Factors determining modern architectural space

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Abstract. The article gives a short review of modern trends in the development of architectural space and essential factors that influence this process: material and technical; and socio-cultural. The introduction touches upon modern requirements for organizing the living environment. The body of the article defines and analyses the factors determining the development of the modern architectural space. They represent two different trends of influence: material and technical; and socio-cultural. The body starts with the description of material and technical factors that include development and improvement of material and technical resources, technological progress, changes in the engineering and technical requirements. The author pays particular attention to their impact on modern construction concept and space planning. The article further on investigates socio-cultural factors that are regarded as the underlying for the process of shaping a modern architectural space. Among socio-cultural factors new patterns of behaviour, ecological responsibility, universalisation of architectural space and reinterpretation of national architectural traditions are considered. The author supplements the theoretical analyses with specific architectural examples, illustrating the effect of the defined factors on the architectural space. The results represent the basic factors determining a modern architectural space. The conclusion sums up the degree of the influence of different factors on the development of a modern architectural space.

1. Introduction

An architect’s scope of professional activity does not confine itself to only developing projects of isolated buildings and structures. One can hardly conceive of an architect planning urban space with no regard for the existing urban environment. As a matter of fact, very few professionals have an opportunity to create a new urban area on a spare territory from scratch. The modern level of social development requires architecture and urban planning to keep up to date not only when it comes to the architectural planning concept in general or designing specific architectural components on all levels, from master plan to a particular building. Contemporary project development should be based upon a complex formation of objects and systems of human environment as a harmonious, aesthetic entirety of all its components [1]. In the author’s point of view, architecture should be proactive, taking into consideration the trends in the development of society, its material, cultural and social needs. As a result, it requires a shift in values concerning organizing the living environment, improving its spatial characteristics, increasing its quality standards. Several researches support this idea [2].

The object of this article is to analyse factors determining the modern architectural space.
2. Factors forming the modern architectural space

Considering conditions influencing the formation of the architectural space, we came to the conclusion that material and technical factors along with socio-cultural factors play a significant role in this process. Further the both groups will be discussed in more details.

2.1. Material and technical factors conditioning a new approach to planning architectural space

The quality of life is increasing rapidly, which naturally leads to a change in requirements for civic space. Contemporary conditions feature a rise in quality requirements for building and construction, as well as for space planning decisions; an introduction of new engineering and technical requirements for installation of modern equipment inside buildings and structures. In our view, one important reason for this is the development of material and technical resources and the technological progress in the building industry. Things unavailable just a couple decades ago, now are considered a norm, a “basic” element of construction. On analysing research [3-5], one can come to a conclusion that not only construction techniques and materials have changed. Evidently, the society itself and its perception of architecture have altered to a great extent.

Among material and technical factors determining modern architectural space the first to mention are the invention of new modern technologies and techniques; and development of new building and construction equipment. Consequently, they helped speed up the construction process.

Another important factor producing a great impact on modern architecture is the improvement in material and technical resources. An introduction of new machinery, process automatization along with decrease of manual work resulted in the growing production quality.

The next significant factor is implementation of new modern materials. Contemporary construction resorts to new soundproof and thermally insulating materials, concretes with different properties, foam plastics, etc. The appearance of new composite materials and their implementation in building construction led to a shift in space planning decisions. Modern construction materials have become lighter, which allows to cut costs when assembling or installing construction elements. As a result, using lightweight materials brings about a change in building structural scheme, since they make it possible to make the planning more flexible. Eventually, space planning decisions become more creative and impressive, whereas buildings acquire sophisticated forms and shapes.

To sum up, modern project development is determined by material and technical factors to a great extent. However, we suppose that the key role in forming modern architectural space belongs to social factors.

2.2. Socio-cultural factors conditioning a new approach to planning architectural space

2.2.1. Developing new architectural styles. A social model is the first important factor producing a considerable impact on architecture. As we know from history, due to a number of objective reasons the model of contemporary society has undergone several changes which found their reflection and externalization in architecture.

For instance, the end of the 19th – the beginning of the 20th centuries witnessed a crucial change of the social structure. The industrial boom, the First World War, revolutions launched processes that altered the world for ever. There appeared new social patterns of behaviour. Subsequently, urban life was characterised by an increasing number of public places: banks, theatres, shopping centres. Apart from that, there appeared novel public buildings and structures, such as garages, railway stations, electricity generating stations. As concerns the social model of the 21st century, it possesses its own typical features. New social demands have led to emergence of recreational, entertainment- and business centres, congress halls on a large scale. Different sport buildings and constructions are widely spread: swimming-pools, stadiums, fitness-centres, along with amusements parks: fun-fairs, aqua parks, extreme-parks, etc.

Emergence of new architectural styles is also a social phenomenon. Thus, constructivism came to life in architecture as a reflection of the industrial development and new building structural systems.
appearing in construction, but also as an expression of freedom, a fresh view of the renovated society. Withdrawal from old architectural styles symbolised a dynamic development of the society that declared its views through architecture among other things too. The end of the 20th – the beginning of the 21st centuries were characterised by the bloom of the high-tech style that developed as an embodiment of science and progress, a symbol of social consolidation, it protested against fossilized forms of art. Emergence of deconstructivism at the end of the 20th century, in its turn, was caused by pressing social problems, such as political and economic stagnation, local wars [6, 7], as well as by a striving for new forms in art and architecture.

Growing consideration for ecological problems, an increasing level of ecological responsibly among the world’s leading countries demonstrate themselves in architecture as the bionic style, which amply employs natural motifs, dynamic composition, unrestricted forms. The bionic style is based upon constructivism which has been given a new, more human-oriented meaning.

Contemporary architecture is characterised by predominance of deconstructivism and techno style, sometimes regarded as a branch of high tech, along with the ultramodern style representing a peculiar fusion of the above-mentioned styles.

The influence of new trends in architecture can be traced in the Scottish Parliament Building. New architectural decisions epitomise a new concept of legislation process and symbolize withdrawal from conformism in taking decisions. The Scottish Parliament Building comprises a complex of structures up to 6 storeys high, both modern and functional. At the same time, the building bears unique features and reproduces the spirit of Scotland figure 1. The Scottish Parliament Building has earned 9 architectural awards.

![Figure 1. The Scottish Parliament Building, Edinburgh.](image)

2.2.2. Influence of globalization on modern architecture. Another important factor producing a significant influence on modern architecture is the globalization process. It should be noted, that its impact on the social and economic development is multifaceted. During the globalization process trade liberalisation, technological progress, development of international infrastructure and international relations, revolutionary changes in information technologies result in incredibly fast cultural assimilation. Not only political borders, but also economic, cultural, social borders are blurred [8-10].
If this tendency keeps on, a country may face the risk of losing its original, definitely recognisable visual image during this process of integration into the global society. The effects are particularly conspicuous in architecture. While in private life human relations are not likely to undergo such changes as in public life – patterns of family life are known to be the most change-resistant – in architecture this process takes place on a global scale, first, due to the significant role of architecture in society, and second, due to its longevity.

There is an opinion that at present culture is being universalized according to western standards [11]. Indeed, results of our research prove that modern architectural space is characterised by more homogeneous means of expressions, differences between national architectural schools are disappearing, the notion of modern national architecture itself is becoming indistinct. As an example, one can compare two museum buildings, The Art Gallery of Alberta in Edmonton (the project chief architect Randall Stout), and The Guggenheim Museum Bilbao in Bilbao (architect Frank Gehry). The buildings rather belong to a particular architectural style than to an architectural tradition. Both of them have metallic facades, glazing of huge areas having strict geometrical boundaries, divided in rectangles, occasionally orthogonal and at times oblique. The shapes represent similar sophisticated waves in combination with simple cubic spaces. For a viewer with no or little architectural background it is difficult to identify which national architectural school the building represents only by its look, without knowing in what country it is situated figures 2,3.

Considering modern tendency in the societal development, the architectural universalisation, on the one hand, facilitates international communication process. Common elements in living environment help an individual to integrate into a new urban and social space.

However, there are not only advantages but also disadvantages. Labour migration has increased immensely in the modern world [12,13]. If earlier dislike of the new living environment, its being “not cosy” used to be among factors limiting the immigrants’ flows, now this factor is minimised. This leads to certain social controversies.

Another aspect worth noticing is the loss of the individuality of the living environment. Its universalisation leads to the loss of the national identity of the whole nation as well as of separate individuals. It may result in psychological problems for a person connected with sense of self in the society. An individual loses “ego” identity.

2.2.3. Development of national architectural schools. Despite the significant impact of globalisation on contemporary architecture, the development of national architectural schools experiences counter reverse tendency, aimed at preserving the national identity.
Modern architecture has to solve a tricky task – along with providing the society with the necessary living environment according to high modern standards, in the process of constant development it should remain human-oriented, preserving national traditions and expressing a nation’s social essence.

Emergence of new styles in architecture and withdrawal from old traditions is a natural phenomenon, recurring regularly. The next step in the development of architecture within the framework of a nation’s sense of identity follows when the existing architectural tradition and mentality start to affect the “basic” elements. Thus, the effect of “negation of negation” is observed. Within the bounds of a new style architectural ensembles are formed under the influence of the existing national style. This process is reflected on the semantic level. Though similar in materials, technologies and construction, specimens of new architecture in each region bear traits of traditional architectural schools due to space compositional solutions, correlation of masses of parts and the whole, positioning the object in the environment. Global concepts determine the general trend of development of a new architectural style. By adjusting and adapting the object’s composition, including “traditional” methods and techniques, unique materials typical of local areas a new vision of the architectural form is born.

In project development, it is important to take into account characteristic features of the specific terrain: temperature, humidity and wind conditions. They predetermine the choice of materials, optimal architectonic and space planning decisions. For example, while creating the above-mentioned The Scottish Parliament Building, the architects’ main task was to integrate it into the surrounding World Heritage Site listed by UNESCO. The space planning decision of the parliamentary complex is characterised by dynamic composition. The plan view of several buildings has a leaf shape. Textured, solid tiling of facades contrasts with light elegant roof structures reminding of upturned boats. Terracing the lower layer of the complex in the form of diverging waves enhances the dynamism of the composition. Materials used for the construction are typical for Scotland – gneiss and granite, as well as oak and sycamore used for the interior figure 4. Along with modern thermally-insulating materials and resource-saving technologies, the parliamentary complex has a traditional Scottish flat roof greening, which serves a natural protection of roof covering from heating and cooling. Roof greening has the following positive effect: lowering expenses on heating and cooling the building, decreasing the level of harmful emission from roof materials into the atmosphere, absorption and disposal of excessive moisture from the atmosphere, providing optimal conditions for constructions functioning and improving the humidity conditions.

In this way, national architectural traditions are reinterpreted and acquire new traits.

Figure 4. The Interior of the Debating Chamber, The Scottish Parliamentary Building, Edinburgh.
3. Results
In the course of the research we identified factors affecting the development of the modern world architecture. According to the direction of the influence, the established factors fall into two groups.

First, there exist objective material criteria referring to construction and building technologies, such as:

- development and improvement of material and technical resources;
- increasing the level of the technological process in construction;
- inventing new building materials;
- evolution of engineering and technical requirements, and, consequently, alteration of space planning decisions in civic architecture;
- automatization of life and work processes, installation of modern equipment inside buildings and structures.

The second, and the more important group of factors reflect the socio-cultural development of the society:

- new patterns of behaviour, resulting in increasing requirements for the living environment caused by a higher quality of life;
- an increasing level of ecological responsibility, affecting the choice of materials, optimal design concepts and space planning decisions;
- universalisation of architectural space due to globalisation;
- reinterpretation of national architectural traditions.

These two groups of factors exist simultaneously, affecting each other and the development of the architectural field.

4. Conclusion
Emergence of new styles and trends in architecture is a natural and recurrent phenomenon. This process is usually characterised by the style spreading far beyond the borders of one particular state. As history of architecture shows, following the “fashion” in architecture does not deprive traditional national architectural schools of their distinctive character and expressivity. The process of globalisation speeds up the expansion of new architectural methods, materials and construction technology and influences the formation of the modern architectural space. As we found out, due to its global character, monumentalism and longevity, architectural space possesses stability enough to withstand transitory “fashions”. Under the influence of external and internal factors it develops and transforms, keeping its distinctive features and typical qualities, which allows to identify it as a specific socio-cultural space.

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