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Concepts and Methods of Research on the Visual Image of the City

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Abstract
The visual image of a city is an integral component of urbanism and architecture, reflecting the interplay between the external appearance of the city and the socio-cultural environment in which it is situated. This study examines the concept and various methods for analysing a city's visual image. The research findings indicate that the city's image is shaped by architectural design, socio-economic conditions, and individual perceptions. It encompasses internal and external elements, contributing to the cultural and social landscape. An understanding of this dynamic can inform more effective urban planning, enabling the better meeting of the needs of residents and visitors.

Keywords: research approaches; architectural environment; perception of identity; influence of infrastructure; socio-cultural analysis.

1. Introduction

The need to study the concept and methods of researching the visual image of the city is due to several problems and challenges facing modern cities. One of the key problems is the need to create a harmonious and attractive urban environment that contributes to improving the quality of life of citizens. The visual image of the city plays an important role in the formation of public space and its perception by residents and visitors. Its attractiveness as a place to live, work and rest depends on how pleasant and functional the urban space is perceived. In addition, the development of modern cities faces the challenges of sustainable development and urban planning, requiring the consideration of visual aspects in the design and development of urban areas. The need for a better understanding of the impact of the urban environment on people's psychological and emotional state emphasizes the importance of studying the visual image of the city and its impact on public life.
Exploring the concept of the visual image of the city can help to fill several gaps in the understanding of the visual component of urban space. One of them is the unclear understanding of how architectural elements, street infrastructure and natural landscapes shape the overall visual perception of a city. Research can help to identify which specific aspects of urban space most influence its visual image and how these elements interact with each other. The lack of understanding about how a city's

visual image affects the behaviour and emotional state of its residents and visitors is also crucial. The study can help to uncover this relationship and identify which aspects of a city's visual image contribute to positive or negative perceptions, and which factors can influence social behaviour in the urban environment.

The concept of the visual image of the city is becoming increasingly important, reflecting not only its architectural features but also socio-cultural aspects that determine its uniqueness and attractiveness as a place of residence, work and leisure. Despite this, the multifaceted nature and complexity of this phenomenon leave unresolved issues of its perception and analysis. In the works of K. Mouratidis (2021), P.V. Mikhnova (2023), and H. Herdiansyah (2023), the authors examined the concept of the visual image of the city in the context of its relationship with cultural and social aspects of the urban environment. The research considered the influence of architectural styles, urban infrastructure and social activity on the formation of the visual image of the city. The findings confirmed that the visual image of a city is closely related to its cultural heritage and social dynamics. However, it remains important to take into account the variability and dynamism of the urban environment, as well as the diversity of cultural and social contexts in which the visual image of the city is formed. This will allow a better understanding of the processes of visualization and perception of the urban environment by different socio-cultural groups and create more accurate methods of researching this phenomenon.

Special attention to analysing the impact of urban infrastructure on the formation of the visual image of the city was paid in the works of A.K. Omurkanova (2020) and the Intergovernmental Panel on Climate Change (2023). The study included an assessment of the role of various infrastructure elements such as roads, bridges, public transport, parks, and squares in creating the unique atmosphere of the city. The results showed that the quality and organization of urban infrastructure have a significant impact on the visual perception of the urban environment by residents and visitors. Thus, well-organized parks and pedestrian zones can create a cosy and attractive atmosphere, while streets cluttered with cars and a lack of recreational areas can create a sense of chaos and uncertainty. At the same time, it should be taken into account that an important aspect is not only the presence of different infrastructure elements but also their harmonious interaction with each other and with the architectural environment of the city. Such an analysis helps to understand which infrastructure elements should be developed or modernized to improve the visual image of the city and create a more pleasant and functional urban environment.

Essential aspects of studying the visual image of the city are also important aspects of analysing the relationship between urban symbols and their perception by society. Studies by C. Wu et al. (2023), K. Kourtit et al. (2021), and A. Cheshmehzangi (2020) showed that specific symbols of a city, such as monuments or architectural structures, can have a significant impact on residents' visual perception of the city and its image in the eyes of visitors. The presence and preservation of historical monuments can contribute to the image of the city as a cultural centre with a rich heritage (Tsyrfa et al., 2024). However, despite this, it is important to consider that the perception of city symbols may differ depending on the socio-cultural context and individual preferences. In addition, modern symbols of the city, such as high-rise buildings or contemporary art sculptures, may also play an important role in shaping the visual image of the city, which may require further attention.

Since the visual image of a city plays a key role in shaping its unique identity, this paper aimed to explore the concept and the principles and methods of analysing the visual image of a city. The objectives of the paper were to explore different approaches to analysing the visual image of the city, including naturalistic, structuralist, constructivist and phenomenological aspects, as well as to reveal in detail the importance of the visual aspect of the urban environment for its inhabitants and visitors.

2. Materials and Methods

A comprehensive methodology was developed to investigate the concept and methods of researching the visual image of the city, including the following aspects. Initially, a detailed review and analysis were conducted to explore existing theories and research related to the visual image of the city. This stage included analyses covering various aspects of urban visuality. The various

approaches and concepts proposed in the field were reviewed, thus providing a comprehensive view of the range of possible approaches and methods used in analysing the visual image of the city. Key research methods that have potential for application in this study were also identified.

Such detailed analysis helped to systematize and structure information about the visual image of the city, identify the main trends and directions in the research and highlight gaps and prospects for further research. This provided a basis for developing further stages of the research and identifying key aspects that needed to be studied in more detail. The extensive analysis not only allowed familiarizing ourselves with current theories and concepts but also identifying research methods that can be used to assess and study the visual image of the city. Also, statistical data on urban environments were collected to provide baseline information (Statista, n.d.; European Union, 2023). This involved collecting information on different architectural styles, street elements, urban infrastructure and other aspects using open databases. The collected data was comprehensively analysed using qualitative and quantitative methods. This included identifying the main trends and characteristics of the city's visual image, as well as their relationship with various factors such as cultural context and social conditions.

The data obtained was interpreted to identify the significance of various elements and factors in shaping the visual image of the city. This included analyses to highlight the key aspects that have the greatest influence on the perception of the urban environment by residents and visitors. The interpretation of the data helped to deepen the understanding of which elements of the urban space are perceived as the most significant and memorable and to identify which aspects could potentially be improved to create a more attractive and harmonious image of the city. The data interpretation processes also helped to better understand not only the visual perception of the urban environment but also which specific aspects can influence the behaviour and preferences of residents and visitors to the city. This is important for identifying potential areas for improvement of urban spaces to create more comfortable, functional and aesthetically pleasing environments. As a result of data interpretation, specific areas and aspects that require special attention and improvement as part of further research and development to improve urban spaces have been identified.

The mathematical principles of sum, difference, differentiation, and incrementalism were investigated using statistical and analytical methods. Aggregation and subtraction methods were used to analyse the sum and difference, respectively, to assess the overall effect and differences between different parameters or variables. The use of the Shannon-Wiener Index and Gini index was considered in the study of the principles of differentiation. The principle of incrementalism was examined in this paper through the use of scale factors, which allow the estimation of relative changes in values or parameters in different situations or periods.

Given the conducted analysis, general conclusions were formulated regarding the concept of the visual image of the city and key methods of its research were highlighted. This approach allowed getting a comprehensive understanding of the visual image of the city and its formation, as well as identifying the influence of various factors on this phenomenon, such as architectural features, socio-cultural processes and urban infrastructure.

3. Results

Determining the status of a city as a historic city requires a careful analysis of the visual image of the urban environment, taking into account its peculiarities. Most trends are characterized by a change in urban structure towards industrialization, with cities seeking to attract tourists by emphasizing their attractive side. In cities where culture and tourism play a key role, the visual image becomes more important as it directly affects tourists' perception of an area and can be a key factor in the decision to visit (Chan et al., 2021).

When it comes to the visual image of a city, it is relevant to understand the distinction between its image and the concept of image. The image is the physical component of a city, including the buildings, monuments, and streets that form its architectural landscape (Lyalyuk et al., 2024). This image is constantly changing and evolving under the influence of various factors such as technological innovation, socio-cultural change

and economic demands. It reflects the dynamism and instability of contemporary urban space. On the other hand, the image of a city is the perception of its inhabitants and visitors. It is how people perceive the city, its atmosphere, character, and features. At the same time, the image of the city is the result of interaction with personal preferences, stereotypes, and thoughts of each individual. It is a complex process involving the perception and interpretation of visual, emotional and cultural aspects of urban space. It is also necessary to take into account that the image and the image of the city exist in different spheres of reality and consciousness. The appearance is an objective reality, while the image is a subjective perception and interpretation of this reality (Bollano, 2024). Understanding this distinction helps to analyse and understand urban space more deeply, as well as to effectively manage its development and create more harmonious and attractive urban environments (Povilaitienė, 2021).

The visual image of a city is determined by many factors, starting from the general mental picture of the physical space of the city, which is an individual map known to each person. It is shaped by different paradigms, each of which represents a unique approach to perceiving and analysing the urban environment (Fig. 1).

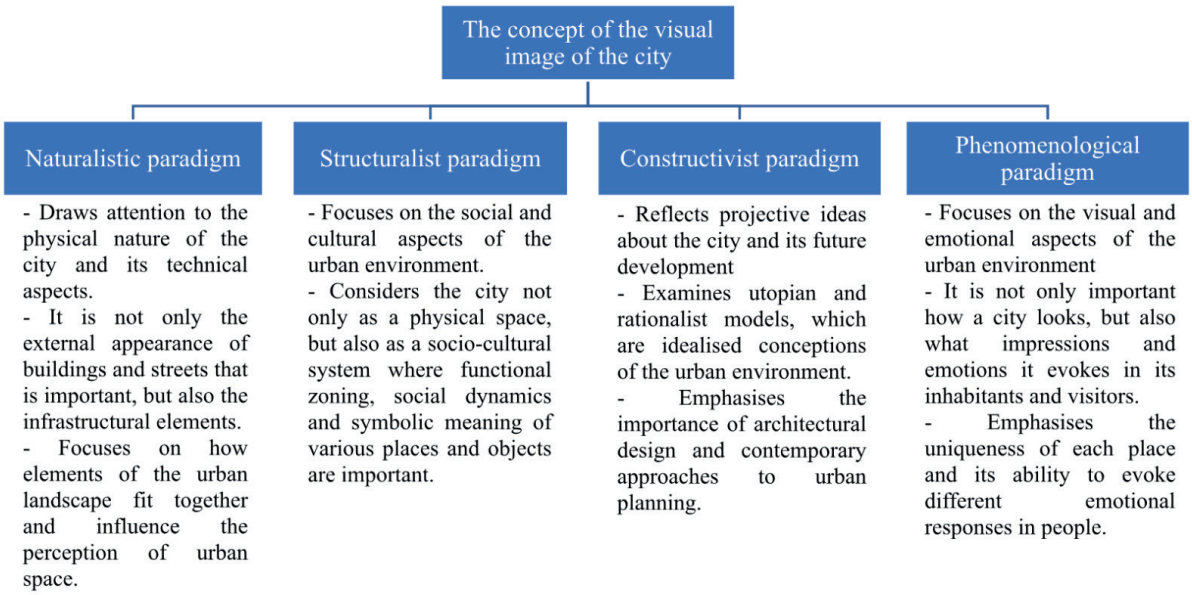

Figure 1. Definition of the concept of visual image of the city. Source: developed by the authors

Each of the four paradigms creates its model of the image, which can manifest itself as reflection, representation or presentation, being both an ideal object and a socio-cultural project. Awareness of this multifaceted nature of the visual image of the city allows for a deeper understanding of its visual characteristics and socio-cultural significance. Visual images of the city are a complex combination of objective and subjective characteristics that are formed under the influence of various factors (Kerimkhulle et al., 2023a). Each person perceives the urban environment individually, which leads to a variety of images of the city among different people. In this process, factors such as age, social status and education level play a significant role, which determining the perception and interpretation of the surrounding world (Jin, 2023).

Various details of the urban landscape become building blocks in the process of forming a visual image of the city in the human mind (Bugaevsky et al., 2020). These images of the city develop and transform over time, reflecting not only individual preferences and experiences but also the general characteristics of a

generation, social group or cultural tradition. Thus, images of the city become not only individual-personal but also collective, reflecting a wide range of diverse socio-cultural and historical contexts. It is important to consider that these images of the city are not static, but dynamically evolve in response to changes in the environment and people themselves. They may be influenced by historical events, cultural movements or technological changes, making them an integral part of urban life and cultural heritage. Understanding this complex dynamic of the visual images of the city allows us to better understand its essence and its importance in shaping the identity and social belonging of different groups and communities.

Preserving the image of the historic city requires constant revision of the principles and approaches to its protection and development. In modern practice, there is a need for new solutions that would take into account modern challenges and requirements, while preserving the unique features and cultural heritage of the city. Historic cities in Europe have long been not only architectural historical monuments but also centres of intellectual activity, where creative and scientific research and production processes were concentrated. This context favoured the formation of an intellectual stratum and had a significant impact on the development of culture and way of life in these cities. The idea of the city often becomes a symbol of power, both civic and religious. Urban environments often reflect social and political ideals as well as power dynamics. Architectural monuments and streets witness historical events, symbolizing the power and influence of rulers or religious leaders. This aspect emphasizes the importance of preserving a city's historical heritage not only as a cultural phenomenon but also as a source of knowledge about its past and historical roots (Tabibov, 2023).

The perception of the city plays a key role in shaping its image and establishing its place in the public consciousness (Subin-Kozhevnikova et al., 2023). The visual perception of the urban environment not only influences the individual perception of the city but also shapes public opinion and mass evaluation, which eventually create a consolidated image – a kind of "spiritual theme" of the city. This image includes not only visual aspects of the urban landscape but also associative and emotional relations that are associated with certain places, events or architectural objects. Every city has its own "image of the world", which is the result of the perception of its inhabitants and visitors (Kerimkhulle et al., 2023b). This image can be rich and multi-layered, reflecting the diversity of cultural, historical and social aspects of city life. The perception of a city can be different for different people depending on their personal experiences, preferences and cultural background. In this way, the city becomes a kind of palette on which each individual paints his or her own emotional and cultural shades.

It should be taken into account that the perception of a city is dynamic and subject to change over time. This can be caused by various factors such as socio-cultural changes, economic transformations or architectural innovations. It is therefore important to continuously analyse and study the processes of city perception to understand its evolution and adapt development and planning strategies to the changing needs and expectations of society. The study of the visual image of the city is a complex process that requires the use of various methods and approaches. The urban image is formed not only in real space but also in people's imagination, and research aims to understand this impact on individual and collective consciousness. The city, as an environment in which people spend a significant part of their lives, has a significant impact on their behaviour, preferences, and perception of the world.

An important aspect of the study is to analyse the visual impact of symbolic constructions in urban space. These symbols can be both architectural monuments and historical landmarks, and modern icons of culture and art. Investigating their impact helps to understand what values and ideals are reflected in the image of a city and how they influence the behaviour and perceptions of its inhabitants (Rasoolimanesh et al., 2019). In addition, studies of the visual image of the city allow assessing the general cultural level of the city and identifying the characteristic features of its culture and identity. The city becomes a kind of mirror reflecting the cultural, social and historical aspects of the society that inhabits it. Therefore, studies of a city's visual image not only help to better understand its essence and development

dynamics but also contribute to the development of sustainable urban planning and development strategies that consider its cultural heritage and the needs of its inhabitants.

The study of the visual image of a city is a fascinating aspect of interest to both tourists and locals. The difference in perception between these two groups of people reflects perceptual features that can be investigated using various methods, including mathematical principles (Fig. 2).

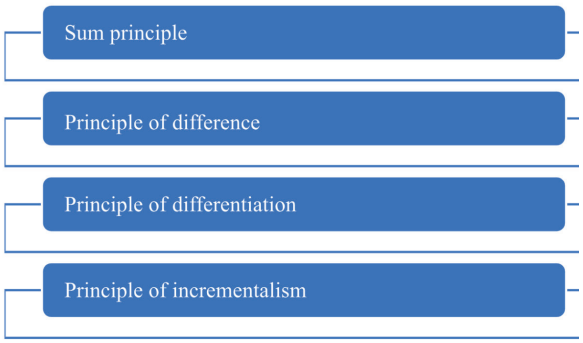

Figure 2. Mathematical principles of city image research. Source: developed by the authors

The sum principle in the context of urban visual image research suggests that striking and expressive aspects of an urban landscape can attract attention and override less pronounced features. This principle has a mathematical expression, where the total sum of a city's visual impression (*S*) is equal to the sum of the contributions of each aspect (*Ci*) to this impression (Tang, Long, 2019). Formula (1) takes the form:

$$S = \sum i = 1n\, Ci, \quad (1)$$

where: S – the total sum; Ci – the contribution of each aspect i to this impression (the larger the value of Ci, the greater the contribution of a given aspect to the total sum S).

Thus, the sum is a quantitative assessment of the visual image of a city, where vivid and expressive aspects can have a more significant impact on the overall perception than less pronounced ones. The sum principle allows us to assess the importance and contribution of each element of the urban environment in shaping its overall visual image. It helps to understand which aspects of a city attract more attention and have the greatest impact on its overall picture as perceived by tourists and locals alike. Understanding this principle allows for better analysis and planning of urban space concerning its visual attractiveness and receptivity.

The principle of difference, in turn, suggests that weaker features of the image can be strengthened in contrast to stronger ones. Mathematically, this is expressed as the difference between the most pronounced and the least pronounced features of the image (D), which is defined as the difference between the maximum and minimum contributions of each aspect to the image (C) (Zikirov et al., 2021). The formula for calculating this difference can take the form (2):

$$D = max(C) - min(C), \quad (2)$$

where: D – the difference between the most pronounced and the least pronounced features of the image; C – the vector of contributions of each aspect to the image (the greater the value of the difference (D), the more pronounced the contrast between different aspects of the city).

The principle of difference allows identifying and analysing differences in the perception of different aspects of urban space. It allows for determining those features of the image that have the greatest contrast or diversity, which can be useful in shaping urban planning and development strategies. It helps to understand which aspects of a city may be most attractive or meaningful to its residents and visitors, and which may require additional attention or improvement.

The principle of differentiation in urban visual research argues that highlighting and emphasizing the diversity of a city's features can enhance its visual perception. Diversity in this context refers to the variety of architectural styles, functional areas, landscapes and other aspects that make a city unique and interesting to study. Mathematically, this principle can be expressed through various measures of diversity, such as the Shannon-Wiener index or the Gini index

(Pártlová et al., 2020). The Shannon-Wiener index (H) is defined as (3):

$$H = -\sum_{i=1}^{n} p_i \log p_i, \quad (3)$$

where: – the probability of encountering the i-th element; n – the number of different elements.

This index allows for estimating the degree of diversity of urban landscape elements or architectural styles. The higher the index value, the greater the diversity of visual features of the city. The Gini index (G) can also be used to measure diversity in the context of a city's visual image (Mahinpei, 2021). It is defined as (4):

$$G = \frac{\sum_{i=1}^{n} f_i \cdot \sum_{j=1}^{i-1} f_j}{\left(\sum_{k=1}^{n} f_k\right)^2} * (n - 1), \quad (4)$$

where: – the proportion of area occupied by the i-th element; n – the number of elements.

This index allows us to assess the uneven distribution of urban landscape elements. The closer the index value is to 1, the more diverse are the elements of the city. The principle of differentiation is important for understanding how the diversity of aspects of a city affects its visual perception and attractiveness to different groups of people. Exploring this principle can help identify the key features that make a city attractive and unique, as well as identify areas for improving its visual appearance and sustainable development. Also in this context, it is important to consider the principle of incrementalism, whereby it is argued that the perception of a city can change from the general to the particular and vice versa depending on the context. This means that at different scales of analysing or considering a city, different aspects may be highlighted and their impact on the image of the city may change. Mathematically, this principle can be expressed as a change in the contribution of aspects of the city to the visual impression when the scale of analysis changes.

One way to express this principle mathematically is through the use of scale factors (Opara, Arabas, 2019). For example, if there is a set of aspects of a city A_1, A_2, …, A_n, each of which contributes C_1, C_2, …, C_n to the visual experience. As the scale of analysis increases, certain aspects may become more prominent and contribute more to the overall image of the city, while other aspects may become less prominent and reduce their contribution. This can be expressed as follows (5):

$$C_i = f_i * C_i^0, \quad (5)$$

where: – aspect contribution to the visual impression at the given scale of analysis; – the scale factor for the aspect ; – the contribution of this aspect at the basic scale of analysis.

Thus, the principle of incrementalism emphasizes that the visual image of a city can be perceived differently depending on the level of detail or scale of analysis at which it is considered. This is important for understanding which aspects of the city may be more significant at different levels of analysis and how they influence the formation of the overall visual image. Exploring this principle allows us to identify the key factors that determine the visual perception of a city at different levels of detail, and to develop appropriate strategies for planning and development of urban space.

Within the naturalistic paradigm, the focus is on the application of empirical quantitative methods to collect and analyse urban morphology. Here, a key aspect is the focus on clusters of social, economic and political organization, which allows for a better understanding of the relationship between the structure of the city and its visual image. The city is seen as a systemic object where architectural and infrastructural components play an important role. To analyse the visual images of the city in more depth, an integrated approach is used, which involves considering the urban landscape as a model that is investigated using applied methods. This includes the analysis of archival and field materials, as well as the application of various modelling techniques. Given empirical data, researchers can conduct comparative analyses and assess the quality of urban environment representation (Huang et al., 2021).

One method that can be applied to analyse urban morphology in the context of the naturalistic paradigm is graph analysis. The urban landscape can be represented as a graph, where nodes represent buildings or other objects and edges represent the connections between

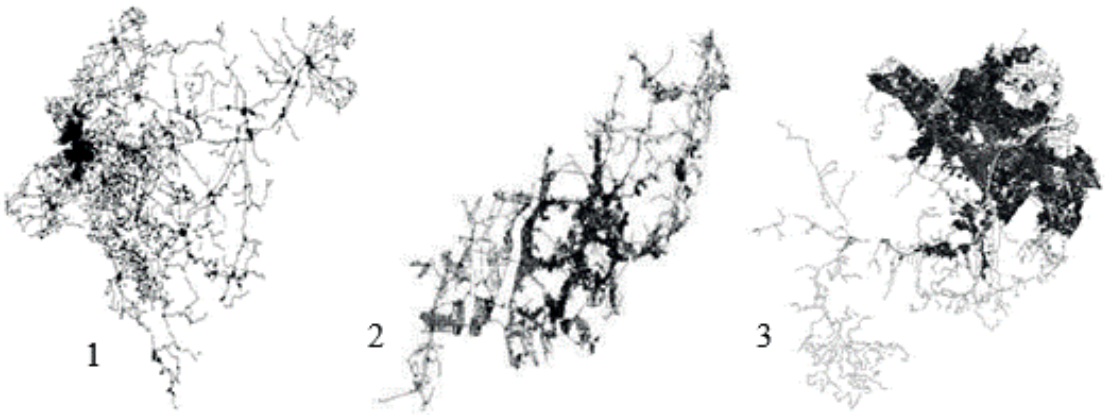

Figure 3. Example of graphical analysis of cities. Note: 1 – Harbin; 2 – Pussan; 3 – Sapporo. Source: developed by the authors based on J. Modrzewski et al. (2023)

them. Using graph analysis, it is possible to identify structural features of the city, such as the presence of central nodes or clusters, and to identify the relationships between different parts of the urban space (Fig. 3).

Research in this field relies on archival and field materials, which allows for studying and comparing historical and contemporary aspects of the urban landscape. This includes the assessment of urban panoramas, and ensembles, as well as modelling the visual image of the city in dynamics. One of the research directions is the analysis of images of the city in the media, social networks and open access, which allows for assessing the quality and effectiveness of the representation of the urban environment in modern communication channels. Functional and semantic analyses, which aim to identify, record and historically modify life zones, as well as the area and configuration of city districts, can be referred to within the framework of the structuralist paradigm of research on the visual image of the city. This approach considers the city as a system that includes various functional and semantic aspects that determine its appearance and character.

Functional analysis of the city focuses on the study of the functional purpose of its various zones and districts, as well as their interrelationship and influence on the organization of urban space. Semantic analysis, in turn, is aimed at studying the semantic content and symbolic meaning of various elements of the urban environment, such as toponymy, architectural symbols and public spaces. Various methods are used to conduct functional and semantic analyses of the city, including qualitative and quantitative research, as well as the use of geographic information systems (GIS) and digital data processing technologies. This provides a comprehensive view of the structure and organization of the urban environment, as well as its semantic content and symbolic meaning (Ali, 2020; Jebur, 2021). In the field of the constructivist component of the city image, research is conducted using the observation method, which is aimed at analysing the public spaces of the city. The focus is on changes in the social and cultural environment of the city, the formation, and development of the city image model, and the interaction of its inhabitants and self-representation through public spaces. E. Ali (2020) and A.K. Jebur (2021) analyse the ideological scheme and behavioural practices to understand what images and symbols dominate the urban environment and how they influence the perception of the city by its residents and visitors.

Social tolerance and spatial equality are important evaluation criteria in the research process. These criteria measure the extent to which a city's public spaces are open to all its residents and visitors, regardless of their

social status, gender, age, or ethnicity. Social tolerance is assessed through the level of inclusiveness and accessibility of public spaces, while spatial equity is assessed through the distribution of resources and opportunities for all population groups in the city. Within the phenomenological section, the mapping method finds application, focusing on the analysis of meaning for both producers and consumers of visual images of the city. The main subject of research here is the everyday image of the city, which can be analysed using mental maps. This method allows for studying how people perceive and orientate in the urban environment, as well as identifying their preferences and relationships between objects and locations in urban space (Koznarska and Didyk, 2022).

An important feature of the mapping method in the phenomenological aspect is its ability to assess the trajectories of people's movement in the urban environment through the locations of specific objects. This is done through the creation of thematic maps that reflect the distribution and interrelation of various elements of urban space in terms of their importance and perception by citizens. The application of the mapping method in the phenomenological aspect also makes it possible to identify dependencies between social phenomena and recurring cycles occurring within the city. This can be useful for analysing the influence of various factors on the life and behaviour of an urban community, as well as for identifying needs and problem areas in urban infrastructure, which confirms the importance of the mapping method in the study of the visual image of the city and its socio-cultural context (Firozjaei et al., 2021).

When analysing the visual image of a city, it is important to take into account the differences between the image created by its residents and the image formed by visitors. The model formed by residents is an internal image of the city, which reflects the personal relationship of the citizens with the elements of the urban environment. This internal image of the city includes cultural, social and economic aspects that reflect their personal experience and interaction with the city in the context of local perception. On the other hand, the external image of a city is formed by visitors to the city and is based on a simplified image of the city that can be replicated outside the city. This image may be distorted or simplified due to the visitors' limited experience or information about the city. However, when experiencing the city, this external image may be complemented and even modified by the emotional and rational perception of the city. Understanding the differences between the internal and external image of a city allows for a better understanding of its multifaceted and complex perceptions. It can also help to design strategies for managing and developing the urban environment, taking into account the needs of both its inhabitants and visitors (Han et al., 2021).

The visual image of a city is inextricably linked to each person's perception, their goals, psychological state and external circumstances at the moment of perception. It is important to realize that this image can contain both individual aspects, important only for a particular person, and mass elements expressed by cultural codes and common perceptions. The iconic image of a city is formed from a variety of associations and elements that are not always consistently linked. Therefore, it is logically difficult to trace which specific phenomena and emotions formed the basis for the formation of each person's visual image of the city. This image is also not the product of a single moment of perception, but the sum of different types of experience, which makes it multidimensional and mobile. It should be realized that the perception of a city can be subjective and changeable depending on the situation and mood, which makes its study more complex. However, taking these factors into account allows for a deeper understanding of the peculiarities of the city's visual image and its impact on the behaviour and interaction of its residents and visitors.

In general, the study of the visual image of the city requires considering it as a complex sum of models created by different urban communities. These models are shaped by many factors, such as social status, gender, age, education, as well as daily activity and the level of social and spatial contact. They are visual depictions of the urban landscape that individuals mentally construct using their experiences and perceptions. At the same time, the visual image of the city is shaped by the real factors of the urban environment, such as landscape, natural conditions, the presence of people, cultural characteristics, and landmarks. These elements have

a significant impact on the perception of the city as a habitat and a place of social activity. Such research can provide a better understanding of how different groups of people perceive and interact with the urban environment. This is important for the development of urban planning, the creation of comfortable living and learning environments, and the formation of urban culture and identity. Understanding the visual image of a city as a sum of diverse patterns can help to reveal its diversity and dynamism, which in turn contributes to the development of the urban environment as a whole. Also, the physical framework and a key element in the formation of the visual image is the architectural environment of the city. It carries information about the city at all levels of its structure and development. Both the framework and the fabric of the city act as important aspects that translate social processes at the cultural level, preserving the historical context and at the same time producing future directions of development (Lynch, 2023).

The environment of a city, being a carrier of social memory, shapes its material structures and determines the cultural code of its inhabitants. The visual image of a city epitomizes its attractive aspects and reflects the wide range of problems it faces. These problems may include a lack of social positivity, economic inequality, demographic imbalance, as well as the isolation of different socio-ethnic groups and the marginalization of certain areas of the city. Thus, the visual image of a city is a complex and multifaceted phenomenon that reflects not only its architectural environment but also social, economic and cultural processes. Analysing this image allows not only understanding the structure and features of a particular city but also identifying its problems and potential for development. Taking into account the differences in the perception of the city by residents and visitors, as well as understanding the influence of socio-cultural factors on the formation of its image are important steps to create an urban environment that would take into account the needs of all its residents and contribute to the development of social and cultural life.

It is recommended that city governments and relevant stakeholders prioritise the enhancement of the city's visual appeal and quality of life. This may be achieved by the development and maintenance of green spaces, the integration of natural elements into urban planning, and the fostering of community engagement. The expansion of green spaces, including parks, community gardens, and urban forests, has been demonstrated to confer psychological and emotional benefits, such as stress reduction and enhanced mental well-being. Such spaces should be designed to encourage social interaction and physical activity, with the creation of pedestrian-friendly zones and car-free areas. The incorporation of natural elements, such as green roofs, living walls, and water features, into urban designs can enhance the visual landscape and promote sustainability. The preservation of historical monuments and the integration of traditional architectural styles with contemporary designs will result in the creation of a distinctive identity for the city, reflecting its cultural heritage and supporting tourism. Infrastructure development should ensure the maintenance and modernisation of essential facilities, with due consideration given to their visual integration with the surrounding architectural context. It is of the utmost importance to engage local communities in decision-making processes to guarantee that the city's visual identity reflects its cultural values and social needs. The implementation of public art initiatives and cultural events in public spaces will serve to enhance the city's social and visual landscape. The implementation of sustainable urban development practices, including eco-friendly building designs and urban regeneration projects, has the potential to significantly enhance the city's visual appeal while concurrently addressing environmental challenges.

4. Discussion

Research on the visual image of the city plays an important role in understanding and shaping the contemporary urban environment. In a world where more and more people live in cities, it is important to understand how the visual aspects of urban space affect the lives and well-being of its inhabitants. The concept of the visual image of a city encompasses not only architectural features but also socio-cultural and economic factors that define its uniqueness and identity. Research in this area helps to reveal important aspects related to the visual perception of the urban environment by residents

and visitors, as well as to identify key factors that shape the image of the city. The results of such research can serve as a basis for the development of urban planning strategies aimed at creating a more attractive, comfortable and harmonious environment for living and working. Understanding the visual image of a city is also important for the development of tourism and cultural exchange between cities. Distinctive visual features of a city can attract tourists and promote cultural tourism, which in turn contributes to economic development and enhances the city's prestige in the global community. The study of research methods on the visual image of a city is also critical to understanding its structure, formation, and impact on residents and visitors. Different research methods allow analysis of different aspects of the urban environment, including architectural elements, cultural features and social interactions, which broadens our understanding of the visual nature of cities and their impact on social development.

In a study by T. Basu and A. Das (2022), the authors considered the concept of the visual image of the city as a complex and multifaceted phenomenon that encompasses not only architectural and geographical aspects but also a wide range of socio-cultural factors. The study took into account various visual aspects of the urban environment, such as architectural styles, street elements, landscape features and other factors that influence the overall visual perception of the city. In addition, external influences such as cultural and social features that can shape the image of a city for different groups of people were also considered. The findings provided a deeper understanding of how different aspects of the urban environment interact with each other and how this affects the visual image of the city as a whole. Assessing the results of both studies, it should be noted that both works were aimed at understanding the visual image of the city as a complex and multifaceted phenomenon influenced by various factors. While the researchers focused on the visual aspects of the urban environment, this study delved deeper into analysing the structural types of urban images such as naturalistic, structuralist, constructivist and phenomenological. It also found that the visual image of the city is formed not only through visual aspects but also through a wide range of socio-cultural and economic factors, which confirms the complexity and multifaceted nature of this phenomenon. This understanding requires a comprehensive approach to analysing and interpreting the visual image of the city, which becomes the key finding of this study.

The work of L. Dai et al. (2021) put a focus on analysing the influence of visual space on the perception of the image of the city and the psychology of residents in general. The study focused on which specific architectural elements and styles contribute most to the overall visual perception of the urban environment. The work identified the main architectural characteristics that define the visual image of the city and create its unique atmosphere. The findings of the study provided a deeper understanding of which architectural solutions contribute to the formation of an attractive and characteristic image of the city, as well as identified potential areas for improvement of the urban environment in terms of architectural design and planning. Both studies sought to identify the influence of architectural styles on the formation of the visual image of the city. However, unlike the work of the researchers, this study takes into account not only specific architectural elements and styles but also a wide range of socio-cultural and economic factors influencing the overall visual perception of the urban environment, providing a more in-depth analysis of different structural types of the city's visual image. It also points out that the visual image of a city is shaped not only through architectural decisions but also through other factors. Thus, this study provides a fuller understanding of the multifaceted nature of the visual image of the city, considering its relationship with a wide range of factors, including socio-cultural and economic aspects.

In the work of T. Yigitcanlar et al. (2022), the authors focused on the influence of urban infrastructure on the formation of visual image. The work analysed how various infrastructure elements such as roads, bridges, public gardens, and other objects affect the overall visual perception of urban space. The results showed that the character and quality of urban infrastructure play a key role in shaping the unique look and feel of a city. It was also noted that along with architecture, infrastructural elements also have a significant impact on the visual perception of residents and visitors to the

city. Thus, the study emphasized the need to consider urban infrastructure when developing strategies to improve the visual image of a city and increase its attractiveness. Comparing the results of both studies, the work of the researchers in conjunction with this study must emphasize the study of factors that influence the formation of the visual image of a city. In contrast, this study broadened this perspective by including not only infrastructural elements but also a wide range of other factors in the analysis. This study also considered the principles of sum, difference, differentiation, and incrementalism. By analysing these principles, it is possible to better understand which specific elements and factors contribute to the overall visual perception of the city, as well as to identify the characteristics of their interaction.

A study by P. Shan and W. Sun (2021) focused on the application of Geographic Information Systems (GIS) to investigate the visual image of a city. Using GIS, the researchers were able to analyse spatial data on various aspects of the urban environment such as architectural styles, distribution of facilities and other infrastructural features. This method was able to create cartographic models of the urban environment and identify spatial patterns that influence the formation of the visual image of the city. The results of this work confirmed the significance of the spatial approach to the study of the visual image of the city and showed that GIS is a powerful tool for data analysis and visualization, which allows for gaining a deep understanding of the visual dynamics of the urban environment and identify areas for its improvement. In comparing the results of the study by the researchers with the results of the present paper, it should be noted that this study also considered various aspects of the visual image of the city, including architectural styles and elements of urban infrastructure. However, this approach was complemented by analysing the principles of sum, difference, differentiation and incrementalism, which added another level of understanding of visual image formation to the study. Thus, both studies complement each other, providing a comprehensive view of the city's visual image and providing tools for its analysis and improvement.

According to the results of the study by P.K. Mall et al. (2023), a mathematical modelling method was used to study the visual image of the city. According to the findings, this method allowed the creation of formal models based on mathematical equations and statistical methods to analyse different aspects of the urban environment and their impact on the visual image. Using data on urban infrastructure, architectural features and socio-cultural factors, the paper developed mathematical models that allowed predicting changes in the visual image of the city according to different development scenarios and changes in the urban environment. The use of such methods made it possible to quantify the impact of various factors on the visual image of the city and identify optimal strategies for its improvement. Unlike the study by the researchers, this research did not use mathematical models in a straightforward sense, but instead focused on a more conceptual understanding of the visual image of the city. This work identified the significance of cultural and social factors and their influence on the visual dynamics of the urban environment. This approach allowed for a deeper understanding of the essence of the visual image of the city and its relationship to the cultural and social context. Thus, this study complemented the findings by providing a more philosophical and conceptual view of the problem.

The presence of green spaces and natural elements has a considerable impact on the visual image of a city and the psychological and emotional well-being of its residents (Rexhaj, 2024). They serve to enhance the aesthetic appeal of an area and promote a sense of calm, relaxation, and balance between the built and natural environments. The presence of greenery has been demonstrated to have a beneficial impact on stress levels, anxiety, and cognitive functioning. Furthermore, green spaces facilitate recreation and social interaction, thereby fostering a stronger connection with the environment. The incorporation of natural elements, such as water features and green roofs, serves to enhance visual coherence, thereby reflecting an underlying commitment to sustainability and ecological consciousness. Furthermore, green spaces have been demonstrated to improve air quality, reduce noise pollution, and create habitats for urban wildlife, thereby enhancing the overall quality of life. It is incumbent

upon urban planners to comprehend the function of green spaces in the creation of aesthetically pleasing and emotionally supportive environments (Radzinska et al., 2024).

In general, it should be noted that such studies play a key role in understanding and shaping the urban environment. Understanding the visual image of a city not only contributes to the creation of an attractive and functional urban environment for residents and visitors but is also of significant importance for the development of cities in general. Research in this area helps to identify the factors that influence the visual image of a city and identify strategies for its improvement and development. Thus, it is important to continue research on the visual image of the city to shape an urban environment that meets the needs and expectations of society and contributes to its well-being and development.

5. Conclusions

As a result of this study, it is evident that the visual image of the city is a multifaceted and complex phenomenon that is conditioned by different structural types such as naturalistic, structuralist, constructivist and phenomenological. These types represent different approaches to analysing and understanding the image of the city, considering its different aspects and characteristics. One of the key findings is that the visual image of the city is formed as a result of the perception of the urban environment as a whole. It is the sum result of many influences, including architectural environment, cultural features, and social and economic factors. It is important to note that it can be both internal, related to personal perception, and external, formed outside the individual, for example, through cultural perceptions. It is also important to note that the visual image of a city is subjective and depends on many factors such as age, social status and education of the individual. It can also contain both universal and individual aspects, which makes it multidimensional and fluid.

Finally, the visual image of the city is an integral part of its cultural and social landscape. It reflects not only architectural features but also socio-cultural processes taking place within the urban community. Thus, understanding of this phenomenon requires a comprehensive approach that takes into account the diversity its components and a multitude of factors influencing its formation and interpretation. Further research in the field of the visual image of the city may include a deeper analysis of the impact of specific architectural and urban elements on the formation of the image of the city among its residents and visitors. This could include examining the impact of specific architectural styles, urban layouts, street elements and landscapes on the perception of the urban environment. It is also crucial to investigate how changes in urban space, such as new developments, renovations and restorations, affect a city's visual image and status. Such research can be of great importance for urban planning and design, helping to create more comfortable, aesthetically pleasing and functional urban environments for all its residents and visitors.

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Conflict of Interest

None.

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