

ATTRACTIVENESS OF CEMETERIES VERSUS SOCIOECONOMIC AND SPATIAL DEVELOPMENT OF NON-METROPOLITAN CITIES IN POLAND

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ABSTRACT

Motives: Societies have developed a variety of services to meet their basic needs. One of them is to deposit and commemorate the bodies of the dead, for which cemeteries are used. Cemeteries and cities are thus interlinked.

Aim: The first aim of the study was to verify whether cemeteries located in secondary cities with a high synthetic measure of socioeconomic development and with sustainable spatial policy on cemetery greenery are more attractive. Second aim was to verify whether attractiveness of cemeteries is related to their age. The study was conducted on a sample of 96 cemeteries located within the administrative boundaries of 10 cities of population between 50 000 and 300 000 inhabitants within city limits, that were representing various NUTS1 regions. Criteria of the cemetery evaluation based on the features of the cemetery were elaborated in terms of location, accessibility and development of the necropolis. Moreover, analysis of the current socioeconomic situation of cities was carried out.

Results: Finally, the mutual correlation of indicators was examined using the Spearman correlation coefficient. The relationship between the cemeteries features, the socioeconomic development, share of municipal cemeteries as well elements considered in study of spatial policy on cemetery greenery in non-metropolitan cities has been noticed. As the result of performed analysis the guidelines on how to increase the attractiveness of cemeteries in non-metropolitan cities were developed.

Keywords: municipal cemetery, NUTS1, synthetic measure of socioeconomic development, urban cemetery evaluation

INTRODUCTION

Main goal of urban development is optimization expressed primarily in balancing the needs of different interest groups and different users, therefore, no municipal services can be marginalized in this process

(World Urbanization Prospects, 2018). Historical data support that social functions of cemeteries have played an important role in the formation and development of early cities (Ariés, 1974; Vovelle, 1983; Kolbuszewski, 1996; Bryant, 2003). Nordh and Evensen (2018) have noticed that research focusing on cemeteries as

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urban public green spaces is limited. For example, the subject of cemeteries and its assessment in the aspect of location, accessibility and development of cemeteries and its buffer zone is grossly neglected in the Polish studies. The necessity to conduct research in the field of urban cemeteries is justified by demographic forecasts of the Central Statistical Office in Poland and Eurostat. All demographic forecasts assume a slow increase in deaths due to the fact that the population of the post-war population enters the post-productive age phase (Szukalski, 2016; Eurostat, 2020). The main stimuli that prompted the authors to scrutinize this topic is a lack of central database aggregating information about: number, type, area and current state of cemeteries development in Poland. Meanwhile statistics related to burial but also data about distribution of cemeteries form, are the basis of planning burial investments all around the world (Fisher, 1992; Santarsiero et al., 2000; Croucamp & Richards, 2002; Larkin, 2011; Kjølner, 2012; 2013). Moreover, researchers have found that poor management of cemeteries can cause negative perceptions among local inhabitants (Tudor et al., 2013; Niță et al., 2014).

First hypothesis states that cities with high synthetic measure of socioeconomic development and sustainable spatial policy on cemetery greenery have more attractive cemeteries. Sustainable spatial policy on cemetery greenery is defined by authors as high share of cemetery greenery per capita, high share of municipal cemeteries and including cemetery greenery into urban greenery system. As far as we know, none have examined the correlation between such urban development indicators and the attractiveness of cemeteries. Cemeteries constitute some of oldest and largest green and open spaces of urban landscape (Laske, 1994; Rogers, 1997; Harnik & Merolli, 2010). With the rapid densification of the city, and the extensive loss of green space, verifying the relationships between cemeteries attractiveness, local spatial policy as well as socioeconomic status of cities and understanding the potential of these sites as multiperspective facilities, complementing the cityscape is critical for the sustainability of the city (Al-Akl et al., 2018).

Second hypothesis states that the attractiveness of a cemetery may be related to its age due to the changing trends in planning practice. Finding such relation may help urban planners to implement some good practices in projecting new burial spaces.

One has to emphasize the fact the flora of cemeteries in Europe has been best studied in Poland (Löki et al., 2019). It is not surprising when taking into account our very rich tradition of designing well integrated cemeteries with cultural landscape (Kolbuszewski, 1996; Czerner & Juszkiwicz, 1995). There is a number of outstanding cemeteries combining art and environment, like Powązki Cemetery in Warsaw, Rakowicki Cemetery in Cracow, Srebrzysko Cemetery in Gdańsk, Central Cemetery in Szczecin, Central Municipal Cemetery in Koszalin, Central Cemetery in Gliwice, as well as Pęksowe Brzysko Cemetery in Zakopane. Large share of greenery in the spatial layout of historic cemeteries has contributed to their attractiveness and timeless character (Długozima, 2011). While big and famous cemeteries in biggest Polish cities (especially national pantheons that have become important tourist destinations) seem to be a frequent subject of many different research (Tanaś, 2008; Dębczak, 2010; Hodor, 2012), there is still little attention paid to ‘ordinary’ cemeteries located in smaller cities. Are they also attractive? What makes some of them more attractive than the others? Does their attractiveness correspond with development of each city or local urban policy?

The objectives of this study were as follows:

1. To describe selected cities in the terms of socio-economic and spatial development, and spatial indicators related to cemeteries;
2. To define an assessment criteria to evaluate attractiveness of cemeteries;
3. To calculate cemeteries attractiveness index of selected cemeteries;
4. To verify relationship between the attractiveness of cemeteries, their age, sustainable spatial policy on cemetery greenery, share of municipal cemeteries and socioeconomic development of the city.

In the last section, the results were discussed and provided. Authors of this research developed

the guidelines on how to increase the attractiveness of cemeteries in non-metropolitan cities, which could be useful in master planning of urban burying places.

LITERATURE REVIEW

Cemeteries, apart from fulfilling the basic function of burying the dead, are an integral part of the space and in European (Polish) cultural tradition, they play an important role. Chmielewski (2010), Długozima (2020) include burial to the service infrastructure. Researchers agree with its crucial role in the functioning of local communities (Francis & Kellaher, 2005; Swensen et al., 2016; Grabalov, 2018). Cemeteries are important components of the urban green infrastructure, simply because of their number and the area they cover.

To elaborate the criteria taken into account during the process of analyzing the attractiveness of cemeteries, it was necessary to determine the phenomenon of cemeteries in the aspect of socio-cultural and legislative conditions (regulations demanded by law in Poland). It should be emphasized that cemeteries are facilities dedicated to burial purposes, they have a very wide collection of designations (including: green area, building intended for religious worship and religious activities) (Długozima, 2020). In addition, cemeteries are different from other categories of land use due to their specificity and thus affect the local community, natural environment, spatial structure of the cities and its use. Therefore, cemeteries require an individualized approach in developing the criteria for their assessment. Due to the need to ensure the epidemiological safety, the cemetery must fulfill restrictive requirements in the aspect of location and development. The basic acts regulating the establishment and maintenance of cemeteries in Poland include: the Act of January 31, 1959 on Cemeteries and Burials of the Deceased, Regulation of the Minister of Municipal Economy of August 25, 1959 on determining which areas in terms of sanitation are suitable for cemeteries, Regulation of the Minister of Infrastructure of March 7, 2008 on requirements for cemeteries, graves and other places of burial

of corpses and remains, the Building Law Act of July 7, 1994, the Act on Nature Conservation of April 16, 2004. According to the Nature Conservation Act cemeteries are classified as green areas. On the basis of research carried out by ecologists, landscape architects and urban planners (Abernathy, 1970; Gilbert, 1991; Laske, 1994; Richter, 1995; Szumański, 2005), it should be stated that cemeteries complement the urban natural system. In addition, sacred places, both the church and the cemetery, have a very high status in the hierarchy of space (Humphrey & Vitebsky, 1997; Harvey, 2006; Cheng, 2013), which is highlighted in Polish Classification of Building Facilities. „Buildings intended for religious worship and religious activities (class 1272) include, among others: cemeteries and related facilities”. Due to multidimensional character of cemeteries, especially natural and architectural, integration in the aspect of planning, design and evaluation is needed. The main components of cemeteries evaluation are as follows: location conditions, communication imperative (accessibility), development of the surroundings (buffer zone) and development of its space. Literature review shows that for the proper performance of their functions, cemeteries require a well-thought-out, defined space (Lehrer, 1974; Capels & Senville, 2006). Irrational use of cemeteries space and intensification of historical cemeteries development lead to degradation of composition of the cemetery (Długozima, 2011; Osiekowicz & Podciborski 2013; SAO, 2016; Pilarczyk & Nowak, 2019). Thus, it affects the negative social perception of the cemetery space (Tudor et al., 2013). The Act of 1959 on Cemeteries and Burials of the Deceased indicates that cemeteries are designated and enlarged in the areas specified in local land use plans. The grave cannot be liquidated earlier than 20 years after its foundation and if anyone extends the right to use the grave by paying the fee for the next 20 years, which can be repeated many times. The issues regarding selection of a proper area for the construction of cemetery are regulated by the Regulation of 1959, which indicates that before establishing the cemetery, one should analyze features and conditions of the area taken into account as the place where burials are located.

The following are analyzed: type of land, water system of the area, terrain, existing plant complexes. Chudak (2012) pointed out that the tradition based on Christianity does not allow entertainment in the vicinity of the necropolis. Locations of service and industrial enterprises emitting abnormal noise, pollution and odors should be avoided, as well as shaping monofunctional funeral districts (Thomas, 1991). This approach corresponds to the recommendations of planners and urban planners, who emphasize the need to organize urban structures in accordance with the criterion of social rationality (Douglass, 1980; Calhoun, 1998; Amin, 2006). In addition, Chudak (2012) recommends the concept of the common good in the aspect of cemetery location. After all, cemeteries are a matter of concern for administrators, owners and local communities (residents, associations, social movements, tourists). Regulation of 2008 indicates that cemeteries should be designed and maintained as a park-based area. It is required that the cemetery is surrounded by a permanent fence with a minimum height of 1.5 m. It was pointed out that the cemetery,

apart from the burial area, should also include the areas intended for: isolating and decorative greenery, roads, walking and pedestrian routes, parking spaces, waste collection areas, toilets, water drawing points (wells), morgue, funeral parlor, possibly also a chapel and administrative and economic facilities. Passages between the graves should have a width of no less than 50 cm.

MATERIAL AND METHODS

The research was conducted in 96 cemeteries located within administrative boundaries of 10 non-metropolitan cities from which: 3 are voivodeship capitals (Kielce, Rzeszów, Zielona Góra), 4 are cities of regional significance (Częstochowa, Grudziądz, Tarnów, Słupsk) and 3 are cities of subregional significance (Suwałki, Stargard, Jelenia Góra) (Fig. 1) (The National Spatial Management Concept, 2012). These cities play the role of regional administration pillars as they provide regional functions (especially in social and infrastructural sphere) for territory

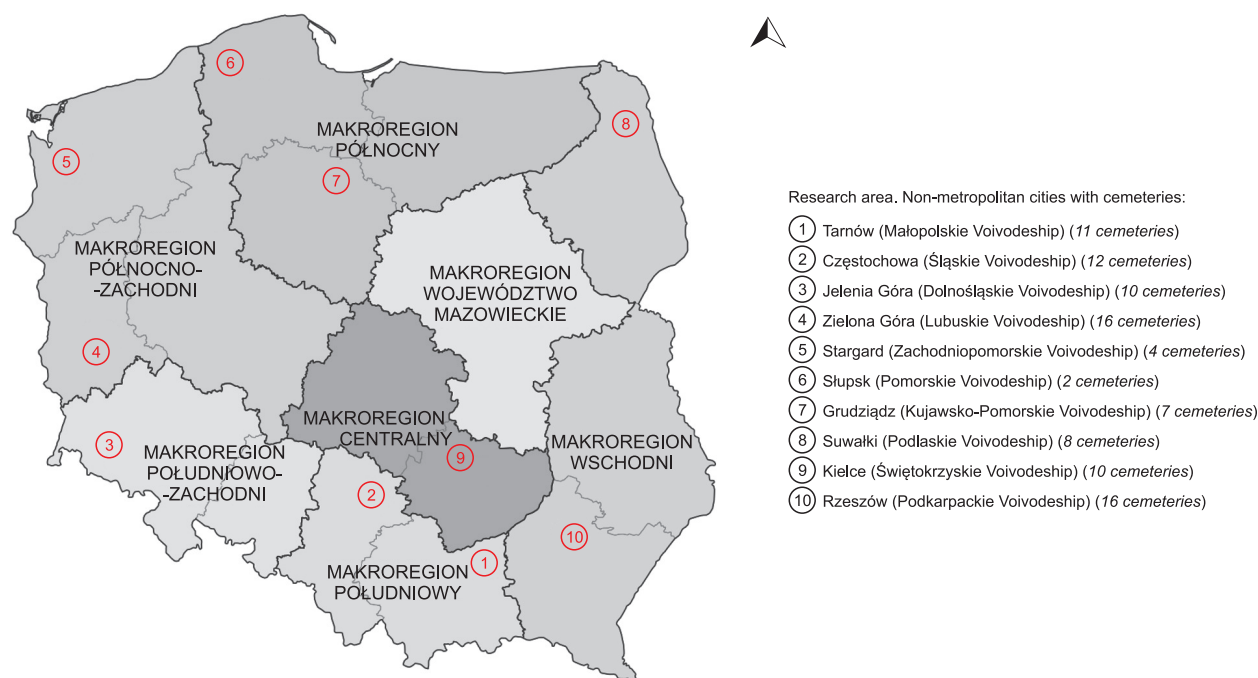


Fig. 1. Research area on the map of Poland, including division into 7 NUTS-1 macro-regions and 16 voivodeships
Source: own preparation based on 'Poland's division into NUTS 1 units' map from <https://stat.gov.pl/> (10.04.2021).

of a size from at least few poviats to whole voivodeship (voivodeship capitals). Due to suburbanization processes functional urban area (FUA) context was also included in analysis. In order to make research internationally comparable joint Eurostat and OECD delimitation of FUAs was chosen (OECD, 2020).

The process of study went through 4 stages (in accordance to the research objectives):

Phase 1: Characteristics of selected cities in the aspect of spatial policy and socioeconomic development, including spatial indicators related to cemeteries.

Phase 2: Defining criteria assessing the attractiveness of cemeteries.

Phase 3: Calculating cemeteries attractiveness index.

Phase 4: Verification of mutual correlation between analyzed indicators.

Phase 1: Characteristics of selected cities

The characteristics of ten cities constituting a research sample were elaborated based on local spatial policy documents and data provided by the Local Data Bank, National Heritage Board of Poland, local spatial documents (Spatial Development Conditions and Directions Study and local land use plans), local Sanitary and Epidemiological Stations and Polish Funeral Association. These data sources were screened to calculate main spatial indicators:

- area of cemetery greenery per capita,
- area of cemetery greenery included into urban greenery systems,
- area of municipal cemeteries,
- average age of cemeteries in every city.

Demographic data (population, population change, annually number of deaths, change in annual number of deaths) was also collected to include wider background of ten cities constituting a research sample. The synthetic measure of socioeconomic development of every analyzed city was calculated using the SMR statistical method (Malcher & Zielińska-Sitkiewicz, 2017). The indicators that were taken into account were:

1. Population change within 2015–18 – measured for FUA;
2. Number of business entities per 1000 inhabitants – measured for city itself;
3. Number of universities (including out-of-town departments of universities from other cities) measured for FUA.

These three indicators represent three main themes of the Silicon Valley Index (2010), that was created to measure regional and urban socioeconomic development and was successfully used in similar analysis in Poland (Męczyński et al., 2010). They were selected according to the highest degree of mutual Spearman correlation (computed in SPSS statistics) with indicators from other themes. Based on these 3 indicators, using SMR statistical method, the synthetic measure of development was calculated for 10 cities included in the main research (Częstochowa, Słupsk, Stargard, Jelenia Góra, Tarnów, Rzeszów, Kielce, Suwałki, Grudziądz, Zielona Góra).

Phase 2: Defining criteria assessing the attractiveness of cemeteries

Cemeteries differ from other categories of land use due to their specificity and thus affect the local community, natural environment (important component of urban green infrastructure), spatial structure of the cities and its use. Therefore, cemeteries require an individualized approach in developing the criteria for their assessment. Based on the literature review, reports (ASA, 1952; SIFUREP, 2016) and analysis of the law regulations in the aspect of planning cemeteries in Poland – 9 criteria of the evaluation of urban cemeteries with scores (0, 1, 2 points) were elaborated. The selection criteria for assessment of cemeteries were based on the top-down principle, i.e. from general to specific. The general is the context of studied cemeteries (location in the relation to existing functional and spatial structure), after which a specific space is analyzed, i.e. spatial layout of the cemetery. The following criteria were assessed: I) location of the cemetery within the landscape; II) location of the cemetery in relation to the city center; III) location of the cemetery in the urban

Table 1. Criteria of the cemetery evaluation

Criteria	Scores	Weight (ratio correcting)
1	2	3
I. Location of the cemetery within the landscape. Visibility, ease of identification, attractive location (King et al., 2010; DDC, 2010; Pécsek, 2015)		
poor visibility: cemetery surrounded by buildings, infrastructure; difficult to identify	0	0.048
moderate visibility: cemetery overlooked by a small number of buildings, visible from close range	1	
good visibility: cemetery easily identifiable in city landscape	2	
II. Location of the cemetery in relation to the city center (Lehrer, 1974; Capels & Senville, 2006)		
cemetery located peripherally in relation to the city center (located in low-density, rural clusters)	0	0.113
cemetery located moderate distance from the city center (located in clusters with moderate density of suburban population)	1	
cemetery located non-peripherally in relation to the city center (located in clusters with high population density, urban and downtown character)	2	
III. Location of the cemetery in the urban natural system (Gilbert, 1991; Quinton et al., 2020; Act on Nature Conservation of 16 April, 2004; Abernathy, 1970; Richter, 1995)		
no connections between the cemetery and the system of urban green areas	0	0.024
the cemetery as an area supporting the urban natural system (in the vicinity of green areas)	1	
the cemetery is included in the basic areas of the urban natural system	2	
IV. Location of the cemetery in relation to other religious facilities in the city (Harvey, 2006; Polish Classification of Building Facilities, 1999; Humphrey & Vitebsky, 1997; Cheng, 2013)		
no religious facilities in the vicinity of the cemetery	0	0.073
religious facilities in the immediate vicinity of the cemetery e.g. cemetery, church, small sacred architecture	1	
the cemetery as one of the element of sacred complex	2	
V. Accessibility of the cemetery area. Transport infrastructure (SIFUREP, 2016; Śleszyński, 2014; Komornicki, 2013; Komornicki et al., 2009)		
no public transport access; only private transport	0	0.169
access only to public transport or only to bicycle paths in the vicinity of the cemetery	1	
access to both public transport and bicycle paths in the vicinity of the cemetery	2	
VI. Accessibility of the cemetery area. Frequency of public transport (Śleszyński, 2014; Komornicki, 2013; Komornicki et al., 2009)		
every 1 hour or less	0	0.185
every 31–59 minutes	1	
less than 30 minutes	2	
VII. Program of services in the vicinity of the cemetery (Chudak, 2012; Dian, 2004)		
no services	0	0.065
individual service facilities with monothematic program (industrial, light industrial, retail outlets)	1	
many service facilities with a diverse program (culture, gastronomy, public administration services)	2	

cont. Table 1

	1	2	3
VIII. Cemetery in the urban context (Dian, 2004; Bennett & Davies, 2014; Afla & Reza, 2012; Benmoshé, 2017)			
no connections		0	
moderate connections: urban plan determined the cemetery layout or vice versa (mainly a network of communication routes)		1	0.161
strong connections: cemetery as an important element spatial composition in the city; cemetery as a landmark		2	
IX. Cemetery development. Quality of the cemetery space development, types of infrastructure (law regulations)			
poor development: burial space, communication system, greenery		0	
medium development: burial space, communication system, greenery, park furniture		1	0.161
full development: burial space, communication system, greenery, park furniture		2	

Source: own preparation.

natural system; IV) location of the cemetery in relation to other religious facilities in the city; V) accessibility of the cemetery area (transport infrastructure); VI) accessibility of the cemetery area (frequency of public transport); VII) a program of services in the vicinity of the cemetery; VIII) cemetery in the urban context; IX) cemetery development (Tab. 1).

Phase 3: Calculating cemeteries attractiveness index

After selecting the factors of cemeteries attractiveness, the next step was to calculate the importance of each criterion. For calculation of weights, this study has consulted with 30 experts from the fields of cemetery administration, environmental management and land use planning. Experts have determined which criteria, in their opinion, are the most important and which are less important (weights). The weights add up to 1 (100%). The greater the weight of a criterion, the greater its importance in the final assessment. The maximum number of points that cemetery could score was 2. The analysis of the criteria for the attractiveness of cemeteries was made possible by the use of cartographic materials (topographic maps, aerial photos). Additional, non-cartographic sources of information about the cemeteries were local spatial policy documents: Spatial Development Conditions and Directions Studies and local land use plans. As part of the analytical research,

inventories of cemeteries were compiled (general sketches and photographic documentation was prepared). The average ratings for the attractiveness of cemeteries in the analyzed cities created cemeteries attractiveness index.

Phase 4: Verification of mutual correlation between analyzed indicators

In this phase mutual Spearman correlation of achieved spatial indicators, synthetic measure of development and cemeteries attractiveness index in the city was calculated.

RESULTS

Characteristics of the selected cities in the aspect of spatial policy and socioeconomic development

Ten cities included in the main research represent different sizes. The biggest are Częstochowa with 222 200 inhabitants within city limits and 393 180 within its FUA and Rzeszów with 191 564 inhabitants within city limits and 517 628 within its FUA. The smallest one is Stargard with 67 900 inhabitants within city limits and 81 338 within its FUA. They also represent different administrative status. Three of them (Rzeszów, Kielce and Zielona Góra) are voivodeship capitals with powiat status, six (Częstochowa, Słupsk,

Jelenia Góra, Grudziądz, Suwałki, Tarnów) are cities with powiat status and one (Stargard) is a powiat capital without any special status. It is also important to underline that every analyzed city with powiat status is also a capital for surrounding powiat.

There is a noticeable tendency of increase of the number of deaths in all analyzed cities (Tab. 2). It is symptomatic and should lead the authorities to verify whether resources in the area of burial space are sufficient. The largest percentage of the city's area

developed by cemeteries was recorded in Słupsk (0.77%) and Stargard (0.67%), despite the fact that these cities have the smallest number of cemeteries: 2 facilities in Słupsk and 4 facilities in Stargard. In turn, the smallest share of cemeteries in the overall area of the city characterizes Zielona Góra (0.17%) with the most burial sites (16 facilities). On 1 January 2015, the rural commune was incorporated into the city of Zielona Góra. 17 villages were included into the administrative boundaries of the city along with the rural cultural heritage e.g. small rural cemeteries and former Protestant cemeteries (nowadays inactive).

Over a half of analyzed cities face up depopulation problems. Highest decline of population between 2005 and 2018 was recorded in Częstochowa FUA (21942 inhabitants). Significant decline was also observed in Jelenia Góra FUA (6174 inhabitants), Kielce (4504 inhabitants), Grudziądz (1793 inhabitants) and Słupsk (1222 inhabitants). Decline in Stargard was lower than 1000 inhabitants. Highest increase of population was recorder in Rzeszów FUA (26147 inhabitants) and Tarnów FUA (11457 inhabitants). Significant increases were also recorded in Zielona Góra FUA (2115 inhabitants) and Suwałki FUA (1874 inhabitants). It's important to notice that population increase in Tarnów FUA has stopped in 2012 when population became stable with tendency to decline. The highest number of business entities per 1000 inhabitants was recorded in Jelenia Góra (over 155), which is an important tourist destination (Eurostat Urban Audit). High numbers can be also found in voivodeship capitals (Kielce, Rzeszów and Zielona Góra), but also in Słupsk (approximately 140). The remaining of analyzed cities recorded much smaller results with the lowest one in Grudziądz (84). The highest number of universities characterized Kielce FUA (18) and Rzeszów FUA (11) that are also important supra-regional academic centers, whereas the lowest number (2) characterized Stargard FUA and surprisingly Zielona Góra FUA, that is considered as a major academic center of Lubuskie voivodeship. However, academic life in this city concentrates mostly in one strong "University of Zielona Góra" with relatively small numbers of students.

Table 2. Demographic data of analyzed non-metropolitan cities

Item	City (Voivodeship)	Population	Population	Number
		City	FUA	of deaths
		2005/2018	2005/2018	2005/2018
1	Tarnów (Małopolskie Voivodeship)	117 560	292 788	1 046
		109 358↓	304245↑	1 142↑
2	Częstochowa (Śląskie Voivodeship)	246 890	415 122	2 758
		222 292↓	393180↓	2 972↑
3	Jelenia Góra (Dolnośląskie Voivodeship)	87 017	141 741	912
		79 686↓	135567↓	1 079 ↑
4	Zielona Góra (Lubuskie Voivodeship)	118 221	209 332	1 000
		140 297↑	211447↑	1 370↑
5	Stargard (Zachod- niopomorskie Voivodeship)	70 639	82 288	566
		67 938↓	81338↓	696↑
6	Słupsk (Pomorskie Voivodeship)	98 695	170 981	917
		91 007↓	169759↓	1 021↑
7	Grudziądz (Kujawsko- Pomorskie Voivodeship)	99 578	128 273	988
		95 045↓	126480↓	1 262↑
9	Suwałki (Podlaskie Voivodeship)	69 268	84 897	459
		69 827↑	86771↑	600↑
9	Kielce (Świętokrzyskie Voivodeship)	208 193	397 646	1 704
		195 774↓	393142↓	2 134↑
10	Rzeszów (Podkarpackie Voivodeship)	158 539	491 481	1 141
		191 564↑	517628↑	1 494↑

Source: own preparation based on the Local Data Bank, <https://bdl.stat.gov.pl/> (10.04.2021).

In overall, the highest value of synthetic measure of development was obtained by Rzeszów (0.82). Also the result of Kielce was quite high (0.75). These two cities clearly outperformed the others that obtained scores between 0.59 (Zielona Góra) and 0.40 (Częstochowa) (Tab. 3). These results correspond with a strong concern in public debate that Rzeszów is the best developing non-metropolitan city in Poland, but also confirms the validity of actions taken in recent years by Kielce authorities (such as: creation of new science and technology park and scientific campus of National Office of Measurement Główny Urząd Miar), that were conducted to strengthen Kielce's metropolitan functions.

In the Spatial Development Conditions and Directions Studies (SDCDS) of analyzed cities, little mention was made of cemeteries. In above-mentioned document for all analyzed cities, old cemeteries (especially historic objects) were included as elements of the urban greenery system. In Tarnów, Rzeszów, Jelenia Góra, Stargard, Kielce historic cemeteries are classified as the most valuable green areas. Additionally, the spatial policy documents in Słupsk, Stargard, Grudziądz emphasized the natural importance of these areas. Moreover, in the Study of Kielce, Rzeszów, Tarnów, and Stargard

old cemeteries are defined as elements of cultural landscape possessing tourist values.

Moreover, the SDCDS of Częstochowa, Kielce, and Stargard includes a general description of the cities' cemeteries.

Zielona Góra is the only city among the analyzed ones with the Strategy for the Development of Green Areas. As a part of this document, the expert team for the revitalization of green areas in the city conducted a SWOT analysis, in which the presence of historical cemeteries was considered as one of the strengths. There are also guidelines for planning cemetery greenery within the city.

In the case of Stargard, information on cemeteries is provided by the City State Report (2019).

Based on the planning documents entries, three proposed directions for the functioning of cemeteries with respect to the city's natural system can be identified (Fig. 2):

1. Cemetery as a green enclave;
2. Cemetery as an element of city's natural system;
3. Cemetery as an element of green corridor.

Type 1. Cemetery as a green enclave: this solution refers to historical cemeteries, which along with urbanization were surrounded by built-up areas. Such a location imposes a park program on these

Table 3. Values of development indicators in analyzed cities

City	Population change (2005–2018)	Number of business entities per 1000 inhabitants (2018)	All universities (2018)	Synthetic measure of development
	(FUA)	(City itself)	(FUA)	
Rzeszów	26147	139,4729699	11	0,819666681
Kielce	-4504	140,9839917	18	0,69031735
Tarnów	11457	103,9317086	9	0,627941009
Zielona Góra	2115	139,3213986	2	0,559002871
Słupsk	-1222	135,7788445	3	0,554383558
Jelenia Góra	-6174	155,4227479	3	0,535465936
Stargard	-950	115,3993347	2	0,501998022
Suwałki	1874	99,7608375	1	0,457739644
Grudziądz	-1793	84,29691199	5	0,446039642
Częstochowa	-21942	118,37583	6	0,42134482

Source: own preparation based on the Local Data Bank, <https://bdl.stat.gov.pl/> (10.04.2021).

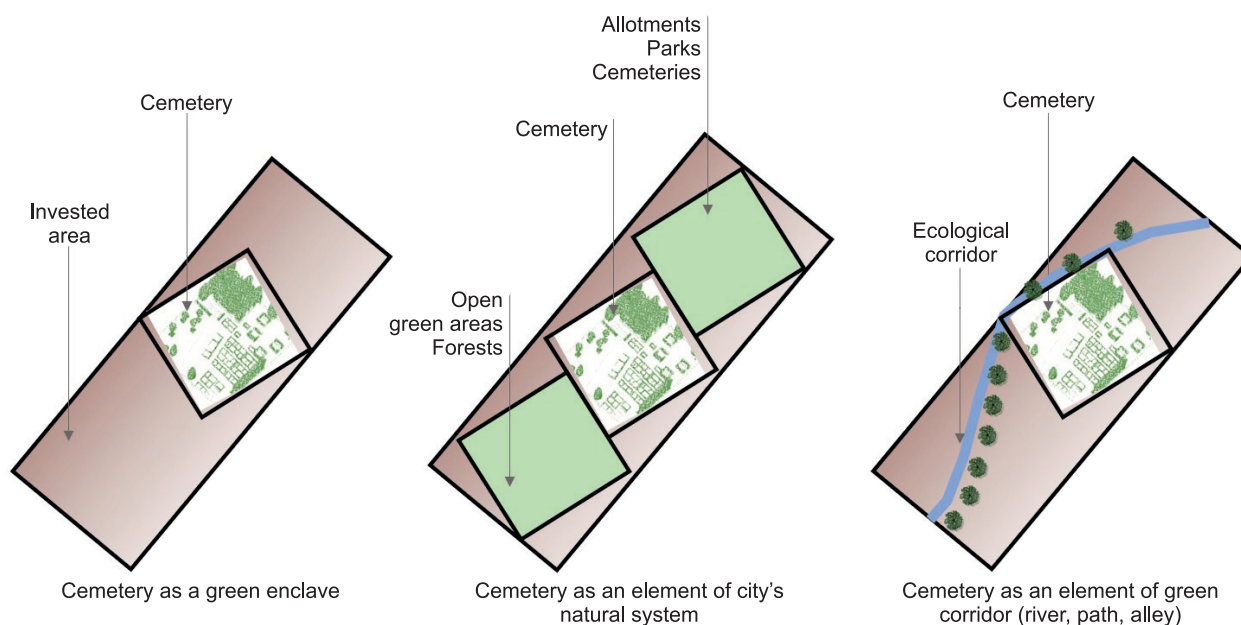


Fig. 2. Cemeteries in city's natural system
Source: own preparation.

areas, which is reflected in the provisions of planning and strategic documents (e.g. Saint Roch Cemetery in Częstochowa, the park cemetery at the at the Holy Cross Elevation Church in Jelenia Góra). The cemeteries located in the open areas are also identified as the “green islands” in the functional and spatial structure of the cities (provided that the trees are included in their development), enriching the landscape of the area (e.g. municipal cemeteries in Cmentarna Street in Kielce).

Type 2. Cemetery as an element of city's natural system: this category refers to modern cemeteries located in the direct vicinity of green areas classified in the SDCDS as “ZL” i.e. forests (e.g. the communal cemetery in Suwałki), “ZD” i.e. allotment gardens (e.g. the communal cemetery in Stargard), “ZC” i.e. cemeteries in the vicinity of the historical burial sites (e.g. new communal cemetery in Częstochowa and Zielona Góra). This category also includes historical cemeteries, around which other green areas of recreational character (city park, city-forest park, stadium, allotment gardens) were aggregated and developed, e.g. Grudziądz and Kielce.

Type 3. Cemetery as an element of green corridor: this category refers to historical cemeteries which are “green islands” and at the same time constitute one of the elements of development in the vicinity of watercourses, e.g. the Old Cemetery in Rzeszów included in the nature trail along the Wisłok River and the Old Cemetery in Tarnów on the Wątok River which, apart from the sepulchral object, include green areas of high natural value.

This excerpt from spatial documents shows that in Poland authorities are inclined to cover the issue of old cemeteries while at the same time the modern ones are omitted, which results from lack of present-day Polish cemetery art. Spatial development conditions and directions studies for Grudziądz and Częstochowa, where a lot of attention is paid to the contemporary cemeteries, are unique.

Cemeteries attractiveness index of selected cities

In order to compare the quality and attractiveness of cemeteries in non-metropolitan cities, the index of the cemetery greenery per 1inhabitant (in m²) was

used, based on the American Planning Association (APA) and Association for Public Service Excellence (ASPE). This indicator shows that the largest area of cemeteries can be found in: Stargard (6.9 m²) and Jelenia Góra (4.8 m²), and the smallest in Kielce (2.4 m²), Tarnów (2.7 m²) and Rzeszów (2.8 m²) (Tab. 4).

Cemeteries are an important component of city's green areas in the structure of Suwałki, Stargard, Tarnów, Rzeszów and Kielce.

The highest total score of attractiveness was obtained by cemeteries in Słupsk, Suwałki, Jelenia Góra and Kielce. In turn, the lowest score was obtained by cemeteries in Grudziądz and Zielona Góra (Tab. 5).

The following features were rated the highest: development of cemeteries and its location in relation to transportation infrastructure (availability) (these two features have the greatest impact on the attractiveness of cemeteries). Most of the researched cemeteries fulfill legal requirements in the aspect

Table 4. General data on the non-metropolitan cities analyzed

City	Area [ha]	Number of cemeteries	Total area of cemeteries [ha]	% of Total	Area of greenery [ha]	% of cemeteries in greenery	Cemetery greenery/1 inhabitant [m ²]
Tarnów	7238	11	29.39	0.41	241.84	13.69	2.7
Częstochowa	15971	12	65.45	0.41	736.36	7.10	2.9
Jelenia Góra	10922	10	38.20	0.35	702.2	4.46	4.8
Zielona Góra	27832	16	48.12	0.17	889.41	1.42	3.4
Stargard	4808	4	47.27	0.98	219.02	21.58	6.9
Słupsk	4315	2	33.10	0.77	431.66	10.54	3.6
Grudziądz	5776	7	27.77	0.48	326.42	5.61	2.9
Suwałki	6551	8	25.55	0.39	132.18	21.94	3.7
Kielce	10965	10	46.22	0.42	371.14	12.81	2.4
Rzeszów	12041	16	53.35	0.44	406.15	13.1	2.8

Source: own preparation based on the Local Data Bank, <https://bdl.stat.gov.pl/> (10.04.2021).

Table 5. Results of the evaluation of cemetery attractiveness in non-metropolitan cities. M – municipal cemetery, D – denominational cemetery, W – war cemetery

City	Average attractiveness	The highest score		The lowest score	
		Cemetery name	Score	Cemetery name	Score
Tarnów	1.100	Old cemetery (M)	1.668	War cemetery no. 200 Chyszów (W)	0.555
Częstochowa	0.906	Cemetery Complex of Saint Roch (D)	1.611	Stradom cemetery (M)	0.257
Jelenia Góra	1.142	Park Cemetery at the Holy Cross Elevation Church (D)	1.837	Sobieszów cemetery (M)	0.460
Zielona Góra	0.799	New cemetery near Wrocławska Street (M)	1.377	Sucha cemetery (D)	0.306
Stargard	1.007	Old cemetery (M)	1.490	International War Cemetery (W)	0.652
Słupsk	1.289	Old cemetery (M)	1.829	Western Cemetery (M)	0.749
Grudziądz	0.792	Cemetery Complex (D)	1.490	War and Garrison Cemetery (W)	0.467
Suwałki	1.170	Multi-religious cemetery complex (D)	1.611	Zastawie cemetery (D)	0.185
Kielce	1.108	Cemetery Complex near Kwasa Street (M)	1.603	Cemetery of Soviet POW's (W)	0.137
Rzeszów	1.053	Old Cemetery near Targowa Street (D)	1.829	Matysówka parish cemetery (D)	0.322

Source: own preparation.

of spatial arrangement (i.e. fence, legible burial ground, circulation route, entrance, parking facility, water intakes). There is the obligation in Polish law to build a funeral parlor or chapel in contemporary cemetery. In the researched non-metropolitan cities, there were cemeteries without above-mentioned facilities identified, e.g. Zastawie parish cemetery in Suwałki, Stradom and Mirów municipal cemeteries and Gnaszyn parish cemetery in Częstochowa. Despite the legislative intention that “the cemetery should be arranged and maintained as a park-based area”, many of the cemeteries in non-metropolitan cities are without tall greenery (e.g. Zastawie cemetery in Suwałki, enlarged municipal cemeteries in Kielce Cedzyna or Suwałki) and benches or lighting (basic park furniture).

Correlation between analyzed indicators

Output were divided into 4 main categories to facilitate the determination of classes of cemeteries attractiveness: I. Very high; II. High; III. Average; IV. Low (Tab. 6).

It was found relationship between cemeteries attractiveness and spatial policy. Facilities classified with very high and high attractiveness are included in planning documents. Situated in downtown clusters, due to the preserved old trees, they are green islands and treated as an important element of the city’s natural system.

No statistically significant correlations between cemeteries attractiveness index and other indicators has been found. However it was found that some criteria that make up cemeteries attractiveness index have statistically significant correlations with some spatial indicators (Appendix 1, Appendix 2).

1. Accessibility of cemetery by transport infrastructure (criterion V) has statistically significant correlation with area of cemeteries included in city greenery system;
2. Program of services in the vicinity of the cemetery (criterion VII) and cemetery development stage (criterion IX) have statistically significant correlation with area share of municipal cemeteries;
3. Visibility of cemetery in urban landscape (criterion I) has statistically significant correlation with cemetery’s age.

Table 6. Classes of cemeteries attractiveness

Classes of cemeteries attractiveness	Partitions (scores)	Attributes of attractiveness	Examples
I Very high	$1.500 \leq x \leq 2.000$	Cemetery as landmark in urban landscape (good visibility, good connection with urban structure), full development (cemetery as a park), good availability	Old Cemetery near Targowa Street, Rzeszów Pobitno Cemetery, Rzeszów Old Cemetery, Słupsk Park Cemetery at the Holy Cross Elevation Church, Jelenia Góra
II High	$1.000 \leq x < 1.500$	Full development, good availability, moderate connections with urban landscape, cemetery situated near monofunctional areas, communication nodes (outgoing and incoming roads)	Krzyż Cemetery, Tarnów Mościce Cemetery, Tarnów New Municipal Cemetery, Zielona Góra Cemetery near Sudecka Street, Jelenia Góra Staromieście Cemetery, Rzeszów New Municipal Cemetery, Częstochowa
III Average	$0.500 \leq x < 1.000$	Peripheral location (low availability, low visibility), medium development, situated in the vicinity of green areas	Kobylanka Cemetery, Grudziądz Municipal Cemetery near Reja Street, Suwałki Bzianka Cemetery, Rzeszów
IV Low	$0.000 \leq x < 0.500$	Peripheral location (low availability, low visibility), poor development, warehouses, industrial facilities in the cemetery buffer zone	Stradom Cemetery, Częstochowa Sucha Cemetery, Zielona Góra Budziwój Cemetery, Rzeszów

Source: own preparation.







Fig. 3. Graphic presentation of classes of cemetery attractiveness, on the example of Old Cemetery in Rzeszów (class I), new municipal cemetery in Częstochowa (class II), municipal cemetery in Suwałki (class III), parish cemetery Zastawie (class IV)

Source: own preparation based on <https://polska.e-mapa.net/> (02.05.2021).

Table 7. Synthetic measure, spatial development policy and cemeteries attractiveness – results

City	Synthetic measure	Average attractiveness of cemeteries	Cemeteries in spatial policy documents
Tarnów	0,627941009	1.100	 
Częstochowa	0,42134482	0.906	  
Jelenia Góra	0,535465936	1.142	 
Zielona Góra	0,559002871	0.799	
Stargard	0,501998022	1.007	  
Słupsk	0,554383558	1.289	 
Grudziądz	0,446039642	0.792	  
Suwałki	0,457739644	1.170	
Kielce	0,69031735	1.108	 
Rzeszów	0,819666681	1.053	

the document emphasizes:

-  the natural value of the cemetery, including facilities in the local ecological network;
-  historic values of the cemetery, postulating conservation protection;
-  list and description of cemeteries in the city;
-  feasibility study in the aspect of cemeteries expansion (burial needs) taking into account contemporary burial culture

Source: own preparation.

It's important to add that mutual correlation between cemeteries age and attractiveness criteria was examined only for those 60 cemeteries (representing every analyzed city) whose year of establishment was precisely known and it was made for individual notes

of each cemetery not for city's average note as for other indicators.

Establishment of old necropolis in analyzed non-metropolitan cities is connected with the decline in using the church cemeteries which occurred in Rzeczpospolita in the second half of the 18th century. In the beginning of the 19th century, establishing cemeteries outside of city limits was a common practice throughout Europe. Cemeteries founded in the 18th and 19th centuries as “*extra muros*” facilities had a vast space, which was arranged as a park-based area or a garden-based area (Curl, 1980; Etlin, 1984; Linden-Ward, 2007). Nowadays these cemeteries are attractive public parks and gardens as a result of the city boundaries extension (Rogers, 1997; Harnik & Merolli, 2010; Uslu, 2010; Swensen et al., 2016). Cemeteries established in the second half of the 20th century are characterized by the lowest attractiveness index. Given the solemn and dignified nature, cemeteries typically keep a low profile and do not promote their significant role. Due to the state policy aimed at secularizing the society and limiting the zones of public influence of the Roman Catholic Church, as well as large shortages in the field of burial space, a decision was made to establish municipal cemeteries by means of small financial outlays, which determined the quality of cemeteries (Rogowska, 2014). Part of the reason for this low profile may be that cemetery operators are often guided by a philosophy of service that leads to the situation where large burial surfaces devoid of plants create a monotonous and depressing impression. In turn, the average attractiveness index is found in cemeteries established after 2001. They constitute large-scale urban investments equipped with cubature buildings, small architecture, technical and communication infrastructure. However, due to restrictive sanitary and hydrological requirements, they are located on the outskirts of cities (difficult accessibility), without any connection with the urban context (new cemetery does not create a spatial composition with other sacred objects in the non-metropolitan city).

It is significant that in all researched non-metropolitan cities, new burial investments (built

from 1989 to 2019) are municipal ones. It appears that the share of communal cemeteries increases, which is associated with progressing secularization and problems related to cemetery management noticed in the Supreme Audit Office report (2016) (church authorities are increasingly deciding to transfer the administration of the cemetery to local governments).

Moreover, the research showed the problem with identifying a specific number of cemeteries in each non-metropolitan city, which results from the lack of a coherent definition of cemeteries in Poland. There is also a problem with classification of inactive cemeteries; in spatial policy documents (local land use plans and spatial development conditions and directions studies), the cemetery area is classified as „ZC” (cemetery), „ZP” (park) or „US” (religious services). Such discrepancies may be one of the factors determining the low attractiveness of cemeteries.

GUIDELINES. HOW TO IMPROVE THE ATTRACTIVENESS OF URBAN CEMETERIES?

Guidelines have been developed to improve the quality and attractiveness of cemeteries in urban context and to strengthen the role of cemeteries in documents as an important element of green infrastructure. The authors developed recommendations that are universal and can be implemented to other urban cemeteries.

Nordh and Evensen (2018, p. 80) pointed out that “Cemeteries are green spaces, but in planning documents, they are assigned a limited number of environmental qualities. Cemeteries are publicly accessible spaces, but treated as private spaces in municipal plans”. Because of the multi-perspective character of cemeteries, space and its important role in shaping cityscape, especially as a part of green urban areas (Długożima & Kosiacka-Beck, 2020; Yilmaz et al., 2018; van Leeuwen et al., 2010; Haq, 2011). That is why cemeteries should be included in the concept of green infrastructure in the respective municipalities. According to the principles of integrated planning, spatial policy should take into account cemeteries,

not only by listing them, but also by identification, characterization, valorization. Cemeteries should be treated as an important element of the city’s structure.

In this aspect, the analyzed as well as other non-metropolitan cities, could follow the spatial policy assumptions for Łódź, where the City Urban Planning Department proposed a multisectoral project “The Green Ring of Tradition and Culture”. A concept to protect the most valuable areas and objectives – parks, cemeteries, allotment gardens, university campus surrounding the city centre with its main street. “The Green Ring of Tradition and Culture” including cemeteries could be one of the basic elements of the spatial structure of the city in the project of the SCDS, ensure sustainable development and improve the city’s identity and attractiveness (Müller et al., 2005).

In the analyzed non-metropolitan cities, active and inactive cemeteries coexist, some of them are the testimony of multicultural (e.g. Evangelical and Jewish cemeteries) and dramatic (war cemeteries) history of Polish land. These inactive facilities are often devastated and are invisible in the urban landscape. Therefore, to ensure optimal development of cities, it is necessary to pay more attention to cemeteries in spatial policy.

A cemetery’s primary function is to provide a physical space for the memorialization and final resting place of the deceased. It plays an important role in social infrastructure.

The use of a multi-criteria method of assessing the attractiveness of objects may be useful in spatial planning. By selecting attractive objects, it is possible to plan cultural and bicycle trails and include cemeteries in their program what would make them an element of ecosystem services.

On the other hand, the identification of unattractive cemeteries allows preparation of a strategy to improve the quality of their functioning.

The currently conducted works on national law on spatial planning and development, as well as the works on the national law on cemeteries and the burying of the deceased, constitute an excellent excuse to standardize the nomenclature and propose

a legal definition for a cemetery trying to include both the historic and ecosystem values of objects in this definition. It's also important to mandatory include cemeteries as city green infrastructure as well as to maintain them as park layouts, so that they constitute an attractive cultural space, while supplying the city's greenery system.

The current trends that have been observed in many European cities suggest an increasing degradation in the general quality of existing urban green spaces. That is why cemeteries should be assigned in spatial policy documents as green areas. It ensures the development of green spaces. Such strategy will contribute to integrate existing cemeteries into a coherent natural system.

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Appendix I. Values of correlations between analyzed cityscale indicators. (Statistically significant correlations are marked on red)

I	II	III	IV	V	VI	VII	VIII	IX	Area of cemeteries included in city greenery system			I
									Cemetery greenery indicator per capita [m ²]	Synthetic measure of development	Area share of municipal cemeteries	
1,000000	0,042946	0,276079	0,352767	0,118015	-0,006135	0,055048	-0,021539	-0,009259	0,244659	0,328227	-0,403687	-0,077641
0,042946	1,000000	0,323171	0,289634	0,074080	0,317073	0,145897	0,431195	0,012270	0,231004	-0,317073	0,601826	-0,228412
0,276079	0,323171	1,000000	0,332317	-0,259279	0,353659	0,455929	0,425078	-0,003068	-0,072949	0,210366	0,085107	0,123466
0,352767	0,289634	0,332317	1,000000	0,074080	-0,103659	0,012158	0,623856	-0,337430	-0,133739	0,250000	-0,231004	-0,246932
0,118015	0,074080	-0,259279	0,074080	1,000000	0,419785	0,172328	-0,015481	-0,018634	0,867795	0,117293	-0,018464	-0,093750
-0,006135	0,317073	0,353659	-0,103659	0,419785	1,000000	0,595747	0,143732	-0,276079	0,565352	0,262195	0,188451	0,012347
0,055048	0,145897	0,455929	0,012158	0,172328	0,595747	1,000000	0,353665	0,403687	0,163636	0,303953	0,454545	0,738549
-0,021539	0,431195	0,425078	0,623856	-0,015481	0,143732	0,353665	1,000000	-0,067693	-0,189028	-0,067279	0,140247	-0,030961
-0,009259	0,012270	-0,003068	-0,337430	-0,018634	-0,276079	0,403687	-0,067693	1,000000	-0,030582	-0,168715	0,562715	0,776412
0,244659	0,231004	-0,072949	-0,133739	0,867795	0,565352	0,163636	-0,189028	-0,030582	1,000000	-0,072949	0,103030	-0,178483
0,328227	-0,317073	0,210366	0,250000	0,117293	0,262195	0,303953	-0,067279	-0,168715	-0,072949	1,000000	-0,486324	0,240759
-0,403687	0,601826	0,085107	-0,231004	-0,018464	0,188451	0,454545	0,140247	0,562715	0,103030	-0,486324	1,000000	0,443129
-0,077641	-0,228412	0,123466	-0,246932	-0,093750	0,012347	0,738549	-0,030961	0,776412	-0,178483	0,240759	0,443129	1,000000

Source: own preparation.

Appendix 2. Value of correlation between each criteria of attractiveness of individual cemeteries and their age (statistically significant correlations are marked on red).

Criteria of attractiveness of individual cemeteries									Age	
I	II	III	IV	V	VI	VII	VIII	IX	of cemetery	
1,000000	-0,182311	-0,646809	-0,083241	-0,265645	-0,164650	-0,361180	-0,409873	-0,456179	0,281764	I
-0,182311	1,000000	0,127717	0,033087	0,519885	0,188966	0,335068	0,385990	0,413416	0,082601	II
-0,646809	0,127717	1,000000	0,136184	0,160489	0,243257	0,515261	0,457319	0,352117	-0,193498	III
-0,083241	0,033087	0,136184	1,000000	0,184997	0,001167	0,170034	0,170063	0,130176	0,112223	IV
-0,265645	0,519885	0,160489	0,184997	1,000000	0,211765	0,313971	0,346754	0,478631	-0,002195	V
-0,164650	0,188966	0,243257	0,001167	0,211765	1,000000	0,547880	0,428985	0,049573	0,027844	VI
-0,361180	0,335068	0,515261	0,170034	0,313971	0,547880	1,000000	0,667087	0,254326	0,098839	VII
-0,409873	0,385990	0,457319	0,170063	0,346754	0,428985	0,667087	1,000000	0,372452	0,159212	VIII
-0,456179	0,413416	0,352117	0,130176	0,478631	0,049573	0,254326	0,372452	1,000000	-0,092541	IX
0,281764	0,082601	-0,193498	0,112223	-0,002195	0,027844	0,098839	0,159212	-0,092541	1,000000	Age of cemetery

Source: own preparation.