



A new level of analysis
for the built world.

The background of the entire page is a high-angle photograph of a construction site. In the foreground, two construction workers wearing white hard hats and safety vests are looking at a large set of blueprints. Behind them, a multi-story building is under construction, with visible concrete pillars, steel beams, and rebar. The site is surrounded by lush green trees, and in the far background, modern residential buildings are visible under a clear sky.

Construction Analytics: Progressing from Descriptive to Predictive Analytics

Learn how emerging technology is shaping the way
construction firms gain predictive insights.

Moving from descriptive to predictive analytics.

According to McKinsey, many construction firms have a ways to go since it remains one of the last industries to adopt technology in mass. Sophisticated stakeholders are beginning to mandate BIM and reality capture tech, but this is only a piece of the puzzle. Avvir pushes reality analysis to provide actionable insights in planning, during, and delivering large-scale projects. These actionable insights are one of the first critical steps to providing business intelligence and construction analytics to owners, GCs, and subcontractors on each project.



4

Defining Analytics

Defining Construction Analytics in Construction.

5

4 Common Types

What are the 4 common types of Construction Analytics?

6

Establishing a Baseline

Establishing a Baseline with Descriptive and Diagnostic Analytics.

7

Moving Toward Predictive

Construction Leaders are Moving to Predictive Analytics.

8

Conclusion

Digital transformation will pave the way for better project decisions.

8

References

Data sources and reference citations.



**Increase
planning,
execution &
forecasting.**

Best Practices.

Construction Analytics helps increase planning, execution and forecasting agility across your entire organization.

- Stay on top of material costs and manage labor efficiently for multiple projects at once.
- Utilize continuous planning and forecasting technology that are backed by up-to-the-minute reporting and cross-project analytics

that will enable you to make decisions.

- You can view real-time data with ease and clarity in a way that manual, spreadsheet-based planning processes can't match.

Your business survival demands that you take the next step. In this guide, we feature best practices for leveraging construction analytics and tips for progressing from descriptive to predictive analytics.



Defining Construction Analytics in Construction.

Construction Analytics is considered predictive, focusing on the “why” to make more informed predictions regarding construction projects.



4 Common types of Construction Analytics.

Understanding the nuances between Descriptive, Diagnostic, Predictive, and Prescriptive analytics to better manage construction projects.



Establishing a Baseline with Diagnostic Analytics.

Why implementing standard data practices during project planning will help ensure accurate analytics and answer important questions during construction.

Defining Construction Analytics in construction.

Construction Analytics is considered predictive, focusing on the “why” to make more informed predictions regarding construction projects



Business Intelligence vs. Construction Analytics.

Business intelligence is the descriptive form of data analytics since it includes past and present collected data to assemble insights into what has happened or is currently happening during projects. For example, business Intelligence can tell you where a project fell short (scheduling, process, materials, labor, etc.) or the current state of progress but does not necessarily help project leaders and other stakeholders predict/prevent shortfalls in the future.

On the other hand, Construction Analytics is considered predictive, focusing on the “why” to make more informed predictions regarding construction projects. With Construction Analytics, data analysis helps predict challenges and adapt to improve outcomes.

Construction analytics solutions help organizations counter low-performing trends by asking the “right” questions of the right people at the right time to collect data to assist project owners and leaders with managing costs and improving performance.

Construction analytics visual outputs include dashboards containing real-time

key performance measures at the project, program, and portfolio level by employing the following steps:

Construction data, which typically resides in various systems and tools, including paper-based processes, is collected and processed-initially manually and later automatically as source data improves.

A database platform analyzes, sorts, and aligns incoming data, enabling consistency from multiple sources.

Dashboard visualization is crucial to presenting a consistent look and feel with the appropriate amount of detail for the intended audience to digest. In addition, the visualization provides easy and efficient reporting on key performance measures at customizable reporting levels.

Construction analytics solutions like Avvir analyze real-time performance data against the model plan with thresholds—assessing trends over time and transforming information into insight, enhancing decision-making, reducing costs, and improving overall project delivery.

What are the 4 types of Construction Analytics.



Moving from descriptive to predictive and prescriptive analytics to improve project delivery.

Descriptive analytics helps users answer questions about what happened on construction projects. These practices summarize large datasets to describe outcomes to project stakeholders - Owners, GC's and other stakeholders. By developing KPIs, these strategies can help track failures and successes. Metrics such as "planned vs. actual" for production tracking are used by many innovative builders. This process requires collecting relevant and real-time data via the jobsite, processing the data in the cloud, data analysis engine, and data visualization in dashboards. This solution provides essential insight into past performance and where you are today.

Diagnostic analytics. While descriptive analytics uncovers what's happening within a construction project or portfolio of projects, diagnostic analytics take this further by drilling down into the why. In doing so, diagnostic analytics help construction firms understand why activities (e.g., schedule delays or budget overages, etc.) have occurred. This is done using historical data to allow construction firms to rectify changes to refine operational workflows or apply beneficial techniques in other areas for further optimization.

Predictive analytics helps you answer questions about what will happen in the coming months of your current project or on future construction projects. These methods use historical data to identify trends and determine if they are likely to recur. As a result, predictive analytical tools provide valuable insight into what may happen and help

on future projects. Its methods include a variety of machine learning and statistical methods, such as regression analysis, decision trees, and neural networks, etc.

Prescriptive analytics helps answer questions about what action to take at a certain stage of the project. By using insights from predictive analytics, you can make data-driven decisions in the face of uncertainty. Prescriptive analytics techniques rely on machine learning strategies to find patterns in large datasets. For example, the likelihood of different outcomes can be estimated by analyzing past decisions and events.

One of the essential prescriptive analytics in construction is risk analysis and risk management, which are critical elements for successful project delivery and continued building operations. Most projects that incur significant delays, and cost overruns, are victims of poor risk management in the planning and execution of construction projects. Risk management involves planning, identification, monitoring, classification, response analysis, and several other factors. Risk analysis estimates future assets, outcomes, and impacts that may present complications—innovative field-first technology and risk management and analysis tools.

The many variables (e.g., complexity, project type, technical elements, location, number of players, etc.) related to construction projects can make Risk Management challenges.



Assessing project risk.

Prescriptive analytics aid in risk management by answering questions about what actions to take at each stage in the construction process. This is important for successfully delivering projects on-time and under budget. In addition, this helps mitigate maintenance risks associated with building operations.



Establishing a Baseline with Descriptive and Diagnostic Analytics.

Implementing descriptive analytics assists you in understanding what is happening across your projects and portfolio. Still, you first need to implement standard data practices or expect to have significant accuracy challenges.

Very few projects implement standards, and a lack of standards leads to dirty data. In our experience at Avvir, our customers often want to answer questions they have not prepared for in project planning.

If you report on projects or portfolios to answer specific questions, you must first embed those concepts into your project.

With these data sets built in a clean, normalized way, we can start to understand why using diagnostic analytics.

Predictive analytics

Reporting Examples.

- Rooms
- Areas
- Floors
- Subcontractors
- Manufacturers
- Specification
- Installation Type
- Sequencing

Leaders are moving to Predictive Analytics.

General contractors can track the progress of individual trades by comparing as-designed BIM data against LIDAR laser scans that track as-built construction. LIDAR laser scans capture a three-dimensional image of as-built construction with accuracy down to the eighth of an inch.



Tracking construction progress to measure deviation and prevent costly rework.

There are many challenges for contractors and their project managers, including misaligned processes, paper-based workflows, data silos, and ineffective software solutions for collecting critical details from the jobsite.

Predictive analytics helps stakeholders take action at various stages of the project as well as on future projects. This requires collecting massive amounts of data in real-time on the jobsite and across the organization.

Nevertheless, this is a game-changing solution in the construction industry. Multiple work scenarios based on insights can be applied to improve estimates, reduce costs and avoid failures on future projects, helping produce better outcomes on the current work.

Descriptive Analytics describes what is happening. Some say Diagnostic analytics tell why a trend is occurring. Predictive analytics leverages historical data. Statistics and machine learning to predict what will happen.

Use Case:

Predictive analytics can leverage past project costs to account for accuracy and the likelihood of project budgets being on target. With Avvir, we can leverage historical trends across subcontractors, manufacturers, and specifications to highlight where errors are more likely to occur onsite. If we highlight that 80% of deviations on past projects come from incorrectly installed [x] elements, then we can likely predict where future deviations will be and what costs or schedule delays might be associated.

Conclusion



Construction Analytics: Progressing from Descriptive to Predictive Analytics.

Leveraging Business Intelligence and Construction Analytics requires tackling Descriptive Analytics in the first step.

The digital transformation and adoption in the construction industry will pave the way for predictive analytics to help Construction Teams make better business and project decisions.

In order to understand how Construction Analytics can serve the construction industry, think about a GPS system.

According to [Inside Info](#), GPS technology is a

commonly used prescriptive analytics tool. It provides recommended routes to get users to their desired destination based on journey time and road closures.

In this instance, prescriptive analysis optimizes an objective that measures the distances from your starting point to your destination and prescribes the optimal route that has the shortest distance.

Applying construction data analytics can literally be a roadmap for how to improve efficiency across projects, portfolios, and an industry. However, it starts with your firm.



References

- [Master's in Data Science.org](https://www.masterinsciencedata.org/)
- [Oracle Construction Analytics](#)
- [Construction Exec - Data Analytics](#)
- [Data Shapa - The Rise of Business Intelligence in Construction](#)
- [The Four Types of Data Analytics](#)
- [McKinsey Construction Analytics](#)
- [VentureBeat - Toric - Construction Analytics](#)

About Avvir

Avvir is reshaping the way project owners and their general contractor partners manage construction progress. Contractors can track the progress of individual trades by comparing as-designed BIM data against LIDAR laser scans that track as-built construction. LIDAR laser scans capture a three-dimensional image of as-built construction with accuracy down to the eighth of an inch.

The Avvir platform includes *Avvir Progress*, *Progress 5D*, and *Avvir Inspect*.

- Focus on solving issues, *not finding them*.



+1 (917) 275-7276
hello@avvir.io



28 Liberty Street
New York, NY 10005



www.avvir.io
linkedin.com/company/avvir