Scientific-Practical Approach to Revitalization Urban Environment of an Existing Single-Industry Town

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Abstract. The research method is aimed at solving the problems of a particular place of settlement and through this to design a key solution to solve the problems of settlement as a whole. The article gives an example of study and development of tools on the revitalization of the urban environment and related facilities in an existing single-industry town. In accordance with temporary, economic, territorial and other factors, principles of revitalization close to urban acupuncture have been developed. During the course of study, five stages of the town revival were proposed. Each stage involves the increase in the radius of the study and the impact on the urban environment. Programs of the stages could be general, but rather individual. Each stage has its own program and result. The strict adherence to each stage of the program gives a better result. And finally the five-stage approach makes it possible to achieve the prosperous, dynamic and sustainable settlement with the well-being town life.

1. Introduction
At present a number of settlements in Russian Far East are based on a single city-forming enterprise (monotowns). The risk of monotowns is the lack of diverse and sustainable economy [1]. The urban activity of population in such settlements at the present economic conditions has tendency to decrease. A tendency of local population is to visit larger cities in weekends or relocate there to use the high-quality urban environment and related facilities. Therefore at the present economic conditions it is important to provide diverse competent approach in reconstruction of urban environment of promising monotowns, replacing the outdated paradigm of industrial economy and the minimum needs of the population into paradigm of livable cities [2,3]. This reconstruction, in turn, is important because people here are much more successful dealing with each other and with their environment through transitions towards improved sustainability [4]. Unfortunately it is impossible to provide effective reconstruction of the entire settlement territory in a short time due to budgetary constraints [5]. And for that reason it is necessary to develop the scientific-practical approaches and programs to achieve tangible results with small funds. Urban sustainable development can be achieved easily at local scales [6,7]. Therefore it was required to find an effective program for the revival of a promising monotown, using changes in urban parameters (new construction) study. The town environment which was previously destructive to its inhabitants, after the transformation becomes attractive for the local residents and for the visitors as well [8].

The territory of Bolshoy Kamen, the town in the Far East of Russia (the population: 40000 inhabitants), was used as the study area in this research. It was considered to explore the possibility of
improving a much larger area when changing urban parameters (a new construction), in view of the local changes. The starting point of the study was the Technical Assignment to design the Hotel Complex near the seaside for city-forming enterprise long term employees. The study territory was used for scientific-practical development of approach, proving the relevance of theoretical testing in possible formulate of the real development Programs, Master plan, etc. [9]. The first approaches and implementation of study could provide positive results due to the possibility of site improvement of the town periphery which is already popular with local population [10]. The city-forming enterprise of Bolshoy Kamen monotown, in comparison with other towns, is developing by the Federal and international programs. In this case it is possible to relate Bolshoy Kamen as a promising monotown and to predict its further urban growth [8]. There was a verification of hypotheses of possibility to restore a prosperous urban environment of promising monotown, by using minimum resources to achieve greater outcomes. Also according to conclusions of contemporary researches, the development of town urban services can be more important and demanding, compare to the development of the town industry (here the shipbuilding plant), if we aim for sustainable future [3]. The proof of these conclusions is obvious - despite the development of the town industry the local population city life is uninspiring. The city of Vladivostok with its population of 630000 people and multiple public facilities is 110 kilometres away around the Bay. Therefore based on Bolshoy Kamen developing shipbuilding plant the study recommended to provide tools, aimed to develop this town sustainable and multifunctional, with large amount of urban public services and activities. On the basis of data on the location of the Hotel Complex, new indicators were received and a new vision of the development of the territory and the town was proposed [11].

2. Methods

Five stage approach was developed in order to provide urban activity. Each stage has its own radius, based on the oval shape, directing from the pre-selected constructional site mostly to north-east. Each stage becomes the point of growth of the site as well as the town and leads to the growth of the area of 700 square km., including 2 cities, 1 town, 8 rural settlements (total population 792300) [10].

- **1**\textsuperscript{st} stage covers the territory of 3 hectares. The program is to make the Hotel Complex territory sustainably attractive itself;
- **2**\textsuperscript{nd} stage study area radius is 1.2 km. The program is to connect the Hotel Complex territory to the main town street;
- **3**\textsuperscript{rd} stage study area radius is 3.1 km. The program is to provide livable criteria to the main town street from downtown to the Hotel Complex territory;
- **4**\textsuperscript{th} stage study area radius is 6.4 km. The program is to connect the site, the main town street with the intercity highway;
- **5**\textsuperscript{th} stage study area radius is 35 km. The program is to interconnect the transportation circle with Vladivostok.

Each stage was based on the information, received in the previous study (the street net, the master plan, case studies, interviews with administration, local population, developers, the use of the real estate data, etc.) [12].

2.1. Stage 1. To make the hotel complex territory sustainably attractive itself

The square is 3 hectares. The conditions – the territory is used as the main local seashore recreation site (unorganized) for town residents. The territory has many natural resources – the seashore, the hill, the slopes, existed scenery observation public track, observation points, untouched natural area, and the beach [13]. The Hotel Complex construction at that site will provide the activation and prudent use of unorganized town periphery [10]. The four Programs of territory development were suggested: Hotel, Public, Mixed and Natural. Successful implementation of these four programs as well as the sustainable development of the Hotel Complex and thereafter the whole town can be made possible by enlarging the site area which should be twice as large as necessary for the Hotel Complex alone.
The Hotel Program involves the development of diverse temporary residence functions – the hotel, apartment hotel, cottages and villa. The Public Program (both within the site and going out the site borders) aims to provide diverse types of public recreation – the multifunctional park, the Museum, cafes, observation points, scenery walkways, lawns, playgrounds, connection to the seashore. The Mix Program is proposed to provide multifunctional use of its territory – both for hotel and town residents, taking into account many urban attractions available there [14]. The Nature Program involves maximum conservation of the existing natural resources of the territory, landscaping of the territory in order to improve the comfort of use and safety by transforming the abandoned forest territory into an attractive one.

The Results: this approach will achieve the sustainable development of the territory in the present and in the future, the flow of investment and a competent use of land. The hotel long term residents will be provided by diverse types of urban services within walking distance, and the site will be made attractive for the hotel as well as for the town residents. The design: the building of the hotel and apart-hotel suggested to place at the foot of the hill, serving as circular gates opens to the ocean. The upper part of the hill is organized as a town coastal park, it will serve both for local and hotel residents [15,16]. The establishment of the marine-shaped museum pavilion dedicated to the main town-forming shipbuilding plant would draw the attention to the top of the hill, make the place safer and comfortable and cause the arrangement of pedestrian tracks [17-19]. In order to organize contemporary city life, the first floors of the hotel and apart-hotel were proposed to be made public open, facing the circular street, connected to the park on the hill and to the seaside [19,20] (figure 1).

2.2. Stage 2. To connect territory to the main town street
The radius is 1.2 km. The conditions – the territory of the Hotel Complex (i.e. the main local seashore recreation site) has a lack of connection to the town center. It passes through the forest, devastated and industrial areas. The Program is to extend main town street - Karl Marks Street - to the Hotel Complex site and the seaside. The other aim is to fill the “urban voids” or negative spaces there [21]. The Program will not function successfully if the connection of the site and the main street will pass through negative spaces. Therefore there is a need to fill these spaces by visitors, services and provide all kinds of transportation, including walkability [10,22]. This need is possible to be realized due to the plan of Bolshoy Kamen town to construct new residential areas nearby. The Results - all this will definitely cause the sustainable development of three areas – the Hotel Complex, the planning residential areas and the main town street.

2.3. Stage 3. To provide livable criteria to the main street till the Hotel Complex territory
The radius is 3.1 km. The conditions - flat relief, street wide is 35 m., existed lines for motorized and pedestrian transportation (not in good conditions), has the resource for diverse transportation and use. The main street plays role of downtown central planning axis and the area of urban activity. At present the number of public gathering places has a tendency to decrease. The Program – to redevelop Karl Marks Street: to provide space for diverse types of transportation; to fill this linear area by public infrastructure according regulations – the competent ratio of architectural volumes, patios, greening and public communications. The number of public gathering places is not important, but the distance between them should be walkable [18,19]. The conclusion is to design a master plan for the main street. The Results – there will be a sustainable axis, which connects the central street, holding all downtown activities to the main seashore recreational activities (figure 2).

2.4. Stage 4. To connect the site, the central street with the intercity highway
The radius is 6.4 km. The conditions: the connection between central town street and intercity highway is under poor conditions and has no attractions. The Program is to provide the revitalization of road facilities – marking, light, attractive points, all kinds of transportation including walkability, attractive town entrance. The Results - the Hotel Complex and the main street could be sustainably
connected to the intercity highway network, i.e. the other settlements and attractive places outside the
town, the Priority Development Areas (PDA), the Gambling Zone, etc. (figure 3).

2.5. Stage 5. To interconnect the transportation circle with Vladivostok

The conditions: half-destroyed pier for previously existed Vladivostok – Bolshoy Kamen ferry line. The Program – is to close the transportation circle with Vladivostok by using a ferry line. The Results - closing the arch shape of land transportation into the circle we have achieved the continuous circle movement and to combine the various kinds of transportation, including a ferry. Bolshoy Kamen town is a part of the Vladivostok Agglomeration Program [23]. Therefore the revival of the ferry line, besides the circle effect, will support the Agglomeration Program which could engender the synergy effect (figure 4).

It should be mentioned that it is important to create a vector (strategy) of development in the
direction indicated in the study, and strict implementation of all regulations that will contribute to the
development of a sustainable urban environment [8].

Figure 1. Stage 1.

Figure 2. Stages 2 – 3.

Figure 3. Stage 4

Figure 4. Stage 5
3. Results
The research includes the study of hypothesis of possibility to restore a prosperous urban environment of promising single industry town by constructing the architecture volumes and continue by local changes having limited funds, using changing town data. As a result, previously separated territories, each at every stage, would be connected together. The study has resulted in achieving tangible effect on improving the livable criteria, urban sustainability, the positive opportunities of future development in much larger area (1:23333) involving much more population (1:20).

4. Discussion
It would be good to conduct monitoring and studies in the direction of what is being designed and built, due to the fact that architectural volumes are being designed and constructed, especially in the promising single-industry towns. On the basis of such studies it is possible to develop programs, guidelines and regulations of revitalization of the urban environment. This could help to create the life-loving cities, to serve the local population in their vision of their future city, businesses to find a right way of developing to sustainable cooperation with natural environment [2,14,17].

There were previous cutting-edge studies which are organically intertwined to this research. Based on the fact that settlements were created for people, the high-quality urban life (i.e. Well-Being Index) should be provided there [17]. The problems of the town periphery, in our case BolshoyKamen periphery, should be studied, using its unique features in different scales [10,13]. The development of town industry alone will not provide the future sustainable development of the town – it is necessary to develop the multifunctional urban services [2,3]. Despite the limited funds it is still possible to achieve great results. Transport also plays an important role in town development, transportation must be diverse and intended for different needs of town population [22].

In addition this kind of research will always be a point of scientific-practical interest - what results can be achieved? This study can also become a platform or a part for future studies.

5. Conclusions
The result of the study consist in pointing out the necessity to carry out this kind of research into the towns, based on received changing data using local features because the process of designing a new facility is required to consider the construction territory as a key to solve problems of a town. In the case of this study the local design (of the Hotel Complex) could be considered as a key to provide revitalization of all town area.

As the result of such studies it is possible to develop programs with a powerful (synergetic) effect in budgetary constraints. These programs could produce the development of the town according to set parameters and ensure the rapid development of the city, its economy, the welfare of residents and safekeeping of the natural environment. On the basis of the study it was concluded that the Programs can be general, but most likely individual, on the basis of contemporary data of different nature. In order to achieve the best efficiency it is better to keep the sequence following the stages starting from the first one [2]. As a result, the complete and rapid implementation of urban activity within a town is expected. On the other hand it is possible to develop the stages separately. In that case the urban revitalization effect will be temporary delayed. It is important to have a vision of hypothetical scenario as well as its possible implementation.

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