ABSTRACT

of the dissertation for the degree of Doctor of Philosophy (PhD) in specialty 6D042000 – «Architecture» by Abdulkhalyk Sadykhozhaevich Nabiev on the topic: «The Phenomenon of Digital Culture in Architectural Morphogenesis»

Digitization today has become an integral part of our lives, as we use digitization and embedded electronic computing technology in all spheres of societal activities. It is impossible to address social communication issues in a broad sense without numerous gadgets and applications, including in modern architecture. The process of form-making in architecture, which is an essential part of culture and the "face" of the surrounding environment, entails artistic imagery and is now being reinterpreted in digital format, taking the forefront. The primary role of digital culture in architectural morphogenesis is to realize ideas in the shortest possible time, and without succumbing to the pressure of the "machine", demonstrate the significance of the contribution of human intellect.

In the realities of modern architecture, the question naturally arises: "why and how do 'strange' (curvilinear) and at the same time, fascinating spatial forms emerge, and what place should they occupy in our world?". The first reason for the interest in the concept of "digital nonlinearity" is that in the modern world, design is becoming more integrated with the nature of biology, computing technology, one's own ideas and their development, forming a unified and inseparable whole. The second reason is technological progress, as modern digital technologies are rapidly evolving, offering new tools and methods for design and construction. This includes computer modeling, algorithmic design, the use of virtual and augmented reality, and other innovations. The third reason is the need to understand how digital technologies and the principles of digital culture can be integrated into architectural education.

The relevance of the research topic is determined by the strategic task of transitioning to an innovative path of development according to the "Digital Kazakhstan" program and the urgent necessity to implement digital technologies in architectural and construction design.[1]

Overall, the researched topic is relevant and significant for architectural science and practice, as it reflects the transition to a new understanding and usage of space and form in the era of digitization. Digital culture not only transforms our lives but also influences the physical space around us - including architecture and urban environment. It offers new approaches to the design, construction, and operation of buildings and structures, which can contribute to a more efficient, innovative, and

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[1] On the approval of the State Program "Digital Kazakhstan" https://adilet.zan.kz/rus/docs/P1700000827,
I International Innovation Forum "Digital Kazakhstan: BIM technologies in architecture and construction" https://www.normy.kz/index.php/novosti/15-novosti/324-i-mezhdunarodnyj-innovatsionnyj-forum-tsifrovoj-kazakhstan-bim-tekhnologii-v-arkhitekture-i-stroitelstve

sustainable appearance of our cities. Moreover, digital culture raises questions about the role of the architect in modern society, about the interaction between people and buildings, about the social and cultural significance of architecture. Investigating these issues can help architects better understand and respond to the challenges and opportunities of the digital era.

Thus, studying the formation of the digital culture phenomenon within a systemic approach defines the aim and objectives of this dissertation research, making it relevant and practically significant. This is the timeliness of the present dissertation "The Phenomenon of Digital Culture in Architectural Morphogenesis", where its results will reflect advancements in the field of architectural science, practice, and education in the context of the widespread adoption of digital technologies in society.

The key concepts of the dissertation are denoted by the terms "digital culture" and "digital morphogenesis" in architectural form-making. The author analyzes these aspects in terms of theoretical and technological components.

The object of research is digital culture in architecture.

The subject of the research is the interrelation and mutual influence of digital culture and architectural morphogenesis, as well as the analysis and evaluation of various tools and methods, such as computer modeling, algorithmic design, virtual and augmented reality, and their impact on the process of creating architectural forms.

The aim of the research is to investigate and assess the influence of digital culture on architectural morphogenesis, to study modern methods of architectural design prompted by digital technologies, and to identify prospects and possibilities of digital architecture exemplified by innovative architecture in Kazakhstan.

Research objectives:

- To study and analyze the evolution of digital culture in architecture and to identify the key elements and aspects of digital culture that influence architectural morphogenesis.
- To uncover the main mechanisms and factors of digital technology development affecting architectural morphogenesis, and to develop comprehensive theoretical models of interaction between architecture and digital culture.
- To determine global trends and interactions of digital culture in architectural morphogenesis.
- To analyze modern methods of architectural design, including computer modeling, virtual reality, and to provide recommendations for architects on how to use digital technologies and approaches to create new and innovative forms.
- To formulate and substantiate conclusions about the influence of digital culture on architectural morphogenesis and identify the prospects and challenges for architecture.

– To analyze the prospects of architectural morphogenesis in the context of the digital culture development strategy in Kazakhstan and to develop models of future form-making in digital architecture.

The degree of study. The degree of study. In the context of rapidly developing digital technologies and their impact on various fields of activity, architecture is also undergoing revolutionary changes. There are many studies on digital shaping in this area, which confirms its relevance. For a deep understanding of this relationship, the following aspects were considered:

Historical overview of the development of digital culture – in order to understand the interaction of current trends in technology and society, the origins of the development of digital culture were studied, scientists such as Manuel Castels [102] developed the concepts of a "Network Society", revealing a new understanding of the dynamics of globalization and technological changes in society. His research is extensive and has a huge impact on many disciplines.

Jean Baudrillard [89] in his works on hyperreality and simulations gave a new understanding of the relationship between reality, symbols and society in the digital age.

Lev Manovich [113], in the "Language of New Media", explored the principles and forms of digital cultural production, as well as how technologies transform visual media.

Yuval Noah Harari [144] has traced how technology can affect the future of human evolution, economics and social structure in his insightful works.

Nicholas Negroponte [118], who put forward the idea of moving from atoms to bits, became the engine of innovation and research at the MIT Media Lab.

relationships, especially in the context of emotional connections.

Yelkina E.E. [87] profoundly investigated the influence of social media on the behavior of young people, identifying new forms of communication and socialization.

Gere Ch [26] focused on the intersection of digital art and technology, exploring how digital tools expand the boundaries of creativity.

Integration of digital technologies into architectural projects – to understand the impact of computer technology, the works of authors whose research directly influenced modern architectural design were studied: Charles M. Eastman [17,16], developed computer-aided design methodologies, providing a platform for integrating digital tools into the architectural process.

Patrick Schumacher [149], being one of the main theorists and practitioners, supports and applies parametric design, allowing you to create complex and adaptive architectural forms using algorithms.

Kas Oosterhuis [51,52], researched "living" architecture, creating dynamic buildings that can respond to the environment using embedded digital systems.

Greg Lynn [39,40] used computer modeling tools to develop nonlinear and organic forms in architecture.

Bernard Kash, introduced an algorithmic approach to design, allowing architects to create complex structures based on mathematical models.

The issues of studying the phenomenon of digital culture as a factor of socio-cultural growth, in the context of the general premise of digitalization and the generation of artificial intelligence in architecture, were considered in the works of the authors: Averkin AN., Altunyan A.O., Benze M., Braslavsky P. I., Vesnin A.A., Vilkovsky M., Volichenko O.V., Voronina T. P., Gavrilov A. A., Galanin R., Danilov D.S., Dedovets R.V., Demidova M.A., Jenks Ch., Dobritsyna I.A., Dolgova A., Emelyanova O.I., Ivanov V.F., Ivanova A.S., Igumnova A.S., Isabaev G.A., Izodzhanova G.R., Kavtaradze S., Kalinina E.E., Kalnitskaya E., Kobzeva I.A., Kolodiy V.V., Ramilo Ru., Kondratiev E.A., Korsuntsev I. G., Krauss R., Krylov D.A., Lomholt I., Lurie D. A., Luchkova V.I., Meerovich M.G., Mokshantseva O.A., Nadyrshin N.M., Nosov N.A., Orzunova O.E., Pomorov S.B., Repkin D., Resin V., Rochegova N.A., Ruzavin G. I., Ryabova O.V., Savelyeva L.V., Sadriev A.Sh., Saprykina N.A., Somov G.Yu., Stepanov A.V., Sterlikova A.I., Talapov V.V., Taratuta E. E., Tahirov B. N., Trambovetsky V., Khutoroi S. N., Chernichenko E.A., Agkathidis Ast., Aiello C., Andadari S. Tri, Angulo A., Ascott R., Baitenov E., Bhooshan S., Chaillou S., Daniela B., Duffy Alex H.B., Efanova T.A., Engelbart D., Esaulov G.V., Feist S.T., Barchugova E.V., Gero J.S., Garcia M., Hansmeyer M., Grisaleña Ar. Jon, Hauwa O.Y., Kaiyang W., Knish V.I., Kolarevic B., Krawczyk R. J., Lee J., Leach Ne., Maver T., Malakhov S.A., Carlos L. Marcos, Werner Liss C., Terzidis Ko., Mikhailov S.M., Mokeeva O.D., Morel P., Moussavi F., Iwamoto Li., Milgram P., Raina A., Roussou M., Stsesel S., Tanaka T., Uhrík M., Whyte J.

To analyze the current state and prospects of digital technologies in Kazakhstan, information portals on the Internet provide the most objective picture [147,80].

Based on the studied material on the topic of the dissertation - with the development of digitalization in architecture, and their influence on the shaping process has been the subject of many studies. However, how these technologies interact with broader aspects of digital culture, such as openness, collaboration and networking, require further study. In addition, the question of how architecture can adapt to the changing needs and expectations of the digital society, and how digital technologies can contribute to sustainability in architecture, as well as along with the downside of the problem — the dependence of architecture on modern technologies remain open for further research.

The scientific novelty lies in the fact that this study allows us to consider architectural shaping in the broad context of digital culture and technology. It pays considerable attention to the theoretical aspects of the influence of digital culture on architecture, while many studies focus on the technological aspects of digital shaping. In other words, this study is dominated by aspects of the influence of digital culture on the processes of shaping, and how this is reflected in modern architecture. Also, the research can contribute to the theory of digital architecture, stimulate the

development of new methodologies, new ways of understanding and applying digital culture in architectural shaping, thereby promoting an understanding of how these theoretical concepts can be implemented in practice.

The reliability of the scientific results of the study is confirmed by quantitative and qualitative analysis, graphic presentation and scientific and theoretical systematization of the collected material, research of various digital sources.

The methodological basis of the research is the study of academic literature, scientific articles, books and publications related to digital culture and its influence on architectural shaping. The solution of the tasks set in the work was carried out on the basis of the application of general scientific research methods within the framework of logical and chronological analysis, as well as methods of comparison, generalization, graphical interpretation of information.

The research methodology includes such types of scientific analysis of information as: theoretical analysis - in the study of specific examples of architectural projects in which elements of digital culture are used, where it is possible to illustrate theoretical ideas and give a deep understanding of the issue; interdisciplinary approach - taking into account methodology from various fields of knowledge, including cultural studies, information and communication technologies, architecture and algorithmic design; cultural and philosophical analysis, in identifying numerically digital sources; critical analysis is the analysis of existing ideas, approaches and trends in the field of digital culture and architectural shaping in order to offer new perspectives and approaches.

The hypothesis of the study is that digital culture has a significant impact on the process of architectural shaping, leading to its further evolution based on traditional approaches and methods and stimulates the creation of new architectural forms and structures that reflect digital technologies and the values of the information society. This can be predicted through a detailed study of modern architectural trends, as well as through the development of new theoretical models and methods of architectural shaping based on the principles of digital culture.

The boundaries of the study in chronological terms cover the prerequisites created since antiquity, at the same time, the main attention is paid to the period from the middle of the twentieth century to modern world trends in the field of digitalization of architectural shaping.

The theoretical significance of the conducted research consists in generalization of knowledge, theoretical review, analysis of general scientific methods within the framework of logical and retrospective research on the development of transformable technological modernization, in digital architectural shaping, which can be used in the course of further study of this problem in relation to this area.

The practical significance of the dissertation can be reflected in the following aspects: in the development of new methods and approaches in the field

of architectural shaping, which take into account the influence of digital culture; in the effective use of digital technologies, which in turn can lead to an improvement in the quality of architectural design; the results of the study can help theoretically comprehend and interpret modern trends in architecture related to digital culture; it can help teachers and students to better understand the impact of digital culture on architecture and equip them with new approaches and techniques of execution in this area; contribute to a deeper understanding by future researchers of social and cultural processes, the relationship between digital culture and architectural shaping taking place in our time, and lead to the creation of architecture that better meets the needs and values of modern information society.

Structure and scope of work.

The scientific results and provisions of the dissertation were discussed at the meeting of the methodological seminar of the Faculty of Architecture of the IOC/KAZGAS. The main provisions, results and conclusions of the dissertation research were presented at international scientific and practical conferences.

The results of the dissertation research were published in 7 (seven) scientific papers of the author, reflecting the main conclusions of the study. Including:
− 1 article in the collections of scientific papers on the materials of international and republican conferences held on the territory of the Republic of Kazakhstan;
− 1 article in the journal included in the database "Web of Science".
− 3 articles in journals recommended by the Committee for Control in the Field of education and Science of the Ministry of Education and Science of the Republic of Kazakhstan;
− 2 articles in a journal included in the database "Scopus", which has a non-zero impact factor

Provisions, results submitted for protection:
 - The influence of digital technologies on the evolution of architectural
shaping.
 - The role of digital culture in modern methods of architectural
design.
 - Global trends in the interaction of digital culture and
architecture.
 - The contribution of digital technologies to the formation of architectural
shaping.
 - Prospects of digital architectural shaping in
the context of the digital culture development strategy.

The structure of the dissertation it is subordinated to the logic of the disclosure of the topic, the goals and objectives of the research defined in it. The work consists of an introduction, five sections, including 14 subsections, conclusions, a list of sources used, a list of illustrative materials (figures and tables) and appendices. The total volume of the dissertation: 143 pages of computer text in

Russian. The bibliography contains 150 sources. The dissertation is illustrated with 63 figures, 5 tables.

Keywords: digital culture, digital architecture, digitalization, digital architecture, digital technologies, innovation, modeling, parameterism, research methods, integrated approach, architecture of Kazakhstan.

THE MAIN CONTENT OF THE WORK

Introduction

I. EVOLUTION OF DIGITAL CULTURE IN ARCHITECTURE

1.1. The history of the development of digital culture in architecture

1.2. Prerequisites for the use of digital programs in the process of architectural design

II. MECHANISMS AND FACTORS OF ARCHITECTURAL SHAPING IN DIGITAL TECHNOLOGIES

2.1. "Embedding" digital technologies in architecture

2.2. Digital shaping as the most important factor in modern architectural design

III. ARCHITECTURE AND DIGITAL CULTURE: DIALECTICS OF INTERACTION

3.1. Current trends in architectural shaping using digital technologies

3.2. The influence of digital culture on architectural shaping

3.3. Functional capabilities of digital culture in architectural shaping at the present stage

IV. MODERN METHODS OF ARCHITECTURAL DESIGN

4.1. Digital design tools in modern architecture

4.3. BIM technology in architecture

4.3. VR technologies in architecture

V. PROSPECTS FOR THE DEVELOPMENT OF DIGITAL ARCHITECTURE SHAPING

5.1. Industry 4.0 in architecture and its predictive capabilities

5.2. Neural networks as a promising direction in architectural design

5.3. Prospects for the development of digital culture in the creation of innovative architecture of Kazakhstan

Conclusion

The dissertation work is devoted to the theoretical analysis of cultural space in the context of becoming from drawings and drawings to digital architecture. The paper considers the process of architectural shaping, ranging from "manual" design to digital culture in architectural shaping, modified in the new information reality, and also studied the phenomenon of the digital generation and its cultural space, considered contradictions in the context of the world problems of digital civilization.

The intended audience for this dissertation is architects working in the "digital" direction, researchers, teachers and students aimed at studying and creating

innovative architecture. The dissertation consists of five chapters with an introduction, conclusion, literary sources, as well as drawings, graphs and tables explaining the logic of scientific research.

The introduction reveals the relevance of the influence of digital technologies and the principles of digital culture on the process of designing and implementing architectural objects. In the era of digitalization, technology is penetrating into all major aspects of our lives, and architecture is no exception. The use of computer modeling, algorithmic design, virtual and augmented reality, as well as the principles of digital culture, such as openness (open code generation), interaction and interoperability (interoperability), brings new opportunities and challenges to architectural shaping. The study identifies several key stages:

- the impact of digital culture on society and culture as a whole;
- study of the influence of digital technologies on architectural shaping;
- analysis of modern architectural shaping based on the principles of digital culture;
- consideration of opportunities and problems that arise in connection with the integration of digital culture into architectural shaping.

Actually, the phenomenon is how digital technologies and digital culture transform architecture, bringing new forms, methods and approaches to it, as well as how architects can use these new tools and opportunities to create more functional, sustainable and innovative architectural solutions.

In the first section of the dissertation, the concept of digital culture is given, its influence on architectural shaping is considered. It describes the main characteristics of digital culture, such as historical background and the use of computer technology, the Internet, social networks, etc. It analyzes how these technologies affect the design process and the creation of architectural objects, as well as the perception and evaluation of these objects by society.

Conclusions on the first section

1. The concept of "digital culture" has been defined in the context of architecture and form-making. The origins of digital culture in architecture have been traced, from the times of Pythagoras to the present. The key moments of the introduction of computer technologies in architecture, the birth and development of Computer-Aided Design (CAD) systems have been pointed out. In this context, the history of the evolution of digital culture in architecture shows us how technological progress impacts this field and how architecture, in turn, influences the development of technologies.

2. The prerequisites and factors that have facilitated the integration of digital culture into architectural form-making have been analyzed. The changes in design, material use, technology, and interaction with space and environment caused by the influence of digital culture have been discussed. This includes technological innovations, social, economic, and cultural changes.

The results of this section can serve as a basis for further research in the field of digital culture in architecture for theoretical application in the process of architectural design.

The second section examines the role of digital culture in the context of architectural shaping. Describing the XXI century as the age of digitalization, the importance of such issues as the digital economy, digital technologies, digital crime, digital culture, digital death and immortality is increasing. Digitalization, being a product of artificial and natural, has become a certain stage in the evolution of society.

Mechanisms of a new phenomenon in architectural shaping based on the integration of architectural stylistics and digital culture. The influence of the "computational" approach on shaping in architecture. Bionic architecture, digital architecture, nonlinear architecture, parametric architecture, etc. The current problems of sustainable development of digitalization are considered as a factor that creates a certain "coloring" and sets a vector for a well-defined development of architecture.

Conclusions on the second section

1. Key factors and mechanisms that influence the application of digital technologies in architectural form-making, such as socio-economic, cultural, and technological, have been identified and analyzed.

2. Based on the analysis conducted, a theoretical model has been developed that describes the influence of digital technologies on the process of architectural form-making, and identifies the main mechanisms of influence.

In the third section

The dialectic of interaction between digital culture and architecture lies in the fact that the "product" of this interaction - digital architecture allows you to level and bypass numerous difficulties that limit architects and make it possible to solve the problems of creating various complex forms. Experimental projects are being created in the virtual digital cyberspace, which in one way or another affect the aesthetic outlook of architects and the design process itself as a whole. One of the main achievements in digital culture is also the ability to anticipate the results in the process of generating an architectural form. Since the methods of algorithmization and parametrics in architectural shaping are the main ones in the generation of the form, they are the factors of the emergence, including new aesthetic properties (in the paradigm of "new aesthetics"). Not only the form is important now, but also the ways to achieve this form, the "beauty of the code"

Conclusions on the third section

1. The dialectical relationships between architecture and digital culture have been identified, including their mutual "fusion", exchange, and mutual enrichment between the specific "objects" of these fields of activity.

2. The influence and functions of digital culture and technologies on the choice of design methods have been analyzed, showing how they alter traditional approaches in the field of architecture.

3. Based on the analysis conducted, a theoretical model has been developed that describes the influence of digital technologies on the process of architectural form-making.

Also, the study examines how digital culture has influenced the change in approaches to architectural form-making, including the formulation of design principles, the use of materials and technologies, and interaction with space and the environment.

In the fourth section

This section examines the analysis of current trends in architectural shaping. Where many architectural structures are designed with the help of computer technology, complex solutions are made by a complex computational parametric method.

Digital culture is one of the most significant phenomena of our time, influencing various spheres of life, including architectural shaping.   The influence of digital culture on architectural shaping is considered, as well as the main trends and directions of development of this process, the use of BIM and VR technologies in modern architecture within the framework of digital design tools are analyzed.

Conclusions on the fourth section

1. It has been demonstrated how digital culture and related technologies influence architectural form-making, including the use of new materials, techniques, and concepts.

2. The reciprocal reaction of architecture on the development of digital culture has been identified, using it for its own "purposes", in the creation of public spaces, social interaction, and cultural practices.

3. Based on specific examples, the interaction between architecture and digital culture has been analyzed and key trends and patterns in this interaction have been identified.

4. A comprehensive theoretical model of interaction between architecture and digital culture has been developed, encompassing all identified modern design methods.

5. Form-making in Revit: experiments were conducted based on Khan Shatyr, EXPO-2017, and other objects.

In the fifth section

Currently, the process of architectural activity is undergoing strong changes, where, in the aggregate, stylistic problems intersect with the possibilities of new digital approaches in design, and the design method itself even generates new stylistic directions, which, of course, must be rethought and reflexed - this is one of the promising areas of innovation associated with the introduction of digital technologies in architecture. In general, in this regard, the prospects of artificial intelligence and the features of its implementation in architecture at all levels are

extremely important. Challenges of this order, promising huge dividends, but at the same time the lurking danger of negative results in the "fragile" humanitarian sphere, including architecture, suggests the need to find flexible, "self-organizing" solutions, which is the general line of architecture development in new conditions. Research in this area inevitably leads to the synthesis of "culture" and "technology" as a symbiosis capable of giving new value orientations. This is particularly relevant in the conditions of modern Kazakhstan. The paper identifies the areas in which research on the introduction of digital culture into modern Kazakh architecture should be conducted first of all.

Conclusions on the fifth section

1. An assessment of current trends in the field of digital form-making has been presented, as well as forecasting potential future development directions.

2. The potential of modern prospective technologies such as artificial intelligence and their influence on architectural form-making have been identified.

3. Possible impacts of the digital architecture of the future on social, cultural, and ecological processes have been defined.

4. A detailed sociological survey has been conducted to identify the influence of digital culture on architectural form-making.

5. A theoretical influence model has been developed - an integrated approach to assessing the effect of digital technologies on the future architecture of Kazakhstan, which may serve for further research and practical application in Kazakhstani architecture.

The obtained results can contribute to the promotion and development of digital architecture and assist practicing architects, teachers, and students to adapt to the changing digital method for creating new, innovative forms and spaces, including in the architecture of Kazakhstan.

Conclusion

The first section of the research examines the concept of "digital culture" in the context of architecture and shaping. Starting from the historical roots in the era of Pythagoras and tracing the evolution to the present day. The transformation of approaches to architecture with the development of CAD systems is indicated.

1. The history of the development of digital programs and computer technologies begins since the time of Pythagoras. These are numbers – numbers. "Numbers rule the world" is also from the version "Numbers are the basis and the beginning of every thing", in this the essence of each phenomenon can be recorded in a digital series.

2. The analysis of modern architectural projects reflecting the influence of digital culture has led to the identification of common trends and patterns, as well as to comparison with traditional approaches to architectural shaping. This helped to identify key differences and similarities in these approaches.

Thus, this section is a resource for further research in the field of digital culture in architecture and can serve as a basis for theoretical application in the process of architectural design.

The second section of the study emphasizes the importance of using digital technologies in architecture. Thanks to these technologies, new, previously impossible forms and structures have appeared in architecture.

1. The factors and mechanisms influencing the use

of digital technologies in architectural shaping have been identified. Including socio-economic, cultural and technological aspects, they made it possible to understand the variety of areas that affect the use of digital technologies in architecture.

2. A detailed analysis of specific use cases was carried out

digital technologies in architectural shaping. This analysis revealed general trends, as well as problems and opportunities related to digital technologies in this area.

3. Based on the analysis, theoretical models have been developed

that describe the impact of digital technologies on the process of architectural shaping. These models can help to better understand the mechanisms of this influence and assess its scale.

Thus, the second section emphasizes not only the importance of digital technologies in modern architecture, but also the need for further analysis and research to deepen understanding of this influence.

The third section of the study highlights the dialectical relationship between architecture and digital culture, emphasizing the mutual "fusion", exchange and enrichment between specific "subjects" of these areas.

1. The influence of digital culture and technology on the choice

and application of architectural methods is analyzed. The study showed how digital technologies are changing traditional approaches to design, opening up new horizons for architectural thought.

2. Specific examples of successful use of digital

methods in modern architectural projects. This analysis revealed the main advantages and disadvantages of using digital technologies in architecture.

3. Based on the data obtained, practical

recommendations were developed on the use of modern design methods in various contexts of architectural shaping. It is a valuable resource for practicing architects and designers.

4. Theoretical models describing the optimal

the use of modern design methods in the context of digital culture. These models can become a key tool for architects and designers in their work.

Overall, the third section is an extensive study of digital technologies in architecture, highlighting their impact on modern design approaches and providing valuable resources for practitioners.

The fourth section of the study confirms how digital culture and related technologies transform architectural shaping. The influence of digital culture has led to the use of new materials, techniques and concepts in architecture.

1. The importance of interaction with digital culture is manifested not only in its influence on architecture, but also in the opposite influence - in how architecture affects the formation and development of digital culture. This manifests itself in the creation of public spaces, social interaction and cultural practices.

2. Based on concrete examples , the interaction of architecture and digital culture was analyzed, which made it possible to identify key trends and patterns in this interaction.

3. Comprehensive theoretical models of interaction between architecture and digital culture have been developed, including all identified factors and mechanisms of this interaction. This is a valuable tool for further study and practical application of knowledge about the interaction between these two areas.

4. Finally, the students conducted experiments on shaping in Revit program based on existing buildings, which further confirms the practical significance and relevance of this study.

Thus, the fourth section substantiates the importance of digital culture for modern architecture and emphasizes the need for further study of this interaction.

In the fifth section of the study, current trends in the field of digital shaping were assessed and forecasts were made regarding possible directions of their development in the future. This analysis helps to assess the impact of promising technologies, including artificial intelligence, on architectural shaping.

1. Possible influences of the digital architecture of the future on social, cultural and environmental processes are identified. This is an important area of research, as modern architecture is increasingly connected with these aspects of society.

2. Based on the results obtained, specific recommendations were formulated for architects, designers, and urban planners. These recommendations will help in the formation and use of digital architecture in the future, they can be applied not only in Kazakhstan, but also in any other country.

3. Theoretical models of the creative laboratory on digital architecture have been developed. These models can serve as one of the methods for further research and practical application for the development of architecture in Kazakhstan.

Thus, the fifth section of the study puts forward promising directions for the further development of digital architecture and emphasizes the importance of using modern technologies and methods in architecture.

The results of all sections trace the line from the origins of digital culture to its introduction into the process of architectural design and further, its influence on the restructuring of the approach to architectural shaping. Propositions related to the

prognostic aspects of the interaction of architectural shaping and digital technologies, as well as ways of developing this symbiotic formation in the future, are expressed.

List of publications

1. Nabiev A.S., Pomorov S.B. Retrospective and contradictions of creating architectural projects in the context of digitalization // Scientific journal "Bulletin of KAZGAS". – 2021. – № 4 (82). – Pp. 63-73.

2. Nabiev A.S., Pomorov S.B. The relevance of cultural convergence in architectural shaping in the aspect of digitalization // Scientific journal "Bulletin of KAZGAS". – 2023. – № 2 (88). –

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