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Exploring the transparency of street frontages in Krakow

Introduction

Public spaces are the obvious bloodstream of the city [1]–[4]. Their condition (functional, formal, technical) determines the efficient organization of life in the city. Particularly important is the proper functioning of the layout of public zones in downtown areas. Urban sprawl is changing the quantity and dynamics of movements in these spaces, which, in view of the dominance of vehicular traffic becomes an important challenge for the city's spatial policy.

Much has been written about the role of the automobile in breaking down the cohesion of the city's public spaces. The expanding arteries of vehicular transportation in transit first break up the local connections of street sequences [5] and consequently lead to the sectorization of space. The weakening of public zones has also its source in the centralization of services in large commercial complexes, which is also a consequence of car use.

Contemporary efforts to free up the public spaces of city centers for both pedestrian traffic and places of safe, social interaction in open space show many effective and successful solutions [6]. The planned balancing between vehicular, pedestrian, and bicycle traffic is carried out both through prohibitions (legal or planning regulations) and through the effective definition of functional and formal solutions [7]–[9].

It is important to see the urban space between the definition of both space and place. This distinction by i-Tuan [10, pp. 16, 23, 24, 75] between space – abstract, unknown and boundless – and place – inhabited, familiarised, with given values – leads to the possibility of defining the urban space in relation to both context and thematic scopes, more or less related to three-dimensional reality.

The idea of transparency and multiplied spatial relations draws much from the ideas of the years of modernism and is present in 20th century thinking about space. The postulated liberation of solids and their placement in free space [4], [11] was realized by modernism with the intensification of accessibility at the scale of the urban complex. A spatial attractiveness was the main motive here.

The distinction between being able to access, see or feel the space became very important [12]. This involves the negation of the traditional street [13] and its shape with the associated breakdown of the urban block, as well as an increase in the scale of built complexes using *negative space* (according to Ch. Alexander et al. terminology, [14]) like superblocks and housing estates. And this comes at the expense of the comfort of being present in the street space – the ability to have a good space orientation and a general sense of safety.

For orientation in space, the basic perceptual dimension is 6 m – this is the distance of “safety” in which a person monitors activities and decides what is comfortable for him [15]. The informational context of the detail in the direct contact space is also important [16].

Seeing the transparency of building edge in this context means both safety and comfort of urban space [17, pp. 29–35].

Street frontage transparency is rarely an element of urban law.

We can recall Stockholm or Copenhagen examples [17, pp. 29–34].

The problem of street frontage transparency also deserves attention in North America.

New Urbanism reminds us of the need for such solutions – it is necessary to open up the view of commercial spaces. The Smart Code proposes transparency of at least 70% of ground level elevations [18, pp. 28, 32]. Alex Lehnerer, in his book on grand urban rules [19], presents the case of Seattle, where since 1963 the urban code regulations have

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included arrangements for ground level transparency for downtown commercial streets [19, p. 203 ff.]. The regulations specify requirements for the continuity of service ground level, as well as the class of transparency of the ground levels of these streets. Based on these regulations, Lehnerer formulates one of 115 urban planning principles – Façade Transparency [19, p. 27]. Class I streets are 60% transparent façades, and Class II streets are 30%, with maximum blind façade lengths of 4.6 and 9.1 m, respectively. Current regulations for Seattle maintain these values [20].

In Vancouver, this ratio is higher – 75% of the commercial façade is to be transparent [21]. The standards for San Francisco [22] stipulate that the façade must be 60% transparent. This applies to heights of 1.2–2.4 m. Visibility should be provided up to 1.2 m in depth at 75% of the site area. Even greater ground level transparency (up to 90%) is proposed by Glenn Pape [23].

Concern for the condition of pedestrian public spaces seems to be increasingly appreciated and prioritized in planning strategies. This is not easy, especially in city centers, burdened by the relationships of the entire urban body and its expanding structure. The dynamics of the relationship between locality and transit still requires new arrangements in the dimension of both service and transit traffic adjustments [24, pp. 164–170]. Also, the functional content of both open spaces and volumes that serve them is constantly transforming and often, as already mentioned, weakening.

At the same time the transparency of storefronts of commercial premises is not the subject of general legal provisions in Poland.

Detailed plans [25] do not give detailed guidance on the degree of transparency of ground floor partitions although they do indicate the function of the street enclosure as commercial or residential with services. There are, however, indications concerning the preservation of historic shop fronts – both in form and size – for a part of Starowiślna Street they specify that a glazed shop window may not be larger than 70% of the ground floor elevation of the building. There is also a guideline concerning the possibility of placing advertisements – for shop windows in the Old Town (Szewska, Sienna) and for part of Królewska Street. The site cannot be covered by more than 20% (Szewska, Sienna) and 30% (Królewska, Starowiślna) of the advertising. These principles are the result of the entry into force of *Uchwała krajobrazowa – Zasady i warunki sytuowania obiektów małej architektury, tablic reklamowych i urządzeń reklamowych oraz ogrodzeń* [Landscape resolution – Principles and conditions of placing small architecture objects, billboards and advertising devices, and fences] [26] for Krakow, which came into force in 2020 and concerns, among other things, the placement of advertising. The Inventory indicated that these principles are not yet applied everywhere.

The issue addressed in this study relates to the transparency of street frontages, one of the important determinants of the relationship of the person present in the space to the elements surrounding it.

The main questions posed in the paper are:

a) how is the street frontages transparency developed on selected street sequences,

b) what is the relationship between the premises function and street frontages transparency,

c) whether the distance from the center and the nature of the movements in the street have an impact on this transparency,

d) what is the activity of the street buildings function as measured by the number of entrances to the buildings.

Materials and methods

Context of the research

The paper presents the research on the role of street frontage transparency in the public space using selected street sequences, coming radially out of the center of Krakow¹ (Fig. 1). The study presented here is a continuation of research conducted in 2018 [27].

The inventory was carried out in November and December 2022. It focused on both the amount and types of services and on the classification of premises openings.

The study shows the ground level of pedestrian zones along two different radial routes: Szewska, Karmelicka, and Królewska Streets² and Sienna with Starowiślna Streets³ (Figs. 1, 2), leading radially from the center of Krakow in two directions – northwest and southeast.

Szewska Street leading north-westwards from the Main Market Square and its radial continuation – Karmelicka and Królewska Streets – constitute the most important sequence linking the districts located on the western part of the city. Historically it was also an important direction of the city relation towards the Royal Palace in Łobzów which became the dominant westward extension of city structure.

Sienna Street leading south-eastward from the Main Market Square and its radial continuation – Starowiślna Street – constitute the most important sequence linking the districts located on the eastern part of the city. Historically it was an important direction of the city.

The selected street sequences are the only ones that lead out of the centre into the area beyond the second

¹ Krakow as a Poland's second largest city and the capital of Małopolska region is one of the most important cities of culture and science, both historically and because of its contemporary role. Being for centuries the capital of Poland, today it is one of the best developing cities in Poland – with services for business, one of the biggest railway and air transport hubs in Poland and the second largest (after Warsaw) for office space. Its Old Town is listed in the UNESCO World Heritage (1978). The core of the city is its historical zone with Wawel Hill, Okół (a medieval settlement by the Wawel) and Cracovia (chartered town from 1257, with an orthogonal grid and a spacious market square 200 × 200 m).

² Szewska Street – founded in 1257 as one of streets of Cracovia chartered city (leading to the West); its name derives from shoemakers, who lived there; until 1820 closed with Szewska Gate (Shoemakers Guild's Gate) in the fortifications (today Planty Park); Karmelicka Street – a 14th-century main street of Piasek suburb (later on Garbary) led to Szewska Gate next to the Carmelite church and monastery and leading to Czarna Wieś and Łobzów; Królewska Street – built in parts since 1924. In 1940s the Germans extended it as far as to Podchorążych Street (a German district) [28]. An end part of this street was built up after World War II.

³ Sienna Street – founded in 1257 as one of streets of Cracovia chartered city (leading to the East); Starowiślna Street – known from 16th century was prolonged in 1913 by bridge over Vistula River [28].

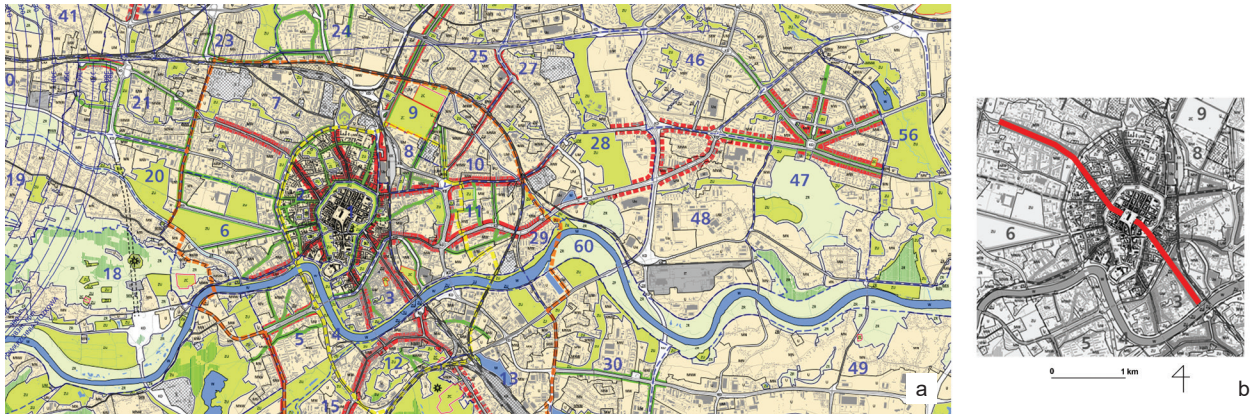


Fig. 1. Study of conditions and directions of planning development of Krakow:
a) Board K1 – Spatial Structure. Development Directions and Principles, b) diagram of the location of the surveyed streets
(elaborated by A. Kantarek based on [29])

II. 1. Studium uwarunkowań i kierunków zagospodarowania przestrzennego Krakowa: a) K1 – Struktura przestrzenna – kierunki i zasady rozwoju, b) diagram z lokalizacją badanych ulic (oprac. A. Kantarek na podstawie [29])

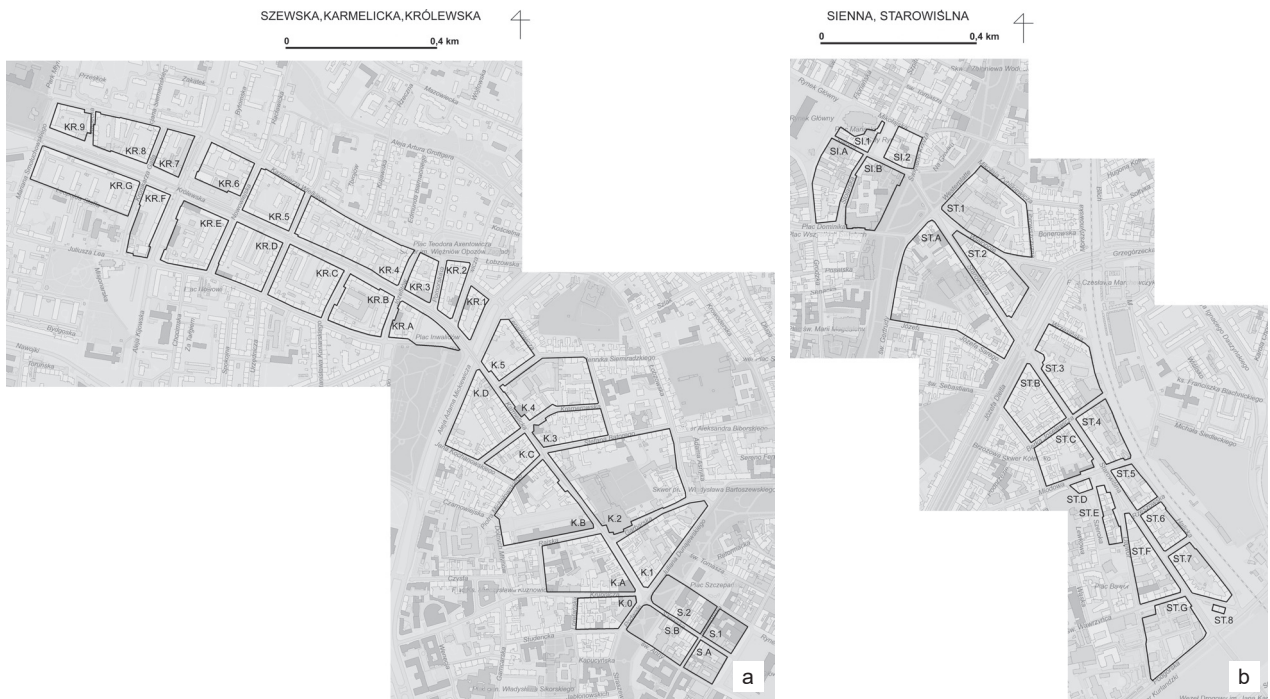


Fig. 2. An urban block structure: a) Szevska, Karmelicka, Królewska Streets – a west-north axis,
b) Sienna, Starowiślna Streets – an east-south axis (elaborated by A. Kantarek, source of the map: <https://msip.um.krakow.pl/>)

II. 2. Struktura kwartałów: a) Szevska, Karmelicka, Królewska – kierunek północno-zachodni,
b) Sienna, Starowiślna – kierunek południowo-wschodni (oprac. A. Kantarek, źródło mapy: <https://msip.um.krakow.pl/>)

traffic ring⁴ and at the same time provide a continuous, active pedestrian space with an active service ground floor level⁵.

⁴ That is, outside the ring of streets: Aleja Trzech Wieszczów, Wita Stwosza, Aleja Lubomirskiego, Aleja Powstania Warszawskiego, J. Dietla, M. Konopnickiej, Dębnicki Bridge, which partly coincide with the 2nd bypass of the City [30].

⁵ Cracow Old Town and its everyday activities as a cultural center is also a subject to a lot of research related to culture and sociology, for example [31], [32].

Methodology

The problem addressed in this study is related to the question of the state of the visual relationship between an open street space and the enclosing volume containing functions directly serving the street. In the traditional public space of city these storefronts played an important role, providing an opportunity to learn about the store's offerings and view of the interior. Those inside, in turn, allowed people to observe the street. The transparency of the storefronts is crucial here for describing the "in-out"

relationship of the public open space and the functions inside the volume. It becomes a measure of the generation and maintenance of both activity and vitality as well as safety of the public domain.

The method chosen for the research is simple and low-vectorial.

The method boils down to:

- 1) the selection of street sequences and collection of their general characteristics,
- 2) defining the degree of relationship between the premises and the street space from the point of view of transparency and the categories of functions,
- 3) measuring the degree of shop window transparency and the types of uses of services located on chosen streets,
- 4) showing the relations of types of uses and types of shop window transparency,
- 5) calculating the number of entrances to buildings,
- 6) calculating the relation between the number of transparent openings (*view into the interior*) for 100 m of each urban block frontage (*T* index).

Research and design process, data specification

The following is an elaboration of the points set out above.

Ad 1

Figure 1 shows the location of chosen streets in the center of Krakow and their radial role in the tissue.

A plan from the *Studium uwarunkowań i kierunków zagospodarowania przestrzennego Miasta Krakowa* [Study of conditions and directions of planning development of Krakow]⁶ [29] presents the development directions and principles for the city, as well as its postulated spatial structure. Respecting the dominant role of the historic city, the main shopping thoroughfares are represented and understood as radial sequences of pedestrianised public spaces structuring the city's various districts (Fig. 1, in red).

In addition, in the study's guidelines on public space and its enclosure – in the conditions included for individual urban units – the requirement is set out *To create representative public space enclosed by services in the ground levels of buildings based on the main traffic routes* [33, pp. 19, 25, 47].

The streets surveyed have different characteristics in terms of type and volume of traffic.

Szewska Street and part of Sienna Street are pedestrian zones, with limited traffic allowed for residents and deliveries (during the morning hours). Therefore, the entire width of Szewska Street (with a width of 11.6 m) and part of Sienna Street (with a width of 8.2–9.4 m) is available for pedestrians. Despite this, there is no space for greenery.

Karmelicka, Królewska and Starowiślna Streets are streets open to car traffic, with a tram line. All the streets are within the paid parking zone.

Karmelicka Street is ca. 15.5 to 22.5 m wide, with carefully designed car and pedestrian traffic zones and parking areas. The pedestrian lanes are more or less even on both sides of the street (6.5–7.00 m) with narrowings to 3 m. The street has a small amount of plantings. From Planty to Garbarska Street, there are some trees planted along the street frontage; in other sections greenery is found only where buildings are set back from the frontage line.

The width of Królewska Street varies – from ca. 30 m to over 50 m. But the part intended for car and tram traffic is constant – ca. 12.5 m. The sidewalks are of variable width with a lot of space for pedestrian traffic and greenery. Along the entire length of the street, we can find a single or double line of trees.

Starowiślna Street has two sequences with slightly different street section distribution. The first part is ca. 18.5 m wide with car/tram strip of 9 m and sidewalks 4.5–5.0 m with narrowings to 3 m.

The second part is ca. 19.0 m wide with car/tram strip of 11.5 m and with narrow sidewalks (3–4.5 m).

On several fragments on Królewska and Starowiślna sidewalks, lanes for bicycles are separated.

In both street sequences the width of the sidewalks is further restricted by the cars parked there. There are also few food gardens – 11 on each of the sequences.

Szewska, Sienna, Karmelicka and Starowiślna Streets are enclosed by tenement houses with strict street line with several withdrawals from the street line. Królewska Street presents a diverse type of enclosure, both with tenement houses as well as with free standing buildings or additional squares open to the street.

In Table 1 main urban indicators of the streets were collected – an average number of floors at the frontage and street and frontage length [in m]. The percentage of the frontages/street length were calculated.

Ad 2

Premises openings were classified as follows (Figs. 3–5):

- view into the interior,
- no insight – a blind window,
- no insight – a high ground level,
- display of goods,
- advertising with insight or display of goods,
- large format advertising.

In this study, only the first category is treated as transparency, as it not only provides an attraction to the pedestrians, but also allows interaction of visibility of both the interior from the street and the street from the interior. It is important to recall here the definition of Jan Gehl, who understands façade transparency more broadly: *Façade transparency is defined in part by glassed areas vs. closed areas, by the opportunities to look into the ground floor area, and by the integration of activities on the ground floor with the street space* [34, pp. 74, 75]. In this approach, the next distinguished categories will be transparency (*display of goods, advertising with insight or display of goods*).

The following functions were distinguished:

- banks,
- restaurants, cafes, bars, catering facilities,
- grocery, bakeries,

⁶ Study of conditions and directions of planning development [29] is the main planning tool in Poland. It has no legal status. Synthetic in character, it sets out the main strategic principles, also in the form of a spatial record, relating to the directions of development. It is not a Master Plan.

Table 1. Main urban indicators of the streets (elaborated by A. Kantarek)
 Tabela 1. Główne parametry urbanistyczne ulic (oprac. A. Kantarek)

Street	Average number of floors at the frontage	Street length [m]	Frontage length [m]	Percentage of the frontage to the street [%]
West-north direction from Krakow Main Marketplace				
Szewska	3.422	289.1	386.8/2=193.4	66.9
Urban blocks S.1, S.2	3.719	289.1	189.9	65.7
Urban blocks SA, S.B	3.125	289.1	196.9	68.1
Karmelicka	3.575	768.6	1373.5/2=686.8	89.4
Urban blocks K.1-K.5	3.512	768.6	694.4	90.3
Urban blocks K.0-K.D	3.638	768.6	679.1	88.4
Królewska	5.373	1279.9	1840.8/2=920.4	71.9
Urban blocks KR.1-KR.9	5.756	1279.9	925.2	72.3
Urban blocks KR.A-KR.G	4.989	1279.9	915.6	71.5
Total		2337.6	3601.1/2=1800.6	77.0
East-south direction from Krakow Main Marketplace				
Sienna	3.271	342.8	391.2/2=195.6	57.1
Urban blocks SI.1, KR.2	3.625	342.8	176.2	51.4
Urban blocks KR.A, KR.B	2.917	342.8	215.0	62.7
Starowiślna	4.139	1298.5	2189.1/2=1094.6	84.3
Urban blocks ST.1-ST.8	4.682	1298.5	1046.4	80.6
Urban blocks ST.A-ST.G	3.595	1298.5	1142.7	88.0
Total		1641.3	2580.3/2=1290.2	78.6

- other shops,
- other services.

Additionally, premises to let or out of use were also noted (but not calculated in the stock).

In the number of *other shops* we can find clothing, cheap clothing, vintage, shoes, pharmacy, drugstore, souvenirs, bookshops, antique shops, technical equipment, household goods, stationery, florists and in *other services* – travel agencies, theaters, watchmakers, ophthalmologists, hairdresser, beautician, tattoo studios, tailor, printing, telephone services, photographic services, offices, art galleries, workshops and co-working areas, religious facilities, libraries, educational services.

And types of entrances were differentiated as:

- entrance to premises,
- house entrance,
- entrance with car access, service path, entrance to the passage.

Ad 3

A detailed inventory for each street has been made by the degree of frontage transparency and the types of uses of services (Figs. 3, 4).

Ad 4

Figure 4 shows details of relation between types of uses and degree of windows transparency.

Ad 5

An important indicator for measuring the relationship between open spaces and the volume that defines them is the ground level quality index of building façades, defined by Gehl in a study for Melbourne [35]. The Melbourne study used a scale from A to E, depending on sev-

eral parameters. These include the number of doors and windows, the layout of features, the absence of blind and passive walls, the diversity of façade modelling, and the quality of materials and details. Thus, it is mainly a measure of the dynamics of movement between volume and open space. In this study, the Gehl index was calculated according to the number of entrances.

Here are the quantities of entries suggested by Gehl [6, p. 241] for the category:

- A – active – 15–20 doors per 100 m,
- B – friendly – 10–14 doors per 100 m,
- C – mixture – 6–10 doors per 100 m,
- D – boring – 2–5 doors per 100 m,
- E – inactive – 0–2 doors per 100 m.

Ad 6

Figure 6 shows *T* index for each urban block.

Results and findings

The following are the most important data that result from the collected inventory materials.

The average heights of buildings broken down into individual urban blocks are presented. They are, respectively, 3.4, 3.6 and 5.3 for the Szewska, Karmelicka, Królewska sequence and 3.2 and 4.1 for Sienna, Starowiślna. The height of the buildings increases with distance from the centre (Table 1).

The infill of the frontages varies on individual streets although it is similar in both sequences (77% for Szewska, Karmelicka, Królewska and 78.6% for Sienna, Starowiślna, Table 1).

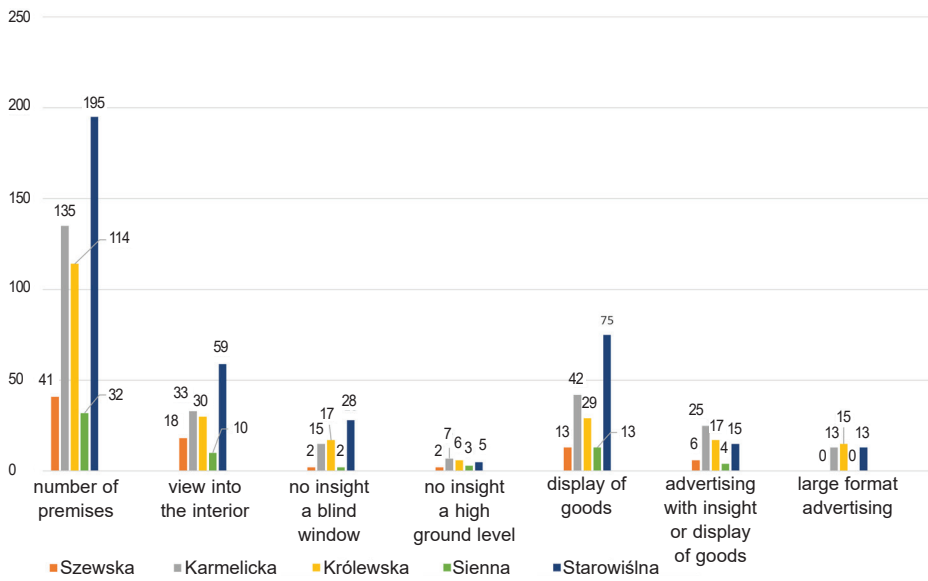


Fig. 3. Szewska, Karmelicka and Królewska, Sienna and Starowiślna Streets with the types of frontage transparency (elaborated by A. Kantarek)

II. 3. Ulice Szewska, Karmelicka and Królewska, Sienna i Starowiślna – typy przezroczystości pierzei (oprac. A. Kantarek)

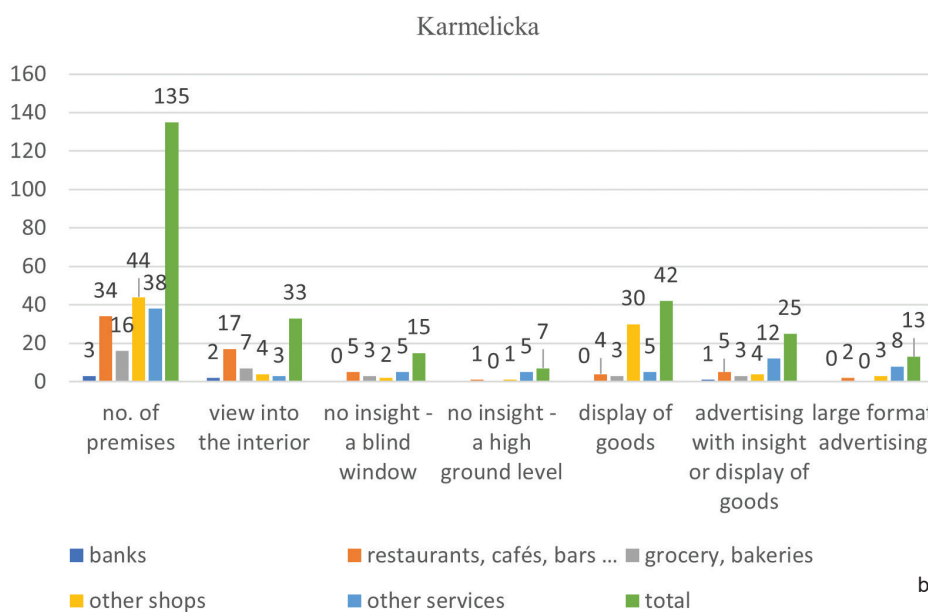
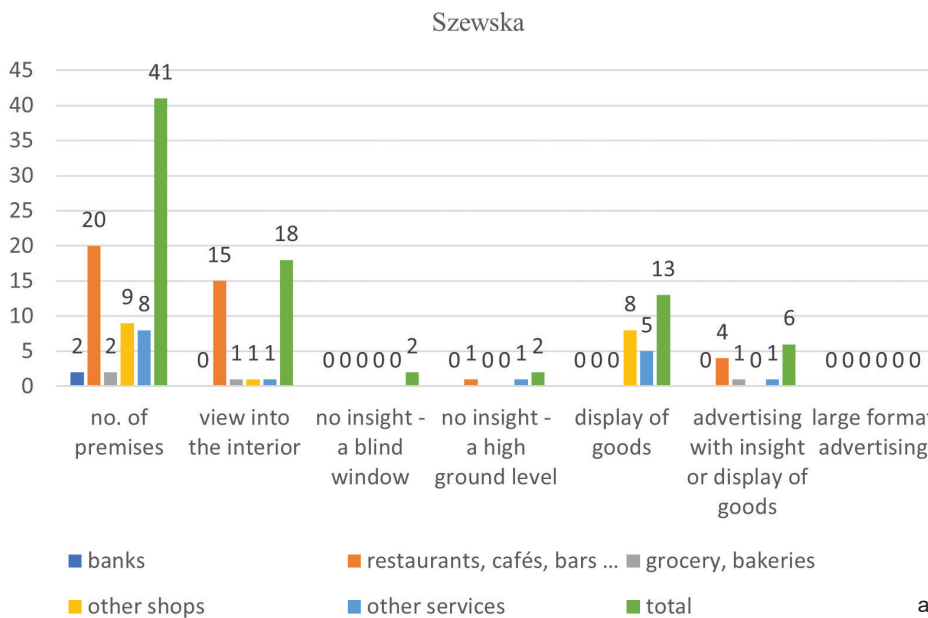


Fig. 4. The juxtaposition of functions with the types of frontage transparency: a) Szewska Street, b) Karmelicka Street, c) Królewska Street, d) Sienna Street, e) Starowiślna Street (elaborated by A. Kantarek)

II. 4. Zestawienie funkcji z rodzajami przejrzystości pierzei, ulice: a) Szewska, b) Karmelicka, c) Królewska, d) Sienna, e) Starowiślna (oprac. A. Kantarek)

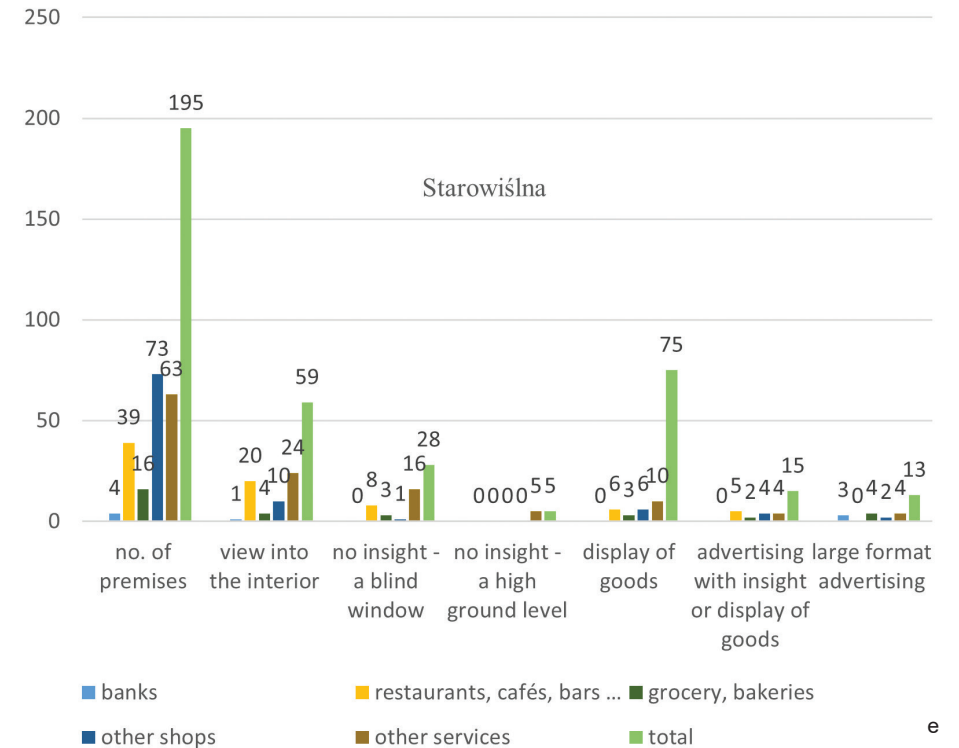
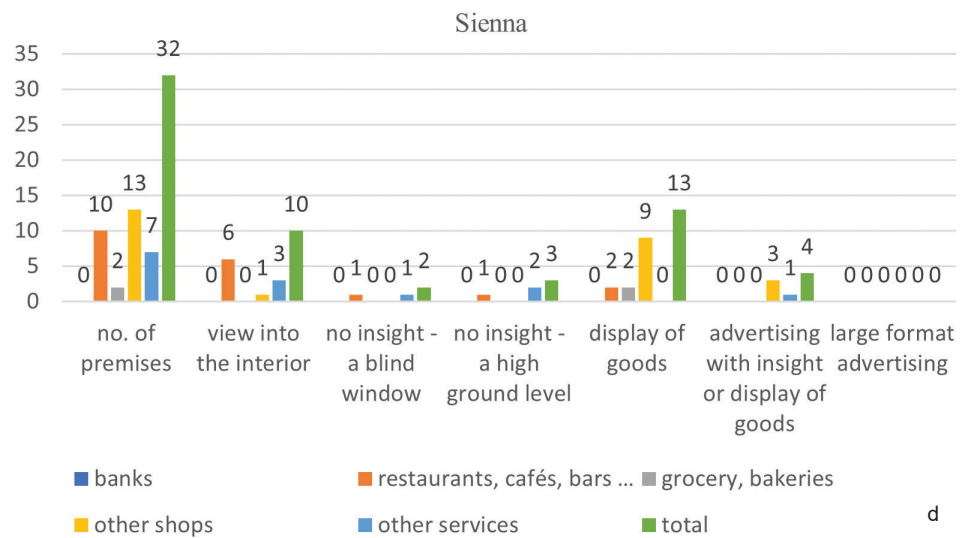
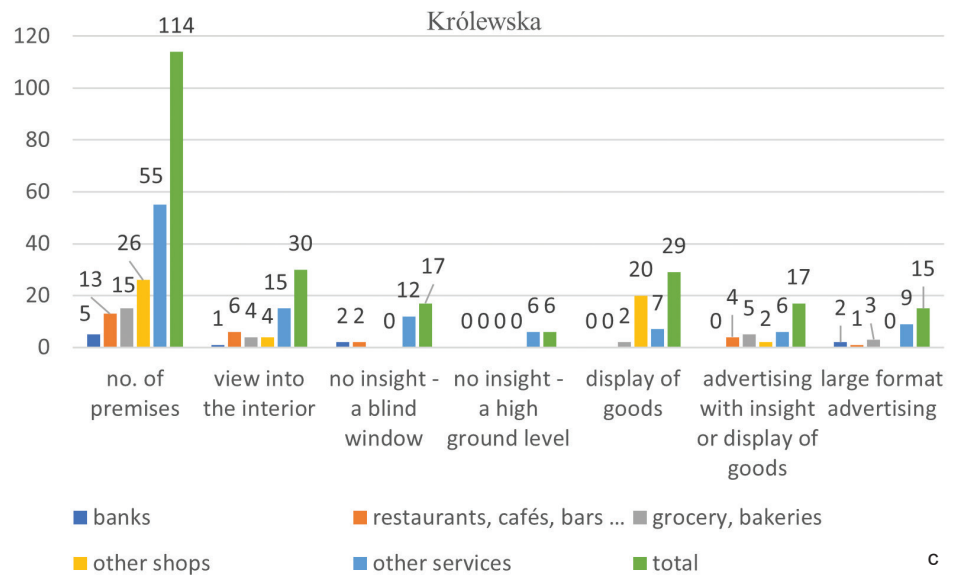


Fig. 4 cont. The juxtaposition of functions with the types of frontage transparency:
 a) Szewska Street,
 b) Karmelicka Street,
 c) Królewska Street,
 d) Sienna Street,
 e) Starowiślna Street
 (elaborated by A. Kantarek)
 II. 4 cd. Zestawienie funkcji z rodzajami przejrzystości pierzei, ulice:
 a) Szewska,
 b) Karmelicka,
 c) Królewska,
 d) Sienna,
 e) Starowiślna
 (oprac. A. Kantarek)

Table 2. Number of service premises along selected streets (elaborated by A. Kantarek)
Tabela 2. Liczba usług na badanych ulicach (oprac. A. Kantarek)

Street	No. of premises north	No. of premises south	No. of premises total	No. of premises to let or out of use, north	No. of premises to let or out of use, south	No. of premises to let or out of use, total
Szewska	19	22	41	4	1	5
Karmelicka	72	63	135	5	20	25
Królewska	51	63	114	2	8	10
Total	142	148	290	11	29	40 (12% of all)
Sienna	9	23	32	0	2	2
Starowiślna	109	86	195	10	21	31
Total	118	109	227	10	23	33 (13% of all premises)

Table 3. Street characteristics – the most frequent uses and types of frontage transparency (elaborated by A. Kantarek)
Tabela 3. Charakterystyka ulicy – najczęstsze zastosowania i rodzaje przejrzystości pierzei (oprac. A. Kantarek)

Street	1	The most frequent type of uses		1	The most frequent type of frontage transparency	
		type	[%]		type	[%]
Szewska	2	1. restaurants, cafés, bars ...	48.8	2	1. view into the interior	43.9
					2. display of goods	31.7
Karmelicka		1. other shops	32.6		1. display of goods	31.1
		2. other services	28.2		2. view into the interior	24.4
		3. restaurants, cafés, bars ...	25.2		1. view into the interior	26.3
Królewska		1. other services	48.3		2. display of goods	25.5
Total	3	1. other services	34.8	3	1. display of goods	29.0
		2. other shops	27.2		2. view into the interior	27.9
		3. restaurants, cafés, bars ...	23.1			
Sienna	4	1. other shops	40.6	4	1. display of goods	40.6
		2. restaurants, cafés, bars ...	31.3		2. view into the interior	31.3
Starowiślna		1. other shops	37.4		1. display of goods	38.5
		2. other services	32.3		2. view into the interior	30.3
Total	5	a. other shops	37.9	5	1. display of goods	38.8
		b. other services	30.8		2. view into the interior	30.4
		c. restaurants, cafés, bars ...	21.6			

Both street sequences contain a similar number of premises – 290 for Szewska, Karmelicka, Królewska and 227 for Sienna, Starowiślna (Table 2).

The number of premises closed – to let or out of use – was also counted. Their number on both sequences of streets is similar – 12–13% (Table 2).

Also similar for both sequences is the intensity of premises distribution measured in the number of running metres of street frontages on one premise (12.4 and 11.4, respectively).

In Figure 3 and Table 3 the number of premises is presented with a breakdown by type of premises openings.

In the sequence Szewska, Karmelicka, Królewska *view into the interior* constitutes 27.9% of premises and in the sequence Sienna, Starowiślna – 30.4%.

However, the largest number of premises is *the display of goods* category with amounts to 29% and 38.8% respectively.

Table 3 sums up the most frequent uses and premises openings categories on given streets.

Figure 6 shows an important result of the research – the distribution of transparent premises openings by street urban blocks.

The presented material provides answers to the questions posed in the final part of *Introduction*.

How is the street frontages transparency developed on selected street sequences?

Of the presented categories (*view into the interior; no insight – a blind window, no insight – a high ground level, display of goods, advertising with insight or display of goods and large format advertising*) only *view into the interior* is considered transparent.

The number of such openings is calculated in relation to the total number of premises and in relation to the length of the street (the urban block) (*T* index).

In the first case the number of premises with *view into the interior* is second after *display of goods* and is similar on both street sequences – 27.9% for Szewska, Karmelicka,



Fig. 5. Examples of types of shop windows: a) view into the interior, b) no insight – a blind window, c) no insight – a high ground level, d) display of goods, e) advertising with insight or display of goods, f) large format advertising (photo by A. Kantarek)

Il. 5. Przykłady typów witryn: a) wgląd do wnętrza, b) brak wglądu – ślepa witryna, c) brak wglądu – wysoki parter, d) wystawa towaru, e) reklama z wglądem do wnętrza lub wystawą towaru, f) reklama wielkoformatowa (fot. A. Kantarek)

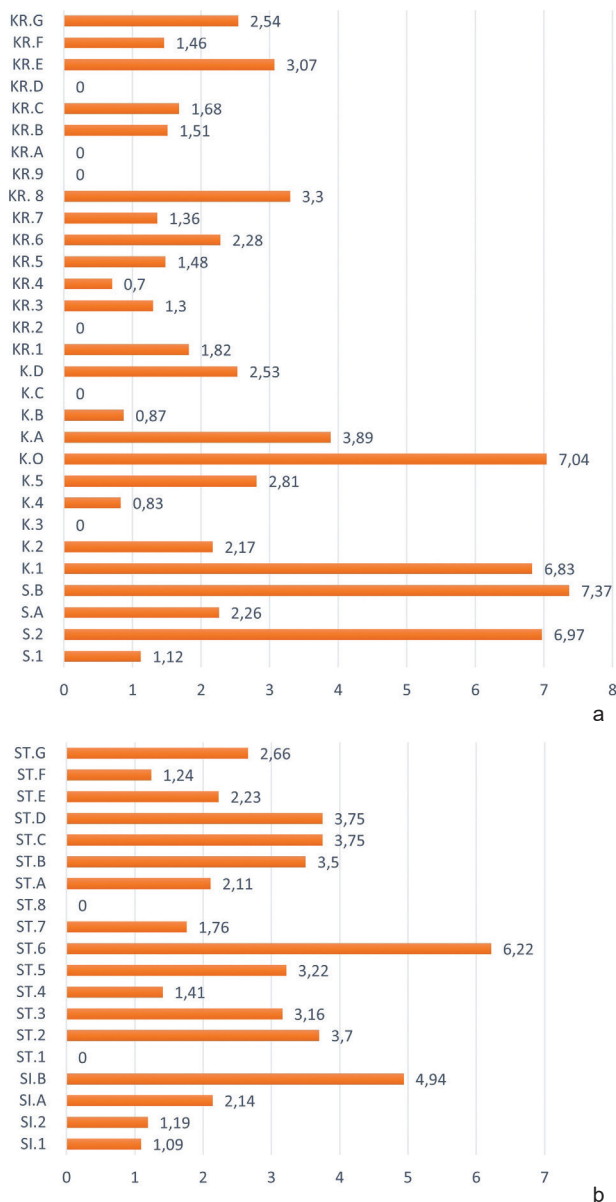


Fig. 6. *T* index – the distribution of transparent openings by urban blocks (view into the interior, premises/100 m):
 a) Szewska, Karmelicka, Królewska Streets,
 b) Sienna, Starowińska Streets (elaborated by A. Kantarek)

II. 6. *T* index – rozkład otworów transparentnych w blokach miejskich (wgląd do wewnątrz, lokal/100 m),
 ulice: a) Szewska, Karmelicka, Królewska,
 b) Sienna, Starowińska (oprac. A. Kantarek)

Królewska and 30.4% for Sienna and Starowińska. The maximum rate is reached on Szewska Street – 43.9% (Table 3).

In the second calculation the index *T* is shown for each urban block frontage with reference to its length (number of units/100 m). The results are presented in Figure 6.

What is the relationship between the premises function and street frontages transparency?

As it is seen in Figure 4 and Table 3 the biggest number of premises with transparent frontage is *restaurants, cafes, bars, catering facilities* for Szewska, Karmelicka, Królewska

sequence (38 premises for 81 total) and *other services* for Sienna, Starowińska sequence (27 premises for 69 total). Here *restaurants, cafes, bars, catering facilities* category is on the second position with 26 premises for 69 total.

Whether the distance from the center has an impact on this transparency?

When the distance is measured with accuracy to the streets in sequences studied and related to the whole number of premises, the percentage of services with full transparency varies depending on the distance from the centre. For the sequence of Szewska, Karmelicka, Królewska it is 43.9%, 24.4% and 26.3%, respectively, i.e. for Szewska it is significantly higher than for the other streets.

For the Sienna and Starowińska Streets sequence, we also see a reduction, but a slight one – 31.3% and 30.3%, respectively.

A breakdown of data by street urban blocks shows that on Sienna and Starowińska sequence a reduction is evenly distributed, while on Szewska, Karmelicka and Królewska sequence we see concentrations at the beginning of Karmelicka Street and at the end of Królewska Street.

The conclusion is that distance from the city center has an impact on the percentage of services with a transparent site, although it varies in both sequences.

When we consider the *T* index, relating the number of transparent openings to the length of the urban block (transparent premises / 100 m), we can see a much larger variation. Figure 6 shows the differences in the distribution by urban blocks.

What is the activity of the street buildings function as measured by the number of entrances to the buildings?

The sequences of streets studied here are important in creating an active public space connecting the city with its downtown districts. A summary of street activity is measured here by the Gehl index [6]. It was compiled in relation to the number of entrances on each street section. The total index for both street routes is B and it is not affected by the distance from the center and varies for individual street block sections.

It is also interesting to mention some additional findings of the inventory (Fig. 4, Table 3).

Szewska Street is dominated by *catering functions* (48.8%). 75% of catering functions has *view into the interior*.

In Karmelicka Street *other shops* (non-grocery) are the most common function (32.6%). The type of frontage transparency most common in these shops is *display of goods* (69.8%).

In Królewska Street the largest group of premises are *other services* (48.3%) and the most common type of frontage transparency in this services is *view into interior* (27.3%).

In summary the north-west sequence of streets is dominated by other services (34.8%).

Sienna Street is dominated by catering functions (31.0%). 60% of catering functions has *view into the interior*.

In Starowińska Street *other shops* (non-grocery) are the most common function (37.4%). The type of frontage transparency most common in these shops is *display of goods* (76.7%).

In Sienna and Starowińska Streets sequence the most common functions are *other shops* (37.9%).

An important characteristic of the streets is the occurrence of premises out of use (for rent, under renovation). They account for 12–13% of the number of premises.

Discussion

The discussion covers topics from main thematic areas – state of research, planning regulations and trends in urbanism.

It should be noted that the criteria adopted in the study narrow the concept of transparency to situations where the interior-street relationship is possible from the user's point of view and a glass window is not obscured by a display of goods or advertising. It is not used in other research. Such studies have not been popularised to date with the exception of earlier studies of the sequence of Szewska, Karmelicka, Królewska streets which was the subject of a study in 2018/2019 [27] done by the author of this research. The number of premises was smaller then – 260 to 290 as it is now. *View into the interior* was then concerned with 20% of frontages with the most for *restaurants, cafes, bars, catering facilities* (59% of 20%). Interestingly, *view into the interior* was only in third place after *display of goods* (37%) and *large format advertising* (25%).

We also see a similar approach to frontage transparency in the already cited regulations of selected North American and Scandinavian cities [18]–[22].

In the majority of studies, transparency is considered more broadly, as a lack of full barrier in relation to the ground floor volume. The already quoted Gehl, in some of his works, defines transparency more broadly [34], [17]. The transparency is also mentioned when researching public spaces in relation to eye level research [17].

While talking about the role and the power of legal documents we have to remember that *Studium uwarunkowań i kierunków zagospodarowania przestrzennego Miasta Krakowa* guidelines [29] underlines the crucial role of selected street sequences in terms of linking the City of Krakow (Old Town) with the inner-city districts located to the west (Krowodrza, Bronowice) and to the east of the (Downtown,

Podgórze). This applies to both cars, trams, and pedestrian traffic. They also fulfil an ordering and powering role in local transverse relations, providing the active pedestrian zone. At the same time the range of services is created spontaneously both in response to demand and according to the possibilities of investors and property owners.

A new act – *Uchwała krajobrazowa* [26] is an opportunity to improve the situation from the point of view of reducing advertising spaces in the city space, which may involve an increase in transparent surfaces.

Conclusions

The research carried out was intended to check to what extent the ground level premises of the observed streets are transparent in relation to the space of the street itself. This transparency is understood as basis for easy contact regarding the uses of the proposed services and goods, but also an additional attraction for both the open space of the street and the interiors. It is also important for users' sense of safety.

The analysis has shown that the transparency of shop windows is not very developed and does not even cover half of the premises in the streets surveyed. Opportunities for visual contact are therefore limited.

The study has shown that the highest number of transparent shop windows is associated with catering functions.

It is also found that the distance from the centre has an impact on this transparency. The percentage of premises with a transparent opening decreases with distance from the centre, although it varies in the two sequences. *T* index, introduced in the research, shows the more detailed relation of transparency distribution.

In addition, to broaden the characterisation of the streets, the activity of frontages was examined according to the Gehl index as measured by the number of entrances to the buildings. It came out that the index is B.

The above research can be used to formulate legislative recommendations for new development plans. A proposal for Krakow, for example, would be the principle of maintaining transparency in the range of 0.9–2.4 m in height with 100% of the window area for catering functions and 50% for others. This allows transparency to be combined with other forms of openings (display of goods, advertising).

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Abstract

Exploring the transparency of street frontages in Krakow

The ground floor activities that define the street space play a key role both in traditional and contemporary public space. They provide an inward and outward relationship and contribute to both liveliness of the street and a sense of security. Thus, frontage transparency is crucial for the relationship between the open public space and the internal functions at the edge of the street, as well as for the production and maintenance of a vital public domain.

This paper summarises the results of a study on the transparency of street frontages in public space using selected sequences of radial streets in Krakow as an example.

The research measures building front transparency in two radial sequences of streets coming from Krakow's inner city, using inventory of a shop window in two categories – degree of windows transparency and premises uses.

The study reveals the basic characteristics of the street frontage transparency and the functional preferences of its degrees.

Key words: street frontage transparency, public space, streetscape, urban design, Krakow

Streszczenie

Badanie przejrzystości pierzei ulicznych w Krakowie

Różne rodzaje aktywności w parterach budynków definiujących przestrzeń ulicy odgrywają kluczową rolę zarówno w tradycyjnej, jak i współczesnej strefie publicznej. Zapewniają relację do wewnątrz i na zewnątrz oraz przyczyniają się zarówno do ożywienia ulicy, jak i do poczucia bezpieczeństwa. Przejrzystość pierzei ma zatem kluczowe znaczenie dla relacji między otwartą przestrzenią publiczną a funkcjami wewnętrznymi na krawędzi ulicy, a także dla tworzenia i utrzymywania żywej domeny publicznej.

W niniejszym artykule podsumowano wyniki badania przejrzystości pierzei ulicznych w przestrzeni publicznej na przykładzie wybranych ciągów ulic w Krakowie. W badaniu dokonano pomiaru transparentności frontów budynków w dwóch radialnych ciągach ulic wychodzących ze ścisłego centrum Krakowa, wykorzystując inwentaryzację witryn sklepowych w dwóch kategoriach – stopnia transparentności witryn oraz przeznaczenia lokali.

Badania ukazują podstawowe cechy przejrzystości pierzei ulicznej i preferencje funkcjonalne różnych jej rodzajów.

Słowa kluczowe: przejrzystość pierzei ulicznych, przestrzeń publiczna, krajobraz ulicy, projektowanie urbanistyczne, Kraków