

**DIFFERENCES IN INTERIOR DESIGN BASED ON CAD AND BIM
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Annotation: This article analyzes the differences between two major technologies widely used in interior design-CAD (Computer-Aided Design) and BIM (Building Information Modeling). A comparative study is conducted on their theoretical foundations, practical applications, documentation capabilities, impact on design efficiency, and the potential for saving time and resources. The advantages of BIM technology in modern interior design are substantiated.

Keywords:Interior design, CAD technology, BIM technology, Revit, AutoCAD, building information modeling, graphic drawing, design efficiency.

Introduction: In the modern era, the importance of digital technologies in the field of interior design is steadily increasing. Construction and design processes have become more complex, faster, and demand higher precision than ever before. As the scale of projects and their technical capabilities continue to grow, designers are required to adopt more innovative and efficient approaches. Against this backdrop, CAD (Computer-Aided Design) and BIM (Building Information Modeling) technologies stand out as essential tools.

CAD technology—particularly the AutoCAD software—has been used as a primary tool in interior design for many years. CAD technology focuses on creating project drawings in two or three dimensions. In this approach, the designer draws the interior space of a building using vector-based graphic elements. Every object—walls, windows, ceilings, furniture—is represented through lines, shapes, and surfaces; however, these elements do not carry semantic information within the software. A detail drawn in a CAD program may be graphically accurate, but it does not contain information about what the detail represents, what material it is made from, or how much it costs. This limitation becomes especially noticeable when changes are made to a project—every drawing must be manually updated, which results in greater time and human resource consumption.[1] Nevertheless, CAD software has its advantages: it offers users a library of ready-made blocks, a "layer" system, export/import functionalities, and the ability to create drawings with millimeter precision. As a result, the designer can create not only a visual but also a highly detailed model. This approach significantly enhances project quality, accuracy, and coordination among stakeholders.

However, as digital technologies have advanced, BIM technology has entered the construction industry. BIM is not just about geometric modeling—it is a comprehensive system that enables working with information linked to every element within a project. Building Information Modeling (BIM) is now widely used not only in construction but also as an effective and modern approach in interior design [2].

With this technology, not only drawings but fully scaled, three-dimensional information-rich models are created. In a BIM model, each element—wall, window, lighting fixture, furniture, floor covering—is represented not only by its shape and placement, but also by a wealth of information such as technical specifications, material, manufacturer, cost, and lifespan.

Changes made in a BIM model are automatically reflected in all related documentation. For example, if the ceiling height is altered, this change is instantly updated in sections, specifications, and visual renderings. BIM technology also enables real-time functions such as sunlight analysis, heat loss simulation, material consumption tracking, and budget evaluation[3].

The main differences between these two technologies can be summarized as follows: CAD operates based on graphic drawings, and all objects exist only in geometric form. BIM, on the other hand, encompasses the entire project lifecycle through information linked to each object—not only covering the pre-construction phase, but also including the stages of operation and eventual demolition.

For instance, in an interior design project developed using CAD, if the ceiling height is changed, this adjustment must be manually applied to all drawings. In BIM, however, such changes are automatically updated across the entire documentation. According to concrete data, Autodesk reports that the use of BIM technology can accelerate design processes by 30–50%. Furthermore, the same report states that the number of errors in BIM-based projects is reduced by up to 40%. In addition, changes in BIM projects are made within a single unified model, and these changes are automatically reflected in all plans, elevations, and specifications [4]. In CAD, this process is done manually, which increases the likelihood of human error.

In my personal experience, I worked with both CAD and BIM software on the same project. During the working process, the differences between the two became clearly evident. I initially developed an office interior design using AutoCAD. It took 10 days to complete all stages of the project. Then, I tried replicating the same project in Revit, and this time it was completed in just 5 days [5]. During the modeling process, documentation was generated automatically, and the visualizations had a realistic appearance.



Figure 1: Comparison of Workflow Efficiency between CAD and BIM.

In the field of modern interior design, the use of digital technologies plays an important role not only in revealing a designer's creative potential but also in increasing work efficiency. The comparative analysis of CAD and BIM technologies discussed in this article shows that there are significant differences between them in terms of content, functionality, and effectiveness [6]. While CAD technology has long served as a primary tool for designers, it is based solely on graphical drawings and does not provide extensive information about objects. As a result, any changes made to the project must be manually updated across all documents, which increases time and labor costs and leads to a higher risk of human error.

BIM technology, on the other hand, is becoming an integral part of the modern project development process. It encompasses the entire life cycle of a project not only through geometric modeling but also by attaching technical, economic, and functional information to each object. Any change made within a BIM model is automatically reflected across all relevant documents, which increases labor productivity, reduces errors, and ensures project accuracy [7].

Conclusion: Based on the analysis above, it can be stated that BIM technology is an advanced digital tool that ensures high efficiency, precision, and a systematic approach in interior design. It not only automates the designer's workflow but also allows the entire project lifecycle — from concept to operation — to be managed within a single platform. As a result, human errors are reduced, time and resources are saved, and documents are consistently coordinated and updated in real-time. Therefore, for modern interior designers, learning BIM technologies, applying them in practice, and integrating them into the design process is a relevant and essential task today.

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