

AI & Construction: Separating Data From Debris

By Dr. Perry Daneshgari & Dr. Heather Moore



Humans have been seeking, using, and benefiting from data since the dawn of civilization. But while the cycle remains the same, the scale has exploded. Today, we're in the midst of a data evolution. Artificial intelligence (AI) is reshaping industries, pushing companies to build smarter, faster, and more adaptable data infrastructures.

In 2025, construction companies must prioritize data quality and developing outcome-driven AI strategies to stay competitive in a rapidly evolving landscape.

This article explores how data has evolved alongside human progress, the risks of accumulating “data junk,” and why construction companies must refine their data

strategies to accelerate industry transformation. It also examines how construction financial professionals (CFPs) can take the lead in ensuring AI tools are built on reliable, high-quality data.

AVOIDING DATA JUNK

CFPs have used data for years to forecast company and project outcomes. However, only recently has that data been aligned more effectively with operational realities. Yet, we are just beginning to unlock its full potential for decision-making. Because of this, there is a growing risk of “junk data” flooding systems if we aren’t asking the right questions. And AI is only as good as the data it’s given.

The NASA Orbital Debris Program was commissioned 45 years ago to reduce space junk. ¹ But this is the first year that a space mission has been scheduled to launch specifically to clear out space debris. ClearSpace-1 will pave the way to clean Earth’s orbit of 3,000 failed satellites (and 2,000 live ones). ² Similarly, to avoid creating “data junk” for AI — a sea of bits and bytes that provides no intelligence — we need to both generate and use data with the same foresight, regardless of the type of AI technology.

In construction, the continuing workforce shortage is another reason to harness the wisdom of experienced veterans through data and correct interpretation. This knowledge can help companies create their own AI with the correct mapping and translation techniques.

As we predicted a decade ago, the construction industry will be able to use the current data and technology to industrialize much faster than other industries, by modeling human decision-making and learning.

THE DRIVING FORCES BEHIND DATA EVOLUTION

For centuries, there have been three key themes for why and when data is needed. They are:

1. *Economic improvement* — through trading, measuring, and improving business outcomes
2. *Increasing collective knowledge* — through libraries and mass production of media

3. *Advancing data storage and accessibility* — through innovations like the printing press, magnetic storage tapes, and digital computing

Although individuals may benefit from all of these simultaneously, major leaps in data evolution typically happened for one primary reason at a time. The cycle for the data evolution has been:

1. *Creating theories* for how processing power can help solve problems and expand knowledge
2. *Developing algorithms* (using language, logic, math, etc.) to model and solve problems
3. *Using machines* (e.g., quill, printing press, calculators) to run algorithms faster and broader
4. *Reach limits* (e.g., humans, natural resources, machines, processors, memories, data volumes)
5. *Breaking through* to the next stage of data evolution

This cycle has allowed humans to connect via commerce, communication, and transportation. The energy and technology used to make these connections also evolves.

The industries that have dealt with data the longest are the ones that have propagated. Any attempts to misuse, abuse, or destroy the data-to-human connection do not survive.

DATA: THE OIL OF THE DIGITAL AGE

The shift from industrial production to digital infrastructure highlights how data has become the defining resource of the modern era.

A century ago, massive factories like Buick City in Flint, MI, spanned 413 acres, producing over 16 million cars throughout its lifetime.

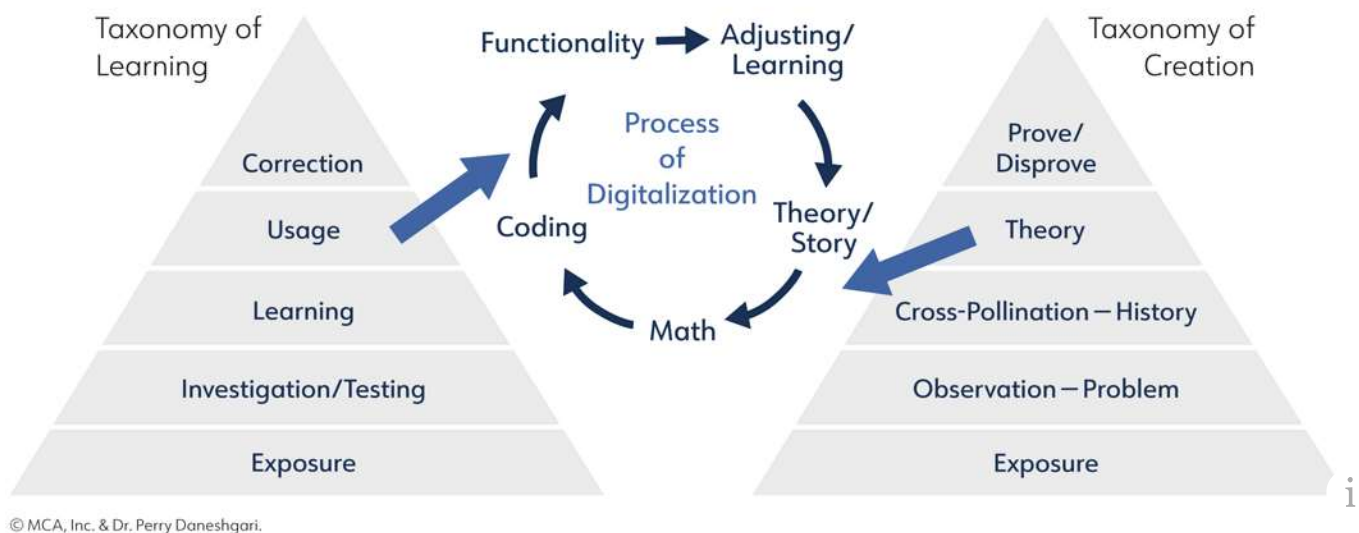
Today, AI datacenters are occupying similar footprints but with entirely different outputs — like the first AI datacenter in 2024, covering 407 acres and consuming 340MW of

power to generate machine learning capabilities instead of physical goods.

Just like the natural resources needed to fuel the Industrial Revolution and, specifically, to expand the automotive industry, we need “fuel” to progress. And the “oil” of the information age is data. But just like oil, data needs to be mined and refined carefully and correctly to be useful. Data alone cannot replace the human connection that creates and uses it.

Exhibit 1 shows an expansion on the *Taxonomies of Creation and Learning* concept, conveying the role that digitalization (and data) plays.³ Data fuels human learning and creation, and, thanks to the 20th century expansions of computing power, that engine can turn faster than ever before.

Exhibit 1: The Role of Data in the Process of Digitalizing Creation & Learning



AI & DATA IN CONSTRUCTION: WHAT’S NEXT?

We have studied, modeled, and predicted the Industrialization of Construction® for more than a decade, explaining that the same five steps of industrialization will happen in construction as they have in other skilled-trade-based industries. We’ve also predicted that technology will help accelerate Industrialization of Construction®, just as it did in manufacturing.⁴

While agriculture took three centuries to go through the five steps, manufacturing only took one. With construction already a few decades into the process⁵ as well as the

availability of data to model and optimize the work environment, this industry may get there in less than a century.

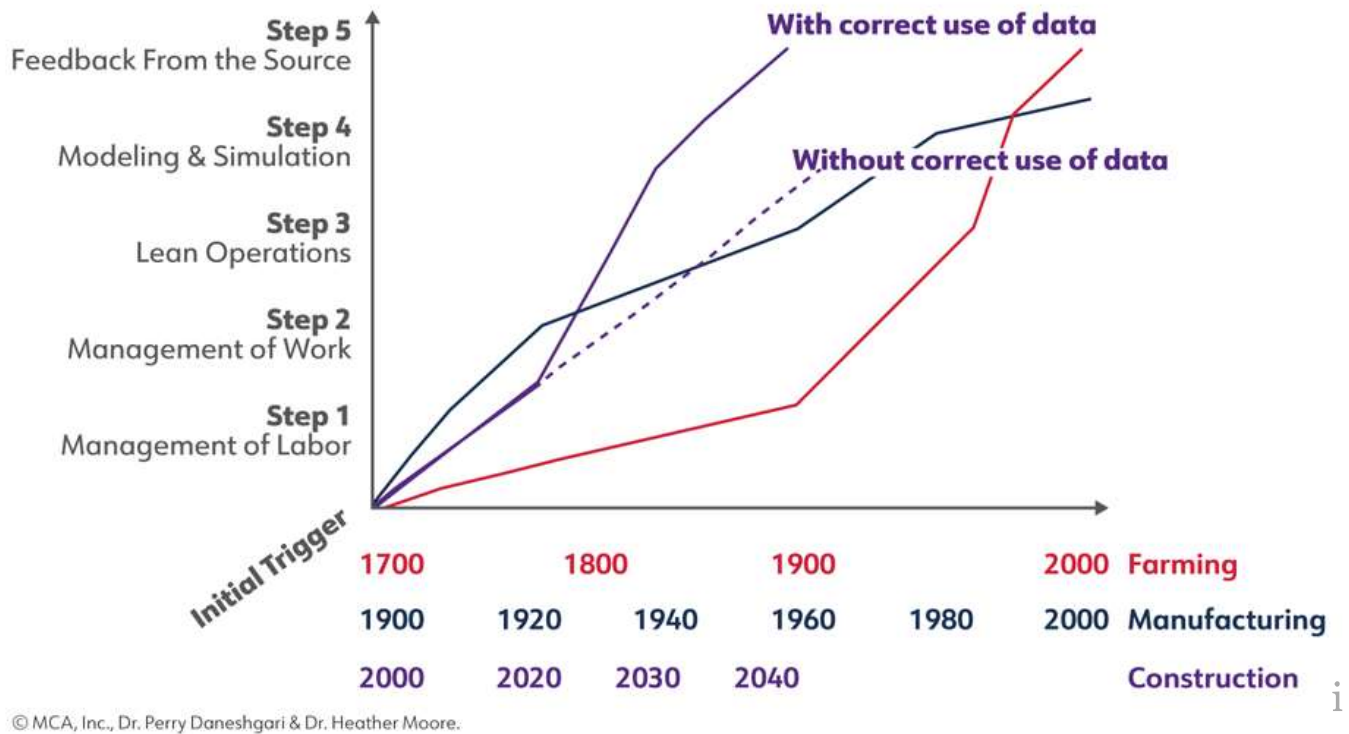
Exhibit 2 shows two potential trajectories for Industrialization of Construction® — one that results from the correct use of data, and one that stays linear without the use of data to learn and expand.

The correct use of data is the current and biggest challenge, as the industry still allows decisions and manipulations to happen on the jobsite. ⁶

Making it worse is the proliferation of software that may be good data “repositories” but that are not database-driven, not interconnected to other data sources, and, worst of all, not built on the true experience of the work environment.

The industry needs to learn to work with data at an operational level — to optimize workflow so it can outpace manufacturing in industrialization. This means that data must be a limiting factor in decisions. We are closest to this point with construction accounting, where the Financial Accounting Standards Board (FASB) provides regulations and CFMA then translates and educates those regulations for CFPs. However, even accounting data can be manipulated at the lowest level, when project managers (PMs) forecast costs and profit often without data representing the realities of the jobsite.

Exhibit 2: The Potential for Data to Accelerate the Industrialization of Construction®



Estimating is the next closest, where most projects are budgeted and bid based on historical data. However, the reference points are often outdated and not linked to performance. The furthest away from optimizing data is in operations, where we still face resistance in collecting and relying on data to make the jobsite visible.

Adding AI to any of these, especially when using public and open AI, can backfire if the data sources are unreliable.

HOW CFPs CAN LEAD THE AI TRANSITION

Because CFPs are already interested and often required to use data, they can work to explain the reliability of data to the other roles of the operation. Explaining how to match or test “gut feel” with what the data shows is something a good accountant does well. CFPs can guide PMs and forepersons to provide data that backs up their reports and decisions. CFPs should consider asking their PMs:

- What data source are you using as a reference point for projected profit?
- Do you know which cost codes are the highest weight or contribution to the project?
- Can you qualify your percent complete with something in addition to cost?

- Are you projecting your labor with scheduling tools and incorporating network logic instead of just “here’s what I think I need”?

CFPs should also be prepared to align their accounting software with estimating and operational databases. Because accounting software systems have been around longer, they are the most reliable. However, they may also have older data structures that will take work and understanding to align with APIs.

CFPs can play a key role in initiating and driving an AI strategy. This is critically important, given the risk and opportunity in using AI. Most roles in a construction organization don’t work with data daily like the CFP does and may trivialize the importance of distinguishing “good” data or protecting data. Public AI technologies are powerful, but they can also be dangerous, especially now when there are no regulations to protect their usage.

BUILDING A SMARTER FUTURE WITH AI

In today’s world, we have unprecedented power at our fingertips to generate, store, and use data. Data’s evolution shows how it grows alongside technology, always driven by human needs. AI offers immense potential, but only if we learn to separate junk data from useful data and prevent digital clutter from drowning out real intelligence.

If we use data correctly, the next few decades in construction will drive an industry-wide transformation. But if we don’t, construction will lag behind, struggling to catch up while others surge ahead.



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Endnotes

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