

Member Communication Experience

Rethinking Procurement Through Human-Centered Design

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Construction organizations continue to invest heavily in digital technologies to improve project delivery, operational performance, governance, and workforce management. Digital permit-to-work systems, workforce management platforms, AI-enabled analytics, inspection software, and mobile field applications have become central to digital transformation strategies. Yet despite significant investment, many organizations fail to achieve the levels of adoption and operational value they anticipated. Recent research suggests that many of these challenges originate long before implementation begins. They begin during procurement.

Despite this investment, organizations often assume digital construction technology fails because workers resist change or because implementation falls short. Recent research suggests something different. In many cases, the conditions that determine whether technology succeeds or fails are established before workers ever log into the system. They are created during procurement.

Many organizations continue to encounter a familiar challenge. Systems introduced with the expectation of simplifying construction management often become underutilized, inconsistently adopted, or viewed by frontline workers as an additional administrative burden rather than a practical tool that supports operational delivery. When this occurs, attention typically focuses on implementation. Organizations respond by increasing training, strengthening communication, or encouraging workers to embrace change. While these



interventions are important, they often address the symptoms rather than the underlying cause.

This research examined why digital construction technologies succeed in some organizations but struggle in others. Drawing on interviews with frontline construction workers, experimental usability studies, and mixed-methods analysis, it found that adoption depends as much on organizational decision-making as on software capability. These conditions are established during procurement, where decisions about functionality, governance, and organizational priorities shape how technology is ultimately experienced by the workforce.

THE PROCUREMENT DECISIONS WORKERS NEVER SEE

Technology procurement is commonly viewed as a commercial

and technical exercise. Procurement teams assess cybersecurity requirements, reporting capability, integration with existing business systems, contractual obligations, and overall cost before selecting a preferred solution. These are entirely legitimate considerations and remain essential for effective organizational governance.

However, procurement also determines which voices influence the design and configuration of the technology that workers will ultimately use. In practice, procurement decisions frequently prioritize organizational requirements such as compliance reporting, auditability, and management oversight, while comparatively little attention is given to how the system will function within the realities of construction work.

This distinction is important because construction workers experience technology very differently from those evaluating it. A digital platform may satisfy every organizational requirement while simultaneously creating unnecessary complexity for the people expected to use it throughout the working day. By the time implementation begins, many of the design decisions affecting usability have already been made, leaving organizations to manage challenges that originated much earlier in the process.

Consider two contractors purchasing the same digital permit-to-work system. One evaluates the software with supervisors and frontline workers on a live construction project, observing how it performs while workers wear PPE and complete routine field tasks. The other selects the platform primarily on reporting capability demonstrated in a meeting room. Although both organizations purchase the same technology, the likelihood of successful adoption is very different because the procurement process itself has determined how well the system aligns with operational reality. This example illustrates an important point: implementation cannot fully compensate for procurement decisions that fail to consider the realities of frontline work. The technology itself has not changed. What has changed is the procurement process used to evaluate it.

WHEN ORGANIZATIONAL REQUIREMENTS CREATE DIGITAL BURDEN

One of the strongest themes emerging from the research was not that workers resisted digital technology, but that they became frustrated when technology disrupted rather than

supported the way they worked.

As one participant explained:

"The app takes longer than just writing it down."

Another described why digital records were often completed retrospectively:

"You end up doing it later because you don't have time."

These comments are revealing because they challenge a common assumption that poor adoption reflects resistance to change. Instead, they suggest that workers make rational decisions when digital processes increase effort without providing an obvious operational benefit. When systems require repeated data entry, multiple screens, or workflows that bear little resemblance to how work is actually undertaken, workers naturally seek practical ways to maintain productivity while still meeting procedural requirements.

These findings led me to develop the concept of **Digital Compliance Burden** - the additional physical and cognitive effort created when digital construction systems prioritize organizational reporting and compliance over the practical realities of frontline work. Rather than simplifying construction management, poorly designed digital processes increase workload, create friction, and encourage workers to develop informal workarounds simply to complete routine tasks.

CONSTRUCTION IS NOT AN OFFICE

Many digital systems are selected following demonstrations undertaken in meeting rooms, training facilities, or office environments where lighting, connectivity, and working conditions are controlled. Construction sites present a very different reality.

Workers routinely wear gloves, safety glasses, and other personal protective equipment, operate in changing weather conditions, move between work areas, and frequently work in locations where mobile connectivity is unreliable. These environmental factors fundamentally influence how digital technology performs, yet they are rarely evaluated with the same rigour as reporting functionality or software integration.

The workers interviewed during the study repeatedly described these practical constraints.

One participant summarized the challenge of interacting with touchscreens while wearing protective gloves:

"Can't do it with them on."

Another highlighted the limitations created by poor connectivity:

"If you're in the basement or somewhere with poor reception, you can't log in or sync the tablet."

These comments illustrate that usability is not determined solely by software design. It is equally influenced by the physical environment in which technology is expected to operate.

Experimental research reinforced this conclusion. Simple interventions, including the use of stylus pens and touchscreen-compatible gloves, significantly improved interaction with digital field applications while maintaining PPE compliance. The findings also demonstrated that relatively small design interventions can produce meaningful improvements in usability. Larger touch targets, simplified workflows, and interfaces requiring fewer interactions reduced frustration and enabled workers to complete digital construction tasks more efficiently. These observations reinforce an important principle: organizations should not expect workers to adapt to technology when technology can often be adapted to support workers.

TECHNOLOGY ADOPTION IS ALSO AN ORGANIZATIONAL ISSUE

Successful technology adoption depends upon more than usability alone. Organizational culture, supervisory support, confidence, and access to assistance all influence whether workers develop trust in new systems and continue using them over time.

One participant reflected this challenge succinctly:

"There's no one to ask for help. If you go to your supervisor, they just tell you to get on with it, so you're left figuring things out on your own."

This observation highlights an important issue. Training should not be viewed as a single event delivered during implementation, but as part of a wider support system that

enables workers to develop confidence and competence over time. Equally, organizations should avoid assuming that additional training can compensate for procurement decisions that have already introduced unnecessary complexity into the user experience.

Organizations achieving the greatest success with digital construction technology adopt a different approach. Rather than treating frontline workers simply as end users, they recognize them as subject matter experts whose operational knowledge provides valuable insight during procurement. Piloting technology under genuine site conditions, evaluating usability alongside functionality, and incorporating worker feedback before contracts are awarded enables organizations to identify barriers that are rarely visible during software demonstrations.

RETHINKING DIGITAL PROCUREMENT

Digital transformation should begin with a different conversation. Alongside discussions about functionality, integration, and compliance, procurement teams should also consider whether technology genuinely supports the realities of construction work.

Questions such as whether the system can be comfortably operated while wearing PPE, whether it functions reliably in low-connectivity environments, whether interfaces minimize unnecessary cognitive effort, and whether simple accessories such as stylus pens or touchscreen-compatible gloves should be provided may appear operationally minor. The research suggests they are strategically significant because they influence whether technology becomes embedded within everyday practice. Equally important is recognizing frontline workers as operational experts rather than simply end users. Their experience provides evidence that procurement teams cannot obtain from software demonstrations alone.

Reducing digital compliance burden should become a strategic procurement objective alongside functionality, cybersecurity, system integration, and commercial value because it directly influences whether workers experience technology as an enabler of safe work or simply another administrative obligation.

Construction does not have a shortage of innovative

technology. It has a shortage of procurement processes that give equal consideration to organizational governance and frontline usability.

Digital transformation is not determined by the sophistication of the software purchased. It is shaped by the decisions made before implementation begins, whose voices are heard, which problems are prioritized, and whether technology is designed around the realities of work.

If organizations genuinely want digital technology to improve project delivery and workforce performance, procurement must become more than a commercial exercise. It should be recognized as the first stage of implementation and the point at which successful adoption is either enabled or constrained. 



About the Author

Melvin Keyani is an environmental, health, and safety director at [Dornan Engineering](#) (A Turner Company), where he leads health, safety, and wellbeing strategy across major construction and engineering projects.

With more than 25 years' experience in the construction industry, Melvin specialises in high-risk environments, organizational leadership, digital transformation, and human-centered health and safety. He is currently completing doctoral research exploring the factors that influence the successful adoption of digital health and safety technologies on live construction projects, with a particular focus on usability, worker engagement, and procurement practices.

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