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SPATIAL DIMENSION OF NEIGHBOURHOOD LIVEABILITY. COMBINED PERSPECTIVE OF LOCAL CUSTOMERS AND SERVICES' PROVIDERS

PRZESTRZENNY WYMIAR ŻYWOTNOŚCI OSIEDLA Z PERSPEKTYWY UŻYTKOWNIKÓW I USŁUGODAWCÓW

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ABSTRACT: Neighbourhood liveability is a concept reflecting the perceived living conditions in a housing area. Liveability depends on one hand on the relationship between demand and supply on the local services market, and on the other hand on the spatial structure of the neighbourhood. In this paper we combine those two aspects by asking a question: what physical forms are the most effective in providing quality of life and satisfying the everyday needs of citizens? We present the results of social survey and mapping analysis conducted in five neighbourhoods in Poland representing big cities, medium towns and suburbs. Each case study referred to the opinions of both the customers and services providers. The results show that some spatial structures (streets, squares, passages) are positively evaluated by each of the two groups, thus determining the neighbourhood liveability.

KEY WORDS: neighbourhood liveability, urban services, perception of space, local service centre

STRESZCZENIE: Żywotność osiedla (neighbourhood liveability) to pojęcie określające warunki życia w obszarach mieszkaniowych. Żywotność zależy z jednej strony od relacji między popytem i podażą na lokalnym rynku usług, a z drugiej od struktury przestrzennej osiedla. W prezentowanym artykule łączymy te dwa aspekty zadając pytanie o to, jakie formy przestrzenne są najbardziej efektywne w zapewnianiu jakości życia i zaspokajaniu potrzeb mieszkańców. Przedstawiamy tu badania społeczne i analizy przestrzenne przeprowadzone w pięciu osiedlach reprezentujących różne konteksty osadnicze w Polsce. Każdy przypadek uwzględnił opinie klientów i usługodawców. Wyniki badań pozwalają na wskazanie elementów struktury funkcjonalno-przestrzennej (ulic, placów, pasaży, skwerów etc.) ocenianych pozytywnie przez obie grupy, a tym samym sprzyjających żywotności wybranych osiedli.

SŁOWA KLUCZOWE: żywotność osiedla, usługi miejskie, percepcja przestrzeni, lokalne centrum usługowe

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The question of neighbourhood liveability

Neighbourhood liveability refers to the state of living environment, which should offer an acceptable quality of life to the residents. Liveability depends on the perception of local economic, social and cultural conditions by the users (Pandey et al. 2013). Availability, accessibility and affordability of services have a positive relationship with neighbourhood liveability (cf. Lovejoy et al. 2010, Arundel & Ronald 2017) and therefore residents in 'compact-cities', where high density of housing is accompanied with various facilities appear to be significantly more satisfied with their neighbourhoods compared with residents of sprawled suburbs.

There are several physical aspects of liveability, such as infrastructure, public amenities, quality of environment and land-use pattern. The functional diversity of urban space is necessary for presence of various people for various purposes, in various times of the day. This diversity means a mix of different functions (workplaces, housing, services, business) located in different buildings, creating a harmonious whole and determining the sociopsychological well-being of the residents (Pandey et al. 2013, Wojnarowska 2017).

The most common measure used in empirical studies to assess liveability within built environments is neighbourhood satisfaction, connected with safety, quietness, neighbour ties, accessibility and attractiveness (see Lovejoy et al., 2010; Mouratidis 2018). Thus neighbourhood offering easy access to amenities, to public spaces and public transport has a positive association with liveability.

Thus it may be assumed that liveability depends on one hand on the relationship between demand and supply on the local services market, and on the other hand on the spatial structure of the neighbourhood. In this paper we combine those two aspects by asking a question: what physical forms are the most effective in providing quality of life and satisfying the everyday needs of citizens in urbanized neighbourhoods? Are there any common patterns in spatial distribution of places satisfying the needs of the two groups in various settlement settings? In order to answer those questions we adopt a 3-step research method described below.

The 3-step research method

The proposed three-step interdisciplinary approach included inventory, social research and GIS studies. The desk research and field research was conducted in the years 2017-2019 in 5 locations in Poland representing various geographical settings (large cities, medium towns and suburban areas – see the details of the research sample below) and comprised of the following stages:

In the first step a thorough inventory of selected locations was carried out, including delimitation of research areas (local service centres and their surroundings) and typology of available services and public spaces.

In the second step social surveys (paper and pencil interviews) were conducted among two groups of respondents: customers (users of public spaces) and services providers. The questionnaires included a map on which the respondents marked their preferred places.

In the third step the respondents' answers were geocoded and an in-depth mapping analysis was conducted. The details of the method are presented below.

The 5 case studies

Services have originally developed as natural concentrations of human activity. A traditional urban neighbourhood comprised of a housing estate and a local service centre (LSC) defined as a specific urban structure including multi-function public space and surrounding buildings providing access to local (everyday) services, fostering social integration (Damurski et al. 2019).

Today those natural mechanisms are challenged by new phenomena: digitalisation, metropolisation, suburbanisation and gentrification. This is particularly visible in urban neighbourhoods where 'glocalisation' effects occur, reflecting the tension between traditional values and post-modern trends (Walton 2000). Therefore the basic object of the presented research is a neighbourhood with its local service centre.

In this paper we focus on 5 local service centres located in Poland. The research sample has been carefully selected in order to represent various settlement contexts, starting from large cities (Warszawa, Wrocław), through medium-sized towns (Ostrów Wielkopolski) down to suburban areas (Siechnice, Zabierzów). It is not random nor representative in statistical terms, but offers a good insight into different locations and appeals to the B. Flyvbjerg's idea of 'phronetic research' which means that the researched problems are not only academic (theoretical) but are considered real problems by the rest of society and that the results will feed back the political, administrative, and social environment (Flyvbjerg 1998).

When studying neighbourhoods, the boundaries of the research area can be determined on the basis of administrative, statistical, spatial or social criteria (cf. Ohmer et al. 2019). The choice of criteria depends on the research objective and organisational capabilities of the research team (i.e. feasibility of the research). In practice, researchers usually rely on figures related to the intensity and use, transport mobility and the economic value of the site and facilities. However, these methods are quantitative in nature, and thus omit the issue of qualitative diversity of phenomena. Following the suggestion of A. Wojnarowska (2017), qualitative methods such as cartographic studies, literature review, participatory observation, analysis of places with cultural functions, identification of areas with a significant share of pedestrian traffic, etc., should be used to determine the LSC's boundaries.

In the presented paper, the frame that defines the spatial range of local service centres are the streets and pedestrian routes from the central node (which cumulates

most activities) to characteristic service points such as a shop, library or church. In order to maintain comparability of the LSC in different contexts, the principle has been adopted that only buildings and areas with a service function (e.g. a shop located on the ground floor of a residential building or a school with a sports field), public spaces (unfenced and accessible around the clock) and semi-public spaces (fenced but accessible for most of the day) are included within the research area. Thus, the boundaries set in this way do not take into account buildings with a purely residential function, as this would create significant delimitation dilemmas and undermine the comparability of individual cases.

The first local service centre is located in Ochota district in Warszawa (area: ca 11 hectares). It is a street market in Mołdawska street with long-lasting traditions, located in a mixed neighbourhood (some 50-year old blocks of flats and some apartments from the last 10 years).

The second location is Pereca square in Wrocław (area: ca 12 hectares) with a well-established LSC in a typically urban pre-war neighbourhood offering a variety of services (including discount supermarket, schools, post office, pharmacy, café, bank, library, church). The third example is a well-established cluster of various services in a 40-year old blocks of flats neighbourhood situated around Waryńskiego, Śmigielskiego and Paderewskiego streets in Ostrów Wielkopolski (area: ca 12 hectares). The fourth case study is a newly built (2014-2017) market square in Siechnice with the municipality office situated in the central part, surrounded by blocks of flats with some services in the ground floor (area: ca 5 hectares). The last example is also a newly built (2014-2018) market square in Zabierzów (area: ca 11 hectares) with a municipality office building (Figure 1).

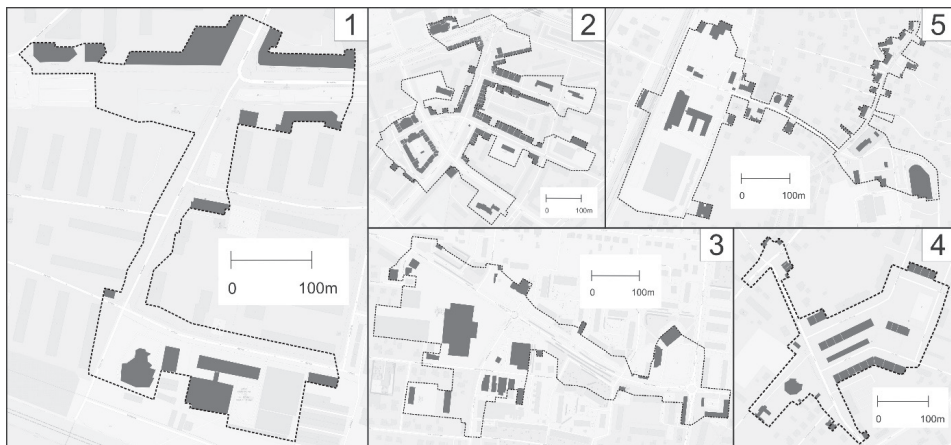


Fig. 1. Local service centres selected for the study: (1) Mołdawska street in Warszawa, (2) Pereca Square in Wrocław, (3) Waryńskiego, Śmigielskiego and Paderewskiego streets in Ostrów Wielkopolski, (4) Rynek in Siechnice, (5) Kolejowa and Krakowska streets in Zabierzów

Source: authors' own research. Sources of background maps: <https://www.openstreetmap.org>.

Step 1: inventory

The first task was to define the range each local service centre within its neighbourhood. LSC borders were drawn by the buildings with services in the ground floor, including public spaces between them (streets, squares, pathways, greenery areas). They did not include merely residential buildings. Thus the range of the LSC was delimited by streets and pedestrian pathways leading to the centre, starting from characteristic amenities (such as school, library, church or park).

Step 2: social survey

In the second step paper and pencil interviews (PAPI) were conducted among two groups of adult respondents: users of public spaces and services providers. The questionnaire comprised 12 main questions covering various aspects of neighbourhood environment plus 5 'metrics' questions (age, sex etc.). The last question included a map on which the respondents marked their preferred places: the customers pointed the places where they felt good and the services providers pointed the places where locating a business is the most effective.

The questionnaires were distributed in each LSC by students of the Wrocław University of Science and Technology in selected public spaces and residential areas. The distribution was systematically organised: it was conducted in spring-summer season, in selected weekdays (usually Wednesday and Sunday), in various daytimes (9:00-12:00 and 16:00-19:00). This approach provided necessary standardisation of research and enabled capturing the variety of local population in its daily routines as well as the condition of the local services market.

Table 1

Number of questionnaires filled in particular locations

Local service centre		Number of respondents			
Location	name	Users		Services providers	
		number	%	number	%
Large cities	Warszawa: Mołdawska street	161	26,1	43	24,6
	Wrocław: Pereca square	159	25,7	58	33,1
Medium towns	Ostrów Wielkopolski: Waryńskiego street and surroundings	135	21,8	28	16,0
Suburban areas	Siechnice: market square	73	11,8	16	9,1
	Zabierzów: Kolejowa street and surroundings	90	14,6	30	17,1
Total		618	100,0	175	100,0

Source: authors' own research

A total of 793 filled questionnaires was collected (618 from public space users and 175 from services providers – cf. Table 1). The numbers of respondents varied significantly in particular LSCs which was a result of their settlement contexts (large cities / medium town / suburban areas). This research sample is not representative in statistical terms which means that the results cannot be generalized for the whole population. However, it is reliable in methodological aspects and allows building some general remarks on neighbourhood liveability characteristics.

Step 3: geocoding, processing and visualising

The results of the social survey conducted have been geocoded as points with particular geographical coordinates. This database served as a basis for the maps of attractiveness of public spaces from the point of view of the customers and of the services providers in the 5 case study areas.

Graphical visualization of the results was conducted using the GIS application by adopting a distance-dependent density estimation tool (Kernel shape). This method enables a non-parametric surface smoothing of the distribution of respondents' answers (Silverman, 1986) by establishing the core of density based on the following relationship:

$$\tilde{K}(x, y) = \frac{1}{n} \sum_{i=1}^n K_h(t_i) K_h(s_i)$$

where:

n – random variable

K_h – kernel ratio

h – smoothing parameter

The research adopted quartic/biweight function, for which the kernel equation takes the following form:

$$K_h(t_i) = \begin{cases} \frac{15}{16} \frac{1-t_i^2}{h} & \text{if } t_i < 1 \\ 0 & \text{if } t_i \geq 1 \end{cases} .$$

The size of computing cells (X, Y) were implemented as 5m and 10m, and the distance radius as 50 m. The size of the cell is a result of averaged public distance (Hall, 1997, p. 157-158) and the range of analysed local service centres. The radius of coverage was adjusted to the 5m areas, whereas for the visualisation of resulting parameters it was raised without major losses to 10m due to the program computational capability. The parameters have been standardized for each of the locations which enables reliable comparisons despite significant differences in the number of respondents.

Following geocoding, a second GIS analysis has been conducted in order to link the answers of the customers and of services providers. A reclassification procedure was used to transform raster files into geodata polygon files (shape). Then the areas pointed by users (d_{use}) were merged with areas pointed by services providers (d_{ser}) (GIS function: Union) and areas preferred by both groups were extracted (GIS function: Intersect). As a result, a convergence ratio (CR) was counted using the following equation:

$$CR = \frac{d_{int}}{d_{uni}}$$

where $d_{uni} = d_{ser} + d_{use}$ (Union)

and $d_{int} = d_{ser} \cdot d_{use}$ (Intersection)

Research results

Geocoding of answers enabled the visualisation of customers' and services providers' preferences regarding public spaces in particular local service centres. The resulting maps show the spatial distribution of respective public spaces in each neighbourhood (Figure 2). They also demonstrate significant differences in the approach of each of the studied groups: concentration of positive answers given by the users may be interpreted as „places of local community” where particular emotional attitudes are located

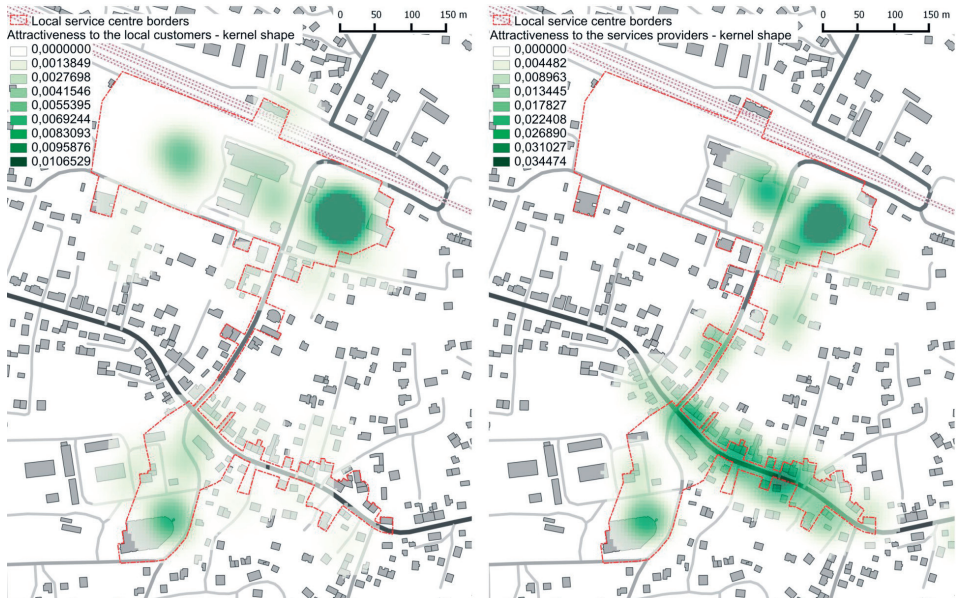


Fig. 2. Sample visualisation of answers of customers (left) and services providers (right) in Zabierzów local service centre

Source: authors' own research.

(Agnew, 1987). On the contrary, spatial preferences of services providers are based on economic characteristics, such as catchment area, market capacity land value. In theory, the two groups should meet in one place in order enable comfortable exchange and to satisfy their needs. In practice, the picture of attractiveness of local service centres is much more complex: most customers prefer public places and squares whereas most services providers point streets and passages (Figure 3).

Spatial preferences of services providers are characterized by two features. First, there is a visible tendency to areas where movements of customers cross: main cross-roads and streets with high traffic volumes are the most attractive places (LSC in Zabierzów and in Ostrów Wlkp.). This feature is connected with parking spaces – for example in LSC in Wrocław services are located mainly in Pereca Street where places for cars are provided, not in Grabiszyńska Street where the highest traffic load is observed. Such car-transport dependence of services has been proven also in other research (cf Mayer-Wydra 2019).



Fig. 3. Examples of spaces attractive to customers (left) and services providers (right) in Zabierzów local service centre

Source: authors' own resources and research.

The second factor crucial for services providers is the existence of other amenities, especially those with long tradition. New shops and cafes are preferably located near the previously built ones which is supposed to raise the number of potential clients. For example in LSC in Warsaw the street market became a reference point for many other areas indicated by the services providers.

The results for customers (surveyed users of public spaces) showed that neighbourhood attractiveness may be connected with a general notion of spatial order and aesthetics. The mostly preferred areas are greenery (a park near the LSC in Warsaw, playground in LSC in Wrocław) and public squares (LSCs in Siechnice and Zabierzów). Each of those places has been quite recently refurbished and probably this “newness” is the main reason for such preferences. Paradoxically in the areas pointed by customers there is relatively low number of services – it seems that average users of public spaces prefer quiet and relaxing zones than busy concentrations of services.

Despite the differences described above, there are several commonalities in perception of space by the users and by the services providers. In each local service centre there are at least two concentrations of positive answers, the dispersion of areas preferred by both groups is relatively high. Moreover, it is hard to prove any regularity in location of particular zones, despite one: only open public spaces, equipped with greenery, clear pathways for pedestrians and surrounded by buildings with services on the ground floor were commonly pointed by both groups. This observation proves the indispensable role of traditional LSC forms for neighbourhood liveability (Figure 4).

Juxtaposition of the quantified spatial preferences of customers and services providers reveals relatively low levels of convergence in each local service centre: the CR values reach from 0,14 to 0,21 (Table 2). The preferences of customers and of services providers are significantly different, in particular in Zabierzów case study.

Table 2
Convergence between customers and services providers answers regarding the attractiveness of neighbourhood public spaces

Local service centre		Areas preferred by		Convergence ratio CR
Location	name	either users or services providers d_{uni} [m ²]	both users and services providers d_{int} [m ²]	
Large cities	Warszawa: Mołdawska street	89 922,42	16 200,00	0,18
	Wrocław: Pereca square	39 952,12	8 526,92	0,21
Medium towns	Ostrów Wielkopolski: Waryńskiego street and surroundings	88 870,37	17 982,90	0,20
Suburban areas	Siechnice: market square	21 105,21	3 775,17	0,18
	Zabierzów: Kolejowa street and surroundings	41 227,19	5 883,28	0,14

Source: authors' own research



Fig. 4. Areas positively evaluated by customers and services providers. Example of Zabierzów local service centre

Source: authors' own resources and research.

Conclusions

Among decision-makers there is a common desire to support cities in improving their attractiveness, liveability and economic competitiveness (JPI 2015). In this paper we tried to address this challenge by juxtaposing the perspectives of users and services providers in five selected neighbourhoods in Poland in order to answer the question “what physical forms are the most effective in providing quality of life and satisfying everyday needs of citizens in urbanized neighbourhoods?”

The research results presented in this paper are of limited range and cannot be generalized for all the urbanized neighbourhoods. However, they show some tendencies in the spatial distribution of neighbourhood liveability. The most important findings can be summarized as follows:

1) Local service centres in selected neighbourhoods are differently evaluated by the users and services providers. Each of those groups has its own preferences regarding the attractiveness of public spaces, reflecting their different needs and expectations. The customers point mostly public places and squares (especially those including greenery areas) whilst the services providers point commonly the streets and passages with high numbers of pedestrians passing by.

2) Despite the differences described in point 1), there are some areas where the preferences of customers and services providers meet and overlap. The convergence zones are those where overall attractiveness is cumulated. However, the values of *CR* (convergence ratio) are relatively low and surprisingly similar in all the analysed locations. This observation shows how hard it is to create spaces satisfying both customers and services providers, regardless of the settlement context (large city / medium-sized city / suburban area).

3) The biggest concentrations of convergence zones have been observed in open public spaces, equipped with greenery, clear pathways for pedestrians and surrounded by buildings with services on the ground floor. It proves how fundamental is the role that traditional forms of local service centres play in their neighbourhoods – they are the most effective spatial structures for providing satisfaction for both customers and services providers and thus conditioning neighbourhood liveability.

4) This study is another proof for the Gehl’s (2009) postulates: it is better to concentrate than to disperse activities, it is better to attract various groups of users than to divide them. The contribution of this paper to the state-of-the-art is focused on geocoding and quantifying the preferences of customers and services providers in various settlement contexts, showing some universal regularities in perception of neighbourhood spaces despite their different backgrounds, structures and functions.

5) The presented method of visualising the attractiveness of local service centres by customers and services providers seems to be a useful and reliable tool for evaluating the physical dimension of neighbourhood liveability. However, further research is needed to verify its utility in other spatial contexts and other groups of users.

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