

# Residents' Opinions about the Influence of Public Green Space on Prices of Residences — the Case of Poznań, Poland

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## Abstract

*The influence of public green space on the value of real estate has been proven many times in different publications. Therefore, the aim of this study was to investigate which factors, in Poznań inhabitants' opinions, influenced the real estate value and if residents of individual parts of the city noticed the influence of public green space on the value of their real estate. From April to July 2015 we conducted preliminary research on asking prices of residences in Poznań (n = 480). We conducted quantitative analysis (n = 366) for a questionnaire survey. The most expensive residences in Poznań are located in the sector with the greatest amount of public green space. However, in spite of the fact that there had been proven differences in the prices of residences, only a slight majority of respondents (54%) saw the influence of green space on these prices. In our study the respondents indicated that the choice of residences was mostly influenced by the price and living space area. Only 1 out of more than 12 respondents found access to public green space to be important for making a decision about the choice of residences. Green space in Poznań is poorly used as a tool increasing the attractiveness of public space in the city and the city inhabitants are too rarely aware of the fact that it influences real estate value.*

**Keywords:** public green space, property value, green infrastructure, survey

## Introduction

Inhabitants of urbanized areas highly appreciate facilities offered by public green space, as they have positive influence on city dwellers' health and increase quality of life in the city (Jim and Chen 2006; Madureira et al. 2015; Pandit et al. 2013). In developing countries there are still situations where aspects related to green space are skipped or marginalized in the process of spatial planning (Luttik 2000; Tajima 2003).<sup>1</sup> The positive effect of green space in urbanized areas comprises its influence on biodiversity, air quality, reduction of noise nuisance intensity, stabilization of the urban climate and reduction of temperature in urban heat islands (Chen and Jim 2008; Chiesura 2004; Gill et al. 2007; Kattwinkel, Biedermann, and Kleyer 2011; Liu and Li 2012; Schwarz, Bauer, and Haase 2011). Available sources also indicate other significant roles of public green space in urbanized areas — i.e., it improves inhabitants' health and well-being (Tzoulas et al. 2007), reduces fatigue (Cohen et al. 2007), provides a meeting venue with positive effect on the possibilities of

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1. See also: The Value of Open Space: Evidence from Studies of Nonmarket Benefits. by Virginia McConnell and Margaret Walls. Lincoln Institute of Land Policy Working Paper, 2005, [@:] [http://conservationtools-production.s3.amazonaws.com/library\\_item\\_files/110/122/valueofopenspace.pdf?AWSAccessKeyId=AKIAIQFJLILYGVDR4AMQ&Expires=1475153105&Signature=A6jyMFKIxvTCXya%2Bqojm7j2DnK4%3D](http://conservationtools-production.s3.amazonaws.com/library_item_files/110/122/valueofopenspace.pdf?AWSAccessKeyId=AKIAIQFJLILYGVDR4AMQ&Expires=1475153105&Signature=A6jyMFKIxvTCXya%2Bqojm7j2DnK4%3D).

cooperation between neighbors and local communities (Kazmierczak 2013) and increases aesthetic values of urbanized areas (James et al. 2009).

Urban green space follows the concept of green infrastructure, which has been gaining popularity in recent years (Madureira et al. 2015). Scientific communities provide different definitions of green infrastructure—this fact reflects the ambiguity of this scientific term, which is being developed by numerous disciplines, ranging from a strictly environmental theory to socioeconomic approaches (Wright 2011). In spite of the fact that it is difficult to give a clear definition of green infrastructure it is possible to prove that the essentials of the concept include multifunctionality and the possibility to integrate communities (Ahern, Cilliers, and Niemela 2014; Madureira and Andresen 2014; Newell et al. 2013; Roe and Mell 2013). James et al. (2009) stress the fact that public green space is a basic component of green infrastructure in urbanized areas.

Being an element of green infrastructure, public green space may be of different value for residents of urbanized areas and this may translate into the value of real estate (Madureira et al. 2015). Studies conducted in different cities all over the world (Jim and Chen 2006; Jim and Shan 2013; Lo and Jim 2012; Tyrvaainen, Makinen, and Schipperijn 2007; Vesely 2007) were based on the hedonic pricing method to assess the influence of all public green spaces on the value of real estate or they were based on the assessment of the influence of strictly defined types of public green space (community parks) on the value of real estate (Eriksson et al. 2012).

Public green space in urbanized areas may have different value, depending on the knowledge, age, experience and economic potential of the people making the evaluation (Madureira et al. 2015). Therefore, it is necessary to investigate the opinions of residents of urbanized areas about the functions and value of public green space. So far all over the world there have been many studies conducted by means of questionnaire surveys concerning the perception of the role and value of public green space in urbanized areas (Eriksson et al. 2012; Jim and Shan 2013; Lo and Jim 2012; Tyrvaainen, Makinen, and Schipperijn 2007; Vesely 2007). However, none of these studies concerned Poland—a country which was behind “the iron curtain” for decades and which was characterized by a centrally planned economy, where heavy industry and agriculture were most important.

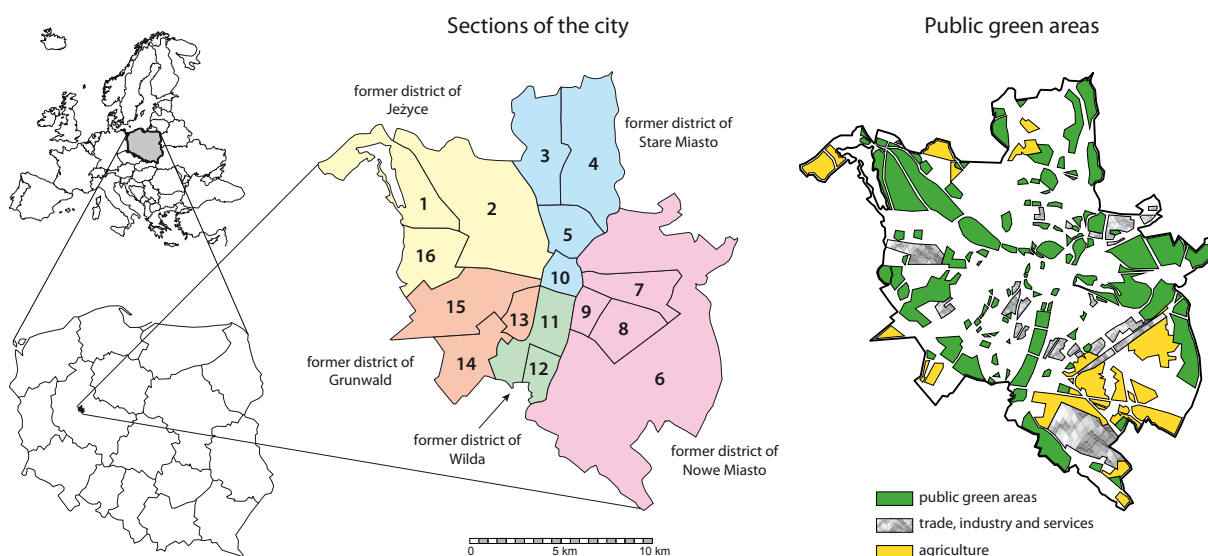
The aim of this study was not to confirm scientifically proven trends concerning the influence of public green space on the value of real estate. We wanted to check which factors, in Poznań inhabitants’ opinions, influenced the value of real estate and if residents of individual parts of Poznań noticed the influence of public green space on the value of their real estate.

## 1 Material and methods

### 1.1 Prices of residences

From April to July 2015 we conducted preliminary research on asking prices of residences in Poznań. Poznań (52°24'30.4" N, 16°56'03.4" E) is the seventh largest Polish city in terms of area (over 261 km<sup>2</sup>) and fifth in terms of population (over 540 000). Green areas in Poznań form a system of green wedges and rings, which means that greenery is arranged as four wedges in the naturally shaped river valleys of the Warta, Bogdanka and Cybina. Apart from forest areas and residential green areas, there are over 270 separate green facilities, including: numerous parks, squares, gardens, allotments, scientific research parks, two zoos and 24 cemeteries (Parysek and Mierzejewska 2006; Urbański, Krzyżaniak, and Rydzewska 2009). The area of the city was divided into 16 sectors (fig. 1) and 30 second-hand residences sales offers were randomly selected from the following websites: otodom.pl; domiporta.pl and homebroker.pl. All of the randomly selected residences were located on the first floor of multi-family buildings with a different number of storeys and different living space areas.

We delimited 16 sectors of Poznań allowing for the boundaries of the former 5 districts of the city and internal homogeneity of the sectors, which included the character of residences, types of public green space and land use structure. In order to better illustrate residence price tendencies in Poznań we compared the price growth rates—i.e., the overall price growth rate and the rate concerning the prices of residences in two voivodships—Mazowieckie Voivodship (capital



**Fig. 1.** The research object and division of the city into 16 sectors with location of public green space (1—Wola, 2—Jeżyce, 3—Piątkowo, 4—Naramowice, 5—Winograpy, 6—Nowe Miasto, 7—Malta, 8—Górny Taras Rataj, 9—Dolny Taras Rataj, 10—Stare Miasto, 11—Wilda, 12—Dębiec, 13—Łazarz, 14—Górczyn, 15—Grunwald, 16—Ławica)

**Tab. 1.** The inflation rate (in percentage) between 2003 and 2014

Region	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Masowieckie												
total	1,1	3,1	2,1	1,1	2,2	3,9	3,4	2,4	3,7	3,5	0,8	0,0
houses	2,9	3,0	2,7	3,8	3,3	6,8	7,1	2,2	5,1	5,6	1,4	1,1
Wielkopolskie												
total	0,9	3,6	2,1	0,7	2,4	4,7	3,6	2,8	4,7	4,0	1,1	0,2
houses	2,7	3,3	3,3	3,3	3,3	8,4	7,3	3,4	5,5	5,4	2,1	1,4
Poland												
total	0,8	3,5	2,1	1,0	2,5	4,2	3,5	2,6	4,3	3,7	0,9	0,0

*Data source:* Central Statistical Office of Poland, as published in 2015

[In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

city—Warszawa) and Wielkopolskie Voivodship (capital city—Poznań) with the inflation rate in Poland (tab. 1). According to the statistics collected by the Central Statistical Office of Poland (in the year 2015), the average price of one square meter of real estate in Poland increased by 203,42%—from PLN 1 930 per m<sup>2</sup> in the fourth quarter of 1998 (average salary PLN 1 239,49) to PLN 3926 per m<sup>2</sup> in the first quarter of 2015<sup>(2)</sup> (average salary PLN 4054,89).

## 1.2 Questionnaire survey

We conducted a quantitative analysis as part of the research. We made a questionnaire, which supplied responses to questions about the reasons for choosing the respondents' current place of residence in Poznań and the influence of public green space on the real estate value. We conducted the questionnaire survey between May and July 2015. Anonymous questionnaires were completed by randomly selected adult inhabitants of Poznań. Each of the respondents was informed about the purpose and content of the questionnaire. We emphasized that participation in the survey was optional. Respondents were randomly selected for the survey in public green spaces and they were requested to fill in the questionnaire. Altogether 640 people were requested to take part in the

2. On 20 August 2015 the average exchange rates were as follows: EUR 1 = PLN 4,17; USD 1 = PLN 3,77; GBP 1 = PLN 5,91; as published by National Bank of Poland.

survey (40 people in each sector). 366 of them (i.e., 57,19% agreed to it). There were 73 respondents in the former Stare Miasto District (73% of all potential respondents requested in sectors: 3, 4, 5, 10; 19,95% of all the people requested), 69 respondents in the former Nowe Miasto District (69% of all potential respondents requested in sectors: 6, 7, 8, 9; 18,85% of all the people requested), 74 respondents in the former Grunwald District (74% of all potential respondents requested in sectors: 13, 14, 15; 20,22% of all the people requested), 82 respondents in the former Jeżyce District (82% of all potential respondents requested in sectors: 1, 2, 16; 22,40% of all the people requested) and 68 respondents in the former Wilda District (68% of all potential respondents requested in sectors: 11, 12; 18,58% of all the people requested). In order to present the gathered data more clearly the questionnaires from the sectors were grouped into the five former districts of Poznań (tab. 2).

**Tab. 2.** Socioeconomics

Variable	Former districts of the city of Poznań (present sectors numbers in brackets)									
	Stare Miasto (3, 4, 5, 10)		Nowe Miasto (6, 7, 8, 9)		Grunwald (13, 14, 15)		Jeżyce (1, 2, 16)		Wilda (11, 12)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Age</b>										
< 18 . . . . .	7	9,6	4	5,8	5	6,8	9	11,0	4	5,9
18–24 . . . . .	9	12,3	5	7,2	4	5,4	5	6,1	5	7,4
25–34 . . . . .	12	16,4	7	10,1	8	10,8	14	17,1	6	8,8
35–44 . . . . .	10	13,7	11	15,9	12	16,2	11	13,4	10	14,7
45–54 . . . . .	13	17,8	8	11,6	10	13,5	6	7,3	9	13,2
55–64 . . . . .	9	12,3	12	17,4	15	20,3	16	19,5	11	16,2
65–74 . . . . .	8	11,0	15	21,7	12	16,2	14	17,1	14	20,6
> 75 . . . . .	5	6,8	7	10,1	8	10,8	7	8,5	9	13,2
<b>Gender</b>										
male . . . . .	41	56,2	36	52,2	35	47,3	40	48,8	28	41,2
female . . . . .	32	43,8	33	47,8	39	52,7	42	51,2	40	58,8
<b>Monthly income<sup>a</sup></b>										
< 1000 . . . . .	5	6,8	9	13,0	6	8,1	9	11,0	8	11,8
1000–2000 . . . . .	9	12,3	13	18,8	9	12,2	7	8,5	11	16,2
2001–3000 . . . . .	17	23,3	11	15,9	11	14,9	13	15,9	12	17,6
3001–4000 . . . . .	10	13,7	8	11,6	13	17,6	17	20,7	3	4,4
4001–5000 . . . . .	6	8,2	3	4,3	10	13,5	7	8,5	1	1,5
> 5000 . . . . .	4	5,5	1	1,4	4	5,4	3	3,7	1	1,5
no answer . . . . .	22	30,1	24	34,8	21	28,4	26	31,7	32	47,1
<b>Education level</b>										
basic . . . . .	7	9,6	6	8,7	3	4,1	9	11,0	11	16,2
incomplete second. . . . .	17	23,3	16	23,2	29	39,2	17	20,7	18	26,5
complete second. . . . .	27	37,0	24	34,8	18	24,3	27	32,9	21	30,9
university (higher) . . . . .	22	30,1	23	33,3	24	32,4	29	35,4	18	26,5
<b>Occupation</b>										
self-employed . . . . .	13	17,8	9	13,0	17	23,0	19	23,2	12	17,6
employed . . . . .	25	34,2	19	27,5	12	16,2	16	19,5	19	27,9
other active . . . . .	3	4,1	5	7,2	6	8,1	6	7,3	5	7,4
unemployed . . . . .	2	2,7	3	4,3	3	4,1	2	2,4	2	2,9
student . . . . .	12	16,4	15	21,7	12	16,2	16	19,5	6	8,8
retired . . . . .	16	21,9	13	18,8	19	25,7	18	22,0	19	27,9
other no active . . . . .	2	2,7	5	7,2	5	6,8	5	6,1	5	7,4
<b>Children</b>										
yes . . . . .	41	56,2	39	56,5	39	52,7	49	59,8	31	45,6
no . . . . .	32	43,8	30	43,5	35	47,3	33	40,2	37	54,4
Total	73	100,0	69	100,0	74	100,0	82	100,0	68	100,0

<sup>a</sup>in PLN

The respondents were asked which factor was decisive in their choice of residences in a particular location. The following options were provided: the price of residences, living space area, storey, transport connections to the city centre, wide availability of trade and service facilities, security/24-hour monitoring, neighbors, short distance to the city centre, style/architecture of the building, access to public green space in direct neighborhood (not further away than within 5-minute walking distance), fashion/prestige of the place and other aspects. The respondents were also asked to assess the value of public green space in their immediate neighborhood. The following response options were provided: economic (it increases the real estate value), social (it enables meetings and recreation), cultural (it is a witness of events or the remains of former facilities); scenic/aesthetic (it increases the value of surroundings), ecological (it is a refuge for the fauna and flora), technical (it provides protection from noise) or other. The respondents were also asked about the type of public green space which they can mostly see in the neighborhood. The following response options were given: generally accessible green space in estates, street green space, green space in closed estates, green squares, parks, playgrounds/recreational areas, protected areas, areas of natural value and educational gardens (e.g., botanic gardens). The respondents were also asked if in their opinion the presence of public green space had influence on the growth of the real estate value at their place of residence. The respondents' age, sex, education, marital status and number of children were also noted.

### 1.3 Statistics

We used basic statistical measures, such as minimum, maximum and mean values as well as standard deviation in order to better describe the results. The dispersion measure (standard deviation) was introduced to check how the values under study were dispersed around the arithmetic mean.

## 2 Results

Table 3 shows the mean, minimum and maximum prices of residences per square meter in the sectors of Poznań. We also calculated the standard deviation. The prices of residences were definitely the highest in sector 7—Malta, where the average price was nearly PLN 7 000. The price range was minimal in comparison with sector 10—Stare Miasto, where the greatest price range was observed (i.e., from PLN 4 000 to PLN 9 857,14) (tab. 3). The least expensive residences in Poznań were located in sectors 11—Wilda and 12—Dębiec. In the cheapest districts in Poznań the price of one square meter of residences ranged from PLN 3 069,37 to PLN 6 603,77. The high price range was affected by a large number of factors described below.

The most important factors that were decisive in the choice of residences in Poznań were the price and living space area. On average the influence of these factors on the choice of residences amounted to 23% and 28%, respectively. The respondents found the availability of trade and

**Tab. 3.** The mean, minimum, maximum and standard deviation (SD) values in the prices of residences in different sectors of Poznań per square meter of residence area

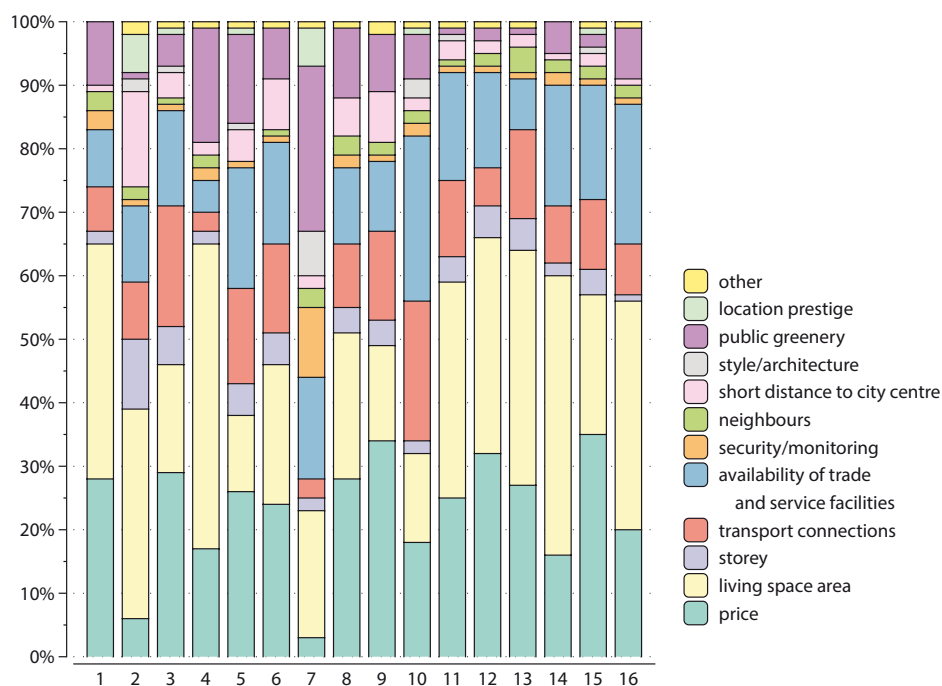
	Wola	Jeżyce	Piątkowo	Naradowice	Wino-grady	Nowe Miasto	Malta	Górny Taras Rataj
Mean	5 051,52	4 952,51	5 622,22	6 039,43	5 459,35	4 843,14	6 963,36	5 108,19
SD	850,21	1 522,74	666,60	614,96	395,38	721,01	923,16	1 315,25
Min	4 104,48	2 629,31	4 522,73	5 340,00	4 876,92	3 970,59	5 452,83	4 050,63
Max	7 242,42	7 448,28	6 363,64	7 169,81	6 148,94	6 289,47	8 367,35	7 980,00
	Dolny Taras Rataj	Stare Miasto	Wilda	Dębiec	Łazarz	Górczyn	Grunwald	Ławica
Mean	6 077,74	6 258,31	4 584,47	4 653,06	4 907,30	5 426,26	5 475,51	6 187,73
SD	1 066,41	2 358,05	874,91	889,37	1 159,44	857,88	1 063,61	1 157,15
Min	4 659,09	4 000,00	4 000,00	3 069,23	3 793,10	4 700,00	4 602,56	4 100,00
Max	7 377,05	9 857,14	6 603,77	6 052,63	7 333,33	7 250,00	8 076,92	7 500,00

**Tab. 4.** The respondents' opinions about the factors decisive to the choice of residences in Poznań (in %)

Factors	Mean	SD	Min	Max
Price . . . . .	23	9,20	3	35
Living space area . . . . .	28	11,20	12	48
Storey . . . . .	4	2,39	1	11
Transport connections. . . . .	11	5,27	3	22
Availability of trade and service facilities	15	5,39	5	26
Security/monitoring . . . . .	2	2,48	1	11
Neighbours. . . . .	2	0,97	0	4
Short distance to city centre . . . . .	4	3,74	1	15
Style/architecture . . . . .	1	1,83	0	7
Public greenery . . . . .	8	6,89	1	26
Location prestige . . . . .	1	2,00	0	6
Other . . . . .	1	0,52	0	2

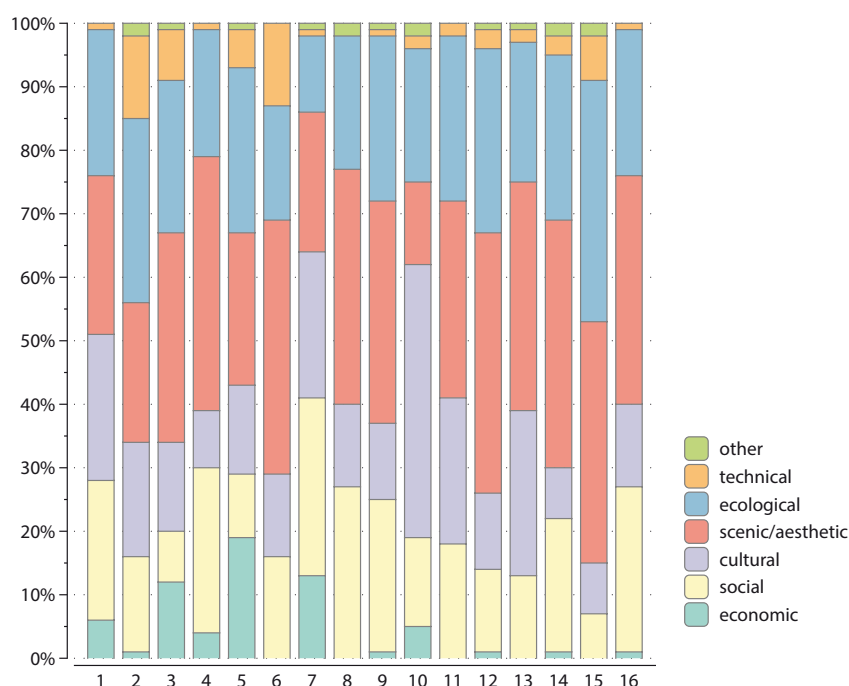
service facilities and transport connections to be important factors, whereas security/monitoring, neighbors, style/architecture and fashion/prestige were the least important (tab. 4). The research revealed that the distribution of individual factors varied in different sectors of Poznań (fig. 2). The living space area was the most important for owners of residences in sector 4—Naramowice. The inhabitants of sector 7—Malta paid less attention to the price, whereas they found other elements—i.e., security/monitoring, style/architecture and fashion/prestige, to be important (these elements were completely unnoticed by people purchasing residences in the other sectors of the city). Access to green space and the view were more important for them. In sector 10 (Stare Miasto) the availability of trade and service facilities and transport connections were important factors which affected the respondents' decision to purchase their residences.

The respondents paid attention to the presence of green space in the city. Most of them appreciated the scenic, aesthetic and ecological value (tab. 5). The respondents did not notice the economic or technical value of public green space in the city. There was considerable discrepancy in the respondents' answers. As far as the cultural value is concerned, the responses ranged from

**Fig. 2.** The factors decisive to the choice of residences in individual sectors of Poznań (the numbers are consistent with figure 1)

**Tab. 5.** The respondents' opinions about the value of urban green spaces

Factors	Mean	SD	Min	Max
Economic. . . . .	4	5,77	0	19
Social . . . . .	18	7,00	7	28
Cultural. . . . .	17	8,97	8	43
Scenic/aesthetic	32	8,31	13	41
Ecological . . . . .	24	5,67	12	38
Technical. . . . .	4	4,21	0	13
Other . . . . .	1	0,82	0	2

**Fig. 3.** The respondents' opinions about the value of urban green space in individual sectors of the city (the numbers are consistent with figure 1)

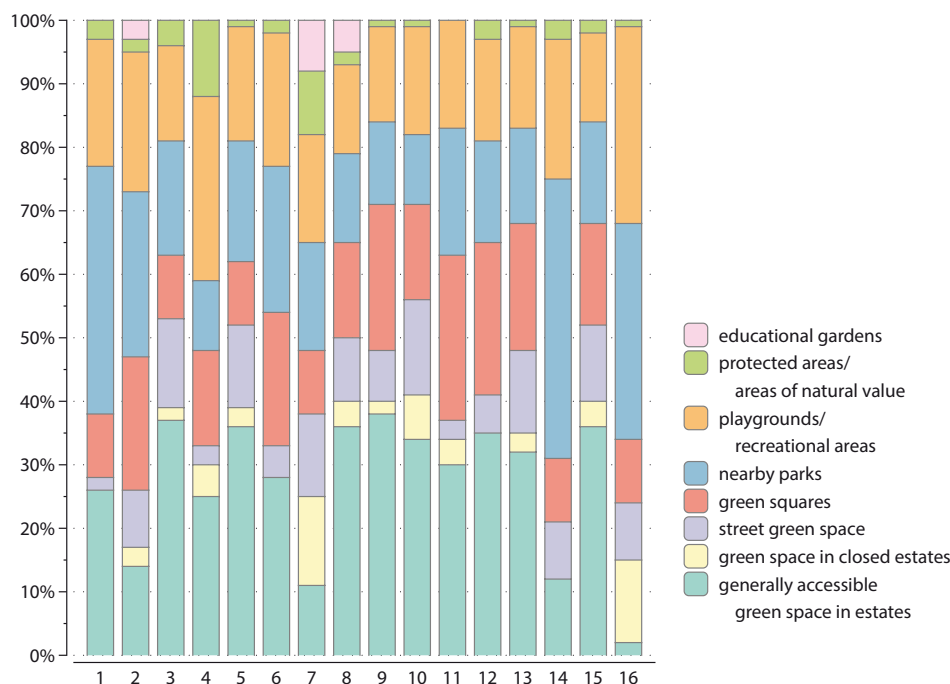
8% (sectors: 14—Górczyn and 15—Grunwald) to 43% (sector 10—Stare Miasto). More than 1 out of 7 inhabitants of sector 3—Piątkowo, 5—Winogrady and 7—Malta paid attention to the economic value of public green space in the city. More than 1 out of 8 inhabitants of sector 2—Jeżyce and 6—Nowe Miasto paid attention to the technical value (fig. 3).

The responses provided in the questionnaire let us conclude that the most appreciated/noticable/wanted areas of public green space were: green space in estates (27%), parks (21%) and playgrounds/recreational areas (19%). The respondents did not consider protected areas, areas of natural value or educational gardens to be public green space in general comparison (tab. 6). The inhabitants of the city sectors under study gave different answers to the question. In the sectors located near protected areas (4—Naramowice, 7—Malta) more people saw protected areas and areas of natural value as public green space (1 out of 10 respondents) (fig. 4).

Our research proved that only a slight majority of Poznań inhabitants noticed the favorable influence of public green space on the value of their real estate. The percentage of respondents expressing this opinion in 13 sectors was greater than 50%, on average—54,06%. The highest percentage of the respondents who noticed the influence of public green space on the real estate value was observed in 5 sectors of the city under study: 65% of the respondents in sector 8, 64%—in

**Tab. 6.** Types of public green space noticed by Poznań inhabitants

Factors	Mean	SD	Min	Max
Generally accessible green space in estates	27	11,23	2	38
Green space in closed estates . . . . .	4	4,21	0	14
Street green space . . . . .	9	4,21	2	15
Green squares . . . . .	16	5,76	10	26
Nearby parks. . . . .	21	9,93	11	44
Playgrounds/recreational areas . . . . .	19	5,03	14	31
Protected areas/areas of natural value . .	3	3,31	0	12
Educational gardens. . . . .	1	2,34	0	8

**Fig. 4.** Types of public green space noticed by Poznań inhabitants in individual sectors under study (the numbers are consistent with figure 1)

sectors 5 and 9, 62%—in sector 7 and 61%—in sectors 3 and 14. On the other hand, the highest percentage of the respondents who did not notice the influence of public green space on the real estate value was observed in 3 sectors of the city under study: 73%—in sector 6, 68%—in sector 2, and 62%—in sector 4.

## Discussion

The city is man's life environment, where essential functions and needs related with living, education, employment, leisure and spiritual life can be satisfied. Public green space is particularly important for achievement of these functions. However, contemporary cities, especially city centers, where land prices are high, lack free space for parks and squares chiefly due to economic reasons. In Poland the attractiveness of a capitalist economy and the ruined urban planning system resulted in negative changes in the quality of public space.<sup>3</sup> The analysis of legal acts with the term 'green space' and the lack of clear criteria delimiting these areas let us conclude that this concept is one of

3. See: *Przestrzeń życia Polaków*. Report by Janusz Sepioł et al. SARP, Warszawa, 2014, [@:] [http://www.sarp.org.pl/pliki/1908\\_53fdc64bb3140-pzp\\_spistresci\\_1.pdf](http://www.sarp.org.pl/pliki/1908_53fdc64bb3140-pzp_spistresci_1.pdf).



the least precise terms used in Polish spatial planning (The Construction Law Act, 1994, The Nature Conservation Act, 2013, The Spatial Planning and Development Act, 2012).<sup>4</sup> The imprecision of the concept caused green space to become a casual tool in spatial planning, which is often uncomfortable. In consequence, it affects the character of contemporary urban space in Poland. The study conducted by Kotus (2006) proves that Poznań is an example of a post-socialist city, where investors' share in the creation of urban spatial structures is too big. Green space, such as green squares, is used for new investments with trade and service facilities. However, a plot of undeveloped land is never used to make an area of public green space (e.g., a park). Among the disadvantages of urbanization in Poznań agglomeration Bonenberg (2011) are depreciation of public space, increasing chaotic development, the lack of coherent compositional forms and dullness. Conedera et al. (2015) note that urban sprawl may have a very negative effect on city dwellers' health and well-being. Their study proved that contact with public green space or at least the possibility to see it from the windows of one's residences had positive influence on quality of life.

The statistical analysis of our data with prices of second-hand residences revealed that the most expensive residences were located in sector 7 (Malta), whereas the least expensive residences were in sector 11 (Wilda), which may have been caused by the amount of available public green space. Sector 7 is an area with a high share of green space and simultaneously it is a developing, modern and fashionable place of residence (Parysek and Mierzejewska 2006). The study by Lindsey et al. confirms the fact that the average sales price of real estate located in an area with access to public green space is higher than the price of other real estates.<sup>5</sup> Also the results of studies conducted all over the world show that the quality of life is better in newly designed urban estates with a high share of public green space or which are located in the neighborhood of immense green areas (Anderson and West 2006). On the other hand, sector 11 is an older district of Poznań, with a low share of green space. It used to be the place where labor communities resided. Moreover, it is often associated with pathological phenomena. It is noteworthy that studies conducted abroad proved that revitalization of neglected areas and transforming them into places with a high share of green space may increase the prices of real estate located there. It may also improve security and social relations in these areas (Conedera et al. 2015; Jim and Chen 2010; Krellenberg, Welz, and Reyes-Packe 2014).

The results of our questionnaire survey show that although we had shown differences in the prices of residences, only a slight majority of the respondents (54%) saw the influence of green space on the prices. In 13 out of the 16 sectors under study over 50% of the respondents expressed this opinion. Studies conducted all over the world proved that the presence of healthy trees in areas with public green space might result in real estate prices increasing by 6–9%, whereas a nice view from the window (e.g., a lake or open space) might increase the price of a real estate by 6%–12% (Noor, Asmawi, and Abdullah 2015; Zhang et al. 2012). Sander et al. (2010) estimated that the presence of public green space at a short distance from the real estate increased its value by more than USD 1300. Conway et al. (2010) arrived at a similar conclusion. They proved that when the amount of public green space increased by 1% within a distance of 200–300 m from the real estate, its value grew by 0,07%.

In our study the respondents indicated that their choices of residences were most influenced by the price and living space area. Only 1 out of 12 respondents found green space to be important for the choice of their dwellings. The sectors under study differed in the distribution of factors decisive to the choice of residences. It is noteworthy that according to the results of a nationwide report, for purchasers the most important criterion to the choice of residences was a positive rating of the functionality of the building inside. According to the order of importance, other factors that were

4. See: Ustawa z dnia 7 lipca 1994 r. — Prawo budowlane. [the Construction Law Act], DzU z 1994 r. nr 89 poz. 414; Obwieszczenie Marszałka Sejmu Rzeczypospolitej Polskiej z dnia 14 maja 2013 r. w sprawie ogłoszenia jednolitego tekstu ustawy o ochronie przyrody. [the Nature Conservation Act], DzU z 2013 r. poz. 627; Obwieszczenie Marszałka Sejmu Rzeczypospolitej Polskiej z dnia 24 kwietnia 2012 r. w sprawie ogłoszenia jednolitego tekstu ustawy o planowaniu i zagospodarowaniu przestrzennym. [the Spatial Planning and Development Act], DzU z 2012 r. poz. 647.

5. See: Public Choices and Property Values: Evidence from Greenways in Indianapolis. Report prepared by Greg Lindsey, Seth Payton, Joyce Man, John Ottensmann. IUPUI (Campus). Center for Urban Policy and the Environment [at:] [https://archives.iupui.edu/bitstream/handle/2450/447/44\\_03-C19.1\\_Greenway.pdf?sequence=1](https://archives.iupui.edu/bitstream/handle/2450/447/44_03-C19.1_Greenway.pdf?sequence=1).

decisive to the choice of residences were low maintenance costs, safety in the area surrounding the building, the amount of vegetation and free space around the building.<sup>6</sup> On the other hand, studies conducted in other cities all over the world proved that the location of the real estate, its usable area and closeness to the place of work were more important determinants of the real estate value than the availability of green space (He et al. 2010).<sup>7</sup> Our questionnaire survey also showed that residents most often appreciated the scenic and ecological function of green space in the city. This social perception is often used by developers, who very often give attractive names to their investments. They make references to green space, vegetation and ecology, but it is hardly ever reflected by reality. Jim and Chen (2006) described a similar trend.

As seen in our study, residents tend to overlook the economic and technical value of public green space and do not see it in the form of protected areas, areas of natural value and street green space. On the other hand, studies conducted in the United Kingdom (Gibbons, Mourato, and Resende 2014) show that the value of real estate decreases as distance from protected areas increases. Thus, our research findings may indicate that the urban community has low awareness of the natural environment. These results may also have been the effect of socioeconomic gaps and post-communist mentality, which can still be observed. Jim and Chen (2006) also observed an analogical dependence. This phenomenon may also point to the fact that in social awareness green areas lack integrity and continuity in the city. Simultaneously, it seems that this fact may reflect the unfavorable situation in urban spatial planning in Poland, local policies promoting commercialization of urban space and poor quality of social participation (Kotus 2013).

Apart from that, it is necessary to say that there is low social awareness of public green space in the city. The value of green space was appreciated only in 3 sectors—i.e., 4 (Naramowice), 5 (Winogrady) and 7 (Malta), which may have resulted from the fact that these sectors are located in direct neighborhood of immense areas of public green space in Poznań. Therefore, it seems even more important that green space should be introduced even in the form of individual elements accompanying buildings. Intensive and rational management of areas to be covered with vegetation is necessary. The globally popular concept of green infrastructure should be implemented in order to achieve this goal (Ahern, Cilliers, and Niemela 2014; Madureira et al. 2015; Tzoulas et al. 2007). In particular, green areas should be protected from changes in their use; built-up areas should be integrated with public green space through growing plants (e.g., the idea of social gardens, green roofs and walls). Apart from that, trees and shrubs should be planted along roads, tracks, railway lines, in car parks and sports facilities, playgrounds and public transport stops. It also seems necessary to develop public green space by extending, condensing and supplementing it, especially in the city center, paying particular attention to the historical value of these places. Studies confirm the fact that the consolidation of cultural heritage positively affects the quality of public space and values of real estate (Seeland 2011).

It is noteworthy that these recommendations are in agreement with the provisions of “The Charter of the New Urbanism,” which states that generally accessible public areas with a clear spatial outline should be an element of urban development. In this context, compact districts with mixed functions are particularly important. They should be friendly to pedestrians and they should be connected by means of corridors, such as green belts and various forms of green space in these districts (Talen 2013).

It is noteworthy that until 1990 there were 5 big districts in Poznań (Stare Miasto, Nowe Miasto, Wilda, Grunwald, Jeżyce), which were replaced by auxiliary units called community councils. At present Poznań is divided into 42 units.<sup>8</sup> Such considerable fragmentation seems to be in disagreement with global tendencies and it may have negative influence on the development and perception of green space in the city.

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6. See: Polacy o architekturze. Komunikat z badań BS/134/2010, CBOS, Warszawa, październik 2010, [@:] [http://www.cbos.pl/SPISKOM.POL/2010/K\\_134\\_10.PDF](http://www.cbos.pl/SPISKOM.POL/2010/K_134_10.PDF).

7. See also: Public Choices and Property Values, op. cit.

8. See: Uchwała nr LXXX/1202/V/2010 Rady Miasta Poznania z dnia 9 listopada 2010 r. w sprawie Statutu Miasta Poznania. [the Statute of the City of Poznan], [@:] <http://bip.poznan.pl/bip/uchwaly/uchwala-lxxx-1202-v-2010-z-dnia-2010-11-09,35810/>.

To sum up, green space in Poznań is an underrated element of urbanistic composition, a poorly used tool increasing the attractiveness of urban public space and a factor affecting the real estate value, which city dwellers are too rarely aware of. This is a pilot study and it will be continued in other cities to obtain a fuller picture of the situation of green areas in Poland.

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