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THE IMPACT OF THE INTERNET OF THINGS ON EVERYDAY LIFE AND INDUSTRY

The Internet of Things (IoT) has become a game changer in the technology landscape, revolutionizing the way we live, work and interact with the world around us. [1]

What is the Internet of Things (IoT)? The Internet of Things (IoT) is a technological revolution that encompasses a vast network of connected devices, allowing them to communicate and exchange data with each other. [1] This interconnected network extends beyond traditional Internet connections between computers and smartphones to include everyday objects. [2]

The Internet of Things can change our daily lives in ways we never imagined. At its core, the Internet of Things is a network of physical objects equipped with sensors, software and communications that allow them to collect and exchange data. [1] These objects can range from everyday devices such as smartphones, smart home appliances, and wearable devices to more complex systems such as industrial equipment and smart city infrastructure. [1]

From increasing convenience and efficiency to increasing security and sustainability, Internet of Things promises to transform our daily lives and improve our quality of life. [1] For example, smart home appliances can automate tasks, wearable devices can track health indicators, and smart city infrastructure can improve city life. [1]

The Internet of Things is also part of the Fourth Industrial Revolution, transforming industries through the creation of smart cities and, in the future, self-driving cars. [2] It is changing the way businesses operate by offering greater connectivity, resulting in increased accuracy, safety and efficiency. [3]

For example, soil moisture sensors are used to optimize farmers' yields, while thermostats and thermometers are changing the way we live and work. [2] In fact, according to McKinsey [2], in 2019, about a quarter of enterprises used Internet of Things technologies.

While exploring the exciting potential of the Internet of Things, it is important to address the challenges and implications arising from this technological revolution. Security concerns, privacy concerns, and the need for standardized protocols are just some of the challenges that must be overcome to reap the full benefits of IoT. [1]

In conclusion, the Internet of Things is changing various aspects of our lives and industries, promising a future that is more convenient, efficient and sustainable. However, it also brings with it challenges that must be overcome in order to fully realize all the opportunities. [1]

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OPTIMIZATION OF ENERGY AND CARBON FOOTPRINT THROUGH THE IMPLEMENTATION OF BUILDING INFORMATION MODELING (BIM) DIGITAL TWINS

Problem Statement. Modern construction is one of the largest consumers of energy and a significant source of greenhouse gas emissions, which significantly impacts climate change and poses a threat to sustainable development. The issue of energy efficiency and carbon footprint has become urgent, demanding the implementation of new technologies and methods to address it. The use of building information modeling (BIM) with the application of digital twins is an important approach to tackling this challenge.

Objective. The objective of this study is to conduct a comprehensive analysis and assessment of the impact of implementing building information modeling (BIM) digital twins on optimizing the energy and carbon footprint of construction projects characteristic of our country.

MainSection. The implementation of BIM technology in construction allows for a detailed analysis of building energy consumption even at the design stage [1]. BIM enables the modeling of various building solutions and determines their impact on the energy efficiency of the building before its realization. Visualization and simulation of different scenarios allow engineers and architects to find optimal solutions to reduce energy consumption during the building's operation [2].

Building information models allow for identifying potential issues with energy efficiency and carbon footprint at the design stage. Through BIM, it is possible to analyze the energy efficiency of different constructions, heating, ventilation, and air conditioning systems, as well as building insulation and the use of natural light [3]. This enables adjustments to be made to the project in its early stages, avoiding additional costs during construction and operation [4].

The analysis of materials during the design and creation of the building information model provides the optimization of the energy and carbon footprint. The results of creating such a model are reflected in the author's (master's) thesis. To build the investigated model of the residential complex in Bucha city, Autodesk Revit 2022 software was used (Fig. 1), and further analysis was conducted on the One Click LCA platform (Fig. 2). The use of this platform has permitted the assessment of the characteristics of the materials used in construction and their impact on the environment, which facilitated the selection of safer materials without compromising the mechanical properties of the object.

Figure 1. BIM model (building information model)