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The phenomenon of the city in the contemporary discourse of urban history

Abstract. The current approach to presenting the history of urban planning is biased by old narratives about understanding the nature of city development as a unique object with a thousand-year history. As Ukraine reconstructs and restores war-torn places, it is necessary to identify specific signs and develop an understanding of this kind of phenomenon according to the challenges of the present. Considering them globally will help develop ideas based on Ukrainian cultural values and continue to establish a national identity in architecture and urban planning. The purpose of the research is to comprehend the processes of city design over five thousand years and to highlight those aspects that are evidence of a phenomenal breakthrough in the development of mankind. The research methodology is based on the principles and methods within the framework of logical and epistemological and philosophical approaches. The research resulted in the identification of the characteristics of the material and spatial content of the ancient cities of the world that have survived a thousand-year history, specific to a particular era and culture, and the qualities that have become decisive for assessing their development. The focus is on the development of Homo sapiens and the emergence of writing, without which the existence of cities would be impossible. A comparative description of ancient cities is presented on the example of such settlements as Carnacus, Babylon, Athens, Venice, Jerusalem, and the Roman Empire, which had a stable urban planning framework for several centuries. These settlements occupy a particular place in history, as they represent specific evolutionary approaches to the establishment and development of the material and spatial environment of human activity. The changes in their formal states varied, but each time they resulted in qualitative transformations. Therefore, the authors propose to delve deeper into understanding the development of ancient cities through the categories of linearity, progressiveness, and regressiveness, and to emphasise the deepening of the usual approaches to the city's study

Keywords: theory; human settlement; development; linearity; spontaneity; identity

INTRODUCTION

In the existing discourse, the history of development occupies a particular place and is fundamental to its comprehension. Development is understood as a series of things that denote both the events that caused the changes and the states that reflected them.

The issue of development becomes even more exceptional when it comes to a city that is five thousand years old. Regardless of the time, any achievements that resulted in its development were isolated, their essence was clarified, and they were consciously applied. These are those that

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indicate the nature of development and are expressions of the historical identity of the city through the specifics of functioning, conditions of continuity, signs of orderliness, possibilities of self-organisation and attractiveness. As experience demonstrates, this resulted in another level of change, which is commonly referred to as evolution.

Without exaggeration, it is unique for the contemporary discourse of urban planning theory, which requires a deepening scientific and cognitive understanding of the substantive features of human architectural and urban planning activities and the results of such actions throughout history. The problematic nature of the research is further exacerbated by the fact that knowledge about the city in Ukrainian education was developed under the influence of narratives that emphasise the change in the status of ancient settlements in a specific chronological sequence. Therefore, with the reconstruction and restoration of war-torn places in Ukraine, it is necessary to design a new vision of the nature of urban development in the global dimension to further present ideas based on Ukrainian cultural values and continue to design a national identity in architecture and urban planning.

The theoretical basis of the research was based on the fundamental works of classical scholars (Benevolo, 1993; Lavedan, 1959; Mumford, 1979), who harmoniously combined the concepts of “city” and “history” and gave them a special significance in urban studies. Despite the passage of time, these works have continued to influence the nature of the development of a holistic conception of the city for several decades. Their influence is explained by a logical presentation of the material and is based on the application of the author’s methods, giving a scientifically sound assessment of the functional and planning structure of historically founded cities. Therewith, their understanding of urban development does not go beyond the ideals embodied in the image of a medieval city. For this reason, well-known popular science publications were considered. The authors of these publications emphasised the global problems of humanity, touching upon the issues of science and philosophy (Hoking & Mlodinov, 2016), describing socio-economic factors (Burdett & Sudjic, 2007), which, in the authors’ opinion, are crucial for the development of cities in the 21st century and the specifics of human development, in particular, those aspects that have driven the transition of humans to a qualitatively new stage of development (Harari, 2016; 2018; Harald, 2002) or gave impetus to changing the old way of urban life (Harper, 2020). In addition, the stated problem obliged the author to turn to works from the genre of “urban biography.” They provided information on a comprehensive historical portrayal of specific settlements (e.g. *Babylon. The Great City* (Pedersén, 2021)), and media that develop a holistic presentation of the urban past supported by historical facts (e.g., the UNESCO Official site).

Considering the significant variations in approaches to the research of urban history (McTominey, 2022) and based on the above theoretical works and empirical studies, a new way of thinking about the history of urban planning

is proposed. It will allow expanding the understanding of the features

The purpose of the research is to clarify the essential features of the formal characteristics of the material structure of ancient historical cities through the prism of their consistent change. Such cities absorbed the signs of a particular state system with specific political, economic, social, and cultural conditions that persisted for a long period.

MATERIALS AND METHODS

The methodological foundation of the research is based on the principle (correspondence) and methods (theoretical, historical-comparative and historical-typological analysis, morphological description), which are logical, epistemological and philosophical.

To summarise and systematise knowledge about the development of ancient cities, *the principle of correspondence* is used, which is based on the theorisation of the current state of research in the field of urban history. Therefore, the objects of ancient urban planning, which are perceived by the senses and are consistent with the philosophical category of materiality, were considered. In this situation, the object of cognition is the material structure of ancient cities, which is manifested formally and described by qualitative and quantitative characteristics.

Particular attention is devoted to the implementation of *the method of theoretical analysis*. It is reduced to choosing a research subject, determining the etymology and essence of the key concepts for the research, and systematising and summarising facts about the specifics of functioning and the specific features of the design of the most historically significant material and spatial structures for the development of mankind.

The historical – comparative analysis of ancient urban developments was based on *the method of morphological description*. It was designed to identify the characteristic features of the formal expression of the material structure of ancient cities. In this research, this method was implemented in the following sequence: selection of an ancient settlement → identification of spatial and temporal boundaries → identification of the material structure and selection of morphological units → identification of characteristic morphological features.

The general theory of urban planning has established two main types of urban planning structures: regular and irregular. They provide the foundation for classifications of ancient cities, and their specificity was manifested in the following features: the allocation of urban structures by formal qualities (Morris, 1994), the identification of urban artefacts that have withstood the passage of time (Rossi, 1966), and the establishment of perceptual elements of the urban environment (Lynch, 1984). According to these types, the historical-typological method allowed identifying homogeneous properties and features in the examined cities.

To achieve this purpose, a *methodology* has been developed to clarify the essential features of the city as a unique phenomenon in historical retrospect and to develop the existing theoretical and methodological tools (principles,



methods and approaches) in the history of urban planning. The research was conducted in *five stages*:

I stage – considered and explored relevant issues of the history of urban planning and fundamental works that are fundamental to understanding the formal characteristics of the material structure of ancient cities. These are L. Benevolo (1993), R. Burdett & D. Sudjic (2007), H. Harald (2002), Y.N. Harari (2016; 2018), S. Hoking & L. Mlodinov (2016), A. McTominey (2022), I.P. Morris (1994), L. Mumford (1979), P. Lavedan (1959), A. Szmelter & J. Zdunek-Wielgołaska (2019) etc. Due to the great attention to urban research, there is a lack of work on the highest achievements of humanity and their impact on the establishment and development of ancient centres of urban civilization. It is identified that currently there is a sharp distinction between applied urban planning, the research of the city as a unique form of settlement in ancient times and the history of its development.

II stage – the prerequisites for the development of ancient cities are identified. It is emphasised that urban settlements – are a unique form of social organisation associated with the emergence of writing and a new way of management. Compared to the development of homo sapiens, the age of the city is quite short, even though it is five thousand years.

III stage – historical and typological analysis of the formal expression of the material structure of ancient cities. The essential features in the functional and planning structure of such ancient cities as Babylon, Athens, Jerusalem and Venice are identified and classified into one of two types.

IV stage – based on the results of the historical and comparative analysis, the characteristic features of the material and spatial content of Babylon, Athens, Jerusalem, and Venice in space and time are compared.

V stage – the role of the city in the history of humanity is determined and the trends in the development of urban planning history in modern conditions are considered.

To accumulate information about the prerequisites for the establishment of ancient cities and to conduct a historical and comparative analysis, an updated source base in the form of graphic materials, tables, and quotations on the quantitative characteristics of the material structure of ancient cities was used. Statistical data became important for determining the real state of urban centres. Photographic materials taken by the author (Bohdan Cherkes) during research expeditions (2015-2020) and obtained from other open sources allowed emphasise the importance of ancient centres of urban lifestyle and provide a visual assessment of the physical attributes of such settlements.

RESULTS

The beginning of the solution to the scientific problem should be considered the authors' previous research (Cherkes, 2008; 2020; Cherkes & Linda, 2019; Idak, 2021), dedicated to the study of concepts and categories of identity in architecture, the specific features of the design of the material-spatial environment of human activity and the understanding of the patterns of its development.

This work is largely concerned with enriching knowledge about the nature of the development of urban objects and strives to understand spiritual values in the inevitable restoration of Ukrainian cities, considering national identity and historical continuity. The main part of the research is devoted to a comparative analysis of the world's cities that have survived a thousand years of history and identifies the qualities that have become crucial for assessing their development. Attention is centred on the formative aspects of cities, which, despite time and their actual condition, remain evidence of a high level of human development.

The process of development itself can be described as permanent, during which, for five thousand years, the city as a phenomenon has evolved from small settlements to multimillion-dollar megacities. And the figure of *five thousand years* is key, since, on the one hand, it demonstrates a relatively short period compared to the evolution of homo sapiens (which is two hundred thousand years), and on the other hand, it is a rather long process (Human Evolution..., 2021), accompanied by both material and spiritual development. In this work, the city as a fundamental category of urban planning theory in its historical retrospective is a type of settlement that was distinguished by its size, density of buildings, and its structural organisation characterised by stability in space for a relatively long period.

Thus, compared to the millennial history of man, the age of a city is a short period in which typical functional features and certain patterns can be traced that have affected both the states of the structural organisation and the processes of their development.

The socio-historical background of the city and the consequences of its development

If considering the specifics of the development of human settlements through the prism of the history of *Homo sapiens*, then it is necessary to start with it, since without its appearance the development of the city would not have been possible. Current research confirms the emergence of homo sapiens 200,000 years ago and traces the nature of its migration from southeastern, mainly east Africa to the north (Litt *et al.*, 2021). The reasons for such movements are still unknown. Such processes can probably be connected to climate change or some kind of impetus in ancient society.

Approximately 100,000 years ago, ancient people appeared in the Mesopotamian region and, relatively recently, 40,000 years ago, reached Europe. Therewith, Europe was home to another type of humanoid – the Neanderthals. Since for some time, these two groups of ancient people were simultaneously in a particular territory, it is assumed that they could intermingle. This conclusion is reached by many modern archaeologists and confirmed by numerous artefacts found during research expeditions (Choi, 2020). In addition, D. Reich (2019) concludes that the mixing of the two types of ancient people is a consequence of their continuous migrations.

However, such transformations were not equivalent but occurred under rather strange circumstances, which



resulted in the complete extinction of Neanderthals (approximately between 41,000 and 39,000 years ago (Higham *et al.*, 2014). For a long time, scientists have argued that the reason for this could be the aggressive behaviour of intelligent humans (Churchill *et al.*, 2009) and their ability to adapt better to change (Massey, 2013). Researchers have suggested that *Homo sapiens* had better-developed brains and were more organised (Ghosh, 2022).

Nowadays, there is sufficient evidence that the process of transferring cultural, technological, and biological codes from one group of ancient people to another occurred on the territory of ancient Europe. It was long and complicated (Higham *et al.*, 2014).

In 10,000 B.C., the agricultural revolution occurred – man became a nomad, as he had been until then, and began to live a sedentary lifestyle. Ian Hodder (2018) explains the connection between the agricultural revolution and the settled way of life through the emergence of dependence between people and things and even certain limitations that determined the nature of the development of the material-spatial environment of their life. As a result, the first permanent settlements emerged (Carbonell *et al.*, 2008), which differed in the number and density of the population, the way they were built, and the type of activity they performed. Archaeological findings that include more than a simple statement of the existence of a culture (Hodder & Hutson, 2003) are evidenced by a large number of works and information resources that declare a much broader way of life of ancient society. As for their location, archaeologists have different opinions: some suggest that they originated near the Mediterranean Sea, from where they spread, while others argue that there were several independent places of settlement.

Thus, speaking of 200,000 years of *Homo sapiens*' existence, the history of urban development in 5,000 years – is a relatively short stage. Settlement is an absolute know-how that arose at a relatively late stage of the development of homo sapiens and is associated with a new way of managing the economy that began to spread in 10,000 AD. Therefore, it was characterised by sedentarisation, the transition to agriculture and conscious animal husbandry. Thus, at an early stage, conditions were established here that resulted in specific patterns of action, which were expressed in agricultural activities, the transfer of spiritual and material values from one generation to another, and the need to have a properly arranged and ordered material and spatial environment as a condition for a safe existence.

Approximately 4 million people lived on the earth 10,000 years ago (Mathieu, 2022). To understand this value, for example, it can be compared to the scale of Ukraine, where as of 2021, almost 4 million people collectively lived in Lviv (2.497750 million) and Ivano-Frankivsk (1.361.109) regions (Timonina, ed., 2021); or with the population of 2.603.813 (Numărul populației..., 2022) in Moldova or 3.728.600 (Population... 2022...) in Georgia.

The first cities as a special form of settlement with a clear structural organisation characterised by stability in space over a relatively long period appeared around 3,000 BC.

The structural-functional analysis of ancient historical settlements identifies a set of constituent elements that have a specific functional purpose and a complex system of interconnections between them. In most cases, the set of such elements has been well-established and is now crucial for the study of the material remains of humanity (Idak, 2020). These include defensive fortifications, neighbourhoods, religious buildings, and other public facilities that were built gradually and were conditioned by sociocultural, political, economic, natural and climatic conditions. In archaeology, when exploring material remains (Hodder & Hutson, 2003), including settlements, a set of features is considered characteristic and stable if their existence is more or less extended in time and space.

Thus, it took humanity seven thousand years of development to establish the first centres of urban lifestyle as a special form of spiritual and material-spatial reality.

In the year zero of the new era, 170 million people lived on earth (Mathieu, 2022). The first billion appeared in 1815 after the Napoleonic Wars and after the beginning of the industrial revolution in the late 18th and early 19th centuries. It is another piece of evidence that human history is associated with hard struggle and, ultimately, with great progress, especially during the agricultural revolution, later the industrial revolution, during a period of dramatic changes in medicine, humanism, philosophy, logic, natural science, technology, etc.

In 1815, the world's population reached the first billion (Mathieu, 2022), and subsequently, the human population began to grow exponentially (Starkey, 2022). Already in 1900, i.e., at the beginning of the 20th century, during the scientific revolution, and later before the digital revolution (Stengel *et al.*, 2017), the world's population amounted to 1 billion 650 million people (Mathieu, 2022). If considering the fact that today the world's population is about 8 billion, the number is called about 8 billion, and in 2050, calculations demonstrate that, unless there are huge changes and revolutions, the world's population will reach 9 billion.

Thus, while it took humanity two hundred thousand years to reach the first billion, it took only two hundred years to reach the level of 8 billion. It is undeniable that such an energy-intensive lifestyle, accompanied by devastating disasters caused by human negligence and the irrational use of mineral reserves and resources, cannot continue. For this reason, in academic circles, the issue of population dynamics is the subject of in-depth historical and demographic research and various discussions by prominent scholars of the present day.

The British theoretical physicist Stephen Hawking said (Fecht, 2017) that if humanity continues to develop at this rate, the earth will not be able to feed everyone and people will have to move to other planets and develop them. Therefore, these recent processes of space exploration, such as the American and Chinese expeditions to the Moon and Mars and plans (NASA's Lunar..., 2020) to establish a nuclear power plant on the Moon's surface by 2024, are not just whims and adventures, but a plan to prolong human existence and intentions to survive the threat of natural disaster.



In terms of exploring the history of the city's development, it is important to concentrate on modern research areas and follow the trends of world science. It is how one of the world's leading universities, the *London School of Economics and Political Science*, together with *Alfred Herrhausen Gesellschaft* (URBAN AGE, 2020), is exploring the city in a global context. Since 2005, with its support, research has been conducted on cities (Addis Ababa, Delhi, Rio de Janeiro, London, Hong Kong, Istanbul, São Paulo, Mumbai, Mexico City, Johannesburg, Berlin, Shanghai and New York City) to assess the quality of form, governance, transportation, natural environment, public spaces, social accessibility, health, housing and economy. The results of such research, and a complex discussion among architects, urbanists, politicians, and scholars, were published in a book (Burdett & Sudjic, 2007). Here, the authors argue that the 21st century will be the age of the city. They discuss the dynamics of population change, noting that in 1900, 10% of the population lived in cities, in 2007 – 50%, and in 2050 when the world's population is theoretically expected to grow to 9 billion, 75% will live in cities. As a result, questions about the shape, size, density, and distribution of the city are becoming increasingly complex and politicised, and the impact of the built environment on social inclusion and quality of life is central to urban planning discussions.

To understand the course of human history and to understand the role of the city in its development, the work of Y.N. Harari (*Sapiens...*, 2016) deserves attention. In the research, the author describes, on the one hand, the history of the development of *Homo sapiens*, and, on the other hand, emphasises the risks and challenges associated with the massive increase in population and the prospects for survival and threats that await it in the future. The author divides the history of *Homo sapiens*' development into four stages: cognitive → agricultural → the process of humanity's unification and colonisation of the Earth → scientific, and modern, which has been reduced to the development of new opportunities and technologies.

Specific features of the development of ancient settlements – centers of urban lifestyle

One of the most controversial issues was and still is the range of questions about the reasons and intentions of the founding of cities. One of the theories about the reasons

and ideas for the establishment of cities was developed by the prominent American architectural critic, urban planner, and historian L. Mumford (1961). His main interest was the impact of technology and urbanisation on the development of human society throughout history. The scientist believed that the first cities emerged near necropolises established by nomads. They constantly returned to the burial sites of their ancestors. Over time, altars were established there, with permanent residences for those who cared for them.

On the other hand, the economic revolution occurred approximately 10,000 years ago (Larson *et al.*, 2014, p. 6140). The practice of breeding animals and cultivating plants spread, and the need for cooking, caring for children and the elderly, etc. arose. Some specific ties and restrictions resulted in the emergence of special organisations. They were characterised by a relatively stable set of constituent elements, most of which were places of permanent residence. Gradually, progress has been made in farming and improving living conditions.

As for Europe, the Neolithic period saw a more intensive development of the agricultural and pastoral form of reproductive economy, which determined a mobile-settled way of life. For example, Ukraine was home to the farming and pastoralist tribes of the Trypillian archaeological culture, which was established in the 6th millennium BC and lasted for about 2,500 years and is known for building giant settlements (Videiko *et al.*, 2005).

One of the most secretive places in modern Europe is the **Brittany** (*Bretagne*) region in northern France (Fig. 1). This picturesque corner is known for human settlement in the Early Paleolithic period. The foundation for this is the megalithic complex, which is considered to be one of the oldest in Europe, established in the region in the city of Carnac between 5,000 and 3,000 BC. The complex acquired its present appearance, which includes 40 hectares of land and a set of 4,000 menhirs stretching for almost 4 km (UNESCO Official Site), *five thousand years ago* (Lageat, ed., 1994, p. 108). It consists of 2,800 stone blocks ranging in height from 0.5 to 4 meters. It is not known for certain what function this giant object performed. Therewith, the connection with the level of development of the first intelligent people, the megalithic architecture that was being developed on the European continent at that time, and the culture of the Celts and other related peoples are quite logical.

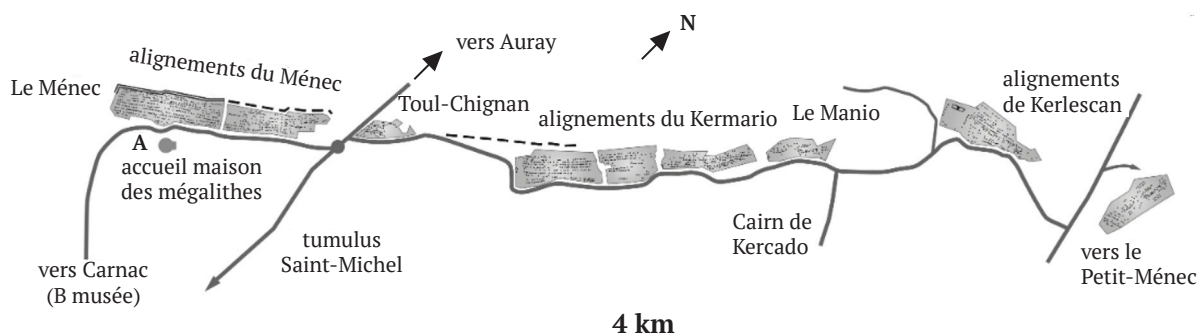


Figure 1. Schematic of the megalithic complex consisting of menhirs, dolmens, mounds and individual menhirs, Carnac (Brittany region, France)

Source: Les alignements de Carnac, 2020-2021



The research problem would not be fully stated if the connection between the city and writing were not considered, and it is not accidental. The criterion of having a written language or a city is generally accepted as a key feature in classifying a cultural entity as “highly developed” or “civilised”. Notably, the history of the city, writing, and font goes back five thousand years. The discovery of writing in 3,000 BC is a huge revolution, which is associated with the complication of trade relations and administrative management. It was necessary to reliably account for finances and record some type of information on mandatory payments by the population, whose number was growing rapidly and was significant in some areas (Boudreau, 2004; Harald, 2002).

The history of writing is not unreasonably associated with records on clay tablets found in Mesopotamia, where the first cities were discovered and established. There was a clear control of financial flows and food. Such data were initially reproduced in separate small figures and with specific markings, and over time, they were marked on clay tablets or other specially made figures (Fig. 2).

Another reason for the recording phenomenon is related to the control of specific groups of people. In the mid-20th century, the American psychologist G.A. Miller (1956) summarised the evidence that people can remember about seven fragments in short-term memory tasks. According to G.A. Miller (1956), a person can process information consisting of 7+/-2 elements in their memory; if the number of elements exceeds this number, they will divide them into groups, each containing 7+/-2 elements, for better memorisation. Later, another thesis about the limited capacity of human working memory gained popularity (Cowan, 2001). Probably considering the nature of human memory, there was a need to record the inhabitants of settlements, whose number could range from several to tens of thousands of people. Thus, the need to record information about the number of people living within the walls of a city, the names of people, their status, and the nature of their economy prompted the discovery of writing. Only under such circumstances could the first rulers, princes, kings, and tsars control the masses, and so society became civilised, which meant controlled (Fig. 2).



Figure 2. Clay tablet, one of the oldest written documents, 3.100-3.000 BC, Mesopotamia. The text refers to beer provided to employees as part of their daily rations

Source: Sumerian... (2022)

In parallel with writing, the system of graphic signs and letters developed. Thus, cuneiform, as an ancient form of writing, went through several stages of evolution and covered the period from the 14th century BC to the first century AD. In the process of development, figurative images were replaced by abstract ones. For example, in 3300 BC, which is the era of the first highly developed cultural centres or cities, the head designation reflected the form in its typical features (Fig. 3). It was the same in 3,000 BC. Already in 2.500 BC, the natural figure of the sun gradually changed its shape, and in 700 BC, it was completely replaced. This process is related to technological aspects – in the process of collecting taxes or recording some data about the city’s residents, it was necessary to make a quick record (Harald, 2002). Such changes are observed concerning the shape of the head, arm, goose, fish, cow, etc. Thus, the change in writing related to technology is nothing more than a continuation of digitisation, which began around 3,300 BC and has been going on for *five thousand years*, just like the development of the city.

	3100 BC	3000 BC	2400 BC	1000 BC
head				
mouth/speak				
water				
drink				
go/stand/bring				
heaven/god				
earth/land				
woman				
mountains				
slave-girl				

Figure 3. Changes in Sumerian Cuneiform script (adapted from G. Sampson, 1985)

Source: Fay et al. (2014)

It can be assumed that the change from figurative to abstract representation in writing influenced the creation of the largest and most powerful metropolis of the time, **Babylon**. This happened between 605 and 562 BC in the era of King Nebuchadnezzar II, which existed in its best manifestations between 3300 BC and 500 AD. Thus, if examining the first laws of Hammurabi, it is evident how the writing looked and what the font was like at that time. It is the first real mention of architects: “*When builders construct a house for a citizen, but their work is not based on a solid foundation, the*



house will fall and cause the death of the owner – this results in that builder or architect being killed or murdered” (King, 1915, §229). Since this text was contained in the first font laws, some precedents made them highly liable for any violations.

The city plan (Fig. 4) allows for estimating the size of

Babylon (Fig. 4 a) in the era of its greatest design and tracing the process of territory development in historical retrospect. The plans of the city identify four parts surrounded by an independent system of defensive fortifications (Fig. 4 b, c, d, e).

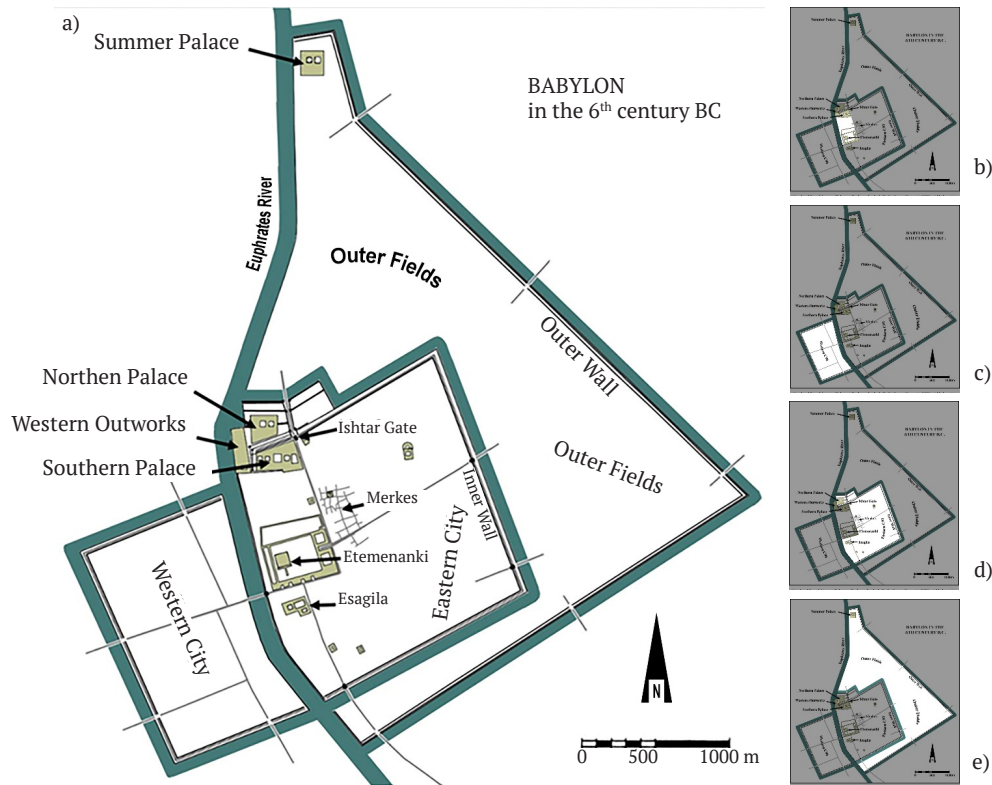


Figure 4. Schematic diagram of the city of Babylon in the era of King Nebuchadnezzar II with the identification of parts corresponding to the stages of its development: a – general plan; b – part of the city associated with its emergence; c – part of the city that demonstrates rapid development; d – part of the city associated with its establishment as a metropolis; e – outer part of the city

Source: Map of Greater Babylon. Redrawn by J.A. Parkoff after Parapetti (2008: 141, Fig. 13); archaeological & theoretical gate locations based on George (1992: 141, Fig. 7); b, c, d – processed: Idak, Y., 2022

The first part is related to the emergence of the city and corresponds to the stage of its development.

The second part – the forbidden or closed city – is a testament to the rapid development of the city’s territory and its large-scale transformations. During this time, the city received a regular layout. The centrepiece is a complex of religious buildings, including the *Etemenanki* ziggurat. This sacred part was connected to the Ishtar gate by a precession axis marked by Procession Street, which was ritually used several times a year. In addition, a country palace adjoined the Ishtar gate.

Relatively later, the third part of the city was completed, which was called the “new city” (Western City on the city plan). This stage can be associated with the city’s establishment as a global metropolis. The new city was surrounded by a moat filled with water and three-membered city walls, which were monumental and, due to their size, were part of the urban ensemble (Nesselrath, 2020). In the process of developing the territory of the new city, the precession axis was lengthened and now symbolically connected the Ishtar

Gate and another city gate named after the patron god of Babylon, the Marduk Gate.

Water canals were constructed through and around the city, passing through the entire territory of the city and being part of a complex irrigation system.

An important component of Babylon was the so-called fourth outer part of the city. Its importance is evidenced by the fact that it was surrounded by a deep moat and walls consisting of a large number of square towers (Willson, 1856). In combination with the fortifications of the old and new city and water canals, the outer walls were an equivalent part of the city’s defence system. Its territory included agricultural land. Due to water canals, this part ensured food independence. The importance of the water channels and the outer part of the city was equally and strategically important for the security and development of the city’s economy.

For the history of urban planning, such data is particularly relevant when it comes to exploring the specifics of the functioning and nature of the development of urban planning objects over several thousand years. The first





three parts of Babylon, which are based on the layout of this ancient city, correspond to the three stages of its development and testify to the transition from one qualitative state to another. The role of the fourth part is determined by the specifics of its functioning. At each stage, the changes that resulted from effective socio-economic policy and a high level of technology development, including construction, can be traced. The consistent change of such states in the process of city development provides opportunities for rethinking past worldview ideas and methodological approaches from the perspective of the present. It demonstrates consistency in building a new, at the time, urban planning culture.

As already noted, since ancient times, historical settlements have been characterised by a well-established set of constituent elements. The main ones acted as expressors of the city's integral identity (Cherkes & Yuryk, 2014, p. 36).

The centrepiece of the city of Babylon was the *Etemenanki* ziggurat (Fig. 5). There are records of it sparkling in the sun and being visible two kilometers away from the city. Therefore, it attracted foreign travellers like a magnet, who left stories and legends about the existence of the mysterious object. Its image has excited more than one generation of artists, architects, historians, and other experts in the study of antiquities, which is why the Tower of Babel has received numerous interpretations of its symbolic meaning. And here it is logical to explain that the process of constructing identity is based on the revision of history, the restoration, partial or complete falsification of the historical past. They naturally result in the revision of mythology, “inventing” new myths (pseudo-myths) or reanimating old myths that are convenient for the current conditions (Cherkes, 2008, p. 29).

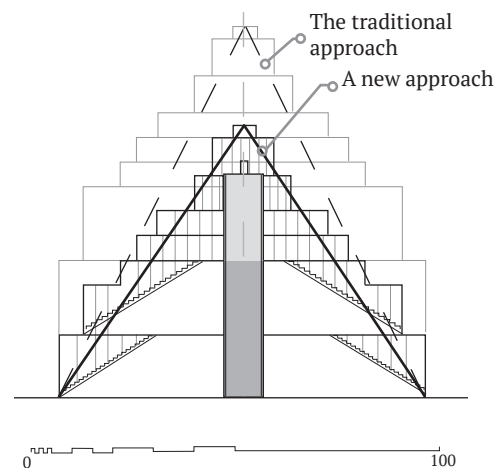
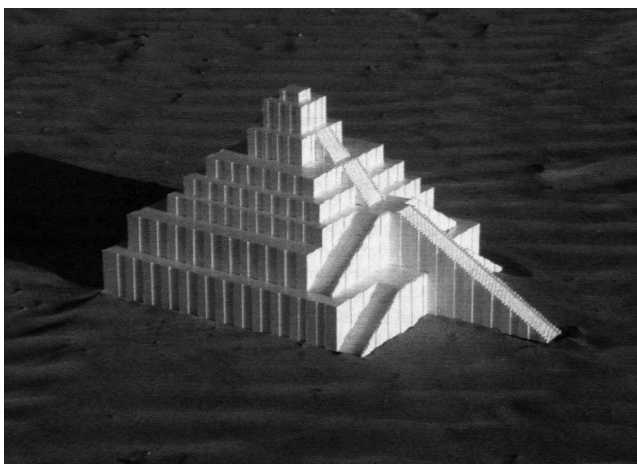


Figure 5. Hypothetical reconstruction of the Etemenanki: a – general appearance of the tower; b – diagram of the analysis of new and old approaches to the reconstruction of the tower

Source: Fenollós *et al.* (2005)

It has been suggested that Babylon was the largest city in the ancient world and the first city to have a population of more than 200,000 inhabitants (Chandler, 1987). Many years of archaeological research conducted by German, Iranian, and Italian expeditions (Pedersén, 2021, p. 15) have yielded data on the exact location, size, and nature of the ancient city's buildings. Its area was about 850 hectares (McEvedy, 2011). To imagine this size in the context of historical cities, it is enough to compare it with the area of the ancient city of Athens, which in its heyday was 215 hectares; and the area of the capital of the Roman Empire, the Eternal City of Rome, in its heyday in the second century AD, was 1,500 hectares, which is 3,000 years later than the first cities were founded.

According to the available archaeological research and graphic materials developed based on it (Pedersén, 2021, p. 15), it is demonstrated that the city of Babylon was developed in the Mesopotamian lowlands and had a regular layout and a simple shape – an almost perfect rectangle divided in the middle by the Euphrates River. In part, this configuration can be traced in the landscape. The river

divided the city into western and eastern parts. Over time, the river changed its course and now flows through the ruins of the Western City.

According to the German archaeologist *Robert Johann Koldewey*, the total length of the city walls of Babylon in the sixth century BC was 18 km (Nesselrath, 2020, p. 191), of which 8 km were the walls of the inner city (Al-Dulaimi *et al.*, 2018). To understand the actual size of the ancient metropolis in the context of a modern city, a comparison can be made, for example, with the historic centre of Lviv, which developed around Rynok Square. Google Maps aerial photography (Google Earth..., 2022) allowed for estimating the size of the area, and a historical map (Austrian War Archive, 1777) helped to identify the walls. The area of the historic city centre is on average 500 x 500 meters; the approximate length of the ancient city defensive walls is 1.6 km, which is more than 10 times less than the length of the walls of Babylon as of the 6th century BC.

The data concerning the size of the defensive fortifications and other important objects of the city of Babylon are not unreasonably impressive. The height of the defensive



walls was 27 meters (Asheri *et al.*, 2007, p. 199). Within their boundaries, in addition to the main temple of the entire Babylonian kingdom, the *Etemenanki* ziggurat, the city had 52 more. In addition, the longest bridge in the ancient world was built in the city, with a length of 115 m and a width of 5-6 m (Asheri *et al.*, 2007, p. 205).

The successful economic policy of Babylon contributed to its active development and the accumulation of significant reserves of wealth, which is why the city attracted an incredible number of conquerors. But all of the conquerors knew little about agriculture, horticulture, or the infrastructure of cities in the East Asian region. As a result, cities fell into decline after significant interventions. The city of Babylon was no exception.

Thus, a characteristic feature of Babylon is the rational development of the settlement territory and its regular planning. They were caused by a uniform change in the formal states of the urban environment in time and space and demonstrate a specific stage, due to the relative

independence of the stages of development, which had characteristic manifestations in the functional organisation and planning structure of the city.

Urban development is influenced by political, economic, and cultural values

History knows numerous examples of when cities were developed based on the principles of harmony with nature. A striking example of such developments is the city of *Athens*. Here, the initial use of space was dictated by the nature of the area, and the development adapted to it (Dimitriadou, 2019, p. 19).

Thus, if the history of the development of the material and spatial environment of Babylon is rethought using formal criteria discovered during archaeological research and initiated by Robert Koldewey in the late 19th century (Boiy, 2004, p. 8), in the case of Athens the key role is played by the Acropolis, which is in the visual focus of the established urban space (Fig. 6).



Figure 6. A general perspective of Athens, with the acropolis in the geometric centre of the image as its central element
Source: photo by Bohdan Cherkes, 2018

The process of developing Athens was not ordinary and occasionally complicated. The starting point for its establishment was a natural hill and in the future the Acropolis of Athens, which played a decisive role in the development of the city. Nowadays, the Acropolis of Athens is a special place of magnificence and veneration for visitors (Midgette & Josing, 2000, p. 14), and for researchers, it is endowed with special attention, as it has become a landmark for rethinking ancient approaches to the development of urban structures.

Archaeological research proves that the Acropolis of Athens (from Greek *Ἀκρῶς* and Greek *Πόλις* – *upper city*) was already inhabited in the 4th millennium BC (DeVries, 2006, p. 352). Initially, there was a palace here, which was surrounded by a powerful wall in 1.250. Later, the Athenians claimed that it was due to it that the city never fell into the hands of invaders and later became the capital of Attica (Castleden, 2005, p. 64). Thus, as the centre of the city's design, the acropolis began to develop around the 13th century BC, i.e., 2,000 years later than the cities of Mesopotamia.

Over time, a settlement grew around the Acropolis. The remains of an ancient settlement are found in three

places: on the summit, high on the north slope, and low in the northwest (Dimitriadou, 2019, p. 20). Eventually, a new addition in the northwest became the site of the agora, and the Acropolis became a spiritual centre (DeVries, 2006, p. 352). At this time, the city's territory is defined by a variety of structural elements and functional content: new urban developments appear and are extended by public buildings that arrange around them a space publicly accessible to city residents, such as an agora. Ian Peter Morris (2009) noted that until the end of the first millennium BC, Greek cities were weak politically and militarily and, therefore, remained small. It was only when the Greeks became part of the Persian Empire that supercities became possible.

The relatively modern appearance of the Acropolis of Athens was obtained in the 5th century BC (Daly & Riccardi, ed., 2015, p. 137-138) (Fig. 7), which is known as the *Golden Age of Athens*. As a result, an ensemble was designed according to a single plan, uniting several buildings: The Parthenon, the Propylaea, the Temple of Nike Apteros, the Erechtheion, and the bronze statue of Athena Promachos (The Acropolis of Athens, 2008). In the 21st century, the Acropolis of Athens is a 156-meter-high hill rising above the city, approximately 300 meters long and 170 meters wide (Jarus, 2013).





Figure 7. Model of Ancient Athens, 5th century, the Acropolis Museum

Source: Bohdan Cherkas archive, 2018

In the 6th century BC, events occurred that changed the course of the history of the entire city. The threat of military attacks necessitated the construction of additional fortifications (DeVries, 2006, p. 352). Such measures fixed the city's boundaries and formally limited its territorial development. However, the city was destroyed.

In the 5th century BC, after the war between the Persians and the Ionian Union of Cities, the Athenian Maritime Union was established under the patronage of *Athens*. The city became the centre of economic, political, and cultural life in ancient Greece. The first democratic foundations of the city's development began to develop here: public spaces were established where democratic processes occurred, theatres, stadiums, democratic temples, later forums, etc. (Connolly & Dodge, 1998). All of these components are not present in the ancient cities of Eastern cultures, which until the 19th century did not know public spaces other than markets. It makes the ancient European city significantly different from those established in Mesopotamia, Ancient Egypt, Ancient China, Ancient India, etc.

Subsequently, conditions were established that favoured reconstruction and caused its transition to a new period (Sofroniou, 2015). From 470 to 430 BC, Athens experienced a golden age (Bancroft, 1876, p. 85). At that time, the city's area was approximately 215 hectares (McEvedy, 2011), of which 150 hectares were developed with private houses (Kolb, 1984, p. 80-81). In addition, many public buildings were constructed, which reinforced the importance of the Acropolis and the agora (DeVries, 2006, p. 353). All the buildings were harmoniously combined; the city's territory has not changed. However, even this time was not calm in the history of the development of this city, as at the end of the 5th-century wars between the Athenian Maritime Union and the Peloponnesian Union began, which resulted in a crushing defeat and a reduction in the territory of Athens. However, this reduction was relatively minor, as the city's territory was previously quite large – 1.6 km in a straight line between the southern and northern parts.

During the era of Roman rule in 290 BC, the city declined, and its size decreased (Ehrlich & Vanderpool, 2022) to 180 hectares. Gradually, after the destruction of the

Byzantine Empire by the Ottomans in 1453, the city turned into a village. It was only in the 19th century, due to the fascination in European society with ancient civilisation, democratic civilisation, and Greek independence after 1830, that Athens was rediscovered. Large-scale excavations began, and it came to life again and began to function in the consciousness of the scientific and later public world. Thus, it can be said that for almost 1,800 years this city as a capital, and the cradle of European urban culture, has been disappearing from consciousness.

Thus, the nature of the development of Athens was slightly different from that of Babylon, for example. The process of changing from one qualitative state to another was unpredictable, driven largely by political reasons. Although they caused rapid territorial development, the transition itself was accompanied by a complex combination of planning elements of different configurations. They became decisive in the design of a special form of aesthetic development of the urban environment.

In ancient times, the development of humanity and the construction of cities were not uniform. The process of change was accompanied by frequent epidemics, which states did not fight, but were perceived as natural disasters, which, in most cases, caused degradation and decline. As a result, the emergence and prosperity were replaced by an era of decline, which, according to scholars, is a natural process. In this context, a book by the American author K. Harper (2020), where argues that climate change and pandemic diseases were an integral part of the fall of the Roman Empire.

The Roman Empire – a state and military-political entity that was established around the Mediterranean Sea and partly the Black Sea. Its establishment was preceded by the political strengthening and economic rise of the Roman Republic at the international level, which developed from the city of Rome. Detailed mapping material (Detailed Map..., 2015) demonstrates that in 211 AD there were more than 870 cities and settlements within the Roman Empire and more than 90 Roman cities and settlements outside the empire. Therewith, the database compiled by J. Hanson (2016) contains information on 1388 cities that



existed during the imperial period in the Roman world. The total length of roads connecting all these settlements was 120,000 km (Cartwright, 2014) (Fig. 8). In the context of

urban planning, the Roman Empire is a highly organised system consisting of many interconnected elements and a clear affiliation with one main city, Rome.

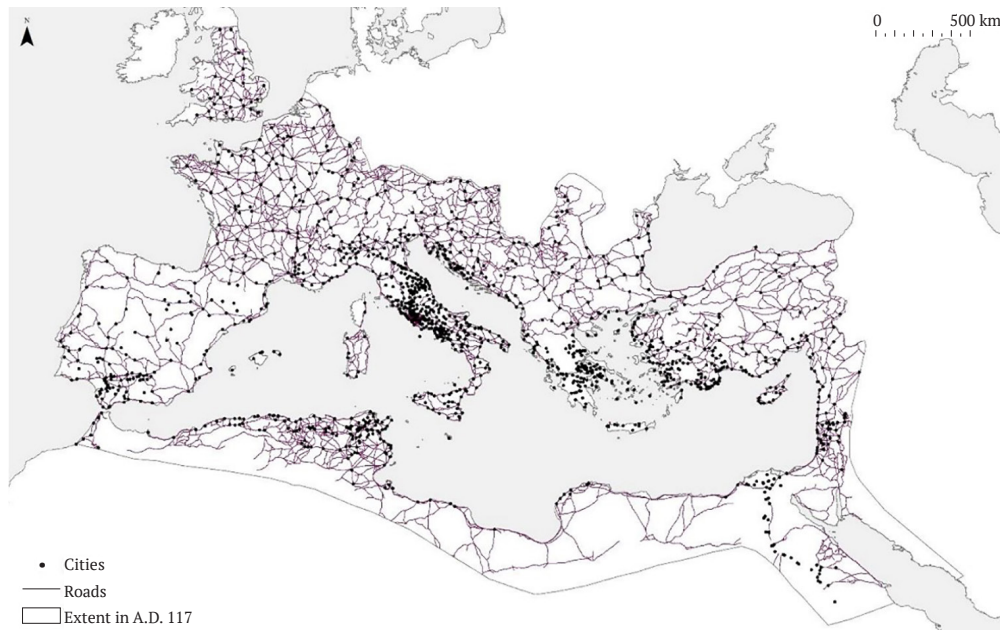


Figure 8. The network of cities and roads of the Roman world, 3rd century AD.

Source: Hanson (2016)

The Mediterranean Sea played a crucial role in the economic development and political strengthening of the Roman Empire. It was its inland lake and provided the adjacent territory with a specific type of subtropical climate, characterised by dry, hot summers and rainy, cool winters. For comparison, the Roman Empire during 250-350 was the largest in the world, covering 4,400,000 square kilometres (Taagepera, 1979, p. 222), and the Mediterranean Sea covered 2,510,000 square kilometres (Salah & Baruch, 2022), which was 57% of the total area of the entire mighty empire. With the conquest of Egypt in 30 BC. For the first time, the Mediterranean became one political unit – a large lake within one empire, the “Roman Lake” (Lopes, 2010).

After several studies by K. Harper (2019; 2020), the idea that the period of the Roman Empire’s greatest prosperity was associated with climate change (Harper, 2020), caused by an increase in average temperature by two to three degrees, has become popular. Thus, the Holocene in northwestern Europe was replaced by a period that went down in history as the Roman climatic optimum (Lacey, 2022, p. 210). It was distinguished by relative air warming, which had a positive impact on the development of agriculture and horticulture.

Already in the next period, which is approximately the time from 250 or 450 (the exact date is currently the subject of deep scientific debate), there was a cooling (Harper, 2020; Lacey, 2022, p. 210). Scientists have attested to this based on references and descriptions of poor harvests and disease susceptibility resulting from heavy rain and thunderstorms, flooding, cold winters, early cooling, and late warming (Harper, 2019).

In the period of 1,000 BC, other cities were established that can boast several thousand years of history. Such is Jerusalem (Fig. 9), one of the world’s greatest cities, with a history dating back more than 3,000 years. The city is known for such sites as the Temple Mount, which is still the site of great tension between Jewish and Islamic cultures, although Christianity has been active in its development.



Figure 9. A model of Jerusalem (Israel), at a scale of 1:50 (1cm=2m) of the real city

Source: Bohdan Cherkes archive, 2018

As for the layout of the city of Jerusalem, it was developed without a clear plan and was determined by some natural causes. Here you can trace the changes that resulted in the development of the city of David, Solomon, and the Roman





governor Herod, who introduced Roman urban elements into the urban structure, from large-scale construction to theatres. This combination of different times and different urban planning approaches have resulted in the enrichment and diversity of the city's urban culture.

Another example of a city unique in its development is Venice (Italy). Just like Jerusalem, its development was caused by events that were arbitrary and heavily influenced by political, economic, and socio-political conditions. Venice was established in the lagoon by refugees from the continent who sought refuge on the water from the barbarians who destroyed and plundered the Roman Empire (Toynbee, 1973, p. 276). These vandals did not know how to navigate. Thus, at first, it was a place for the short-term stay of people. Later, in the 5th century, the territory of almost 600 hectares began to function as a place of permanent residence.

Gradually, the continental and island territories (120 islands (Lyde, 1930, p. 99) merged into one. Through a system of bridges and canals, it has developed into a single conglomerate where harmony and an unconscious sense of identity with European culture reign.

In 1550, Venice had a population of 163,627 (Balchin, 2022.). Currently, on the same 600 hectares, the city accommodates between 45,000 and 50,000 people, demonstrating the influence of the laws of linearity and alignment, progressiveness and regressiveness in the history of urban culture.

A common feature of Babylon, Athens, Jerusalem, and Venice is that they were once world centres of urban civilisation with heterogeneous functional content and a significant volumetric and spatial scope. Therewith, the transition from one qualitative state to another and the formal expression of their material content had significant differences, in particular at the level of functional and planning organisation of the territory. This situation requires a reconsideration of existing approaches to exploring the city.

Finally, the laws of urban development can have quite unobvious signs, such as the cities of Caracas (Venezuela) and Ékmord (Provence, South of France) (Fig. 10; 11).



Figure 10. Slamsy, Caracas (Venezuela)

Source: Murzyn & Varon (2011)



Figure 11. Ekmord (Provence, South of France)

Source: photo by Bohdan Cherkes, 2018

The photograph of the city of one million people in Caracas represents the Slums that were developed in the 20th century. At first glance, the city is completely regular and planned, and on the other hand, Eckmord is a city that was planned in the 13th century and is dominated by much more progressive qualities than the Slums in Caracas.

Thus, five thousand years – this is the time during which specific social groups managed to form a complex material-spatial structure that, under specific political, economic, social, and cultural conditions, was endowed with special features. Such features were expressed both at the level of formal and informal qualities in the design and development of the material-spatial environment of human activity.

DISCUSSION

The research attempts to identify the key points for human development that are within the competence of urban planners. They are recorded by history in the form of the city as an unprecedented type of settlement that has been distinguished by its functional diversity and spatial scope for many millennia. Based on the generalised experience of urban planning and the idea of the city in the context of exploring the history of its development, it can be assumed that this approach was based on the necessity to establish a specific material and spatial environment for human activity and was accompanied by a controlled increase in the size of the territory of settlements.

As a result, settlements with heterogeneous forms and structures emerged. It is confirmed by numerous archaeological sites (Maleev, 2001), images, and descriptions. They record the formal side of the life of these ancient structures: the methods of functional design and ways of organising them, the size, nature of the layout, and the specific features of the spatial solution (Lynch, 1984). Each of these characteristics has become the foundation for the development of various classifications (for example, by configuration or layout) and the identification of specific types. Based on such data, the history of urban planning uses a classification based on the nature of the layout of ancient



settlements. Over time, ready-made schemes and methods for exploring historical objects and phenomena in urban planning emerged.

The most common methodology is the one based on the study of the city as a variable historical phenomenon and focused on identifying the specific features of the design of its constituent elements in the context of historical development and searching for general trends in the history of urban planning. Therewith, the city is considered an integral historical system (Timohin, 2008), and its research is mainly provided by periodisation, historical-systemic, and historical-typological methods. The evidence foundation is based on mechanisms (states and processes) that are logically interdependent.

Following this approach, Babylon, Athens, Jerusalem, and Venice can be described as cities associated with the development and greatness of a particular state establishment. Depending on the conditions in which each of them found themselves, cities underwent some changes or acquired specific states. Therefore, there are general trends based on *linear* or *progressive development*.

Linear development implied a gradual transition from one qualitative state of the material-spatial environment of human life to another. This process was marked by unity and progress in the development of the city. In a specific sequence, structural elements with a new functional purpose and formal expression appeared (Lynch, 1984). In such a situation, the functional organisation and planning structure of ancient settlements had a regular expression and was characterised by stability over a relatively long period. An example of a city with an inherent linear development is Babylon.

Progressive development is more common in cities with a sharp change in the urban environment. In contrast to linear development, it is characterised by spontaneity and emerged under the influence of unplanned actions and needs (Morris, 1994). This order arose naturally, inseparably from the existing elements of natural origin: hills, water bodies, etc. An example of a city with inherent progressive development is Jerusalem.

However, the development of ancient cities was not always linear or progressive. It is demonstrated by the wide palette of architectural and urban planning objects of antiquity (Rossi, 1966). History knows numerous examples when, at certain stages, cities developed rapidly, and later, just as rapidly, they declined. Therefore, if cities are analysed in general, in addition to linear development, a development that corresponds to the nature of the regression can be traced. An example is Athens, which lost its significance and degraded during the Roman Empire's rule, but its territory and attributes have not changed significantly.

After all, such examples in history are not isolated and frequently involve powerful cities. Thus, at one time, the eternal city of Rome turned from a mighty capital, the administrative, cultural, and political centre of the sacred Roman Empire, into a small settlement with a destroyed and looted forum, where, according to travellers' stories, shepherds grazed cattle and marvelled at the scattered stones.

Therewith, with this approach, ancient cities, each of which is unique in its various manifestations (Mumford, 1979), lose their special role in the process of cognition. Generalisations and commonly accepted classifications impede the identification of facts that would confirm the specificity of a particular historical object. In this context, it is advisable to develop an approach to the research of the city based on the idiographic method designed to describe individual features of historical facts (Kovaliv, 2007, p. 405). Without emphasising the logical change of states and processes, all the possible features of a city that mark its natural originality can be identified. Therefore, there is an assumption that this approach will strengthen the connection between the theory and practice of urban planning.

Thus, in his time, Professor Anthony Edwin James Morris of London South Bank University published a thorough work "History of Urban Form: Before the Industrial Revolutions" (1994). Here the author emphasised the states that characterised the physical features of the city. He explained and developed the concept of "unplanned" cities that grew organically, as opposed to "planned" cities that were developed according to the determinants of urban form.

Most ancient settlements in the history of urban planning are synergistic. To explore them, it is not enough to apply classical models of design and ways of development. Therefore, there is a necessity to consider the city as something specific through the categories of destruction, randomness, imbalance, and excluding the possibility of causal relationships.

Historical and comparative analyses of the formal expression of urban centres such as Babylon and Athens (Egli, 1959) have confirmed that functional diversity and spatial scope were important characteristics for representing their greatness and power. However, quantitative characteristics are not always representative of originality. Thus, in the case of the complex history of Athens, it is of interest to identify the accidental factors that influenced its development and functioning even during its decline.

Such examples suggest that the approach to exploring the history of urban planning should go beyond complexity when history considers the city as an interconnected and proportionally coordinated development within one holistic historical system. It is important to emphasise how information is presented and to develop approaches that will determine the essential features of an ancient urban development on a particular example, identifying the processes and conditions that contributed to their change, regardless of whether its original qualities have been preserved or not.

Another important point in the history of urban planning is the fact of understanding the self-expressive qualities of the ancient city through the category of identity (Cherkes, 2008). The modern understanding of identity in architecture and urban planning is quite conscious and diverse. Therefore, the process of establishment is largely coordinated and balanced. In the historical dimension, self-expression in urban planning was ensured by the level of political, economic, social, and cultural development. In this context, Babylon is an example where all the processes associated





with the establishment and development of the material and spatial environment of human activity did not deny the old and established a new one adapted to the existing natural conditions.

CONCLUSIONS

Nowadays, the history of urban planning demonstrates a heterogeneous palette of techniques and methods of organising urban centres that have been established for five thousand years: from the beginning of the development of settlements to the evolution of *Homo sapiens*, from *Homo sapiens* to *Homo urbanus*, from the enormous problems that humanity has today due to the demographic explosion and the challenges that humanity faces today. In this five thousandth minimum, one can understand the essential features of ancient urban centres and the prospects for the development of Ukrainian cities as conventional places of residence for a large number of people and the coexistence of heterogeneous functions.

The research allowed expanding the understanding of the essential features of the mechanisms of development of ancient urban centres, which occupy a special place in the history of urban planning on a global scale. It allowed the development of an opinion on the importance of developing different approaches to exploring the city in a historical context.

In the presence of a significant amount of data on the physical condition of ancient cities, it is necessary to adjust the usual methodology for exploring the city. In particular,

it is proposed to develop two areas. The first, the classical one, should be further designed in the context of the search for general trends in urban development in historical retrospect. The second is to develop it as opposed to the first. In this case, when exploring a city, you should not compare its data with others or rely on generally accepted classifications. Here it is necessary to look for those features that can define its uniqueness and find a place in the past of humanity.

Although historical research employs a large number of methods, it is appropriate to devote attention to the implementation of a synergistic approach. It will allow defining a new paradigm of the history of urban planning in modern conditions. By changing the usual approaches to the city's research, a new model of the city in history will become widespread.

The purpose of the research is to obtain the essential characteristics of historically significant cities with an emphasis on the formal qualities in the organisation of their material and spatial environment. The material developed substantiates the necessity of deepening the theoretical and methodological tools. In the future, it will be the foundation for a new classification of ancient cities and will contribute to adjusting the approach to the presentation of educational material in the history of urban planning.

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Феномен міста у сучасному дискурсі історії містобудування

Анотація. Сучасний підхід до викладу історії містобудування є заангажований старими наративами щодо розуміння природи розвитку міста як деякого унікального об'єкта із тисячолітньою історією. За умови відбудови та відновлення зруйнованих війною населених місць України необхідно виявляти специфічні ознаки та розвивати розуміння такого роду явищ відповідно до викликів сьогодення. Розгляд їх у глобальному вимірі, допоможе розвивати ідеї на засадах українських культурних цінностей і продовжить формувати національну ідентичність в архітектурі та містобудуванні. Мета статті спрямована на осмислення процесів формування міста протягом п'яти тисяч років та виокремленні тих аспектів, які є свідченням феноменального прориву у розвитку людства. Методологія дослідження ґрунтується на принципах та методах у межах логіко-гносеологічного та філософсько-світоглядного підходів. Результатом дослідження стало виділення специфічних для певної епохи та культури характеристик матеріально-просторового наповнення давніх міст світу, які пережили тисячолітню історію, а також позначені тих якостей, що стали визначальними для оцінки їхнього розвитку. Увагу зосереджено на формуванні *Homo sapiens* та виникненні писемства, без яких існування міст було б неможливим. Порівняльну характеристику давніх міст зроблено на прикладі таких поселень як Карнак, Вавилон, Афіни, Венеція, Єрусалим, а також Римської імперії, яка мала сталі містобудівні засади протягом декількох століть. Для історії ці поселення займають особливе місце, так як є репрезентантами специфічних еволюційних підходів у становленні та розвитку матеріально-просторового середовища життєдіяльності людини. Зміна їх формальних станів була неоднаковою, проте кожен раз вона призводила до якісних перетворень. Через це автори пропонують заглибитися у розуміння розвитку давніх міст через категорії лінійності, прогресивності та регресивності, а також зосередити увагу на поглибленні звичних підходів до вивчення міста

Ключові слова: теорія; *human settlement*; розвиток; лінійність; спонтанність; ідентичність



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Light in the contemporary churches of the Ukrainian diaspora

Abstract. Nowadays, the Ukrainian church building has not yet succeeded in establishing its own modern image/type of church, different from the conventional one. One of the significant reasons for this situation is the long break in the design and construction of churches in Ukraine during the 20th century. The Ukrainian diaspora has accumulated considerable experience in the construction of modern churches, which ensures the continuity of the tradition of the church building. The purpose of the research is to explore the still invaluable experience of designing church buildings and the architectural and artistic organisation of their interior in Ukrainian diaspora churches, which is an important foundation for solving the problem of developing the image/appearance of a modern church. For experimental studies, the method of architectural modeling was used, with the help of which the important properties of the church buildings were investigated. The research analyses several projects by architects of the Ukrainian diaspora in the field of sacred architecture. The research identifies the specific features of the establishment and development of church architecture in the Ukrainian diaspora in terms of the debate over the conventional and modern forms of church buildings and the spatial organisation of the light composition of their sacred space. The research outlines the influence of the local architectural tradition of the church building in North America – Protestant and Catholic churches – and the modernist design culture of the period of functionalism and neo-modernism in architecture on the architectonics of Ukrainian churches in the diaspora and the organisation of the light environment of their interior space. For the first time, the features and regularities of the organisation of the light environment of the most famous Greek Catholic churches of the Ukrainian diaspora in Canada and the United States, built in the second half of the 20th century, are explored. The influence of natural light on the architectonics of churches and the specific features of visual perception of their internal object environment and on the development of the appropriate mood imbued with mysticism and sacred atmosphere of the interiors of churches is determined. The experience of diaspora architects is explored and analysed, which has not been understudied but will be essential for use in the practice of Ukrainian architects in designing modern churches while preserving national identity and church-building traditions

Keywords: natural lighting; church; sacred space; church architecture; tradition

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INTRODUCTION

Analysing the architecture of modern church buildings in Ukraine, it can be argued that most contemporary architects do not have the fullness of professional knowledge in the field of sacred architecture, do not understand and do not consider the essential role of light in developing the architectonics of the Eastern Christian church. The subject of the functioning of light, particularly natural light, in the sacred space of the temple has been understudied. A small number of scholarly works by both foreign and Ukrainian authors are devoted to this subject.

Several authors have explored the specific features of sacred architecture and some aspects of the organisation of the light environment/composition of contemporary diaspora churches. In particular: T. Hevryk (1990-1991; 1999), who devoted a significant part of his research to the specifics of the churches designed by R. Zhuk; A. Borys (2015; 2017; Borys & Frankiv, 2015), who covered and analysed numerous sacred buildings by architects of the Ukrainian diaspora and the features of their church-building heritage; V.B. Tymkiv (2017), who explored how architects of the Ukrainian diaspora inherited and interpreted the traditions of the Ukrainian church building, etc. In addition, among the scientific works, particular attention should be devoted to the theoretical works of the famous Canadian architects R. Zhuk (1984) and M. Nimziv (1982), which describe their understanding of the regularities of rhythmic relations in Ukrainian church architecture and the importance of tradition in sacred architecture. A monograph by R. Halysych (2002) is worth highlighting, analysing the artistic features of Ukrainian church architecture and interiors in Eastern Europe and the West in the 20th century.

During the period of the highest development of modernism (in the 1950s-70s), church construction in Ukraine completely stopped, and experiments with modernist forms in the sacred art of the Ukrainian-Byzantine tradition continued only in the diaspora (Halysych, 2002; Proskuryakov & Kucher, 2006). It was among the Ukrainian diaspora in North America that several architects emerged: R. Zhuk (1984), M. Nimtsiv (1982), etc., who attempted to establish a modern image of a church of the Ukrainian-Byzantine tradition made with materials based on the principles of functionalism. The church architecture of the diaspora developed continuously in the context of the world's sacred culture. The architectonics and organisation of the light environment in the interior space of Ukrainian churches in the diaspora were developed under the influence of world sacred architecture, whose structure and architectural forms began to change significantly in the middle of the 20th century. The light composition in the space of the modern church changed accordingly (Borys, 2015; Kutsevych, 2013; Tymkiv, 2017). After the resumption of church construction in Ukraine, the experience of diaspora architects became the main guideline for the creative search for architects in Ukraine.

The purpose of the research – to identify the main factors that influenced the development of church architecture of the Ukrainian diaspora in Canada and the United

States in the second half of the 20th century; to establish methods of developing a light composition in the sacred space of a modern church. The objective of the study – to establish the specific features of the lighting design of the interior space of modern Greek Catholic churches in the diaspora by subjective assessment of the distribution of surface brightness and quantitative indicators of natural light fluxes on individual church models.

MATERIALS AND METHODS

The purpose and specific object/subject of the research – the spatial organisation/composition of natural light in the space of contemporary diaspora churches/cathedrals – required considering the specific features of light functioning in the space of the church in two aspects. From a formal standpoint, it becomes apparent from how the sacred atmosphere of the interior space is expressed using architecture and becomes apparent through the spatial distribution of light in interaction with the vaults, wall surfaces/iconography, and all the object elements of the interior space of the temple, which can be qualified as architectural forms of expression of the sacred. In addition, it is from a semantic standpoint that sprouts from the theological, metaphysical essence of light, elements of the architectural structure of a church building: light openings, windows; light-reflective surfaces (walls, vaults), etc. Thus, the light in the space of the temple was considered from the standpoint of both architecture and architectural lighting technology, as a sacred phenomenon.

A theoretical study was performed, determining information about the features and patterns of development of the light composition inside the church. The research was based on general scientific methods, in particular, observation and generalisation, and special methods, such as analysis, synthesis, and abstraction. Using the method of visual analysis in combination with the method of observation, the main subject of which was the brightness distribution of the interior surfaces of the temple and the main vector/field of light propagation in the interior of a sacred building, the author explored which surfaces play the most important role in the light propagation in the temple from a physical standpoint and which three-dimensional elements should be emphasised in terms of the sacredness of the space. The entire process of light propagation – the spatial distribution and brightness of the surfaces – was decomposed by abstraction into components: straight and reflected light, which has equivalent sacred meanings within the interior of the temple as a sacred space. Using the method of synthesising the physical illumination of the church interior and the spiritual, i.e., sacred, lightness of the interior elements, such as the altar, bath, narthex, and their elements, the importance of their illumination by architectural means was determined, depending on the sacred value of these elements. This approach allowed exploring some aspects of the interaction of the temple's spatial elements with the natural light that penetrates the temple space. Therefore, the method of generalisation





is important in determining the main and effective approaches to designing a suitably illuminated temple space in terms of sacredness.

For experimental research, the method of architectural modelling was used – a method of scientific research of important properties of an object (an existing church building). To explore the quantitative characteristics of light fluxes in the space of a particular church, its model was used, in which the parameters of light openings were reproduced in the appropriate scale, and the internal surfaces were painted with the appropriate light reflection coefficients. Such church models allow roughly determining the coefficients of natural light at specific points and establishing a general picture of the light distribution in the space of a real church.

To explore the distribution of illumination on horizontal or vertical surfaces, models of existing churches in the diaspora were used. The light environment of the Holy Family Church in Washington, D.C., the Church of the Immaculate Conception in Philadelphia, and the Holy Family Church in Winnipeg were studied using the modelling method. The relative proportion of light coming from one or more windows into the interior of the church in the overall system of its natural lighting was explored by the amount of illumination at characteristic points of the interior space of the church. The illumination curves in the characteristic cross-sections of the models and the distribution of light on vertical and horizontal surfaces were determined, which allowed identifying the most illuminated and darkest zones and surfaces in the space of existing churches where the light environment was explored.

RESULTS AND DISCUSSION

In America, several trends in sacred architecture were developed. At the initial stage, these were eclectic buildings made of modern materials and structures that mostly repeated the features of the Byzantine style, the traditions of Ukrainian folk wooden architecture, or Cossack Baroque. The composition of these churches uses domes as the main element of Ukrainian identity (Kutsevych, 2008; Kutsevych, 2013). The light environment of these churches is close to the light composition of traditional Ukrainian churches of the corresponding period/style. In conventional Greek Catholic churches, as in Orthodox churches, for a long time, the light and space composition were developed according to the established principles of spatial organisation. The most important among these principles is the dominance of overhead light streams according to the symbolism and sacred meaning and the hierarchical/uneven distribution of light – increasing the intensity of natural and artificial light streams from the periphery to the centre of the temple (Yatsiv, 2017; Yatsiv & Kryvoruchko, 2017). The means of implementing these principles are the structure of light openings (direct light) and the tectonics of internal surfaces (reflected light). The elements of this design include domes on high-light drums, tall windows in the walls of church buildings, and an optimal ratio between the area of windows and the area of walls. This light composition significantly affects the spatial development and morphology of the

architectural forms of the church building. In addition, the principle of minimal filling of the temple space with natural light is important to establish an introverted sacred environment imbued with mysticism, which brings the human psyche into a state of deep spiritual concentration.

Another group is united by modern Greek Catholic churches abroad, in which the influence of the architecture of local denominations, in particular Protestant churches that were adapted for worship by the Ukrainian community, is evident. In the space of these diaspora churches, a significant increase in the intensity of natural light, illumination of interior surfaces, as compared to conventional churches, and the alignment of illumination (brightness) along the longitudinal axis of the building. This situation of the church building is typical both for America and for many other countries where Ukrainians live (Borys, 2017; Borys & Frankiv, 2015; Kutsevych, 2013).

It is known that the main requirement for the interior design of a Protestant church is to establish a large and high hall, evenly filled with natural light, where everyone can see and hear the preacher (Demianov, 2004). In the typical layouts of houses of worship, the walls are pierced along the perimeter with high skylights. These schemes do not emphasise using overhead luminaires. Thus, the entire original architecture of the Protestant church seems to deny any special role of light. Rather, they are utilitarian requirements for good lighting and visibility in the building space, emphasis on common prayer, and singing psalms. There is plenty of space in the church for those who come to pray, as the main thing in the church is not the cult of the church itself but the community of believers who establish and sanctify this church through their prayers (Hevryk, 1990-1991). People sanctify the church by their presence, and not the church sanctifies people by its architecture and arrangement – this is the main tenet of the Protestant church building (Demianov, 2004). The lighting environment of houses of worship is guided by the principle of comfortable lighting, a homely feeling, and the absence of pomp, special symbolism, or mystical mood.

These two types of sacred buildings were the foundation for an encounter with architectural modernism, the “international style”. The experience of laconic and functional representations of sacred semantics gained during the construction of the first Ukrainian churches and the conversion of Protestant churches allowed for a much easier transition from the eclectic-historical morphology of churches at the turn of the 20th and 21st centuries to the project of the abstract culture of modernism (Borys, 2017). The architects of the Ukrainian diaspora gradually mastered the language of modernity and the “international,” which mitigated the feeling of alienation and established the Ukrainian tradition of the church building as friendly to the main value of modernity-progress. Therewith, the diaspora was at the time of the Second Vatican Council, which proclaimed functionalism as the preferred style of the Christian church (Borys, 2017). It allowed the works of sacred art to be brought closer to the understanding of believers, to be accessible to everyone, and to open the



Church to architectural innovations (Janisio-Pawlowcka, 2017). The Church now encourages simplicity of architectural and artistic design, restrained use of decor, and a limited number of iconographic images. The openness of the church is marked by architectural innovation: Modern architects have the opportunity to add their ideas to the spatial organisation of the sacred building. The monumentality of ancient sacred buildings has been replaced by the simplicity of architectural and artistic solutions, moderate use of decor, and a limited number of sacred images that distract parishioners from the Liturgy and personal prayer.

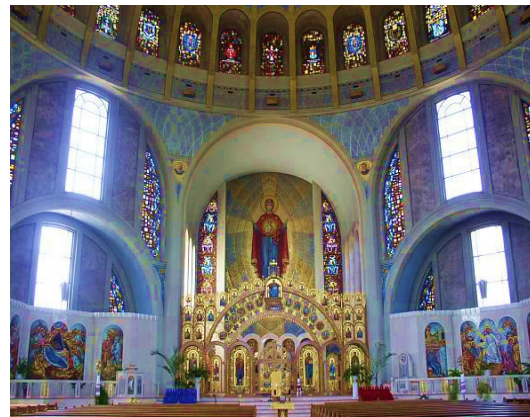
The recommendations of the Second Vatican Council of the 1960s influenced the organisation of lighting in modern churches. According to studies by Polish scholars A. Siwiek (2006) and D. Janisio-Pawlowcka (2017), the following ways of introducing daylight into the space of modern churches can be distinguished: partial (horizontal/vertical) or complete

glazing of the walls in the altar, and the placement of large stained-glass windows in one of the side walls of the nave. In addition, skylights are used, mainly to cover the space above the altar, whose light streams illuminate the icons on the walls or the Crucifix. These means contribute to a significant increase in illumination (brightness of surfaces) in the altar space and equalisation of illumination in the space of the church of the faithful – the prayer hall (Janisio-Pawlowcka, 2017). This important turn in the organisation of the lighting composition of the interior space of the church also took place in the Greek Catholic churches of the diaspora, which were in the same field as the cathedral solutions.

Consider several examples of the organisation of the lighting environment in Greek Catholic churches in the diaspora built in the New Byzantine style. A striking example is the Church of the Immaculate Conception in Philadelphia (Fig. 1a).



a)



b)

Figure 1. Church of the Immaculate Conception in Philadelphia (USA): a – the main facade, b – appearance of the altar space
Source: Archeparcy of Philadelphia Ukrainian Catholic Church (n.d.)

The model for this church was the Church of St. Sophia in Constantinople. The construction of the church is close to the domed churches, faceted in the plan, with slight protrusions of the narthex and apse. The ceiling of the huge dome of the church is decorated with the mosaic “The Savior Almighty”. The base of the dome has 32 window openings with thematic coloured stained-glass windows. They depict the coats of arms of the Ukrainian lands and the bishops who served the Ukrainian Catholic Church. On the altar wall, the Virgin Mary is depicted in a halo/oreole of Divine light (Fig. 1b).

The general nature of the light environment of the temple is defined by the light streams of natural light penetrating through large windows located on the diagonals of the hexagonal plan, rather than on the main axis – the narthex-altar. Thus, there is a uniform distribution of illumination in the church space and on the horizontal floor. In a conventional church, the brightness increases from the bottom up. In this temple, the greatest brightness is in the middle part of the walls. From the top of the iconostasis to the dome itself, the lighting is significantly reduced as the windows are filled with stained glass. The dome looks heavy and earthy.

The light from the windows located in the walls on the sides prevents a good perception of the iconostasis and the image of the Virgin Mary in the apse. Vision is constantly in the process of adjusting from bright windows to not-so-bright images on the walls. It would have been much closer to the Byzantine tradition to move the stained-glass windows from the windows under the dome to the windows in the walls on either side of the iconostasis, which would have increased the illumination in the dome space. The dome would have looked much more impressive, visually light, and “detached” in height.

A striking example of the uniform filling of the sacred space of a church with natural light is the Greek Catholic Church of St. Joseph in Chicago (Fig. 2a). The layout of the church is based on Byzantine tradition and symbolism. Twelve towers from different sides represent the twelve disciples-apostles. In the centre is the main, tallest dome, representing Jesus Christ. The interior space is divided into three parts. The shrine is separated by an iconostasis. The construction of the temple is widely used glazing. The columns, which do not load-bear and surround the main volume of the temple around the perimeter, are made of



glass. The glass covering 75% of the external wall surfaces. A large number of light openings and their location in the building structure contribute to the saturation of the interior space with natural light, which is complex and

circular (Fig. 2b). A large number of windows and their high brightness somewhat impair the perception of the iconostasis and iconographic images in the lower tier of the walls.



Figure 2. St. Joseph's Church in Chicago (USA): a – Exterior of the church, b – interior of the church

Source: Interactive map of the UGCC (n.d.)

Two colours dominate the decoration of the temple's interior surfaces and furnishings: light blue and gold, and the exterior is dominated by glass walls that reflect the sky, painted blue, and the towers are crowned with golden domes.

Among the cluster of architects in the Ukrainian diaspora in North America who integrated into the most modern discourse of modernist/contemporary architecture, several architects tried to answer the question of the architectural image of the temple of the Ukrainian-Byzantine and Ukrainian-Baroque traditions, executed in the language of functionalist morphology (Borys, 2015; Kutsevych, 2013). In these church buildings, the techniques used to serve as national attributes retain their significance, but they are devoid of a historical view of the past and are significantly reinterpreted within the author's style of a particular architect.

Gradually, the sacred architecture of the diaspora began to develop a trend of a kind of synthesis of national heritage and the new language of modernity. An example of such a synthesis is the Holy Family Church in Washington, D.C., designed by architect M.D. Nimziv (1982). The architectural

solution of the church includes several techniques of national identification, which can serve as an example of the concentration of all the intellectual achievements of the sacred architecture of the Ukrainian-Byzantine tradition, which developed in the diaspora environment, in one project (Fig. 3a). The general spatial structure of the church is an imitation of the Carpathian three-story churches, where each top defines a separate structural unit of the building: the altar, the nave space, and the narthex. In all other respects, the building has signs of abstract morphological experiments in the language of modernism. The main volume is designed in a new searching form of a tent pierced with continuous window strips, which is not typical of previous interpretations of the Ukrainian folk church. Such architecture significantly influenced the light environment of the church. The church has natural lighting: low floor illumination, high illumination of wall surfaces, especially window openings, and high illumination of the vaults (Fig. 3b and Fig. 3c). The temple is saturated with sunlight and diffused light from the sky, thus the level of illumination is much higher than in conventional Ukrainian Baroque churches.



Figure 3. Holy Family Church, Washington, DC (USA): a – side facade of the church; b – the general appearance of the nave; c – the appearance of the space under the dome

Source: Archeparchy of Philadelphia Ukrainian Catholic Church (n.d.)



Among the architects who tried to answer the question about the image of the temple of the Ukrainian-Byzantine tradition, executed in the language of the morphology of functionalism, a significant role belongs to the unique experience of R. Zhuk (Borys, 2017). The entire architectural work of the master is a synthesis of the Western Ukrainian and diaspora conceptualisation of 20th-century sacred architecture. R. Zhuk was a figure who almost single-handedly implemented a process that, within other traditions, was the work of entire schools of architectural theory and practice (Borys, 2017). This refers to the complex dialectic of the existence of symbolic and semantic functions of Art Nouveau architecture and the so-called international



a)



b)

Figure 4. Church of the Holy Family (Winnipeg, Canada):

a – side facade of the church; b – general appearance of the nave

Source: Manitoba Historical Society (2022)

The division of the tower into three volumes reflects the main liturgical functions of the church, which are performed in the sanctuary on the central throne and two tables on the sides. The division of the interior space of Ukrainian churches into three parts corresponds to this sacred idea. It, and using the round arch shape, which is a characteristic element of ancient Russian churches, was an attempt to connect this building with the Ukrainian architectural tradition. The central tower is taller than the two side towers. All three rise sharply above the nave, which establishes a visual illusion of remoteness, and separation from the rest of the temple. The integrity of the composition is “supported” by seven thin white arches in front of the entrance to the building, the wall of which is covered with a continuous stained-glass window over the entire width of the facade. The church is an example of modern church architecture, which emphasises functionality, and the layout and decoration only hint at ethnic and religious affiliation.

The main factor in organising the light environment of the temple is the light contrast between the nave and the sanctuary, between the horizontal vector of light distribution in the nave space and the vertical vector of light distribution in the space of the towers above the sanctuary (Fig. 4b). The contrast between the almost solid walls that converge in the perspective of the plan and the slope of

style, with its figurative unification of the entire design typology. Thus, a conceptual product image of a modern Ukrainian sacred building concentrated on one person, was developed, which significantly influenced the culture of designing church buildings in Western Ukraine (Borys, 2017). Consider several implemented projects by R. Zhuk in the context of designing their light environment.

The Holy Family Church is located in Winnipeg. The architecture of the church expresses the main functional composition – a slow rise of the low nave from the entrance to the sacristy. The much smaller sacristy culminates in a tall tower above the shrine, which is the most important part of the building (Fig. 4a).

the nave ceiling draws the congregation’s attention to the altar space. The significance of which is emphasised by the natural light that enters through the huge windows in the towers. The parishioners cannot see the windows from the nave; the full view of the tower is only visible to the faithful when they approach the throne during the Eucharist, the culmination of the Liturgy.

The most interesting, in the author’s opinion, in terms of planning and spatial solutions, and organisation of the light environment is St. Stephen’s Church in Calgary (Canada). The structure of the interior space recreates the spirit of Byzantine basilicas and the high tops of Ukrainian wooden churches on the Left Bank of Ukraine, represented in unique forms (Fig. 5a).

The church building harmoniously fits into the environment, developing the space as a set of optimal compositions. The scale of the building demonstrates the proportionality of the architecture and spatial solution. The architect achieves this with the formal expression of the roofs and the domed end of the church. The dome (tower) is demonstrating both tectonic and spatial success and has an architectural and national identity that is inherently Ukrainian. They reflect the traditions and innovations of the present. The dome, divided into four parts by segmental finials, is a single unit in the interior of the church. Its space is united by natural light.





a)

b)

Figure 5. St. Stephen's Church (Calgary, Canada):

a – side facade of the church, b – general appearance of the nave

Source: Ukrainian Catholic Eparchy of Edmonton (n.d.)

The church is tectonically and visually divided into two parts: the relatively low space of the nave, poorly lit by small ribbon windows under the ceiling, and the space of the sanctuary, well-lit by daylight from the windows of the domes. The light contrast of these rooms is high, which emphasises the significance of the shrine. The natural light of the nave space is dimmed by stained-glass windows and windows under the ceiling, which is located in the walls of the building. The light contrast is enhanced by colour: the walls and ceiling are dark brown, and the walls of the dome are light (Fig. 5b). The planning structure of the church has a feature that is not found in other churches: the location of seats for parishioners in the sanctuary space, behind the throne. Such a layout, together with the lighting composition, enhances the centrality and sacredness of the shrine.

It is established that light in sacred architecture, primarily natural light, has been an important factor in shaping the architectonics and sacred atmosphere of church buildings for centuries. The architectural principles and methods of organising the light environment of the main types of conventional church buildings in Ukraine have been sufficiently explored (Yatsiv, 2017). The initial positions of the spatial organisation of the light environment/composition of an Eastern Christian church (Orthodox and Greek Catholic churches in Ukraine) have been and remain relatively unchanged over a long period of development of sacred architecture. The main principles of organising the lighting composition of a conventional church are: the principle of dominance of overhead light and the principle of hierarchy (unevenness) of light in its space. These principles are based on the religious and theological tradition, Christian dogmas, rules, and rituals that have remained relatively unchanged during the construction of churches from the introduction of Christianity to the present day (Yatsiv & Kryvoruchko, 2017; Kryvoruchko, 2019). And today, these principles should become an integral part of the ideological idea/concept of solving the architectonics of a modern church and the foundation of the process of designing the architectural type/image of a church building.

The diversity of forms of church architecture indicates various external factors that influenced the process of its

development. A church building is established in territories characterised by different natural and climatic conditions, which introduces some differences in the composition of church architecture in different regions. The formal side of modern sacred buildings, their image/appearance, is significantly influenced by the possibilities of modern materials and architectural structures. Notably, the methods and means of designing light compositions in modern church buildings in Ukraine often contradict architectural traditions and theological requirements, and their architectural image does not correspond to modern world trends in the church building.

The results of this research correlate with the opinions and judgments of R. Zhuk (1991a, 1991b), who studied more the traditions and individual approaches of diaspora architects to the development of the light environment of churches, and with the works of V. Kutsevych (2008, 2013) and R. Halysych (2002), who devoted more attention to the evolution of church building and the role of light in the space of the diaspora sacred building. Instead, this research highlights the synthesis of the approaches of the conventional interior design of Ukrainian Orthodox churches with the specific features of the organisation of the light environment in Catholic and Protestant churches in the United States and Canada.

CONCLUSIONS

Ukrainian architects in the diaspora in North America have made many successful attempts to integrate the characteristic features of the traditional Ukrainian church into the modernist design culture of the Anglo-Saxon world. Light in the space of Greek Catholic churches in the diaspora has been and continues to be an important symbolic and architectonic factor in developing the interior space and sacred atmosphere of the church, given the sacred significance of specific volumetric and spatial elements. Notably, modern Greek Catholic churches in the diaspora contain many techniques of light and spatial composition that are in no way related to the already developed system of the Ukrainian sacred tradition, but rather reflect the author's style of a particular architect and the influence of architectural



traditions of other denominations of the Christian rite in North America. In the space of these churches, a significant increase in the intensity of natural light flows, and, accordingly, the illumination of interior surfaces, compared to conventional churches, a significant equalisation of illumination (brightness) along the longitudinal axis and in all areas from the centre of the building, since the most important and sacred part of the church is its altar part. It is conditioned upon the arrangement of large panoramic windows above the entrances, using stained glass windows in the walls of the sanctuary and vertical windows in the walls of the nave, which increases the illumination of both the nave for the parishioners, bringing them closer to the sacred centre of the building, and the illumination and brightness of the altar as the culmination of the sacred space of the church. In addition, light enters the space

of the church through skylights and numerous windows of the upgraded domes. Such an overhead lighting system allows concentrating light fluxes in significant areas of the interior space, primarily in the space of the altar, or on the main images/icons in the iconography of the church.

An essential feature of modern churches of the Ukrainian diaspora is the widespread use of coloured stained-glass windows in the walls of the church and in the windows of the domes/domes, which is not typical of conventional Orthodox and Greek Catholic churches in Ukraine.

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CONFLICT OF INTEREST

None.

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Світло у просторі сучасних церков української діаспори

Анотація. Сьогодні в українському храмубудуванні ще не вдалось створити свій сучасний образ/вигляд храму, відмінний від традиційного. Однією з істотних причин цієї ситуації є тривала перерва в проектуванні та будівництві храмів в Україні впродовж ХХ ст. Значний досвід будівництва сучасних храмів, який забезпечує спадкоємність традиції храмубудування, накопичений в українській діаспорі. Метою статті є дослідження ще неоціненого досвіду проектування храмових будівель і архітектурно-художньої організації їх внутрішнього простору в храмах української діаспори, що є важливим підґрунтям для вирішення проблеми формування образу/вигляду сучасного храму. Під час дослідження було використано загальнонаукові та спеціальні методи. Приділено уваги та вивченню актуальних питань формування світлової композиції в сакральному просторі сучасних храмів діаспори. Проведено аналіз низки проєктів архітекторів української діаспори у царині сакральної архітектури. Виявлено особливості становлення та розвитку церковної архітектури української діаспори в аспекті дискусії навколо традиційної та сучасної форми храмової будівлі і просторової організації світлової композиції їхнього сакрального простору. Окреслено вплив місцевої архітектурної традиції храмубудування в Північній Америці – протестантських і католицьких храмів, а також модерністської проєктної культури періоду функціоналізму та неомодернізму в архітектурі на архітектоніку українських церков діаспори та організацію світлового середовища їхнього внутрішнього простору. Вперше досліджено особливості та закономірності організації світлового середовища найвідоміших греко-католицьких храмів української діаспори на території Канади та США, збудованих у другій половині ХХ ст. Визначено вплив природного світла на архітектоніку храмів та особливості візуального сприйняття їхнього внутрішнього предметного середовища і на формування відповідного настрою проїнятого містикою та сакральною атмосферою інтер'єрів храмів. Вивчено та проаналізовано досвід архітекторів діаспори, який ще мало досліджений але матиме важливе значення для використання в практиці українських архітекторів під час проектування сучасних церков зі збереженням національної ідентичності та традицій храмубудування

Ключові слова: природне освітлення; храм; сакральний простір; церковна архітектура; традиція

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The impact of new buildings on the city's image

Abstract. The research examines the visual perception of new buildings and their impact on changing the overall image of the city. Particular attention is devoted to buildings that are visible from other parts of the city due to their greater height and hilly terrain and can complement the overall composition of the city or destroy it. The importance of exploring the analysis of visual connections between the designed object and the environment is substantiated. The purpose of the research is to explore the perception of the city environment as a set of multifaceted pictures and to identify the elements that have a significant impact on the development of the overall image of the city. To achieve this purpose, a research methodology was developed, which at each stage included general scientific methods and special ones. Before starting the work, field research was conducted on the compositional structure of individual cities, and several paintings were selected for more detailed research. A compositional analysis of the selected examples for planning was conducted using the graphical method. It is established that the city's image is most influenced by the last plan, which, in most cases, is not considered when designing new buildings. As a result of the research, the results obtained were verified for compliance with the shape, style and proportions of the newly built objects with the surrounding buildings. A significant number of paintings were identified that do not correspond to the expected result from the standpoint of the observer. Thus, there is a discrepancy between the planned and the received image of the overall compositional and spatial structure. The reasons for this inconsistency in the combination of individual plans are identified, which in turn had adverse effects on the overall image of the city. In addition, the main factors that influence the development of individual paintings have been identified. The result of the research is defined tasks for pre-design research at the initial stage of designing new buildings. This approach will help minimise mistakes in the design of new buildings, particularly those that have visual connections with other parts of the city and have a significant impact on the overall image

Keywords: urban planning composition; urban space; view streets; multidimensional paintings; urban aesthetics; dead field

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INTRODUCTION

In the process of historical development, the city reflects the main economic, scientific, technical and cultural achievements of society. When developing a master plan for a city, several factors must be considered to address the basic functional, economic, and aesthetic needs. In addition, it should be emphasised that the requirements for a person's lifestyle are constantly changing throughout the entire period of society's development, which results in the necessity to develop new requirements for the design of urban space. Therefore, at every stage, the city requires constant transformation. When designing new requirements for the development of the functional and planning structure, street and road network, and ensuring a favourable microclimate, one should remember the aesthetic qualities of both individual elements and the environment in general. The image of the city is developed based both on the harmonious combination of urban structure elements into a single composition and on the specifics of human perception of the environment. The elements of the urban planning composition have a fundamental difference – the larger size of the object, and therefore, it is necessary to consider another parameter – the time during which a person explores the surrounding space. The establishment of the overall image of the city is based on a set of pictures and impressions that a person receives while walking through the city. The greatest influence on establishing a general impression is the set of pictures that a person sees in the process of cognition of the urban environment. Thus, when designing new buildings, and developing the composition of individual elements of the city, the architect must consider the impact of new buildings on changing individual pictures that immediately influence the overall impression and image of the city in general. Recently, there has been an active construction of objects that both distort the surrounding space and destroy the historically developed authentic image of the city.

Numerous scholarly works are devoted to the overall composition of the city. The space of the city as an object of composition was explored by B. Posatsky (2007). I. Bezkorovaina (2013) emphasises the development of vertical dominants in the context of the historical development of the city. An interesting study of vertical dominants and their visual perception, but in a modern city, is the collective work of Ata Tara *et al.* (2021). I. Korotun (2014) devoted her work to the basics of harmonisation of the urban environment. Some works are devoted to the development of streets and squares (Koznarska & Didyk, 2021), and their importance in establishing the image of the city (Koznarska, 2012). G. Kopteva (2013) emphasises the specific features of visual perception of the city in her works. The aesthetic perception of the urban environment is explored by tourism researcher M. Antonets (2014). M. Gabrel & M. Kosmiy (2019) emphasise the emotional component in developing the image of the city. The specific features of the perception of individual elements of buildings and their impact on the visual assessment of the city were highlighted in the work of M. Sadeghifar *et al.*

(2019). An interesting work is T. Dzieduszyński (2022), in which the author proposes to use digital technologies for a comprehensive aesthetic assessment of the architectural environment. The psychological component of space comprehension was explored by L. Xiang *et al.* (2021), Ch. K. Chau *et al.* (2022). Some of the works are devoted to the aesthetic qualities of the urban landscape. In particular, notably, works by Halyna Petryshyn, co-authored with other researchers, are devoted to the uniqueness of the urban landscape (Petryshyn & Sochackiej-Sutkowskiej, 2012) and the importance of water spaces for establishing the overall image of the city (Petryshyn & Polianska, 2020). M. Półrolniczak & L. Kolendowicz (2021) emphasise the specific features of the city's landscape perception and the "Lviv Belvedere" as a unique phenomenon of interaction between two factors: nature and humans, in the process of both establishing and developing the spatial structure of the Lviv Basin's edge T. Maksymiuk & V. Didyk (2011). T. Inoue *et al.* (2022) analyse visual images of the urban landscape. M. Gyurkovich & M. Pieczara (2021) conducted detailed research on the city's panoramas and their aesthetic evaluation. A particular place should be devoted to the work of the Polish urbanist K. Weichert (2008), who dedicated to the elements of urban planning composition. The author systematised the basic theoretical knowledge that influences the development of the city's image. In addition, he emphasised the psychological properties of a person to perceive the urban environment, which occurs as a result of changing paintings over time.

The purpose of the research is to explore the perception of the urban environment as a set of multifaceted pictures. Justify the significance of analysing the visual relationships of the designed object with the environment. Identify the factors that should be considered when determining the image and proportions of a new building to ensure that new buildings are harmoniously integrated with the existing part of the city. Define the tasks for pre-design research at the initial stage of designing new buildings to avoid adverse effects on the overall image of the city.

MATERIALS AND METHODS

The research of the city's composition requires the processing of a significant amount of illustrative material. The methodology is based on the analysis of individual pictures of the environment, which have the greatest impact on the emotional state of a person and are crucial in developing the overall image. The specific feature of the approach is using field research. Thus, for the study, it is necessary to select pictures of the existing urban environment that contain multidimensionality. Photos should be based on the main visual connections of the city. It is the elements that have visual connections that are the foundation for establishing the image of the city in general.

The research on the development of the city's image should be divided into several stages. Before starting work, it is necessary to explore the general theory of building an urban planning composition and study scientific works on this subject. Then, it is necessary to conduct field research



on the urban environment and select materials for analysis. During the selection process, the focus should be on those paintings that contain visual connections to remote parts of the city and are visible from the vantage point. The most effective way is to immediately compile a diagram of visual corridors, based on which, later, the expected and obtained results can be verified. Later, using the method of graphic analysis, it is necessary to distinguish separate plans of each of the selected paintings. The result is to summarise the research and identify the factors that have influenced the change in the city's image. By verifying the results obtained for compliance with the general theory of city composition, the tendency to change the overall image, considering newly built objects, can be traced and positive or adverse dynamics can be identified.

General scientific research methods were used for the study: empirical (observation, description), theoretical (analysis, generalisation) and special (field research).

A review and examination of scientific works on the composition of the city were conducted. Several studies on the composition of the city and landscape have been identified.

Field studies of the compositional and spatial structure of individual cities were conducted. The emphasis was on prominent streets and venues that have visual connections to remote parts of the city. Among the material received, the most striking pictures of the urban environment were selected, which contain diversity and the presence of new buildings and most vividly reflect the subject of the research.

Based on the selected material, the layout of the paintings was analysed. Each picture was divided into separate parts – foreground, middle ground and background. In other words, each image highlights elements of the city that are distant from the perspective but visible. This approach allowed an opportunity to observe where the designer's mistake appeared, which resulted in the distortion of the environment.

RESULTS AND DISCUSSION

The modern city is being built and renewed. It is very crucial to not lose the historical authenticity and image that was designed over the centuries and is unique in this rapid development.

Each period of architecture and urban development has its construction features, technologies, and style. It is necessary to learn how to professionally combine new modern designs with the historical environment in such a way that does not distort the environment and the overall image of the city and complements it organically.

New buildings can either complement the historically established image of a city or destroy it. Consider the main visual factors that should be addressed when locating buildings.

First of all, the environment needs to be explored as a multi-dimensional picture: foreground, middle ground, and background or “dead field”.

Foreground. Usually, in the foreground, the observer observes an element that attracts our eyes in one way or another with its features – a compositional accent (Fig. 1). Even if this element is the main one to be seen in a particular environment, its perception can enhance or negate the environment.

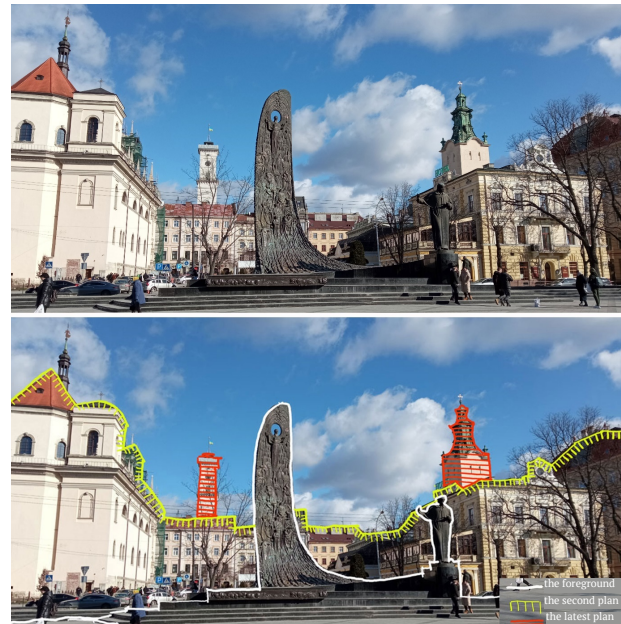


Figure 1. Lviv, monument to Taras Shevchenko. The background is constituted by elements that are frequently located at a considerable distance from the point of contemplation but are nevertheless clearly visible

Source: photo by Koznarska

Middle ground. In the middle ground, the observer's vision is limited to the buildings without individual features that provide the background of the composition. There is not a single point of contemplation in the city where the view would not be limited by the elements of the city. The only difference is what elements constitute this background and how far away from the viewer it is. If the city environment is considered as one big interior, the elements that play the role of “floor”, “walls” and “ceiling” can be distinguished (Wejchert, 2008). Consider the different types of “walls” that serve as space limiters. Accordingly, there can be a related environment consisting of the same type of elements, for example, a series of buildings with a clear building line, the totality of which constitutes a single-plan “wall”. In addition, there can be an alternation of building walls and green spaces – such a space is perceived as much more interesting and attractive. Buildings located at different distances from the point of contemplation are perceived differently – multidimensional “walls”. However, all these elements limit the control of human contemplation to the level of the “floor”.

Notably, M. Gyurkovich & M. Pieczara (2021) use the methodology of analysing the city environment as one large interior in their research to analyse panoramas of the urban landscape. However, the authors evaluate the aesthetic quality by interviewing respondents. Such a method is good for determining the value of individual landscapes of the existing environment to preserve individual established paintings. However, this method will not be useful for determining the tasks associated with the design of new buildings.

The background or “dead field”. The term “dead field” is used by the Polish urbanist K. Weichert (2008)





to define the elements of the background. This term successfully characterises the essence of the problem: in the background of the painting, some elements should not be visible, as they are located at a considerable distance from the point of contemplation but are nevertheless clearly visible. These elements either harmoniously complement the overall composition, for example, Lviv – the monument to Taras Shevchenko: the foreground is composed of elements that are located at a considerable distance from the point of contemplation, but are nevertheless clearly visible (Fig. 1), or spoil it: Katowice – the perspective of Adam Mickiewicz Street is completed by a high-rise dominant that is discordant with the historic environment (Fig. 2a) or a high-rise building in the background causes visual discomfort when perceiving the historically established

buildings from Rynok Square (Fig. 2b); Truskavets – the scale of the historical perspective of the street is broken by the height of the new building (Fig. 2c); Lviv – the unnecessary height of the new building in the historic area provided visual discomfort from Professorska Street (Fig. 2d), and an example of the diminished significance of the Latin Cathedral by the scale of the newly built hotel from Teatralna Street (Fig. 2g). Therewith, the historically established visual axial endings of the streets in the historic area of Lviv have been preserved: the ending of the perspective of I. Franka Street with the monastery bell tower is an example of the preserved historic urban environment (Fig. 2e) and the architectural dominants in the perspective of the street. Horodotska from the west establish a multifaceted picture and identity of the Pryvokzalna district (Fig. 2f).



a) Katowice (Poland). The perspective of Adam Mickiewicz Street is completed by a high-rise dominant that is discordant with the historic environment. b) Katowice. The high-rise building in the foreground represents a visual discomfort when viewing the historically established buildings from Rynok Square. c) Truskavets. The scale of the historical perspective of the street is broken by the height of the new building d) Lviv. The unnecessary height of the new building in the historic area caused visual discomfort from Professorska Street. e) an example of diminishing the significance of the Latin Cathedral by the scale of a newly built hotel off Teatralna Street. f) the completion of the perspective of I. Franko Street with the monastery bell tower is an example of a preserved historic urban environment. g) architectural dominants establish a multifaceted picture and identity of the Pryvokzalna district

Figure 2. An example of visually degraded street perspectives in the historic area of the city – Figs. a, b, c, d, e and preserved historically established visual axial completions of streets in the historic area of Lviv – Figs. f, g

Source: a-c – photo by Koznarska; d-g – photo by Didyk



Notably, in the late 19th and early 20th-century interpretation of the art of statics and order, the architect saw the real environment and, in the process of construction, could prevent adverse effects that could worsen the aesthetic quality of the urban environment. Instead, in the context of modern design, architecture is, first and foremost, the art of balance in movement and dynamic development. The design process is based on a building information modelling platform, where architects mainly consider only the projected object itself in the immediate architectural environment. Even the street scans of the projected facility provided for in the project do not provide a complete

picture of the final implementation. Usually, the architect does not consider whether the building will be visible from the neighbouring street and how harmoniously it will fit into the existing space from a distance. However, it is this “last” plan from the farthest angles that has the main impact on the establishment of the city’s image. Examples of unsuccessful development of the background or “dead field”, which is located at a considerable distance from the point of perception along the axis of street perspectives in the historical area of Lviv, are the perspective of Lesia Ukrainka Street towards the Opera House (Fig. 3a) and the perspective of Zernova Street from V. Chornovil Avenue (Fig. 3b).



a) the perspective of Lesia Ukrainka Street towards the Opera House



b) perspective of Zernova Street from V. Chornovil Avenue

Figure 3. Lviv. An example of the unsuccessful development of the background or “dead field” by the new building, which is located at a considerable distance from the point of perception along the axis of the street perspectives in the historical area of the city

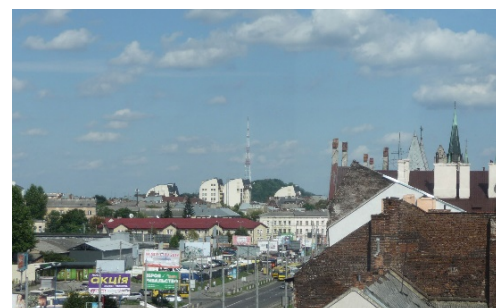
Source: photo by Didyk

The dynamics of the degradation of the perception of the panorama of the Lviv landscape due to the built high-rise buildings within the blocks of historically developed residential buildings are illustrated by the perspectives from the viewpoint in the Skrynia shopping centre from 2005 (Fig. 4a)

and from 2019 (Fig. 4b). Instead, an example of a harmonious combination of all plans in the perception of the panorama of the historic centre of Lviv (protected by UNESCO since 1996) is the view of the castle hill from the southwest from the terrace of the House of Legends restaurant (closed in 2019) (Fig. 5).



a)



b)

Figure 4. Examples of the degradation of the perception of the panorama of the historic landscape due to the construction of high-rise buildings within the blocks of historically developed residential buildings (view from the viewpoint in the “Skrynya” shopping centre): a – 2005; b – 2019.

Source: Photo by Didyk

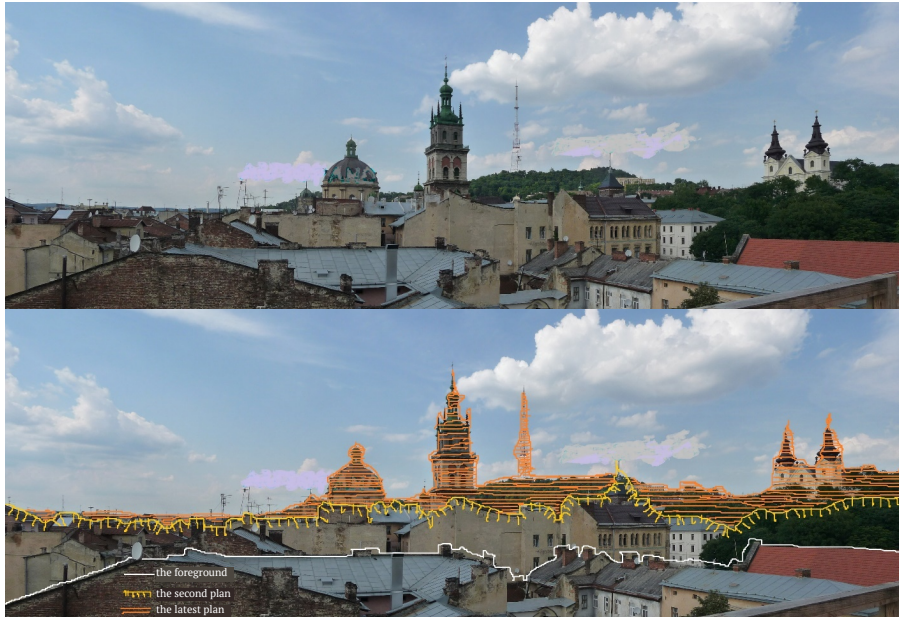


Figure 5. An example of a harmonious combination of all plans in the perception of the panorama of the historic city centre of Lviv (protected by UNESCO since 1996). View of Castle Hill from the southwest from the terrace of the “House of Legends” restaurant (closed in 2019)

Source: photo by Didyk

In addition, it should be noted that the objects that are visible from different parts of the city are in most cases dominant viewpoints (Koznarska & Didyk, 2021). Thus, there are two-way visual connections. However, considering the visibility of these elements of the city, it is necessary to ensure that their appearance harmoniously fits into the existing

image and complements it, rather than spoils it. There are great examples that prove that new architecture can harmoniously complement the image of a city. The new high-rise building of Frankfurt’s business centre in the background harmoniously complements the silhouette of the panorama of the historic city centre from the waterfront (Fig. 6).



Figure 6. Frankfurt – view from the waterfront to the business centre

Source: Get Your Guide (2022)

A similar approach to the analysis of the environment is proposed by the Polish urbanist K. Weichert (2008) in his work “Elements of Urban Composition”, in which he outlines in detail the basic concepts for scientific research of urban planning composition. In addition, he highlighted the main theoretical foundations of combining buildings in one environment, considering the shape, style and proportions.

An interesting approach to the analysis and construction of architectural compositions is presented by T.Dzieduszyński (2022). The author proposed a methodology

for designing spatial compositions using digital technologies. Considering the rapid development of technology, this methodology can be improved and implemented to thoroughly analyse the architectural environment and generate specific requirements for the style, shape and proportions of new buildings in the coming decades.

Based on the research, it should be noted that to increase the aesthetic value of space, it is necessary to consider both the immediate environment and all areas of the city from which the building will be visible when constructing new buildings. The overall image of the city will



depend on how organically the architect fits the object into the urban planning structure. Therefore, before starting the design, it is necessary to analyse all the viewpoints and streets from which the building will be visible and compile

a scheme of visual corridors with the proposed new buildings on the final plan. An example of perception analysis is the scheme of research on visual corridors of new buildings in the background (Fig. 7).

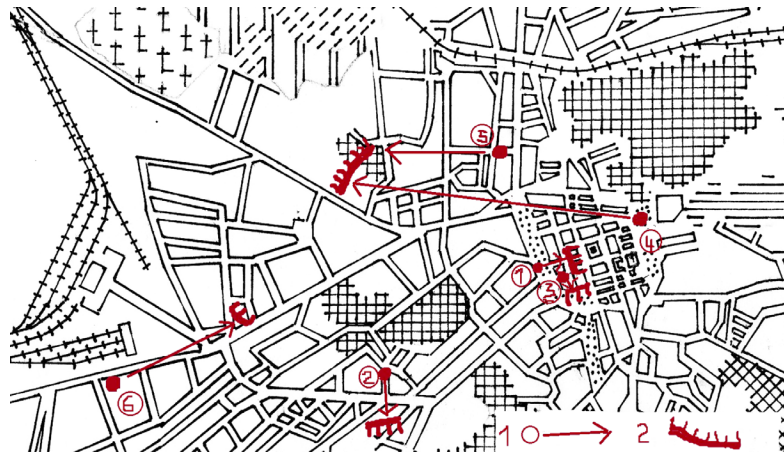


Figure 7. Lviv. Scheme of visual corridors with new buildings in the foreground: point 1 – Fig. 1, point 2 – Fig. 2d, point 3 – Fig. 2g, point 4 – Fig. 3a, point 5 – Fig. 3b, point 6 – Fig. 4b.

Notes: Symbols: 1 – point of perception of the visual corridor; 2 – new buildings in the foreground (“dead field”)

Source: Scheme by the author – Didyk

Based on the scheme, establish the features of the surrounding buildings (shape, style, proportions) and determine the requirements for the architecture of the new building. At this stage, it is necessary to coordinate the building’s height with its surroundings, analyse the nature of the relief and the presence of natural belvederes, and determine whether the proportions and shape of the new building are in line with the surrounding architecture. After such an analysis, it is necessary to carefully explore all the factors and, if necessary, adjust the building’s height, proportions, and shape to match the environment.

CONCLUSIONS

Considering the intensive construction of new buildings, the significance of exploring their visual connections with other parts of the city and their impact on the development of the overall image is substantiated. Based on the analysis of scientific publications, several works devoted to the aesthetic qualities of the composition of the city and landscape were identified. However, there have been no separate studies of the impact of new buildings on the development of the city’s image, which has determined the relevance of this research.

Based on the results of the field research, individual parts of the environment were selected that contain multifaceted paintings. Particular attention was devoted to the new buildings visible from other parts of the city. The graphic analysis of the multifaceted paintings identified examples of the positive and adverse impact of new buildings on the overall image of the city. After verifying the adverse examples for compliance with the compositional principles, the factors that resulted in the distortion of the existing image

of the city were identified. The main factors include the mismatch between the style, shape and proportions of the new building and the surrounding architecture.

To avoid adverse effects on the overall image of the city, the tasks for research at the initial stage of designing new buildings have been identified:

- outline the parts of the city from which the building will be visually visible (a separate scheme of visual corridors with mandatory access to the area can be developed);
- define the basic requirements for the style of the form and proportions of the new building to organically combine the forms of modern buildings with the historically established ones;
- analyse how well the new building corresponds to the proportions of the overall silhouette of the city.

Thus, already at the stage of pre-design studies, it is necessary to establish some requirements for the shape and proportions of the projected building. A particularly thorough analysis should be conducted before the construction of high-rise buildings, as they are urban dominants and have a significant impact on the overall image of the city.

This research proves the importance of an integrated approach to the design of individual elements of the city and emphasises the significance of a thorough analysis of the compositional and spatial structure as a component of architectural and urban planning activities.

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CONFLICT OF INTEREST

None.



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Вплив новобудов на формування образу міста

Анотація. У статті досліджено візуальне сприйняття новобудов та їх вплив на зміну загального образу міста. Особливу увагу звернено на будівлі, які проглядаються з інших частин міста за рахунок більшої висоти та горбистого рельєфу і можуть доповнити загальну композицію міста або її зруйнувати. Обґрунтовано важливість дослідження аналізу візуальних зв'язків проєктованого об'єкту з навколишнім середовищем. Метою статті є дослідити сприйняття середовища міста, як сукупність багатопланових картин та виявити елементи, які мають безпосередній вплив на формування загального образу міста. Для досягнення поставленої мети була розроблена методика досліджень, яка на кожному етапі, містила загальнонаукові методи та спеціальні. Перед початком робіт, були проведені натурні дослідження композиційної структури окремих міст та відібрано кілька картин для більш детального дослідження. Графічним методом було проведено композиційний аналіз відібраних прикладів на плановість. Встановлено, що на формування образу міста найбільший вплив має останній план, який, у більшості випадків, не враховується під час проєктування нових будівель. У результаті досліджень, проведено верифікацію отриманих результатів на відповідність форми, стилю та пропорцій новозбудованих об'єктів з навколишньою забудовою. Виявлено значну кількість картин, які не відповідають очікуваному результату з точки зору обсерватора. Тобто, невідповідність між планованим та отриманим образом загальної композиційно-просторової структури. Встановлено причини цієї невідповідності поєднання окремих планів, які у свою чергу, призвели до негативних наслідків у формуванні загального образу міста. Також, виявлені основні чинники, які впливають на формування окремих картин. Результатом дослідження є визначені завдання для передпроектного дослідження на початковій стадії проєктування новобудов. Саме такий підхід допоможе мінімізувати помилки під час проєктування новобудов, а особливо тих, які мають візуальні зв'язки з іншими частинами міста і мають безпосередній вплив на формування загального образу

Ключові слова: містобудівна композиція; простір міста; видові вулиці; багатопланові картини; естетика міста; мертве поле



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Convergence of the materialistic and idealistic in the methodology of urban planning

Abstract. The realities of the present require changes and development of urban methodology as a science of methods covering the entire methodological chain – from clarifying concepts, streamlining tasks and establishing characteristics of objects to methods of analysis, evaluation and justification of decisions, and urban planning design and management of urban development. The purpose of this study is to provide an in-depth understanding of the methodology of urbanism in the context of convergence (rapprochement, interconnection, interpenetration) of materialistic and idealistic approaches, and to streamline and develop methodological tools for urban planning. Urban planning activity is considered a set of purposes, criteria, priorities, and constraints. The multiplicity of purposes – strategic, tactical, regulatory, and criteria – necessitates changes in methodology, analysis and assessment of spatial situations, and justification of decisions, including the requirements of multicriteria. The design of territorial systems is oriented towards integrated development, increasing the validity and efficiency of the implementation of the concepts of their spatial organisation. The study is methodological – it emphasises the significance of improving the methodological culture and developing the urbanist’s systemic thinking (reflection, worldview), their creative potential and the set of professional knowledge, skills and abilities to implement projects and other functions of professional activity. It is extremely important in the era of large databases and the Internet, changes in planning and research practices, increased capacity and depth of information analysis, and the emergence of new techniques and procedures. Integration of new research methods should be designed to obtain new knowledge about processes and phenomena, establish regularities and increase the validity of the principles of organisation, functioning and development of urbanised systems and territories

Keywords: methods; the convergence of materialistic and idealistic approaches; multicriteria; knowledge; information; data

INTRODUCTION

The new realities of the present (administrative-territorial reform; transformations of ownership and management; the Russian-Ukrainian war, destruction of cities and critical infrastructure in the regions; uncontrolled migration, re-thinking of values, etc.) require changes and development

of urban methodology as a science of methods. The changes should cover the entire methodological chain – from clarifying concepts, streamlining tasks, and establishing object characteristics to methods of analysis, evaluation, and justification of decisions, and urban planning design and

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management of urban development. The need to change the methodology is explained both by the emergence of new tools (computer technologies, information and analytical systems) and by the problems of specialists in updating existing and developing new types of urban planning documentation. Difficulties arise in analysing and evaluating spatial situations (developing and organising the information base and knowledge base about territorial systems), selecting and using methods of analysis and evaluation of situations, and justifying decisions. The priorities in urban development and the criteria for its evaluation are changing. A systematic rethinking of the fundamental categories of urbanism, its theories and methods are required for the dynamic conditions and chaos of the present.

Methodology as a science of methods of cognition and transformation of the world brings order to chaos (develops systemic integrity), organises the thinking of a specialist, and is the antithesis of voluntarism and a tool for overcoming it. It systematises algorithms for solving problems – not chaotic “grabbing and digging” or searching for solutions by trial and error (finding the right solution after everything else has been tried), but a clear ordering in the methods and algorithms of activity (Bilodid, 1971). The key idea of the research is to find ways and methods to bring materialistic and idealistic approaches to urbanism closer together. The materialist understanding of the world proceeds from the decisive and determining role of material and immediate life, the necessity to explore real processes of life, and explains not practice from ideas, but ideological structures from the material (religion, philosophy, morality, law, etc.). The idealistic understanding and explanation of the world are based largely on ideas, will, faith, aspirations, theories, doctrines, and consciousness of people; thus, the principles of idealism in understanding events, processes, and phenomena (Gorodnyak, 2007). While the materialistic understanding of the process in its radical manifestation exaggerates the importance of the material foundations of society’s life, the idealistic understanding overemphasises the role of spiritual, religious, moral, philosophical, legal, and other factors. Depending on what is used as the foundation of the process, there are objective (materialistic) and subjective (idealistic) processes (Vermenych, 2011).

The purpose of this publication is to provide an in-depth understanding of the methodology of urbanism in the context of convergence (convergence, interconnection, interpenetration) of materialistic and idealistic approaches, systematic development and improvement of the science of methods and streamlining of methodological tools for urban planning. *The tasks* are: to structure important categories of methodology and the methodological system of urbanism, to clarify the content of some of them; to organise the knowledge base and information system of urbanism, characteristics and indicators of urban space; to describe the structure of methods, highlighting those that are closely related to the issues being explored; to substantiate practical recommendations, requirements and applied methods of urban planning activities and solving specific problems based on a combination of materialistic and idealistic.

TERMINOLOGY AND THE STATE OF THE RESEARCH

The authors have clarified some concepts considering the specifics and objectives of the publication. *The methodology* is interpreted as the doctrine (science) of *methods* of cognition and transformation of the world, methods are a set of research techniques used in various subject areas according to the specifics of the object and subject of knowledge (statistical, sociological, historical, etc.) (Bilodid, 1971). *Knowledge* – is a set of concepts, theoretical constructs, ideas, principles, laws and regulations that operate in a particular subject area. I. Horodniak (2007) argues that knowledge as a basic category of various systems of scientific research of society is widely used to interpret and explain the process, and consequences of human activity and behaviour. *Urban studies* is a science and activity related to the research of cities and their role in society. *Urban planning* is the science and art of designing cities and territorial systems of various levels, scientific substantiation and creative search for solutions to their spatial organisation and development (Vermenych, 2011). *Characteristics and indicators* – description, analysis, and evaluation of the properties of specific objects, phenomena, processes, and actions. Properties are described by characteristics – those that can be expressed quantitatively are called *indicators* (Iftachel, 2006; Gabrel, 2021). *The systems approach* involves analysing an object as a systemic whole without dividing it into components. *An integrated approach* involves dividing the object into subsystems (units, elements), their factor-by-factor analysis, research and design as separate components, and then “stitching” them together into a single integrity (Zhylynska, 2010).

The objective of the methodology is to explore the cognitive activities performed in various fields of science, to identify general patterns of functioning and development of scientific thinking, and to develop general scientific methods of cognition (Senhupta, 2017; Hnatiuk & Rokhman, 2018). The methodology is a general theory of methods, based on which each specific science develops its methods and individual techniques. One of the varieties is the methodology of urbanism and urban planning, which explores the complex of phenomena that belong to the instrumental sphere of cities, their functioning and development. The methodology examines the totality of territorial systems, tools used in the subject area, objective characteristics and properties of urbanised systems, features of professional activity that play an essential role in obtaining objective knowledge, substantiating the principles, provisions and rules that organise and govern the spatial organisation and development of territorial systems of different hierarchical levels (Posatskyi, 2011).

Many urbanists devote attention to methodology as a science of methods at the systemic level. The development of planning and urban planning theories is traced by A.O. El-Kholei (2018), who recommends means for reforming planning education in Egypt and the organisation of architects’ work; M. Casagrande (2019) considers urban acupuncture as a transition to a model of sustainable urban transformation. The general provisions centred around the





methodology include systemic, comprehensive, structural, informational, merit-centred, problem-oriented, and other approaches. The systemic approach as a category does not have a single definition and is interpreted as: integration, synthesis of consideration of different aspects of a phenomenon or object; a means of research and development of objects that are an organic entity (Kustovska, 2005); expression of procedures for representing an object as a system and ways of developing them; search for different options for performing a particular job with the subsequent selection of the optimal option (Yashchuk, 2019).

Rutledge's research on planning methods is an extended look at the traditions, methods, and problems of organising research and project justification in contemporary urban planning (Silva *et al.*, 2016). Chinese researchers (Shah *et al.*, 2019; Song *et al.*, 2017; Cao, 2013) explain and expand on several methodological subjects and their application to urban planning practice, identifying new opportunities for cooperation between planning practitioners and scientists, and the application of agreed methods to solve real urban planning problems. In the book edited by M. Rako & F. Savini (2019), planning and knowledge are presented as new forms of technocracy that define modern cities.

Methodological support for urban planning in Ukraine is insufficient and is considered in an aspect-by-aspect manner. Among the researchers are: the initiators of urban planning design of cross-border regions, the developer of the methodological foundations of regional planning Y. Bilokon (2002); M. Demin *et al.* (2022), who have their vision of designing a methodology for the development of territorial systems of different levels; V. Timokhin (2018) traces the universal and cyclical sequence of the deployment of "beauty" and "harmony" in the history and theory of the development of the modern architectural and urban environment, proposes a structural model of the aesthetic development of the environment in the form of a "divine hail". A. Pleshkanovska (2011) explores the complex reconstruction of the city, the phenomenon of social and spatial development; spatial changes in Ukraine and testing of the model of differential urbanism conducted by K. Mezentsev (2017; 2015) *et al.* Urban theories, methodologies, and methods are based primarily on a model of the city that includes people, environment, and activities (Bertalanffy, 1962). Partial theories emphasise social, environmental, historical, economic, and other priorities (Mazur, 2014; Reinert, 2007). The authors of this research have repeatedly addressed the issue of streamlining the methodological tools of urban planning (Habrel, 2020; Musiyaka *et al.*, 2021).

The research of urban systems at the global level attempts to explain the complexity of the city and intercity interactions by isolating some components of social processes and then linking these processes to others that occur both within the city and between cities and the outside world (Alexander, 2017; Li *et al.*, 2018). The basic methodological provisions of urban studies are based on dialectics as a doctrine of the most general laws of development and movement, the source of which is considered to be the unity and struggle of opposites (Vernadsky's noospheric...

2013). The provisions of dialectical materialism were widely used as a doctrine that provides a materialistic explanation of the world, ways of cognition and transformation based on the general laws of dialectics. The materialistic explanation was opposed to the metaphysical one. Current approaches do not oppose the materialistic and idealistic in science, and their combination in the methodology of urban planning is associated with a convergent approach. The key idea of this publication is to find ways and methods of convergence between materialistic and idealistic approaches in urbanism and spatial planning (Galasyuk, 2019). In the era of large databases, when planning and research practices are changing, the potential and depth of information analysis is increasing, new research techniques and procedures are emerging, established methods and new research should be combined and oriented towards gaining new knowledge about processes and phenomena, explaining the basic principles of organisation, functioning and development of urban settlements and territories.

METHODOLOGICAL PROVISIONS, DATABASE AND KNOWLEDGE BASE OF URBAN PLANNING ACTIVITIES

In terms of methodological specificity, the approach that combines the materialistic and idealistic is close to the systemic approach, which studies the patterns and mechanisms of establishing a complex object from specific components, emphasising the diversity of internal and external relations of the system, and the processes (procedures) of combining the main components into a single theoretical picture. In the current conditions, the systematic approach is considered to be the main one in the methodology of urban planning. Systems science emphasises the knowledge and evaluation of the entirety and integrity, levels of complexity of objects, ways of interaction and relationships of system components. Highlight some of the properties and requirements of the systems approach methodology for urbanism and urban planning:

- the systematic approach involves isolating an object from its environment (totality) and considering it as systemic integrity (Kustovska, 2005). Thus, an important systemic property of urbanism and urban planning is *integrity*;

- justification of the purpose is the primary requirement of the methodology, and its systemic property is *purpose establishment* (identification of the general purpose and construction of the purpose tree). The purpose can be set both "from above" (its obligatory refinement after the analysis and assessment of the system state) and "from below" – from the analysis and assessment of spatial situations and systems. When building a purpose tree, the general purpose is divided into local and tactical purposes. At the bottom level of the tree is a system of characteristics and indicators. Here, it is essential to justify the criteria that are important for achieving the purpose and are used to assess the "degree of approach to it" (Shershniova, 2004);

- a property of a system is its *structure* (the structure, interconnection of parts of the entirety). There is a separate scientific methodology of structuralism that explores the



structure of objects, the form and variety of structures that occur in nature, consciousness, and society (Zaucha, 2007);

- The systems approach methodology shifts the emphasis from the study of elements to *connections and relationships*. Communication is the correlation between different phenomena based on interdependence and mutual interdependence (forward and backward, controlled-uncontrolled, active-passive, external-internal) (Medeiros, 2021). If the forces of connection within the system outweigh the external ones, the element belongs to the system; if the external connections are stronger, the element is transferred to the supersystem. For connections in urbanised systems, it is essential to explore their intensity and strength using appropriate methods and tools of analysis and evaluation. Relationships – these are unfilled connections. The relations of similarity, inclusion, and hierarchy are emphasised;

- *hierarchy* is a fundamental property and principle of building and developing a system as an arrangement of parts or elements of an entire in a specific order from higher to lower (Poljak Istenich, 2019).

However, the synthesising approach has its own differences from the systemic approach: it combines both materialistic and idealistic aspects of methodology and systemic and complex approaches.

The identified properties of urbanism and urban planning activities are similar to the methodological trends (systems science, system technology, system philosophy) identified by L. von Bertalanffy (1990) and are essential for establishing a general algorithm for the development of an information base, knowledge base and methods of analysis, evaluation and justification of decisions.

The knowledge base is interpreted by the authors as a system of knowledge about the object and methodology of urban planning activities; it should determine the required basic level of a specialist (Silona, 2017). The diversity of tasks and spatial situations does not allow obtaining knowledge for all options; it is designed and developed in the course of work, i.e., when solving particular tasks. There is the knowledge that is provided in the course of the research, and there is the knowledge that is acquired through experience. Knowledge is not just a space for storing data – it is a tool for intelligence and making smart decisions. For these purposes, the following methods are used: analytical, logical (analysis of natural consequence relations), heuristic, methods of synthesis as a necessary condition for justifying decisions, etc.

The specific features of the spatial organisation of cities and territories should be considered against the background of understanding and knowledge of the multifaceted nature of the material and immaterial processes and phenomena, in particular (Habrel & Cosmos, 2022):

- macro processes occurring in society and the global world, the role of states in this system, the model and extent of their intervention (influence) in the socio-economic sphere, and using systemic effects, understanding and considering threats from globalisation processes;

- regional policy (the role of cities and regions), using

“internal reserves”, the phenomenon of self-sufficiency and forms of system management;

- “human factor” and the totality of social relations – social conditions, moral, psychological and other characteristics of the “human” dimension;

- economic relations (forms of ownership, economic systems), economic theories and their relation to urban development;

- new urban and spatial organisation theories of society, trends and theoretical explanations of the development of cities and territories;

- ecological and sustainable development theories and systems resilience;

- the regularities of the general course of human activity in the territories, the development of both material and spiritual culture, and the history of urban planning. The cities and territories of Ukraine have long been developed and managed, and are unique in terms of history and culture.

The development of the knowledge base of urban studies requires *knowledge of the analysis and evaluation of spatial situations and systems*, in particular:

- justification of the purpose and objectives, purpose setting system, identification and selection of criteria, establishing priorities in purposes and criteria;

- understanding of urbanised systems as a hyper-complex phenomenon, knowledge of systems analysis and systems engineering;

- knowledge of the types of situations and system analysis, and the composition and properties of urbanised systems;

- assessment of spatial situations (losses, conflicts and defects in the system, spatial potential);

- determining the efficiency of the system, its reliability, environmental friendliness, comfort, and aesthetic properties.

In addition, the knowledge base of urbanism requires methodological knowledge of *decision-making and development management*, among other things:

- *modelling and forecasting* (deterministic, graph analytical, optimisation models, linear forecasting, simulation modelling, etc.);

- *decision-making*, including under conditions of uncertainty (types and levels of uncertainty, random factors in urbanism, queuing theory in decision-making, development of alternative options, multi-criteria selection, forecasting, justification of the structure and scale of systems, functional organisation, etc);

- *substantiation of the concepts* of spatial organisation and development of systems as basic ideas and principles (functionality, modelling, purpose establishment, flexibility, implementation stages, traditionalism, systematicity, elimination of uncertainty, harmony), and the main macro characteristics of the system.

The knowledge outlines the requirements for urbanism and urban planning, in particular, the requirement of meritocracy (the foundation for understanding the phenomenon is based on two concepts – *meritos*, which means worthy, dignified and is associated with the concept of





meritocracy; and *centrism* – not as a compromise (middle position, but as something that is in the centre of the system and is the foundation for justifying decisions on its development) is interpreted by the authors as a system of knowledge and concepts related to the dignity and system of values of a person and relations in society. This requirement does not imply the priority of intellectual elites in the state and its governance; it is an approach to the spatial organisation and development of urbanised systems based on knowledge, new values (intangible), and the uniqueness of space (geopolitical role, location, history, etc.). This model (Musiyaka *et al.*, 2021) envisages the spatial development of the state based on systemic ideas and new knowledge, the priority of new values, innovations and the latest technologies, and the harmonisation of the state's spatial system as an increase in the coherence of space dimensions. Harmony should be achieved by increasing the efficiency of using the spatial potential by reducing resource intensity, increasing utility, and reducing harmful environmental impacts. Meritocratic requirements define:

- environmental orientation of actions and decisions, understanding of the ecological capacity and limitations of natural resources and nature's ability to self-regulate;
- strengthening the connection between practical activities and scientific research, and the unity of theory and practice. Sociological issues and the requirements of socially oriented solutions are separately highlighted;
- considering the "subjective" components, as there are tasks in urban planning that are poorly structured and cannot be standardised in conditions of dynamic process complexity (models of analysis and synthesis can be verbal);
- problem-oriented approach with the integrity of consideration, when each of the problems of the territory has close ties to the set of problems of the entire system. It is necessary to correctly distinguish them from the environment, establish a hierarchy of problems and their interconnectedness, and perform a cause-and-effect analysis;
- combining knowledge of various related subject areas with urban planning knowledge allows for substantiating the best solutions;
- it is essential to consider the design solution from the rational or functional perspective, and to use knowledge and experience based on user empathy and two-way knowledge transfer between designers and residents (public dialogue);
- the phased development and implementation of systemic concepts (strategies, comprehensive plans), which take a long time, and in uncertain situations these documents "can not work". However, time demands urgent decision-making, thus, the development of strategic documents should be a permanent process and contain a flexible system of recommendations and decisions.

The database in urban studies is interpreted considering different approaches to information and its management (Silva *et al.*, 2014). Data processing methods are subjective, and the level of data information depends on the accuracy of the methods used in information processes. Development of: various data structures and types; forms

of data representation; concepts of linear data structures, fields and data space; database, bank, and data warehouses; data interpretation and generalisation; data validation and diagnostics; forecasting and planning as a task for intelligent systems.

The information base for the development of cities and territorial communities includes tangible and intangible characteristics. The properties of any system are described by characteristics – those that can be expressed quantitatively are called indicators. Indicators of urbanised systems usually describe the material essence of the system as an object:

- *efficiency* – includes usefulness, costs, effects, and is associated with using resources, primarily non-renewable ones, and new technologies;
- *functionality* (functional sufficiency, usefulness) is a value that changes with the change of the argument (people's needs and motivations). This category is relative, with important situational characteristics of relevance and individual understanding of needs and expectations for opportunities;
- building *density* (population);
- *the complexity of the planning structure* and the development of connections as a physical characteristic of space;
- *the scale of objects (elements)* and the system in the supersystem – interpreted as a relative value (scale, measure) of the importance (weight) of the system.

The characteristics of the intangible essence of urbanised systems are, in particular:

- *comfort* (in terms of everyday life, the satisfaction of physiological, technological and other needs), the possibility of immediate communication and participation of residents in urban processes and self-organisation;
- *security* (personal and social), which is related to physical, functional and psychological safety. The urban environment has vulnerable and dangerous fragments, and the concentration of people in megacities threatens to cause large losses in the event of epidemics, natural disasters, military conflicts, or terrorist attacks;
- *aesthetics* – compliance of the environment with the requirements of aesthetics and the general laws of artistic cognition and artistic reflection of reality;
- *informational and semantic meanings* – the reflection of the content of objects in figurative and expressive terms. They include subjective attitudes towards the environment; communication between people, threats, etc;
- *cultural-spiritual* characteristics as a state of humanisation of the living environment, morality, and cultural and ethical provisions of urban life.

Consider *three integral parameters of the state of urbanised systems* that combine the tangible and intangible:

1. *The quality of living conditions* is an evaluative category of living and working conditions. It is based on the characteristics of the *quality of life* (including an assessment of the totality of welfare conditions as understood and perceived by the population). It is a dynamic balance of satisfaction with life and all its aspects. An essential component of this category is *the level of "gap" between expectations and reality*. A tool for assessing the quality of



life is considered to be the *standard of living*, which covers various components, including housing and its affordability (Maslov, 1943), and *the quality of urban space*. Their components are related to health, social opportunities, safety, leisure time organisation, aesthetics, comfort, and information and semantic meanings.

2. *Urban resilience*. Sustainability and sustainable development inherently places environmental issues and care for the environment at the centre of urban activities, although it considers aspects of economic activity and is oriented towards a difficult-to-predict (uncertain) future. The nature and growing pace of urbanisation increase the pressure on the environment and make the category of urban resilience a special one, which is oriented towards countering the new challenges of the present.

3. *The socio-environmental and economic efficiency of cities* includes environmental, social, economic, and technological characteristics as attractiveness for business and the efficiency of urban systems.

Thus, it is possible to track the impact of today's realities on changes in the methodology of urban planning. The author emphasises the *information approach to scientific knowledge* of objects, processes or phenomena, according to which information aspects are primarily identified and analysed and the information-centred method of exploring urbanised systems is used. An essential methodological condition for the convergence of the materialistic and the idealistic in urban activity is creativity, which is the ability to propose new (creative) solutions. The creativity of an urbanist as a metaphysical category does not explain the phenomenon of the birth of an idea (design solution) and is closer to the creativity of an engineer than an artist. It is based on knowledge and information, on thinking and worldview, i.e., on the ability to justify new things (to act outside the box), and not just to derive new things on emotions and creativity (Oakley & Banks, 2021).

The authors identify signs of creativity:

- the highest degree is both establishing something new and "being a discoverer." In addition, interpretations are seen as creativity, for example, the application of general patterns to particular cases;

- the interest of the creative process for the "creator" who rejects clichés, exposes abilities, and enjoys the solution and idea;

- the creativity of urbanism is close to engineering, it is based on intelligence and knowledge of laws and the canons of art;

- artistic creativity – primarily a product of imagination and influence on human emotions. Creativity in art is oriented towards connoisseurs and is sometimes associated with deception (to catch the tastes of customers), while engineering and urban creativity and ideas have more objective evaluation criteria;

- For creativity as a process (from the idea, and search for elements to the synthesis of the general), the primary idea is the idea that manifests itself as a concentrated impulse of originality and can be fundamental or ordinary. The signs of creativity in urbanism are constructiveness,

productivity, and the importance of the idea;

- ideas can be fake and populist, in particular, in the socio-political sphere, which is closely related to urbanism. For example, the communist idea of "good intentions" is groundless, but it can stupefy and attract to the masses with its simplicity, designed for primitive understanding;

- new trends in art are conditioned by changes in conditions – for example, the emergence of formalism is associated with the emergence and opposition of photography, which perfectly reflected real paintings. Changes in urban creativity and the emergence of new ideas are conditioned upon changes in political and socio-economic conditions, and aesthetic preferences (Renaissance ideas, socialist realism, etc.);

- the emergence of new ideas requires conditions and a critical mass in society and among professionals. It should be highlighted that the creative potential of the Ukrainian people is high, both in the artistic sphere and in engineering and the establishment of innovative engineering solutions.

The increasing role of the intangible and idealistic in approaches to the spatial organisation and development of territorial systems is a condition for reforming some provisions of the urban studies methodology, shifting attention to things that cannot be defined, methods of their research and consideration in decision-making. The "human" dimension is at the centre of the intangible.

RESEARCH METHODS, REQUIREMENTS AND RECOMMENDATIONS FOR THE DESIGN AND DEVELOPMENT OF URBANISED SYSTEMS

Nowadays, a wide range of methods for researching and justifying design decisions is known and used in urban planning. Due to the commonality of considering the materialistic and idealistic, it is advisable to introduce some changes at the level of methods and practical recommendations. The authors divide the methods into groups: *analysis of spatial situations; assessment of the state of situations and systems; justification of decisions*; their classification and analysis, and changes are presented.

1. *Methods of analysing spatial situations* are divided into groups: urban planning studies, analysis of natural and landscape conditions; methods of special analysis:

a) *Urban planning research methods* include analysis:

- situations (composition, structure, connections);

- problems of the system's state (security, social, humanitarian, spatial and environmental);

- cause-and-effect connections;

- structural analysis;

- functional organisation of systems;

- density of buildings and facilities across the territory;

- defining the boundaries of the zone of influence of the central elements;

- zoning of territories by the intensity of connections;

- location of public attraction centres.

b) *Methods of analysing natural and landscape conditions:*

- natural (relief, water supply, vegetation as components of the landscape);





- landscape analysis of the territory;
- uncomfortable and disturbed elements;
- resource conditions of the territory.

c) *Special methods of analysis:*

- the compositional structure of the city;
- historical-genetic analysis of the spatial organisation of urbanised systems;
- interconnection of natural and anthropogenic landscapes in the area of urban influence and the junction of different natural and landscape systems;
- analysis of processes in the system.

2. *Methods for assessing spatial situations and systems (comprehensive assessment and diagnosis of the state of systems)* (Spatial organization..., 2004). The evaluation includes criteria:

- system efficiency, which is assessed as the ratio of utility to costs and consequences (utility fee); includes components of utility, resource intensity, harmful effects, safety, aesthetics of space, ergonomics and usability. Efficiency depends on the structure and composition of the system, and is a time category – it can be high today but lost in the following periods;
- functional sufficiency – ensuring that the system's functional processes are secure, timely and consistent. It includes the time dimension and is provided by: infrastructure productivity, the number of objects, the volume of works and services per physical unit, the time during which services must be provided (work performed), the duration of service provision, and the coefficient of variability;
- spatial potential (resources and capabilities of the system);
- issues, ranking them by their impact on the situation and interconnectedness;
- limitations (thresholds) for the development of the system (moral and environmental imperatives, regulations, etc.).

Indicators of the real situation are defined as the ratio of the actual value to the regulatory value or the best value in other systems of this type. Includes assessments of: spatial potential; strengths and opportunities; losses, weaknesses and threats; system efficiency; reliability; comfort; aesthetic characteristics. A comprehensive assessment is based on a preliminary factor analysis and is reduced to using a SWOT assessment (weaknesses and strengths that describe situations within the system, and opportunities and threats that come from the supersystem, i.e. the external environment) (Spatial organization..., 2004). Assessing the state of the system is a prerequisite for decision-making,

which can be performed by both individual specialists and integrated groups of analysts. The choice depends on the purpose, tasks, and object of analysis and evaluation.

3. *Justification of decisions – ideas, principles and methods.*

The conceptual provisions of the spatial organisation and development of urbanised systems are centred around the *key idea of increasing the system's sustainability* and include policy:

- security (from national military doctrine to citizen security – psychological, food, environmental, social, cultural, and legal);
- humanitarian (development of values, raising the cultural and spiritual level of society);
- environmental (harmonisation of life and health of the population, balanced use of resources);
- social (demographics, elimination of inequality and poverty).

The solution is based on specific *principles and methods of spatial organisation and system development* (Fig. 1).

Among the methodological changes that are becoming a reality in modern urban planning are the following:

- combining materialistic and ideological approaches, bringing them closer together and developing a common methodological platform that covers the entire chain – analysis, assessment of spatial situations, justification of urban solutions, implementation and monitoring of project proposals;
- The dynamic development of computer technologies and information and analytical systems is an effective tool in the methodology of urban planning, expanding computational and analytical capabilities, allowing for a more objective assessment of the spatial situation, and making a more informed choice from a variety of solutions. In these conditions, the importance of the intellectual and creative component of a specialist, their creativity and ability to offer new ideas and solutions is growing. It is the purpose of this research and the purpose of uniting the material and the immaterial (idealistic) - knowledge, values, etc;
- the growing importance of a specialist's knowledge and intelligence as an ability to propose new ideas. They are manifested from the very beginning of the question as the ability to see and justify the problem, and then permeate all stages of urban planning. The computer, new technologies and methods of convergence of the materialistic and idealistic emphasise the importance of thinking, fundamental knowledge and creativity, the ability to see dependencies and synthesise solutions, and to avoid over-formalisation of "computer" justifications and decisions.

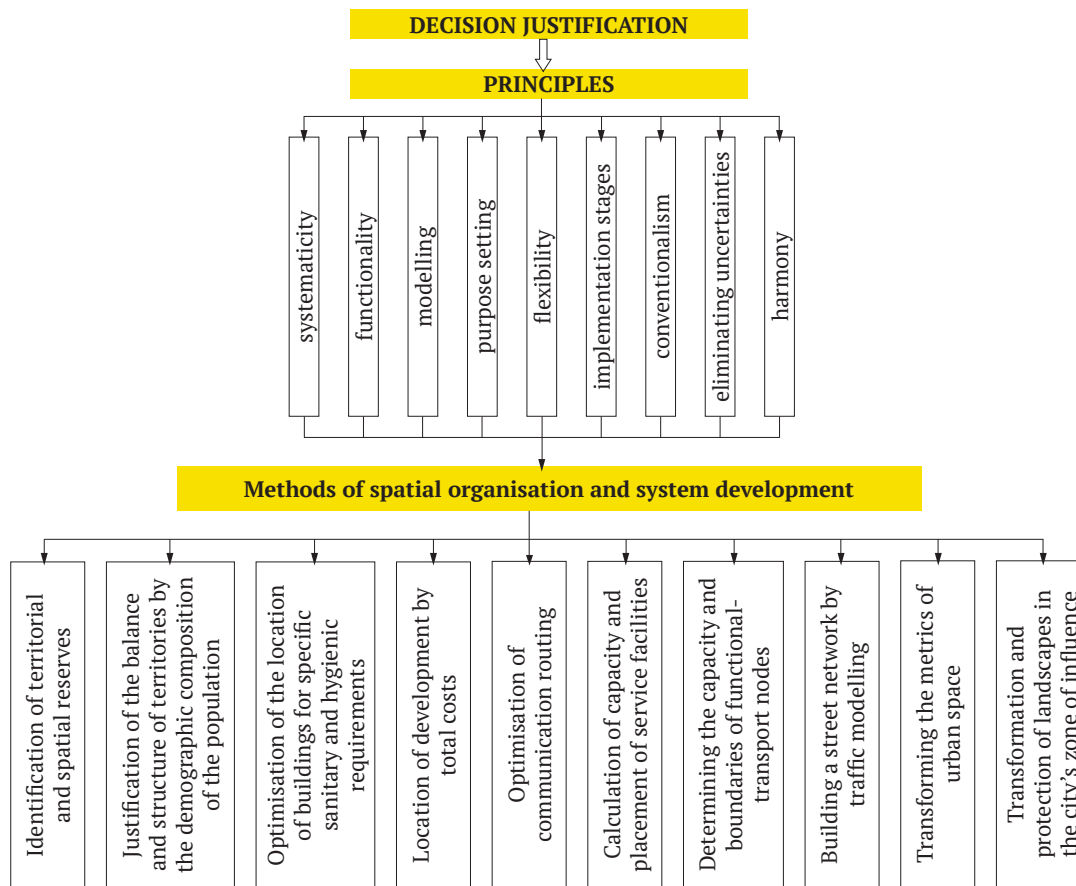


Figure 1. Principles and methods of substantiation of solutions for the spatial organisation of urbanised systems

Source: author's development

The requirements and algorithms for substantiating decisions proposed by the authors are as follows: to competently develop a purpose tree with criteria at the lower level, to prioritise and hierarchise requirements and purposes; to objectively assess resources (including intangible resources) and means of achieving the purpose and partial purposes; to reasonably determine the areas of development and decision options; to professionally predict and assess the adverse effects and threats from various alternatives; to determine the optimal solution using the methods of single and multi-criteria optimisation and analytical and emotional choice. A selection condition – if the system model (as a simplified reflection of reality) is appropriate (reflects the main properties of the system and has a high coefficient of approximation to reality), the selection and evaluation criteria are reasonable, the selection methods are correct, and the experts – professional, then the right choice can be expected.

CONCLUSIONS

Architects and urbanists are facing complex problems of updating and developing new design documents for the spatial organisation and development of territorial systems of different hierarchical levels and managing their implementation in the current realities of Ukraine. Updating the methodological platform of urbanism – theoretical foundations and principles (knowledge base), structuring

of information (databases – hierarchical, network, relational, temporal, distributed, post-relational, multilevel), streamlining of methods of analysis, assessment of the state of systems and justification of decisions on their spatial organisation and development, which is already a necessity today, considering the active transition to large databases, which changes the practice of planning, research, principles of organisation, functioning and development of urban settlements and territories, etc.

Urban development is considered a set of purposes, criteria, priorities, and constraints. The multiplicity of purposes (strategic, tactical, regulatory) and criteria necessitates a multi-criteria analysis and evaluation of decisions. The design of territorial systems is oriented towards their integrated development – strengthening useful properties, eliminating or weakening harmful ones, etc. A prerequisite for reforming some provisions of the urban studies methodology is the growing role of the intangible, which is centred on the human dimension and idealistic in approaches to spatial organisation and integrated development of territorial systems, emphasising aspects that cannot be defined, methods of research and consideration in decision-making.

The author emphasises the significance of improving the methodological culture and development of the urbanist's systemic thinking (level of thinking and reflection, worldview and outlook), their creative potential and the set of professional knowledge, skills and abilities to





implement projects and other functions of professional activity. New changes, information, and methods disclose a systems perspective as a synergy of urban planning activities for researchers and specialists in design (decision-making) and management of urbanised systems. None.

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CONFLICT OF INTEREST

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Конвергентність матеріалістичного й ідеалістичного в методології містобудівної діяльності

Анотація. Реалії сьогодення вимагають змін і розвитку урбаністичної методології як науки про методи з охопленням усього методологічного ланцюжка – від уточнення понять, впорядкування завдань і встановлення характеристик об'єктів до методів аналізу, оцінки й обґрунтування рішень, а також містобудівного проектування та управління розвитком міст. Метою даної публікації є поглиблене осмислення методології урбаністики в контексті конвергенції (зближення, взаємопоєднання, взаємопроникнення) матеріалістичного й ідеалістичного підходів, впорядкування і розвитку методичного інструментарію містобудівної діяльності. Містобудівна діяльність розглядається як сукупність цілей, критеріїв, пріоритетів, обмежень. Множинність цілей – стратегічні, тактичні, нормативні, і критеріїв зумовлює потребу змін методології, аналізу й оцінки просторових ситуацій, а також обґрунтування рішень, зокрема вимог багатокритеріальності. Проектування територіальних систем скеровується на інтегрований розвиток, підвищення обґрунтованості й ефективності втілення концепцій їх просторової організації. Стаття за своєю сутністю методологічна – підкреслено важливість підвищення методологічної культури та формування системного мислення урбаніста (рефлексії, світогляд), його творчого потенціалу й сукупності професійних знань, умінь і навичок виконання проектів та інших функцій фахової діяльності. Це надзвичайно важливо в епоху великих баз даних та інтернету, зміни практики планування й дослідження, збільшення потенціалу й глибини аналізу інформації, появи нових технік і процедур. Інтегрування нових методик досліджень має скеровуватись на отримання нових знань про процеси і явища, встановлення закономірностей і підвищення обґрунтованості принципів організації, функціонування та розвитку урбанізованих систем і територій

Ключові слова: методи; зближення матеріалістичного й ідеалістичного підходів; багатокритеріальність; знання; інформація; дані



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