Data Wars: Is Your Company Set Up to Win?

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Data Scientist,
Autodesk

Anand is a part of the team at BIM 360 Project IQ where he spends time trying to use data as the foundation for a new stack of construction technologies. He continuously uses AU as a platform to talk about the impact of AI on the Construction Industry.
Andy Leek

VP - Technology & Innovation, PARIC

Andy is responsible for strategic planning, implementations of enterprise technology, and innovation. Andy’s tenure at PARIC has focused on developing a proactive strategy to integrate cloud-based VDC tools with processes that enable extended project teams to be more collaborative and efficient. Most recently, Andy has been focused on leveraging their data using machine learning and artificial intelligence to better understand their projects, and using predictive tools and a common data interface, enable their project teams to glean insights about their projects.
The Construction Landscape
$10.3 TRILLION by 2020
94% of the respondents found difficulty in hiring and retaining skilled labor.

- USG + U.S. Chamber of Commerce Commercial Construction Index - 2018 Q3
Overview of productivity improvement over time

Productivity (value added per worker), real, $2005

$ thousand per worker

Source: Expert interviews; IHS Global Insight (Belgium, France, Germany, Italy, Spain, United Kingdom, United States); World Input-Output Database

McKinsey & Company
Overview of productivity improvement over time

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McKinsey&Company
Construction Startup Investment Cadence


- **Total $ Invested**
- **Number of Deals**

![Graph showing the total capital invested and number of deals from 2010 to 2018. The graph highlights a significant increase in investment and deals in 2015, followed by a decrease in 2016 and a sharp increase in 2018 (YTD).](image-url)
42% use drones to monitor construction status

30% use robotics or automated technology

65% use remote monitoring on sites

30% use radio-frequency identification to track equipment and materials on site

17% use smart sensors to track people on site

61% use Building Information Modeling on a majority of their projects
DATA SILOES
“While we’ve made tremendous strides in implementing technology solutions, we’ve created a level of complexity we can’t fully cope with. Sometimes I feel like we’re inundated by our own data – data which we don’t understand and therefore can’t use.”

- an Executive, as quoted in The Creative CIO, a 2016 KPMG/Harvey Nash global survey of engineering and construction CIOs
COLLABORATE

BUILDING CONNECTIONS
- Digitization
- Connected Jobsite
- Single Source of Truth

AUTOMATE

STREAMLINING PROCESS
- Data Standards
- Communication between technologies
- Improved workflows

PREDICT

LEVERAGING THE DATA
- Proactive problem prevention
- Improving quality and Safety
- Increasing Productivity
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ENR Top 200 Nationally

$635 MM in project revenue for 2017

Established in 1979.

St. Louis Based
+ Kansas City, Des Moines, Cincinnati

Services
General Contractor, Construction Manager, Design/Build, Self-Perform
DEMOCRATIZE
CROWD-SOURCE
GET-TO-ZERO
Miscommunication between teams

Missed Deadlines

Costly Rework
COLLABORATE

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Internal Reporting and Analytics

- Daily Issues
- Weekly Surveys
- Monthly Reviews
- Annual Results
Intelligent Integrated Enterprise
Start: January 10, 2017
Finish: March 05, 2020
Projected End Date: May 13, 2020
Overall Risk: 0.60

Projects:
- LEVEL 4 Complete Construction Punch
  - Start Date: August 27, 2018
  - End Date: August 31, 2018
- LEVEL B1 Tape and Finish
  - Start Date: August 14, 2018
  - End Date: September 04, 2018
- LEVEL 3 Flooring
  - Start Date: August 20, 2018
  - End Date: September 10, 2018
- Roofing
  - Start Date: July 15, 2018
  - End Date: July 25, 2018

ACTIVITY LOG:
- Task Exterior Terracotta on Mt. Stud was updated.
- Task Exterior Terracotta on Mt. Stud was updated.
- Task Terra Cotta was updated.
- Task Terra Cotta was updated.
- Task Point Panels was updated.
- Task Replace Screen Wall was updated.
- Task Exterior Terracotta on Mt. Stud was updated.
- Task Exterior Terracotta on Mt. Stud was updated.
- Task Terra Cotta Tile was updated.

Your project is running but we aren’t sure where you are. Add a location to your project.

1,135 Trees Saved
406 hrs Time Saved
Safety is no accident
Autonomous Flight Overview

1. Collect
2. Process & Analyze
3. Consume

Mission Planning + Data Processing

Multiple Users
Project Permissions
Project Team
Topography Data, Volumetrics, and Design Overlay
Innovation: How API’s enable the Cloud

- Share
- Iterate
- Single Source of Truth
- Common Ground (Control)
- Streamline
Collaborate

Building Connections
- Digitization
- Connected Jobsite
- Single Source of Truth

Automate

Streamlining Process
- Data Standards
- Communication between technologies
- Improved workflows

Predict

Leveraging the Data
- Proactive problem prevention
- Improving quality and Safety
- Increasing Productivity
Risk Today: High

CONTRIBUTING FACTORS

- 12 High Risk Issues
- 8 Water Risk
- 7 Fall Risk
- 3 Safety Inspections
- 2 Design Coordination RFIs

BIM 360 Project IQ
Quality Risk

High Risk Quality Issues

Subcontractor Quality Risk

Risk Today: High

Contribution Factors

- 21 High Risk Issues
- 1 Water Risk
- -1 Weekly Issue Trend
- 22 Days Open (avg.)
- 2 Long Standing Issues

Daily risk is assessed nightly, based upon analysis of current project data.

About Daily Risk

High Risk Issues

- #001057: Level 1 pharmacy area hanging unit reference photo 301, once the ceiling in place, servicing this equipment will be near impossible.
- #001044: Level 1 VAV 208 reference photo 301 incorrect position for future service. Make accessible.
- #001048: Level 1 VAV 341 reference photo 302 incorrect position for future service. Make accessible.
- #001049: Level 1 VAV 323 reference photo 303 incorrect position for future service. Make accessible.
- #001051: Level 1 VAV 231 actuator Incorrect position for future service, no photo available, the actuator is wrapped in plastic and cannot...
- #001052: Level 1 VAV 202 incorrect position for future service, no photo available, the actuator is wrapped in plastic and cannot...
- #001058: Level 1 VAV 459 incorrect position for future service reference photo 312. Rotate valve to make position indicator visible.

Subcontractor: High
Risk: High
Days Open: 10 days
Predict and prevent problems in Virtual Design & Construction

Improve Quality and Reduce Safety Incidents

Eliminate Preventable RFIs

Reduce Change Order Risk

Improve Margins / Reduce Risk
The Next Steps
COLLABORATE

BUILDING CONNECTIONS
- Digitization
- Connected Jobsite
- Single Source of Truth

AUTOMATE

STREAMLINING PROCESS
- Data Standards
- Communication between technologies
- Improved workflows

PREDICT

LEVERAGING THE DATA
- Proactive problem prevention
- Improving quality and Safety
- Increasing Productivity

[Image of a dashboard showing various metrics and data for construction projects, including quality risk factors and subcontractor safety risk.]
## RFI & CO Research

<table>
<thead>
<tr>
<th>Root Cause</th>
<th>Structural</th>
<th>Mechanical</th>
<th>Electrical</th>
<th>Plumbing</th>
<th>Concrete</th>
<th>Fire Protection</th>
<th>Civil/Site</th>
<th>Masonry</th>
<th>Interior Finish</th>
<th>Exterior Envelope</th>
<th>Landscaping</th>
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</tbody>
</table>
Recommendations are made based on RFIs and design changes from the contractor’s past projects.
LOWER RISK

HIGHER MARGINS