



How Generative AI Will Change The Jobs Of Architects And Civil Engineers

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Architects and civil engineers are the shapers of our urban landscape. Their work involves balancing meticulous research and design with the ability to innovate and create.

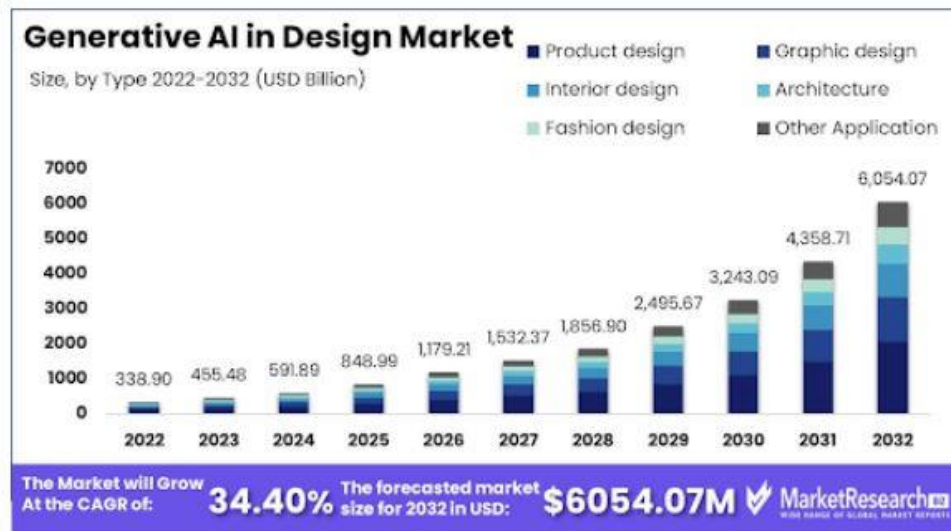
How Generative AI Will Change The Jobs of Architects and Civil Engineers

Today, AI, and in particular language-based generative AI, is set to revolutionize these fields, just as it is changing the day-to-day role of doctors, lawyers and all professionals.

The basic idea is that generative AI tools will empower them to streamline workflows and automate repetitive elements of their work. This will leave them free to focus their limited human attention on tasks that require real ingenuity and creativity.

AI can rapidly create design ideas, using generative design algorithms to create candidates using available resources and materials. It can deploy simulations and digital twins, generate project management and budgeting plans and even help to make the construction of buildings and urban structures more sustainable.

According to Market Research, Generative AI's market size in the overall design industry (product design, interior design, fashion design, graphic design, and architecture) is expected to reach US \$6054.07 million by 2032. The technology is forecasted to grow at a CAGR of 34% from 2023 to 2032.



So let's dive in and take a look at the opportunities being created now, as well as think about how AI could fundamentally change the roles of professionals in those fields.

Generative AI functionality is now a feature of many standard CAD tools, meaning architects and engineers can quickly explore and iterate new design concepts. These designs can then be evaluated against metrics such as structural integrity, efficiency and sustainability.

Designers can simply give the AI tool details about the project goals, location, environment, structural requirements and materials, and it will start to generate ideas for consideration.

The architectural firm Zaha Hadid Architects, responsible for projects including the sand-dune-inspired Bee'ah headquarters in the Arabian desert, uses AI image generation to conceptualize cutting-edge structures. This allows different ideas around sustainability, material choices and aesthetics to be quickly visualized and assessed.

Generative AI can also be used to create digital twins – virtual representations of buildings or structures that behave exactly like their real-world counterparts. This allows them to be stress-tested to find out how they will stand up to footfall, weather or earthquakes before a single brick has been put in place. It can also model the use of energy and water as well as the movement of people and vehicles around buildings or public spaces.

It also creates opportunities in project management, where routine tasks like scheduling meetings, collating reports and filing regulatory and compliance documents can be automated.

Language models can analyze complex building and zoning regulations, and generate predictive insights into issues that could cause delays or bottlenecks during construction. These can be communicated in natural language, meaning that potential problems are more likely to be picked up at an early stage, reducing the risk of costly errors and delays further down the line.



ZHA developing "most" projects using AI-generated images.

It has been reported that architects in China used generative design tools to design a 500-room hotel complex, which was then built from the ground up in four and a half months.

Critically, it can also be used to improve the sustainability and energy efficiency of construction projects and buildings. These requirements can be factored in at the design stage, and AI can be used to identify design features and materials that minimize ecological impact and emissions.

Compared to many other industries, toolsets are already relatively mature; industry-standard CAD platform Autodesk has offered generative functionality for several years. And Alphabet subsidiary Sidewalk Labs creates tools designed to help planners create more sustainable and environmentally-friendly urban spaces, with the assistance of AI.

The Future of Architecture and Civil Engineering

I predict that professionals in these fields who are able to augment their own skill sets through generative AI will find that they can greatly boost their productivity. They will spend less time on mundane, day-to-day aspects of their work, such as creating compliance reports or communicating complex concepts to clients through visualizations.

This will free them up to spend more face-to-face time with those clients, in order to better understand their needs. And they will find themselves more able to take a broader, strategic view of project design and execution.

Human communication skills, conflict resolution, creativity and innovation – things AI won't be able to do for a while - will become increasingly valued and sought-after in all professions, and here it will be no different.

Inevitably it also means that architects and engineers will need at least a basic understanding of these emerging technologies. While they won't have to become experts in technical AI, they will need to understand the role of data and in automated decision making, as well as the dangers of AI mistakes, data inaccuracy and bias.

Of course, when it comes to designing buildings, roads, bridges and structures that humans will use, we can't delegate all of the responsibilities to machines. Humans will still have to be ultimately accountable for safety. So it's critical that we develop the skills needed to supervise the work of machines and make sure they're acting in a safe way.

Understanding where it is safe to let them make decisions and where human oversight has to be maintained is ultimately a question of ethics. Just as is true of almost all other professionals, architects and engineers will need a grounding in the ethical implications of AI use.

Ultimately, the dawn of the generative AI era marks a turning point for anyone involved with architecture, engineering and construction of buildings and public spaces. By understanding how AI can augment and enhance human creativity rather than replace it, it will be possible to drive transformation while increasing productivity, efficiency and sustainability. All while breaking new ground in terms of what we can create in the built environment.

Bernard Marr is a world-renowned futurist, board advisor and author of *Generative AI in Practice: 100+ Amazing Ways Generative Artificial Intelligence is Changing Business and Society*. He has written over 20 best-selling and award-winning books and advises and coaches many of the world's best-known organisations. He has a combined following of 4 million people across his social media channels and newsletters and was ranked by LinkedIn as one of the top 5 business influencers in the world.