

ABSTRACT

for the thesis submitted in fulfilment of the requirements for
the degree of Doctor of Philosophy (PhD) in the educational
program 8D07311 – “Architecture”

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on the topic: “Trends in the Development of Modern Regional
Architecture of Kazakhstan”

An important part of the history of human civilization is architecture – buildings and structures that protect from natural forces while showcasing culture, technical achievements, and the way of life. At the turn of the 20th and 21st centuries, the world entered a qualitatively new stage of development, described in global science as globalisation, the formation of a post-industrial world, and an information society, in which scientists propose various vectors for the further development of humanity.

The relevance of the research. Kazakhstan, a young independent country, faces the challenges of maintaining sovereignty amidst global integration. Architecture, playing a key role in shaping the living environment, becomes a crucial aspect of this process. In the 21st century, research aimed at identifying trends in architectural development in the context of globalisation and regionalisation becomes particularly relevant. Integration into global architectural processes allows Kazakhstan to acquire new technologies and investments while preserving its unique architectural features and traditions. It is essential to analyse external and internal factors and determine the prospects for the development of the country’s architecture to effectively respond to contemporary challenges and maintain its identity in a global multicultural environment.

The boundaries of the research:

- *substantive*: the focus of the research is aimed at analysing the development of the world context of the architecture of the twentieth century, identifying the place of Kazakhstan in this process and the influence of modern global trends on the development trends of Kazakh architecture;

- *chronological*: the study covers the period of the 20th - first quarter of the 21st centuries, with selective inclusion of information outside this time;

- *geographical*: the study examines the processes that took place in the area of Western and Eastern Europe, as well as in the territory of the former USSR, including the modern territory of the Republic of Kazakhstan.

The object of the research – the architecture of buildings and structures in Kazakhstan, professionally formed as a result of the country’s development process in the 20th and early 21st centuries.

The subject of the research – the origins of the current state of architecture in Kazakhstan, as well as the trends that shape its regional uniqueness and ensure sustainable development in the future.

The aim of the research – to theoretically substantiate and identify the main trends in the development of contemporary architecture in Kazakhstan as a response

to regional and global challenges, taking into account current trends and highlighting priority directions.

To achieve the stated goal, the following tasks were set:

- to study the historical and theoretical background for the development of world architecture in the twentieth century, including the architecture of Western countries and the Soviet Union;
- to identify the sources of restructuring of professional thinking in world architecture of the late twentieth century;
- to analyse and systematise the process of the genesis of Kazakhstan's architecture in the twentieth century;
- to determine the architectural and artistic features of the unique buildings of Almaty in the last quarter of the twentieth century as a programmatic stage that characterises a turning point in the formation of modern architecture of Kazakhstan;
- demonstrate, using the example of Astana, the stage of transition of Kazakh architecture to global trends at the end of the twentieth century;
- to identify modern problems of architecture in Kazakhstan based on an analysis of the current state of regional architecture, social needs and preferences of modern society;
- to critically compare traditions and innovations of expression of regionalism in modern architecture of Kazakhstan;
- to substantiate the role of architecture as a basic factor in the formation of regional and cultural identity;
- to determine trends in the development of regional architecture in Kazakhstan in the 21st century in the context of global challenges, taking into account current trends in architecture and highlighting priority areas.

The scope of the study entailed an analytical review of the current state and understanding of the contemporary global architecture of Kazakhstan. The analysis was informed by research conducted by both national and international scientists, as well as legislative documents from governmental agencies and domestic and international sustainable development initiatives. This scrutiny revealed a significant concern: the absence of a thorough analysis and assessment of the modern architecture of Kazakhstan, particularly in the context of recent international and governmental sustainable development programs.

The scientific novelty of the research resides in synthesising specific facets of Kazakhstan's developmental trajectory, contextualised within the paradigms of both Soviet and post-Soviet eras. This synthesis provides valuable insights into the qualitative transformations occurring within the architectural realm and sheds light on its prospective directions. These changes are enshrined in state documents and urban development policies aimed at enhancing the living environment, as well as broadening perceptions of architecture's role in shaping regional identity:

- the pathways of transformation of Kazakhstan's architecture in the late 20th century from Soviet modernism to global trends have been identified;
- the global and local factors shaping the current state of architecture in Kazakhstan have been specified;

- a hierarchy of contemporary issues in Kazakhstan's architecture has been constructed;

- the features of the identity formation process in modern regional architecture have been identified;

- the idea of visualising symbolic images, reinterpreted in modern architectural forms, as a key construct of regional identity has been substantiated;

- for the first time, current trends in the further development of architecture in Kazakhstan in the context of international and local influences, which constitute the essence of the modern movement towards a sustainable world, have been identified.

Validity of the core scientific provisions the validity and credibility of the core scientific provisions, conclusions, and recommendations presented in this work are substantiated through the application of a vast array of fundamental studies on the specified topic, analysis of the project, and graphic materials, utilisation of normative legal documentation, and methods of computer processing of sociological survey results. Additionally, the propositions of this dissertation have been validated through publications in peer-reviewed domestic and international scientific journals and in-person presentations at international scientific conferences in Russia, Azerbaijan, and Croatia.

The research methods. The research employed various methods to ensure the comprehensive achievement of its objectives and the resolution of the tasks at hand:

- method of theoretical-empirical analysis (theoretical and experimental study of architecture for a better understanding of phenomena and development processes);

- method of comparative analysis (the study of architectural phenomena through comparison and analysis for a deeper understanding of their relationships);

- iconographic method (analysis and interpretation of artistic meanings of architectural images, decoding symbolism for understanding and meaningful interpretation of regional architectural objects);

- method of logical modelling (description of the development of a predicted object based on identifying a cause-and-effect relationship, the relationship between the individual and the general, the use of general techniques of logic - analysis, synthesis, deduction, induction, inference by analogy, etc.);

- field survey method (data collection, photographic recording, execution of measurement drawings of architectural structures);

- questionnaire method (conducting a survey using a questionnaire in the Survey program);

The scientific hypothesis of the research: a critical analysis of the evolution of Kazakh architecture during the Soviet and post-Soviet periods, identifying the synchronicity of emerging global and local trends (integration into international contexts, utilisation of advanced technologies, and adaptation to unique local conditions), will facilitate the development and implementation of sustainable innovative architectural solutions. These solutions will contribute to the creation of a comfortable living environment and humane architecture in Kazakhstan, characterised by a distinct regional identity.

The theoretical significance of the research lies in expanding the understanding of the importance of maintaining the connection between contemporary architecture and its previous stages and in identifying developmental vectors amidst global challenges. This significance is evident in the potential for further scientific studies and its application in educational programs. The findings can serve as a foundation for developing new theoretical concepts in regional architecture and can be integrated into the curriculum of the “Architecture” educational program. The research materials have been applied in the educational process and included in lecture and practice materials for the course “Globalization and Regional Issues of Architecture in Kazakhstan” (EP 8D07311–Architecture) during the 2023-2024 academic year.

The practical significance of the research is justified by the necessity of incorporating the best design and construction traditions into architectural practice, adapted to global challenges and local specificities. The dissertation findings will benefit projects related to preserving and reconstructing architectural monuments, conserving cultural heritage, and adapting to contemporary societal needs, thereby enhancing the objects’ functional appeal and economic value. The research materials have been utilised in the experimental design-reconstruction project of the “Three Bogatyr” residential complex in Almaty in 2024.

This thesis will defend the following theoretical propositions:

- *The evolutionary process of Kazakhstan’s architecture* in the 20th century, driven by the integration of professional design and construction methods within the socio-economic and political realities of the era and the planned economy of the USSR, fundamentally altered Kazakhstan’s architectural and urban landscape. The increase in the number of cities and rural settlements and the creation of a professional sector based on construction production capacities and design organisations contributed to unprecedented architectural and urban changes across the vast territories of Kazakhstan;

- *The transformation of Kazakh architecture* in the late 20th century from Soviet modernism to global trends, necessitated by the shift in the state’s socio-economic paradigm from a planned economy to a market economy, followed by economic collapse, required the implementation of modern mechanisms for organising design and construction activities in Kazakhstan. The organisation of international competitions for significant projects during the construction of the new capital, Astana, foreign investments, and the import of innovative technologies facilitated the entry of Kazakh architecture onto the international stage and opened new opportunities for realising creative concepts by Kazakh architects;

- Amidst global changes in all spheres of life, Kazakhstan experiences pressure from both internal and external factors influencing its development, including regional architecture. The research presents a *diagram of regional architectural issues in Kazakhstan, constructed on a hierarchy of internal, local and external global factors*. This illustrates the interrelationship of existing issues and expands the understanding of their branching from the major problem of “budding”;

- One of the main scientific ideas of the study is the *identification of the role of architecture as a fundamental construct in the formation of regional identity*,

substantiated by natural and anthropogenic factors; enhancing the cultural significance of architecture in creating the international image of the state against the backdrop of modern Kazakh architecture's integration into international processes;

- In the context of the dramatic shift in architectural development paradigms at the turn of the millennium, amidst the fragmentation of scientific research in the field of architectural theory and the traditions of architectural formation in historical retrospection, and the recognition of the root origins of local architecture, the study proclaims the primacy of a critical approach in using traditions and innovations in modern Kazakh architecture in the context of global integration and regional identification;

- Considering Kazakhstan's established integration into international political, economic, and cultural processes, and consequently, the infiltration of global issues into Kazakh conditions, the dissertation presents *trends in the development of regional architecture in Kazakhstan in the 21st century*. This includes local and global challenges (sustainable development, digitisation of the architectural and construction industry, adaptive reuse of buildings, participatory architectural identity, and design) as strategic vectors for local practices aimed at forming a humane and comfortable living environment.

MAIN CONTENT OF THE WORK

Chapter 1, “**The Development of Global Architecture in the 20th Century**”, examines the evolution of architectural trends and innovations that characterise this period in order to identify the most important trends that determined the modern appearance of the architectural world. Particular attention is paid to the role of the architectural movement in Western countries, as well as to an analysis of the specifics of architectural practice in the Soviet Union. Systematisation of ideas, structuring and visualisation of key changes and dynamics of development made it possible to identify a rethinking of professional architectural paradigms at the end of the 20th century.

Conclusions on the first chapter

1. Based on the analysis of 20th-century international architecture conducted in this study, it has been determined that modernism in architecture is represented by a broad spectrum of movements, each of which has significantly influenced contemporary architectural practice. In the first half of the 20th century, architects sought to express industrial progress through new forms that reflected the technological advancements of the time. However, the second half of the century witnessed a substantial shift in architects' preferences towards harmony with nature and cultural context. This transition not only highlights the evolution of architectural thinking but also reflects profound changes in society's cultural, technological, and philosophical paradigms.

2. The research allowed us to establish that the basic principles of modern architecture were formed before their official recognition, changing the paradigm of

architectural practice and establishing a new era. Modernism of the 20th century initiated the emergence of new architectural centres and the spread of “Western” ideas to remote regions, significantly influencing peripheral countries’ development. This interaction highlights the importance of regional modernism, which, taking into account modern scientific and technological advances, as well as interdisciplinary connections, has contributed to the preservation of cultural identity and the creation of a rich architectural heritage in the context of globalisation.

3. The analysis of theoretical research and building design practice during the Soviet Union reveals the distinctive influence of socio-cultural and ideological processes on architectural development. Political and ideological factors played a central role in shaping the architectural paradigm of the Soviet era, where modernism served as an expression of industrial progress in the first half of the 20th century, transitioning towards harmony with nature and cultural context in the second half. Ultimately, the study demonstrates that the architectural heritage of the Soviet Union represents a complex phenomenon that reflects and shapes the political and cultural values of its time, holding significant importance for understanding the historical context of architectural development.

4. A study of the sources and architectural structures of the late 20th century allows us to conclude that there was a restructuring of professional thinking in world architecture, reflecting the complex circumstances and ambitions of the time. Postmodern architecture emerged as a global cultural phenomenon capable of expressing regional identities. By paying attention to a place’s context, history and phenomenology, the architects sought to integrate tradition with modernity, understanding the past as a source of certainty. However, postmodernism was a temporary phenomenon, and starting in the 1980s, architecture began to seek new forms of expression. The development of the first computer modelling led to the emergence of new technologies and design methods, and attention to durability and efficiency of construction became important. Trends such as regionalism and ecological architecture grew out of the search for local identity.

Chapter 2, “**The Evolution of Architecture in Kazakhstan in the 20th Century**”, reflects the complex socio-economic and political changes in the country. Significant transformations occurred from the beginning to the end of the century: from traditional forms to innovative architectural solutions symbolising Kazakhstan’s independence. The study highlights key stages and architectural-artistic features of development, as well as the influence of global trends on local practices.

Conclusions to the second chapter

1. The architecture of Kazakhstan in the first half of the 20th century developed in line with the country’s level of productive forces. At the beginning of the century, settlements were dominated by single-story houses, but over time, buildings became increasingly complex, incorporating multi-story structures and dynamic forms. In the 1930s and early 1940s, a new phase in architecture began, blending constructivist principles with elements of simplified classicism. This synthesis aimed to achieve aesthetic harmony and functionality, reflecting changes in the republic’s social and cultural life. Reconstruction and construction ensued

after World War II of 1941-1945, characterised by the unification and standardisation of designs. This process accelerated construction and reduced costs, which was especially important in the post-war period. During this time, new types of public buildings were developed and adapted to local climatic conditions and social needs.

2. The second half of the 20th century saw a shift from standard architectural forms to modern, often experimental solutions designed to meet the needs of a rapidly changing society. From the 1950s onwards, mass construction of residential complexes with developed infrastructure began, becoming one of the main factors in shaping the urban environment. The stages of industrialisation, the development of virgin lands, and subsequent urbanisation significantly influenced the architectural landscape of the country. The development and implementation of standard projects, as well as new structural solutions such as earthquake-resistant buildings, illustrate technological achievements within the framework of a planned and socialist economy.

3. The study of the architectural and artistic features of unique buildings in Almaty in the last quarter of the 20th century revealed their significant influence on preserving cultural heritage and strengthening regional identity. Almaty's architecture demonstrated a drive for innovation, the introduction of new materials and technologies, as well as an emphasis on earthquake resistance and the use of national decor. These aspects substantially influenced the city's architectural appearance. The impact of unique architectural objects built in Almaty in the last two decades of the 20th century played a decisive role in shaping modern approaches in Kazakhstan's architecture by searching for a new language of form creation.

4. With the attainment of independence, a new stage of architectural development began, marked by the aspiration to create a national image. Since 1991, when the capital of Kazakhstan was moved from Almaty to Astana, a new era of active implementation of advanced technologies and contemporary architectural solutions began. Astana became an experimental platform for numerous projects developed by Kazakhstan and foreign architects, fostering the emergence of new concepts and innovative approaches in construction. The architecture of high-rise residential and public buildings, such as the "Palace of Peace and Reconciliation" and "Khan Shatyr", among others, illustrates the successful combination of global architectural trends with regional characteristics, forming regional symbols.

Chapter 3, "**Actual Aspects of Forming Modern Regional Architecture in Kazakhstan,**" it examines how, in the conditions of globalisation and rapid urbanisation, Kazakhstan faces the challenge of preserving and developing its regional identity. Intertwined traditions and innovations can create a unique regional architecture that reflects a rich cultural heritage and meets modern societal needs. Using examples of traditional architecture, respect for historical forms, and the integration of modern technologies allow the formation of architectural spaces that become an integral part of the urban fabric.

Conclusions on the third chapter

1. Based on the analysis of buildings, the research establishes that the contemporary state of Kazakhstan's architecture is a logical continuation of the country's historical development in the 20th century. The country has managed to preserve and enhance its architectural and urban planning achievements while navigating complex socio-economic and political changes. The analysis of structures built in Kazakh cities reveals that the modern language of Kazakhstan's architecture articulates a new understanding of regional forms through the reinterpretation of local experiences, artistic-symbolic imagery, and progressive technological trends. The expression of regional identity in architecture is founded on the identification of fundamental factors (natural and climatic features of the region, cultural traditions, and the construction experience of the local population) and their transformation through the lens of universal global standards and new technologies.

2. The study of identity expression in architecture showed that one of the most evident techniques is the visualisation through traditional Kazakh ornamentation, which has been used in architecture across different periods and interpretations. The continuity of ornamental design traditions is achieved by incorporating this technique into new structures but in a different compositional and technological interpretation: the ornamentation of facades of the National Museum, the Palace of Schoolchildren in Astana, and other buildings expand the understanding of architectural visualisation in regional conditions.

3. To determine the role of architecture in the formation of a city's identity, the study conducted a sociological survey of more than 800 respondents. Based on the survey results, it was established that architecture is one of the basic factors of a city's identity, which not only shapes the living environment of people but also transmits to future generations the material signs of the region's culture. To date, the architectural science of Kazakhstan has not conducted extensive research into the origins of the identity of the country's cities. At the same time, the study and purposeful formation of identity is a condition for creating a recognisable and attractive image of the city and can be not only a humanitarian construct but also an important economic tool - a source of investment and attracting tourists.

As a result of a survey of respondents, factors shaping the city's identity were identified:

- natural (climate, landscape, flora, fauna);
- anthropogenic, which, in turn, is divided into two groups: material-spatial (architecture, spatial environment) and cultural-symbolic (images, myths, historical associations).

The study presents an analysis of the identity of Almaty, the largest city in Kazakhstan, and defines the role of architecture in this process:

- the conditions for the formation of the city's identity are determined, taking into account the influence of natural-climatic, historical, anthropogenic, functional and socio-cultural factors;
- a study of public opinion regarding the perception of the city's identity was conducted;

- the role of modern architecture as a factor in the formation of Almaty's identity is revealed.

The importance of conducting such a study is caused by the need to substantiate not only humanitarian but also economic approaches to the functioning of the city.

Chapter 4, “**Trends in the Development of Kazakhstan Architecture in the 21st Century**”, identifies contemporary local challenges impacting architectural formation; architecture is examined within the context of global sustainable development trends; principles for the development of regional architecture under modern conditions are defined; and priority directions for the future development of regional architecture in Kazakhstan are established.

Conclusions on the fourth chapter

1. The Influence on the Development of Contemporary Kazakh Architecture: The formation of modern architecture in Kazakhstan is significantly influenced by internal (local) challenges that have emerged as a result of socio-economic, environmental, and technological upheavals over recent decades. The independence gained in 1991 marked the starting point for substantial transformations in the architectural and urban planning sector, reflected in the development of master plans and territorial development schemes. However, these achievements are accompanied by serious issues such as uncontrolled internal migration, overloaded infrastructure, a shortage of quality housing, and threats to architectural heritage. Addressing these problems requires a comprehensive approach, including the development of research institutions, strengthening legal protections for architects, and active public participation in urban planning processes. The architectural community in Kazakhstan must continue integrating advanced global practices, such as sustainable development, digitalisation, and energy efficiency, to create a comfortable urban environment.

2. Under present conditions, Kazakhstan's significant achievements in sustainable development and “green” architecture are evident. These achievements, as evidenced by national strategies and international partnership projects, are a result of the country's global engagement. Government policies focused on decarbonisation and enhancing energy efficiency have substantially improved the quality of life for the population, reduced environmental risks, and fostered sustainable economic growth. Programs implemented in cooperation with international organisations, such as the United Nations Development Programme (UNDP), have proven effective in introducing energy-efficient technologies and modernising the housing sector.

Kazakhstan's integration into global economic and political processes has exposed the country to various global challenges, including cultural, environmental, and technological issues. Environmental challenges, such as climate change, air and water pollution, and land degradation, necessitate implementing robust environmental protection measures and transitioning to sustainable management practices. Economic diversification is essential to mitigate the vulnerabilities of a commodity-dependent economy to global price fluctuations. Technological modernisation, including digitalisation and developing “smart” cities, is crucial for

enhancing economic competitiveness. Social inequality and the impacts of the COVID-19 pandemic have underscored the importance of equal access to education, healthcare, and social services. Addressing these multifaceted issues requires coordinated efforts from the state, the professional community, and civil society to create a sustainable and comfortable architectural-spatial environment that meets contemporary demands and societal needs.

3. **Principles for Regional Architectural Development:** The analysis reveals that the development of regional architecture in Kazakhstan under contemporary conditions requires adherence to principles such as environmental safety, continuous scientific and technological modernisation, revitalisation of architectural structures, socialisation of architecture, and a critical approach. These principles ensure sustainable and harmonious development, combining historical traditions with the latest global trends. Implementing energy-efficient technologies, using renewable energy sources and environmentally friendly materials, and active public involvement in design processes contribute to creating unique architectural solutions that support cultural diversity and historical continuity, ensuring a high quality of life for the population.

4. Through analysing contemporary and local theoretical and practical frameworks, we have delineated key trajectories for the evolution of regional architecture in Kazakhstan in the 21st century. These trajectories address regional challenges while integrating global trends. The main vectors are:

- Sustainable development and green architecture
- Digitalization of the architectural and construction industry
- Adaptive use and repurposing of buildings
- Participatory design with community involvement;
- Formation of architectural identity in modern conditions

Conclusion

In the 21st century, architecture, within the context of a post-industrial world, emerges as a key driver of national development, shaping the physical spaces of settlements and people's living environment. The interaction between contemporary architecture, technology, and techniques, alongside their investment and humanitarian potential, has increasingly influenced the development of the economy, social sphere, environmental concepts, and the expression of city and country identities. This evolution presents new tasks and challenges for architecture as a field responsible for the production of material structures.

Given this, there is a growing need to study the architecture of Kazakhstan and, specifically, to understand the trajectory of its future development.

As a result of the research on the topic “Trends in the Development of Contemporary Regional Architecture in Kazakhstan”, the following conclusions can be drawn:

1. Kazakhstan's architecture, which originated in the material culture of ancient and medieval nomadic civilisations and evolved from Soviet architecture of the 20th century, has managed to preserve and enhance its architectural and urban achievements in the 21st century. Despite undergoing complex socio-economic and political changes, it has actively engaged with contemporary global movements. By

integrating into global architectural processes, Kazakhstan contributes to international efforts to address pressing housing issues, preserve historical heritage, and combat climate change — challenges recognised worldwide as common to all countries.

2. The resolution of the objectives outlined in the dissertation has made it possible to identify the origins of the current state of Kazakhstan's architecture and determine the priority trends for its development in the foreseeable future:

- by examining the historical and theoretical underpinnings of global architectural development in the 20th century, including Soviet architecture, the sources of the transformation in professional thinking have been identified — from the universality of modernism to the uniqueness of regionalism;

- an analysis and systematisation of the evolutionary process of Kazakhstan's architecture in the 20th century have been conducted. This revealed the role of historical periods in shaping architectural distinctiveness: before the 1950s, characterised by principles “national in form and international in spirit”; the last quarter of the 20th century, highlighting the architectural and artistic features of unique buildings in Almaty as a pivotal stage marking the transition in modern architecture; and the independence period from the late 20th century to the present, marked by the transition of Kazakh architecture from Soviet modernism to global trends;

- the global and local factors shaping the state of Kazakhstan's architecture have been specified;

- the process of identity formation in contemporary regional architecture has been studied. Through a survey of professionals and consumers, the role of architecture as a fundamental factor in the formation of regional identity has been substantiated;

- the concept of visualising symbolic images, reinterpreted in contemporary forms, has been presented as a key construct of regional identity;

- the potential for mutual integration of traditions and innovations in contemporary Kazakh architecture has been critically examined;

- the current trends for further developing Kazakhstan's architecture have been identified as part of the emerging global system for creating a sustainable living environment actively transformed by human activity.

3. As a result of the dissertation research, the theoretical principles put forward for defence were proven:

- ***The process of architectural evolution in Kazakhstan during the 20th century***, marked by integrating professional design and construction methods into the country's practice under the era's socio-economic and political conditions, fundamentally transformed Kazakhstan's architectural and urban planning landscape. The rapid increase in the number of cities and rural settlements and the creation of a professional sector based on construction capacities and design organisations contributed to unprecedented architectural and urban planning changes across vast territories of Kazakhstan. In the 20th century, as part of the USSR's architectural framework, Kazakhstan received a powerful impetus for development in line with global trends, supported by a developed construction

industry and the establishment of its own school for training architectural personnel. The study generalises certain aspects of Kazakhstan's development within the Soviet and post-Soviet coordinates, reflecting qualitative changes in architecture and its development prospects. These changes are documented in state policies and urban planning strategies aimed at improving living conditions and expanding the understanding of architecture's role in shaping the regional identity of the population;

- ***The transformation of Kazakhstan's architecture in the late 20th century*** from Soviet modernism to global trends, driven by the shift in the state's socio-economic paradigm – from a planned system to a market economy, followed by an economic collapse – necessitated the implementation of modern mechanisms for the functioning of the design and construction industry in Kazakhstan. The construction of the new capital, Astana, the active implementation of foreign projects in our country, foreign investments, and the import of innovative technologies opened new opportunities for realising creative concepts by foreign and Kazakhstan architects. Despite the socio-economic and political collapse following the dissolution of the USSR, Kazakhstan's architectural, urban planning, and construction sectors continue to develop positively in the 21st century. Our research concludes that contemporary Kazakhstani architecture, emerging from Soviet architecture, has become part of the global architectural landscape and develops according to common laws, with its distinctive features and formation characteristics;

- Kazakhstan faces pressures from both internal and external factors affecting development, including regional architecture. The study presents ***a diagram of regional architectural problems in Kazakhstan***, built on a hierarchy of internal, local and external global factors, illustrating the interconnection of existing issues. Contemporary architectural and urban planning problems in Kazakhstan (violations of master plans and detailed plans; construction in areas prone to natural risks; densification in major cities reducing environmental comfort; overloaded infrastructure and utility networks; uninspiring building designs; environmental issues; construction quality concerns, etc.) hinder further development of the material and spatial environment. This hindrance, in turn, impedes the country's economic growth and the resolution of social and environmental issues and negatively affects the formation of civil society. Identifying local architectural problems helps develop new solutions through global approaches such as sustainability, digitalisation, energy efficiency, participatory design, “green technologies”, and regional architectural identity etc. Global architecture penetrates regional systems and contributes to the understanding of traditional values and the expression of regional identity. The mutual penetration of the global and local in architecture is inevitable. However, it is possible to balance local characteristics and introduce innovations;

- One of the main scientific ideas of the research is ***identifying the role of architecture as a fundamental construct in forming regional identity***, justified by natural and anthropogenic factors, increasing the cultural significance of architecture in creating the state's image amidst the integration of contemporary Kazakhstan's

architecture into international processes. Undoubtedly, one of the important architectural trends of the 21st century will be the expression of regional identity through the design and construction of unique buildings reflecting local specifics while incorporating global technological innovations. Architectural identity is visualised through morphology—a system built on the laws of forming structural elements and their combinations as stable relationships. In the context of a specific region, the form of architectural structures transmits information on ideological and artistic content from generation to generation. This cultural “memory” is as important as the utilitarian functions of architecture, contributing to people's practical orientation, the formation of their psychological attitudes, and personal development;

- In the context of the paradigm shift in architectural development at the turn of the millennium, amidst fragmented scientific research in the theory and traditions of architecture in historical retrospect and the understanding of the roots of local architecture, the study proclaims the supremacy *of the principle critical approach* in using traditions and innovations in contemporary Kazakhstan's architecture under global integration and regional identification. In the 20th century, technology transitioned from a construction tool to a source of metaphors for architectural form. This was facilitated by technological progress, rationalisation of thinking, the elevation of tangible objectivity and practical expediency, and the rejection of the subjective and irrational. This stance favoured novelty over the continuity of traditions. With the expansion of digital attributes in architectural creativity, the novelty of design concepts requires an even finer understanding of the interplay between traditions and innovations.

- The main outcome of the dissertation is the substantiation of a new approach to studying the architecture of modern Kazakhstan, not merely as a phenomenon of form-making but as a comprehensive process that considers the country's established integration into international political, economic, and cultural connections. Consequently, this approach considers the penetration of global issues into Kazakhstani conditions. Based on this approach, the dissertation develops trends for regional architecture in Kazakhstan in the 21st century, considering the country's established integration into international political, economic, and cultural connections and, consequently, the penetration of global issues into Kazakhstan's conditions. Taking into account the current integration of Kazakhstan into international political and economic, the dissertation examined cultural processes, thereby highlighting the incorporation of global issues within the context of Kazakhstan *trends in the development of regional architecture of Kazakhstan in the 21st century* in the context of local and global challenges. The study concluded that the development trends in Kazakhstan's regional architecture are likely to influence its future trajectory through several key vectors, each of which subdivides into various constituent components:

-creating and erecting structures prioritising environmental sustainability and resource efficiency encompasses several key practices. These include recycling construction debris, minimising carbon emissions, promoting green buildings, and

implementing sustainable architectural principles. Additionally, it involves enhancing energy efficiency and incorporating renewable energy sources;

- digitalisation of design (computer programs as a design tool and as a source of creative concepts, computer generation of forms, implementation of BIM, “smart houses” and “smart cities”, “Internet of things”, artificial intelligence, 3 D modelling, 3 D printing of buildings, computer simulations – in silico);

- adaptive reuse of buildings focuses on conserving material heritage through extensive restructuring, reconstruction, restoration, and integration of modern infrastructure. This process involves the functional repurposing of structures, the development of exoskeletons, and the creation of versatile spaces. Additionally, it incorporates biomimetics, drawing on the evolutionary strategies of living organisms for efficient environmental adaptation;

- participatory design (the partnership of professionals with local communities, businesses, and administrative entities, guaranteeing environmental accessibility for all demographic groups);

- expression of the regional identity of the country through the design and construction of unique buildings that reflect local specifics and include global technological innovations (individual signature of the architect, creative thinking, new morphology of architecture, geo-urbanism and geo-landscape design).

3. Thus, through the consistent resolution of the set tasks, the research goal was **achieved**: the work theoretically substantiates and identifies the main trends in the development of modern architecture in Kazakhstan as a response to regional and global challenges, considering current trends and priority directions in the long term.

Based on the above, it can be stated **that the scientific research hypothesis was confirmed**: the dissertation, through a critical analysis of the evolution of Kazakhstan’s architecture during the Soviet and post-Soviet periods and the identification of synchronous global and local trends (such as integration into international contexts and the use of advanced technologies adapted to unique local conditions), demonstrates that the synergy of these factors will contribute to the development and implementation of sustainable, innovative architectural solutions. These solutions are capable of ensuring the formation of a comfortable living environment and humane architecture with a pronounced regional identity in Kazakhstan.

Validation and Implementation of Research Findings: The main findings of the dissertation have been presented at international and national scientific conferences, including:

- The 79th All-Russian Scientific and Technical Conference “Traditions and Innovations in Construction and Architecture”, Architecture and Urban Planning, Samara State Technical University (ASA SamSTU), Samara, Russia, 2021;

- The III International Scientific Conference “Modern Problems of Design”, Azerbaijan University of Architecture and Construction (AzUAC), Baku, Azerbaijan, 2021;

- The International Scientific and Practical Conference “Problems of Forming a Comfortable Object-Spatial Environment of Cities: Issues of Architecture,

Construction, and Design”, dedicated to the memory of Dr. Tech. Sci., Prof., Honored Builder of Kazakhstan Kusainov A. A., and the 30th anniversary of design education in the Republic of Kazakhstan, Opatija, Croatia, 2022.

The following publications pertain to the dissertation research topic:

1. Aukhadiyeva L.M. Traditional Mashrabia and their Re-inventions for Cooling the Air and Constructing Identity in the Contemporary Architecture of the East // ISVS e-journal, 2023 Vol. 10, Issue 2, P1-20 https://isvshome.com/pdf/ISVS_10-2/ISVSej_10.2.14_Laura.pdf

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The structure and scope of work

The dissertation consists of one volume, which includes a text part (147 pages), consisting of an introduction, four chapters, a conclusion, a bibliographic list (531 sources), as well as appendices on 45 pages (41 author’s graphical-analytical tables, 2 implementation acts, 1 certificate of approbation). The total volume of the dissertation is 226 pages.