh, I, 2014. PP 52: 55). The process of determining the spatial relationship or interaction depends on the characteristics associated with the factors of time and distance. Therefore, the primary goal of this analysis is to reduce the distance between demand points and service locations (Dileep.R, Sule, 2001, p. 27,). The standard response time or distance used in the analysis is one of the most important factors that can affect the performance of the site allocation model in choosing the appropriate location and the possibility of reaching it. Naturally, the result of using different measures of time or distance will affect the optimal locations that are determined using this model, as each type of measurement may produce different results of its kind depending on calculating the time taken or the length of the distance between the service request site and the nearest service provision facilities (Taran, 2019, p. 115). From the analysis of Figure (12) and Table No. (14), it is clear that the allocation areas for real estate services offices in Abha city vary among themselves as follows: -



Source: Arc map 10.7.

Figure (12) Allocation range (Thiessen Polygons) for real estate services offices in Abha city in 2023.

Table (14) Numbers and areas of allocation polygons (Thiessen polygon) for real estate services offices in Abha city in 2023.

Area		Polygons		Category
%	km^2	%	number	
25.8	77.42	2.7	2	20 km^2 and more
11.8	35.43	2.7	2	15 km^2 for less than 20 km^2
10.8	32.57	4.1	3	10 km^2 for less than 15 km^2
31.7	95.37	19.2	14	5 km^2 for less than 10 km^2
14.4	43.22	23.3	17	1 km^2 for less than 5 km^2
5.5	16.44	47.9	35	Less than 1 km^2
100	300.44	100	73	Total

Source: Prepared by researchers using the program (ARC GIS10.7).

- A very large area (20 km2 or more) and includes 2 polygons that constitute 2.7% of the total number of real estate services offices in the city and occupy about 25.8% of the total area of the city. They are distributed in the southeast and northwest of the city.

- A large area (15 km2 to less than 20 km2) and includes 2 polygons that constitute 2.7% of the total number of real estate services offices in the city and occupy about 11.8% of the total area of the city. They are distributed in the south and west of the city.

- A medium area (10 km2 to less than 15 km2) and includes 3 polygons that constitute 4.1% of the total number of real estate services offices in the city and occupy about 10.8% of the total area of the city. They are distributed in the east, center and south of the city.

- Less than average area (5 km2 to less than 10 km2) and includes 14 polygons, representing 19.2% of the total number of real estate services offices in the city, and occupying about 31.7% of the total area of the city. They are distributed in the east, center and south of the city.

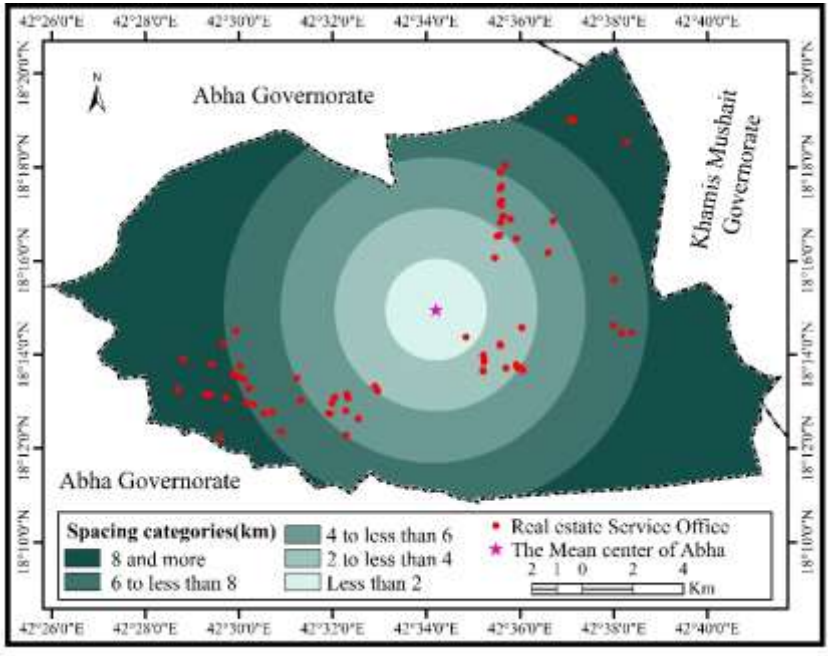
- Small area (1 km2 to less than 5 km2) and includes 17 polygons, representing 23.3% of the total number of real estate services offices in the city, and occupying about 14.4% of the total area of the city. They are distributed in the north, center and west of the city.

-Very small area (less than 1 km2) and includes 35 polygons, representing 5.5% of the total number of real estate services offices in the city, and occupying about 47.9% of the total area of the city. They are distributed in the north, center, west and south of the city.

B - Spread around the geometric center

It is used to identify the extent of the spread of real estate services offices or their concentration in Abha city around the engineering center. The engineering center is located in the city center in the Al Naaman residential neighborhood, at the intersection of latitude 56 ˚ 18 ´ 14 ˝, with longitude 12 ˚ 42 ´ 34 ˝, using the (10.7 ARC GIS) program from the Mean Center command menu (Daoud, 2012, p. 42).

The study used the Haram tool to create a Haram area (Buffer) around the engineering center for several distances at the same time, from the proximity menu, which is a tool for analyzing geographical proximity, from the Analysis Tools toolbar, to identify the planning scope of real estate services offices in Abha city. By applying the tool to real estate services offices, Figure (13) and Table (15), the following results can be recorded: -



Source: Arc map 10.7.

Fig. (13) Locations spread for real estate services offices in Abha city in 2023.

Table (15) Locational spread of real estate services offices in Abha city in 2023.

Offices		Distance from the geometric center of the city (km)
%	number	
1.4	1	Less than 2
27.4	20	From 2 to less than 4
32.9	24	From 4 to less than 6
20.5	15	From 6 to less than 8
17.8	13	From 8 or more
100	73	Total

Source: Prepared by the researchers using the computer program (Arc map 10.7).

The distance category (from 4 to less than 6) from the city's engineering center came in first place in terms of the concentration of the number of real estate services offices, 24 offices, representing 32.9% of the total offices in the city, while the category (from 2 to less than 4) came in second place with 20 offices representing 27.4%, and in third place came the category (from 6 to less than 8) with 15 offices representing 20.5%, while the category (from 8 and more) came in fourth and penultimate place with 13 offices representing 17.8%, and finally the category (less than 2) with one office representing 1.4%.

c- Average spacing.

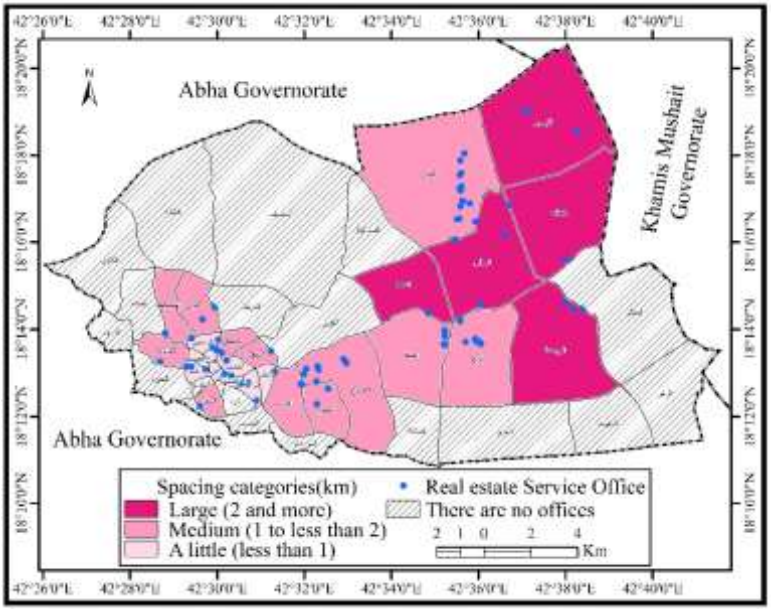
The average distance between real estate services offices in Abha city indicates their pattern of spread according to the natural and human factors affecting the distribution, as the greater the distance between offices in the region, the lower the density of offices and vice versa (Qteishat and Abu Subha, 2014, p. 542). Table No. (16) and Figure No. (14) show the disparity and divergence between real estate services offices in Abha city as follows- :

Table (16) Average spacing of real estate services offices in residential neighborhoods in Abha city in 2023.

Average distance (km)	Real Estate Services Office	Area (km^2)	Residential neighbourhood	S	Average distance (km)	Real Estate Services Offices	Area (km^2)	Residential neighbourhood	S
0.59	3	0.91	Al Nuzha	24	2.94	1	7.51	Al Numan	1
0.52	2	0.48	Al Qabil	25	2.93	2	14.90	Sultana	2
0.47	1	0.19	Downtown	26	2.80	3	20.35	Al Zohour	3
-	-	2.09	Al Dhabab	27	2.51	3	16.42	Al Rawda	4
-	-	7.28	Al Sinaiyah	28	2.29	3	13.62	Al Rawabi	5
-	-	34.93	Al Masif	29	1.83	1	2.91	Al Wasayef	6
-	-	0.43	Al Maftaha	30	1.57	1	2.13	Al Khalidiya	7
-	-	1.89	Al Sarawat	31	1.49	2	3.87	Al Rabwa	8
-	-	4.95	Al Salama	32	1.42	2	3.50	Al Naseem	9
-	-	9.00	Al Areen	33	1.41	14	24.08	Al Ghadeer	10
-	-	3.50	Al Buhaira	34	1.38	6	9.93	Al Safa	11
-	-	1.18	Dhra	35	1.38	2	3.29	Al Qura	12
-	-	15.86	Al Muntazah	36	1.26	8	11.00	Al Badi	13
-	-	0.15	Al Aziziyah	37	1.25	1	1.35	Shamsan	14
-	-	2.25	Al Wurood	38	1.23	8	10.51	Al Morouj	15
-	-	5.55	Al Sharafiyah	39	1.22	1	1.30	Al Manhal	16
-	-	4.10	Al Salam	40	1.15	1	1.15	Al Shifa	17
-	-	8.25	Al Taawun	41	0.99	1	0.85	Al Nusub	18
-	-	16.67	Al Matar	42	0.95	1	0.78	Al Andalus	19
-	-	9.66	Al Zahr	43	0.70	1	0.42	Al Faisaliah	20
-	-	12.29	Al Aqeeq	44	0.67	2	0.78	Al Wardatayn	21
-	-	7.14	Al Yaqoot	45	0.66	1	0.37	Al Khasha	22
2.18	73	300.44	Total		0.61	2	0.65	Al Sad	23

Table (17): Categories of average spacing of real estate services offices in residential neighborhoods in Abha city in 2023.

Real Estate Services Offices		Area		Residential neighborhoods		Spacing categories (km)
%	N	%	Km^2	%	N	
16.4	12	24.2	72.80	11.1	5	Large (2 or more)
64.4	47	25.0	75.03	26.7	12	Average (1 to less than 2)
19.2	14	1.8	5.44	20.0	9	A little (less than 1)
-	-	49.0	147.17	42.2	19	No offices
100	73	100	300.44	100	45	Total



Source: table.(17)

Figure (14) Average spacing of real estate services offices in Abha city in 2023.

From the two tables and the figure, it is clear that: -

- Large spacing (2 or more) and occupying 5 residential neighborhoods (Al Naaman - Sultana – Al Zahour – Al Rawda – Al Rawabi) constitute 11.1% of the total residential neighborhoods, occupying a quarter of the city's area 24.2% of the total area, there are 12 real estate services offices in the city about 16.4% of the total city. They are distributed in the east and center of the city.

- Medium spacing (1 to less than 2) and includes 12 residential neighborhoods constituting 26.7% of the total residential neighborhoods, occupying a quarter of the city's area 25% of the total area,

there are 47 real estate services offices in the city about 64.4% of the total city. They are distributed in the north, south and west of the city.

-Small spacing (less than 1) and occupying 9 residential neighborhoods that constitute 20% of the total residential neighborhoods, occupying 1.8% of the total area, there are 14 real estate services offices in the city, about 19.2% of the total city. They are distributed in the west of the city.

Conclusion:

The study concluded with several results, the most prominent of which are the following:

-Real estate services offices are spread across the residential neighborhoods of Abha city, which number 45 residential neighborhoods. Real estate services offices are concentrated in about 22 residential neighborhoods, representing 48.9% of the total residential neighborhoods, with 73 real estate services offices, distributed between the old residential neighborhoods in the southwest of the city, and the modern residential neighborhoods in the northeast of the city. The correlation coefficient between the number of residential neighborhoods and the number of real estate services offices in the city reached about 0.35, which is a weak positive correlation. Evidence of this is that less than half of the residential neighborhoods are devoid of real estate services offices in the city. The study shows that the Lorenz curve is not symmetrical, whether for the total area, as well as the urban area, as well as the population, as about a fifth of the offices are distributed over less than a tenth of the area, while more than half (53.4%) of the offices are spread over about a quarter of the area (23%) of the area, and three-quarters of the offices (76.7%) are spread over two-fifths of the area (39.4%), and 100% of the offices are spread over half the area (51%) of the area. As for the urban area, about a third of the offices (30.1%) are distributed over less than a tenth of the urban area (8.1%), while more than half (53.4%) of the offices are spread over about a quarter of the urban area (20.6%) of the urban area, and 100% of the offices are spread over three-quarters of the urban area (76.9%) of the urban area. As for the population, about one-fifth of the offices (19.2%) are distributed over less than one-tenth of the population (6.4%), while more than half (53.4%) of the offices are spread over about one-third (33.1%) of the population, three-quarters of the offices (74%) over more than half of the population (55.4%), and 100% of the offices are spread over three-quarters of the population (74.7%) of the population.

− The study shows that the total length of paved roads in the city reached 237.3 km, of which 70.6 km are main roads, representing 29.8% of the total length of paved roads in the city, distributed on its sides by about 16 real estate services offices, representing 21.9% of the total real estate services offices in the city, while the length of regional roads reached 166.7 km, representing 70.2% of the total length of paved roads in the city, distributed on them by 57 real estate services offices, representing 78.1% of the total real estate services offices in the city. Al Mahala Road, which extends from the north of the city to its south in the city center, came in first place in terms of the number of real estate services offices spread around it, about 15 offices, representing 20.55% of the total city, and King Abdulaziz Road came in second place with about 6 offices, while King Fahd Road came in third place with about 5 offices, and with the same number of 5 offices came Al-Bukhari Road, as well as Makkah Al Mukarramah Road, about 5

offices, while the rest of the offices were distributed on the main roads. And regional in varying proportions.

− Average geographical center of real estate services offices in Abha is located in the city center in Al Naaman neighborhood, at the intersection of latitude 32 ˚18 ´ 14 ˝, with longitude 41 ˚42 ´ 33 ˝; This explains the concentration of the majority of real estate services offices in densely built residential neighborhoods east and southwest of the city.

− standard circle area of real estate services offices in the residential neighborhoods of Abha city occupied about 112.66 km2, which constitutes 37.5% of the total area of the city, which is 300.44 km2. The basic model assumes that the standard circle contains 68% of the total points, but the reality indicated that the standard distance circle of real estate services offices included 41 offices, representing 56.2% of the total real estate services offices in the residential neighborhoods of Abha city, which indicates that the geographical distribution pattern of real estate services offices in the residential neighborhoods of Abha city is a semi-regular distribution pattern, as the higher the percentage, the more the distribution pattern tends to the regular form, while the lower the percentage indicates its random spread. In analyzing the geographical distribution pattern of real estate services offices in Abha city, the Spatial Analyst add-on was used in the Arc GIS program. The study showed the dominance of the Clustered pattern in the geographical distribution of real estate services offices in Abha city, as the value of the nearest neighbor was recorded at 0.405645, which indicates the closeness of the distribution, albeit in an irregular form.

− It is concluded from the results of the indicators of the nature of the spatial distribution trends of real estate services offices in the residential neighborhoods of Abha city that there is a clear concentration of these offices in the southwest of the city such that they are clearly close to each other, and the general trend prevailing for the distribution of these machines of all kinds extends from west to east and vice versa in the directions of the city's expansion in terms of area and population. - The study concluded that the relationship between the distance from the average real estate services office and the number of offices in the old neighborhoods is a "perfect" direct relationship. The greater the distance from the average office of the city's neighborhoods, the greater the number of restaurants, and thus the coverage rate increases. This is confirmed by the value of the correlation coefficient (one correct) between the cumulative coverage rate for the service range of 7.5 km, where the old neighborhoods of Abha are concentrated. It can also be said that the relationship between the distance from the average office and the number of real estate offices in modern neighborhoods is an inverse relationship. As the distance from the average office increases, the number of offices decreases and thus the coverage ratio decreases, which is confirmed by the value of the correlation coefficient (- 0.99) between the cumulative coverage percentage of the service area and the area of the area. Extending more than 8 km, it shows the modern neighborhoods of the city of Abha.

− The number of polygons reached 73 polygons covering the city area of 300.44 km2, where the areas shrink in the southwest of the city, where the majority of real estate services offices are concentrated, which account for more than three-quarters of the real estate services offices in the city, then the area of the polygons expands in the east, north, south, and city.

- The study of the spacing rate showed a close relationship between the distribution of real estate services offices and the central area in the southwest of the city, such that the spacing rate decreases to increase the level of service in the west of the city, and the quality decreases and the distance increases the further we move towards the northern, northwestern, and eastern outskirts, where the area of the neighborhoods increases the further we move away from the center, most of which are newly established neighborhoods, which led to an increase in spacing rates towards the outskirts, so the relationship is inverse here between the distribution of real estate services offices and the spacing rate from the center to the outskirts of the city. This is in addition to the neighborhoods deprived of the service of real estate services offices in the city of Abha, which suggests the need to increase ATM machines in the northern, eastern, and southeastern neighborhoods of the city of Abha to raise the level of service in the future.

The study recommends the following:

- Creating an electronic platform that activates geographic information systems technology and is constantly updated, aiming to inform the beneficiary of existing and closed offices in a way that saves time and benefits, and linking this platform to providing brief information about the name of the office, available services and working hours.
- Establishing real estate complexes whose numbers are linked to the population density in each neighborhood; to eliminate the randomness of opening and closing offices, and facilitate the beneficiary's access to the required location and obtain multiple options in record time, in addition to linking them to the (GPS) service.
- Conducting scientific studies aimed at identifying the services that the beneficiary is looking forward to and also evaluating the services currently provided and the service provider in each office.
- Officials' interest in planning the distribution of real estate services offices in newly established neighborhoods and urban and population development, especially in residential neighborhoods in the center, north and east of Abha city.
- Acknowledgements The authors extend their appreciation to the Deanship of Research and Graduate Studies at King Khalid University for funding this work through small group research under grant number (RGP1/62/45).
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