

ANNOTATION

to the dissertation of Sarsembayeva Dinara Yerzhanovna on the topic:
"Architecture of social infrastructure of the cities of Northern Kazakhstan"
for the degree of Doctor of Philosophy (PhD)
in the specialty 6D042000 – "Architecture"

Relevance of the study. The study of the regularities of the formation of social infrastructure contributes to the determination of their theoretical and practical value for modern design and construction. At the same time, it is important to take into account the new needs of the population, which is currently especially important for the Republic of Kazakhstan.

The implementation of a socially oriented policy in the country requires the development of a new architecture of social infrastructure that ensures comfort and accessibility of services for all groups of the population. It is obvious that the emergence of hypermarkets and multifunctional shopping and entertainment centers outside the city limits requires the mobility of the population, which is not accessible to all categories of city residents. In these cases, mixed schemes and a combination of different forms of service are necessary. In this regard, the importance of social infrastructure objects is increasing, the study of which is becoming particularly relevant.

In the study, the concept of architecture (structure) is introduced as a basis for the formation of social infrastructure, implying the construction of a multi—level network of public service centers, representing social facilities united by transport links and differentiated depending on the location in the planning structure of the city and belonging to its structural elements. Each urban area is understood as (a residential area in a large city) a relatively autonomous unit that allows for a full set of urban functions. The function (specifics of the service sector) of the center of the urban area allows for stable development of others, increasing the level of comfort of life, work and recreation of the population.

The relevance is justified by the following provisions:

- the need to identify historical patterns of the formation of the social infrastructure of cities;
- increased demands of the population to the social infrastructure of cities;
- the need to determine a promising system of social infrastructure in the administrative-territorial units of Northern Kazakhstan, taking into account a set of factors and conditions, prospects for their development;
- the absence at the present stage of scientific developments on the formation of social infrastructure in the cities of Northern Kazakhstan.

In the course of the research , the works were used:

- according to the peculiarities of the development of settlements in the settlement system, they are examined in the works of: A.I.Alekseev and S.G.Safronov, V.N. Belousov, V.V.Vladimirov and F.M.Listengurt, F.N. Bazanova, B.J.Garner, M.A.Handelman, M.D.Spector, N.F.Golikov, U.M.Iskakov, I.G.Lezhava, G.M.Lappo, P.Self, N.G.Auzhanov, M.Devedzhiev, Le Corbusier, V.A.Laptev, A.S.Senyavsky, A.V.Sigaev, D.G.Khodzhaev, L.F.Fedorova, A.A.Kornilova, E.A.Akhmedova, T.V.Karakova, etc.;

- on the formation of the planning structure of settlements and their individual elements is reflected in the works of: A.Zh.Abilov, S.V.Litvinov, G.I.Zosimov, V.A.Lavrov, B.I.Ogly, V.V.Baburov, P.I.Goldenberg, T.Ya.Rebain, Ya.T.Kravchuk, B.S.Khorev, V.K.Stepanov, L.B.Velikovsky and A.S.Taturin, A.V.Ikonnikov, V.A.Sosnovsky, M.I.Kurennoy, V.V.Musatov, Ya.V.Kositsky, I.M.Smolyar, L.N.Avdotin, M.G.Barkhin, A.V.Krashennnikov, A.V.Bunin, A.E.Gutnov, Ye.M.Khorovetskaya, V.V.Toskina;

- on the socio-economic and demographic foundations and the reconstruction of settlements are disclosed in the works of: L.B.Kogan, G.K.Kasenov, M.Vilkovsky, T.I.Anufrieva, O.Niemeyer, G.D.Moskvina, K.Tange, S.E.Tolybekov, A.A.Badina, A.T.Moshegova, V.P.Krasovsky, Sh.I.Rakhmatulloeva, Z.N.Yargina;

- on historical and national aspects of the formation and development of settlements are shown in the works of: B.A.Glaudinov, N.Zh.Kozbagarova, B.U.Kuspangaliev, F.Nazarov, M.Orynbekov, O.A.Segizbayev, R.U.Chekaeva, A.Sh.Chikanaev, V.N.Kalmykov, S.Sh.Sadykova, Yu.S.Yaralov;

- the influence of natural and climatic factors on urban planning and environmental aspects are discussed in the works: A.P.Vergunov, O.N.Yanitsky, V.K.Litskevich, B.M.Poluy, Yu.I.Kurbatov, etc.;

- on the formation of social infrastructure and community centers are presented in the works of: T.D.Tovstenko, V.V.Bykov, P.Velev, G.A.Gradov, E.Zaslavsky, O.Kudryavtsev, S.A.Kolesnikov, G.A.Maloyan, I.V.Ponomarev, S.I.Pshenichnikova, M.I.Sikharulidze, V.Ya. Khromov, etc.;

- on the use of systemic research methods, which are disclosed in the works: N.M.Demin, G.N.Fomina, Z.N.Yargina and V.A.Sosnovsky, etc.

Currently, there are not enough works reflecting the formation of social infrastructure in the changing socio-economic conditions of Northern Kazakhstan

All this served as the basis for this study. The complexity and novelty of the problems shown in the study, as well as the lack of methodological, methodological and organizational foundations, integrated planning of the social infrastructure system in modern socio-economic conditions, theoretical and historical foundations have predetermined the structure and content of the work.

The aim of the study is to develop a concept of the formation of social infrastructure based on the definition of the basic principles of its spatial organization.

To achieve **this goal** , the following tasks are solved:

1. Study of the theoretical foundations of building a service system in the conditions of changing socio-economic paradigm and changing the palette of needs of the population in obtaining social and cultural and entertainment services.

2. Research of historical features of the formation of social infrastructure in the territory of Northern Kazakhstan

3. Analysis of the current state of the social infrastructure of the cities of Northern Kazakhstan

4. Identification of the main factors and conditions affecting the formation of social infrastructure in the specific constraints of the natural and climatic complex

5. Development of a conceptual and theoretical model of the formation of social infrastructure;

6. Development of recommendations on the typology of settlements in Northern Kazakhstan, the spatial organization of social infrastructure in the cities of Northern Kazakhstan, the formation of social infrastructure on the territory of Northern Kazakhstan.

Research methodology. The work used: a systematic approach, a number of analytical methods (statistical, selective), methods of probabilistic and expert forecasting, sociological research in the form of surveys and questionnaires. The method of architectural design was also used.

The full-scale survey method was used to study the current state of the public service sector in the cities of Northern Kazakhstan. The field survey provided information on urban planning, compositional, technical and other data on urban development and the formation of community centers.

The statistical method made it possible to identify data on the demography of the population, the availability of service facilities, which contributed to determining the load on the social infrastructure of settlements.

During the research, the materials obtained at the Scientific Research Design Institute "AstanaGenplan" LLP, "AstanaArchitecture" LLP, the Center of Urban Studies were studied and summarized. To clarify the historical aspects of the development of cultural and consumer services, documents were studied in the State Archive of the Republic of Kazakhstan (Astana city).

The study is based on factual material collected in 2017-2023. In the process of a full-scale survey of the cities of Northern Kazakhstan (Astana, Kokshetau, Kostanay, Pavlodar, Petropavlovsk), the problems of cultural and consumer services at the present stage were studied. At the same time, the objects were photographed, which made it possible to clearly reflect the weaknesses and strengths of the social infrastructure.

Object of research: social infrastructure of the cities of Northern Kazakhstan.

The subject of the study: the regularities of the formation of social infrastructure and ways to improve it.

The leading hypothesis. The optimal state of the architecture of social infrastructure is achieved with a comprehensive account of all factors and conditions, taking into account the dynamics of the time vector.

The scientific novelty of the work is as follows:

- revealed the patterns of formation of the social infrastructure of cities in the process of their growth and changes in historical, socio-economic factors, administrative and territorial transformations;
- a universal conceptual and theoretical model for the development of the social infrastructure of the cities of Northern Kazakhstan has been developed;
- the principles of formation of the architecture of the social infrastructure of the cities of Northern Kazakhstan are determined;
- the main components of the formation of a conceptual and theoretical model were identified and a promising scheme for the development of the architecture of social infrastructure in the territory of Northern Kazakhstan was proposed.

The scientific reliability of the provisions established in the work is justified by the following:

- field surveys and analytical work-17 settlements were surveyed (republican center, 4 regional centers and cities of district significance);
- study and comparison of both statistical and archival materials for the last 50 years; collection, study and analysis of literary sources of domestic and foreign experience in the development of social infrastructure and its components.

Approbation of the work. The results of the research work were implemented in the design of the following objects of " Krasivy resheniya" LLP:

- "Pedestrian zones and harmonious, comfortable arrangement of public spaces of the city" (Astana, Almaty district, in the square of Saryarka, Bogenbai Batyr, Republic Avenues and the Esil River embankment);
- "Reconstruction of the Shakhter Park in Ekibastuz".

Theoretical developments on the formation of the architecture of social infrastructure, architectural and planning solution of service centers are taken into account in the educational process during the training of architects at the Faculty of Land Management, architecture and Design of the Saken Seifullin Kazakh Agrotechnical Research University in lecturing in course and diploma design.

The following provisions of the dissertation are submitted for defense:

- a universal conceptual and theoretical model of the formation of social infrastructure;
- principles of formation of social infrastructure;
- a multi-level system of organization of social infrastructure.

Personal contribution:

1. Methodological foundations for the formation of the architecture of social infrastructure have been developed.
2. Questionnaires have been developed and a survey of the population has been conducted to identify the main directions of the formation of social infrastructure.
3. Settlements and social infrastructure of the cities of Northern Kazakhstan (Astana, Kokchetav, Kostanay, Pavlodar, Petropavlovsk) were surveyed.

The results of the study. The main results of the research were reported and discussed at scientific and practical conferences on urban planning, architecture,

planning, landscaping and construction in the cities of Astana, Moscow, St. Petersburg, Samara.

15 articles have been published on the topic of the dissertation, including 3 articles in publications recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, 3 articles in the materials of international conferences included in the database of the Russian Science Citation Index, including 2 in the materials of foreign conferences, 2 article in the international scientific a publication included in the Scopus database.

Scope of work: The dissertation research is presented on 172 pages of typewritten text. The work consists of an introduction, three sections, conclusions and suggestions, a list of references (191 titles), an appendix (31 tables) and illustrative material explaining and supplementing the text part.

In the introduction of the dissertation, the relevance of research is substantiated, goals and objectives are formulated, the object of research. Research methods and scientific novelty are also considered.

In the first section, the theoretical and historical aspects of the formation of the social infrastructure of cities in the settlement system of Northern Kazakhstan are identified; domestic and foreign directions in the development of cultural and consumer services are outlined; the assessment of the current state of the social infrastructure of cities in the settlement system is given on the example of the city of Nur-Sultan.

The main conclusions of the first chapter:

The theoretical analysis of the historical panorama of the formation of social infrastructure and its components allows us to conclude that in their development, according to the totality of signs of urban planning and character, three historical stages are clearly traced.

The first stage is characterized by social infrastructure, as oriented to the central streets of cities with rare service facilities, mainly at the place of residence of producers of consumer goods.

The second is characterized by the formation of social infrastructure based on a stepwise system of public services 1954-65.

The third - since December 1991, is characterized by the formation of social infrastructure based on the creation of urban planning nodes.

The service systems were analyzed stepwise, communicative, nuclear network. It is established that following the norms of a step-by-step service system is possible in a compact city. In the new socio-economic conditions (growth of cities, territories, changing needs), it is difficult to apply the regulatory framework, placing service institutions based on the service radius.

The study of the current state of social infrastructure revealed: the uneven location of service facilities in the structure of the city, the location of large urban planning nodes (social infrastructure) only in the central districts of the city, the pedestrian zone does

not have a walking holiday in winter, the absence of public centers in conjunction with the public passenger transport network.

The research materials show that modern social infrastructure has urban inertia. New components have been identified in the system of population needs, corresponding to the rhythm of socio-economic transformations and not coinciding with the currently available space. The mechanism of adaptation to the specifics of the territory necessitates a comprehensive and detailed analysis of its components.

The second section analyzes the regional factors influencing the formation of the architecture of the social infrastructure of the cities of Northern Kazakhstan on the example of the city of Astana; the results of sociological research are presented; the classification of cities and service centers is presented.

The main conclusions of the second chapter:

The analysis of natural and climatic factors has shown that in many respects the climate of Northern Kazakhstan is uncomfortable, which needs to be mitigated by architectural and urban planning methods.

The study of statistical data on population dynamics showed the mobility of the population - an increase in internal migration of the able-bodied population (age group 16-45 years) of the population of cities in Northern Kazakhstan; an increase in natural growth in cities; an increase in the share of people employed in the production of services (from 53 to 66.8%).

The data of the sociological survey made it possible to identify and supplement the necessary list of social infrastructure facilities of the microdistrict, city district; also to reveal that in the cities of Northern Kazakhstan there is an increasing need to improve the organization of public services.

The analysis of scientific and technical factors allowed us to establish that improving the quality of service depends on increasing the share of high-performance service sectors in the residential area and improving the equipment of social infrastructure facilities in the microdistrict.

In the third section, a conceptual and theoretical model of the formation of social infrastructure in regional conditions is developed; principles of the formation of the social infrastructure of cities in Northern Kazakhstan are proposed; a methodology for the formation of the architecture of social infrastructure is proposed.

The main conclusions of the third chapter:

The proposed service system ensures self-sufficiency, self-regulation of the structural elements of the city, which will ensure the needs of the population and their development in time and space. The proposed system assumes a solution where the center of the urban area fixes the dominant functional orientation (taking into account the advantages in the service sector).

A multi-level system of organizing the social infrastructure of cities of different importance has been developed, taking into account the regional peculiarities of Northern Kazakhstan.

The composition of institutions has been developed in accordance with the value of the center. The structural composition of the public centers of districts and microdistricts includes the entire list of services, taking into account the digital format of service.

The proposed form of architecture of the social infrastructure of the cities of Northern Kazakhstan is adapted to the climatic, historical, socio-economic conditions, which determines the feasibility.

The architecture of social infrastructure proposed in the dissertation contributes to the effective interaction of public service centers, the inclusion of all planning elements in the service system, the development of each district of the city in accordance with the resource potential, increasing the interaction of public and private investments, individual development of planning elements in the service system.

A methodology for implementing the architecture of social infrastructure is proposed:

- determination of the potential for reconstruction of the territory of an urban and residential area;
- selection of the location of community centers.

Conclusion

1. The theoretical analysis of the historical panorama of the formation of social infrastructure and its components allows us to conclude that in their development, according to the totality of signs of urban planning and character, three historical stages are clearly traced. The first stage is characterized by social infrastructure, as oriented to the central streets of cities with rare service facilities, mainly at the place of residence of producers of consumer goods.

The second is characterized by the formation of social infrastructure based on a stepwise system of public services 1954-65.

The third - since December 1991, is characterized by the formation of social infrastructure based on the creation of urban planning nodes.

2. The features of the social infrastructure and settlement of the cities of Northern Kazakhstan are revealed, which causes the following:

- determining the importance of cities in the service system;
- creation of a service system that takes into account the importance of city centers, the population, the dominant functional value, taking into account its advantages;
- take into account the resource potential of the structural units of the city;
- concentration and urbanization with the development of social infrastructure.

3. The study found that the territory of Northern Kazakhstan with a low density of settlement, with an insufficiently developed social infrastructure causes the need for:

- urbanization based on employment in the service sector;
- development of all types of cities;
- determination of dominant functions in the service sector for each city.

4. The proposed conceptual and theoretical model of the architecture of social infrastructure takes into account regional peculiarities and allows it to be used in the implementation in each city of Northern Kazakhstan. Principles the formation of the social infrastructure of the cities of Northern Kazakhstan will make it possible to provide services to the population of cities, regardless of its size. The proposed model makes it possible to create a hierarchical service system that provides self-sufficiency, relative independence, self-regulation, individuality of the structural elements of the city, with conditions for human self-realization. At the same time, the service system should include the centers of the structural elements of the city, large specialized centers and network centers. The basis of the system is a relatively independent structural element of the city (administrative urban area, residential area). The proposed system assumes a solution where the center of the urban area consolidates the dominant functional orientation (taking into account the advantages in the service sector).

5. The architecture of social infrastructure contributes to the effective interaction of public centers of the service system. The functional structure of the public center for the architecture of social infrastructure is proposed to be built from seven main service areas.

A multilevel service system is proposed that takes into account the administrative-territorial division of cities and includes 5 levels.

6. In the process of work, methods of implementing the architecture of the social infrastructure of the cities of Northern Kazakhstan have been developed and proposed.

7. The effectiveness of this study can be traced in economic, social and architectural plans:

in the economic direction, the model provides job growth in the urban area; the interaction of public and private investments increases; the proposed model does not contradict the resolutions on the development of regions, as well as the main course of the strategy "Kazakhstan 2030";

in the social direction, a service system is being achieved that improves the standard of living of the population and conditions for human self-realization in each of the types of cities;

in the scientific direction, conditions are created for the interaction of scientific achievements in the operation of the service system. Conditions are also provided for combining service institutions with knowledge-intensive industries;

in the architectural direction, a comprehensive solution of service centers is being created with the possibility of specific development.