



Smart Construction Management- An Innovative Approach

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Introduction

As per humankind history, construction is one of the first businesses that came into light, and fortunately it is continuously shaping our daily life in several ways. If you look around, virtually every other business relies on the construction industry to provide and maintain their plants, accommodation, and infrastructure.

However, construction is a deciding factor of how and where almost everyone lives, plays and works. For approximately the total population of the world, the constructed environment impacts quality of life.

Therefore, the construction industry is impacted by megatrends in four dimensions:

- Sustainability and resilience
- Markets and customers
- Society and workforce
- Politics and regulation

So the construction industry needs to discover and implement optimal responses to these megatrends – both with consideration to the opportunities they offer and the challenges they pose.

Another major challenge for the construction industry is that it is one of the least digitized sectors and is dominated by traditional or outdated techniques to accomplish projects. Being a turtle in technology adoption, construction professionals are undergoing a hard time with the increasing complexity.

So, how can construction companies keep up with the rapidly changing industry dynamics? Let's dive into the details

Evolution of Digital Technologies in the Construction Industry

The construction industry is at its peak stage where construction companies need to revamp their designs and rework on developing more efficient and outstanding business processes. This is why companies must be adaptive enough to respond to situations quicker and innovate faster than ever before to accomplish project deadlines on time and budget. To achieve this, they need to focus on improving efficiency, quality control across their operations and supply chains and productivity.



Technological Challenges Faced by Construction Experts

The construction sector has been surviving through the phase of its life enthusiastically by growing nonstop and encountering several challenges at the same time. Some of these challenges are quite new; others are as traditional as the industry itself. There are multiple approaches to construction problems.

For instance, at times slow technology adoption rates are considered as the one big challenge, and sometimes it is considered as the host of various problems – including, scheduling problems, communication problems, problems with documentation, and the list goes on.

We all know that the construction industry is one of the most pressured industries in the world because of the least digitalization. There's no right time to adopt new technologies, it is now. As projects continue to become more complex and costly, putting your managers under extreme pressure to boost efficiency, cut timelines and do more for less, you will lose your valuable employees in no time.

Despite this, several construction firms that have already adopted new technology are seeing great results. Not only does technology allow them to work more efficiently, but also it lays the foundations for smart solutions like artificial intelligence. This type of technology helps construction businesses avoid cost overruns, plan projects more effectively, mitigate risk, and improve productivity and safety.

Now we're going to go over some of the most popular technological issues in the construction industry, beginning with the issue of compliance in the world of constantly changing rules and regulations. Other issues will also be mentioned:



- **Challenge #1: Poor productivity**

As mentioned before, construction consists of numerous resources, tools for a project, and lack of real-time data hamper the overall productivity rate dramatically. Updating every process data manually is time-consuming and there is always a chance of data mismatch or inaccuracy.

So having such a poor system in place, measuring and monitoring the performance of humans and equipment can give migraine issues to any construction owner. Moreover, if the executives don't have proper data on the resources used, expenses, and project completion status, the end result is poor productivity.

- **Challenge #2: Inaccuracy in product traceability**

This is the next biggest challenge that potentially affects the project completion timeline. For any construction professional, tracking material movements for any project right from the procurement stage to the disposal is usually tedious and nerve-wracking.

Managing this task manually is the most labor-intensive and time-consuming for the workforce, resulting in poor performance tracking and delayed overall equipment effectiveness (OEE).

- **Challenge #3: Poor resource utilization, management**

No doubt, construction projects involve a great workforce and huge materials for every project and the major challenge is utilizing every resource/equipment smartly. As a huge sum of money is invested in the resources, managing them badly turns out to be inordinate.

The issue is due to the improper data and poor visibility across the project tasks. And as the only source of communication between workforce and higher level management is manual channels, resource management undergoes a lot of issues.

- **Challenge #4: Risky project environment**

Human life is important and no labor would prefer to work in an environment that is dangerous. Construction consists of tools, heavy machinery, and materials that could affect workers' safety. Most workers on the site work under such circumstances, leading to below normal productivity.

- **Challenge #5: Inefficient Processes and Improper Data Management**

Usually, construction projects are fragmented along the value chain with numerous layers of subcontractors, contractors, and in-house specialists situated in various teams and departments.

It becomes difficult to coordinate paper-based processes and spreadsheets across your stakeholders, which makes it inefficient and risky, especially with the value of construction projects being high. Unfortunately, if you misplace any paperwork, the chances are that someone is working from an outdated and wrong document. This data captured on paper needs to be updated at back office systems with data, which adds up to slower communication and a higher chance that something will go incorrect.

- **Challenge #6: Improper Reporting and Poor Visibility**

Improper reporting and poor visibility to the construction project will never take you to your set goal. This is because you will keep manually updating every piece of information that leads to inaccuracies. When you do not get real-time data or complete oversight of every project on every construction site, you'll be unable to finish your project on-time.

Moreover, taking a high level overview of the complete projects and breaking it down into the details of specific builds. Also, staying ahead of or lagging behind schedule as well as evaluation of financials in real time becomes difficult.

When you don't get a level of insight, management of your organization at all levels becomes inactive in addressing issues, understanding blockers and taking action to boost progress.

The Current Scenario of Technologies in Construction Sector

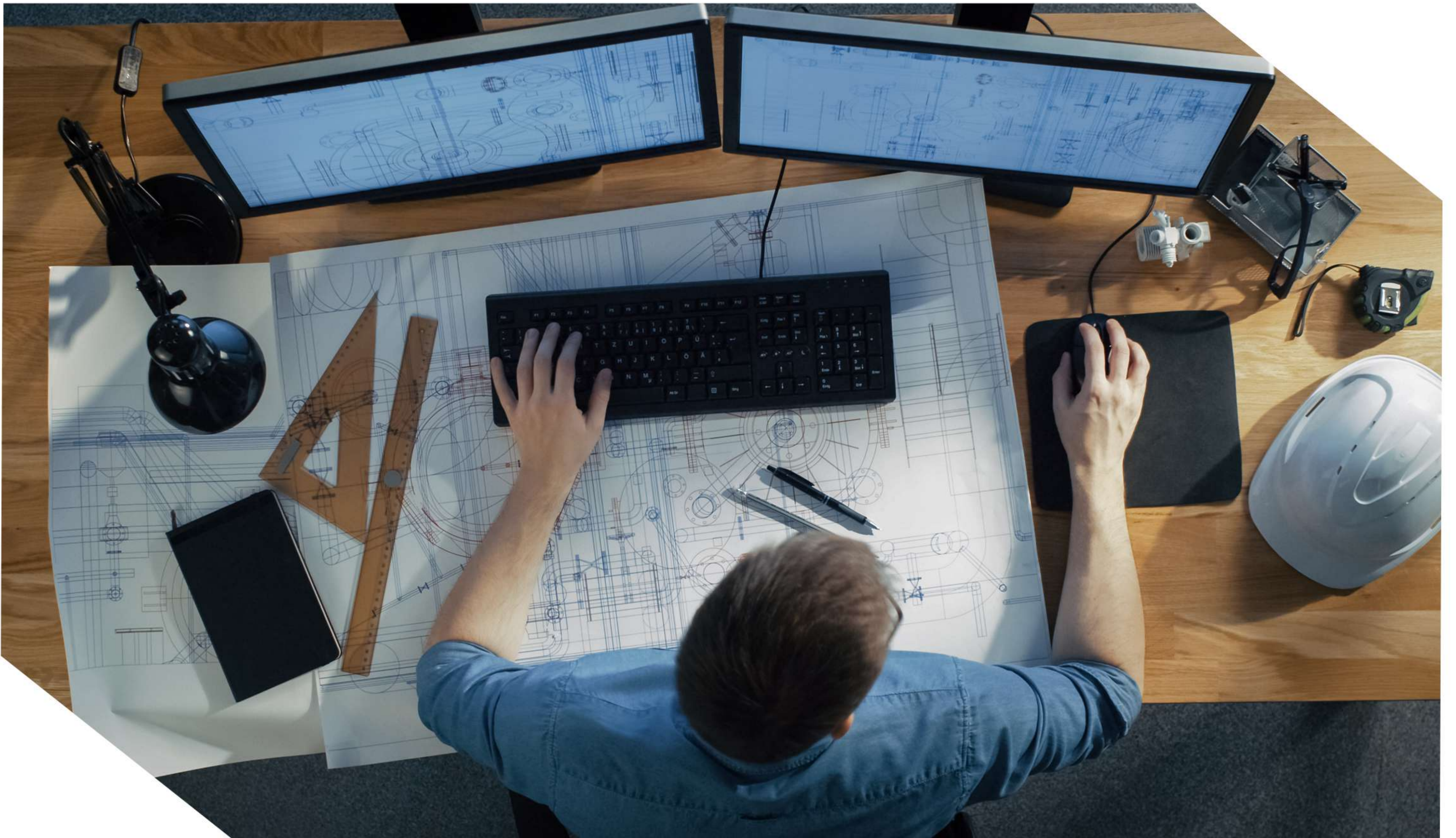
Today, innovative technology allows construction professionals with huge improvements in the efficiency, safety and productivity of big construction projects. As we have already seen, construction has a great history of innovation that has encouraged spectacular advances in the types of buildings we can construct.

For instance, the development of caissons and cofferdams opened the door for magnificent underwater structures. On the other hand, advancements in tower crane technology pushed the construction industry upward, opening up the possibility for huge skyscrapers.

1. AI and Machine Learning for Simplified Workflows

Every construction business owner needs to streamline their workflows for well-running projects and teams in the industry. But, due to the increasing difficulty of construction, workflows may get disconnected and manual in nature. The three most common areas within optimized construction workflows are data, communication, and transparency.

AI is making things quite seamless to succeed across all three of these areas, resulting in higher profits and productivity.



2. Workforce and Resource Management Software

Workforce and resource management are great expenses for construction companies. Efficient workforce management can assist companies optimize resource allocation, keep operations running seamlessly, and prevent unexpected expenses as well as delays.

Presently, more companies are switching to integrated software to bring more actionable analytics and efficiency within their workforce, whether they be on-site, remote, large, or small. Construction technology innovations in workforce management solutions involve forecasting, predictive tracking, and mobile-first interfaces. These solutions eliminate several manual processes that come with resource planning.

3. The Hype of 3D Printing

You might be unsurprised to see 3D printing on our list. After all, it has long been the most top construction innovation. But, its future is even more dazzling these days as the technology moves from an original to an emerging industry standard. With the best implementation strategy—and some out-of-the-box thinking—3D printing can make materials more accessible, speed up projects, and enable you to develop amazing designs.

When it comes to usage, you can use 3D print design elements such as facades to make them more complex and comprehensive. 3D printing can also be used to print fixtures, parts, and furniture for your building. This is specifically functional

when you're going through supply shortages or when working in a remote area. Instead of waiting for weeks or months for the materials you require, you can print them within a few hours or days.

We can see 3D printing technologies continue to grow in the future as well. As companies look for ways to enhance quality control, address labor shortages, and discover smart designs, 3D printing will be here to assist them to make it a success.

4. AR, VR, and the Metaverse

We've all read about Virtual Reality (VR) and Augmented Reality (AR). VR immerses us deeply into the digital world, while AR brings digital elements to our environment in real time. This immersive reality combines these two worlds into one world—which is where the metaverse comes into action. The metaverse is a new term of the internet that enables users to experience it like the original world. This is made possible with gadgets such as VR headsets and AR glasses.

AR & VR reality brings actual benefits to businesses, especially those that depend on cross-departmental collaboration to get things done. It enables teams to “meet” in the metaverse so they can interface in a virtual, rich environment—something that isn't accessible when you're behind a computer screen.

5. Sensor Data Tracking

Several components of your business—including job sites, manpower, and equipment—are significant. Appropriate monitoring assists in project planning, promotes seamless operations, and ensures compliance with safety and worker regulations. Here's something new for you: thanks to construction sensors and IoT technology, keeping a hawk on the several moving parts of your projects is easier than ever before.

There are a variety of solutions in the market that can enable you to track materials through the supply chain, monitor site conditions, improve worker safety, and empower better facility management. Forward-thinking firms are also using sensors to predict and prepare for future events.

6. Digital Twins

Digital twins is absolutely a buzzworthy term, but what advantage does it have for the construction industry? As it sounds, a digital twin is a digital replica of a physical entity, involving its potential and existing assets, data, systems, processes, people, workflows, and devices.

In the construction industry, digital twins collect data through sensors to thoroughly understand a physical structure and then develop its duplicate. Having a duplicate source of a physical structure enables workers to manipulate, assess, and optimize the building.

As they analyze the digital twin, they can unleash potential means of developing safety protocols, creating efficiencies, reducing risks, and improving quality. Digital twins also enhance BIM by working as a digital thread, connected straight to a physical structure.

Since 80% of a building's lifetime value is decided during operations, the data and insights provided by a digital twin assist owners to better maintain their facilities, simplify operations, and enhance capital planning. You can also use digital twins to decide if a built asset is meeting certain metrics and KPIs.

Conclusion

As construction projects are becoming complex increasingly, construction companies must be capable enough to manage the challenges, and be responsive enough to act faster than ever before.

By tapping into the advantages of advanced technology solutions, the construction industry can reach new levels of efficiency, flexibility, and speed. Innovative cloud technology can assist construction companies to keep up with the growing world of construction, engineering, and operations.

This is where ProjectPro can help you thrive. A well-structured construction accounting software powered by Microsoft Dynamics Business Central. It helps construction business owners to keep easy track of their resources, stay ahead of accounting books and exceed customer expectations. Schedule a demo now.

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