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

PRZESTRZENNY WYMIAR ŻYWOTNOŚCI OSIEDLA
Z PERSPEKTYWY UŻYTKOWNIKÓW I USŁUGODAWCÓW

ABSTRACT: Neighbourhood liveability is a concept reflecting the perceived living conditions in a housing area. Liveability depends, on the one hand, on the relationship between the demand and the 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 the 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 a social survey and mapping analysis conducted in 5 neighbourhoods in Poland representing big cities, medium-sized towns and suburbs. Each case study included opinions of both customers and services providers. The results show that there are particular spatial structures (streets, squares, passages) positively evaluated by each of the two groups, determining the neighbourhood liveability.

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

ABSTRAKT: 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 uwzględniał opinie klientów i usługodawców. Wyniki badań pozwalają na wskazanie elementów struktury funkcjonalno-

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-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

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 the presence of various people for various purposes, at 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 an easy access to amenities, to public spaces and public transport has a positive association with liveability.

It may be assumed therefore that liveability depends, on the one hand, on the relationship between the demand and the 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 the 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 the spatial distribution of places satisfying the needs of the two groups in various settlement settings? In order to answer these 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-sized towns and suburban areas – see the details of the research sample below) and comprised the following stages:

1) 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.

2) 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.

3) 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.

5 case studies

Services have originally developed as natural concentrations of human activity. A traditional urban neighbourhood typically consisted 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 'glocalization' 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 with large cities (Warsaw, Wrocław), through medium-sized towns (Ostrów Wielkopolski) down to suburban areas (Siechnice, Zabierzów). It is neither random nor representative in statistical terms, but offers a good insight into different locations and appeals to 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 Warsaw (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 dating 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 a 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 the 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 on the ground floor (area: ca 5 hectares). The last example
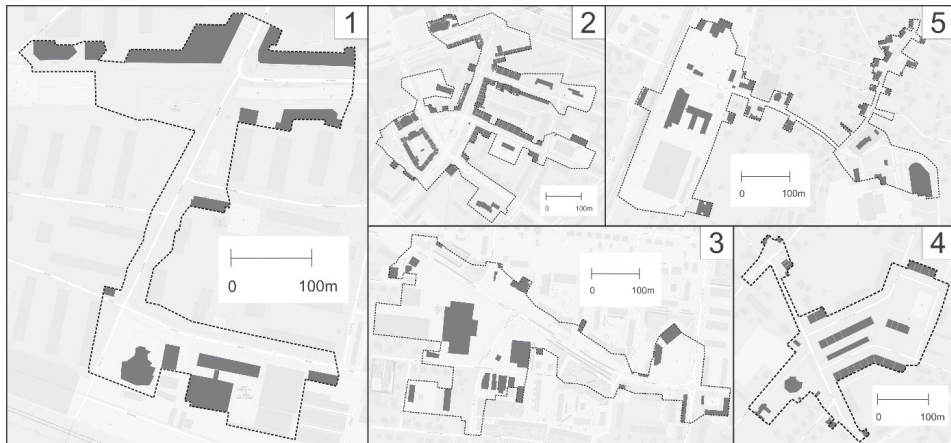

Fig. 1. Local service centres selected for the study: (1) Mołdawska Street in Warsaw, (2) Pereca Square in Wrocław, (3) Waryńskiego, Śmigielskiego and Paderewskiego streets in Ostrów Wielkopolski, (4) Rynek in Siechnice, (5) Kolejowa and Krakowska streets in Zabierzów

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

is also the newly-built (2014-2018) market square in Zabierzów (area: ca 11 hectares) with a municipality office building (Fig. 1).

Step 1: Inventory

The first task was to define the range of each local service centre within its neighbourhood. LSC borders were drawn by the buildings with services on 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 with characteristic amenities (such as a 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 the spring-summer season, on selected weekdays (usually Wednesday and Sunday), at 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	Warsaw: Mołdawska Street	161	26.1	43	24.6
	Wrocław: Pereca Square	159	25.7	58	33.1
Medium-sized 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-in 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-sized 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 visualizing

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.

Graphic 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:

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

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:

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

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

Following geocoding, a second GIS analysis was 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 the areas pointed by services providers (d_{ser}) (GIS function: *Union*) and those 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 allowed making 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 (Fig. 2). They also demonstrate significant differences in the approach of each of the stiudied groups: concentration of positive answers given by the users may be interpreted as "places of local community", where particular emotional attitudes are located (Agnew 1987). On the contrary, spatial preferences
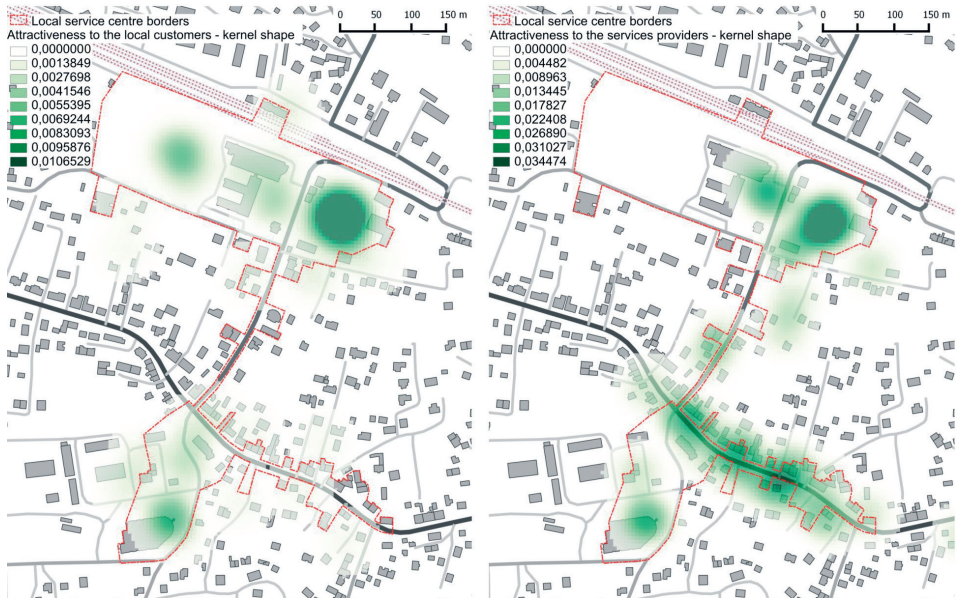

Fig. 2. Sample visualisation of answers offered by customers (left) and services providers (right) in Zabierzów local service centre

Source: authors' own research.

of services providers are based on economic characteristics, such as catchment area and market capacity land value. In theory, the two groups should meet in one place in order enable a 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 to streets and passages (Fig. 3).

Spatial preferences of services providers are characterized by two features. First, there is a visible tendency to choose areas where customers' paths cross: main crossroads 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 Wroclaw services are located mainly in Pereca Square, where places for cars are provided, not in Grabiszyńska Street, where the highest traffic load is observed. Such a car-transport dependence of services was also proved 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 other factor crucial for services providers is the existence of other amenities, especially those with long traditions. 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 the LSC in Warsaw, the street market has become 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 the LSC in Wroclaw) 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 selected by customers, there is a relatively low number of services – it seems that average users of public spaces prefer quiet and relaxing zones rather than busy concentrations of services.

Despite the differences described above, there are several commonalities in the perception of space by users and by 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, except 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 to by both groups. This observation proves the indispensable role of traditional LSC forms for neighbourhood liveability (Fig. 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		Conver-gence ratio CR
Location	Name	Either users or services providers d_{uni} [m^2]	Both users and services providers d_{uni} [m^2]	
Large cities	Warsaw: Mołdawska Street	89,922.42	16,200.00	0.18
	Wrocław: Pereca Square	39,952.12	8,526.92	0.21
Medium-sized 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 contemporary 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 5 selected neighbourhoods in Poland in order to answer the question: What physical forms are the most effective in providing quality of life and satisfying the everyday needs of citizens in urbanized neighbourhoods?

The research results presented in this paper are of a 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 in the following points:

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 to mostly public places and squares (especially those including green areas), whilst the services providers commonly indicate 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 accumulated. 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 the role that traditional forms of local service centres play in their neighbourhoods is – 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 of the aptness of 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 current studies in the field 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 dimesion of neighbourhood liveability. However, further research is needed to verify its utility in other spatial contexts and other groups of users.

Acknowledgements

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