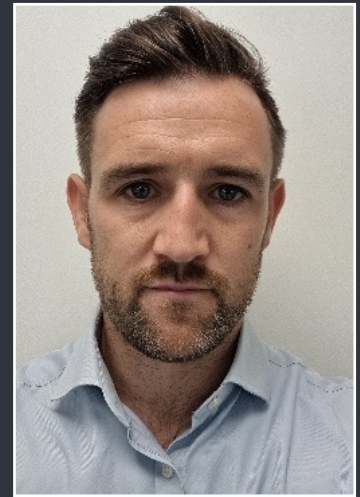


# A Framework for Utilising Activity-Level Site Data during the Construction Phase of Projects

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The construction industry faces significant challenges, including low productivity, a lack of research and development, and slow technology advancements. Construction productivity can be defined from both macro and micro perspectives. Macro-level productivity data fails to provide sufficient insights required for productivity improvements. Productivity improvements require analysis of micro-data of the actual performance of specific projects at the activity level. Collecting activity level data often relies on manual, time-consuming methods, with the data often not effectively utilised within the construction phase of projects. Data is required to inform effective, accurate and timely decision-making. This study focuses on utilising field data at the activity level to enhance productivity through informed decision-making.

Literature highlights how technology can be utilised to assist data capture, which is required for decision-making; however, there are challenges to the adoption of these systems. This research aims to develop a framework based on the DIKW (Data, Information, Knowledge, Wisdom) hierarchy, with wisdom being the accurate, timely, and informed decisions that will improve construction project productivity. The framework looks to assist construction projects in implementing digital tools in collecting and utilising site data effectively, and overcoming the barriers to implementation.

Primary data was collected through a mixed-methods approach. An exploratory investigation within a Tier 1 construction organisation was followed by a survey of 160 construction professionals from this organisation across a range of projects. The survey determined how site data, implementation of digital tools and dashboards were currently being used for the purpose of decision-making and challenges and barriers. Based on these results, a series of interviews was conducted with project decision-makers to provide insights into improving adoption and identifying potential metrics for measuring site data.

The survey identified a positive relationship between the use of digital tools and where individuals perceived productivity benefits, and improved decision-making at a site level, however site, section and senior engineer roles showed the lowest engagement in the use of site data. The interviews revealed that current barriers for this engagement included insufficient time in their role due to conflicting priorities, a lack of understanding of the value of the data, a project culture that prioritises data for management reporting over production improvement, and limited resources available to support implementation. For the use of metrics and dashboards in improving activity-level decision-making, the themes included the need for a feedback loop for data forecasting, a single source of truth, access to data across projects and sectors, and automation of data systems. A key area for improvement metrics was around quality.

These insights are incorporated into the DIKW hierarchy to provide a framework that identifies steps and challenges that need to be addressed to realise the business value (wisdom) of site data through informed decision-making. This is a preliminary study that identifies new lines of enquiry for evaluation on live projects to develop digital strategies, ensuring project team engagement and overcoming implementation barriers.