

A construction worker wearing a white hard hat and an orange safety vest is looking at a tablet computer. He is standing on a construction site with scaffolding, rebar, and a yellow crane in the background under a blue sky.

MTWO

Complete Construction Cloud

How MTWO Complete Construction Cloud helps construction businesses to perform digital transformation by adopting one integrated cloud platform.

www.mtwocloud.com



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1. The New Normal of Construction is Digital

The construction industry employs about 7% of the world's working-age population and is one of the world economy's largest sectors, yet this sector has been far slower than other industries in adopting and adapting to new technology, causing its labor productivity to stagnate. Despite the fact that a plethora of digital technology platforms already exist and have been supporting forward-thinking construction firms to handle complex challenges, this industry has been somewhat resistant to new thinking, new ways of working, and new technologies.

COVID-19 has significantly impacted this industry in several ways, including project delays, productivity loss, supply chain disruptions and more. These impacts have accelerated the need for digital transformation of this industry. Digitalization and digital connectivity have never been as critical as they are today. It has become the lifeblood of businesses looking to support people as they work from home and collaborate online, and it is vital that these technologies keep improving.

"We strongly believe that innovation is the most important thing to live and exist as a construction company. We will need to use digital technologies and even AI to improve and manage the business, and to tackle all the challenges in the construction industry today."

Tom Willemen,
CEO of Willemen Group

Connectivity has never been as vital as it is today

Some enterprises claim that they are 'digitalized', yet they still suffer collaboration issues; the main issue being that several systems are not integrated with one another yet are being used simultaneously across an organization, causing data to be dispersed across multiple sources. This in turn makes it cumbersome to increase overall productivity.

A great deal of construction data remains unstructured and unused due to outdated processes or using tools that are not integrated. According to an FMI Whitepaper, 96% of all data captured goes unused in the engineering and construction (E&C) industry, 90% of data generated is unstructured, and 13% of E&C working hours are spent looking for project data and information ⁽¹⁾. That translates to a massive waste of time and budget.

Intelligence and automation is the future

AI has been a driving force in identifying patterns in data to automate processes and uncover insights. The construction industry is one of the main economic sectors where robotics and automated systems have the potential to address inefficiencies and low productivity. Artificial Intelligence in the

global construction market is forecasted to reach USD \$4.51 Billion by 2026, according to a new report by Reports and Data ⁽²⁾.

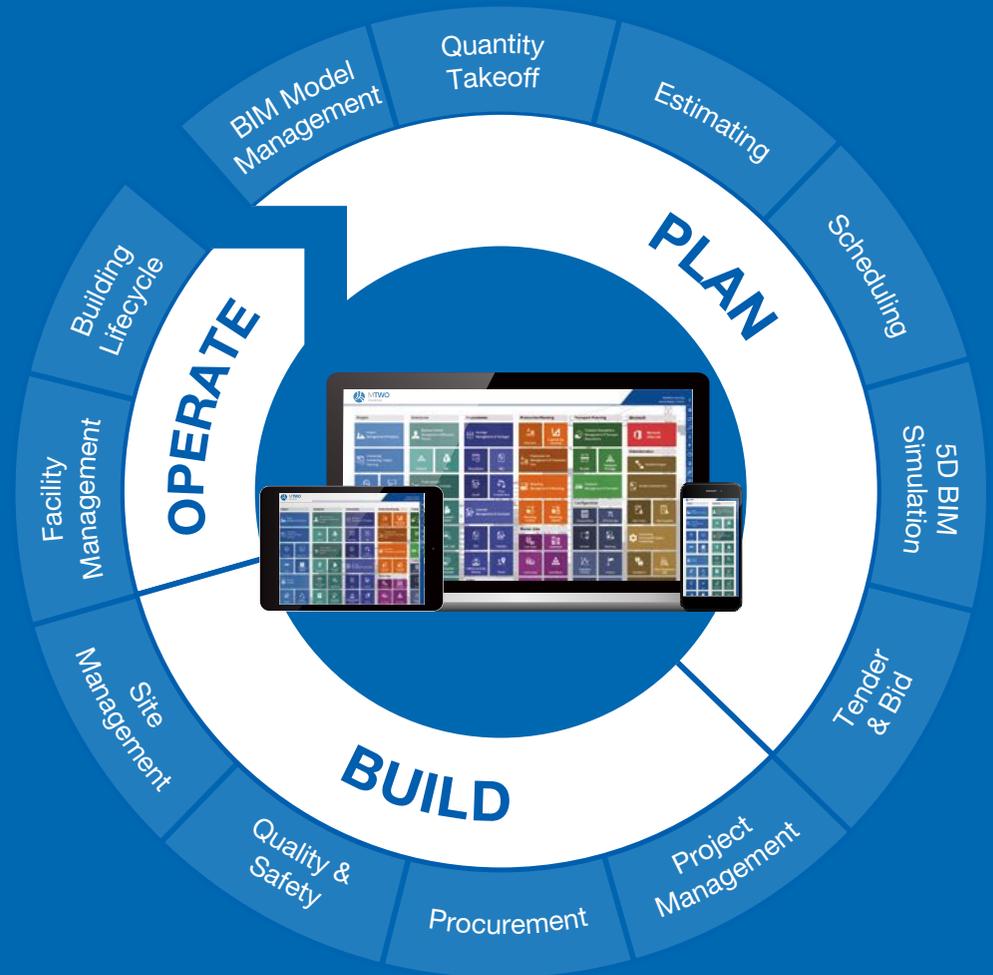
The construction industry is turning to technology solutions that utilize artificial intelligence to solve significant and long-standing challenges. Extracting meaningful insights efficiently can only be possible if data sources are integrated and managed correctly. Better decisions can be made by utilizing your own accumulated data and implementing machine learning and deep learning. With the potential that AI offers, the time is now to begin thinking how your organization can be transformed to establish a competitive advantage.

Hence, forward-thinking firms in the industry should implement practical solutions to stay connected, increase their efficiency, improve productivity, and ensure long-term competitiveness. Such solutions should prioritize connecting people, data and processes; such as a single cloud platform where enterprise-wide teams' collaboration is made easy. The continuity of data between different teams and different partners is ensured, and participants have unfettered access to accurate and consistent data. This platform should also be open and can easily be integrated with other software solutions to connect teams, unify data and standardize processes.

* (1) Jay Snyder, Alyssa Menard and Natalie Spare, "Big Data = Big Questions for the Engineering and Construction Industry", fminet.com

(2) Reports and Data, "Artificial Intelligence (AI) in Construction Market", July, 2019, reportsanddata.com

2. MTWO Complete Construction Cloud



MTWO Complete Construction Cloud is an integrated 5D BIM enterprise cloud platform for contractors, asset owners and developers to accelerate their digital transformation journey. It helps AEC companies move away from digitalization with the 'tool thinking mindset' into a 'platform thinking' one. It enables all teams on construction projects to perform their day-to-day work and collaborate throughout the project lifecycle in the same platform.

The connectivity and consistency between different work areas is one of the key values of the platform. All participants work within the same database, all data is stored in one place, and all processes are connected. Comprehensive project reports are generated quickly and easily, and you own the data to develop artificial intelligence that can optimize your processes and keep you ahead of the competition.

With deep industry know-how and innovations such as 5D BIM, Cloud, Business Intelligence, Artificial Intelligence, Mixed Reality, IoT technologies and more, MTWO is the most complete, integrated and intelligent solution for the AEC industry. It supports 5D BIM project lifecycle management, enterprise digitalization, data analytics, data-driven decision making and automation with artificial intelligence. The result is streamlined workflows, more efficient collaboration, lower risk, shorter project duration and unprecedented productivity.



“With iTWO 4.0, we see it as one of the key strategic developments in the industry. It’s going to be an enabler to interlink our key processes with our innovation strategy. We realize that iTWO 4.0* addresses the key issues we have; we need process integration, usability and scalability, as well as inherent transparency.”*

Dr. Ian Quirke,
Business Unit Manager, Zublin

* iTWO 4.0 is the core solution of MTWO Cloud.

Platform Technology

The highly fragmented construction industry needs platform technology. It is only when all business-units and projects have unified workflows and processes that the real value of enterprise digitalization can be unlocked. MTWO is the only complete cloud platform on the market that offers the advanced functionalities and technologies needed to support modern construction projects and enterprise digitalization.

It's not an additional tool, it's an integrated platform that combines all your processes into one interface. Different areas of work can communicate and interact freely with each other, allowing each project role to work within the same package and interface while knowing the connection and influence of one section's data upon others. This supports enhanced collaboration and helps to rapidly improve productivity. The platform can be further extended by adding more applications with open APIs, leveraging the most up-to-date technologies to create better outcomes.

Intelligence and Automation

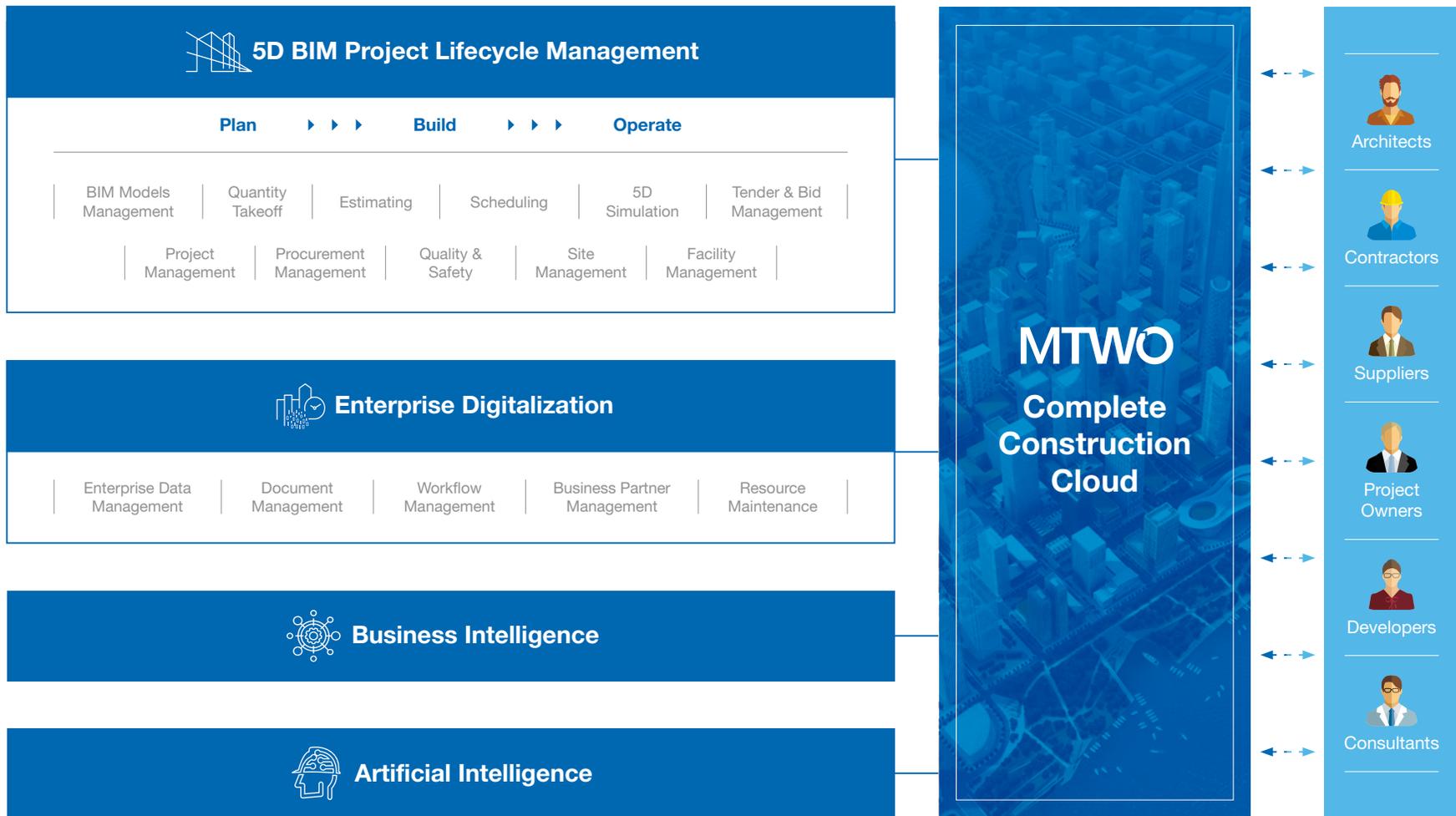
MTWO supports smart analytics, data-driven decision making and construction workflow and processes automation through innovations such as Cloud, Big Data, Business

Intelligence and Artificial Intelligence. It turns data into actionable insights, predicts development trends and detects risks and performance anomalies. It makes your construction management more data-driven by enabling everyone to access real-time project information. Your workflows and processes can be simplified and automated by AI algorithms and machine learning data analysis, providing precise predictions, forecasts and insights for the entire project lifecycle.

Advanced 5D BIM Support

BIM is one of the most valuable processes for visualizing structured construction information digitally. It can be helpful in keeping up with your defined goals in a verifiable way, if construction and operation phases are included. This is what MTWO focuses on; it integrates construction planning, building and operation with 5D BIM. In this way, you will make time and quality gains in execution planning and construction for your projects. The visual BIM models create a lifelike demonstration of building processes for everyone involved in the planning, execution and operation phases. Within MTWO, BIM can help to optimize planning and better control budgets and deadlines in the execution and operation phases with constant, real-time comparison of target and actual costs and schedules.

3. One Unified Digital Platform for Project and Enterprise Management



5D BIM Project Lifecycle Management

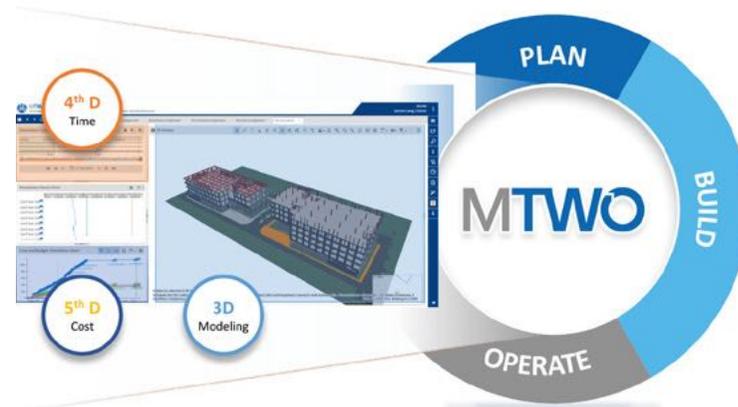
MTWO integrates the management of entire project lifecycles with 5D Building Information Modeling in one platform. From quantity takeoff, estimating, scheduling, procurement, site management and facility management, all processes are interconnected and linked with the BIM models. All project roles and stakeholders, including BIM managers, estimators, schedulers, procurement managers, project managers, site managers, project owners, subcontractors and more carry out their day-to-day tasks in the same platform and share information in real-time. This new way of working provides one single source of truth for the project team, helps to increase transparency and tractability of all data, and thus improves quality and productivity across all project phases.

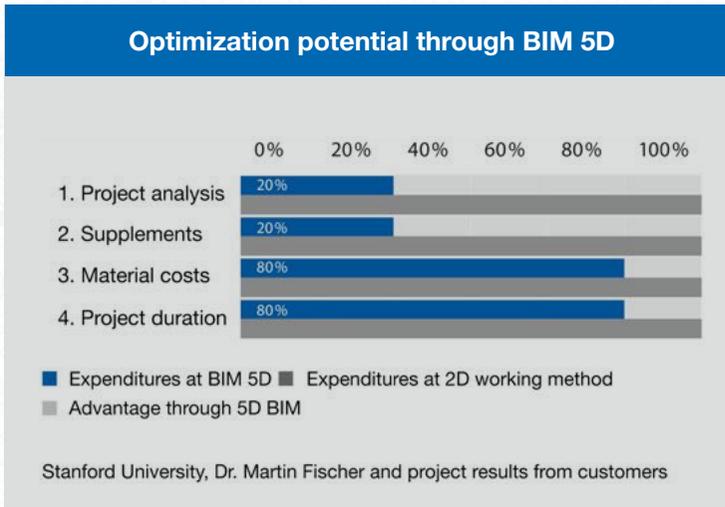
From 3D BIM to 5D BIM

MTWO extends the use of BIM technology from the design phase into the construction and operation phase by introducing the 5D BIM concept. This refers to adding the 4 D (time data) and the 5 D (cost data) to the 3D BIM models, and sharing it among all project roles and stakeholders across every project phase to enhance collaboration. The 5D approach brings all project stakeholders in the early phase of the project to work out the optimal project plan, with 5D simulation comparing different time and cost scenarios. As a

result, the team has access to a master plan to guide project execution, reduce change orders, manage risk and increase productivity.

- **BIM model management**
- **Quantity takeoff**
- **Estimating**
- **Scheduling**
- **5D simulation**
- **Tender & bid management**
- **Project management**
- **Procurement management**
- **Quality & safety**
- **Site management**
- **Facility management**





“The advantages for the customer when using BIM 5D are in the consistency and quality of the data regarding the entire planning and execution procedure. They are the basis for the verifiable increase in quality and efficiency in your projects over all project phases.”

Martin Fischer,
 Professor of Civil and Environmental
 Engineering and (by Courtesy) Computer
 Science, Stanford University

Enterprise Digitization

MTWO is not only a platform for AEC companies to transform projects digitally, but also to unlock the digital value across their enterprises. Once implemented, AEC companies are taken on a digitization journey that transforms their processes and fully digitalizes their operation. Enterprise data and resources are efficiently managed, enterprise workflows are standardized, and all data is structured in one single source of truth. Multiple business units of a company can manage multiple projects enterprise-wide on the same platform, enhancing the collaboration between multiple project teams, and facilitating the management to gain an enterprise-wide view of resources for optimized resources allocation. Insight from enterprise data is generated to improve workflows for current and future projects.

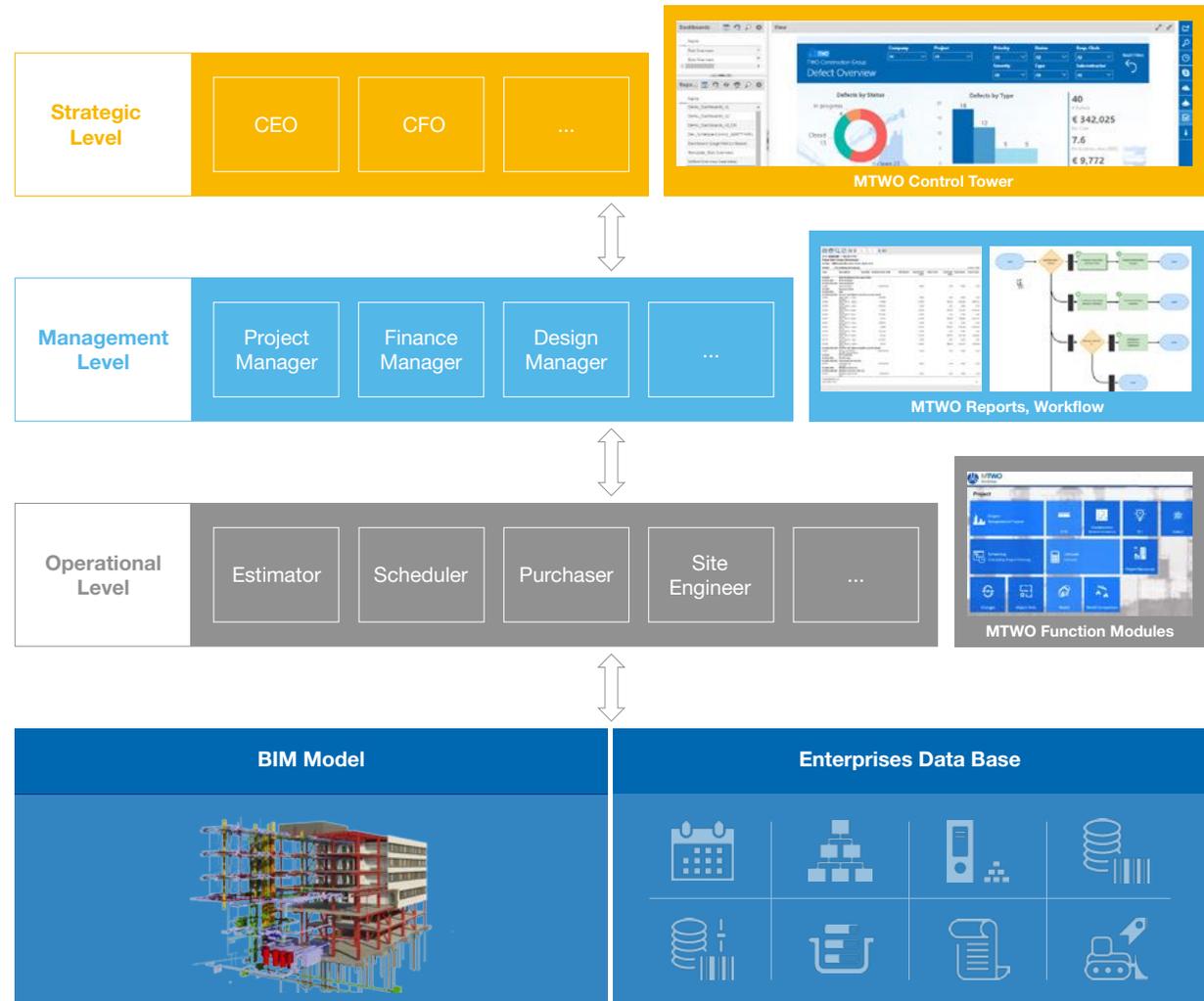
- **Workflow Management**
- **Business Partner Management**
- **Enterprise Data Management**
- **Enterprise Resource Management**
- **Document Management**



“At Implenia, the RIB solution was and is an essential component to push BIM and 5D in particular, as well as the entire digitization process within the company.”

Matthias Jacob,
Chairman of the Management Board at Implenia Hochbau

Whether from the operational level, management level or strategic level, the comprehensive functionalities and real-time data from MTWO fulfill different management needs. The enterprise database consolidates and structures data and templates of different processes, such as the cost code, procurement structure, material catalog, model evaluation master, assemblies and more. The operational level can easily leverage the historical proven templates to facilitate their task management, substantially simplifying their works and improving efficiency. Operational data is interconnected and can be extracted to create reports to support management level in project performance control. The workflow management function streamlines and standardizes management workflows. Towards the end of the lifecycle, the enterprise control tower provides the strategic level with dashboards to gain holistic business insight.



Business Intelligence

Data collection and analytics is the key to digital transformation. The MTWO Cloud platform, empowered with business intelligence capability, is set to help AEC companies fully utilize data, supporting executives and managers to gain full transparency into enterprise-wide business performance and trend forecasts for data-driven decision making.

Structured data is the cornerstone for business intelligence. With a centralized database, all project management and enterprise management data is connected and structured in one place. Accompanied by the workflow management



function, the data is further standardized and data accuracy is ensured. Furthermore, data of different processes can talk to each other. All of these aspects help to form a solid data foundation for business intelligence.

After a simple setup process, visual and interactive BI dashboards and reports can be created to turn data into actionable insights, enabling teams to view overall or detailed project performance in scope, costs, schedule, safety and more. By interacting with the data, teams can quickly discover root causes or unforeseen issues before taking proactive action.

- **Customizable dashboards and reports**
- **Visual and interactive data**
- **Holistic and actionable insights**

“If you own the DATA, you can do the analysis and can also draw conclusions better than others. Suddenly, you get a digital business model that will add additional opportunities for your company that it didn’t have in the past.”

Gernot Strube,
Senior Partner of McKinsey & Company

Artificial Intelligence

MTWO is a future-proof solution with artificial intelligence capability. McTWO, its artificial intelligence assistant, is designed specifically to support construction professionals to work smarter, more safely and more efficiently. Combining proprietary Machine Learning models with big data and cloud computing, McTWO analyzes enterprise data and workflows and automatically detects mismanagement or performance anomalies, before providing detailed predictions, forecasts and insights for the entire project lifecycle. In addition, McTWO automates construction management workflows and processes to eliminate tedious manual work.

“Which industry is going to benefit the most from artificial intelligence? Real estate and construction comes in at Number 1.”

Alain Crozier,
*Microsoft Corporate,
 Chairman and CEO of Greater China Region*

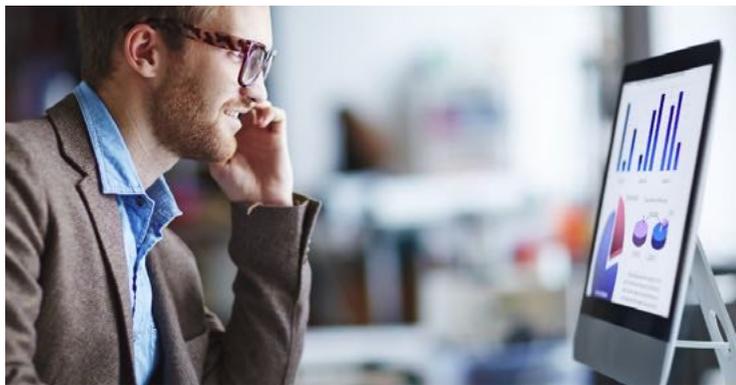
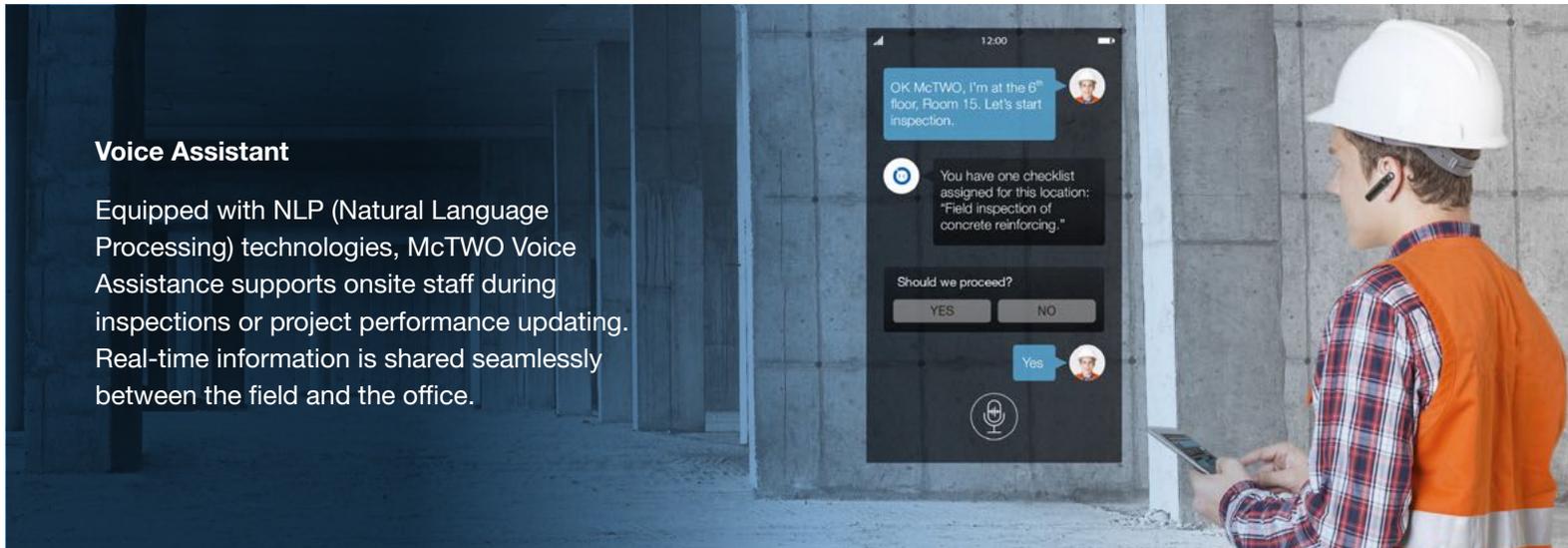
Chatbot

With McTWO Chatbot, project teams can access their critical project information quickly by simply asking project-related questions. This allows data to be accessed quicker than ever, supporting more efficient processes throughout the project lifecycle.



Voice Assistant

Equipped with NLP (Natural Language Processing) technologies, McTWO Voice Assistance supports onsite staff during inspections or project performance updating. Real-time information is shared seamlessly between the field and the office.



Machine Learning

Through deep analysis of your project data, McTWO provides predictions, forecasts, and recommendations to simplify your works with automation and to reduce risk. For example, this might include predicting the impact on project cost and scheduling that defects or issues will bring to the project.

Build better, faster and smarter with MTWO Complete Construction Cloud

MTWO Complete Construction Cloud features connectivity, intelligence and automation as its backbone. The enterprise solution is designed to help you deliver projects better, faster and smarter. From project initiation to completion, it is at your side to meet all your project and enterprise digitalization needs.

Optimized Planning

MTWO empowers planning teams to develop an optimized project plan. The 5D BIM and Cloud capability of the platform enables teams to work and communicate with the same dataset early in the planning phase to develop the optimized time-cost planning with 5D simulation. It helps to improve accuracy in the construction phase, resulting in reduced risk, lowered cost and shortened project time.

Improved Collaboration

MTWO Construction Cloud enables effective collaboration among project teams, which is key to the success of modern projects. Contractors, owners, site managers and any other project roles can easily integrate and manage their processes through a single, always-connected cloud-based platform. The main office and construction site are seamlessly

connected with real-time data sharing through mobile devices. It eliminates information silos and minimizes delays, rework and communication errors among stakeholders and between the office and the jobsite

Intelligent Control

MTWO Construction Cloud enables better control on project cost, schedules and quality within a single platform. The real-time constant comparison of planned VS actual cost and visualized schedules allows teams to reallocate resources and tasks to ensure projects remain on time and on budget. By processing quality inspections and quality control with the help of mobile apps and AI, onsite teams can take proactive action to reduce project risk and improve project quality.

Data-Driven Decision Making

MTWO Construction Cloud empowers teams to make data-driven decisions across their projects and the organization. With a centralized database connecting enterprise-wide data, it allows project teams to access the latest project data in real time to perform tasks and make decisions in a timely manner. The visualized and interactive dashboards and reports, empowered by BI technologies, help management to understand project KPIs at a glance. It's also simple to discover root causes of project issues and view development trends that form the basis of optimized project processes for better outcomes.

4. How to Implement the Complete Construction Cloud

Establish your digital roadmap

Adopting new software is not only a transformative shift in your technology, but also a change in your overall planning and workflows. Before the implementation starts, RIB's expert team will help you to establish a clear digital roadmap for the change management process, which must be able to clearly define expectations such as:

- **How will the company benefit from this digital transformation?**
- **What result is to be expected after the construction management software is implemented in the company?**
- **How exactly will the implementation process work?**
- **What do the milestones and schedules look like?**

RIB's expert team combines deep industry knowledge with the ability to understand your unique situation. Together, we will work together to help define a bespoke digital roadmap for your business that will deliver results in the short and long term.



Senior Management Participation

To help deliver a significant and lasting change in the way a business operates, it is critical to ensure that the new platform implementation is supported by senior management who can allocate appropriate human resources and time to this new undertaking. Change management is a leadership-driven process and the senior management plays a central role in the overall success of its deployment. If the senior management involvement is lacking, team behavior will not change.

Kick off the training with key users

To ensure effective training sessions, you can start out by selecting a small group of people, referred to as Key Users, who not only have the capability to understand the new system but also have a good understanding of how the company currently works. Training of this first group is conducted by our consultant teams. The training process, initially facilitated by consultants, can thereafter be continued with only intermittent assistance from the RIB consultant team. The key users can then be tasked to train the less experienced personnel. Active questioning and debate are critical to this process. Through the training sessions, firms can constantly seek feedback on the effectiveness of the training and how future sessions can be improved.

Enterprise Rollout

As more staff are trained in using the new software and gradually get used to the new working methods, you can start to move to the next stage - enterprise rollout with selected pilot projects. When deciding on a pilot project, substitute simple tasks from multiple platforms into the new software. Use key modules as a starting point for any new project being done in the new platform, then gradually roll other modules out across the project lifecycle and later all enterprise projects. The key users also assist in setting up the project properly in line with the project scope and specifications. Through this interaction on a live project, the users will gain practical skills in the new software and increase productivity with the software features.



About RIB Software

RIB Software SE is an innovator in the building and construction industry. The company develops and offers cutting-edge digital technologies for construction enterprises and projects across various industries worldwide. RIB has joined forces with Microsoft to deliver MTWO, the world's first enterprise cloud technology based on 5D BIM with AI integration for construction companies, industrial companies, developers and project owners, etc. With over 50 years of experiences in the construction industry, RIB Software SE focuses on IT and engineering and becomes the pioneer in construction innovation, exploring and bringing in new thinking, new working methods and new technologies to enhance construction productivity. With over 2,700 talents in more than 25 countries worldwide, RIB is targeting to transform the construction industry into the most advanced and digitalized industry in the 21st century.



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