



Building a Modern Data Infrastructure in Construction: Unifying Project Data for Efficiency and Innovation

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Introduction

Navigating the modern construction landscape requires more than just traditional spreadsheets, reports and email. In an era of tightening margins, cost and schedule blow-outs, stringent new regulations and workforce productivity challenges, more and more AEC companies are looking for ways to use data and analytics to stay competitive.

In the construction industry, the challenge lies in managing all that data — everything from storage and access to security and compliance. A modern data management platform solves this problem by using all the data an organization owns to accelerate informed and more accurate decision making. It's also the foundation for advanced analytics such as AI and machine learning.

With the majority of construction businesses adopting some level of digital data management, now is the time to get started or be left behind. And don't forget, the benefits can be transformative— critical, actionable insights when and where they matter most.

In this eBook, we'll explore the topic of modern data solutions for the construction industry, why the sector has historically lagged in adoption, how a modern data platform can help overcome long-standing obstacles, and what the path to modernization looks like.

Unlocking the True Potential of Data

As technology evolves, construction companies are capturing more data than ever before through smartphones, drones, wearables, jobsite sensors, GPS systems on heavy equipment and other mobile touchpoints. Then there's all the project documents: plans and specifications, RFIs, change orders, meeting notes, site survey data and production photos from technology like drones. All this data can become overwhelming as firms try and find ways to structure and analyze it for actionable decisions that will improve their bottom line.



Big data may soon become the most important tool at a construction company's disposal.



Considering that data is the new oil, having too much data shouldn't be viewed as a problem. Instead of looking for ways to reduce data, the vision should be to look for more **strategic and economical methods to managing data**. One-fourth of decision makers say updating and modernizing their data infrastructure is the most important part of their current business transformation strategy. And, in order to effectively use all the data being collected, you need to have the right systems and software solutions in place.

Unique Challenges in Construction

It hasn't been an easy change for the construction industry, which has historically lagged in technical modernization. Construction projects involve a multitude of third parties: architects, subcontractors, compliance officials and more. Each has its own data, method for collecting it, and system for doing so. With so many autonomous entities, it's difficult to collect, convert and use all that data for collaboration and insights.

Another critical challenge has been the absence of mobile solutions and remote connectivity for field teams. Without mobile-friendly tools, communication delays and data discrepancies can occur, impacting the accuracy of project updates and limiting collaboration. Companies need high-quality tools and applications that can handle quick transfers of information and referential information like project IDs, vendors, leads and opportunities, and more.

A Deloitte study showed that, while labor productivity across industries has increased by 25 percent in the past 20 years, it has only grown by 5 percent in the construction industry. While progress has been slow, it's clear that adoption of digital construction tools and data platforms can be a powerful way for construction firms to address issues that have plagued them for years.



AI Joins the Game

When we're talking about getting the most out of construction data and presenting it in an easily consumable way, AI finds its way into every conversation. And to use the power of AI, you need a modern data platform that can be integrated with AI services and machine learning models.

For construction and engineering companies, the possibilities AI brings are endless. For example, AI can be used to generate more accurate forecasts for cash, labor, equipment, materials, and other resources needed across an operation. Over time, AI's machine learning models can refine forecast curves based on project history. Those insights can then be applied to new projects that have similar characteristics.

Imagine the AI-driven data points that would be valuable in the AEC industry:



Market price indices: information on the cost of materials, labor, and equipment over time.



Contractor and supplier data: analysis of the cost performance and efficiency of contractors and suppliers on previous projects.



Inflation and economic indicators: analysis of the overall economic environment and its impact on construction costs.



Industry benchmarks: comparison of a company's cost performance with industry standards and best practices.



Predictive weather analysis: analysis of weather patterns and forecasts for potential disruptions to construction schedules.

What a Modern Data Estate Looks Like



The simplest definition is **the infrastructure to help companies systematically manage all of their data**. You can only make sense of your data and make intelligent decisions based on that data if it's collected in a strategic manner, housed in a central system, and accessible to those who need it.

At Hitachi Solutions, we use the Microsoft Azure cloud as the foundation for our construction solutions. It's a state-of-the-art data platform that can bring in data from both internal and external sources, align it, centralize it and apply intelligence so you can spend your time acting instead of collecting and parsing data.

Advantages of Modern Data Platform

Supports Any Data Source



Highly Scalable and Available



Provides Insights from Dashboards in Real-Time



Supports a Machine Learning Development



Because modern data estates run in the cloud, they are agile and scalable, meaning they can handle growing data volumes, users and applications without performance degradation. Usage can be scaled up and down as needed without any structural changes, making cloud storage cost-effective. In fact, cloud data storage has become so inexpensive today, that the cost is quite low to retain historical construction and project data for future analysis.

“Construction companies are realizing the benefits of efficient data management, with 43% saying they would make better decisions if they had greater access to real time and historic information on project performance.”

— Significant digital transformation underway, [Bloomberg.com](https://www.bloomberg.com)

Building Blocks of a Modern Data Infrastructure

Modern data architectures can handle all sources, formats, and types of data and make it accessible to everyone involved in the construction process, including contractors, architects, tradesmen, and clients. With that in mind, any data platform you invest in should be able to:



Provide Built-in Individual Security

Any modern data estate should include a robust security and governance framework. Many recent factors make the construction sector particularly vulnerable to security risks due to the amount of confidential and proprietary information that is digitally stored and shared across projects.

In addition to data encryption, access controls, and audit trails, many modern database systems also offer **two-factor or multi-factor authentication** and feature built-in real-time monitoring and alerting tools. This level of security goes far above and beyond what businesses can expect from legacy systems to protect their data more effectively against threats such as cyberattacks and data breaches.



Integrate with Internal and External Systems

All construction companies work with a plethora of third parties and each has its own tools. A modern data infrastructure needs to be able to integrate data from third parties easily. For example, your data system should be able to ingest a subcontractor's cost estimates for analysis.

Internal integration is just as important. When you integrate back office finance systems with your CRM and project management systems, teams can assess budgeting and forecasting decisions based on actuals from the accounting team. Both sides will be empowered to make knowledgeable decisions and can more accurately monitor the financial health of a project.



Ingest and Serve Data in Real Time

Real-time processing enables quick insights and decisions based on the freshest available data, allowing project team members to respond to events and changes as they happen. When project team members trust the data — in terms of accuracy and timeliness — planning and project decisions are made more confidently. It's why the best decisions are the ones that are driven by more **real-time data**, and the riskier the project, the more important data becomes.



Offer Great Visualization Tools

BI dashboards, like Power BI, have been around for years, but the latest breed of BI and analytics tools are built to fit within a larger modern data platform. These are generally more self-service platforms that allow users to explore data, rather than just consume graphs and charts. Think of all the metrics that can be visualized and further explored with visualization tools:

- Project management metrics such as budget, schedule, and resource utilization.
- Labor and equipment costs, including utilization and efficiency.
- Job site safety metrics, such as incident rates and compliance with regulations.
- Material costs, quantities, and deliveries.
- Procurement and supplier performance metrics.



Handle Complex Compliance Requirements

Investment in the right data solution can pay dividends in everything from better safety data to inform new and safer practices, to time saved on the administrative aspects of safety reporting and training, to better compliance with regulatory requirements. Record keeping can be relatively painless with a web-based application that auto-populates data across all required forms, saving time and virtually eliminating filing mistakes.

Sometimes construction projects are long engagements—some take years. It's not uncommon for documents like insurance policies, licensing, bonds, and lien waivers to expire during the lifecycle of a project, triggering noncompliance. Often, frustration results when there are many dates to track, different types of coverages, and other requirements that all need to be reviewed and confirmed.

A modern data estate should be able to store and analyze all compliance certifications, insurance and related documents. And, through automated notifications, make the right team members aware when information is missing or expiration dates are approaching.

The Path to Modernization

It's a lot to consider. Don't be afraid to call for reinforcements. The real value of data depends on its **ease of use as much as its potential outcomes**. If you are just starting your data journey, or you are currently mired in a swamp of data that you don't trust or can't access, a dedicated partner can help guide you in choosing the right solution.

At Hitachi Solutions, our focus is on ensuring construction companies are working with accurate, unified data from your existing systems. This includes a thorough examination of the business processes and controls that are in place for your existing source systems. It's critical to ensure that the data coming to the sources is uniform and accurate. For example, if the same vendor is manually created in five separate input systems without any standardization, you'll have inconsistency from the start.



Assessment

There are many approaches to building or modernizing a data platform. Our goal at Hitachi Solutions is — and always will be — to **meet our customers where they are at**. In this instance, that means starting with your existing data infrastructure and helping you evaluate the best near-term approaches to moving forward and realizing ROI.

Each and every construction organization is at a different point in their data maturity. Some contractors are still conducting analysis by using spreadsheets, while others have departments that have developed their own analytics systems. And other organizations fall somewhere in between.

We begin with an assessment of your current data ecosystem including data architecture, data sources, data quality, and data governance to help you identify areas for improvement and plan a roadmap for the future. For construction companies, this includes a keen review of project management tools, internal and third-party integrations, document storage, regulatory compliance processes, and so on.



Planning

Construction companies need to start any planning exercise by identifying and defining all the data that intersects in the lifecycle of a construction project—ERP systems, CRM systems, third party integrations, external partners. Once defined, the goal is to aggregate, process the data and surface it in real time, in a way that all project participants can use. That's the goal for any data modernization effort and how we approach planning.

For example, one of the biggest struggles for construction companies today is the coordination of drawings and specifications—making sure everyone is operating with the same versions, and that the information is timely. Traditionally, these large files have been difficult to share over a wide area network. If your organization identifies this as a priority, we can start by creating a modern data estate that allows you to share CAD drawings, blueprints, contracts and other documents in a safe repository that is updated in real time and secure by default.

It's about creating and validating a modernization plan that will meet your prioritized needs today and set your organization up for success as it grows and expands.



Get Your Data Flowing In A Way That's Flexible, Affordable And Sustainable

Hitachi Solutions created a streamlined method to support our clients to rapidly centralize their data sources — in a matter of days — onto a single cloud platform called Hitachi Solutions Empower Data Platform. We wrangle your varied data, supporting more than 200 sources, where it can then be used to manifest intelligence your teams can utilize to make strategic business decisions. [Learn more about our Empower Data Platform.](#)



Architecture

Once we've assessed your current situation and identified priorities and immediate needs, we turn to technology and how to architect the solution.

There are many options available; we recommend a PaaS data platform built on [Microsoft Azure](#) and [Azure Synapse](#) technology. PaaS platforms are true modernized data platforms because they allow companies to manage large amounts of data that require significant computing resources.

At Hitachi Solutions, our Azure-based PaaS **solution includes a host of accelerators and pre-built tools** that are designed to accelerate deployment and decrease the time to realize business value. Our solutions are built using state-of-the-art [lakehouse architecture](#), so organizations can take advantage of all types of data, both structured and unstructured.

Another option is a turnkey SaaS-based model from Hitachi Solutions. We call it [Empower](#) — a **subscription-based platform** that automates the buildout and management of Azure Data Services quickly, to help facilitate self-service reporting and other more advanced data use cases.

Hitachi Solutions has worked with many customers moving their platform from an on-premises system to Empower, and they're seeing real value from it. It's a great option for companies that have been trying build their own data estate and find themselves in a never-ending struggle— they can't hire resources and they can't afford to build it out.

Modernize Your Infrastructure with Hitachi Solutions

The intent of Hitachi Solutions suite of offerings is to provide our construction customers with the flexibility to build out a data estate in a way that makes the most sense for their organization in both the short and long term.

Our **broad array of solutions** — from unified, modern Azure-based data platforms to turnkey, SaaS-based models that reduce development and capital costs — can help you turn construction data into predictive and analytical power. In a low-margin, high-volume industry, a modern data platform can typically pay for itself in the first or second year of operation and produce recurring savings annually after that.

For over a decade, Hitachi Solutions has been working with construction organizations around the world to enhance their technological infrastructures. We can find a solution to help turn your project data into opportunities for growth, increased cost savings and rising productivity.

Contact us today to learn more about our construction data solutions built on the Microsoft platform.



Let's Start Your Modernization Journey Today!

 **Hitachi Solutions**

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