

# Architectural and typological priorities creating comfortable urban environment in future cities

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**Abstract.** The contemporary world provides new features for people and society, which is why it is necessary to reform the habitation structure. Different countries meet differently their strong demand for personal accessible and comfortable habitation and urban design. In Europe social housing and renovation programs are in progress. In Asia the high-rise housing is in priority due to super urbanized conditions. Microdistrict development in Russia is comfortable for developers, but not for citizens. To mark movement from such a practice we developed the new typological criteria based on quarterly principles. Nowadays European practice is full of flexible and lovely architectural solutions in different profiles. It might be a detached dwelling complex or a new development area as well. The article discusses the main trends in housing based on famous European projects. The most universal methods and solutions are summarized, which turned out to be especially in demand. The results highlight the general typological principles of the residential buildings formation, which can be implemented in Russia.

## 1. Introduction

Today the housing construction industry is in great paradigm movement – the new trends emerge constantly. In 2016 the UN session Habitat III proclaimed the principle for all the future solutions: «Housing is not a convenience but the natural right for everyone» [1]. The last few decades practice of living area developments in Russia connected with design standards rejections. Obviously, tiredness of multi-story aggression in neighborhoods filled city outskirts. Therefore, panel house construction needs to be modernized. The new standards and the new construction patterns are in demand. Nowadays Russian built-up urban areas meet the recommendations of international OECD and Habitat UN for 5 % only. These areas are historic quarters as a rule [1,2].

Demographic and migration crisis of Russian regions since 2000s led in the federal demand in housing typology change and its area improvement. In 2017 the national project on comfortable urban development and new standards of housing quality started in Russia [3].

The vitality of quarters could be the basis for uniform patterns of habitation in Russian cities. It confirms contemporary and historic districts in many European and Russian cities as well. Quarter buildings are relevant to the theory of mixed-use development and accept a wide range in number of floors and architectural solutions. We can see the lovely examples of such approach in European cities.



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In Barcelona, Budapest, Milan, Paris, Oslo and Berlin the real estate market refers quarters to premium class habitation. The chief architect of Moscow S. Kuznetsov marked quarter principle as the most important urban planning criteria in future. Historically panel housing sections were designed not for this goal. That is why the house-building plants nomenclature had no comfortable corner sections. There are also no sections allowing the effective development of public functions on the ground floors. A tough and unsuccessful apartment plan reduces the attractiveness of housing for residents. B. Goldhoorn believes that the return of quarters to Moscow is not only the opinion of the city's chief architect, but also the historical logic of development [4].

## 2. Materials and Methods

The design process of the 1970s and 80s in Europe became more democratic and in the urban environment moved from a strictly functional modernist to postmodern paradigm. In the early 1990s, all Europe was in the midst of a housing crisis, which was also associated with a popular direction related to landscaping widely used by architects in a large number of projects. As a result, a new inclusive trend has emerged, which is most pronounced in Germany and the Netherlands.

In many countries, local authorities are starting to build affordable and social housing in their areas [5]. This crisis affected mainly Spain in Europe, as refugees from all over the world come there. As a result, state policy is focused on the variability of living space, primarily due to differences in the number of family members and types of families that live depending on national characteristics [6]. Famous local and international architects invited the Madrid Housing Authority Plan (EMVS). The result of this policy was the unique and typologically diverse social hiring areas - Barajas, Carabanchel, Ortaleza and Waikas that surrounded Madrid [8]. Architectural stars show ingenuity by outlining social housing trends. The cities of Bilbao, San Sebastian and Malaga are also leaders in terms of the amount of social housing provided for social hiring. Experts from Westminster University, the University of Technology Vienna and the Oslo School of Architecture study the constraints that European architects work with and how this stimulates creativity and potentially innovative solutions when a flaw is a series of inevitable constraints [9].

The Netherlands play the leading role in architectural Europe as the birthplace of Rem Koolhaas (OMA) and the MVRDV group [10, 11]. MVRDV projects allow us to see all the trends in European architecture and the whole variety of approaches to housing in different countries and urban environments. Bureau architects believe in urban density to prevent the extensive growth of cities around the world. When developing new approaches of architects to quarters, it becomes obvious to create a diverse environment with combined typological solutions, various volumes and solutions to improve energy efficiency. A popular direction related to landscaping is widely used by architects in a large number of projects. Nieuw Bergen aims to become a modern and advanced eco-quarter, combining a rational urban environment with landscaping at the ranch level. In the Feldbreite district near Emmen Dutch architects proposed Urban Hybrid – a complex that combines the best features of rural (trees and multi-storey private houses) and urban housing (central location, infrastructure). Li01 is a similar example in Berlin by Zanderroth Architekten, where mini-gardens with living trees on terraces and balconies were designed. The modular housing principle is realized thanks to a flexible combination of plans [12]. Biopositive housing is presented in Russia as well. V. Logvinov designed the conceptual project “Vertical Dacha”, which arranges each apartment with wide and deep balcony-terraces (6.6 x 6.6 m) floor across floor.

The typology of housing for students and the elderly in the Funari quarter by MVRDV is intentionally mixed. Architects especially indicated the desire to get away from contemporary model of habitation with entire districts for specific segments of people. These examples are quite common in Europe. Putting the standard project Traumhaus as a basis architects designed 5 categories of houses. Dutch bureau applied a similar concept of multi-unit housing for a low-rise quarter in Beijing where accent is not on living cells but on public buildings complex varied on form and function [11].

The high-rise habitation approach is equally varied and includes all the actual trends – modularity, energy efficiency, biopositivity. Future Towers by MVRDV in Pune, the 8th largest Indian city, are the

true vertical city for 5000 habitants with 1068 apartments. Despite the expressive image, Future Towers design is based on MVRDV research of Indian housing and requests of Indian middle class for comfortable living services. Towers peaks optimize natural daylight streams. Inclined roofs allow getting a number of overview terraces, private and public as well. Large entertainment features are available around this complex. One more proposal for high dense countries is the container skyscraper solving the housing problem in developing countries.

In Moscow the high-rise living development trend in a premium segment increases at the moment. Therefore, it is no strong demand to decrease the number of floors within quarters. The capital city has few dozens of actual residential complexes at over 100 m: Triumph Palace, Tricolor, Edelweiss, skyscrapers at Moscow-city and new premium-class project Neskuchniy Home & SPA as well. The residential complex on Mosfilmovskaya by Skuratov architects consists of 213 and 132 m tall towers – the most expensive and luxury penthouses in Europe. GORN Development experts consider such trend quite natural: multi-storeyness symbolizes success in the whole world.

Temporary housing for high-qualified people is popular in the Netherlands. They cannot afford to simply rent an apartment. Temporary housing is easy to assemble and disassemble and is considered as one of the natural and humanitarian crisis solutions. On average people live there for 2-3 years till the social housing construction or reconstruction is being completed.

One more format is co-living. Deficit for contemporary young generation is live communication. It means for housing market the demand to create convenient and comfortable public zones for communication. Individuality and personal feelings become more important. Co-living is co-working and housing under the single roof. Co-living might be highly specialized and mixed as well, for long term and week living, size of a large apartment and a whole building. The large scaled co-living is Old Oak in London. It is for over 500 accommodations [12].

The important factor in housing architecture is energy volatility of European countries. Increasing the cost of public utilities influences on energy efficiency and economy apartment's popularity. For example, The Malings complex in London has a especial thermal system which allows to save resources with conditioning and heating. Student's innovative house SOPP in Lillehammer, Norway, uses similar technologies for house and water heating.

Speaking about the Russian modernization program of panel habitation we need to note the successful experience of current buildings reconstruction in Europe, not the demolition as it is now in Moscow. Germans and Finns build on and reconstruct old panel houses. It allows them to increase the living space and its energy efficiency. In other words, it might call retrofitting [13].

German architect Stephen Forster is one of the unique experts on 5-story housings, which were built up in the 1950-70s in GDR. He proposed the profitable way of reconstruction which enlivens almost dead districts. The results of such approach are: aesthetically actual forms, decreasing the number of floors, energy efficiency solutions, flexible apartment plans, unit and 3-cells block use, account the handicapped groups and elderlies [14]. In Munich, all the houses to build partially financed from budget according to the law have to be usable with handicapped groups and elderlies. Social houses are also build according to, for example, the new Preungesheimer Strasse complex in Germany.

The Asian experience as well shows just another approach. In particular, mass housing, arose there in 1960-80s for the first time, is unmodified as the quarter principle used initially. Absolutely another approach is in China. Mass urbanization and fast pace of construction connected with resettlement form high-density environment. In Hong Kong almost 2,5 thousand houses exceed 100 m height. It is 3 times more than in New York, and 20 times more than in Moscow. Most of these high-rises are residential. There is no enough free space in city and there is nothing unusual about life in small cell on the 40th floor. Mainland China does not lag as well: country is going through the mass super urbanization period. According to local requirements, total area of a standard apartment for 5 persons is 25-28 m<sup>2</sup>. It is about 2.2 m<sup>2</sup> living space per adult and 1.1 m<sup>2</sup> per child. Social housing queue numbers over 100 thousand people. Almost half of Hong Kong residents live in "social" buildings and use different kinds of habitation subsidies. Contemporary residential areas in China are high-rises tower-type buildings standing free within quarter, which area can reach 30 hectares. Of course, expensive segment cultivates

the approach of open terraced comfortable penthouses. Speaking about number of floors, increasing Chinese do not forget about beautiful landscaping and “car free yard” concept. The greening is in focus as eco troubles are everywhere.

There are some exclusive projects of high dense living where architects play freely with building typology and number of floors. The Interlace in Singapore by Ole Scheeren is a 24-storey residential complex with 1000 apartments, composed of 30 blocks located chaotically. They form hexagonal structure of 6-storey buildings stacked top to each other. The experiment with a modernist form in the spirit of last OMA projects allows architect to reach the diversity of environment [15]. The large residential complex Reflections Keppel Bay in Singapore by Daniel Liebeskind covering area of 8 hectares have grown up 6 24-41-storey sections and 11 6-8-storey sections. Total capacity is 1129 apartments [16]. In high-density China Steven Hall plays forms and “cut” quarters. In Chengdu, southwestern part of China, Sliced Porosity Block by Steven Hall was completed. Complex consists of 5 high-rises surrounded with large square. Under the square there is a 6-storey trade center. Towers are for apartments, offices and hotel. Its image is the answer for local requirements – such a configuration provides minimal shade to surroundings [17].

### 3. Discussion

European state habitation programs not only meet strong demand for housing but also an important cornerstone of powerful ambitions to create a state of prosperity on universalism principles [9]. European budget limits stimulate innovations, political and technological approaches. Last completed projects in European cities show the diversity of approaches in contemporary habitation [18]. Some interesting projects on existing housing stock and new projects propose a modern comfort level for different social groups. The success of such novelties fully depends on context: settlement, country, population. Only few completed projects and legislative steps could be live as origin in contemporary Russian reality [13]. New habitation format has a potential to develop, but it does not mean the total market capturing.

Today almost every expert accepts the quarter habitation psychologically more comfortable for inhabitants. Of course, micro districts were an advanced solution in former times, but nowadays cities reorient to quarters. Quarter development in Europe has a progressive movement on diversity way of living environment. On the contrary, quarter development in Russia considered as “downshifting”. It is the unique moment to rethink and modify current domestic micro districts and to move to address and progressive housing typology. Completed residential projects in Moscow show that the quarters as pristine form are rarely: sometimes a number of floors could be sacrificed, sometimes housing sections oversize limit areas as it should be, sometimes blocks stand as designed but there is no through passages between. As a result there are single quarters appear on micro district areas. So the most important to lead comfortable habitation is “increasing density with decreasing the number of floors”. Otherwise, the new quarters save all the micro district failures with giant houses where nobody knows each other. However, the density of living will be much higher. «The whole world experience points that the quarter development over 9 floors doesn’t exist”, - noted Y. Grigoryan, the principal of Meganom, Moscow. The research of Dutch architects as well has revealed that correct proportions provide 9-storey quarter with even more density than any micro district.

The society studies on future generation, who we orient, show the changes in housing type demands. It is obviously, the strong communication deficit and loneliness in cities increase the need for comfortable public spaces. The outsource working leads to increasing mobility: a lot of people not to seat in one place and can work from any point of the globe. According to international studies for young people the impressions are more important the possession. Due to Colliers International, Dirk Bakker studies in western countries 58% to 75% young customers prefer to spend money travelling and entertaining not buying. Due to One Shared House 2030 study by IKEA 66%, young customers vote for strong separation of private and public spaces with clear functions. Moreover, 60% are ready to refuse even their own kitchen.

In addition to co-living, as experts note, some rented services and apartment buildings are much perspective. As a commodity, it might be not a standard apartment but a service apartment. "Urban continuity and diversity are the factors to inherit from urban planning of former epochs", thought Rob Krier, one of new urbanism and post-modernism pioneers [8].

#### 4. Results

Within all the diversities of completed objects, let us mark the main trends of the European approach to living space formation. These trends are actual for closest future and have to be introduced to Russian practice:

1. A decreasing number of floors in mass segment. All levels of housing have the strong trend to decrease number of floors. In Russian practice, the trend to increase number of floors in mass and business segment is being prevail. The mid-rise houses are in high class housings only.
2. Approach of diversity. Individual preferences, national traditions faithfulness, interest to special types of habitation.
3. Hybrid typology. Typological and method mixing, opportunity to create original solutions and diversified urban spaces. Townhouses and multi-apartment buildings as in Stratford, London, or Burkhalter Sumi, where duplexes mixed with block units.
4. Flexible living space. Transforming and adaptive space providing compact and individual "quartography".
5. Biopositivity – including the greening to apartment areas thanks to terraces, balconies and roofs.
6. Innovative developments orientation – technology priority, energy efficiency, passiveness and safety.
7. Modularity and mobility – trend to easily assembling and modular units.
8. High arch-aesthetic features – all the housing classes have individual architectural solutions and high level of site improvement.
9. New habitation format – co-living. In fact, it is the new form of a civil hostel where private space covers the minimal area. Facilities for other needs are in large amount.

At the end of 2017 basing on Complex Territory Development Standard, the open international competition of architectural concepts for standard housing and residential development was spent. The competition results supervised by DOM.RF allow us to mark the key points:

1. Quarterly development principles modified meeting reality. In most cases, it is real for Russian cities to live on till 2040 following the master plans, developed last years. The street and large quarter (micro district) network is defined. Even competitors develop new features for micro districts, dividing them to fine half-closed living groups with isolated system of everyday service on first floors. Such residential groups they call quarters.
2. School and kindergarten areas are the planning modules as usual collecting few quarters into super-quarter (micro district).
3. Mid-rise quarter horizon does not exclude tower-type buildings.
4. Quarter development has better diversity thanks to different building types: gallery; blocked, sections in different compounds.
5. Quantity of varied apartments within section is about 20!
6. Using terraces and glasses as the comfort accessory. Such solutions stimulate residents to identity the space as "their own".
7. Open and glassed first floors as usual with no apartments: retail; services; food points.
8. Parking out of yard contour and "car free yard" concept implementation.
9. Double-oriented entrances – to street and to yard.
10. Multi-level parking with walking accessibility to apartments.

## 5. Conclusions

The study results allow defining the amount of current approaches and direct ways in residential architecture. The results of competition for habitation arch concept improve us to realize modern trends in habitation design and construction specific for current international architecture into Russian practice. Nowadays Russian settlements are tired of monotonous faceless panel houses. More and more people consider quartography and architecture of buildings. It is possible as well the increasing of eco and energy efficiency trend value. The cheap construction and social housing demand lead the new concepts focused on fast assembling and decreasing the price. Due to permanent progress in the field of construction and material technologies, it is likely to appear in the new architectural solutions which were impossible in past.

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