

Social infrastructure importance for modern city and the ways of its urban development

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Abstract. The present study objective is to determine the importance of social infrastructure for modern city and to identify the ways of its urban development (Moscow, as an example). Statistics data (taken from official municipal and regional sources), results of systematic, typological, functional and structural analysis, sociological survey of population was used. Assessment of society development current challenges, analysis of scientific research in economy, education, culture, allowed the author to determine the importance of social infrastructure for modern city as a tool for urban environment transformation, quality improvement of human asset, strengthening the economic basis of the city. The author offered the periods of Moscow social infrastructure development from the early 20th century until present by identifying basic political and economic tasks, which determined the role and directions of cultural and consumer services sphere development. Within existing structural deformations of the system of cultural and consumer services for the population, the lack of territorial resources in the established development areas, the ways of social infrastructure improvement were proposed. These ways include planning optimization of the territory, clarifying typology and structure of public centers, working out the model of functional and spatial organization of the service system, techniques for intensifying the territory usage, sociological factor accounting, monitoring the level of social infrastructure urban development. The newness of the present study from the scientific point of view is a comprehensive approach to improvement of the city social infrastructure, including planning, sociological, architectural and spatial aspects.

1 Introduction

Modern city is the most complex system. Its improvement requires effective tools: economic, engineering, transport, environmental and many others. In this article we would focus on the urban social infrastructure. At the present stage of development with the predominance of tertiary and the growth of the quaternary sectors of the economy, social infrastructure is the main source of employment and different services, such as educational, medical, cultural, sports and etc. [1]. Respectively it provides economic stability and life comfort of the population. Thus, in the process of development social infrastructure, being

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the main component of the service industry, turns into the sphere of investment in human capital [2, 3, 4, 5].

Social infrastructure (hereinafter SI) is a complex hierarchical metasystem, including elements which are diverse in their functional purpose and scale [6]. In other words, SI is a combination of interacting industries and the united by them objects, responsible for forming conditions for the reproduction of human resources, training professional personnel due to the needs of economy, responsible for the education of patriotic spirit and rooting deep national traditions. SI unites institutions of education, healthcare, culture, sports, social protection of the population, trade, consumer services, public catering, tourism and etc. (Fig. 1).

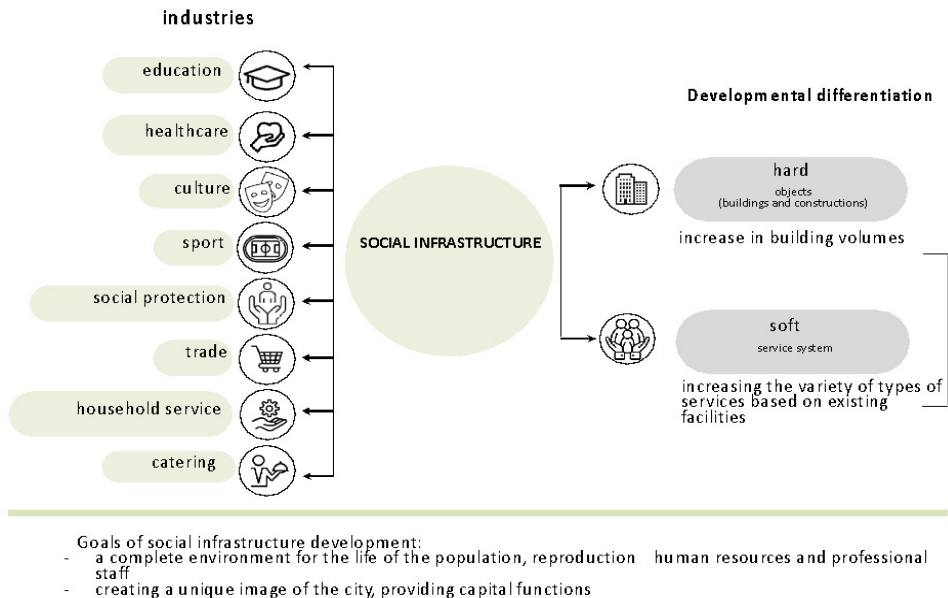


Fig. 1. Social infrastructure content, objectives of its development. *Source:* compiled by the author.

Within the urban economy structure, SI is included in the service industry, along with transport, administrative, banking services, as well as public organizations' services. Production sphere completes the formation of urban economy. The equity ratio of the service industry and the production sphere is an indicator of the economic development level. It is appropriate to mention here the theory of economic sectors (a three-sector model of economy by Fisher-Clark). It described the phased dominance of primary (extraction of raw materials), secondary (production), tertiary (service industry) sectors at different stages of commodity-money relations development. The model was worked out by Alan Fisher, Colin Clark and Jean Fourastier in 1935-1949. Alan Fisher made a discovery by allocating of three sectors of the economy [7]: primary sector, meaning the extraction of raw materials, agriculture, fishing and forestry industries; secondary sector is industrial production and construction; tertiary sector is service industry. Clark's innovation was that he identified the connection between changes in the sectoral structure of production and employment and changes in the consumer demand structure. Schematically the dynamics of transformation is implemented as follows: growth of per capita income gradually decreases the demand for agricultural products and increases the demand for manufactured goods. When achieving a certain market saturation level, the demand for manufactured goods also decreases, thus yielding to the demand for services [8]. Jean Fourastier's role was to determine the proportion of population employment at different historical stages of

economic development: at the first stage (pre-industrial society) with the distribution of employment – 70% primary sector, 20% secondary sector, 10% tertiary sector; at the second stage (industrial society) - 40% primary sector, 40% secondary sector, 20% tertiary sector; at the third stage (post-industrial society) - 10% primary sector, 20% secondary sector, 70% tertiary sector (Fig.2) [9]. He also raised such aspects as life quality, social security, labor humanization and unemployment prevention, importance of expanding the variety of educational, medical, cultural, sports and other services.

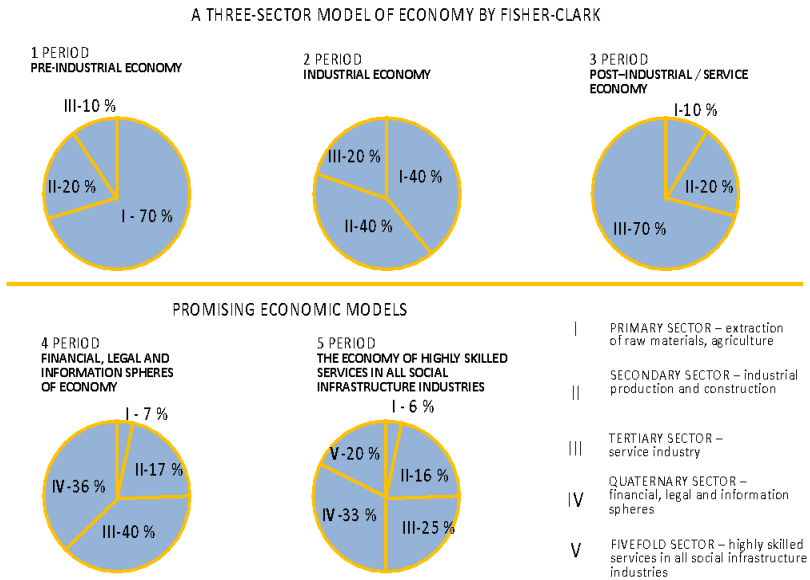


Fig. 2. Structure of population employment within the sectors of economy at various stages of its development. Source: compiled by the author.

The next evolutionary step is the separation of the quaternary sector of economy from its tertiary sector. This sector is characterized by high employment of labor resources in financial, legal and information spheres of economy [10]. However, scientists predict the next stage of economic system transformation: the fivefold sector separation of highly skilled services in all social infrastructure industries. The above mentioned argumentations confirm the unique role and powerful potential of social infrastructure for the promising urban development.

Placed in urban environment, SI objects imbue it with a meaning, enrich it with attraction points, both in relation to useful leisure and in terms of places of employment. The process of positive influence of highly cultural urban environment on a person was considered and presented evidently by scientists, teachers, social scientists, culture experts, philosophers. This influence is multi-aspect. It is formed by educational, cultural, sports and wellness components.

The cultural component of the urban environment forms a person's moral conscience. Culture and art are tools for a person to determine his social "roles" by expanding horizons, developing of aesthetic feelings, which in turn determine the content of the personality, the richness of the inner world. S.L. Rubinstein determined a personality as "a concrete, historical, alive individual included in real relations to the real world. Social patterns of human development (not biological ones) are essential, defining, leading for a person as a whole" [11]. Analysis of the correlation of concepts between "man" and "culture" brings to the fore (out of 4 possible roles: person is a product, consumer, producer, translator of

culture) the role of man as a cultural product. D. Dewey, American philosopher and teacher, believed that the effect of assimilation of cultural and social values of society is achieved when a person is immersed in certain qualitative conditions, as a result of which he is "imbued" with the necessary values. This was facilitated by a vast field of opportunities to prove oneself in various crafts, then in the fields of science [12].

Urban planning science has deeply studied principles and regularities of the formation of public centers system, with SI being their main functional composition. The investigations of A.E. Gutnov, I.G. Lezhava, V. Kristailler, L.I. Pavlova, R.S. Zhukovsky are dedicated to this problem [13-17]. In the works of E.I. Semenov [18], Kazemi Taban Mehdi [19] issue of functional connectivity of public, transport, and production development is revealed. V.N. Makarychev in his thesis research explored economic aspect of the program and target planning of SI objects' complete reconstruction [20]. S.O. Maksimov [21] studied the urban planning factors which influence the assessment of population needs for SI objects. Yu.V. Kogan [22] showed the parameters of interconnected housing stock development and SI. In his research work, D.V. Topchiy [23] elaborated architectural and planning aspects of industrial buildings transformation into the objects of cultural and consumer services. A.S. Vilkova [24] worked out the issues of spatial planning organization of leisure facilities in the shopping centers.

Within the deep disclosure of various directions, scientific experience analysis has indicated the lack of comprehensive look at the process of the public service system improvement based on sociological and urban planning reasons, and the lack of consideration of the previous stages of development experience and modern realities. To solve this scientific problem, the author has identified the periods of SI development over the last hundred years, determined the current challenges, requiring consideration, elaborated and described the approaches to the qualitative transformation of the SI functional and spatial organization.

2 Materials and Method

The purpose of the study is to determine the value of social infrastructure for modern city and the ways of its urban development. Objectives of the study are as follows: to determine the phases of SI development, due to the political, socio-economic circumstances of Moscow development over 100 years; to reveal the current and prospective conditions for the city development; to formulate approaches to the SI improvement of the city.

The data of statistics, the results of system, typological, functional and structural analysis, a sociological survey of the population have been used. The data from official municipal and regional sources have been used.

3 Results

Social infrastructure is deeply integrated in our everyday life. The task of SI is to sensitively react and to convert with the benefit arising political, economic, demographic and urban planning challenges. What are the current challenges for SI at present?

The first and important challenge is the necessity in the society humanization, due to the distortion of universal human values, priority of material values and political superiority. The second challenge is the active phase peculiarities of economic development information stage. Human capital becomes the main resource with the dominating role of creative, intellectual work and information products. An actual task is to create an environment which could meet the needs of a free, active and creative personality. The third serious challenge is socio-demographic. It means increasing in average life

expectancy, increasing in retirement age, growth of social and professional activity of the population. Portrait of the modern user is changing: personification of needs could be seen. Actual formula of public consumption is a combination of three conditions: fast, convenient, diverse. Pandemic and the remote use of services in conditions of limited physical activities of a person turned out to be a unique social experience. The fourth condition of modernity is extensive technological possibilities of Internet, allowing a large number of available services in the field of culture, education, healthcare, retail, catering, consumer services, social protection, sports and others. Such situation positively effects reallocation of the time budget thus increasing the share of cultural and developmental leisure. The fifth actual challenge is connected with the problems of spatial development of megacities - the exhaustion of territorial reserves within previously organized boundaries, the mono centricity of the planning structure of the majority of European cities.

It is useful to consider mutual influence and the interaction of historical conditions and social sphere, taking the example of Moscow within the period from the beginning of the 20th century up to the present period of the 21st century. It is legitimate to single out 4 phases of Moscow social infrastructure development, conditioned by unique historical tasks. (Fig 3).

The first phase, defined as the "Origin" (1917 – 1950s), is connected with the politics of ensuring the young Soviet state independence. Socio-economic tasks considered ultra-rapid formation of an independent economics through industrialization. Social sphere played an auxiliary role in two directions. The first direction solved the basic socio-economic tasks: to increase the potential of labor resources, to create a basis of professionally educated personnel, to provide conditions for the reproduction of the population and the overcoming depopulation. The second direction ensured the fulfillment of the ideological and political task: affirmation and glorification of a new way of life. The art was assigned to fulfill this task, as it reflected the high level of spirituality and humanism of the new political system by using innovative artistic forms.

The labor resources potential increased as well due to the involvement of female part of the population in the production sphere. The role of the house keeper was minimized with a help of ideological propaganda, individual household processes were transformed into collective ones. Family life was replaced by public life (Fig. 4). Social infrastructure has provided mass consumer with an advanced network of public catering facilities (canteens), household complexes (bath-laundries), shops focused on consumer goods. Great Patriotic War tragic events and the following recovery period did not change the auxiliary role of social infrastructure.

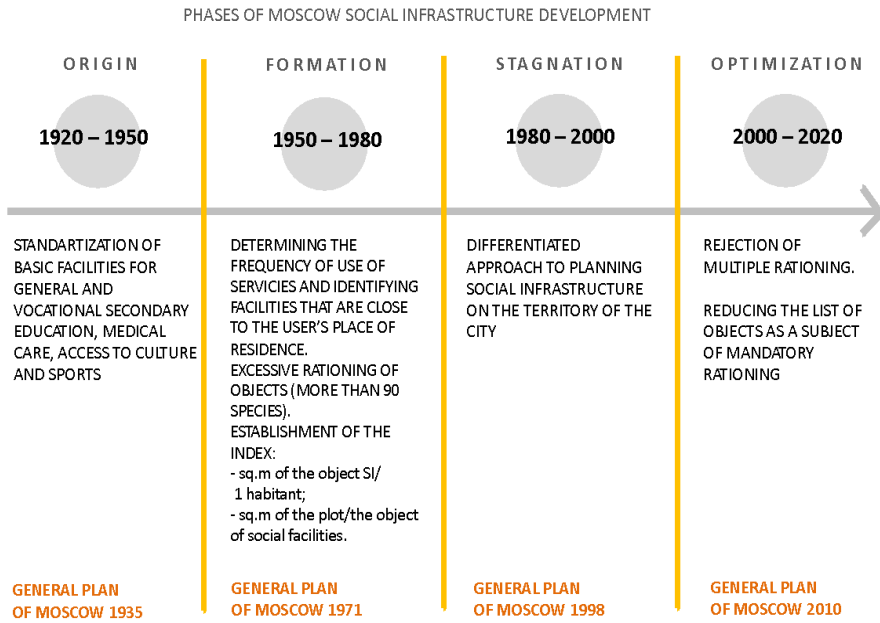


Fig. 3. Phases of Moscow social infrastructure development from the early 20th century until present. Source: compiled by the author.

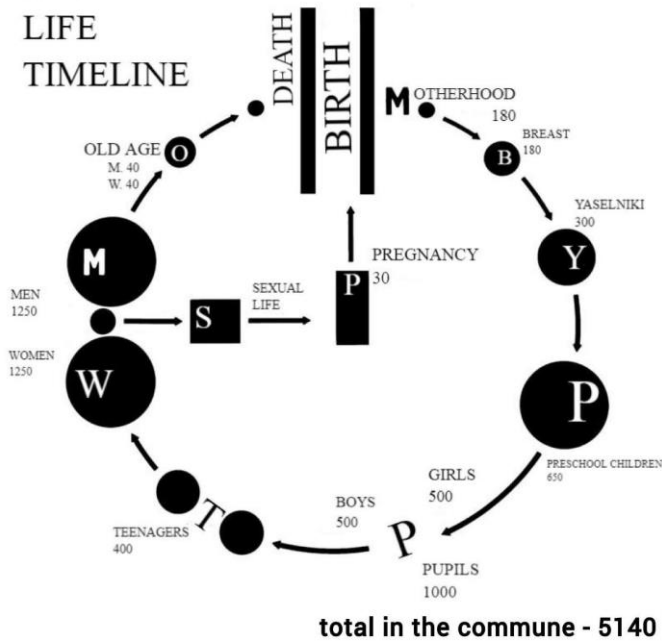


Fig. 4. "Life schedule" of the members of Anzhero-Sudzhensky coal mining region housing facility. 1928-1929. N.S. Kuzmin. Source: <https://www.projectbaikal.com/index.php/pb/article/download/1183/1174/1379>.

The second phase, defined as the "Formation" (1950s- 1980s), demonstrates qualitative changes in relation to the social infrastructure. It starts to be seen as a priority sphere of urban economy, is subject to state planning and is entirely funded entirely from the budget. Social infrastructure objects became the subject of rationing in the field of architectural and urban design. This was caused by the necessity to solve a major task of providing the population with housing. Within this task, the optimal values of indicators of housing and social services were determined. Soviet standards were based on the definition of basic human needs: number of underwear changes, seasonal clothing, demands frequency for household services (haircuts, bath services, wear rate of clothing, etc.). The normative values were also based on the results of sociological surveys of the population [25].

The first documents were adopted- construction codes and regulations (called SNIP in Russian Language) II-B.1 dated 1954 (Layout of settlements). The revised version of the document was adopted in 1958 named "Rules and Regulations of Urban Planning and Development" (construction codes /SN 41-58). The frequency of services' usage was determined within the identification of daily and periodic maintenance objects. More than 90 types of objects were rationed, the indicator' values of the provision of residents with the total area, the provision of the object with the land plot were regulated. At the same time, excessive rationing of service facilities was noted. The set of services was determined by the mass consumption principle, in which the individual needs of age or social groups of the population were not considered. Kindergartens, schools, cinemas, outpatient departments, hospitals, consumer service plants, shopping facilities, etc. are being built in accordance with the standard projects. The planning feature of design of that period is construction of detached objects on the land plots.

General plan for the development of Moscow, adopted in 1971, expanded the boundaries of the city in the northern and southern directions. The development of the cultural and consumer services sphere was provided in the form of volumes of new construction for the city in general and for each of the 8 planning zones [26]. Each zone was provided by the cultural center, commercial and household facilities, healthcare objects and mass sports areas. Such structure provided residents with the necessary set of daily and periodic services within the planning zone and minimized trips around the city.

The third phase of social infrastructure development (1980s - 2000s) can be defined as "Stagnation". It is conditioned by negative economic, political, demographic changes of "perestroika" period and the USSR collapse. Social infrastructure was critically affected with the volumes reduction of housing and public construction. It was noted that the regulatory framework requirements in urban design were ignored. In addition, the beginning demographic decline led to the lack of demand and mass re-profiling of social facilities: kindergartens, outpatient departments, pioneer camps, etc.

In Moscow only more than 250 objects have lost their educational function. The reviewed historical period confirmed the vulnerability of social infrastructure position as an investment-independent object. Its development has been suspended due to a significant reduction in budget financing. Thus, in the third period a stable deformation of the social block structure, due to the shortage of basic types of social services (preschool, school education, physical culture institutions, social protection of the population, etc.) was formed with a significant increase in the share of commercial development for commercial and household purposes.

The fourth phase, the current period of SI development (2000s - present), can be called "optimization". It is based on the stable signs of service economy and individual elements of the emerging information economy. Special attention is paid to a human as a unique personality, capable to elaborate innovative solutions for technological and humanitarian processes. As we told earlier, this approach is focused on forming a comfortable environment, providing maximum scope of services in minimal spatial accessibility. When

planning the territory, the tendency of consolidation of the social functions as a part of residential, public and industrial territories becomes a priority. At the same time, the shortage of undeveloped territories within the boundaries of the Moscow Ring Road and the limited budget financing are the restricting factors. The city administration strives to distinguish between social guarantees of the city and the services provided by commercial structures. Due to such approach, the normative framework of urban planning design is also being adjusted in the direction of reducing the list of mandatory socially significant objects.

The abovementioned arguments prove the undervaluation of the SI role in Russian reality being an effective tool for transforming the urban environment as well as obligatory condition for improving the quality of human capital. It is necessary to search for new innovative ways of SI urban development in the areas of existing housing where the territorial resources are absent, taking into account as well the aforesaid modern challenges.

To qualitatively transform SI, provide an opportunity to realize its role as an effective tool for enhancing the living environment quality, the author has developed current approaches to improve the functional and spatial organization of SI on the example of Moscow [27]:

- 1) Improvement of the planning structure of the city territory - considering fundamental changes in the transport network, being an anthropogenic planning divider, as well as identification of self-sufficient planning areas (area – 2000-3000 hectares, population - 500 thousand people); within the boundaries of the planning area residents are provided with the necessary services and places of employment. This reduces the volume of daily migration and favorably affects the time budget allocation (Fig.5);

- 2) Refinement of the public centers structure of the planning areas and their integration into the system of the citywide center - the system of citywide centers is formed by agglomeration, inter district, district levels; the largest agglomeration level centers are being developed in the nodes of the outer network on the basis of the biggest transport and transfer hubs (hereinafter TTH) with the maximum flow of the daytime population; inter district centers are located on the external network, based on TTH of urban significance; district centers are located in the nodes of the internal network provided by metro stations (Fig. 6);

- 3) updating the model of SI functional and spatial organization - structuring of the service facilities, taking into account the objectives of ensuring the vital activity of the population and the metropolitan functions of Moscow; differentiation of services based on the demand frequency and optimal distance from the consumer;

- 4) Intensification of the urban area and development resources usage: the first one is the development of a new type of public complex with social functions predominance (sports, culture, additional education /art, music/, social protection), which will allow to use the territory of the city more efficiently; the second one is an active integration of social functions into the lower floors of residential buildings (1-3 floors);



Fig. 5. The scheme of new planning areas on the territory of Moscow north-western sector. Source: compiled by the author.

5) Consideration of the sociological factor, the preferences of residents of various social and demographic groups regarding the perspectives of the SI development; for this purpose, being at the pre-project stage, a sociological survey is conducted in the form of personal interviewing visitors of the facilities, online surveys on the city administration websites, SI facilities and residents' communities;

6) Monitoring the level of SI urban development in order to identify the most problematic zones - it is suggested to use an integral rating of the areas. Its construction is based on a mathematical calculation of the population provision and subjective assessment of residents' satisfaction with service development (by industry and type of objects).

4 Discussion

Presented investigation results have a scientific newness value due to a deep immersion in the historical data of the causes, directions and problems of SI development in different periods of Moscow development, the identification of the most important modern conditions of its functioning, the elaboration of comprehensive approach to its improvement. Some of the mentioned issues were present fragmentary in the previously completed research and project works, others were not revealed. However, the merit of this

research is based on the history experience and due to the interrelated consideration of sociological, planning, architectural aspects of SI development.

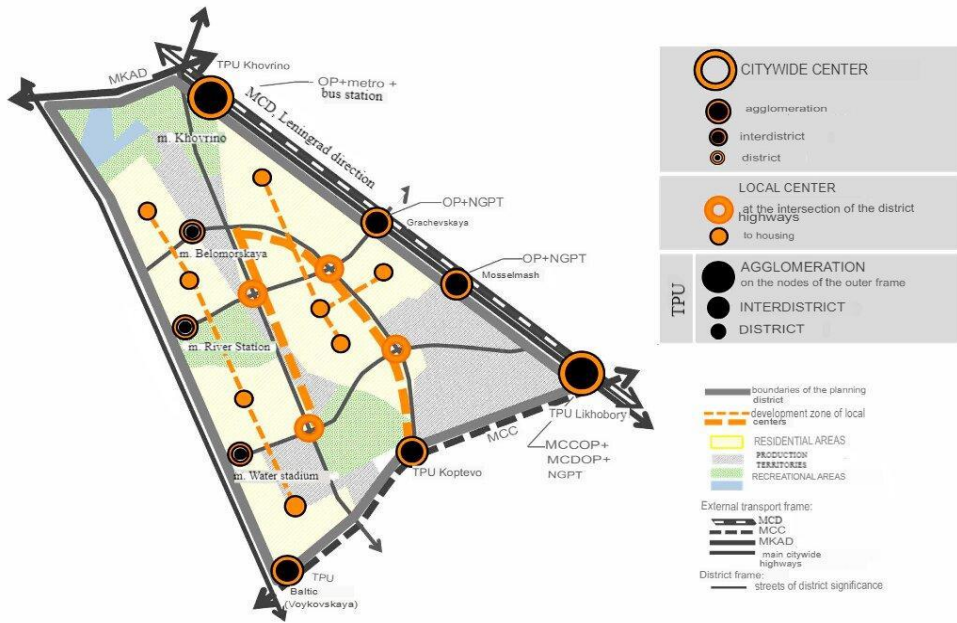


Fig. 6. Scheme of improvement of system of planning area's public centers. Source: compiled by the author.

5 Conclusion

The unique role of social infrastructure, being a complex system of interacting objects, consists in its ability to raise the quality of the urban environment, to improve the spiritual structure of a person. The four phases' analysis of the evolution of Moscow social infrastructure over the past hundred years has proved the inefficient usage of its possibilities and the accumulation of chronic problems of service system. The transitional period from the post-industrial (tertiary) to the information (quaternary) stage of economic development greatly strengthens the SI potential being an urban development engine. However, the overcrowding of urban development and the lack of undeveloped area reserves is an objective obstacle to its implementation. Consequently, the approaches elaborated by the author to improve the functional and spatial organization of the SI (Moscow, as an example) become extremely relevant. These approaches include: improving the planning division of the city territory, clarifying the structure of public centers of the planning areas, adjusting the model of functional and spatial SI organization, working out techniques for intensifying the usage of urban area resources and development, considering the preferences of residents of various social and demographic groups regarding the perspectives of the SI development, using an integral rating of areas in monitoring the level of SI urban development. The results presented correspond to the objectives set at the beginning of the research.

Elaborated proposals have a practical value and are recommended for the usage at the territorial planning stage (when working out substantiating materials to adjust the General Plan of the city), territorial schemes, being a part of the planning documentation. In the

framework of a further theme study, detailed consideration of the functional structure of public centers is supposed, accounting transport accessibility, public center radius of influence, existing level of SI development on the adjacent territory.

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