Rise of the Jobsite Robot

How Automation Can Help Save the Construction Industry

Introduction

The robots are coming! Actually, they're already here – in their less sensational forms of **digitization and automation** – and ready to help us **tackle our industry's biggest challenges:** inefficiencies, low productivity and labor shortages. Best of all, they can do it with **technology we're already using.**

Wait, we need help?

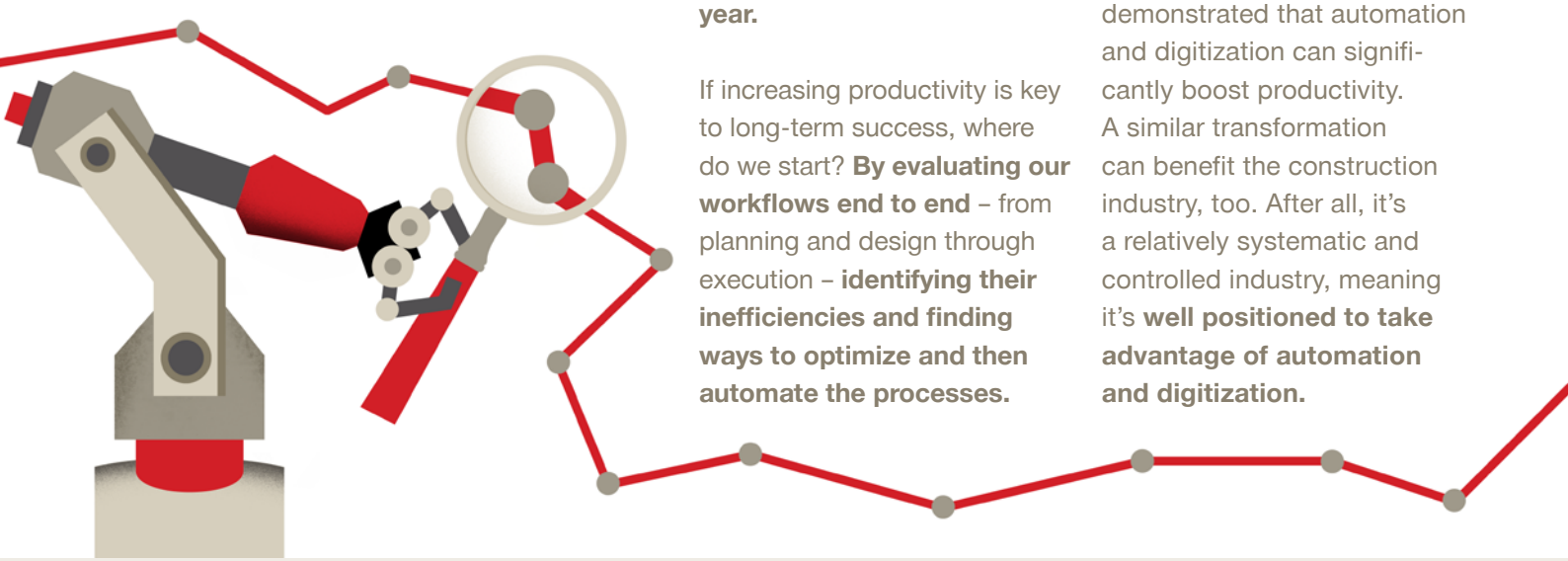
Despite the past year's challenges, the global construction industry is as robust as ever, consuming upwards of 10% of the global GDP and growing at a compound annual growth rate of 4.2% from 2018 to 2023, according to forecasts.[1] However, it still struggles with the same old challenges, particularly **low productivity and profitability.** In fact, productivity has barely grown over the past 20 years,[2] and profit margins continue to hover at around 2%, a tenth of what some other industries enjoy.[3]

Boosting productivity is our industry's golden fleece. To find it, we're going to have to **change the way we've been doing things** for the past 50 years. Take mechanical, electrical and plumbing installations, for example:

- Mistakes in planning and execution can lead to **inefficient on-site improvisations and costly rework.**
- Coordinating multiple players with overlapping applications can be **complex and expensive.**
- Repetitive work can be **time-consuming, error-prone** and even **demoralizing.**
- Overhead work is particularly inefficient; it can also be physically demanding, which doesn't help ease the labor shortage and makes **maintaining your employees' health more critical than ever.**
- Skilled labor shortages can result in **poor-quality installations that need to be redone.**

> **To boost productivity, we're going to have to change the way we've been doing things for the past 50 years.**

Even a slight bump in productivity can translate to a significant amount of money, especially on multimillion-dollar projects. The World Economic Forum estimates that just a **1% rise in construction**



productivity could save the industry up to $100 billion a year.

If increasing productivity is key to long-term success, where do we start? **By evaluating our workflows end to end** – from planning and design through execution – **identifying their inefficiencies and finding ways to optimize and then automate the processes.**

The automotive and agriculture industries have already demonstrated that automation and digitization can significantly boost productivity. A similar transformation can benefit the construction industry, too. After all, it's a relatively systematic and controlled industry, meaning it's **well positioned to take advantage of automation and digitization.**

Preparing for the future – and the now

Digitization is already making an impact on the construction industry. **Almost three-quarters of U.S. contractors report using Building Information Modeling (BIM)** to create more accurate digital plans and develop more efficient processes.[3]

Thanks in part to BIM, automated and semi-automated technologies are also making inroads. In fact, these **two technologies can work together to deliver even more value.** BIM's digitized workflows, such as Hilti BIM-to-field solutions that layout drilling points and cast-in components like anchor channels, **create a mine of construction data that robots can access** and utilize. By simply following the BIM process, **you're already creating a robot-friendly jobsite.**

Automated and semi-automated machines are most useful when carrying out **mundane, repetitive, or dangerous tasks** that require accuracy or speed or that exceed reasonable human limitations. Using robots to dig, drill, cut, weld, move heavy loads and pour concrete can help **make jobsites more efficient, more precise and safer.**

Automation can help contractors attract digital-native candidates that otherwise wouldn't consider working in construction.

Specifically, automated and semi-automated robots can:

- allow humans to reallocate their time to **more satisfying, high-value tasks**
- perform **strenuous or dangerous tasks** that would otherwise threaten the health and safety of humans
- **perform tasks in harsh conditions** unsafe for humans
- **reduce insurance costs** by mitigating human risk
- work overnight to **slash timelines**
- help **avoid rework** due to human error

Though the construction industry is typically a slow adopter of new technologies, automated and semi-automated robots are already in use around the world.

Examples include:

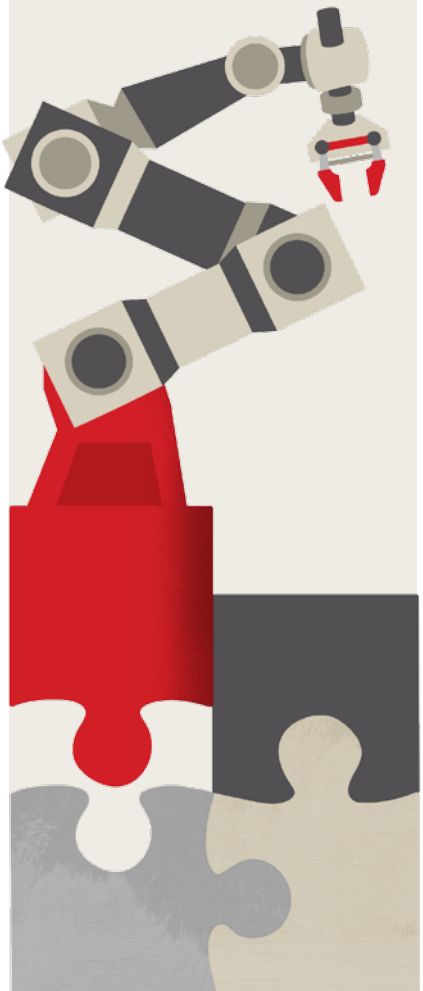
- **Boston Dynamics Spot,** a mobile robot that easily navigates jobsite terrain to perform inspection tasks and collect data.
- **Dusty Robotics FieldPrinter,** which uses BIM data to print full-size floorplans straight onto the building deck.
- **Canvas,** an automated drywall finishing machine that has been used at San Francisco International Airport and Chase Arena.
- **Hilti Jaibot,** a semi-automated cordless drilling machine for MEP and interior finishing installation work, especially overhead tasks, that can work for eight hours on a single battery charge.

80%
of construction companies say they can't find the workers they need [5]

30%
fewer young people working in construction from 2005-2016 [6]

45%
of construction professionals say they spend too much time on non-optimal activities [7]

49%
of all construction tasks can potentially be automated [8]

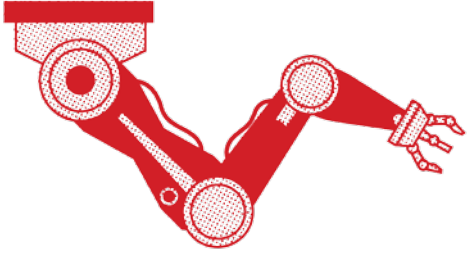


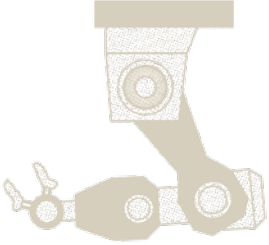
Sounds easy, right?

There are always caveats. Some fear that automation will take jobs away from humans. But the industry is already facing a labor shortage – and employment demand continues to grow, with a **shortfall of 430,000 jobs** in 2021.[4] Automation could help ease that number, especially with low-skilled jobs that are hard to fill.

The key is to **combine human and robot talents,** a concept known as collaborative robotics. For example, a robot still requires a human to manage its resources and program its tasks, even with BIM helping to streamline the process. Collaborative robotics **can help extend the productivity of older workers** who have huge experience but are struggling with the more physical aspects of construction. It can also help contractors – especially those competing for high-quality talent – **attract digital-native candidates** that otherwise wouldn't consider working in construction.

And as it stands, humans are still best suited for work that requires delicate, dexterous handling and improvised decision-making. **Leave the tedious jobs that demand extraordinary speed, strength and accuracy to the robots.**



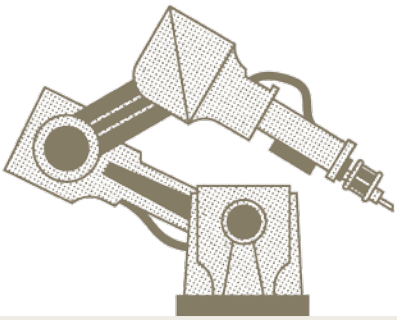


70%

of contractors say that advanced technologies could increase productivity (78%), improve schedule (75%), and enhance safety (79%) [9]

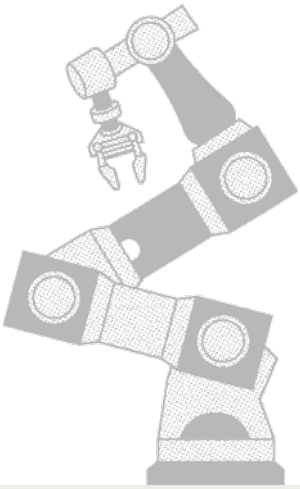
29%

of construction companies report already investing in technology to supplement worker duties [5]



$1.2trn

Within 10 years, full-scale digitization could save the non-residential global construction industry up to $1.2 trillion in the design, engineering and construction phases and $0.5 trillion in the operations phase [10]



It's time to be bold

Acquiring a robot often means making a significant investment in both up-front costs and time learning how to use it and incorporate it into existing processes. When profit margins are low, **spending hard-earned revenue on innovation seems risky.** And when deadlines loom, no one wants to interrupt inefficient but functioning workflows – even if the long-term benefits far outweigh a short-term need to "just get it done."

These fears could explain why only 25% of construction firms admit to having a digital strategy, and **only 9% say they're prepared for the digital revolution.**[3]

However, not embracing technologies that can boost productivity is, well, not productive. Companies need to **anticipate digital disruption** and get ahead of it before their competitors do. **Developing a digital strategy** can begin with a simple ROI assessment – any contractor able to analyze project data and predict costs can **determine if a new tech solution has value.**

But companies also need to be bold, which means developing budgets and establishing KPIs that enable their project managers to **try new technologies, like robotics, without fear of failure.** Those that find ways to identify long-term productivity gains through automation will be **far better positioned in the future.**

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