

CONSTRUCTION TECHNOLOGY

The construction industry has been plagued with a range of difficulties over the past decade. Over a generation, the sector had been constrained by flatlining productivity, difficulties in recruiting and retaining talent, inadequate collaboration throughout the supply chain, and other issues. Each issue, in some way, reflected a larger, more serious problem: **the failure to utilise and embrace the potential of digitalisation.**^[1]

HOW TECHNOLOGY IMPROVES THE INDUSTRY^[2]

Within the industry people have always sought out how to increase innovation, further optimise costs and times, reduce carbon footprints, and many other issues. Whilst some problems still occur, much of the challenges the industry had faced has been solved with the introduction of technology.



All industries do not use the same technologies neither do they all experience success immediately using the latest or most trending technology. Technological use within the construction industry must be handled differently compared to other industries.

The industry is divided among the numerous intermediaries involved to obtain a final product, the fragmentation of the sector is a great challenge to everyone involved in the chain. The use of technology simplifies this and attempts to establish fluent communication and collaboration, achieving more cohesion among all those involved.

The following are ways that technological usage within the construction industry offers satisfactory solutions to today's recurring problems:

- Technology encourages the building of smart cities and structures offering the highest resource efficiency, technology aids in the **construction of metropolises of the future.**
- By **maximising various resource sources and inventory management**, they assist in delivering goods and services to the correct location at the right time.
- By optimising the design, engineering and planning processes and by providing appropriate techniques and tools, technology **maximises the efficiency of a project.**
- They **improve productivity, efficiency, and quality** in the daily management of work on site
- **Providing upgrades in materials** along with new construction techniques that modernise the way the industry constructs, enabling less expensive, more rapid, and more functional developments.
- Providing **new funding avenues**, improving loan and credit management, and promotion transparency within the construction industry

- **Mitigating the carbon footprint** that construction process generates, including technologies that capture carbon, improved plastic recycling technology, better management of energy resources, and processes that promote renewable energies.



- Software that **enables quick information access and simple communication** is essential to increasing coordination between all parties involved in the finished product, therefore **cutting down on execution times, faults and ultimately, costs.**
- **Simplifying tasks**, the use of robotics allows for the optimisation of procedures that would otherwise be costly, unsafe or complex if done by humans.
- **Transport system advancements:** New alternatives are being suggested more frequently that allow material to be moved more swiftly, precisely and without deterioration.
- **New employment opportunities:** As technology develops, problems that call for creative solutions appear. It doesn't matter whether there is a need for experts in data analysis, machine creation, or software engineering.

EXAMPLES OF CONSTRUCTION TECHNOLOGIES

ARTIFICIAL INTELLIGENCE

Artificial intelligence makes use of physical robots, robotic process automation, natural language processing, and machine learning. As it anticipates and corrects hazards before they occur, it provides for the **most efficient use of time and effort** in monitoring the development of the works throughout the compilation phase. Additionally, real-time mapping of multifunctional processes using artificial intelligence can produce valuable data for both tactical and strategic decision-making.^{[3][4]}



BIM

Building information modelling, or BIM technology, combines intelligent data with actual building components. By uniting all the project participants under one framework, it has a direct impact on the industry by enabling an **improvement in efficiency,**

communication, and collaboration. All interested parties can access the plans and other related papers whenever they need to because they are digital. Today, BIM enables **the improvement of safety processes** using 3D models that make it easier and faster to identify risks and potential harm than through 2D drawings of a structure.^{[5][6]}

3D PRINTING

Using this technology, a three-dimensional item can be made by layering different materials on top of one another. There are countless projects and solutions that produce various structures that are still being tested. Many people continue to refine their designs in order to reap the full structural advantages of conventional building. One of 3D printing's key benefits in the construction sector is that technology facilitates the creation of more **adaptable designs, automates construction procedures, and speeds up project execution by requiring fewer actors.** It also reduces expenses and waste.^{[7][8]}



IOT

The frequency of connections between common gadgets and the internet is rising. By facilitating the project's design and planning phase, it enables knowledge of atmospheric behaviours and the environment. Installation of IoT sensors along with BIM technology can provide information to feed production and logistics plans during the management and logistics phase. It **promotes preventative maintenance and operations, enables time and cost savings through the avoidance of new equipment investments, and prevents construction delays.** In addition to detecting the possibility of collapse in places with a high risk of natural disasters, sensors built into building materials can also foresee construction risks and keep track of how buildings fare following calamities.^{[9][10]}

MARKETPLACES

By implementing the current standard of marketplaces and online purchasing into the construction industry, it lowers costs, lets suppliers control their goods and services directly, and boost supply chain effectiveness by encouraging centralised supply and demand management. Making decisions based on information offered, such as the performance, pricing, and availability of items, commodities, or services, also enables better control over the products, goods, and services contracted and promotes transparency.^{[11][12]}