The Construction Data Journey: Start Now!

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Whether you are an owner, a design firm, or a contractor, the construction sector will be facing several major challenges in the coming years. The below figure illustrates the results of our 2019 Global Risk Survey results for the construction sector and these represent the top risks as identified by key leaders within the global construction economy. Whether it is financial risks like economic slowdown, cash flow/liquidity risk, or capital availability/credit risk, or it is labour risks like workforce shortages, failure to attract the best talent, worker injury or the risk of massive retirements in near term, the construction sector needs to start implementing solutions that will prevent and mitigate some of these major risk categories.

Top 10 Risks for the Industry

There are many paths that those in the construction community can go down to create solutions to mitigate these very real current and future risks, however, many believe the foundational strategy to best manage these risks is having a sound data strategy. The construction sector is lagging behind almost all other sectors of the economy when it comes to data sophistication. This lack of data sophistication is largely due to the way construction operates in its most current incarnation. The below figure (figure 1) illustrates the amount of knowledge/data that is lost in each construction project:
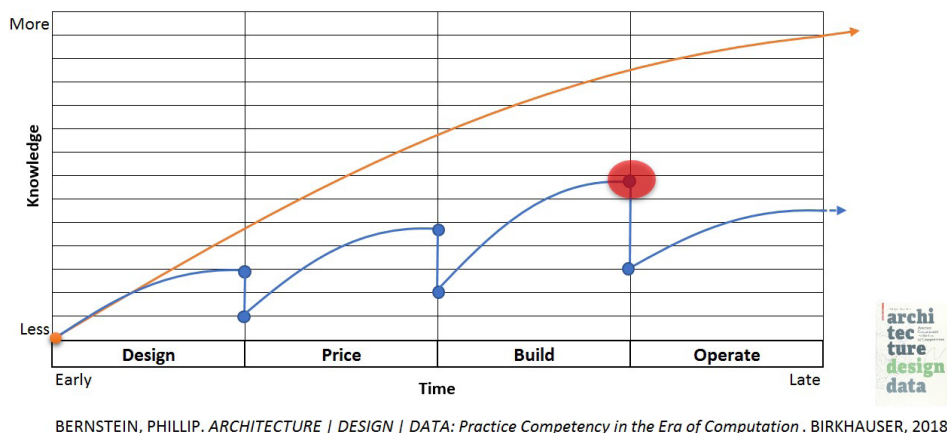

BERNSTEIN, PHILLIP. *ARCHITECTURE | DESIGN | DATA: Practice Competency in the Era of Computation* . BIRKHAUSER, 2018.

Figure 1

Each phase of the life of the asset being constructed is siloed and this results in significant data loss as the knowledge created in one phase is transferred to another phase. Most believe the highest level of asset knowledge is held by the contractor as they transfer the newly completed asset back to the owner to operate and maintain. This knowledge, or data loss has to end if we are going to improve the on-time, on-budget, and operational efficiency results of the construction and asset management industries. Could we better organize and harness the power of data to avoid losing any data, as illustrated in the diagram by the orange line which shows 100% knowledge transfer between each phase? This loss of knowledge/data from one phase to the next is but one piece of evidence that shows why the construction sector lacks the necessary data sophistication to deal with the future risks facing the industry. There are a few other reasons as to why data sophistication within construction sector is lagging compared to other industries:

- **Unique Teams for Each Project** – The construction sector almost always uses new design firms, new main contractors, new subcontractors/suppliers and new owners when they build a new asset. Much of the knowledge/data from the previous builds is lost as each party to that build goes onto their next unique project.

- **Aging Workforce** – Currently most of the data within the construction sector is housed within the minds of the employees of each key stakeholder. These stakeholders leave the company through retirement or taking on a new job. How does the company retain this knowledge/data better and avoid losing it when a person leaves the company.

- **Slow Adoption of Technology Solutions Due to Analysis Paralysis** – Construction technology companies are popping up every day and construction stakeholders need to get familiar with all of these firms and how they can help you on your data journey. Both platform companies that provide enterprise solutions and point solution companies that specifically target certain categories of risk are becoming rampant and continue to knock down the door of the industry, leaving some stakeholders overwhelmed and uncertain. Find partners that can provide unbiased opinions on quality of solutions and help reduce the confusion, thereby accelerating adoption.

- **The Unknown Factor** – Given the significant amount of unknowns associated with the construction sector – things like underground risk, weather risk, existing structures risk, there is skepticism around technology and data being able to create predictive results.

These and several other factors have led to the relatively low data science sophistication within the construction sector. In the last few years there has been an increase in the motivation to improve data science sophistication, largely due to the enabling potential of new technologies coming to the construction sector. Bottomline, there is no better time for all stakeholders within the construction sector to begin their journey to an improved data sophistication state.

The Journey
No matter what your role is within the built world environment: design, construction, operations, or any derivative sector; we must all move forward together to make construction a more efficient, productive, and less risky industry – a win for all stakeholders. The road we each take down our

data journey will inevitably meet on common ground where we are all truly connected and can reap the benefits of synergy through data collaboration across all phases of the asset. With the right groundwork laid out, the construction data journey can be a much easier transition. With the right team, an understanding of what's at stake, the potential for improvement and a shift in company culture the journey will lead to more predictability around schedule, budget and operational uptime.

The right team can help you break through and slingshot into the Industry 4.0 built world. Many construction stakeholders have already started hiring C-suite executives that are responsible for digital enterprise initiatives. Chief Information Officer (CIO), Chief Technology Officer (CTO), Chief Digital Officer/Chief Data Officer (CDO), Enterprise Intelligence Officer (EIO) are a few of the leadership positions that can launch a company on their data journey. It's not just about IT anymore, positions like these are vital to success as we move into the next generation of the built environment and those in these positions will need to work with all areas of their companies, and all areas of their projects/assets, in order to extract the data from everywhere to make better decisions. The right team not only knows where to steer down the data road, but also what vehicles to use, and how various vehicles will combine to create the best decisions. Data needs to be identified, collected, stored, cleaned, assessed and accessed using all the right tools in order to extract maximum value from the data and make the process optimally sustainable.

Where is all the data? The list can go on into the thousands, it's not easy for a company to determine where all the sources of their data reside. It takes

the entire company, and all project stakeholders to come on board and have at least some kind of foundational training around why it's important to have a data strategy. All employees need to take ownership of how they can help identify and aide in the transmission all data sources including their own industry knowledge and experience. For us to truly keep up with proper data management between each phase of the asset's life, we must collect data from the furthest creeping roots of the company and the project/asset. Paper files, emails, text messages, spreadsheets, enterprise accounting, resourcing platforms, point solutions, IoT devices, insurance data, industry data, weather data and many more data sources come into play when realizing the data opportunity. Luckily, there are already a few great ConstrucTech solutions in the market that take the headache out of doing a manual data assessment to cover all the bases. Harvesting and harnessing this data without losing data, between stakeholders and phases of the asset's life, is key to harnessing your companies' competitive advantage moving into the next generation of the industry.

Once a data strategy is in place and starts down the road, you will begin to gather a clearer picture of where all your problems and risks are rooted throughout the life of the asset. Identifying the problem areas through the use of machine learning algorithms will lead to a more predictable outcome on business processes (see figure 2 below) . There will likely be several surprises that add to the value of the data investment. Having a complete view into the data flow of the asset alongside triggers for risks ensure that the next phase of the asset can work with the best possible foundation and keep reducing the risks and increasing predictability all the way down to the operational phase.
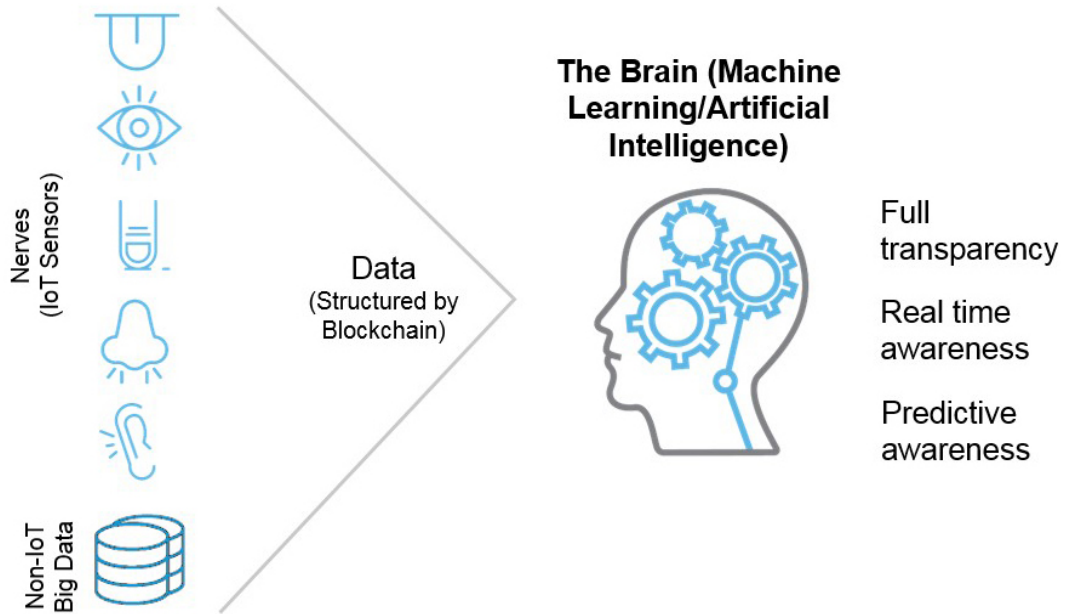
The Data Journey — From Data to Decisions

Nerves (IoT Sensors)

Non-IoT Big Data

Data
(Structured by Blockchain)

The Brain (Machine Learning/Artificial Intelligence)

Full transparency

Real time awareness

Predictive awareness

Figure 2

As you approach a mature state on your data journey, there will be a shift in company culture as the value of data will have proven itself to your entire organization. Decision making can become easier and many of the previously time consuming and monotonous tasks can now be eliminated, making room for more critical thinking and strategy. Using the data of the past, and dynamic present essentially creates a platform to investigate the future to predict failure (data from the future), improve certainty of outcome, increase margins and create a competitive advantage for your organization. This new world will create synergies between all stakeholders, throughout all phases of the asset's life, and thus create more value than the construction and asset management sectors have ever seen in the past.

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