

Perceived intra-urban centrality in Kyiv: The student perspective

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ABSTRACT

This article explores intra-urban perceived centrality in Kyiv, Ukraine's capital, investigating its relationships with the selected non-perceptual measures of centrality. Using a three-stage survey of 141 students, the study examines how respondents delineate the city center's boundaries, which locations they perceive as central, and how they use and experience the space of the city center. The findings reveal both overlaps and discrepancies between contour-derived and location-based intra-urban centrality. The Dnieper River, railways, and major highways serve as strong spatial referents of the center's boundary, while the main city street and square together with certain traditional historic neighborhoods anchor the perceived city center. At the same time, functional load, landmark value, and personal experiential factors significantly shape perceptions, creating local spikes and dips of centrality. Respondents emphasize not so much individual monuments as the broader historic environment and atmosphere of the city center, with walking and *flânerie* as dominant practices. The results highlight tensions between heritage preservation and aggressive commercialization, as well as the underutilized potential of the Dnieper waterfront in the Ukrainian capital. The main contribution of the study lies in underscoring perceived intra-urban centrality as a multidimensional and fluid social construct, shaped by history, functions, symbolism, and everyday social practices, which can be operationalized by urban planners.

KEYWORDS

city center perception; intra-urban centrality; post-socialist urban transformation; perception-based mapping; Kyiv

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1. Introduction

The concept of centrality is one of the key notions in human geography. The study of center-periphery relations contributes to a deeper understanding of the historical development of countries, regions, and cities. Classical geographical theories revealed the essence of the dichotomous notions of center and periphery (Christaller 1966; Friedmann 1966). Cities represent a vivid manifestation and the quintessence of the concept of centrality (Bird 1977; Lefebvre 2003), yet within cities there are also central areas with their own unique characteristics and functions: political, economic, transport, social, and symbolic (Batty 2008; Thurstain-Goodwin and Unwin 2000). Accelerated urbanization, city expansion, the development of information technologies, and urban digitalization call for a rethinking of both the essence and significance of the center for the city and its inhabitants, as well as approaches to its study, the identification of new meanings, and its delineation (Helbrecht and Dirksmeier 2012; Sun et al. 2016; Wurm et al. 2021). The functions performed by the city center are rapidly changing and acquiring new, specific features. For instance, scholars have focused on its residential (Tallon and Bromley 2004), commercial (Karayalcin and Yilmazkuday 2015), and transport (Simpson 2021) functions.

The centers of post-Soviet cities were for a long time controlled by the central authorities and primarily served as the location for buildings of local administrations, government, parliament, and other power structures, as well as the venue for parades, demonstrations, and other mass events (Mezentsev et al. 2023). The planning structure of cities, especially those with capital status, was subordinated to this function, while historical monuments were often demolished (Kostiuchok 2013). The current state of the central parts of post-Soviet cities is debated both in academic literature, particularly in architectural and urban planning studies (Oliinyk 2021), and in public discussions led by civic activists and local historians who criticize urban development and reconstruction plans.

Kyiv, the capital of Ukraine, offers a promising case for studying the contemporary city center. First, it lacks a single coherent architectural ensemble of a city center, leaving its spatial form, morphology and functions open to debate and reconstruction. Second, as the national capital, Kyiv hosts numerous functions that, to varying degrees, gravitate toward the center. This increases the concentration of economic and social activity within a rather large area around the city's key central streets and squares. The commercialization and uncontrolled character of changes heighten the need for research (Cybrivskyi 2014; Mezentseva 2017; Dronova and Maruniak 2019). Third, the Revolution of Dignity and Russia's full-scale invasion since 2022 have significantly reshaped the

center through new memorials, commemorative sites, and exhibitions (Gentile 2025).

Thus, the aim of this study was to identify the perceived city center of Kyiv and delineate it according to aggregated individual perceptions based on the survey results. The research questions were the following:

1. In what ways does the perceived city center relate to various forms and indicators of centrality, and what are the reasons behind the coincidences and mismatches?
2. Does the definition of the perceived city center differ when it is understood as a continuous territory (an urban district) versus as a set of individual locations with their own characteristics, such as historicity, functions, etc., and why does this happen?
3. What kinds of places, social practices and functions are associated with the city center?

Various factors may shape how residents and visitors perceive the city center. Our hypothesis is that, despite the multifunctionality and ambiguity, a shared image emerges in people's perceptions, much like the image of the city as a whole (Lynch 1960). This perceived center should reflect local knowledge, personal experience, expectations and emotions (Deng et al. 2021). At the same time, it should be anchored in material structures that mark boundaries, such as old city walls, in landmarks of historical or symbolic, and in places performing specific functions, including commercial, recreational, entertainment sites, etc.

2. Theoretical aspects of intra-urban centrality

When studying the spatial development of a city, it is impossible to avoid analyzing center-periphery relationships, with particular attention given to the central part with its undeniable advantages. However, definition of a certain urban area as a central or peripheral often is ambiguous: intra-urban centrality may be associated with a variety of specific urban functions, morphological and topological features (Bird 1977; Sun et al. 2016; Wurm et al. 2021). When determining the spatial limits of the center from the perspective of a researcher, urban planner or ordinary city resident, one or several approaches or criteria for evaluating the degree of centrality of a given urban area may be used, either consciously or, in case of ordinary people, subconsciously.

First, the city center may be understood either geometrically or in terms of networks. Geometrically, it corresponds to the city's centroid or the barycenter of a specific distribution, such as population or built environment. In network terms, it is the most central node of the transport graph, the point of best accessibility, measured by centrality indices (Crucitti et al. 2006). Both are abstract models of centrality (van

Meeteren 2021), and their variety leads to multiple possible centers. Depending on criteria such as density, diversity, design, destinations, distance, demand management, or urban planning concept, different areas of the same city may be defined as central (Natalia and Heinrichs 2019). Nevertheless, better accessibility is considered to be the key advantage of the central position, which facilitates business activities, urban development management, and contributes to the formation of urban identity and city branding (Sun et al. 2016; Li et al. 2017; Simpson 2021). The corresponding economic and social effects of locating in the center are thoroughly described in classical geographic theories, primarily Central Place Theory (Christaller 1966), the center-periphery theory (Friedmann 1966), and related works (van Meeteren 2021).

Second, the city center can be considered as a historical category (Deng et al. 2021), which in turn reinforces the importance of historic city centers as spaces of aesthetic and cultural consumption (Henriques 2022). Centrality may function as a synonym for antiquity, historicity, a place “from which everything began”. From this perspective, the center can be viewed as either a specific point location or a significant spatial core from which the city’s development chronologically originated: a territory formerly protected by city walls, a central market square, a palace, a church, or another landmark (Bird 1977). Identifying a city’s historical center depends on the presence of material evidence in the urban landscape that reflects antiquity and cultural value, such as monuments and historic buildings. Throughout different historical stages of development, older cities may face challenges in expanding their core in line with new technological conditions, which can lead to the emergence of new centers corresponding to the development of new urban functions (Bird 1977; Miranda et al. 2020). Thus, a city may have multiple historical centers.

Third, centrality can also serve as a synonym for power, governance, or authority, primarily political power. Associating the city center with a power core is one of the oldest concepts, since the administrative function has been one of the key city-shaping functions since antiquity (Nooraddin 2016). Accordingly, the city center can be identified with hubs of concentrated administrative and religious institutions at the urban level, and if the city holds the status of a regional administrative center or national capital, then also at the regional or national level.

Fourth, centrality has traditionally been associated with a business function as well. From this perspective, the center serves as a source of the city’s economic growth – a locus of office complexes, including the headquarters of leading companies, banking and financial institutions that exert significant influence on financial and economic policy, as well as major establishments of commerce and entertainment, particularly shopping malls. In North American cities, business centers are known as Central Business

Districts (CBDs). Such business districts function as symbols of urban economic growth, associated with ideas of progress, modernity, and prosperity. Their delimitation typically takes into account criteria such as the magnitude of land rent, building height, and traffic flows (Murphy and Vance 1954).

Fifth, the city center can also be understood as a locus of events and communication (Mitković and Branković 2004). Centrality can be associated with a place of high social activity, where “something is always happening” or where “something important” for the urban community takes place. Centers are the sites of mass gatherings – celebrations, concerts, presentations, civil and military parades and demonstrations, but also contestations, protests and revolutions. These moments, whether festive or tragic, strongly shape the emotional perception of centrality. Participation fosters communication and exchange of ideas, reinforcing the center as a space of interaction. Cultural events may even temporarily shift centrality to peripheral areas (Michel 2024).

Sixth, symbolic landmarks, streets, and squares often define and embody the city center, shaping city identity, image, and branding. Iconic examples include the Statue of Liberty, Fifth Avenue, Wall Street, and Broadway in New York. Most cities worldwide have a historically established and widely recognized “main” street or square, often though not always hosting city administration. Such status may not be formally designated but is firmly embedded in public consciousness, sometimes even in the street’s name. In some cases, central districts are formally defined (for example, Śródmieście in Warsaw or Mitte in Berlin), reinforcing symbolic centrality.

Ultimately, city center may be perceived not as a place of concentration or dominance of a single function, but rather as a multifunctional hub, a space where multiple functions intersect (Burgess 1925/1967). From this perspective, centrality is defined primarily through multifunctionality, while mono-functional urban districts cannot claim the role of a center. Due to the highest possible concentration of diverse functions, the center is characterized by the most intensive use of urban space. In historical and touristic cities, this often manifests as the geographical proximity of administrative and historical centers, where key symbolic landmarks, as well as “main” streets and squares are typically located (Sun et al. 2016). A generalized model of intra-urban centrality includes religious and administrative buildings, the inner/historic city, transport hubs, the business district, workplaces around it, and commercial establishments (Bird 1977), thereby ensuring the political, economic, administrative, and social functions of the center.

Under the influence of industrialization, accelerated urbanization, and globalization, city centers and the mere essence of urban centrality began to change rapidly (Helbrecht and Dirksmeier 2012). The set of functions inherent to the city center has shifted; in

some cities it has remained singular, while in others the phenomenon of polycentricity can be observed (Harris and Ullman 1945; Zhu et al. 2024). The increased concentration of human activity leads to a reassessment of the advantages and disadvantages of centrality. Many city centers are noisy, polluted, and face problems such as congestion and excessive touristification (Gusman et al. 2019; Foronda Robles et al. 2025). In historic towns, subcenters are emerging as a town grows and the historic center co-evolving with the entire urban area and surrounding urban centralities; the rise of centralities testifies to the vitality of the town (Miranda et al. 2020). On the other hand, deindustrialization and revitalization of central urban areas create a new form of centrality (Helbrecht and Dirksmeier 2012), which imposes new demands on architecture and the organization of public spaces.

Thus, centrality, which for many centuries was based on economic rationale and could be described using geometric models, is increasingly imbued with social meaning. A unique social space is produced in the city center (Lefebvre, 1974/1991, 2003). Cities seek a balance between designating the center for tourists or for residents, combining historical value with modern design and architecture (Gusman et al. 2019). These processes underscore the importance of involving residents in identifying and delineating the spatial boundaries of the city center and shaping its future development trajectories.

The spatially-referenced image of intra-urban perceived centrality and, more specifically, perceived city centre embodies via cognitive or mental maps – selective mental representations of spatial physical structures of a city center and meanings (emotions, senses, values, activities, etc.) associated with them (Gould 1966; Gould and White 1974; Nasar 1990). Visualizing such maps, people typically emphasize symbolic landmarks, key streets and squares, familiar routes, and areas of concentrated everyday practices, while omitting or simplifying less meaningful spaces. Boundaries of the center, similar to the other vernacular urban districts, may appear as blurred, irregular, or fragmented rather than fixed, reflecting personal experience, cultural narratives, and functional use of space (Lynch 1960; Appleyard 1970). In this way, mental maps reveal both the spatial structure and the subjective, experiential dimension of how the city center is understood and lived.

3. Characteristics of Kyiv in the context of the city center perception

In this section, we briefly describe key features and landmarks in Kyiv that are important for understanding the geographical context of the study and its results (Fig. 1).

From a historical perspective, the city center can be seen as either the city's oldest neighborhoods or

the location of its historic built environment. Until the early 19th century, Kyiv lacked a single center and consisted of three distinct parts (Diomin and Oliinyk 2022): (1) Verkhnie Misto / Saryi Kyiv [Upper City / Old Kyiv], the political and religious core since Kyivan Rus, home to princely palaces, the Church of the Tithes, Saint Sophia Cathedral, and St. Michael's Monastery; (2) Podil, which developed as a crafts-and-trade district, later industrializing around the Dnieper port; (3) Pechersk, centered on the princely settlement of Berestove and the Kyiv-Pechersk Lavra, later a fortified and administrative city hearth. These areas are most often described in scholarship (Vecherskyi 2012; Oliinyk 2021) and media as Kyiv's historical neighborhoods. Yet their combined boundaries do not fully coincide with the limits of the "historical" built environment (up to 1918): historic buildings also exist beyond them, while some of their parts contain modern development (LUN Misto n.d.b; Sliudikova 2009).

Kyiv's Khreshchatyk and Maidan Nezalezhnosti are widely recognized as the city's main street and square, respectively, symbolizing the highest concentration of centrality, which also extends to adjacent areas (Bondar 2018). Considering Khreshchatyk and Maidan Nezalezhnosti as the absolute center of Kyiv, the centrality of other locations can be assessed based on their distance from them. Yet this was not always so: in the late 18th century Khreshchatyk remained undeveloped. Architect Andriy Melenskyi foresaw its potential to connect Kyiv's three main historic neighborhoods – Verkhnie Misto, Podil, and Pechersk – and during the 19th century it gradually became prestigious and well-accessible (Stebletska 2014). By the mid-19th century, with the relocation of the city council and other administrative and commercial institutions, Khreshchatyk was firmly established as Kyiv's main street. The same considerations apply to the gradual rise of the present-day Maidan Nezalezhnosti, one of the key focal points along the Khreshchatyk linear axis, as the main square of Kyiv and a nation. The role of Khreshchatyk and, especially, Maidan Nezalezhnosti as the symbolic center was further strengthened after the events of the Orange Revolution in 2004 and the Revolution of Dignity in 2013–2014.

If the city center is viewed as a concentration of specific functions, three main aspects emerge: tourist, administrative, and commercial-business. Tourist activity largely aligns with Kyiv's historical built-up area, mainly on the high right-bank plateau, where tall landmarks shape the city's panorama, including Kyiv-Pechersk Lavra, St. Michael's Monastery, St. Andrew's Church, Vydubychi Monastery, and the River Station. The Motherland Monument (1981) and Independence Monument (2001) further define the cityscape. Administratively, Khreshchatyk hosts the city council, while the Government Quarter in Pechersk concentrates national authorities, giving

the area a “power center” status; the journalistic expression “Pechersk Hills” is used as a synonym for national political authorities. Commercially, shopping malls and offices have developed primarily in the historical center, key urban nodes near metro stations, and revitalized former industrial areas, but are scarce in poorly connected districts, especially on the left bank (Dronova and Polieshko 2017; Mezentsev and Mezentseva 2017; Mezentseva 2017; Bykova and Shchabelska 2022). Consequently, Kyiv’s commercial-business center overlaps largely with the historical center but extends beyond it, forming a diffuse network of hubs potentially perceived as having elevated centrality.

The Dnieper River also shapes Kyiv’s intra-urban centrality. While historically a vital factor in the city’s development, it also functions as its main internal barrier due to limited bridges and rapid transit connections. The right bank, where Kyiv originated, concentrates historical landmarks, business districts, and state institutions, reinforcing its image as the prestigious and “central” side. By contrast, the left bank, developed intensively only from the mid-20th century, is dominated by large housing estates and industrial zones. Often perceived as a “bedroom community” with poor accessibility, it remains widely regarded as peripheral rather than central (Gnatiuk et al. 2023).

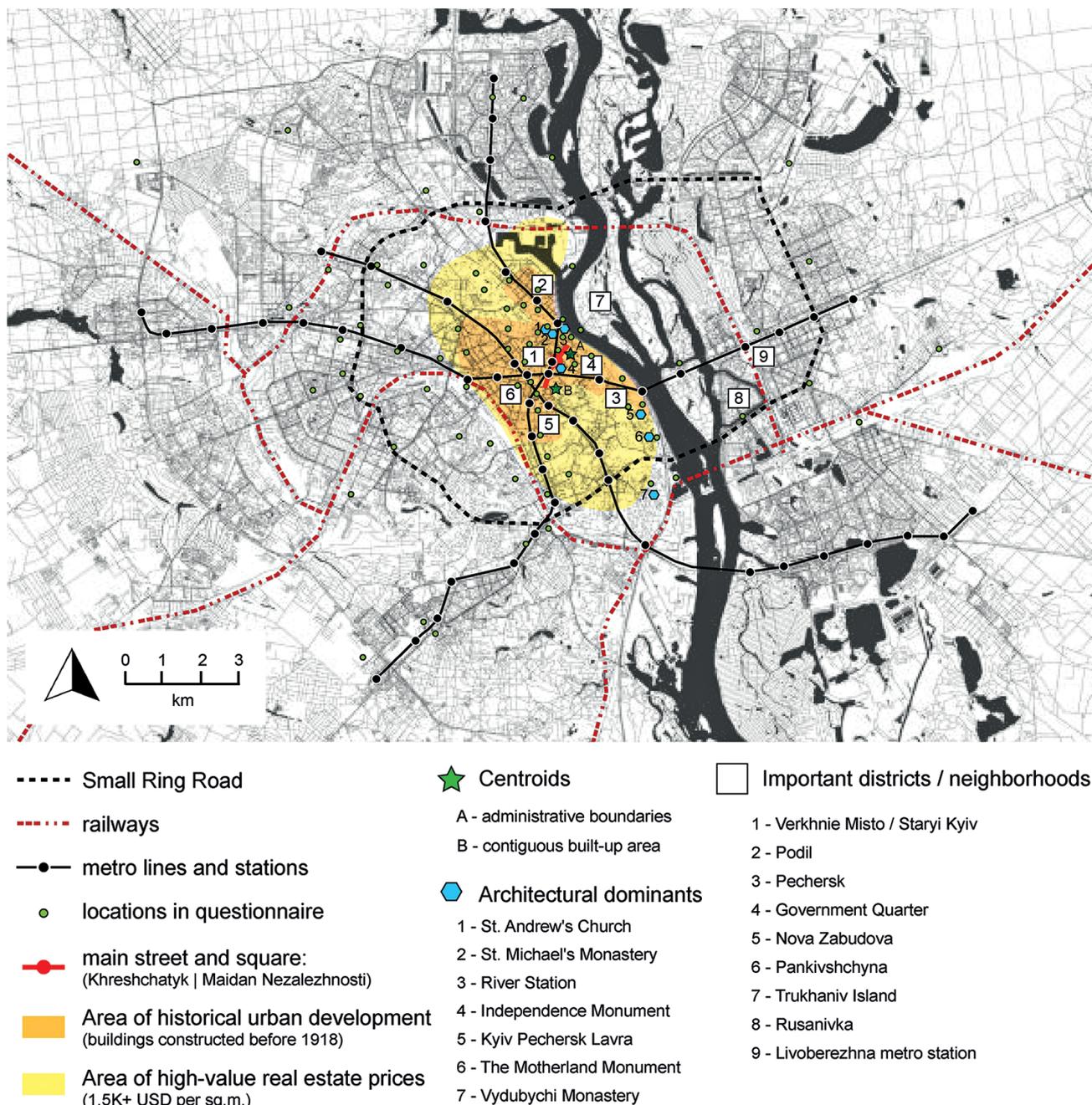


Fig. 1 Kyiv as a study area: key features and landmarks. Source: authors’ elaboration; data on the area of historical urban development and real estate prices from LUN Misto.

Geometrically, Kyiv's centroid varies depending on the area considered. Within the city administrative boundaries, the centroid lies near the north end of Khreshchatyk. Considering only the contiguous built-up area, excluding forests and wastelands, the centroid shifts slightly southwards and locates south to Maidan Nezalezhnosti. In both cases, centroid aligns closely with the city's symbolic center and fits into the area of historical urban development.

4. Data and methods

The study surveyed 141 bachelor 17–22 year old students studying in Kyiv. Among the respondents, men accounted for 74 (52.5%) and women for 67 (47.5%). All students were from Ukraine; 42 (29.8%) were native residents of Kyiv, while the remaining majority of 98 (69.5%) came to study from other regions of Ukraine. Of the latter group, 17 had lived in Kyiv for less than one year, 24 for 1–2 years, 32 for 2–3 years, and 25 for more than three years; the vast majority resided in a university dormitory located on the south-western periphery of Kyiv. The respondents were students of economic geography and urban studies and planning.

The anonymous survey was conducted from March to May 2025, yielding 141 completed paper-based questionnaires. The questionnaire was pilot-tested with a small group of students ($n = 10$), whose answers have not been included into the research sample. The survey consisted of three stages, combining drawing sketch maps of a city and answering the interview questions (Nasar 1990). In the first stage, respondents evaluated 84 specific locations in Kyiv using their names and photographs, indicating whether each location belonged to the city center ("Yes", "No", or "I don't know the location"). All participants completed this stage. In the second stage, which employed adopted Lynch-type mental map research technique (Lynch 1960; Montello et al. 2003; Nawrocki 2017), respondents drew their perceived boundaries of Kyiv's city center on a contour map showing key spatial landmarks (city boundary, Dnieper River, main streets, railways); 136 maps were usable, as five were incomplete or spoiled. The third stage involved three open-ended questions: (1) frequency of visiting the city center, (2) purposes of visiting, and (3) specific places visited. All respondents completed this stage. This design allowed the study to capture both individual perceptions of centrality and patterns of spatial interaction with Kyiv's center.

The key concepts employed in the subsequent analysis of the questionnaires were "perceived center" and "perceived centrality". A perceived center refers to an individual respondent's view of the city center, including its spatial boundaries, features, functions, and purposes. Perceived centrality refers to the degree to which a specific location is perceived as

central, measured as the percentage of respondents identifying a location as part of the city center.

To map contour-derived perceived centrality, all respondent maps were digitized in Adobe Illustrator creating a filled polygon corresponding to the drawn contour of the city center. After that, specifically elaborated Python script (employing NumPy, Pandas and Pillow libraries) sequentially processed the rasterized image of each map, determined, for every pixel, the percentage of maps on which that pixel was marked by respondents as part of the city center, and draw a final isoline map of the integral contour-derived perceived centrality. To map location-based perceived centrality, for each location a percentage of "Yes [it is a city center]" answers was calculated excluding "I don't know" responses, and then isoline map of perceived centrality was generated using kriging interpolation (utilizing Surfer software) of points representing locations. Additionally, an isoline map showing differences between location-based and contour-derived centralities was produced. A heat map of locations "in the city center", visited by the respondents, was created using a 500×500 m grid, with shading intensity proportional to the frequency of mentions per cell. The rest of the answers (on the frequency and aim of visiting the city center, and the functional categories of the visited places) were processed using simple percentages from the total number of questionnaires.

It is important to note the limitations of the study. We engaged university students as respondents because the views of young people are particularly valuable for understanding how the city center is perceived by a generation that has grown up entirely in the post-socialist period and within a globalised society; these are people who will most actively use and shape the city center in the future decades (cf. Osóch and Czaplínska 2019; Gnatiuk et al. 2023). At the same time, since university students are predominantly young people with quite specific everyday practices, values, and worldviews, it is likely that perceptions of the city center and centrality among other social groups, as well as among residents of different parts of the city, may differ. Therefore, we do not claim that the identified characteristics of Kyiv's perceived center are representative of all its residents. The other limitation is the specific temporality of the research. As it is discussed below, condition of war and the presence of the memory about the Revolution of Dignity in the urban environment may affect perceived centrality, especially in such symbolically important place as a present-day Ukrainian capital. The involvement of students as research subjects together with a specific historic settings restrain the generalizability of the findings. One more methodological limitation lies in the use of kriging interpolation to construct the map of location-based perceived centrality. This procedure was applied (1) to obtain an integral visualization of the perceived city

center and (2) to compare location-based and contour-derived centralities. However, location-based centrality, in a strict sense, can only be defined for specific locations. Therefore, first, its approximation between locations may not correspond to actual values; the real spatial pattern may be more fragmented and indented. Second, the interpolation depends on the specific set of employed locations, their number, and spatial distribution. Third, the result depends on the particular interpolation method used. All these considerations indicate the possibility of inaccurate interpretation, although this risk can be minimized through a reasonable selection of the most representative locations (which we sought to ensure), as uniform a spatial distribution of locations across the city as possible (in our case, location density by necessity is higher in the geometric city center and lower in the periphery), and the use of an appropriate interpolation method (kriging is widely regarded as a golden standard in geostatistics).

5. Results

5.1 Contour-derived centrality

When delineating the city center on the map (Fig. 2), respondents often rely on criteria of geometric and network symmetry. They also tend to configure the center as compactly as possible, avoiding sharp indentations or protrusions along its boundaries.

The Dnieper River is the clearest spatial referent. Its right bank forms a sharp eastern boundary of Kyiv's perceived center, with centrality sharply dropping from 80% to 30%, reflecting the historical built-up area and main administrative and business hubs. At the same time, up to 30% of respondents include the Dnieper islands and up to 20% the adjacent left-bank areas near Livoberezhna metro station and Rusanivka residential area. The railway delineates the center from the west and south: centrality drops sharply from 70% to 40–50% across the tracks,

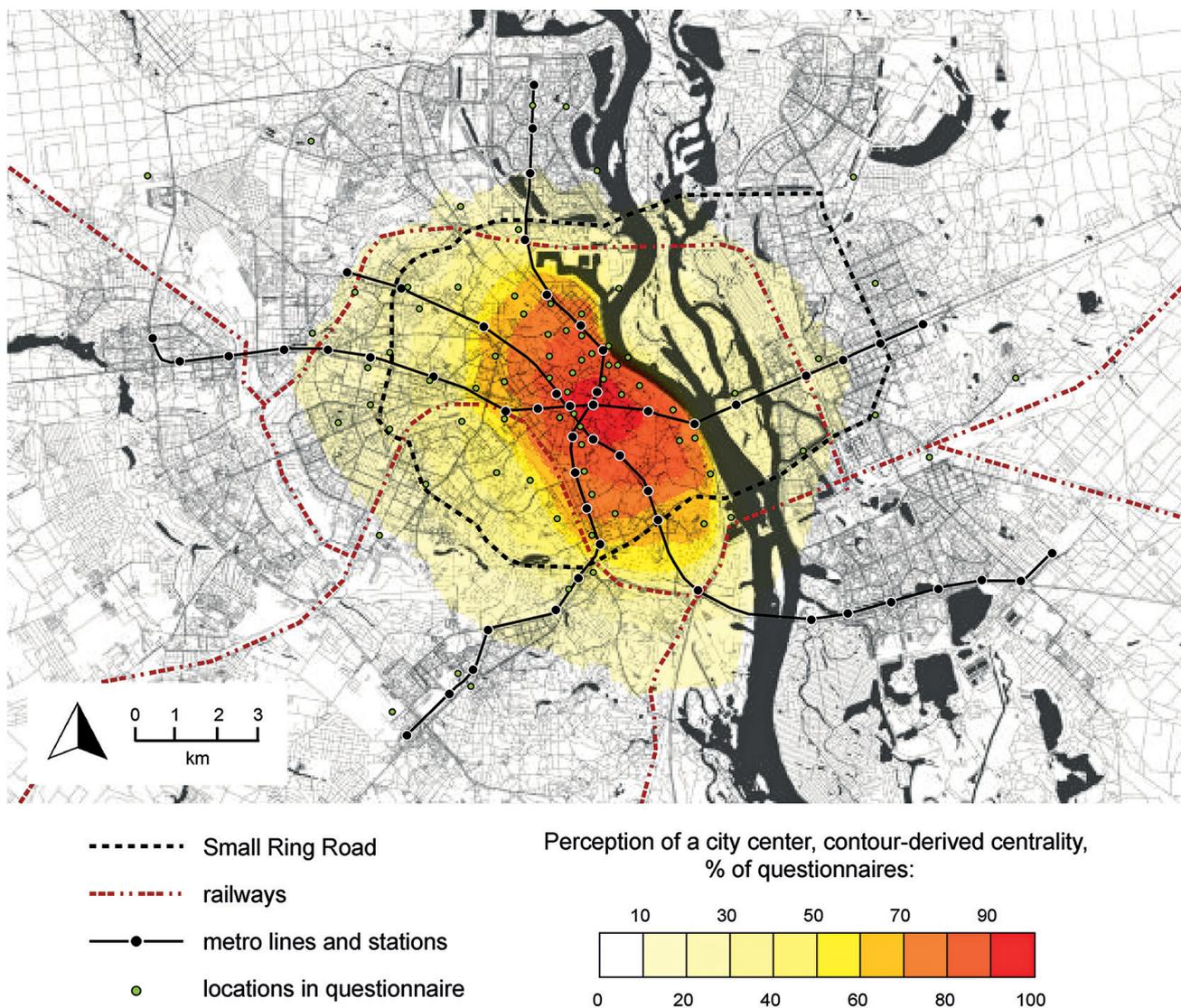


Fig. 2 Contour-derived intra-urban centrality in Kyiv. Source: authors' elaboration.

particularly where the railway follows the Lybid River valley. The Small Ring Road (a circular highway running within the city), together with the northern semicircle of the railway, acts as a third, although weaker spatial referent: centrality isolines of 20–30% on the right bank and 10–20% on the left bank closely follow these transport arteries. Areas beyond these boundaries are almost universally perceived as peripheral.

Overall, Kyiv's contour-derived perceived center has an oval-like shape, elongated from northwest to southeast along the Dnieper River. The transition zone from the center to the periphery is narrower where aforementioned spatial referents are present, and broader and more diffuse where such referents are absent (for example, in the northeast direction).

It is noteworthy that the area delineated by the 60% perceived centrality isoline closely corresponds to the continuous area of elevated housing values in central part of Kyiv (Fig. 1; LUN Misto n.d.a) with Jaccard index of polygon overlap as high as 0.8 (Fig. 3). Outside this zone, which is clearly associated with the city's core, high prices are observed only in the immediate vicinity of metro stations (LUN Misto n.d.a). Real estate values can thus serve as an indirect indicator of centrality, as "central" is often synonymous with "prestigious" and therefore more valuable. Overall,

the perceived center defined by the contour maps much better corresponds with the high-value real estate area than with the historical built-up core.

The frequency diagram of Kyiv's center relative area (measured as the percentage ratio of perceived center's area to the city's total administrative area) reveals distinct peaks, reflecting most common perceptions of the city center's size. The prominent peak occurs at 3% (frequency 0.19), 7% (0.12) and 9% (0.07). Although these peaks cannot be directly linked to specific contour configurations, they show parallels with patterns identified for individual locations (see the next subsection). For most respondents, Kyiv's center occupies no more than one-fifth of the city's total area. If the city were imagined as a circle, a circle five times smaller would have a radius roughly two (more precisely 2.2) times smaller – a ratio that may intriguingly reflect common geometric perceptions of centrality and peripherality in geometric sense.

5.2 Location-based centrality

When assessing the centrality of specific locations (Fig. 4), the perceived center's shape becomes more complex, extending beyond linear referents in some

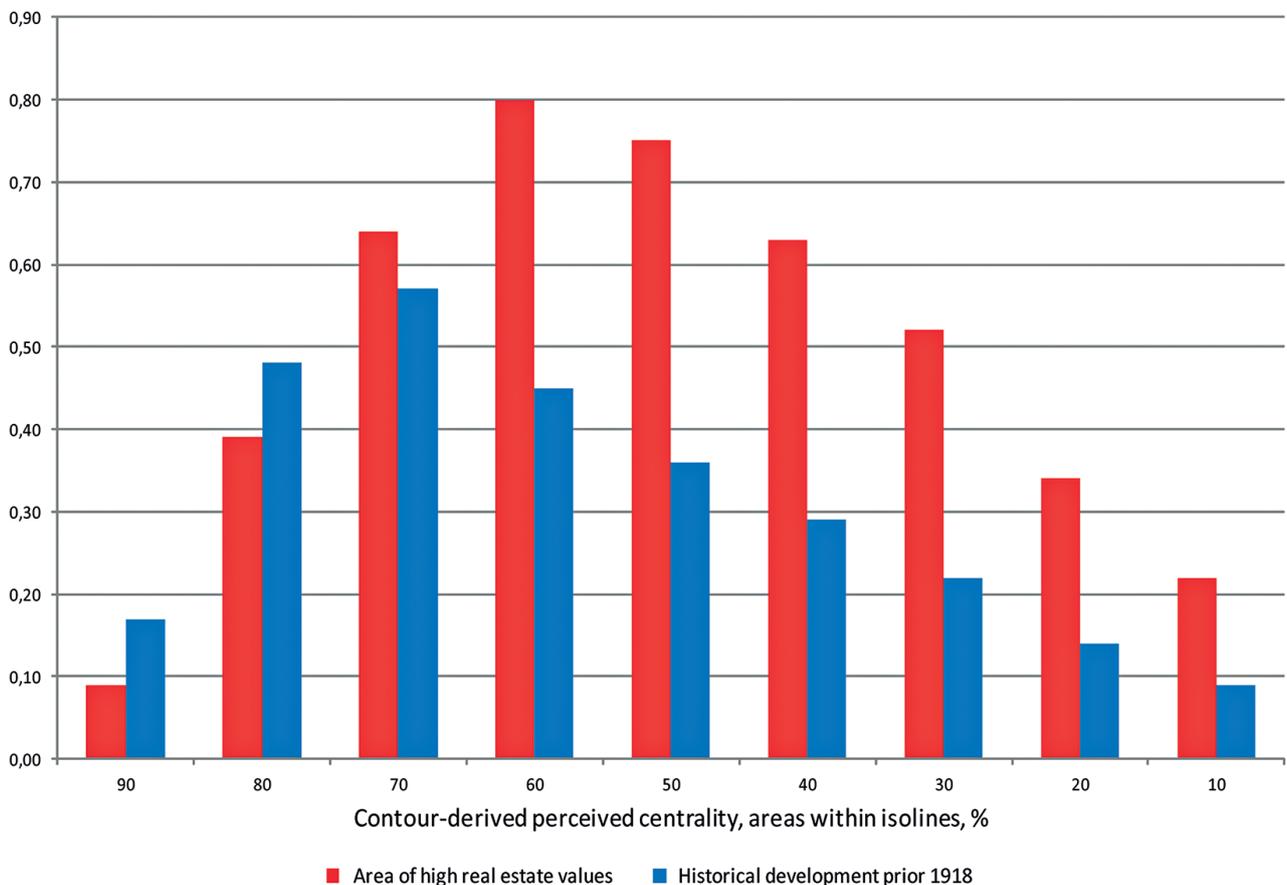


Fig. 3 Jaccard indices for the overlap of the contour-derived intra-urban centrality in Kyiv with the area of the high real estate prices and the historical built-up area before 1918. Source: calculations by the authors.

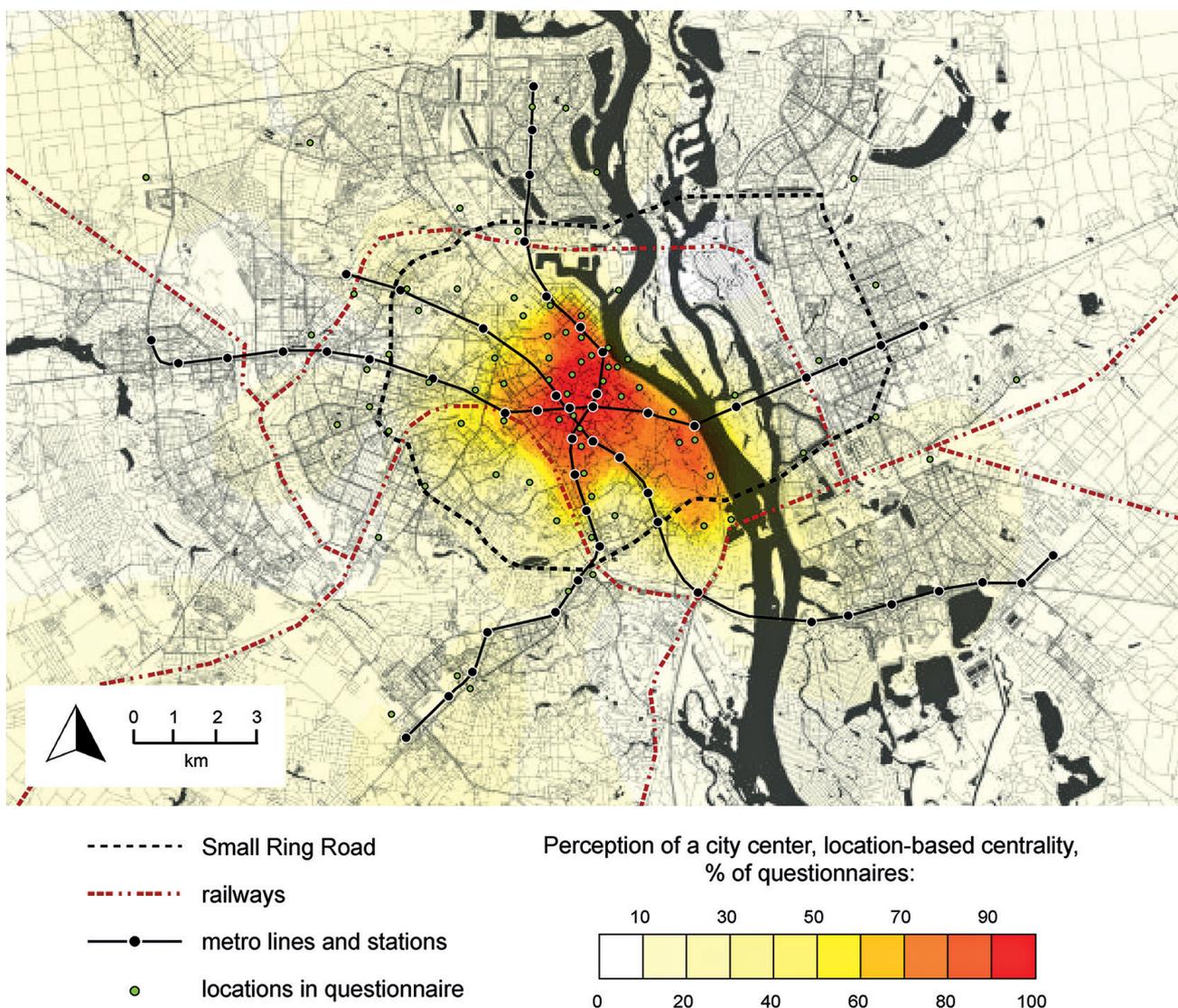


Fig. 4 Location-based intra-urban centrality in Kyiv. Source: authors' elaboration.

areas and curving inward in others. Consequently, the influence of most spatial referents weakens, except for the Dnieper River, which remains a key boundary: perceived centrality drops sharply from 80% on the right bank to 10% on the left. The left bank's centrality is lower when measured by specific locations than by contour. The railway in the Lybid River valley still marks the western limit, with centrality falling from 70–80% to 30–50%, but in south its role diminishes, as the factual decline in centrality occurs north of the railway. The Small Ring Road's influence is minor, visible only on the right bank near the 10% isoline, while the northern railway semi-ring has no noticeable effect.

The role of personal familiarity in shaping perceptions of centrality is evident in locations such as Podil, the Central Railway Station, and the areas around Khreshchatyk, Velyka Vasylkivska Street, and Andriivskyi Descent, being also the most frequently mentioned by respondents as visited in Kyiv's center

(see next subsection). A similar effect is seen with landmarks like the Kyiv-Pechersk Lavra and the Motherland Monument, which, though not cited as personally visited, are well-known architectural dominants. This suggests a tendency to perceive as central both locations familiar through personal experience and those embedded in the stereotypical image of the city.

The impact of historical or landmark status on perceived centrality is evident in sites such as the Kyiv-Pechersk Lavra, the Motherland Monument, the Monument to the Founders of Kyiv, the National Museum of the Holodomor, St. Nicholas Cathedral, Babyn Yar massacre site, and the Ministry of Defense, housed in a classicist building. These places demonstrate higher perceived centrality than nearby locations. In contrast, Vozdvyzhenka, a 21st-century neighborhood built in pseudo-historic style, lacks this effect. Similarly, Baikove Cemetery, a genuine historical site, is considered central by 30% of respondents, compared with only 13% for the Protasiv Yar ski

complex, despite its closer proximity to the geometric and symbolic city centers.

The 70% isoline on the perceived map of individual locations almost perfectly coincides with buildings constructed before 1918 (Fig. 1; LUN Misto n.d.b), while, for instance, structures from 1918–1956 show virtually no correlation with perceived centrality (LUN Misto n.d.b). The diagram of Jaccard indices demonstrates an outstanding peak at 70% isoline for the historical development area (Fig. 5). This suggests that respondents strongly associate urban centrality with historicity, particularly with the built environment shaped before the socialist era in 20 century. Centrality is also linked to power and governance: locations such as the Verkhovna Rada (Ukrainian Parliament), Ministry of Defense, and Kyiv Court of Appeal illustrate how central government institutions are expected to be located in, or to define, the city center. In some cases, green spaces are perceived as more central than surrounding areas. For instance, Natalka Park, despite its peripheral location in the modernist Obolon mass housing area, is slightly more often identified as central compared to the surrounding locations, and Hryshko National Botanical Garden demonstrates noticeably higher perceived centrality compared to nearby sites.

And conversely, certain locations may be perceived as less central than their surroundings when they are little known, lack historical or tourist value, feature

modern architecture, or serve “non-central” functions such as housing, retail, or public health. The combined effect of pro- and contra-factors is often hard to predict. A clear example is the Central Election Commission building, which also houses the Kyiv Regional State Administration. Despite its governmental role and location in Pechersk, traditionally viewed as central city neighborhood, it shows unusually low perceived centrality compared to surrounding sites. This likely reflects its modernist architecture and infrequent interaction of respondents with this part of the city. Thus, location-based centrality allows to identify the “undisputed center” as well as objects perceived as central. These objects are not necessarily geographically close to the historical core of the city. Rather, they have characteristics or functions that are perceived as central, or they are familiar and located in frequently visited areas of the city. The results of the study showed that functions indicating location-based centrality include political, historical, tourist, and entertainment.

Theoretically, the histogram of perceived centrality of locations could show two extreme scenarios: a uniform decline from the center to the periphery in the case of random perception, or two plateaus (high and low) with a sharp slope between them if perceptions were consistent. In reality, the histogram exhibits several steps, reflecting homogeneous areas in terms of centrality and zones of rapid perceptual

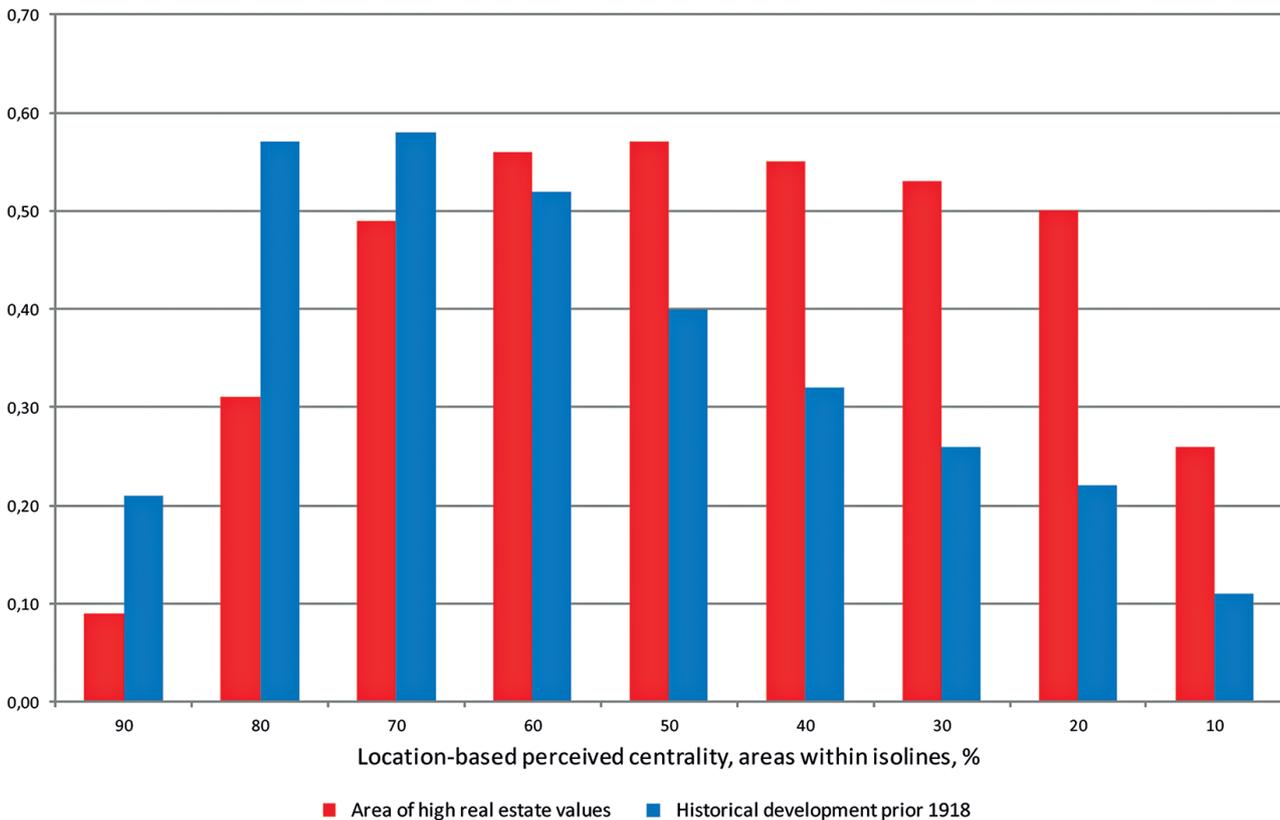


Fig. 5 Jaccard indices for the overlap of the location-based intra-urban centrality in Kyiv with the area of the high real estate prices and the historical built-up area before 1918. Source: calculations by the authors.

change. The first plateau (87–100%) corresponds to two “undisputed center” clusters: the larger encompassing Khreshchatyk, the government quarter, part of Verkhnie Misto, and the proximal part of Podil, and the smaller represented by the Kyiv-Pechersk Lavra. The second plateau (70–73%) – the “center for the majority” – includes areas surrounding these clusters (Pechersk, Verkhnie Misto, Nova Zabudova, Pankivshchyna), bounded by the Dnieper River to the east and the railway to the west, roughly matching the pre-1918 built-up area. This is followed by a sharp decline – a transitional zone ending with the third plateau (29–34%) – the “semi-center”, a zone of “uncertain centrality”, where respondents’ opinions about whether locations belong to the center extremely vary, and perception is strongly influenced by function, age, historical significance, spatial context, and personal experience. The fourth plateau (18–21%) represents the “mostly periphery”, although a small portion of respondents still consider these locations part of the center. Beyond this, perceived centrality gradually declines to the “definitely not center” or “absolute periphery”.

5.3 Comparison of the contour-derived and location-based centralities

The perceived center defined by specific locations is smaller than that defined by the contour, particularly below the 70% isoline. The same isoline demonstrates the highest level of overlap between the two types of centrality (Fig. 6).

As already mentioned, in the case of individual locations the perception of the city center is more fragmented than when respondents think of the center as an integral space. As a result, when drawing sketches, respondents often treated as central certain

locations that are not perceived as such when focusing on them specifically. This applies both to individual locations and to entire areas (Fig. 7). Such locations include those that, in the respondents’ perception, lack historical or cultural significance, do not correspond to their idea of “centrality” in terms of function (for example, residential or industrial functions are not associated with the city center), or are simply personally unfamiliar to most respondents. Examples include the Frantsuzkyi Kvartal residential complex, the Central Election Commission building, Ar-Rahma Mosque, and Zvirynetska and Tarasa Shevchenka metro stations.

At the same time, some locations in themselves were much more frequently identified as central than when they were included within the city center contour on the map. Three such clusters are clearly visible in Fig. 7: the first is associated with the main railway station and the main building of Taras Shevchenko National University of Kyiv, the second with a part of Podil, and the third with a part of Pechersk. These locations are either well known to respondents through everyday experience (railway station, university building, Poshtova Square), or are widely recognized historical and cultural landmarks and city symbols, including strong visual dominants (Kyiv-Pechersk Lavra, Motherland Monument, St. Andrew’s Church, Vydubychi Monastery, Freedom of the Ukrainian People Arch, the Pedestrian Bridge, the Monument to the Founders of Kyiv), or they represent popular public spaces that offer opportunities for walking and various leisure activities (Poshtova Square, Hryshko National Botanical Garden).

Overall, the spatial configuration of the Kyiv’s perceived center is resembling Haggett’s (1965) field distributions, comprising “theoretically continuous [spatial] distributions with a very rapid fall-off near their centre and a very slow, al-most asymptotic fall-off at their outer ranges”, which are often observed in another social spatial structures (e.g. Poorthuis and van Meeteren 2021).

5.4 Activities in the city center: How often, where, what, and why?

The frequencies of visiting the city center by the respondents distributed in the following way: 19% visit Kyiv’s center “almost daily”, usually because they live or work there, while a similar share (20%) do so “less than once per month”; 40% visit city center “at least one time per week”, and the rest 21% do that “several times per month”. These figures mean that the majority of the respondents visit the city center on a regular (daily or weekly) basis.

The most frequently visited specific places are Khreshchatyk (main street), Maidan Nezalezhnosti (main square), and adjacent Verkhnie Misto sites such as the Golden Gate, Andriivskyi Descent, Ukrainian Heroes Square, the Palace of Sports, Volodymyr

		Location-based centrality, isolines, %								
		90	80	70	60	50	40	30	20	10
Contour-derived centrality, isolines, %	90	0,44	0,30	0,18	0,12	0,09	0,07	0,06	0,05	0,02
	80	0,23	0,58	0,65	0,48	0,38	0,30	0,25	0,21	0,10
	70	0,14	0,47	0,71	0,68	0,59	0,48	0,41	0,35	0,17
	60	0,10	0,33	0,55	0,66	0,68	0,62	0,56	0,50	0,24
	50	0,08	0,27	0,46	0,60	0,66	0,66	0,62	0,58	0,30
	40	0,06	0,21	0,36	0,49	0,58	0,62	0,65	0,65	0,38
	30	0,05	0,17	0,28	0,40	0,50	0,59	0,65	0,68	0,48
	20	0,03	0,11	0,18	0,26	0,35	0,44	0,52	0,59	0,59
	10	0,02	0,07	0,11	0,17	0,22	0,28	0,34	0,40	0,50

Fig. 6 Jaccard indices for the overlap of the contour-derived and location-based intra-urban centralities in Kyiv. Source: calculations by the authors.

Hill Park, and Shevchenko Park. Podil also features prominently, especially its principal open public spaces such as Poshtova and Kontraktova Squares. Other visited locations include scattered sites in Verkhnie Misto and Pechersk, parts of Pankivshchyna and Nova Zabudova, Trukhaniv Island, the Livoberezhna metro station area, and de-facto peripheral places near the university campus in the city’s south-western sector (Fig. 8).

Among the categories of locations visited by respondents in Kyiv’s center, open public spaces – streets and squares without further specification – are mentioned most frequently. This category accounts for 29% of all mentioned specific locations and 47% of all answers. The second tier includes specific city neighborhoods or localities (most common: Podil, Pechersk, Verkhnie Misto, Lyvky) (16% and 11%), metro stations and transport hubs (14% and 9%), tourist and cultural sites (museums, exhibitions, monuments, architectural landmarks) (11% and 14%), and open green spaces (parks, squares, botanical

gardens) (10% and 8%, respectively). Less frequent mentions include cultural and entertainment venues (theatres, cinemas, sports arenas, concert halls) (6% and 4%), commercial establishments, specifically large malls (5% and 2%), educational and scientific institutions (3% and 2%), cafés and restaurants (3% and 1%), and waterfronts (Dnieper embankments) (2% and 1%, respectively).

Walking and strolling were the most common purposes for visiting the city center (40%). The next popular reasons were visits to historical landmarks and various cultural institutions (20%), as well as visits to the entertainment and leisure facilities (20%), visiting restaurants and cafés (17%), and socializing with relatives, friends, and colleagues (17%). Less common motives involve shopping (13%), work (11%), errands (administrative, medical, or beauty services) (9%), attending public events, such as celebrations, (6%), using the center for transit (3%), or residing there (1.5%). Worth noting that 12% of the respondents visited the city center to enjoy the local urban

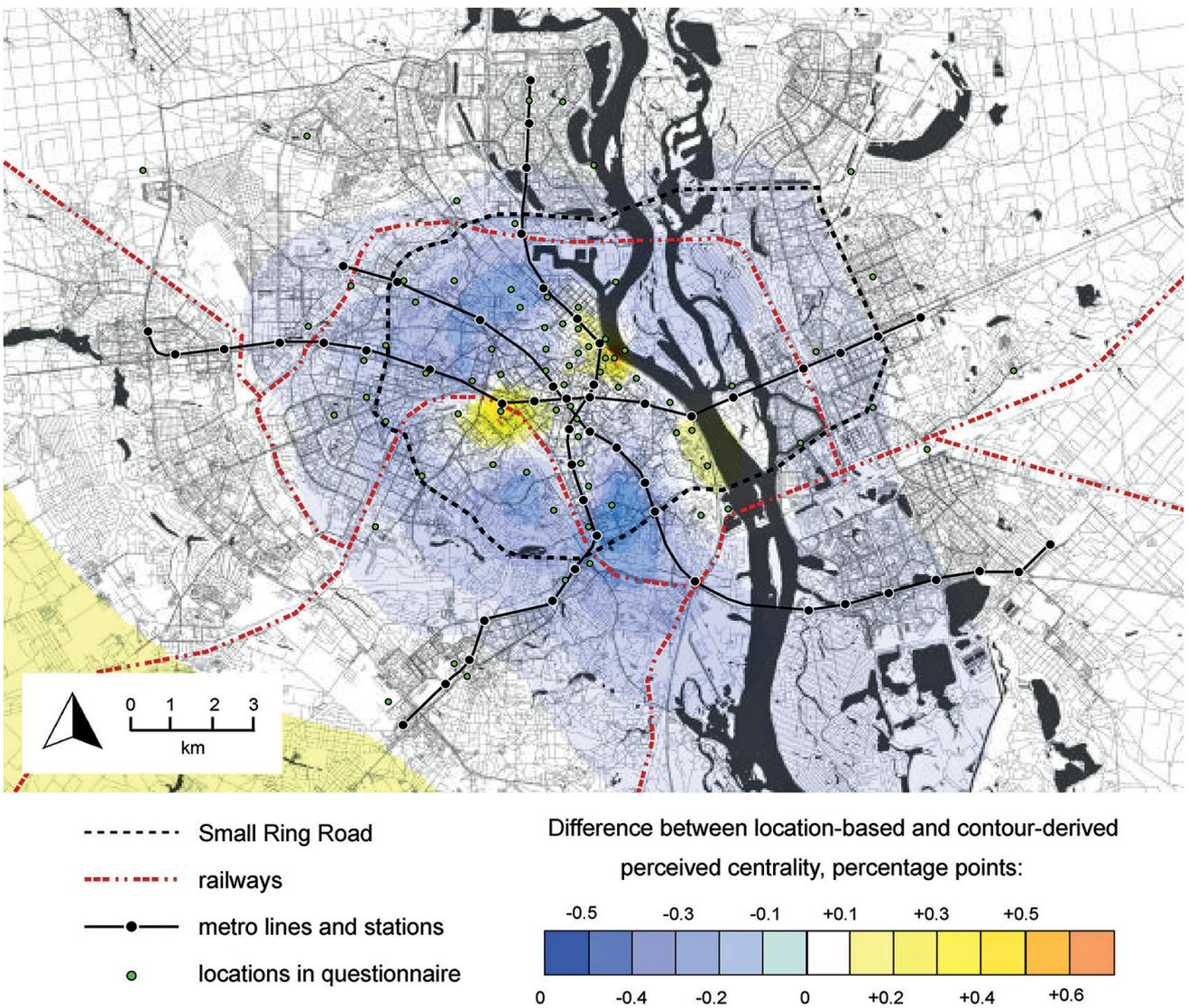


Fig. 7 Difference between location-based and contour-derived intra-urban centrality in Kyiv. Source: authors’ elaboration.

atmosphere regardless of specific locations or particular purposes: to “gain new impressions”, “change the environment”, “draw inspiration from history and architecture”, “appreciate the scenery”, “feel the atmosphere, urban vibe and pace of life”, “take photos or record videos for social media”, and even “cringing at people”.

6. Discussion

The study results show that contour-derived and location-based centrality in Kyiv are broadly similar yet differ markedly in detail. Tab 1 presents the summarizing overview of the causal relationship between perceived centrality and other centralities in Kyiv.

On the one hand, respondents imagine the city center primarily as a compact and coherent spatial structure whose boundaries are defined by key natural and man-made spatial referents with a barrier effect (Lynch 1960), such as rivers, railways,

and roads, and simultaneously correlate with the city’s morphological layout, where the historical character of the built environment plays a crucial role. In addition, the perceived center is structured by topographical symbols embedded in local tradition and media over decades and centuries – most notably the city’s main street (Khreshchatyk) and square (Maidan Nezalezhnosti), seen as the quintessence of centrality and among the most visited sites, as well as neighborhoods such as Verkhnie Misto, Podil, Pechersk, rarely Nova Zabudova and Pankivshchyna, which maintain a stable central image. On the other hand, at the level of individual locations, spatial pattern of perceived centrality becomes more diffuse, and the influence of aforementioned spatial referents weakens. This suggests that perception of centrality depends not only on spatial position and traditional images of the center, but also on function, appearance, and frequency of personal interaction, underscoring the importance of experiential and functional factors in shaping urban centrality.

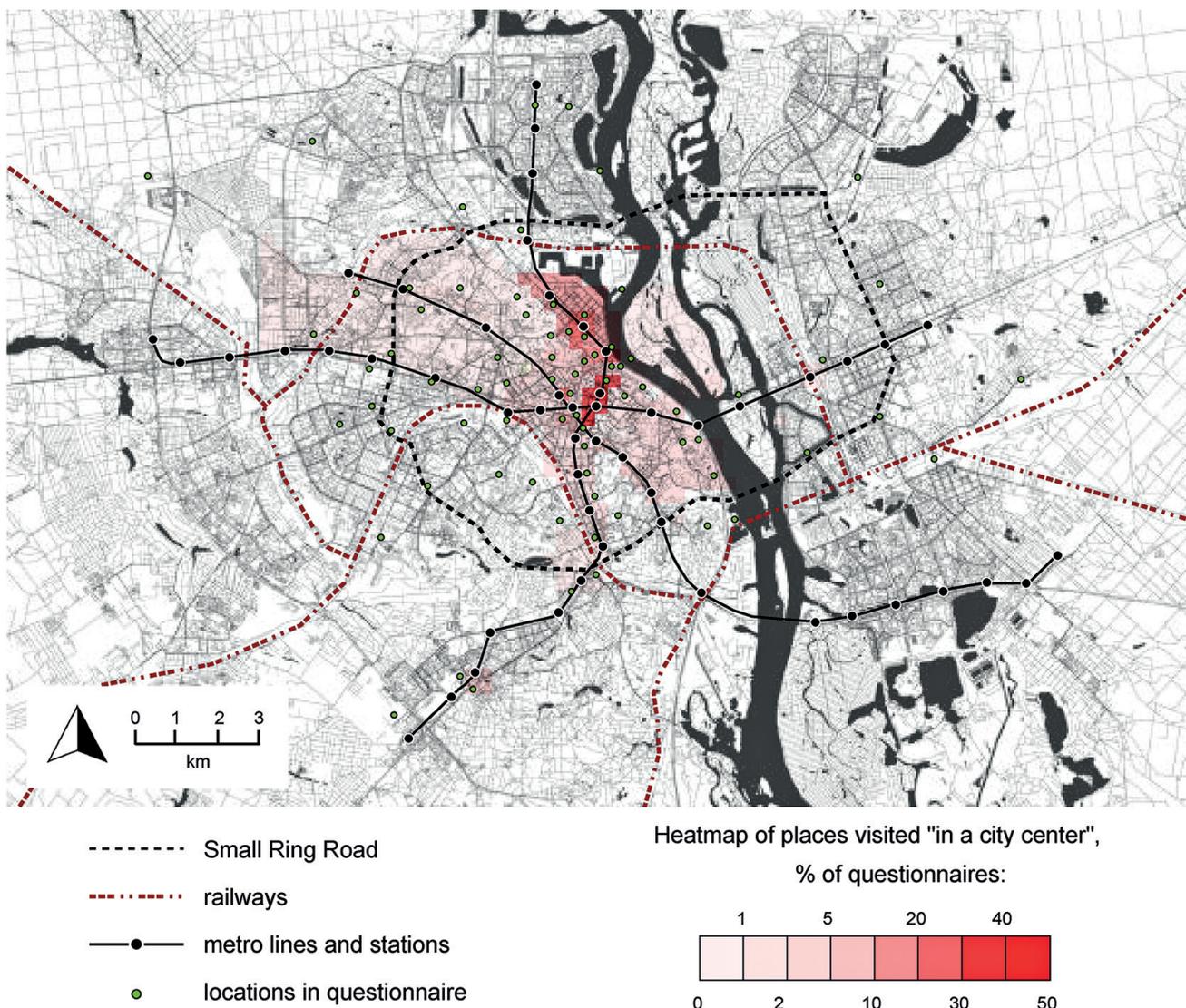


Fig. 8 Heatmap of places visited “in a city center” of Kyiv. Source: authors’ elaboration.

Tab. 1 Relationships between perceived centrality and other centralities in Kyiv.

Type of centrality	Description of the relationship
Geometrical centrality	Strong but ambiguous: Both centroids (calculated for the total area and the continuous built environment) situate within the area of the maximal (>80%) perceived centrality. However, due to the possible interference with historical or symbolic centrality, their direct influence on perceived centrality is vague.
Network / accessibility centrality	Strong: Since the metro system forms the backbone of Kyiv's public transport network (Gnatiuk et al. 2022), public transport accessibility can be fairly well approximated by accessibility to metro stations. Pearson's pairwise correlation coefficients for the locations are as follows: between perceptual centrality (PC) and the distance to the nearest metro station (D, m): -0.40; between perceptual centrality (PC) and the relative accessibility index of the nearest metro station (RA): +0.84. The results of multiple linear regression in Statistica software: $PC = -1.064 - 0.00001 * D + 1.98726 * RA$ ($R = 0.84$, $R^2 = 0.70$, Adjusted $R^2 = 0.70$, $F(2,81) = 94.2$, $p < 0.0000$). The bubble chart (Fig. 9) further illustrates the identified patterns. A strong relationship between perceptual centrality and the relative accessibility of metro stations and a moderate relationship with the distance to the nearest station have been identified. Other studies of Kyiv indicate a positive relationship between poor public transport accessibility and the perception of an urban area as peripheral (e.g. Gnatiuk et al. 2023 on mass housing estates).
Historical centrality	Very strong: Area with perceived centrality more than 70% corresponds well with the area built up before 1918. This suggests that respondents strongly associate urban centrality with the historical urban environment shaped before the socialist era. Important historical and cultural landmarks usually exhibit higher perceived centrality than the surrounding places that do not possess such value. Exploring historical and cultural landmarks, as well as the overall historic atmosphere was among the most popular aims of visiting the center.
Administrative centrality (power, governance)	Moderate: Principal national- and city-level centers of power and governance are strongly associated with the concept of centrality and are therefore perceived as inherent parts of the city center. However, this may not apply to less important administrative institutions, where the factor of historical and cultural significance may play a more important role. Administrative institutions were rarely mentioned by the respondents as their destinations in the city center.
Economic centrality (business, trade)	Moderate: According to the sketches drawn by the respondents, the area with high perceived centrality (>60%) roughly coincides with the continuous zone of elevated housing values in the central part of Kyiv. The same area concentrates the majority of the top-class business centers in the city. Some apparently peripheral areas with concentrations of business activity and large-scale retail probably appear to correspond to secondary peaks of perceived centrality, for example near the Livoberezhna metro station on the left bank. Nevertheless, to make stronger claims, this relationship requires further investigation.
Social centrality (public events, personal communication)	Moderate to strong: Socializing, often in combination with other activities, was among the top ways of spending time in the city center according to the questionnaires. Specific locations for such interactions include both open public spaces (notably, well-maintained green areas are perceived as more central than the surrounding spaces) and a wide range of restaurants and cafés. Participation in public events such as political gatherings, festivals, fairs, and concerts was indicated only rarely; however, this should be viewed in the context of martial law, under which such events are relatively infrequent.
Symbolic centrality	Very strong: Kyiv's main street (Khreshchatyk) and main square (Maidan Nezalezhnosti) form the spatial backbone of the perceived city center. Moreover, they are among the most visited sites within it according to the respondents. Certain neighborhoods are strongly referenced as the central ones. Major architectural landmarks that function as key city symbols demonstrate very high levels of perceived centrality compared to their surroundings, even despite their large distance from the symbolical city center.

Thus, while the city center remains closely tied in perception to the historic environment and to specific places and districts traditionally recognized as central, in a contemporary globalized society its boundaries may blur and shift. The center is not a fixed entity but rather a process and the outcome of struggles among social, cultural, and economic forces (Helbrecht and Dirksmeier 2012). Centrality becomes mobile: location itself loses importance, while greater attention is directed to what actually occupies urban space (Harvey 1990; Lefebvre 2003), including the growing significance of architecture and the physical settings of centrality (Helbrecht and Dirksmeier 2012). It is unlikely that respondents equated Kyiv's center directly with areas of high-value real estate extending beyond the historic core; however, they may well have envisioned gentrified districts of the Ukrainian capital, particularly in southern Pechersk and Nova Zabudova, densely developed over recent decades with skyscrapers, luxury housing, and business centers, embodying the ideas of new centrality (Helbrecht and Dirksmeier 2012). However, spatial

boundaries of Kyiv's perceived center remain closely tied to the historic built environment. This may illustrate how crucial the presence of a historical setting is for perceived centrality in most large post-Soviet cities, whose relatively modest historic cores tend to be overshadowed by the mass residential development of the 20th century.

For the most respondents, the center of Kyiv is a fairly attractive and frequently visited part of the city. Given that, historical and cultural value is perceived by respondents as a primary characteristic of the city center and centrality in general. The presence of historical and cultural landmarks has the strongest impact on the perceived centrality of a specific location. However, based on places visited and, no less importantly, the activities performed by the respondents in the city center, we argue that historical urban space serves as an arena for other social activities rather than an attractor for students as such. To draw people in, the historical and cultural arena needs to be combined with other attractions, such as retail and entertainment venues (from little shops to large malls

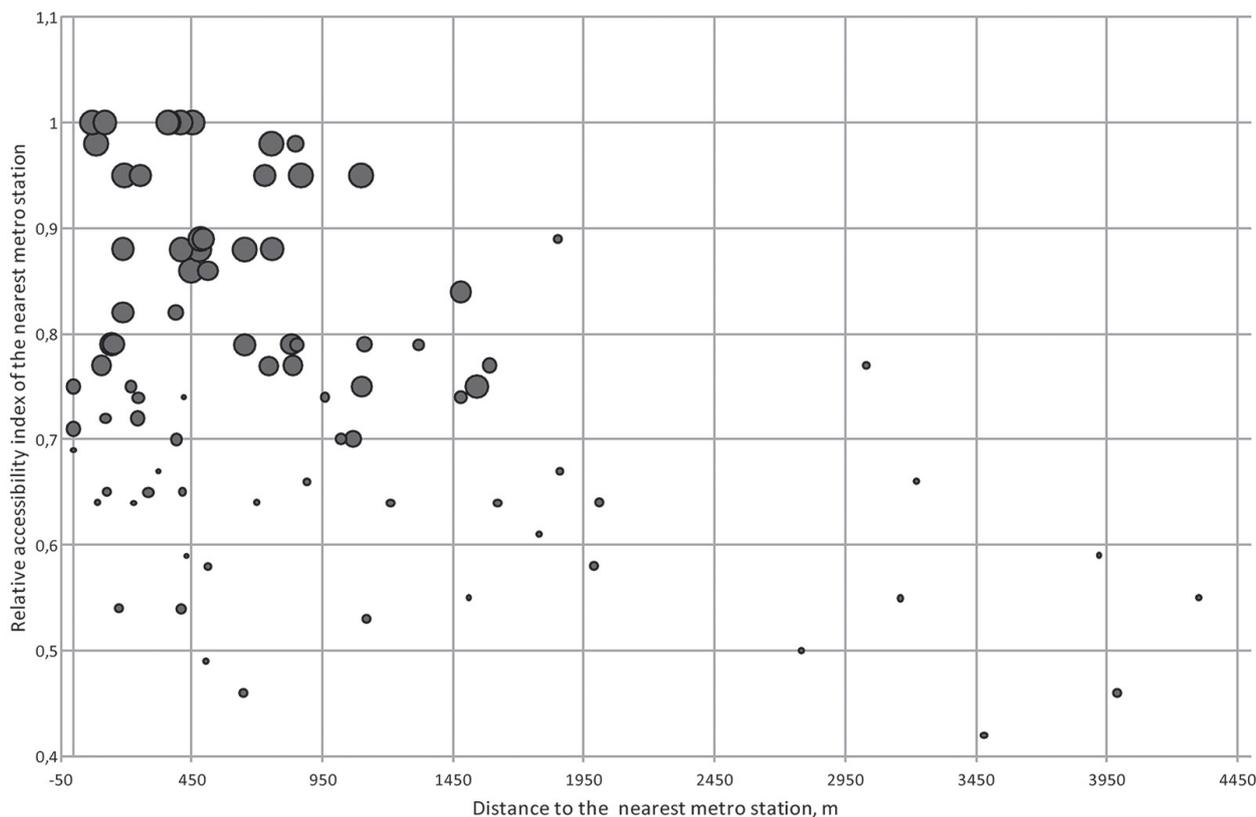


Fig. 9 Relationship between location-based perceived centrality (bubble size) and distance to the nearest metro station and its relative accessibility index.

Source: authors' elaboration.

and entertainment centers), dining establishments (restaurants, cafés), and interesting and comfortable public spaces (squares, parks, gardens) (cf. Deng et al. 2021). At the same time, without historical scenery and cultural senses embedded in the urban landscape, such service venues and public spaces alone do not create a sense of centrality. This aligns with Mezentseva's (2017) observation: although the role of malls in Kyiv has significantly increased over the past decades, they cannot be said to have assumed the role of primary public spaces. The "mall" of a city center is not a good way of inner-city development (Goss 1993; Popp 2004). The results support the idea of a multifunctional and multidimensional center: new functions and forms are layered onto a pre-existing historical and cultural foundation, and together they create a unique and diverse urban environment (Bird 1977).

Another important finding is that respondents value not so much individual famous monuments or architectural dominants but rather the overall atmosphere of the historic built environment, the layout of public spaces, and the activity of people within them. This explains why walking was identified as the primary purpose of visiting the center and why "ordinary" historic streets are often mentioned, even without major landmarks or tourist attractions. The city center thus functions as a space for *flânerie* – a relaxed, seemingly aimless stroll centered on observing urban life and enjoying the city's atmosphere, allowing

people to discover the city, watch others, and observe events unfold. Unlike classical sightseeing, this practice represents a more personal, intimate interaction with urban space that requires no mediators such as guides (Matos Wunderlich 2008; Kramer and Short 2011). This underscores the importance of preserving not only individual monuments but also the broader historic and cultural environment of the city center, which provides the essential setting for such experiences (Deng et al. 2021).

Another important point concerns the perception of the city center as a place for social interaction. First, it provides a convenient meeting point for residents from different parts of the city due to its optimal transport accessibility. Second, it offers a comfortable environment for gatherings, thanks to its unique atmosphere and the presence of interesting, unconventional places and establishments. As a result, the city center functions as a venue for various types of meetings – with close and distant relatives, friends, colleagues, and business partners. Specific locations for such interactions include both open public spaces and a wide range of restaurants and cafés, both mainstream and niche. The center also hosts various events, which create opportunities for different forms of social interaction among participants. Thus, although public spaces in contemporary cities increasingly serve as places for observing rather than interacting (Sennett 1992) – for instance,

in Kyiv, people can be seen sitting silently for hours in large café windows, restaurants, or on benches in parks and squares (Mezentseva 2017) – the public spaces of Ukraine’s capital remain actively used by young people not only for observing the surrounding urban environment and life, but for active socializing as well.

In light of the above, the threat of aggressive commercialization and chaotic, unregulated development in Kyiv’s historic center is increasingly evident (Dronova and Polieshko 2017; Dronova and Maruniak 2019; Mezentsev and Mezentseva 2017). Massive glass-and-concrete “monsters” (Cybriwsky 2014), disconnected from the authentic historic environment, undermine the city center’s atmosphere, aesthetic value, and architectural integrity. They erode its role as a space for flânerie, observation, and social interaction, especially among youth. While the new functions offered by these structures (shops, restaurants, malls, clubs) may attract visitors, their appeal is not unique to the center and could easily be found in peripheral districts. The key challenge for Kyiv lies in finding a recipe of harmonious integration of traditional and new urban elements, balancing between heritage preservation and continuous renewal (Mezentsev and Mezentseva 2017). This may require specific actions from Kyiv’s city administration to integrate memory politics and cultural landscape sensitivity into planning decisions and to protect views, landmarks, and symbolic spaces central to Kyiv’s historical narrative from large-format retail and speculative commercial development. At the same time, the administration may encourage cultural, educational, and community-oriented functions, expand pedestrianization and calm private motor traffic (Oliynyk 2022), as well as provide affordable cafés, social spaces, and non-commercial recreational opportunities in order to avoid a luxury monoculture and make the city center more comfortable and affordable for young people with different social backgrounds.

The case of Kyiv highlights the role of major rivers in structuring intra-urban centrality. Kyiv’s waterfronts were almost never mentioned as visited places in the city center, underscoring the limited openness of the existing centre to its natural waterfront – the Dnieper River. A busy thoroughfare runs along the river, while the embankment remains poorly landscaped and weakly connected to pedestrian zones of the historic core. At the same time, although the Dnieper clearly divides the city into a more central right bank and a more peripheral left bank, up to 30% of respondents still consider the river section adjacent to the historic centre, as well as some Dnieper islands, to be part of the city center. Global experience shows that most new downtowns integrate large water bodies (Jones 2016; Maciukenaite and Povilaitienė 2013). These observations suggest considerable potential for expanding Kyiv’s center or developing new forms of downtown along the river – on the right bank through

regenerated industrial and warehouse areas, on the left bank as a counterbalance to right-bank dominance, or on the islands (the latter scenario would endanger natural landscapes and is therefore undesirable from a sustainable development perspective). In terms of the city’s spatial planning policy, it is recommended to develop the Dnieper waterfront as a continuous, truly accessible, and multifunctional urban space that combines a variety of activities, with priority given to cultural and educational venues, public event spaces, and sports and recreation, while ensuring moderate commercialization and limiting commercial monoculture and gated development. The Dnieper waterfront should be physically and symbolically integrated into the city’s historical center by enhancing pedestrian transit connections and supporting visual and spatial continuity. Also, the city may benefit from the revitalization of the Lybid River, a tributary of the Dnieper, whose valley accommodates the railway and currently forms a clear south-western boundary of Kyiv’s perceived center.

The impact of the Revolution of Dignity and Russia’s military invasion of Ukraine on perceived centrality in the Ukrainian capital cannot be overlooked. It has at least two dimensions, some of which are traceable in the empirical findings. First, since 2014, Maidan Nezalezhnosti and the surrounding streets have transformed into a de-facto open-air museum and a place of commemoration for the Heavenly Hundred. Since 2022, several commemorative sites for Ukrainian soldiers killed in the war have been functioning within the historical center, including Maidan Nezalezhnosti, parts of Khreshchatyk Street, as well as Mykhailivska and Sofiiivska Squares. In 2022, Mykhailivska Square also hosted an exhibition of Russian military equipment destroyed by Ukrainian forces during the defense of Kyiv. The National Museum of the History of Ukraine in the Second World War also organized a special exhibition dedicated to the actual Russo-Ukrainian war. Such memorials and exhibitions may accentuate the importance of certain locations and emphasize the role of the city center as a place of memory and commemoration. Indeed, these places were among the most frequently mentioned by respondents in the present study, although there were no explicit references to the commemorative function of the city center. On the other hand, following the onset of the full-scale Russian invasion, certain parts of the traditional historical center became inaccessible to the general public for security reasons. This primarily concerns the so-called Government Quarter, which hosts the key institutions of state authority, including the Office of the President, the Parliament, and the Cabinet of Ministers. Consequently, some areas of Pechersk and Lypky have been inaccessible since 2022 to people who do not live or work there. This may contribute to the exclusion of this part of the city (despite being a place concentrating “central” functions and attributes like power, governance, as well as

historical and cultural landmarks) from the perceived image of the center (which is indeed observed in our results), particularly among students, many of whom are not native Kyiv residents and actively experience and explore the city exactly during their university studies.

We have not found academic publications that directly examine the issue of intra-urban perceived centrality in large post-Soviet or post-socialist cities, while the existing studies related to this topic differ significantly in their conceptualization, methodology, and the period of data collection. Nevertheless, certain parallels can be identified with previous research conducted in cities in Poland and Ukraine. As in Kyiv, in Kharkiv the perception of the spatial boundaries of the city center varies considerably among respondents due to the presence of multiple possible criteria of centrality: some rely on historical boundaries (within the former fortress walls), while others refer to a broader area of historical development. Thus, when various criteria coexist, a single spatial image of the city center may not necessarily form among residents (Miroshnychenko 2013). The Kharkiv case also revealed a moderate relationship between centrality and prestige defined through housing prices (Miroshnychenko 2014). It was also shown that in perceiving the external boundary of the central areas of Kharkiv, Katowice and Rybnik, as in the case of Kyiv, certain key locations, so-called anchor points, play an important role (Bierwiazzonek and Nawrocki 2009; Miroshnychenko 2013). The delimitation of the central vernacular district of Lviv indicates a clear and strong association with the historical and symbolic center – the area around the main square within the former medieval city walls, characterized by UNESCO-protected historical heritage and pronounced tourist functions; the influence of transport network centrality also appears to be evident (Sosnova 2022). The importance of the symbolic city center – the main square – is likewise confirmed for four Silesian cities (Bierwiazzonek and Nawrocki 2009). Similar to Kyiv, studies of the spatial images of the Katowice city center demonstrated a complete absence of religious buildings and sites in respondents' mental representations, despite their physical presence, which may indicate a desacralization of the city center image, at least among younger people (Bierwiazzonek and Nawrocki 2009). In Szczecin, surveyed students seem to perceive urban space in only two categories: as the city center, where (in their opinion) the most important facilities are concentrated, and as residential areas, perceived as peripheral; within the city center, they pay particular attention to recreational green spaces and shopping malls (Osóch and Czaplińska 2019). Also, in Szczecin, central district (Centrum) is clearly separated from the oldest historical part of the city (Stare Miasto) (Osóch and Czaplińska 2019). However, most of these studies did not focus specifically on city centers, and therefore any comparison should be

treated with caution. For a proper systematic assessment of the generalizability of the obtained results, further comparative research based on a unified methodology is needed.

7. Conclusions

The study explores the perceived center of Kyiv, employing the concept of intra-urban perceived centrality and applying a mixed-method approach that combined cartographic tasks, location-based assessments, and open-ended survey questions. The results highlight both the persistence of traditional centrality patterns and the influence of contemporary socio-cultural dynamics.

On the one hand, Kyiv's perceived center demonstrates a strong attachment to the historic built environment, with its boundaries closely aligned with long-established neighborhoods such as Verkhnie Misto, Podil, and Pechersk. The centrality of these areas is further reinforced by symbolic landmarks like Khreshchatyk Street and Maidan Nezalezhnosti, which embody the essence of "the center" in public consciousness. At the same time, the Dnieper River, railways, and major highways act as significant spatial referents, sharply defining transitions from central to peripheral zones.

On the other hand, the findings indicate that perceived centrality depends not only on spatial position or historic tradition but also on the functional profile and personal familiarity of locations. Respondents more frequently associated centrality with places they visit regularly or that serve as well-known urban symbols. Conversely, modernist residential estates or sites lacking cultural and historic significance often showed lower perceived centrality despite their high centrality in terms of accessibility or location within the historical city neighborhood. The research supports the idea of a city center as a multifunctional urban space rather than a concentration of a certain specific function.

Furthermore, the results reveal the importance of atmosphere and experience. Respondents emphasized walking, flânerie, and enjoying the urban environment as key motivations for visiting the center, suggesting that centrality is as much about lived experience as about formal functions. This reinforces the need to preserve Kyiv's historic fabric and human-scale public spaces in the face of aggressive commercialization and uncoordinated development.

Finally, the study underscores both the resilience and fluidity of centrality within the city. While Kyiv's perceived center remains firmly tied to its historic core, processes of globalization, gentrification, and socio-political transformation are reshaping its boundaries and meanings. Centrality emerges not as a fixed point but as a dynamic construct shaped by social, cultural, and economic forces.

Future research should address the limitations of this study by including broader population groups, longitudinal and comparative perspectives, to better capture how perceptions of intra-urban centrality evolve over space and time.

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