

Best of Business AI

HOCHTIEF case study



Nearly 150 years old, HOCHTIEF is an international infrastructure company that provides construction and engineering services for public and private customers. From the Metro in Sydney to the opera house in Krakow, HOCHTIEF is responsible for roads, buildings, and infrastructure around the world.

Although HOCHTIEF has always been a leader in digital modeling, the construction industry as a whole is behind others when it comes to digitization. That's because digitization in construction is highly challenging: every project is unique and there's no such thing as serial production.

Despite this challenge, HOCHTIEF set out to get itself on par with other industries and differentiate itself from competitors. Given that the company is involved in a wide range of construction projects, from design to operations and maintenance, it was sitting on a massive well of untapped data waiting to be captured and utilized. With the power of technologies like AI, blockchain, and more, this data could be used to revolutionize existing processes and develop new services – driving HOCHTIEF into Industry 4.0 or 5.0.

To accomplish these goals, HOCHTIEF is taking a unique approach: establishing spin-off companies dedicated to digitization. One of these is Nexlore, an innovation hub dedicated to digital transformation launched in 2018. Nexlore works with leading tech firms and universities to develop new hardware and software applications. Another subsidiary is EDGITAL, created to drive innovation related to their public infrastructure projects in the Public-Private Partnership business unit. These companies create and manage cutting-edge applications that help HOCHTIEF monitor construction progress on major projects, keep continuous track of work quality, pinpoint potential savings with machinery, analyze complex contracts, and more.

HOCHTIEF didn't feel daunted because its industry was relatively new to digitization. On the contrary, leaders felt like they had the chance to start strong with a clean slate rather than having to untangle existing data management systems. David Koch, Chief Risk, Organization, and Innovation Officer, explains, "We're in a good position because we were starting from scratch. We're building platforms to gather the data and structuring it in the right way so we can use it directly."

Establishing the right approach to drive AI success

Investing in an innovation engine

As mentioned, HOCHTIEF's transformation strategy includes creating teams dedicated to innovative projects. This is worth calling out as an approach that has helped the company succeed with AI and other cutting-edge technologies. Nexlore and EDGITAL are free to function like startups, which helps them drive transformation at the company.



Culture

Bernd Holtwick, Chief Financial and Digital Officer, HOCHTIEF PPP Solutions and Managing Director EDGITAL, says that establishing a startup culture enables "people to try out new things and have space to deal with this new technology. They can first do proof of concepts and then bring the ideas into a broader space."

In effect, HOCHTIEF has created a breeding ground for continuous innovation. The company is engaging employees at every level and in every area of the company and practicing transparency, which means that AI development isn't occurring in a vacuum and, importantly, it isn't static. Where some companies

approach AI as a monolithic project that only engages a small group, at HOCHTIEF everyone is empowered to generate new ideas and build off existing projects. They've created a continuous innovation cycle that is successfully yielding inventive AI applications.

Creating teams with business and technical experts

According to Koch, it's important for AI development to be guided by the people closest to the problems they're trying to solve. When AI is developed by data scientists in a vacuum, it may not be effective in resolving the company's real-world problems. So, AI development teams get input from workers at, say, a construction site: "Once we identified the problem, we went to the construction site and the guys on site helped to fine tune the challenge."



By the same token, Koch says it's essential to have operations employees lead its cross-functional AI development teams: "We always put operations at the head of our organizational structure, so our most advanced and experienced people will be giving us the functional direction of the tool. Because the tool is developed close to the final user and has the quality stamp of our experts, it will be accepted more easily." This buy-in is key because an AI application is only successful if it's actually adopted by the end user.

Measuring success

For HOCHTIEF and Nexplora, it was key to establish metrics that enable them to evaluate the success of their AI implementations. This can help teams to determine how to make improvements to the AI and keep leadership on board with AI initiatives. Koch explains, "We have very clearly defined KPIs, and we measure them on the individual pilots and projects. We implemented a digital platform for all the projects where we're gathering all the data looking at the individual KPIs, such as reduction of man hours, more efficient work, risk reduction. We bring all this on our platform and have visibility and control over all our projects."



Treating AI models as building blocks

NEXPLORE is creating an architecture that enables them to get more value from each AI model they develop and get to market faster with new applications. Koch explains that each application they produce is made up of several AI models and "we're working on a micro-service architecture so that we can recombine these models to generate more products. Our aim is to have a general toolkit that allows us to build as many applications we need for our business." This forward-thinking approach will not only enable HOCHTIEF to reduce time to market for new products, it will enable them to scale AI across their organization faster and minimize unnecessary resource expenditure.



Data security and privacy has also been important. Like any business operating in Europe, HOCHTIEF has to conform to the requirements of GDPR. The HOCHTIEF group have worked to implement the highest level of data security and privacy through partnership with Microsoft Consulting Services.

Finding the right talent

HOCHTIEF identified that it was key to have data science talent in-house rather than outsourcing data science work to third parties. According to Holtwick, "I wouldn't just externalize everything. So if you have a new business solution with a new business-critical technology, I would advise to hire related experts. You need data scientists, developers, and architects from day one."



HOCHTIEF's approach has been to hire talent from around the world and let them work from their current location, rather than centralizing all their data science talent at a single location. They're also attracting talent through partnerships with universities. David Koch explains, "We launched a dual PhD program that's unique in Europe, where we get the PhD students incorporated into our operations, and while they do their thesis, they also work on practical use cases with us."

Koch also notes that training is key to enhance the skillsets of new and existing employees who may have deep technical skills in some areas of AI but not others. He says, "We have a training program for new engineers and programmers to up-skill them in the tools they're not dominating so far." They also offer a training program for existing engineers who are interested in working in new fields. These training programs ensure that HOCHTIEF's talent pool has the right skillset as their AI development evolves.

Getting management buy-in by selecting the right use cases to start

NEXPLORE and EDGITAL have each used a successful approach to getting buy-in from HOCHTIEF management: starting with internal projects rather than a project for a client. Holtwick explains, "It's important to show that the solution is running and improving. This is why we started on our own project and not with a new client. So that mid-level management understood that this new technique is working and is improving our processes. And in the end, we can save money or even offer the service to a client." By focusing on internal projects first, HOCHTIEF was able to prove how AI could directly benefit the company, making it easier to get buy-in from management.



Building trust through continuous communication

Communicating with employees about its work with AI on a regular cadence is creating the type of transparency that builds trust. At EDGITAL, one example is lunch and learn meetings that are open to all employees. Holtwick explains, "In the lunch and learns, we show people what's possible with the new technologies and discuss how things like this could improve other areas of the business. We have an open discussion which is very important to get feedback and take people along with us on the journey." The lunch and learns give employees the opportunity to learn more about the technology, buy in to its applications, and support it as it's applied across the business.



Holtwick notes that a key part of these meetings is that they're not talking about the technology in the abstract; they're based in real applications that are already being tested. "It's important for people to see that there are already solutions created so people start believing in them."

Establishing new business models and revenue streams

HOCHTIEF's success with AI has helped them reach the next level: it is now monetizing its AI expertise. Through EDGITAL, delivering AI applications to customers as a service, creating new revenue streams and ultimately a new business model. According to Koch, "We will offer all these solutions to market and we will have a new business model for the company."



AI in Action: EDGITAL applies AI to perform predictive maintenance

In fact, HOCHTIEF has already started with digital services to external clients via EDGITAL.

EDGITAL uses digital methods to track the condition of roads, pathways, and buildings. It is cheaper, faster, and more accurate than, for example, what road construction authorities can do today. Holtwick says "Local authorities need to receive overviews of the various conditions of their roads and properties

several times a year. That will help ensure that consequential damage is prevented, that planning can be done in a timely manner, and that money can be saved." A few large cities are currently able to do so, but the use of heavy and expensive equipment is required. EDGITAL's service is faster and cheaper.

EDGITAL developed an AI solution that automates data collection and road condition analysis. They created an edge device, which consists of a camera on a small computer, that continuously captures visual and motion data as it moves over the roads. The captured data is analyzed by AI algorithms which identify damage such as bumps, cracks, and potholes. The device can be attached to a vehicle that already travels the roads regularly, such as a garbage truck. This eliminates the need for manual inspection and enables much more frequent road condition monitoring.

What sounds like a niche product is actually a huge market. Germany's road network alone is almost 20 times the circumference of the earth. If one walked along the routes in a city equipped with a pencil and a notepad, it might take several years to complete such a task.

This example highlights a few of HOCHTIEF's key strengths. The first is delivering AI applications to customers as a service, creating new revenue streams and ultimately a new business model. The second is powerful partnerships with municipalities and other levels of government that help to improve our built environment.

The company is constantly adapting to new challenges. Holtwick explains, "The influence of IT on our work is becoming ever greater. We want to further expand our knowledge edge to make it more difficult for new market players to gain access or even take parts of our value chain. The data is enormous and valuable for us. With AI, we can unleash the power of this big data and create all new business opportunities."

Imagining a future for our communities

HOCHTIEF is disrupting the construction industry by offering new products and services that are only possible with AI. And they've made this a reality by establishing a strong AI strategy, making their culture AI-ready, and building the capacity to scale AI across their organization.

But HOCHTIEF isn't only focused on its own bottom line. As a major player in built environment around the world, HOCHTIEF sees itself as having a responsibility towards the future of the communities it serves. With this in mind, HOCHTIEF founded Life as a Service, a future-facing initiative that explores how technology will transform our lives and create a digitized society. Koch explains, "For us, it was important to make this kind of contribution to how our future cities, transportation, work, life should look, by initiating the right actions today."



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AI strategy*



*Enabling an
AI-ready
culture*



*Responsible
AI*



*Scaling AI
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