



NEW GENERATION ARCHITECTURE: INNOVATIONS, TECHNOLOGIES AND FUTURE DEVELOPMENT

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Abstract:

Modern architecture has been developing rapidly in recent years, combining ecological balance, technological innovations and smart infrastructures. This article analyzes the concept of new generation architecture, its main directions, ecological construction, smart cities, biomorphic design and the impact of artificial intelligence. It also discusses how the growth of urbanization and climate change will affect the development of architecture.

Keywords: New generation architecture, smart buildings, ecological design, biomorphic design, artificial intelligence, urbanization, sustainable development.

Introduction

Architecture is an integral part of human life and is changing in response to the economic, technological and environmental development of society. According to the UN, by 2050, 68% of the world's population will live in cities [1]. This increases the need for new types of construction and infrastructure systems.

Currently, architecture is developing in the following main directions:

Sustainable and ecological design - reducing the use of natural resources.

Artificial intelligence and digital technologies - smart building and management systems.

Biomorphic design - structures inspired by nature.

Smart cities - solutions aimed at improving the quality of life of residents.

3D printing technologies - fast and cheap construction methods.



Smart Architecture: Technology and Innovation

1. Smart Buildings and IoT Technologies

Smart buildings are managed based on automated systems, the Internet of Things (IoT) and artificial intelligence.

Advantages of smart buildings:

Automatic energy-saving systems (lighting and ventilation systems).

Real-time monitoring via IoT.

Temperature and humidity control via artificial intelligence.

Example:

The Edge (Amsterdam, Netherlands) is the world's smartest office building, with BREEAM environmental certification [2].

Google and Apple headquarters are equipped with energy-saving smart technologies.

2. 3D Printed Construction

3D printing technologies are revolutionizing the construction industry, helping to build buildings in a short time and at a low cost.

Advantages of 3D printed construction:

Less consumption of building materials.

Acceleration of the construction process.

Reduction of waste.

Examples:

Dubai 3D printed office building – the world's largest 3D printed building (2021) [3].

NASA 3D printed Mars colony project – designed to prepare for space habitation [4].

2. Ecological Architecture and Green Building

1. Ecological Design Principles

Ecological architecture is based on LEED and BREEAM certifications.

Basic principles:

Using solar and wind energy.

Green roofs and vertical gardens.

Using recycled building materials.



Example:

Bosco Verticale (Milan, Italy) is an ecological building famous for its vertical garden system [5].

2. Biomorphic Architecture

Biomorphic design is an architectural style inspired by nature and based on the principles of sustainability.

Examples:

Eden Project (UK) is an ecological center in a biomorphic form [6].

Zaha Hadid Architects projects are futuristic designs inspired by nature.

Smart Cities and Future Urbanization

1. Smart Cities

Smart cities are based on the harmony of technology and ecology.

Examples:

NEOM (Saudi Arabia) is a city of the future, based entirely on ecological energy sources [7].

Songdo (South Korea) – has the world’s smartest city concept.

2. Transportation and Smart Infrastructure

Hyperloop – an ultra-fast transportation system [8].

Electric and hydrogen transportation – to reduce waste in cities.

Conclusion

A new generation of architecture is developing in harmony with ecology, technology and urbanization. With the help of intelligent systems, sustainable design and futuristic projects, it is expected that the cities and buildings of the future will be more efficient and comfortable.

List of used literature:

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