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Analysis of the Impact of Quantitative and Qualitative Price-setting Attributes on a Market of Real Estate Intended for the Purpose of the Transformer Stations on the Example of Krakow

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Abstract. Based on appraisal reports, obtained from the City Office of Krakow, there were formulated base of real estate properties on which is situated the building of transformer station or which are intended for such purpose. The base consists of 90 properties located in the administrative boundaries of the city of Krakow. Most of these properties are the plots of very small areas, mainly in the range from 30 to 70 square meters. Based on the completed database, there were conducted a statistical analysis of the relevant market the property. In order to determine the relationship between the attributes and the price of real estate, there were calculated coefficients of the Pearson complete correlation and coefficients of the Spearman correlation. The analysis showed significant differences between quantitative and qualitative correlation coefficients for some variables. In order to improve the consistency of the database, using statistical methods eliminated property turned out. Finally, the analysis considered two bases, numbering respectively 90 and 77 real estates. In the following values, there were defined standardized regression coefficients (scale β), the partial correlation coefficients for the dependent variable (price) relative to the rest of variables and coefficients of determination. On the basis of calculations and analysis, there have been drawn conclusions on the impact of each attribute on the market prices of these unusual properties.

Keywords: real estate appraisal, transformer stations, statistical analysis.

Conference topic: Technologies of Geodesy and Cadastre.

Introduction

In everyday practice of real estate appraiser, beyond valuations of the typical real estate, which are generally flat or houses, there are also ones whose purpose is to determine the value of less standard objects. These include the land properties or parts thereof, on which transformer stations are situated. The need for the valuation of such property is usually for the purpose of determining the remuneration for the establishment of transmission easement or compensation for non-contractual use of property (Butryn, Preweda 2016).

Property appraiser, whose task is to estimate the market value of the property, is obliged to make a prior analysis of the market, which will enable the selection of the price-setting attributes of similar properties – in case the use of a comparative approach, or features that differentiate the potential rent rates – in case the use of the income approach (RRM 2004).

Land properties on which transformer stations are situated undoubtedly represent the unusual segment of real estate market. Their specificity consists of a combination of factors, both physical, and legal, which will be presented in the text of this document. In combination with the relatively small number of transactional data, they affect the difficulty of the characteristics of the market for valuation purposes.

In this study was defined the set of potential price-setting attributes for the real estate market, as well as determined the quantitative impact of selected attributes of real estate on prices of plots with transformer stations in Krakow.

Reasons of taking an issue

Introduced in August 2008, the institution of transmission easement created another task for a property appraisers – determination of the remuneration for the establishment of transmission easement and estimating the amount of compensation for non-contractual use of the property (PKZW 2014; Wancke 2015). The first of the objectives is associated mainly with devices that have yet to be constructed on the property. The second one refers to a situation in which transmission facilities are sited on the property for some time, and the transmission entrepreneur has used the property without legal title. Currently, the issue of establishing transmission easement is discussed in many publications (Butryn, Preweda 2016; Wójciak 2015; Zamroch 2015; Sajnóg 2014).

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In practice, there are many types of transmission facilities, typical of the type of transmission network. The objects of this study are the transformer stations, which are devices related to electricity transmission networks (Fig. 1). The transformer station is a facility where there is a separation of electricity at different voltage levels equipped with transformers or converters for AC to DC and back.





Fig. 1. Examples of transformer stations in the area of Krakow (source: own materials)

Transformer stations are objects often associated with power lines of the transmission. Usually, for their foundation they are secreted separate cadastral plot/parcel (or group of parcels), in whole or the majority of stations built facility. As a result, real estate property which is the subject of the valuation is made up of cadastral parcel with a relatively small surface area, fitted out in a certain way. It can therefore be assumed that properties on which transformer stations are situated create a specific real estate market. The aim of this study is to analyze the factors affecting the price level in the market of land, on which are situated transformer stations. Geographical range of the analyzed market is an area of the city of Krakow.

Description of data, research methodology

The basis for the study is a set of properties, on which are situated transformer station or designated for their construction. The data was obtained from the resources of the City Hall of Krakow. They were made available in the form of extracts of appraisal reports. Therefore, it should be noted that the analysis covers the value of property, not transaction prices.

The database consists of 90 properties (Table 2) located in the administrative boundaries of the city of Krakow (Fig. 2). For each of them there is given designation of the property (cadastral unit, precinct, parcel number). Each real estate was described by 10 attributes, characterized below in Table 1 (as a convenience to the recording attributes also determined the letter's abbreviations):

Table 1. Characteristics of the local real estate market (source: own studies)

| Abbrevia- tion | Attribute name | Decsription features | Range of scales | | | |
|-------------------|-------------------------------------|---|---|--|--|--|
| a | Zone of the city | Zone of the city Location of the property expressed by a concentric model - the zone of the city | | | | |
| b | Planning conditions | Zoning, the parameters of possible construc- tion, the potential and limitations, conditions the neighborhood | 10 – parks, green spaces, recreation 20 – low housing 25 – high hosing 30 – municipal housing 35 – trade construction 40 – services construction 50 – industry construction | | | |
| С | Availability of public transport | Access to a public road, public transport (bus and tram) | 2 – very good 1 – good 0 – average –1 – difficult | | | |
| d | Plot surface area [m ²] | The surface area of the plot expressed in [m ²] | _ | | | |

End of Table 1

| Abbrevia- tion | Attribute name | Decsription features | Range of scales |
|-------------------|--|--|--|
| e | The density of construction and environmental influences | The density of buildings in the immediate vicinity of the property, the nature of the environment (land built / unbuilt) | 2 – very beneficial 1 – beneficial 0 – average –1 – unfavorable |
| f | The shape of the plot and topography | The shape of the plot (regular / irregular), lay of the land plot (flat terrain /a varied terrain) | 2 – very beneficial 1 – beneficial 0 – average –1 – unfavorable |
| g | The attractiveness of the location | The attractiveness of a location on the local market in the context of the use of the property | 5 – the most attractive 3 – very attractive 1 – attractive 0 – average -1 – unattractive |
| h | The armament of land | Technical infrastructure situated on the plot or in its neighborhood | The number of networks from 0 to 6 (energy, water, gas, sewage, heating, telecommunications) |
| i | Valuation date | Date on which was estimated market value of the property | _ |
| j | Value | The estimated market value of the property, expressed in full PLN | |

Below is a database of real estate with the unit scale attribute values, which will be analyzed further below:

Table 2. Real estate database – the basis of analyzes (source: own studies)

| Ordinal clinal Cadastral cunit Precinct wint Number of parcel/parcels a b c d e f g h i j 1. Krowodrza 15 43/4, 1 10 0 85 -1 0 0 1 20,09.2015 330 2. Krowodrza 15 18/3,18/5,18/6 1 10 0 86 -1 0 0 1 20,09.2015 3784 3. Podgórze 29 53/4 2 50 1 69 1 1 1 5 16.07.2014 13400 4. Podgórze 68 528/46 2 40 1 79 1 1 1 10.06.2015 5976 7. Podgórze 49 423/13, 423/32 2 25 -1 49 1 1 4 10.06.2015 5907 7. Podgórze 49 464/3/4 2 25 - | | | | | | | | | | | | | | |
|--|-----|-------------|----------|------------------|---|----|----|-----|----|---|----|---|------------|---------|
| November State S | - | | Precinct | | a | b | c | d | e | f | g | h | i | j |
| 3. Podgórze 29 53/4 2 50 1 69 1 1 1 5 16.07.2014 13 400 4. Podgórze 68 528/46 2 40 1 79 1 1 1 1 18.10.2015 9 316 5. Podgórze 49 423/13, 423/32 2 25 1 50 1 1 3 4 10.06.2015 10 63 6. Podgórze 49 427/11 2 25 -1 49 1 1 1 4 07.06.2015 10 261 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26.039 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 61 1/7 2 10 -1 | 1. | Krowodrza | 15 | 43/4, | 1 | 10 | 0 | 85 | -1 | 0 | 0 | 1 | 20.09.2015 | 3 300 |
| 4. Podgórze 68 528/46 2 40 1 79 1 1 1 1 18.10.2015 9 316 5. Podgórze 49 423/13, 423/32 2 25 1 50 1 1 3 4 10.06.2015 10 638 6. Podgórze 49 423/13, 423/32 2 25 1 59 1 1 1 5 10.06.2015 5 907 7. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 07.06.2015 10 261 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26.39 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 | 2. | Krowodrza | 15 | 18/3, 18/5, 18/6 | 1 | 10 | 0 | 86 | -1 | 0 | 0 | 1 | 20.09.2015 | 3 784 |
| 5. Podgórze 49 423/13, 423/32 2 25 1 50 1 1 3 4 10.06.2015 10.638 6. Podgórze 57 216/12, 2 25 1 59 1 1 1 5 10.06.2015 5 907 7. Podgórze 49 645/34 2 25 -1 49 1 1 1 4 07.06.2015 10.261 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26.039 9. Nowa Huta 10 315 2 25 -1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 1 91 1 1 1 4 10.06.2015 7 701 11. Podgórze 57 29/27 2 25 | 3. | Podgórze | 29 | 53/4 | 2 | 50 | 1 | 69 | 1 | 1 | 1 | 5 | 16.07.2014 | 13 400 |
| 6. Podgórze 57 216/12, 2 25 1 59 1 1 1 5 10.06.2015 5 907 7. Podgórze 49 645/34 2 25 -1 49 1 1 1 4 07.06.2015 10 261 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26 039 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 1 91 1 1 1 4 10.06.2015 7513 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7513 12. Podgórze 44 67/27 2 40 -1 | 4. | Podgórze | 68 | 528/46 | 2 | 40 | 1 | 79 | 1 | 1 | 1 | 1 | 18.10.2015 | 9 316 |
| 7. Podgórze 49 645/34 2 25 -1 49 1 1 1 4 07.06.2015 10 261 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26.039 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 1 91 1 1 1 4 10.06.2015 17 001 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7 513 12. Podgórze 57 29/27 2 25 -1 60 1 1 3 0 23.12.2014 12 820 14. Podgórze 44 67/27 2 40 -1 <td>5.</td> <td>Podgórze</td> <td>49</td> <td>423/13, 423/32</td> <td>2</td> <td>25</td> <td>1</td> <td>50</td> <td>1</td> <td>1</td> <td>3</td> <td>4</td> <td>10.06.2015</td> <td>10 638</td> | 5. | Podgórze | 49 | 423/13, 423/32 | 2 | 25 | 1 | 50 | 1 | 1 | 3 | 4 | 10.06.2015 | 10 638 |
| 8. Podgórze 49 427/11 2 25 -1 125 1 1 1 4 12.06.2015 26.039 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 1 91 1 1 1 4 10.06.2015 17.001 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7 513 12. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7 613 12. Podgórze 61 1/7 2 25 1 68 1 1 0 5 12.06.2015 7 60 607 13. Podgórze 84 131/4 2 10 | 6. | Podgórze | 57 | 216/12, | 2 | 25 | 1 | 59 | 1 | 1 | 1 | 5 | 10.06.2015 | 5 907 |
| 9. Nowa Huta 10 315 2 25 1 49 1 1 0 5 29.07.2015 4 520 10. Podgórze 53 522/2 2 20 1 91 1 1 1 0 5 12.06.2015 17 001 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7 513 12. Podgórze 57 29/27 2 25 1 68 1 1 0 5 10.06.2015 6 607 13. Podgórze 31 182/40 2 25 -1 60 1 1 5 5 10.06.2015 12.06.2015 6 607 14. Podgórze 44 667/27 2 40 -1 151 2 1 1 5 19.06.2015 11 949 15. Podgórze 84 131/4 2 10 0 2555 0 1 0 2 15.05.2013 16 575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 1 2 0.09.2015 7 332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 506 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 895 22. Nowa Huta 5 114/60 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 1 1 1.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 1 1 1.07.2014 6 120 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 012 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 15 069 28. Nowa Huta 7 46/1, 1 25 1 90 0 0 0 22.07.2015 19 246 30. Podgórze 49 736/4,736/19 2 25 -1 84 2 0 0 0 0 22.07.2015 19 246 30. Podgórze 49 736/4,736/19 2 25 -1 84 2 0 0 0 0 22.07.2015 19 246 | 7. | Podgórze | 49 | 645/34 | 2 | 25 | -1 | 49 | 1 | 1 | 1 | 4 | 07.06.2015 | 10 261 |
| 10. Podgórze 53 522/2 2 20 1 91 1 1 1 4 10.06.2015 17.001 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7.513 12. Podgórze 57 29/27 2 25 1 68 1 1 0 5 10.06.2015 6.607 13. Podgórze 31 182/40 2 25 -1 60 1 1 3 0 23.12.2014 12.820 14. Podgórze 44 67/27 2 40 -1 151 2 1 1 5 19.06.2015 11.949 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16.575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 1 1 20.09.2015 7.332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16.009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10.506 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 0 23.12.2014 2.060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11.160 21. Podgórze 44 167/2 2 25 1 50 2 1 3 6 14.06.2015 11.895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12.012 23. Podgórze 55 208/5 2 25 1 50 2 1 3 1 21.09.2014 12.012 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 52.902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 1.07.5.2014 15.069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12.120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 16.330 29. Podgórze 49 736/4,736/19 2 25 -1 84 2 0 0 0 22.07.2015 19.246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6.552 | 8. | Podgórze | 49 | 427/11 | 2 | 25 | -1 | 125 | 1 | 1 | 1 | 4 | 12.06.2015 | 26 039 |
| 11. Podgórze 61 1/7 2 10 -1 49 1 1 0 5 12.06.2015 7 513 12. Podgórze 57 29/27 2 25 1 68 1 1 0 5 10.06.2015 6 607 13. Podgórze 31 182/40 2 25 -1 60 1 1 3 0 23.12.2014 12 820 14. Podgórze 44 67/27 2 40 -1 151 2 1 1 5 19.06.2015 11 949 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16 575 16. Krowdrza 14 83/8, 3 20 0 39 1 1 1 1 20.09.2015 7332 17. Śródmieście 16 160/1 3 20 1 | 9. | Nowa Huta | 10 | 315 | 2 | 25 | 1 | 49 | 1 | 1 | 0 | 5 | 29.07.2015 | 4 520 |
| 12. Podgórze 57 29/27 2 25 1 68 1 1 0 5 10.06.2015 6 607 13. Podgórze 31 182/40 2 25 -1 60 1 1 3 0 23.12.2014 12 820 14. Podgórze 44 67/27 2 40 -1 151 2 1 1 5 19.06.2015 11 949 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16 575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 1 20.09.2015 7332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 < | 10. | Podgórze | 53 | 522/2 | 2 | 20 | 1 | 91 | 1 | 1 | 1 | 4 | 10.06.2015 | 17 001 |
| 13. Podgórze 31 182/40 2 25 -1 60 1 1 3 0 23.12.2014 12 820 14. Podgórze 44 67/27 2 40 -1 151 2 1 1 5 19.06.2015 11 949 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16 575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 20.09.2015 7 332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 506 19. Podgórze 36 74/4, 2 10 -1 | 11. | Podgórze | 61 | 1/7 | 2 | 10 | -1 | 49 | 1 | 1 | 0 | 5 | 12.06.2015 | 7 513 |
| 14. Podgórze 44 67/27 2 40 -1 151 2 1 1 5 19.06.2015 11 949 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16 575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 20.09.2015 7 332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 009 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 59 | 12. | Podgórze | 57 | 29/27 | 2 | 25 | 1 | 68 | 1 | 1 | 0 | 5 | 10.06.2015 | 6 607 |
| 15. Podgórze 84 131/4 2 10 0 255 0 1 0 2 15.05.2013 16.575 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 1 20.09.2015 7 332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 16 009 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 0 23.12.2014 2060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 | 13. | Podgórze | 31 | 182/40 | 2 | 25 | -1 | 60 | 1 | 1 | 3 | 0 | 23.12.2014 | 12 820 |
| 16. Krowodrza 14 83/8, 3 20 0 39 1 1 1 20.09.2015 7 332 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 506 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 < | 14. | Podgórze | 44 | 67/27 | 2 | 40 | -1 | 151 | 2 | 1 | 1 | 5 | 19.06.2015 | 11 949 |
| 17. Śródmieście 16 160/1 3 20 1 76 2 1 1 5 19.09.2015 16 009 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 506 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 <t< td=""><td>15.</td><td>Podgórze</td><td>84</td><td>131/4</td><td>2</td><td>10</td><td>0</td><td>255</td><td>0</td><td>1</td><td>0</td><td>2</td><td>15.05.2013</td><td></td></t<> | 15. | Podgórze | 84 | 131/4 | 2 | 10 | 0 | 255 | 0 | 1 | 0 | 2 | 15.05.2013 | |
| 18. Podgórze 49 537/19 2 25 1 50 2 1 3 4 01.07.2015 10 506 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 <td< td=""><td>16.</td><td>Krowodrza</td><td>14</td><td>83/8,</td><td>3</td><td>20</td><td>0</td><td>39</td><td>1</td><td>1</td><td>1</td><td>1</td><td>20.09.2015</td><td>7 332</td></td<> | 16. | Krowodrza | 14 | 83/8, | 3 | 20 | 0 | 39 | 1 | 1 | 1 | 1 | 20.09.2015 | 7 332 |
| 19. Podgórze 36 74/4, 2 10 -1 75 0 0 0 23.12.2014 2 060 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 17.05.2014 15 069 26. Krowodrza <td>17.</td> <td>Śródmieście</td> <td>16</td> <td>160/1</td> <td>3</td> <td>20</td> <td>1</td> <td>76</td> <td>2</td> <td>1</td> <td>1</td> <td>5</td> <td>19.09.2015</td> <td>16 009</td> | 17. | Śródmieście | 16 | 160/1 | 3 | 20 | 1 | 76 | 2 | 1 | 1 | 5 | 19.09.2015 | 16 009 |
| 20. Krowodrza 43 431 1 25 -1 60 1 1 0 1 20.09.2015 11 160 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 17.05.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 | 18. | Podgórze | 49 | 537/19 | 2 | 25 | 1 | 50 | 2 | 1 | 3 | 4 | 01.07.2015 | 10 506 |
| 21. Podgórze 44 167/2 2 25 -1 59 2 1 3 6 14.06.2015 11 895 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 17.05.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 | 19. | Podgórze | 36 | 74/4, | 2 | 10 | -1 | 75 | 0 | 0 | 0 | 0 | 23.12.2014 | 2 060 |
| 22. Nowa Huta 5 114/60 2 25 1 50 2 1 3 1 21.09.2014 12 012 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 7.05.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1365 28. Nowa Huta 7 46/1, 1 25 1 71 0 | 20. | Krowodrza | 43 | 431 | 1 | 25 | -1 | 60 | 1 | 1 | 0 | 1 | 20.09.2015 | 11 160 |
| 23. Podgórze 55 208/5 2 25 1 51 2 1 1 11.07.2014 6 120 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 170.5.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1 365 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 <td>21.</td> <td>Podgórze</td> <td>44</td> <td>167/2</td> <td>2</td> <td>25</td> <td>-1</td> <td>59</td> <td>2</td> <td>1</td> <td>3</td> <td>6</td> <td>14.06.2015</td> <td>11 895</td> | 21. | Podgórze | 44 | 167/2 | 2 | 25 | -1 | 59 | 2 | 1 | 3 | 6 | 14.06.2015 | 11 895 |
| 24. Śródmieście 1 355/2 4 20 -1 162 2 1 5 6 03.04.2014 529 902 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 1 71.05.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1 365 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 | 22. | Nowa Huta | 5 | 114/60 | 2 | 25 | 1 | 50 | 2 | 1 | 3 | 1 | 21.09.2014 | 12 012 |
| 25. Podgórze 63 167/16 2 25 -1 93 2 1 1 17.05.2014 15 069 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1 365 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 23. | Podgórze | 55 | 208/5 | 2 | 25 | 1 | 51 | 2 | 1 | 1 | 1 | 11.07.2014 | 6 120 |
| 26. Krowodrza 31 50/1, 3 50 1 99 0 0 3 1 26.03.2014 12 120 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1 365 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 24. | Śródmieście | 1 | 355/2 | 4 | 20 | -1 | 162 | 2 | 1 | 5 | 6 | 03.04.2014 | 529 902 |
| 27. Nowa Huta 18 1/38 1 20 -1 39 -1 0 -1 0 31.07.2014 1 365 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 25. | Podgórze | 63 | 167/16 | 2 | 25 | -1 | 93 | 2 | 1 | 1 | 1 | 17.05.2014 | 15 069 |
| 28. Nowa Huta 7 46/1, 1 25 1 71 0 1 1 0 23.12.2014 16 330 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 26. | Krowodrza | 31 | 50/1, | 3 | 50 | 1 | 99 | 0 | 0 | 3 | 1 | 26.03.2014 | 12 120 |
| 29. Podgórze 49 736/4, 736/19 2 25 -1 84 2 0 0 0 22.07.2015 19 246 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 27. | Nowa Huta | 18 | 1/38 | 1 | 20 | -1 | | -1 | 0 | -1 | 0 | 31.07.2014 | 1 365 |
| 30. Podgórze 19 286/12 2 40 1 56 1 1 0 6 25.07.2015 6 552 | 28. | Nowa Huta | 7 | / | 1 | 25 | 1 | 71 | 0 | 1 | 1 | 0 | 23.12.2014 | 16 330 |
| | 29. | Podgórze | 49 | 736/4, 736/19 | 2 | 25 | -1 | 84 | 2 | 0 | 0 | 0 | 22.07.2015 | 19 246 |
| 31. Podgórze 13 571/4 1 10 1 51 -1 1 25.09.2015 5 661 | 30. | Podgórze | 19 | 286/12 | 2 | 40 | 1 | 56 | 1 | 1 | 0 | 6 | 25.07.2015 | 6 552 |
| | 31. | Podgórze | 13 | 571/4 | 1 | 10 | 1 | 51 | -1 | 1 | -1 | 1 | 25.09.2015 | 5 661 |

Butryn K., Preweda E., 2017, Analysis of the impact of quantitative and qualitative price-setting attributes on a market of real estate intended for the purpose of the transformer stations on the example of Krakow

End of Table 2

| Orthogological and process of the pr | | | | | | | | | | | | | Ella | of Table 2 |
|--|-----|-------------|----------|--------------|---|----|----|-----|----|----|----|---|------------|------------|
| Section | | | Precinct | | а | h | c | d | P | f | σ | h | i | i |
| 33. Podgorze 55 | | | | | - | | | | | | _ | | | J |
| 34. Podgorze 69 | | | | | | | | | | | _ | | | |
| 35. Krowodza 11. 379/3 2 20 1 45 2 1 3 5 23,09,2015 5649 | | - C | | | | | | | 0 | _ | | | | |
| 36. Krowodza 43 957 2 25 1 78 2 2 1 5 23.09.2015 13.371 37. Sridamiescie 4 2079 3 4 1 67 2 2 1 -1 5 6.05.2013 17.000 38. Newa Huta 2 28/141 2 25 1 123 2 1 -1 5 0.05.52013 18.000 39. Nowa Huta 8 28 2 40 2 42 1 1 -1 5 0.05.52013 18.000 40. Nowa Huta 8 28 2 40 2 42 1 1 -1 5 0.05.52013 18.000 41. Sridamiescie 22 512 3 25 2 51 2 1 1 5 0.05.52013 18.000 42. Nowa Huta 48 11,12/3,127 2 40 1 344 1 0 -1 5 0.07.02013 11.985 43. Nowa Huta 51 44 2 40 1 41 0 0 -1 5 0.07.02013 11.985 44. Nowa Huta 51 44 2 40 0 1 41 0 0 -1 5 11.12015 14.564 45. Nowa Huta 51 42 2 40 0 79 2 1 0 5 5 51.122015 14.564 46. Nowa Huta 51 42 2 40 0 79 2 1 0 5 5 5 11.12015 28.062 47. Podgorze 58 59.08 2 2 5 0 32 1 2 0 0 5 11.12015 3.062 48. Nowa Huta 51 42 2 25 0 33 1 2 0 0 5 0.05.52013 3.200 49. Nowa Huta 53 28.833 2 40 0 78 1 1 0 5 11.09.015 3.630 49. Nowa Huta 53 28.833 2 40 0 78 1 1 0 5 11.09.015 3.630 50. Nowa Huta 5 3 28.833 2 40 0 78 1 1 0 5 11.09.015 3.630 51. Nowa Huta 5 14433 2 25 0 37 1 0 0 1 1 10.005.2013 3.400 52. Nowa Huta 5 14433 2 25 0 35 0 1 0 0 1 1 1 1 1 53. Nowa Huta 5 14433 2 25 0 0 35 0 0 0 0 0 5 11.09.015 3.630 54. Nowa Huta 5 14433 2 25 0 0 0 0 0 0 0 0 0 | | Podgórze | | | 2 | | 1 | | 1 | 0 | | | | |
| 37. SixIndinissics 4 | 35. | Krowodrza | | 379/3 | 2 | 20 | 1 | | 2 | 1 | 3 | 5 | | |
| 38. Nowa Huta | 36. | Krowodrza | 43 | 957 | 2 | 25 | 1 | 78 | 2 | 2 | 1 | 5 | 23.09.2015 | 13 371 |
| 399 Nowa Hutta | 37. | Śródmieście | 4 | 207/9 | 3 | 4 | 1 | 67 | 2 | 2 | 1 | 5 | 06.05.2013 | 17 000 |
| 40. Nowa Huta | 38. | Nowa Huta | 2 | 28/141 | 2 | 25 | 1 | 123 | 2 | 1 | -1 | 5 | 06.05.2013 | 18 000 |
| 40. Nowa Huta | 39. | Nowa Huta | 10 | 847 | 2 | 25 | 2 | 93 | 1 | 0 | -1 | 5 | 06.05.2013 | 8 800 |
| 11. Sródmiscicic 22 | 40. | Nowa Huta | 8 | 28 | 2 | 40 | 2 | 42 | 1 | 1 | -1 | 5 | 06.05.2013 | 6 300 |
| 42. Nova Huta 48. 11,123,127 2 40 1 134 1 0 0 1 5 10,70,2013 24,120 43. Nova Huta 51 44 2 40 0 79 2 1 0 5 11,12015 14 564 44. Nova Huta 51 42 2 40 0 79 2 1 0 5 15,12,2015 4 656 45. Nova Huta 51 42 2 40 0 79 2 1 0 5 11,112015 2 666 46. Nova Huta 51 42 2 40 0 79 2 1 0 5 11,112015 2 760 47. Podgórze 58 59/8, 2 25 0 32 1 2 0 5 60,52013 24 000 48. Nova Huta 52 31 2 10 0 122 0 0 5 60,52013 24 000 49. Nova Huta 10 205 2 25 0 37 -1 0 -1 5 11,092015 3 630 49. Nova Huta 53 285/3 2 40 0 78 1 1 0 -1 5 11,092015 3 630 49. Nova Huta 10 881 2 20 2 216 1 1 -1 5 25,112015 23 00 51. Nova Huta 10 881 2 20 2 216 1 1 -1 5 25,112015 23 00 52. Nova Huta 10 881 2 20 2 216 1 1 -1 5 25,112015 23 00 53. Nova Huta 2 113/16, 116/14 2 25 2 2 40 1 1 -1 5 25,112015 23 00 53. Nova Huta 5 114/33 2 25 0 60 1 2 0 1 11,102012 3 590 54. Nova Huta 5 114/46 2 2 5 0 47 1 2 0 1 11,102012 45 00 55. Nova Huta 5 114/46 2 2 5 0 47 1 2 0 1 11,102012 45 00 57. Nova Huta 5 114/46 2 2 5 0 47 1 2 0 1 10,032013 348 00 58. Nova Huta 5 114/46 2 2 5 0 47 1 2 0 1 10,032013 348 00 59. Nova Huta 5 114/46 2 2 5 0 47 1 2 0 1 10,032013 388 00 59. Nova Huta 5 114/46 2 2 2 0 0 1 0 0 1 11,102012 45 00 50. Nova Huta 5 114/46 2 2 2 0 0 1 0 0 0 1 11,102012 45 00 50. Nova Huta 5 114/46 2 2 0 0 0 0 0 0 0 1 11,102012 45 00 50. Nova Huta 5 114/46 2 2 0 0 0 0 0 0 0 0 | 41. | Śródmieście | 22 | 512 | 3 | 25 | 2 | 51 | 2 | 1 | 1 | 5 | | 11 985 |
| 43. Nowa Huta | 42. | | | | | | 1 | | 1 | 0 | -1 | | | |
| 44. Nowa Huta 2 | | | | | | 40 | 1 | | 0 | 0 | -1 | 5 | | |
| 45. Nowa Huta | | | | | | | | | | | 0 | _ | | |
| 46. Nowa Huta | | | | | | | | | | | | _ | | |
| 97. Podgórze 58 59/8, 2 25 0 32 1 2 0 5 06.05.2013 3.200 | | | | | | | | | | | - | _ | | |
| 48. Nowa Huta 52 31 2 10 0 122 0 0 0 5 0.05.2013 24.000 49. Nowa Huta 10 205 2 25 0 37 -1 0 -1 5 11.09.2015 36.30 50. Nowa Huta 10 881 2 20 2 136 1 1 -1 5 25.11.2015 52.300 52. Nowa Huta 2 113/16,116/14 2 25 2 40 0 36 1 1 0 5 10.09.015 13.59 53. Nowa Huta 45 150/3,157/1 2 40 0 36 1 1 0 5 12.09.2012 13.59 54. Nowa Huta 5 114/31 2 25 0 52 1 2 0 1 14.10.2012 5.900 55. Nowa Huta 5 114/21 2 25 0 52 1 2 0 1 14.10.2012 5.900 55. Nowa Huta 5 114/32 2 25 0 83 1 2 0 1 11.10.2012 5.900 56. Nowa Huta 5 114/32 2 2 10 0 49 1 2 0 1 10.10.2013 7.885 57. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 10.10.2013 7.885 58. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 10.05.2013 7.885 59. Nowa Huta 11 251/1 1 20 -1 80 1 0 -1 1 19.04.2013 3.000 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1463 61. Podgórze 102 219/5 2 20 0 25 0 0 0 2 2 15.03.2014 76.88 63. Podgórze 12 431/1 2 40 1 66 0 1 0 2 15.03.2014 76.88 64. Nowa Huta 7 46(1 2 40 0 71 -1 -1 -1 -1 1 10.12.2014 16.30 65. Podgórze 101 146/1 2 40 0 71 -1 -1 -1 -1 1 10.12.2014 16.30 66. Podgórze 101 146/1 2 40 0 71 -1 -1 -1 -1 1 10.12.2014 16.30 67. Krowodrza 41 407/2 2 40 2 35 1 1 0 4 23.11.2012 24.987 78. Krowodrza 41 407/2 2 40 2 35 1 1 0 5 60.07.2013 23.400 68. Krowodrza 44 40.34/4 2 2 2 2 2 3 5 15.04.2012 24.987 79. Krowodrza 44 40.34/4 2 2 2 2 3 3 3 4 4 4 4 4 4 4 | | | | | | | - | | | - | - | _ | | |
| 49. Nowa Huta 10 205 2 25 0 37 -1 0 -1 5 11.09.2015 36.30 50. Nowa Huta 53 28.573 2 40 0 78 1 1 0 5 11.09.2015 14.270 51. Nowa Huta 2 113/16.116/14 2 25 2 60 1 2 0 1 0 0.55 12.09.2013 3.420 52. Nowa Huta 2 113/16.116/14 2 25 2 60 1 2 0 1 0 0.55 12.09.2012 3.559 54. Nowa Huta 5 114/33 2 25 0 52 1 2 0 0 1 14.10.2012 5.900 55. Nowa Huta 5 114/31 2 25 0 47 1 2 0 0 1 17.10.2012 5.900 55. Nowa Huta 5 114/45 2 25 0 47 1 2 0 1 17.10.2012 5.900 57. Nowa Huta 5 114/46 2 2.55 0 47 1 2 0 1 17.10.2012 5.900 58. Nowa Huta 5 114/46 2 2.55 0 83 1 2 0 1 10.03.2013 7.885 58. Nowa Huta 5 114/46 2 2.55 0 83 1 2 0 1 10.03.2013 7.885 58. Nowa Huta 44 234/2 2 40 11 65 0 1 0 1 15.12.2012 2454 59. Nowa Huta 44 234/2 2 40 11 65 0 1 0 1 15.12.2012 2454 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1463 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 2407.2014 250 62. Podgórze 41 20/3 2 20 -1 36 0 1 0 2 2407.2014 250 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 2 210.03.2013 3240 64. Nowa Huta 5 43/11 2 40 1 66 0 1 0 2 210.03.2013 3240 65. Podgórze 62 99/14 2 20 0 50 1 0 0 4 22.11.2012 4350 66. Podgórze 62 99/14 2 20 0 50 1 0 0 4 22.11.2012 4350 67. Krowodrza 40 524/3,524/5 2 10 1 16 60 0 1 0 1 16.08.2013 3240 68. Krowodrza 40 524/3,524/5 2 10 1 16 0 0 1 0 1 20.03.2013 22.10 79. Sródmieście 5 433/2 3 40 0 58 1 1 0 3 40.07.2014 3759 70. Sródmieście 5 433/4 2 2 2 2 2 | | · | | | | | | | | | - | | | |
| 50. Nowa Huta 53 285/3 2 40 0 78 1 1 0 5 11.09.2015 14.270 | | | | | | | | | | | | _ | | |
| 51. Nowa Huta 10 | | | | | | | | | | | | _ | | |
| 52. Nowa Huta | | | | | | | | | | | | | | |
| 53. Nowa Huta 45 150/3,157/1 2 40 0 36 1 1 0 5 12,09,2012 13559 54. Nowa Huta 5 114/33 2 25 0 52 1 2 0 1 14,10,2012 5900 55. Nowa Huta 5 114/52 2 10 0 49 1 2 0 1 11,10,2012 5900 56. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 11,10,2012 24500 57. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 1 11,10,2012 24500 58. Nowa Huta 41 231/2 2 40 1 65 1 0 1 1 19,04,2013 3000 60. Podgórze 102 219/5 2 1 | | | | | | | | | | | | | | |
| 54. Nowa Huta 5 114/33 2 25 0 52 1 2 0 1 14.10.2012 5 900 55. Nowa Huta 5 114/21 2 25 0 47 1 2 0 1 17.10.2012 5 290 56. Nowa Huta 5 114/46 2 25 0 483 1 2 0 1 11.10.2012 5 290 57. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 10.03.2013 7 885 58. Nowa Huta 44 234/2 2 40 1 65 0 1 0 1 10.04 2.11.2012 2.454 59. Nowa Huta 11 251/15 1 20 -1 80 1 0 4 24.17.2014 2.256 60. Podgórze 40 56/53 2 20 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<> | | | | | | | | | | | | | | |
| 55. Nowa Huta 5 | | | | | | | | | | | - | | | |
| 56. Nowa Huta 5 114/52 2 10 0 49 1 2 0 1 11.0.2012 4 500 57. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 15.12.2012 2 454 58. Nowa Huta 44 234/2 2 40 1 65.5 0 1 0 1 15.12.2012 2 454 59. Nowa Huta 44 234/2 2 40 -1 80 1 0 -1 1 19.04.2013 3 000 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1463 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 22.50 63. Podgórze 41 20/3 2 20 0 <td></td> | | | | | | | | | | | | | | |
| 57. Nowa Huta 5 114/46 2 25 0 83 1 2 0 1 10.03.2013 7 885 58. Nowa Huta 44 234/2 2 40 1 65 0 1 0 1 15.12.2012 2 454 59. Nowa Huta 11 251/1 1 20 -1 80 1 0 -1 1 19.04.2013 3 000 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1463 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 2 250 62. Podgórze 101 46/1 2 40 0 71 -1 -1 -1 10.12.2014 16330 65. Podgórze 101 146/1 2 40 0 7 | | | | | | | | | | | | | | |
| 58. Nowa Huta 44 234/2 2 40 1 65 0 1 0 1 15.12.2012 2 454 59. Nowa Huta 11 251/1 1 20 -1 80 1 0 -1 1 19.04.2013 3 000 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1 463 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 2 250 62. Podgórze 12 431/1 2 40 1 66 0 1 0 2 15.03.2014 7 688 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 4 21.02.2014 1630 64. Nowa Huta 7 46/11 2 40 0 | | | | | | | | | | | | | | |
| 59. Nowa Huta 11 251/1 1 20 -1 80 1 0 -1 1 19.04.2013 3 000 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1 466 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 22.50 62. Podgórze 12 431/1 2 40 1 66 0 1 0 1 16.08.2013 3 240 64. Nowa Huta 7 46/1 2 40 0 71 -1 -1 -1 1 16.08.2013 3 240 65. Podgórze 61 99/14 2 20 0 50 1 0 4 22.11.2012 438 66. Podgórze 61 99/14 2 20 0 50 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | | | | | | | _ | | | | | | | |
| 60. Podgórze 102 219/5 2 10 2 29 0 1 0 4 24.11.2012 1 463 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 2 250 62. Podgórze 12 431/1 2 40 1 66 0 1 0 2 15.03.2014 7 688 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 1 16.08.2013 324 64. Nowa Huta 7 46/1 2 40 0 71 -1 -1 1 10.12.2014 16.330 65. Podgórze 61 10 4 40/11.2012 14 40/12 24 0 1 0 4 22.11.2012 4350 66. Podgórze 62 99/14 2 20 | | | | | | | _ | | | | | | | |
| 61. Podgórze 40 56/53 2 20 0 25 0 0 0 2 24.07.2014 2 250 62. Podgórze 12 431/1 2 40 1 66 0 1 0 2 15.03.2014 7 688 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 1 16.08.2013 3 240 64. Nowa Huta 7 46/1 2 40 0 71 -1 -1 -1 1 10.08.2013 3 240 65. Podgórze 62 99/14 2 20 0 50 1 0 0 4 22.11.2012 1435 66. Podgórze 62 99/14 2 20 0 50 1 0 0 4 22.11.2012 4350 67. Krowodrza 41 407/2 2 40 -1 | | | | | | | | | | | | | | |
| 62. Podgórze 12 431/1 2 40 1 66 0 1 0 2 15.03.2014 7 688 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 1 16.08.2013 3 240 64. Nowa Huta 7 46/1 2 40 0 71 -1 -1 -1 1 16.08.2013 3 240 65. Podgórze 101 146/1 2 40 1 24 1 1 0 4 08.11.2012 1 438 66. Podgórze 62 99/14 2 20 0 50 1 0 0 0 4 22.11.2012 4 350 67. Krowodrza 14 407/2 2 40 2 35 1 1 0 0 5 06.07.2013 23 400 68. Krowodrza 41 508/2 2 20 -1 17 2 1 0 1 20.03.2013 2 210 69. Krowodrza 40 524/3, 524/5 2 10 1 16 -1 0 -1 4 09.11.2012 656 70. Śródmieście 4 202/49 3 40 2 112 2 2 2 3 5 15.04.2012 24 987 71. Śródmieście 5 432/2 3 40 0 58 1 1 1 3 1 18.07.2014 37 549 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 60 000 73. Śródmieście 1 539/7 3 10 1 74 1 1 1 5 5 26.11.2014 24 910 74. Śródmieście 2 1 1 3 10 1 74 1 1 1 5 5 26.11.2014 24 910 75. Śródmieście 5 414/17,414/21 3 25 0 55 2 2 3 5 0.12.2014 24 970 77. Krowodrza 8 133/4 2 40 2 73 1 1 1 0 3 2 14.12.2014 24 900 75. Śródmieście 5 414/17,414/21 3 25 0 55 2 2 3 5 0.15.2.2014 24 700 77. Krowodrza 8 133/4 2 40 2 73 1 1 1 5 5 23.12.2014 24 700 77. Krowodrza 20 60/13 2 20 1 45 1 1 0 3 3 0.4.07.2015 5 677 78. Nowa Huta 11 534/7 2 20 0 0 90 1 1 1 -1 4 10.12.2014 8 100 79. Nowa Huta 5 114/80 2 25 2 5 2 50 1 1 -1 4 12.06.2015 7848 81. Nowa Huta 5 114/80 2 25 2 5 2 50 1 1 -1 4 12.06.2015 7848 81. Nowa Huta 5 114/80 2 25 2 2 3 0 1 0 0 1 0 3 29.10.2014 16 650 82. Nowa Huta 5 114/80 2 25 2 2 3 0 1 0 0 1 0 1 0 3 29.10.2014 16 650 83. Nowa Huta 5 114/60 2 2 25 2 30 0 1 0 0 1 0 1 0 0 3 29.10.2014 12 012 84. Krowodrza 9 231/7 2 40 2 139 1 2 3 4 27.11.2013 20 926 85. Krowodrza 4 762/3 2 40 0 3 2 139 1 2 3 4 27.11.2013 20 926 86. Krowodrza 14 122/3 2 25 2 60 2 2 1 1 1 5 10.03.2012 6820 87. Krowodrza 4 762/3 2 40 0 0 32 1 1 1 0 0 6 60.60.2014 3003 88. Nowa Huta 5 114/29 2 25 2 66 2 2 1 1 -1 5 10.03.2012 6820 | | · | | | 2 | | 2 | | 0 | 1 | 0 | 4 | | |
| 63. Podgórze 41 20/3 2 20 -1 36 0 1 0 1 16.08.2013 3 240 64. Nowa Huta 7 46/1 2 40 0 71 -1 -1 -1 1 10.12.2014 16 330 65. Podgórze 101 146/1 2 40 1 24 1 1 0 4 08.11.2012 1438 66. Podgórze 62 99/14 2 20 0 50 1 0 0 4 22.11.2012 4 350 67. Krowodrza 14 407/2 2 40 2 35 1 1 0 5 06.07.2013 23 400 68. Krowodrza 41 508/2 2 20 -1 17 2 1 0 1 0 90.11.2012 24.987 71. Śródmieście 5 432/2 3 4 | | | | | | | 0 | | | 0 | | | | |
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| 68. Krowodrza 41 508/2 2 20 -1 17 2 1 0 1 20.03.2013 2 210 69. Krowodrza 40 524/3, 524/5 2 10 1 16 -1 0 -1 4 09.11.2012 656 70. Śródmieście 4 202/49 3 40 2 112 2 2 3 5 15.04.2012 24 987 71. Śródmieście 5 432/2 3 40 0 58 1 1 3 1 18.07.2014 37.549 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 20 22 11 3 10 1 60 0 1 3 3 10.12.2014 20 20 1 38 1 1 1 5 26.11.2014 24 916 74. <td>66.</td> <td>Podgórze</td> <td>62</td> <td>99/14</td> <td>2</td> <td>20</td> <td>0</td> <td>50</td> <td>1</td> <td>0</td> <td>0</td> <td>4</td> <td>22.11.2012</td> <td>4 350</td> | 66. | Podgórze | 62 | 99/14 | 2 | 20 | 0 | 50 | 1 | 0 | 0 | 4 | 22.11.2012 | 4 350 |
| 69. Krowodrza 40 524/3, 524/5 2 10 1 16 -1 0 -1 4 09.11.2012 656 70. Śródmieście 4 202/49 3 40 2 112 2 2 3 5 15.04.2012 24 987 71. Śródmieście 5 432/2 3 40 0 58 1 1 3 1 18.07.2014 37 549 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 60 000 73. Śródmieście 22 11 3 10 1 74 1 1 1 5 26.11.2014 4916 74. Śródmieście 4 459/19 3 20 1 38 1 1 3 2 14.12.2014 9500 75. Śródmieście 5 414/17, 414/21 3 <th< td=""><td>67.</td><td>Krowodrza</td><td>14</td><td>407/2</td><td>2</td><td>40</td><td>2</td><td>35</td><td>1</td><td>1</td><td>0</td><td>5</td><td>06.07.2013</td><td>23 400</td></th<> | 67. | Krowodrza | 14 | 407/2 | 2 | 40 | 2 | 35 | 1 | 1 | 0 | 5 | 06.07.2013 | 23 400 |
| 70. Śródmieście 4 202/49 3 40 2 112 2 2 3 5 15.04.2012 24 987 71. Śródmieście 5 432/2 3 40 0 58 1 1 3 1 18.07.2014 37 549 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 60 000 73. Śródmieście 22 11 3 10 1 74 1 1 1 5 26.11.2014 24 916 74. Śródmieście 4 459/19 3 20 1 38 1 1 3 2 14.12.2014 9 500 75. Śródmieście 5 414/17, 414/21 3 25 0 55 2 2 3 5 07.12.2014 24 90 75. Śródmieście 5 414/17, 414/21 3 | 68. | Krowodrza | 41 | 508/2 | 2 | 20 | -1 | 17 | 2 | 1 | 0 | 1 | 20.03.2013 | 2 210 |
| 71. Śródmieście 5 432/2 3 40 0 58 1 1 3 1 18.07.2014 37.549 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 60 000 73. Śródmieście 22 11 3 10 1 74 1 1 1 5 26.11.2014 24 916 74. Śródmieście 4 459/19 3 20 1 38 1 1 3 2 14.12.2014 9 500 75. Śródmieście 5 414/17, 414/21 3 25 0 55 2 2 3 5 07.12.2014 20 625 76. Krowodrza 8 133/4 2 40 2 73 1 1 1 5 23.12.2014 24 700 77. Krowodrza 20 60/13 2 20 <td>69.</td> <td>Krowodrza</td> <td>40</td> <td>524/3, 524/5</td> <td>2</td> <td>10</td> <td>1</td> <td>16</td> <td>-1</td> <td>0</td> <td>-1</td> <td>4</td> <td>09.11.2012</td> <td>656</td> | 69. | Krowodrza | 40 | 524/3, 524/5 | 2 | 10 | 1 | 16 | -1 | 0 | -1 | 4 | 09.11.2012 | 656 |
| 72. Śródmieście 1 539/7 3 10 1 60 0 1 3 3 10.12.2014 60 000 73. Śródmieście 22 11 3 10 1 74 1 1 1 5 26.11.2014 24 916 74. Śródmieście 4 459/19 3 20 1 38 1 1 3 2 14.12.2014 9 500 75. Śródmieście 5 414/17, 414/21 3 25 0 55 2 2 3 5 07.12.2014 20 625 76. Krowodrza 8 133/4 2 40 2 73 1 1 1 5 23.12.2014 24 700 77. Krowodrza 20 60/13 2 20 0 90 1 1 -1 4 10.12.2014 8 100 79. Nowa Huta 5 19/190 2 25 | 70. | Śródmieście | 4 | 202/49 | 3 | 40 | 2 | 112 | 2 | 2 | 3 | 5 | 15.04.2012 | 24 987 |
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| 77. Krowodrza 20 60/13 2 20 1 45 1 1 0 3 04.07.2015 5 677 78. Nowa Huta 11 534/7 2 20 0 90 1 1 -1 4 10.12.2014 8 100 79. Nowa Huta 5 19/190 2 25 2 37 0 1 0 3 29.10.2014 6 650 80. Nowa Huta 5 114/81 2 25 2 60 1 1 -1 4 12.06.2015 7 848 81. Nowa Huta 54 216/25 1 40 0 51 0 1 -1 3 23.12.2015 8 303 82. Nowa Huta 5 114/60 2 25 2 50 1 1 -1 4 21.10.2014 12 012 83. Nowa Huta 18 1/38 1 20 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<> | | | | | | | | | | | | | | |
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| 87. Krowodrza 4 762/3 2 40 0 32 1 1 0 6 06.06.2014 6 400 88. Nowa Huta 5 114/27 2 25 2 62 2 1 -1 5 10.03.2012 6 820 89. Nowa Huta 5 114/29 2 25 2 55 2 1 -1 5 15.03.2012 5 949 | | | | | | | | | | | | | | |
| 88. Nowa Huta 5 114/27 2 25 2 62 2 1 -1 5 10.03.2012 6 820 89. Nowa Huta 5 114/29 2 25 2 55 2 1 -1 5 15.03.2012 5 949 | | | | | | | | | | | | | | |
| 89. Nowa Huta 5 114/29 2 25 2 55 2 1 -1 5 15.03.2012 5 949 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 90. Nowa Huta 5 114/41 2 25 0 52 1 1 -1 3 12.03.2012 3.740 | | | | | | | | | | | | | | |
| | 90. | Nowa Huta | 5 | 114/41 | 2 | 25 | 0 | 52 | l | l | -1 | 3 | 12.03.2012 | 3 740 |

The bulk of the property is characterized by a very small surface, in the range of 30 to 70 m2. Based on the assembled base, it was carried out statistical analysis considered the real estate market.

In order to determine the relationship between the attributes and the price of real estate, Pearson complete correlation coefficients and Spearman correlation coefficients were calculated (Czaja, Preweda 2000; Jasińska 2012).

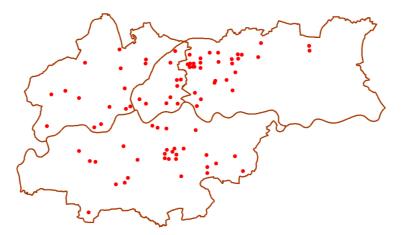


Fig. 2. Location of the properties in relation to the boundaries of Krakow (source: own studies)

The analysis showed significant differences between quantitative and qualitative correlation coefficients for some variables. In order to improve the consistency of the database, using statistical methods (Preweda 2013) outliers were eliminated. Finally, the analysis considered two bases, numbering respectively 90 and 77 properties. In the following, there were defined: the value of standardized regression coefficients (β weights), partial correlation coefficients for the dependent variable (price) with respect to other variables and the coefficients of determination. On the basis of calculations and analyz, conclusions on the impact of each attribute on the market prices of these unusual properties were drawn.

Results

The analysis of the database began with the designation for each attribute: Pearson complete correlation coefficients and Spearman correlation coefficients. Selected results of the calculations are presented in Figure 3 and in Tables 3 and 4 below.

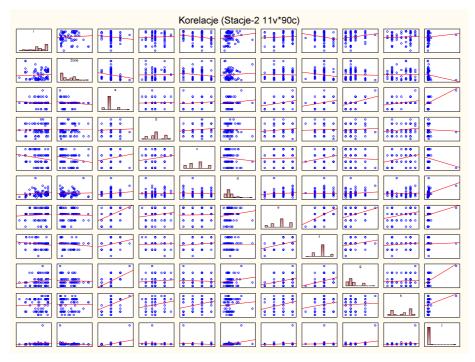


Fig. 3. Correlation matrix graph (base of 90 properties) (source: own studies)

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Table 3. The results of calculations – Pearson complete correlation coefficients (base of 90 properties) (source: own studies)

| Attribute | a | b | c | d | e | f | g | h | i | j |
|---|-------|-------|-------|-------|------|-------|-------|------|-------|-------|
| Zone of the city (a) | 1.00 | 0.05 | 0.16 | 0.14 | 0.39 | 0.29 | 0.54 | 0.33 | -0.02 | 0.52 |
| Planning conditions (b) | 0.05 | 1.00 | 0.16 | 0.01 | 0.15 | 0.04 | 0.09 | 0.14 | -0.01 | 0.02 |
| Availability of public transport (c) | 0.16 | 0.16 | 1.00 | -0.08 | 0.02 | 0.18 | -0.06 | 0.27 | -0.03 | -0.12 |
| Plot surface area [m ²] (d) | 0.14 | 0.01 | -0.08 | 1.00 | 0.13 | 0.00 | 0.14 | 0.06 | 0.14 | 0.23 |
| The density of construction and env. influences (e) | 0.39 | 0.15 | 0.02 | 0.13 | 1.00 | 0.47 | 0.35 | 0.32 | 0.1 | 0.18 |
| The shape of the plot and topography (f) | 0.29 | 0.04 | 0.18 | 0.00 | 0.47 | 1.00 | 0.30 | 0.23 | -0.16 | 0.06 |
| The attractiveness of the location (g) | 0.54 | 0.09 | -0.06 | 0.14 | 0.35 | 0.30 | 1.00 | 0.15 | 0.09 | 0.48 |
| The armament of land (h) | 0.33 | 0.14 | 0.27 | 0.06 | 0.32 | 0.23 | 0.15 | 1.00 | 0.17 | 0.21 |
| Valuation date (i) | -0.02 | -0.01 | -0.03 | 0.14 | 0.1 | -0.16 | 0.09 | 0.17 | 1.00 | 0.02 |
| Value (j) | 0.52 | 0.02 | -0.12 | 0.23 | 0.18 | 0.06 | 0.48 | 0.21 | 0.02 | 1.00 |

Table 4. The results of calculations – Beta weights, partial correlations and coefficients of determination (base of 90 properties) (source: own studies)

| Attribute | Beta weight | Partial correlation | \mathbb{R}^2 |
|---|-------------|---------------------|----------------|
| Zone of the city (a) | 0.38 | 0.35 | 0.41 |
| Planning conditions (b) | 0.00 | 0.00 | 0.07 |
| Availability of public transport (c) | -0.17 | -0.19 | 0.17 |
| Plot surface area [m ²] (d) | 0.14 | 0.17 | 0.06 |
| The density of construction and env. influences (e) | -0.06 | -0.07 | 0.37 |
| The shape of the plot and topography (f) | -0.11 | -0.12 | 0.33 |
| The attractiveness of the location (g) | 0.28 | 0.28 | 0.37 |
| The armament of land (h) | 0.14 | 0.15 | 0.24 |
| Valuation date (i) | -0.06 | -0.07 | 0.14 |

Based on the results of calculations listed above, it can be stated, that the proposed potential price-setting attributes do not explain the estimated market value of real estate for the transformer stations in the city of Krakow.

The calculation procedure was repeated after eliminating outliers. As a criterion for the elimination of outliers was adopted twice the standard deviation determined on the basis of multiple regression.

Finally, it was obtained the base of 77 properties. Within the base was repeated calculation procedure carried out earlier. The results obtained are given below in Tables 5 and 6 and Figure 4:

Table 5. The results of calculations – Pearson complete correlation coefficients (base of 77 properties) (source: own studies)

| Attribute | a | b | c | d | e | f | g | h | i | j |
|---|-------|------|-------|-------|------|-------|------|------|-------|------|
| Zone of the city (a) | 1.00 | 0.24 | 0.29 | 0.08 | 0.40 | 0.25 | 0.33 | 0.33 | -0.07 | 0.29 |
| Planning conditions (b) | 0.24 | 1.00 | 0.17 | 0.23 | 0.18 | 0.12 | 0.22 | 0.19 | 0.02 | 0.32 |
| Availability of public transport (c) | 0.29 | 0.17 | 1.00 | 0.01 | 0.06 | 0.21 | 0.00 | 0.31 | -0.05 | 0.03 |
| Plot surface area [m ²] (d) | 0.08 | 0.23 | 0.01 | 1.00 | 0.20 | -0.03 | 0.12 | 0.06 | 0.28 | 0.15 |
| The density of construction and env. influences (e) | 0.40 | 0.18 | 0.06 | 0.20 | 1.00 | 0.45 | 0.35 | 0.26 | 0.08 | 0.38 |
| The shape of the plot and topography (f) | 0.25 | 0.12 | 0.21 | -0.03 | 0.45 | 1.00 | 0.27 | 0.18 | -0.19 | 0.13 |
| The attractiveness of the location (g) | 0.33 | 0.22 | 0.00 | 0.12 | 0.35 | 0.27 | 1.00 | 0.11 | 0.11 | 0.49 |
| The armament of land (h) | 0.33 | 0.19 | 0.31 | 0.06 | 0.26 | 0.18 | 0.11 | 1.00 | 0.20 | 0.23 |
| Valuation date (i) | -0.07 | 0.02 | -0.05 | 0.28 | 0.08 | -0.19 | 0.11 | 0.20 | 1.00 | 0.35 |
| Value (j) | 0.29 | 0.32 | 0.03 | 0.15 | 0.38 | 0.13 | 0.49 | 0.23 | 0.35 | 1.00 |

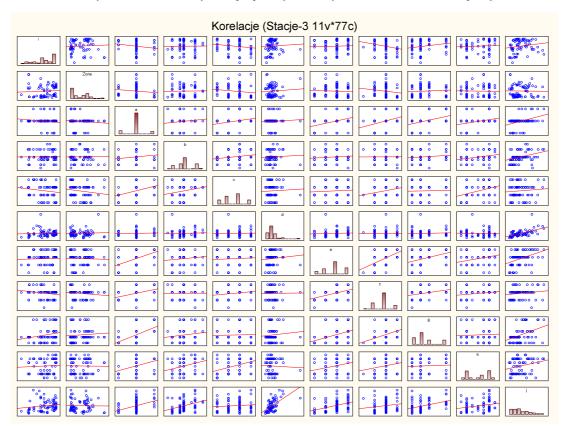


Fig. 4. Correlation matrix graph – after eliminating outliers (source: own studies)

Table 6. The results of calculations – Beta weights, partial correlations and coefficients of determination (base of 77 properties) (source: own studies)

| Attribute | Beta weight | Partial correlation | \mathbb{R}^2 |
|---|-------------|---------------------|----------------|
| Zone of the city (a) | 0.09 | 0.09 | 0.33 |
| Planning conditions (b) | 0.20 | 0.23 | 0.14 |
| Availability of public transport (c) | -0.03 | -0.04 | 0.20 |
| Plot surface area [m ²] (d) | -0.06 | -0.08 | 0.15 |
| The density of construction and env. influences (e) | 0.19 | 0.20 | 0.37 |
| The shape of the plot and topography (f) | -0.04 | -0.04 | 0.31 |
| The attractiveness of the location (g) | 0.33 | 0.35 | 0.23 |
| The armament of land (h) | 0.04 | 0.05 | 0.24 |
| Valuation date (i) | 0.30 | 0.33 | 0.21 |

Summary

Based on the analysis of Pearson complete correlation coefficients, Spearman correlation ranks, beta weights and partial correlations calculated for the analyzed database of real estate, it can be stated that the estimated market value of land designated for the transformer stations do not follow the standard attributes of the property. It is not possible to estimate their value based on a common database developed for the city of Krakow. There was no significant relationship between the attributes of the property and its value. After eliminating outliers, coefficient of determination was only 0.64. It is necessary to search for a different methodology to determine the actual nature affecting the value of these unusual properties. It was pre-noted that the important role is played by planning conditions. When analyzing only the real estate designated for construction services and industry, the coefficient of determination reached $R^2 = 0.79$, and considering only the real estate used for low housing coefficient was about $R^2 = 0.92$. The same value of R^2 were obtained taking into account only the transformer stations located in areas of parks, green areas and recreational facilities. But for the real estate intended exclusively for housing high coefficient of determination was only 0.66. These considerations are a reliable basis for further research in the field.

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