

# SPACE OF THE REGIONAL AGGLOMERATIONS AND RE-INDUSTRIALIZATION

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*The article is devoted to the analysis of the potential to fabricate production processes and their accompanying infrastructure networks as a part of urban areas. The authors explore the mechanisms of expelling production and services to outskirts by modern "post metropolises". The processes showing how industries return to big cities and overcome urban fabric, stating their areas as promising targets to outbound investments, have been analyzed for the first time. The survey findings have revealed the possible ways to increase self-sustainability of cities and reduce consumption of external resources as well as to increase their efficiency due to different factors including distributed energy generation and consumption systems.*

**Key words:** Industry, Area, Agglomeration, Network, Efficiency, Infrastructure, Personalization, Self-sustainability, Energy efficiency

## INTRODUCTION

In the recent years there was an upheaval that changed understanding of the urbanism theory and the mechanisms of urban processes with their impact on the planet. «Nonurban» establishments play a significant part in these processes as well, and the city itself is perceived as specially differentiated unity with varied morphology and patterns of scales, and it is taken as a process rather than a final product. Meanwhile the notion of urban agglomeration is still a core issue in analytical researches, although it is perceived as a mere «...one of the array of measurements and official aspects capitalist urbanization» [6, p. 16]. According to the Professor Neil Brenner at Harvard Graduate School, it is intensification and global expansion of the capitalist production system is a true reason for the modern «changed» urban state of an enormous amount of completely different areas being far beyond agglomerations, and being no longer outskirts.

Over the last 100 years urban fabric expansion was primarily generated due to increase in housing development, so planning was focused on this very aspect. Housing demand was constantly encouraged by migration flows from rural settlements to cities induced by industrial boom and agricultural decline. And, it is no doubt, that

technological networks of city services and production processes altogether are key issues in fabricating the potential urban development. Evolution of the term and the phenomenon of agglomeration itself passed the 'Fordist' stage with its massive manufacturing and the concept of the big center as a backbone. At the early metropolis development stage big cities were centers of gravity showing ultimate congestion of people, activities and functions. Today there is a term «post metropolis» [7, p. 14] – it has a centrifugal effect driving out basic production of goods and services beyond city spaces. This phenomenon is called «ex-urbanization», and is characterized by development of housing, infrastructure and city landscape outside the city. Due to globalization, which caused alienation between management and production, goods consumption and industry restructuring, significance of space concentration, was not diminished, and, on the contrary, went beyond to the new level: now we bear in mind regional agglomerations, where centers and 'knots' have their own facilities in service. Spatial configurations of agglomerations are no longer based on the ongoing physical shape of the city but on the flows of different types of activities, which form functional unity. As to the cities development on the international level, besides the general trend of increase in city population

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and cities growth, nowadays the phenomenon of the cities losing population is generally accepted. Thus, there was a proof of the necessity to create a new upheaval in the theory of cities development switching from the growth towards understanding of changes as dialectics of growth and reformation, and decline as well.

### **INDUSTRY AND SPACE OF THE MODERN CITY**

Recently, opposition of an old industrial model to 'creative' and 'new economy' of knowledge appeared to be an integral part of the movement towards progressive modification of reality, in spite of the fact, that just a few decades back manufacturing was the key of economy and basic leverage of modernization in many countries. Nowadays, on the contrary, it is generally accepted that there are risks and negative impacts of one-sided economic models with individual hypertrophied sectors, whether they were ser-

vices or finances. In the west, there is a trend of industries going back to towns in a new manner: new types of activities development, new technologies, including digital design, engineering design, testing and manufacturing, backed by internal professional services and innovative technologies. It is referred to a new industry requiring appropriate areas. It is highly important to consider in detail and evaluate which possibilities were open for regional economies by globalization, and whether the concept of noisy and polluting industry isolated from cities has passed away. . Industrial area Santa Margarida II with the area of 55 hectares in the city of Terrasa, Spain. Mixed-use «area» of manufacturing and commercial activities (incl. huge leisure center «Par Buyers») tending to be considered as completely integrated into the city structure. However, it may be perceived being far beyond an ideal one.



*Figure 1: Industrial area Santa Margarida II*

Since it has been clarified that competitive advantages of more flexible and geographically independent manufacturing processes (mainly in developed countries), as in case of the suburban resettlement model, may appear provided there are combinations of artificially created favorable factors. But as soon as the situation and environmental costs change, general economical

uncertainty along with the growth of expenses for production go to the foreground (manpower, transit, taxes, changes in customers' requirements, threats of natural disasters growing up to 3% annually over the last 30 years), the necessity for further transformation of this economy sector and its reactivation on the local level (i.e. its return to the country to reduce depressiveness

and fragmentary nature of actions) is getting more evident [8, p. 95]. Certainly, the situation will never come back to its previous state since international enterprises got the leading position long beforehand in different industries, and technological changes and frequent crises force various activities and employees constantly migrate between companies and industries supporting a high level of mobility. But, in an case, it is unlikely that there will be the need to chose between economy of knowledge and industrial production (manufacturing, processing) inside the country: according to the findings of the survey made in the USA there is simply no need to do that, because an excessive gap between the final stage of production and research and development innovations, eventually, starts to generate negative impact [10, p. 23].

As it is known the grounds for the ideology of the postindustrial society were new labour markets and reduction of costs related to transportation and communication, which weakened 'protective' role of distances when it comes to dispersed expansion of enclaves. Thus leading positions were taken by outside areas with their extensiveness and low cost, taxes and salaries. But a consequent collapse of the real estate and finance markets in the end of the first decade of XXI century forced neo-industrialization to develop, that's why a lot of western countries call for support and investments «... as into enterprises, and their ecosystems» [09].

There are true evidences in favor of the significance of the city agglomerations when it comes to the knowledge expansion [4], and there are also detailed reports that prove connection between industry and innovations [8, 10]. From the one hand, industries take an active part in the research and development and innovative works (English: R&D&I - Research, Development and Innovation) – when it comes to both investments into innovations and their implementation, and from the other hand – industries are the first consumers of innovations produced in the service sector. That's why existence of production in the city system does not counteract with the strategy of the cities and agglomerations contributing to be a part of the 'knowledge society'.

Today we deal with 'enterprise chains' with various locations, cooperating with other numerous companies that imply a solid network enterprises and spatial fragmentary nature of industry [10, p.

78]. This non-integrity can be explained by varied favorable factors, which are sought after by each industry segment when choosing an appropriate location. And, it becomes more clear, why industries vanish from the cities moving to countryside industrial parks and areas (particularly, as to E. Glazer, it's typical for mature industries which passed their most innovative stages in the central cities willing to reduce costs by moving to outskirts [4, p. 32]), leaving their representative offices in the central cities to keep the image on the appropriate level..

Thus the scales of establishments tend to be reduced allowing the 'urban fabric' to become more «fine-grained» and permeable, and all the rest segments of the enterprises tend to be regrouped. Consequently, both the city and the industrial enterprise can win, by reducing staffed increasing outsourcing of different professional services. Recognition of this relatively new urban hybrid economics is highly important to realize the significance of such a complex territorial unit as the metropolitan(regional agglomeration), which contains final amount of all the inter-related components and works in production and services sectors broadly expanded outside the city. Trends in the terms of spatial distribution can be described as follows: central location of the service sector assigned for urban manufacturing, outbound dissipation of the manufactures and formation of local industrial clusters outside the city.

Foreign experience over the last fifty years highlights univocal dynamics of the industry move, which started at the stage of ultimate popularization in the big regional cities transforming into much more industrially balanced vast metropolitan regions, where industrial areas and logistics parks make up a network (quite often) on the basis of small-sized and medium-sized cities and efficient highway infrastructure joining them to the capital [10, p. 145]. There is a possibility to boost the growth due to availability of free area, but there is also a concern about well-known trends of the free market, where it is always reasonable to minimize costs for lands, which inevitably 'drives out' industry as far as it is possible from the city centers without due account for consequent difficulties related to service delivery and employees (this is a common issue when it comes to land development and functional activities layout when converting of land plots into objects for residential and in-



dustrial use turns out to be highly profitable business, but not key strategic points in development of region). Figure 2 present Multi-functional distribution and exhibition center BMW Welt in

Munich, Germany. It is located very close to the head-quarters of the company, Olympic park, industrial area and residential districts with underground (subway) lines.



Figure 2: Multi-functional distribution and exhibition center BMW Welt

In the EU countries (France, Spain, Germany, the Netherlands) and in the USA, over the recent years, relations between the city and industries were subject to be systematically reconsidered in favor of protection and reanimation of the manufactures since the long-term externalization of manufacturing processes was declared as dangerous for ability of any state to introduce innovations and compete. It is planned to build new relations on the basis of the combination of strong points related to area proximity, labour market availability, complex nature and ecological performance. Extreme specialization, standardization and functional segregation of the 'Fordist' model associated with the massive production, which expelled industries outside the city and caused an appropriate area planning, are now exceptionally criticized. Scattering of manufacturing agglomerations over the regional areas based only on low land cost, which followed right after the mentioned above stage, is claimed for emergence of a big range of industrial areas with infrastructure of low quality. And it should be noted that the growth of urban ar-

reas of low quality, whether they are industrial or residential ones, as a result, faces the problem of degradation, premature deterioration and environment depreciation, where there is less encouragement and possibility to regenerate, and, quite often, there is no way to influence on the areas and adjust them to new requirements. So there is an issue of technical, economical, moral, social and special deterioration, and it is not only about depreciation of environment due to its long-term use. In summary, foreign researchers [10, p. 182] claim that it is a mistake to make industrial areas isolated from the city life due to spatial barriers and push for considering new industrial areas as a mix-use eco-complex and an integral part of the city environment, which they should be close to, or intensively contact with each other.

### **RUSSIA: REGIONAL AREAS AND MANUFACTURING INFRASTRUCTURE**

In Russia, with the problem of non-uniformly distributed developed regions, the trend of 'de-

velopmentalism' (development as growth and modernization) may be considered as reasonable and appropriate, at least, if it is going to be focused on as urban areas growth as rearrangement of already utilized lands and manufacturing resources allocation taking into account settlements and environment. In this regard it is highly important to consider these land plots firstly as infrastructural grounds for industrial and social and economical progress, and not as an end itself and profitable business. In real life, being focused on the infrastructure development in regions, it appears to be an efficient tool to attract outbound investments into local sector

of economy and to expand local small and mid-sized manufacturing businesses (which are primarily interested in ready-to-use property lease, possibility to develop industrial parks completely equipped with engineering and transportation communications). According to analytical reports investors are looking forward to going to the western and central parts of Russia in 2015 (and cross-border regions near the countries-members of the Shanghai Cooperation Organization), and the major criterion to choose the location is proximity to the Russian and Euro-Asian cross-borders (besides clear legislative and executive framework and taxes costs reduction) [02].

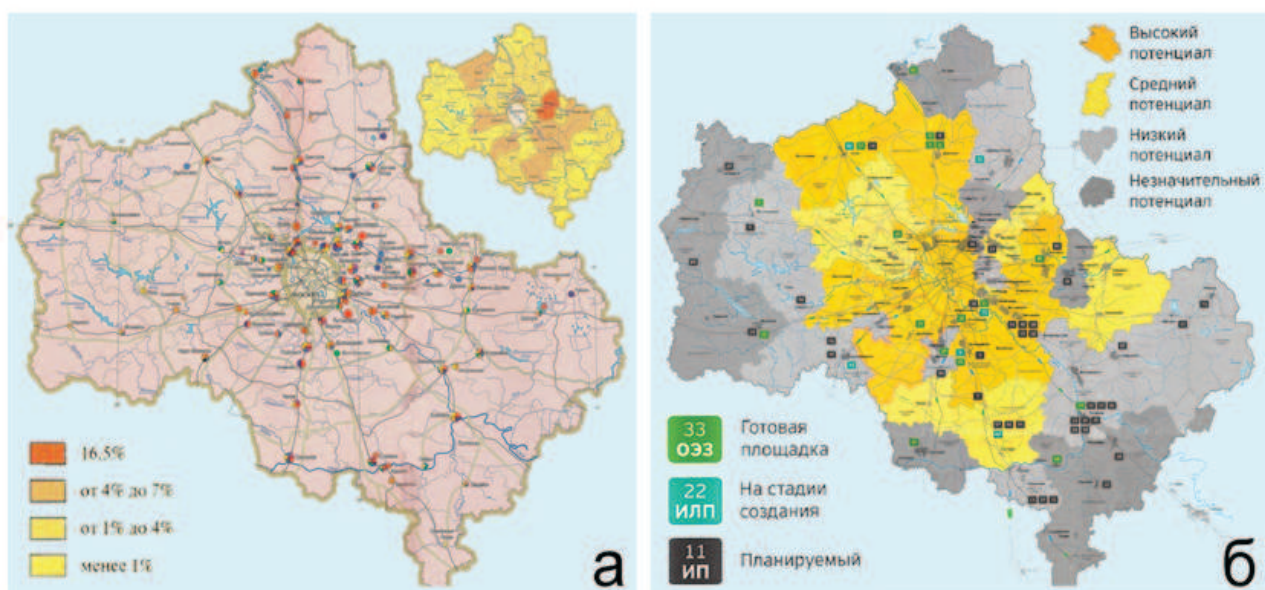


Figure 3: a) Industrial congestion, b) industrial parks in Moscow region

The Figure 3, a) shows from top to right: map showing the shares of regions in industries, from 16.5% (red colour) up to less than 1% (light-yellow). In the center: congestion of industries and electric power stations in the region (source: Kolosova, N. N. Atlas Moskovskoj oblasti uchebnyj (serija «Sfery»). M.: Prosveshchenie, 2004).

The Figure 3, b) shows Map of industrial parks in Moscow region valid for 2014. Land plots are classified as ready-to-use ones, under development or under planning, and the potential of the regional districts (classification is based on the industrial potential, human resources, tax environment, investments and transportation infrastructure) – as high (orange), medium, low and insignificant (dark-red). It is the copyright of the British audit company «Ernst & Young» (E&Y)

If we take congestion of infrastructural investments in Russia it will be possible to identify the

leaders by the amount of linear infrastructural projects under development and under planning (infrastructural projects are generally accepted as highways, bridges, air and railway and water transportation, energy and water supply facilities). And they are mainly the Ural, Pryvolzhsky and partly Northwest, Southern and Far Federal Districts [3]. But nowadays, when it comes to infrastructures required to run businesses, there can be enlisted such more complex non-linear establishments as industrial parks (i.e. industrial and logistics areas), export-processing zones, business incubators, innovative clusters and etc. At the moment the majority of industrial parks are congested in the European part of Russia (totally by the beginning of there are 366 industrial parks in Russia): 37% - in the Central part of Russia and 17% in the Northwest and Pryvolzhsky Federal Districts each. [3, p. 10]. Most of the private



industrial parks are in Moscow region, and the major part of them is represented by non-developed lands amounting to 500-900 ha, which in most cases adjoin to existing low-rise residential settlements. But soon the landscape of radial mains the region will change completely: the area between mains will appear to be 'industrial corridors', which will create solid urban environment with no gaps made up of scattered settlements. And there are certain industrial parks planning to apply new ways of zoning allocating areas to be used for social and business purpose (with housing and social infrastructure) and for commercial purpose (offices, manufacturing and warehousing, e.g. an industrial park 'Koledino' in the Podol'sky region) with due account for recreation and public zones being a buffer between industrial parks and existing settlements. Other development projects do not replicate such integration methods.

As to the worst scenario we may expect that there will be a complete deterioration of the suburban value system in these areas due to invasion of the large impermeable industrial areas causing repeated refuge of dwellers to remote regions. As to the best scenario there will be an opportunity to consolidate regional centers on the basis of small and midsized cities (Klimovsk, Kolomna, Volokolamsk, Klin, Dmitrov and others), which will contribute to decentralization of employment in the region. But there is an issue that should be expected in any case, and it is growth of areas with high population density in the region: in the presentations of industrial parks, which claim to have complex mid-rise housing development, in fact, we may primarily see high-rise housing (see: <http://m2-podolsk.ru/presentation/koledino.pdf>). New large retail-parks and mega malls will complete the panoramic view... But it is in the theory. We may state that the share of ready-to-use industrial parks significantly increased (from 29% in 2010 up to 44% in 2015 [3, p. 12]). Now we may observe that there is a drop in settling of these industrial parks, and construction of already designed large shopping centers (75-450 thousand sq.m.), will be probably postponed for long time or even cancelled (this was the forecast made by analysts at the Roundtable Board «Kiosk VS shopping mall: how shopping patterns may impact on the city environment» during the Moscow urban festival in the end of October 2015).

## **EFFICIENT CITY DISTRICTS**

The concept of completely personalized industry in the framework of so-called third industrial revolution causes controversial estimates. Some people mean total self-sustainability of a person who produces all the material values and goods at a home workshop (3D printing e.g.) or at a private backyard – such a chimera – a regressive and extreme mixture of ecologism and technocracy implying the end of the centralized industry, employment and trade (nevertheless scientific centers, which promote interaction between information technologies and environment, have been existing over fifteen years, and manufacturing workshops «Fab Labs» able to become the core of the new patterns for microenterprises have been operating in more than 20 countries [5, p. 117]). Others claim that information transfer methods and manufactures are inevitably to be digitalized: they are fascinated with the challenge to radically exchange the concept of taking unnecessary parts of natural resources away to obtain final products, which leads to waste emergence, with the concept of supplementing only required materials in favor of massive personalization of the product with its ultimate geometrical complexity. In this case location of such a manufacture is no longer an important criterion, which makes it possible to reach final customers and rapidly meet changes in demand. There is also no need to transfer searching for cheap labour... It should be noted that there is a possibility to spread new hybrid types of industrial spaces close to housing in the city: areas and buildings joining people in groups by the type of the equipment and by working patterns, and not by membership of an enterprise.

In any case the concept to consolidate the model, which overcomes centralized industrial systems in favor of new network structures, is to be considered. Distributed production systems on the basis of interrelated self-sustained units may be evaluated as flexible and able to adjust to changes. And we also have not yet mentioned exposure of current city systems to serious risks under possible collapse of the centralized model of energy supply and oil market shocks. Such risks as a damage of long-spanned infrastructures (railways, electric power lines) due to frequent natural disasters should be also mentioned. Regardless of the discourse to return industrial areas into the cities there is an issue

of ceasing to be just dwelling settlements, which only consume resources and become efficient particularly but not exclusively due to urban fabric itself. In this case, efficiency is a broad term and means possibility to add value to city areas (besides converting areas from environmental to urban ones) due to modernization of planning and design. This implies introduction of the following components: small-scale technologies to generate energy (hybrid systems in each house or neighborhood); economical mode of joint use of resources and objects; distributed manufacturing models; intensifying development of agglomerations); change of a prevailing type of property management in favour of renting; innovative corporate models of investments and management of city infrastructures; protection of linear infrastructure under climate changes and extreme weather conditions in the nearest future and etc. [05].

What is crucially important for coordinated city activities inside regional agglomerations is that there is a possibility to develop these cities as direct and responsible boosters for manufactures

and technological innovations ceasing to be just consumers. Thus provided these so-called 'metropolitan areas' agree about relatively general requirements and needs of the city systems (any type of the progressive city standards, e.g. transportation, infrastructure and public areas), then it will be easier for them, being major customers, to resort to manufactures to satisfy these needs due to large-scale orders for innovative goods and materials (a classic example – cooperation of the Brazil city Curitiba and the group of companies Volvo). This is one of the aspects of the hidden city potential able to create own economy on the basis of transformation of its functioning (i.e. management and supply of high-tech 'smart city' services as an economic activity [5, p. 189]), and not only because of urban fabric reproduction and extending while construction. Generally speaking, management (e.g., energy supply and etc.) and long-life service of areas (housing or infrastructure) executed by property management companies – city economic activity which may become basic in the nearest future.

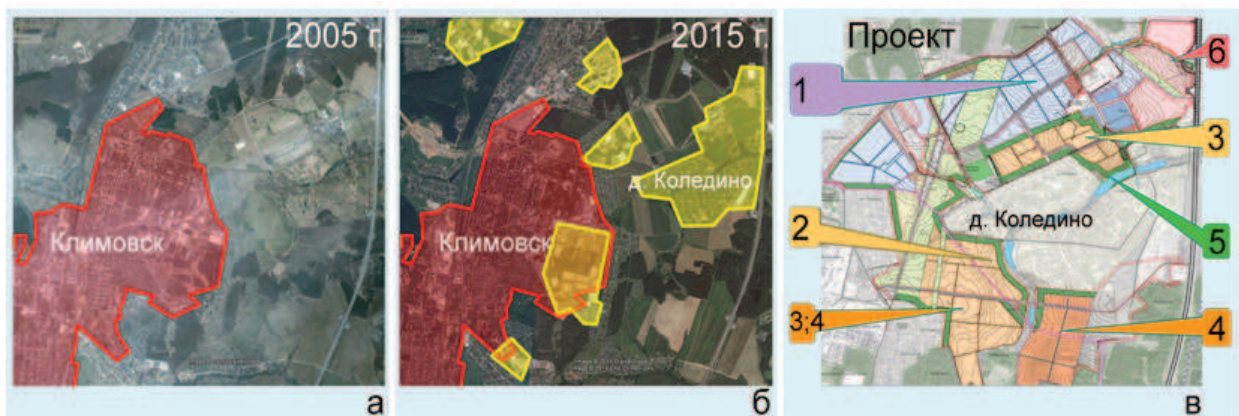


Figure 4: Industrial perk «Koledino» (340 ra) in the Podol'sky district in the Moscow region (the nearest large settlement – Klimovsk).

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Figure 4, a): Status of the areas adjoining to the city of Klimovsk (borders marked with red colour) from the Northeast dated back to 2005 (source: Google map, 2005). Figure 4, b): Process of filling the area between mains with new urban land plots – low-density housing, manufacturing and warehousing. Status in 2015 – new areas are marked with yellow colour, incl. Koledino, around which an industrial park is planned to be developed (source: Google map, 2015).

Figure 4, c): Functional planning and zoning of the industrial park «Koledino» (it consolidates fragmented urban areas of the Klimovsk district) including as follows: manufacturing and warehousing of the hazard class 5 (1); public infrastructure (2); public and business area (3); residential development (4); recreation zone (5) and retail park (6). Whether the location of industrial areas is favorable or not it comes from real life aspects to be improved: soundness to keep its industrial status and necessity for reorganization (in particular, it is the case of industrial areas within the city), which are generally and officially

accepted both in Russia and abroad nowadays [1]. Against all the odds, it is still top-of-the-agenda to keep strategic grouping of enterprises following the principle of complementarity in the course of production chain (agglomeration of basic and supplementary manufactures), which makes it possible to reduce time and delivery costs. As we may see there are no grounds to expect eventual fragmentation and crushing of area sizes, though the goal to achieve the 'permeability' and 'ability to integrate' such large land plots into urban fabric is still up-to-date. There are still good arguments of getting more active in favour of the existing industrial areas, which are in a desperate state. Enterprises quite often leave serious ecological problems (accumulated wastes) to be disposed of, and disintoxication of the areas may make housing and office projects much more expensive. There are still specialists in the cities with dying-away manufactures, and it would be reasonable to rely on them. It is also important that city-forming enterprises remained infrastructure and electric power stations, though the need to be advanced.

Manufacturing, as well as housing development, can't be separated from the process of expansion and spreading of the infrastructural networks. But these networks are not only inert technical systems, they have higher value: they represent the basis of the modern way of life and are involved into cultural and political process of the society, and their availability or lack may cause emergence of areas of social inclusion, as well as areas of segregation. Manufactures should be considered as places of energy consumption, and as an organizing special element to be responsible for the amount of energy consumed for transportation since its location is related to allocation of service outlets and houses and etc. Thus it is recommended to focus on interaction between different systems (displacement of population, industries, manufactures) and energy consumption, infrastructure and social city models.

## CONCLUSION

A real life and up-to-date space of a resident, where he or she lives, works and has a rest, goes far beyond traditional boundaries of his or her flat, house, district and city. Today he or she moves within fractional areas of the network made up from urban cores, natural zones and

infrastructural networks which join them all together. Sizes of such a noncontiguous 'metapolis' are defined by implementation of regular human activities, which have impact on the areas leaving after-effects.

In the same way, as in the case of preferred transportation types, it is reasonable to develop a synthetic model in the city planning instead of making stake on certain models. This model combines advantages of living in small settlements with the best patterns of city density and responsiveness. This concept, described in numerous surveys, is accurately summarized by Vicente Guallart as «a variety 'slow cities' as a part of a «smart city»...» [3, p. 31]. This expression is backed by the following statements: a) we implement processes of daily-life activities simultaneously at different levels with different special scales (flat, house, district, city and region and etc.) and b) special level, at which people can satisfy their needs, may be defined by a certain type of a city: in the cities, where shops and small-sized manufactures are closely located, people may walk; in the cities, where shopping malls and large-sized manufactures are remotely located, the demand for a car is increasing, i.e. already today different models of mobility, density and human relations. Coexistence of different velocities inside the city is possible: mobility with low velocity is suitable for regions and districts with hybrid functions, and mobility with high velocity is suitable for ecological city, intercity, international public transportation in large-scale structured agglomerations. The concept of the 'smart city' implies preliminary 'reengineering' process (works related to supplementary engineering and technical equipping of the city), which makes it possible to interchange information and immediately reprogram city processes and services.

Different models of production and consumption imply land and city planning, living standards, and arrangement of economic and environmental impacts to different extents. And if there is a need to make a vertical leap from one level to another one (i.e. from macro- level to micro- level for a certain consumer) to connect functional 'knots' (e.g. power production) with the final customer of the material values, then it will be necessary to develop a supplementary large-scale network (infrastructure) to connect all these various levels. This fact should be acknowledged and always taken into account. And that's why the idea



of self-sustained buildings, districts, regions and cities, arranged in a horizontal network (where, first and foremost, generated power, information and knowledge are distributed and transferred), has arisen. The network is monitored so that if one part is shut down, then another one continues to operate. In order to implement this it is inevitably required to provide buildings with such distributed intelligent systems (e.g. power production and monitoring), which are to be integrated into structures, and turn them into producers, because they only and entirely consume resources nowadays.

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