Organizational Culture and AI Adoption in Engineering Firms

An Online Continuing Education Course for Engineers

Course Number: FM-2013

Credit: 2 Hours / 2 PDH / 2 CPD

Organizational Culture and AI Adoption in Engineering Firms

Tuesday A. Strong, MBA, MSHRD, MSSM

Introduction

Organizational culture, namely how people think, behave, and interact in the workplace, shapes how engineering firms approach change. Whether it's rooted in long-standing safety practices, a commitment to technical excellence, or a rigid hierarchy, culture often influences the outcome of innovation or change efforts more than the tools or systems we adopt. As artificial intelligence (AI) continues to enter engineering environments, whether predictive maintenance, simulation modeling, automated inspections, or project scheduling, it becomes increasingly clear that technical readiness alone isn't enough. Culture can either accelerate or stall progress.

Many organizations invest heavily in the infrastructure needed for AI, in the tools, platforms, and data strategies. And rightly so, but too often, they overlook the underlying mindset of the organization. Employee fears about job security, skepticism around algorithmic or computer-based decisions, or even a lack of collaboration across departments can slow even the best plans. That's why understanding and aligning organizational culture with AI initiatives isn't optional; it's essential. It's how we build trust, encourage thoughtful risk-taking, and encourage engineering teams to experiment and learn continuously.

This course is designed to help engineers recognize and address the cultural factors that impact AI adoption. We'll examine common culture types found in engineering firms and discuss how each tends to respond to change. You'll also be introduced to a complimentary organizational readiness assessment you can use to start conversations within your own team. We'll look at practical strategies for identifying barriers, shaping a more change-ready culture, and applying proven change models to guide transformation. Whether you're leading projects, supporting implementation, or simply want to better understand your organization's readiness, this course offers tools and insights to help you make meaningful progress, not just with AI, but with the team members who make it work.

Section 1: Understanding Organizational Culture

Culture lives in how we think, work, and relate to one another. In engineering firms, it's shaped over time by project demands, safety expectations, leadership behavior, and industry norms. While engineering often prides itself on logic, accuracy, and structure, the culture beneath the surface, the unspoken rules and shared assumptions, has a powerful influence on how teams respond to change. When it comes to adopting technologies like AI, that influence can either encourage participation and change or slow it down or prevent change entirely.

There's no single "right" culture for AI to succeed in, but understanding your firm's culture is essential if you want your AI initiatives to take root. One useful way to think about organizational culture is through the Competing Values Framework (Quinn & Rohrbaugh, 1983), which outlines four broad culture types.

Each has strengths and challenges in relation to implementing AI:

- Clan Culture values collaboration and mentorship. Organizations known for this type of culture tend to rely on trust and relationships. Innovation often comes from the lower ranks of the organization, but change can be slowed by the pursuit of consensus in decision-making.
- Adhocracy Culture thrives on flexibility and risk-taking. These types of firms embrace experimentation and may lead competitors in terms of piloting new AI tools, but they may struggle with follow-through or consistency.
- Market Culture is driven by results, competition, and bottom-line outcomes. AI adoption may accelerate in these types of organizations when there's a clear return on investment, but employee concerns may be overlooked if speed is prioritized over inclusion.
- Hierarchy Culture emphasizes structure, process, and control. These types of firms often value predictability and compliance, so AI initiatives may gain traction only when they are aligned with regulatory or safety imperatives and backed by leadership and aligned with strategic priorities.

Regardless of which type is dominant within your organization, every culture must manage how change is communicated, who's invited into the conversation, and how innovation is encouraged and to what extent. A firm with a strong hierarchical mindset, for example, may find it difficult to explore AI in its early stages, whereas an adhocracy may jump in quickly but needs help turning early wins into long-term value.

Culture isn't something that stays fixed. It evolves especially when external pressures, like technological change, force organizations to adapt. That's why the first step toward aligning culture with AI is understanding what you're working with. When you know the strengths and limits of your culture, you can identify where friction is likely to occur and plan accordingly. This awareness can guide decisions, shape communication strategies, and help you build a cultural foundation that supports, not resists, your AI goals. There are several elements to consider when assessing your organization's readiness for an AI implementation. Consider using our readiness assessment guide to help get your team started.

Section 2: Cultural Barriers to AI Adoption

AI technologies are widely accessible, and their potential to improve operations, decision-making, and innovation is well-documented. Yet despite their promise, many engineering firms struggle to move beyond small-scale pilots. The reason isn't always technical; it's often cultural. Organizational culture, especially when not deliberately considered, can prevent even the most seemingly simple AI pilots. One of the most common barriers is resistance to change. Engineers are trained to value accuracy, consistency, and safety. These strengths can reinforce a preference for what's known and proven. So,

when AI is introduced, especially in ways that feel disruptive to roles, routines, or long-standing practices, skepticism may naturally follow. This resistance rarely shows up as open defiance. It tends to surface through hesitation, delays, or disengagement.

Another challenge is trust, or rather, lack of it. Engineers often rely on deterministic systems where outcomes can be traced and explained. In contrast, many AI tools operate on probabilities and machine learning models that lack transparency. Without clear communication about how the tools work and what they're meant to do, teams may not feel confident using them. If conversations about data quality, model bias, or ethics are missing from the rollout, trust can erode quickly. Even well-performing tools may go unused if people don't feel safe asking questions.

Silos can be another common deterrence to progress. Many engineering firms are structured around disciplines, mechanical, electrical, civil, and so on. These teams often develop their own ways of working, their own languages, and even their own cultures. But AI doesn't respect silos; it requires data to flow and collaboration to occur across functions. In firms where communication across teams is limited, it's difficult to build the cross-functional partnerships that AI demands.

Job security concerns also play a role. Even when leadership says AI is about augmentation, not replacing people, vague messaging or a lack of transparency can lead to anxiety. People start to wonder what the changes mean for them, and without an opportunity to talk through those concerns, resistance to using AI can take hold. Employees may disengage not out of defiance, but out of self-preservation. And then there's cultural inertia, the sense that what worked before will work again. In firms that have experienced success doing things "the traditional way," change can feel unnecessary or even threatening. When the mindset is, "We've always done it this way," it becomes much harder to introduce something new, especially a technology as transformative as AI.

Recognizing these cultural dynamics is critical. Technology alone won't drive adoption. If we want AI to become an effective tool, we must have honest, proactive conversations, challenge assumptions, and acknowledge the invisible barriers that get in the way. Change efforts that overlook culture might still move forward, but rarely with the speed, alignment, or impact that's possible when people feel included, informed, and supported.

Section 3: Assessing Cultural Readiness for AI

Before introducing AI into an engineering environment, it's important to step back and ask a fundamental question: *Are we culturally ready for this change?* Too often, organizations move forward with implementation efforts and excitement for the technology, but have given little thought to how the organization will respond. Without understanding your current culture, what aspects will likely support change and what might hold it back, you risk missing subtle yet critical dynamics that can determine whether an AI implementation will succeed or fail.

Cultural readiness isn't about having all the answers; it's about knowing where you stand. It means taking a close look at whether your values, behaviors, and ways of working support the kind of experimentation, collaboration, and learning that AI requires. This includes how employees perceive change, how leadership communicates, and whether people feel safe speaking up about concerns. Psychological safety plays a foundational role in any successful AI implementation effort. It involves employees feeling comfortable and safe to speak up, ask questions, or express uncertainty without fear of embarrassment or retaliation. When this type of environment exists, employees are more likely to be receptive to new tools and processes. In engineering environments where precision and expertise are often expected, admitting confusion or voicing concerns about AI can feel risky. But without space for these types of honest conversations, valuable feedback is lost. Creating psychological safety isn't about making everyone comfortable all the time; it's about establishing a culture where people know their perspectives are welcome, where mistakes are seen as part of learning, and where curiosity is encouraged. Especially when introducing technologies that challenge established workflows or decision-making authority, creating an environment with psychological safety is a strategic advantage.

Organizational readiness assessments need to be more than a gut check. While intuition can surface early warning signs, effective evaluations combine both qualitative and quantitative methods to provide a more comprehensive understanding of the culture, even for leaders who believe they fully understand their employees and company. Interviews, focus groups, and open-ended surveys are useful for understanding how employees talk about technology and change, and AI in particular, and whether they feel empowered to experiment, as well as how past change efforts went. These tools can also reveal areas that aren't always visible to leadership, including fears related to job security, reservations about data quality, or even frustrations with siloed communication.

Organizations seeking a quantitative perspective may use culture inventories, internal surveys, or custom metrics to support alignment of AI goals. One option is the Organizational Readiness Assessment Tool I've developed, which focuses on areas including communication flow, cross-functional collaboration, support for new ideas, and leadership consistency. These kinds of tools don't just offer a snapshot; they give you something to measure over time as your culture evolves.

One often overlooked benefit of this process is the ability to identify your culture carriers, those individuals who naturally champion innovation and motivate others to participate, as well as those who, intentionally or not, slow things down. Knowing who holds influence in your organization, both formally and informally, helps you bring the right voices into the planning process early.

What's most powerful about assessing cultural readiness isn't just the data you collect, it's the dialogue it creates. Done well, the process sparks new conversations, surfaces insights you might not have considered, and builds a shared understanding of where you're headed and what might need to shift. These conversations set the tone for change. They show that leadership is serious about listening, adapting, and working together to shape a future that includes, not overrides, your people and your culture.

Section 4: Leadership's Role in Framing the Purpose for Digital Transformation

In engineering environments, digital transformation isn't just about upgrading tools or automating processes; it's strategic and required in a competitive market. Leaders have a responsibility to authorize change and communicate its purpose in a way that helps employees understand where the organization stands in the broader market, how customer expectations are shifting, and what the competitive landscape looks like. This type of communication connects daily effort to the organization's long-term direction, promoting both support and alignment.

Far too often, employees are informed about what will change, but not why. A decision to integrate AI, for instance, may be framed around efficiency or data optimization. While those are valid outcomes, they don't tell the full story. Employees want to know: What is influencing this change? How are competitors approaching similar challenges? What happens if we don't adapt? When these types of questions go unanswered, AI adoption risks being seen as another top-down initiative and disconnected from the realities of employee roles and priorities.

Effective leadership communication bridges that gap. It contextualizes transformation efforts within a broader business strategy. As Leinwand and Mani (2022) explain, transformation efforts succeed when they're capabilities-driven and when leaders foster shared ownership across all levels of the organization. That starts with helping employees see how their work supports strategic priorities.

One approach is to begin by sharing the "market moment"—a synthesis of what's happening outside the organization that makes transformation needed. This could include increased demand for customization, new safety regulations, or how industry standards are shifting due to AI-enabled design and inspection methods. When leaders openly acknowledge these factors, it shifts the narrative from "this is a change we're doing to you" to "this is a response to real-world dynamics we're addressing together."

Just as important is illustrating how customer needs and expectations are evolving. In many engineering fields, clients now expect faster turnaround times, real-time collaboration, and predictive insights rather than static reports. AI helps meet these demands, but only if teams understand how their specific contributions support that shift. Leaders should draw clear connections between internal transformation efforts and external customer value. For example, if AI is being used to automate elements of project scheduling, employees need to know how that improves client responsiveness, not just operational efficiency.

Competitor behavior also plays a critical role in shaping strategic direction. When organizations fail to communicate how they benchmark against industry peers, especially in terms of digital capability, they miss a powerful engagement opportunity. Knowing how others are using AI tools can spark a healthy sense of urgency and curiosity, not just fear. As discussed in the *From Tech-Driven to People-Powered*

framework, understanding through privileged insights is key to fostering alignment (Strong, 2024). In this context, that means giving employees insight into how the company is positioning itself competitively, rather than keeping strategy reserved for the C-suite.

Leaders must also be honest about the organization's digital maturity and how transformation will unfold. Employees don't expect perfection, but they do expect transparency. And even though full transparency isn't always possible, key questions surrounding AI efforts can be addressed, for example, "Will AI adoption occur in phases?" "What training will be provided?" "Will our responsibilities change?" Ambiguity can create anxiety; clarity, even when plans are still developing, fosters trust.

Importantly, choosing *not* to adopt AI, or delaying its implementation, is itself a strategic decision that must be communicated just as clearly. Opting out can send strong signals to customers, partners, investors, and employees alike. If the organization d lines that AI is ate for a specific function or timeframe, leaders should explain th tions are being prioritized. Doing so reinfo g trends.

This level of tra assume AI means imminent job ch n in terms of long-term organi can reframe the narrative. Techno es whether it supports or disrup

Communicating str eetings. It requires continuous es through departmental conve ponsibilities. Project managers an n with enterprise goals. This d reduces confusion.

Finally, storytelling play ations have leveraged digital transfo rom industry journals, conferences, o latable success stories helps employees see what's possible and p e on abstract concepts like "AI adoption" or "market-driven transformation."

In short, strategic alignment doesn't happen automatically. It must be actively communicated, reinforced, and lived by leadership at all levels. When employees understand the organization's position in the industry, what's changing externally, how competitors are evolving, and what role they play in the future, they're more likely to support transformation. And when leaders communicate with clarity and honesty, digital transformation becomes not just a strategic initiative but a shared journey.