Urban Planning by Le Corbusier According to Praxeological Knowledge

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Abstract. The city is formed as a mosaic of various elements which affect its attractiveness. These elements range from location attributes, through economic opportunities, to social aspects. Therefore, urbanity and urban planning should be considered in a multi-dimensional context. In the paper we address the problem of urban planning by Le Corbusier according to praxeological and system knowledge. From praxeological point of view an active human being takes his/her choice between various possibilities by preferring one of these possibilities to the others, and by manifesting it by her actions. The same applies to the design process. Due to this fact, the scientific design process can be treated as a systematic rational reconstruction of the designer’s behaviour. Such a reconstruction requires previous reflection on designer’s work, as well as some consideration and design experience, thus know-how knowledge based on methodological knowledge. In the paper several city visions of Le Corbusier, as well as the characteristics and organisation of his design process are analysed. Le Corbusier’s innovative design ideas resulted from industrialisation changes and motorisation accelerating progress, which gave foundation to a new urban array. This array based on strict geometric forms, regularity and repetition determining standard. Thanks to his theories, Le Corbusier established principles of modern city construction and planning. Although some doubts were expressed as to the scale of centralisation of the cities designed by him and his class-based conception, he was awarded that overall welfare of the individual living in a city was the quality of built environment. Therefore, his designed creations were not only functional but they also produced emotions. The analysis of his prolific design activities allows us to state that the organisation of his architectural and urban planning process was very efficient and complex. The city concepts proposed by him were the subject of analysis by generations of designers. Also now, they can still be the basis for modelling virtual and navigable cities by modern planners. Le Corbusier’s comprehensive approach to modern city planning showed that research activities, that is theoretical thinking, and production activities, that is practice, are linked methodically. Therefore, urban planning should be understood not only as a projection of the possibilities of architecture, but as a multidisciplinary process. Due to this fact, an urban plan, as a result of that process, should be a synthesis of various social, industrial and economic aspects.

1. Introduction

The city is formed as a mosaic of various elements which affect its attractiveness. These elements range from location attributes, through economic opportunities, to social aspects. Therefore, urbanity and urban planning should be considered in a multi-dimensional context. The aspect of urbanity is
broadly discussed in [1]. There, we can find the interview of Swiss architect Christoph Gantenbein, who stated that “it would be difficult to formulate a good definition to determine what urbanity is supposed to mean in modern times… At various times urbanity meant various things. Today we experience a complete lack of cohesive idea of constructive propositions…” Sometimes, the concept of urbanity is simplified and urban space is treated as a symbol of urbanity. However, due to the complexity of the problem, the approach to urbanity, including urban planning aspects should be systemic and complex. One of the pioneers who addressed this issue in a comprehensive way and introduced the idea of living in a city which is planned, designed and then built was Le Corbusier (real name: Charles Edouard, 1887–1965). He is considered to be the most influential architect and urban planner of the 20th century, famous for his buildings constructed throughout America, Europe and Asia. His work and approach to architecture and urbanism have been discussed a lot in literature due to his radical, as well as fairly controversial theories [2-7].

In the paper we address the problem of systemic and complex urban planning by Le Corbusier according to praxeological and system knowledge. We begin in section 2 showing the principles of organization of a creative urban planning process. Section 3 describes the visions of urban city planning by Le Corbusier taking into account praxeological and system knowledge. Section 4 discusses Le Corbusier’s approach to design. Section 5 concludes.

2. The organization of a creative urban planning process

From praxeological point of view an active human being takes her choice between different possibilities by preferring one of these possibilities to the others, and she performs it not in words being thought or pronounced, but in manifesting it by her actions [8]. The same applies to a design process. A scientific design process can be treated as a systematic rational reconstruction of designer’s behaviour. Such reconstruction requires, according to [9], previous reflection on designer’s work, as well as some consideration and design experience (thus know-how knowledge [10]) based on methodological knowledge.

According to existing praxeological and system knowledge the following features and actions in the organisation of architectural and urban planning design can be distinguished [11]:

- examining the needs, formulating the task and design conditions,
- creating ideas of the whole solution as a solution being accepted in anticipation or a priori
- taking into account multidimensionality regarding the complex and interdisciplinary problems of architecture and urbanism,
- analysing the spatial solution as solution that can be divided into partial solutions, connected with generating and selecting variant solutions arising according to will and need of the architect,
- searching through a formal modification for satisfactory partial solutions that can lead to modification of the earlier accepted solution idea,
- producing an urban plan of the designed city/region.

3. Urban city planning by Le Corbusier

Le Corbusier as a prominent architect started from scratch as far as urban planning is concerned, however, he succeeded soon due to his perfect perception of the great problems of the contemporary cities. His approach to urban planning concepts developed during two decades of the 20th century, and it was presented for the first time in the L’Esprit Nouveau articles, and next in his book Urbanisme in 1925 [3]. Due to the fact that his urban theory evolved gradually over years, we can divide it into several stages: “Contemporary City” theory, “Radiant City” theory and “Linear City” theory.

3.1. Examining the needs, formulating the task and design conditions

As it was expressed above, Le Corbusier formulated the task of a traditional city design concept in his publication Urbanisme. It was based on the rational analysis of real-existing cities in Europe and North America. He rejected the layout of traditional European cities with the noisy, tangled and
crowded streets, and high-density tenement houses, which were both dangerous to the occupants and not convenient for further economic and technical development. Le Corbusier knew the reasons of the poor condition of the cities: constancy of old street layout, lack of proper surrounding for high density buildings, as well as unrestricted land speculation. It caused stagnancy or even death of the traditional urbanization process. Therefore, he saw the need to design functionally outlined cities of beautiful form which could be the solution for architectural, technical, industrial, demographical, as well as social changes. Each city designed in the above way could be treated as one organism.

3.2. Creating the ideas of the whole solution as a solution being accepted in anticipation or a priori
According to Le Corbusier, the solution for a new city problem could be a complex project of one compact city, which could be prepared from the beginning to the end by one designer. His ideas about city layout stick in adherence to geometry and resulted from his approach to architecture as to “complex art of construction” [4]. In his opinion “architecture was an absolute wonderful game of solids in the light” and it was the architect’s duty to revive surfaces covering these solids [5]. Besides, according to him “calm and wellness of human being were influenced by geometrical shape” [4]. Due to this fact, he considered simple geometric solid as a generator of architecture. Similarly, the generator of urbanism was a geometric plan of a city. This plan could be a solution for old cites as well as new ones. In his opinion, both the plan of the city and the city construction basing on mathematical calculations created architecture. On the other hand, the projection of architecture created the plan. He understood this mutual dependence. Due to this fact, Le Corbusier’s ideas on the city designing based on rigid geometry and a uniform layout comprising: construction axes, right angles and simple square forms.

3.3. Taking into account the multidimensionality regarding the complex and interdisciplinary problems of architecture and urbanism
Le Corbusier’s approach to architecture and urban planning showed that designing of the contemporary city cannot be done in isolation, that is without comprehension of multi-scalar complexity of the problem. It was revealed in his several visions of a city. City for three million people was introduced in 1922 and it based on the following principles: alleviation of the city centre, increase of population density, development of transportation means, increase of the number of parks and open spaces in the city. These principles were the result of the deep analysis of the current city state. Relieving the congestion of central streets was planned in order to satisfy traffic requirements. On the other hand, it was linked with improving the traffic flow by adjustment of new streets to contemporary means of transportation. Therefore, it was proposed that the road system be segregated depending on the type of traffic: underground streets for trucks, ground-floor level network of regular streets for local traffic and big elevated highways 40 or 60 meters wide for rapid through traffic [3]. Highway traffic was completely separated from pedestrian traffic. The street system based on 400-meter grid and was determined by appropriate intervals/distances between bus stops, subway stations as well as relevant walking distances for pedestrians. Increasing population density in the central district was planned in order to facilitate mutual contact between dwellers, which was necessary due to accelerated pace of economic development. On the other hand, increased density of population imposed building the city vertically, as well as increasing planted areas. The increase in green areas was the architect’s manifestation of concern for a pleasant and healthy environment. Le Corbusier’s “Contemporary City” had a typical structure of three components: central business district (up to 600,000 people), residential districts (600,000 people), garden-cities in the suburbs (2000,000 people) [3]. In turn the result of this vision was the so-called Plan Vision for Paris (figure 1a,1b). It was a plan for a large scale redevelopment of a big area of Paris.
Figure 1. A fragment of Plan Vision for Paris: a) a plan, b) axonometric view

The planned city area had a special layout and varied forms of architecture were segregated and arranged in separate places there. Every element based on a strict grid pattern. The main station was located at the intersection of main North-South and East-West roads. It was surrounded by huge skyscrapers for business offices, as well as museums, universities, restaurants and similar establishments. There were also isolated residential and industrial quarters separated from suburban garden city by protected zone.

The “Radiant City” vision (1925) had much in common with “Contemporary City”, namely the clearance of the historic part of the city, and rebuilding it utilizing modern methods of technology and production. However, its main goal was to give city dwellers a more pleasant and efficient environment.

Another concept of “Linear City” by Le Corbusier put great stress not only on functionally delineated cities, but also on good regional transportation, which was improved due to linear ties to smaller cities and countryside.

3.4. Analysing the spatial solution as the solution that is possible to be divided into partial solutions, connected with generating and selecting variant solutions arising according to the will and the need of the architect

Le Corbusier expressed four principle functions of the city: living, working, circulation as well as care of the body and spirit [6]. However, according to him it was the circulation which determined three other functions. One of the main features of Le Corbusier's central designing was strict separation of the societal functions in the city. He designed separate zones for workplaces, residences, shopping and entertainment centres, and government buildings [5]. This division and segregation of city functions was logical and convenient for the architect. According to Le Corbusier, it was far easier for a city planner to shape an urban space if it was planned for one purpose [6]. This purpose was treated as one variable which could be changed in order to generate variant solutions. When several or many purposes had to be considered in a single urban zone, the task was more challenging. In each zone Le Corbusier calculated space requirements of humans as well as air, heat and light. He established “fourteen square meters per person, but reckoned that this could be reduced to ten square meters if such activities as food preparation and laundering were communal” [5]. He adjusted the space according to human needs and movements, which were expressed by Modulor. One of the first large housing complexes for which Le Corbusier used Modulor was the housing complex in Marseille. Thanks to this design he could realize his vision of social environment. The concept of Modulor was expressed by A. Einstein in a great way: “It's a proportional layout that makes it difficult to do wrong and easy to do well”, [3].
3.5. Searching through a formal modification for satisfactory partial solutions that can lead to modification of the earlier accepted solution idea

Le Corbusier’s city solutions were modified and improved. The “Radiant City” vision in general was a modification of a previous idea of a “Contemporary City”. The aim of a “Radiant City” was to provide man with essential pleasures such as: much sun, much light, sport activity, which could benefit the whole community. The density of residential areas was increased in “Radiant City” as along with elimination of the suburban garden city. Another modification was bringing greenery to the city center. The buildings in the central area were raised on stilts (pilotis) in order to enable a panorama view of unbroken greenery at a ground level, as well as to give more ground space to the dwellers (figure 2).

![Figure 2. Typical “Radiant City” building - a building with “pilotis”](image)

What is more, open green space was easy accessible thanks to designing open cruciform towers as well as thanks to the buildings with roof gardens (figure 3).

![Figure 3. Typical “Radiant City” building – a cruciform tower](image)
The industrial “Linear City” concept was a further modification of the previous concepts and dealt mostly with transportation, which determined the city location. Namely, the location of the “Linear City” was aligned to appropriate transport routes. Due to this fact, the city reflected not only well arranged space but also speed, industry and functionality, as well as the perfect combination of natural and urban environments.

3.6. Urban plan of the designed city/region
The result of Le Corbusier’s vision of the new city was a plan characterized by rigid geometry and a uniform layout. This plan was founded on the concept of creating regularly arranged environment, pleasant space for humans according to the needs and standards. In the architect’s opinion such a plan could be introduced anywhere. He proved his thesis by designing Chandigarh in India, which was a new city designing from scratch. Moreover, Le Corbusier’s view on urban planning was wide and complex. Urban plans of cities as well as villages were realized in the context of their regional economics. Next, they became the components of a global, regional plan.

4. Results and discussion
Le Corbusier’s design activity was very wide. He prepared plans of various buildings or city plans for Paris, Moscow, Marseilles, Geneva, Stockholm, Barcelona, Algiers, Buenos Aires, Sao Paulo, Rio de Janeiro, Chandigarh. His innovative design ideas resulted from industrialisation changes and motorisation accelerating progress, which gave foundation to a new urban array. This array based on strict geometric forms, regularity and repetition, which determined standard. Thanks to his theories Le Corbusier established principles of modern city planning and its construction. Although some doubts were expressed as to the scale of centralisation of the cities designed by him and his class-based conception, he was awarded that overall welfare of the individual living in the city was the quality of the built environment. Therefore, he designed functionally but with a thought that only the creations which produced emotions would survive.

5. Conclusions
The analysis of Le Corbusier’s prolific design activity allows us to state that according to praxeological knowledge the organisation of his architectural and urban planning design process was very efficient and complex. He had a huge impact on a number of generations of designers. The city concept proposed by him is still the subject of analysis by modern planners. It can also be a basis for modelling virtual and navigable cities. Le Corbusier’s approach to modern city planning showed that research activities such as theoretical thinking and production activities, that is practice, are linked methodically. Urban planning should be understood not only as a projection of the possibilities of architecture, but as a multidisciplinary process. Due to this fact, the urban plan, as a result of that process, should be a comprehensive synthesis of various social, industrial and economic aspects.

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