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OPERATIONAL READINESS AS A SOCIOTECHNICAL CAPABILITY: MOVING BEYOND TECHNICAL COMPLETION

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Operational readiness is often misunderstood as a technical milestone (a point at which systems are complete, procedures are documented, and assets are ready to operate). Yet, across asset-intensive industries, a recurring pattern persists: projects that meet their engineering, cost, and schedule objectives still struggle to achieve stable and reliable operations. Startups are delayed, ramp-ups are inconsistent, and operational issues emerge despite apparent technical completeness. This paradox reveals a deeper reality. Operational readiness is not a technical problem; it is fundamentally a sociotechnical one.

At its core, operational readiness depends on the alignment of multiple dimensions that extend far beyond the physical asset. These include people, processes, technology, governance structures, and organizational culture. Sociotechnical systems thinking provides a powerful lens to understand this complexity. It recognizes that operations are shaped by the interaction between technical elements (such as equipment, control systems, and digital tools) and social elements, including roles, skills, communication patterns, leadership, and incentives. These components do not function independently. They evolve together, influencing each other in ways that are often non-linear and difficult to predict.

This interconnectedness explains why technical completeness alone does not guarantee operational success. A system may be fully engineered and tested yet still fail under real operating conditions if the workforce is not adequately prepared, if procedures are not aligned with actual workflows, or if decision-making structures are not equipped to handle uncertainty. In practice, many operational failures originate not from flaws in design, but from misalignment across the broader sociotechnical system.

Consider, for example, the introduction of a new control system. While technically sound, it fundamentally alters how operators interact with the asset, how decisions are made, and how information flows across the organization. Similarly, new commissioning procedures can reshape team coordination, redefine interfaces between departments, and influence the timing and quality of decision-making. Even staffing models, often driven by corporate initiatives, can have profound implications for maintenance strategies and operational performance. Each of these changes triggers ripple effects across the system, reinforcing the idea that readiness must be approached holistically.

Sociotechnical misalignment is a major source of operational disruption. It manifests in delays, cost overruns, unstable ramp-ups, and, in extreme cases, safety incidents. These outcomes are particularly evident during the transition from project execution to live operations- phase characterized by uncertainty, evolving system behavior, and high-stakes decision-making. During this period, organizations are not simply activating assets; they are activating entire systems of interaction. Without proper alignment, even minor inconsistencies can escalate into significant operational challenges.

Modern operational readiness frameworks are increasingly grounded in sociotechnical principles. Among these, the Awareness–Preparedness–Readiness (APR) framework (see note 1) provides a structured approach to understanding readiness as a system-wide capability. Rather than asking whether an asset is technically complete, APR reframes the question: is the organization, across all its dimensions, prepared to operate under real conditions, given the risks and uncertainties it will face?

This shift in perspective is critical. It moves readiness away from a compliance-driven checklist and toward a capability-based model that emphasizes integration, alignment, and adaptability. Within this framework, readiness is achieved not by completing isolated tasks, but by synchronizing multiple elements of the organization. These include the preparedness of frontline personnel, the clarity and usability of workflows, the maturity of the operating model, the integration of digital systems, the robustness of handover processes, and the cultural readiness to operate a new asset. When these elements are designed and implemented in isolation, gaps inevitably emerge. When they are integrated, organizations are better positioned to achieve safe and efficient startups.

The importance of this integration is amplified in modern business environments, where technological advancement continues to increase system complexity. Automation, digitalization, and advanced analytics have transformed how assets are designed and operated. However, these technologies also introduce new dependencies between human and technical systems. Operators must interpret and respond to automated outputs, supervisors must manage risks in increasingly data-rich environments, and teams must coordinate across organizational and functional boundaries. In this context, operational readiness becomes a matter of managing interactions rather than simply deploying systems.

Sociotechnical systems thinking equips leaders with the ability to identify these interactions and understand their implications. It enables organizations to uncover hidden dependencies, anticipate potential points of failure, and design interventions that improve both safety and performance. For example, by analyzing how information flows between systems and teams, organizations can identify bottlenecks that may delay decision-making during startup. By examining the alignment between procedures and actual work practices, they can detect gaps that could lead to operational errors. By evaluating cultural factors, such as risk tolerance and communication norms, they can better understand how decisions will be made under pressure.

Importantly, sociotechnical alignment also enhances decision-making. In complex environments, decisions are rarely made with complete information. They are influenced by time pressures, uncertainty, and the cognitive limitations of individuals. Sociotechnical approaches recognize these realities and emphasize the need for structures that support effective decision-making. This includes clear governance frameworks, well-defined escalation processes, and mechanisms for integrating technical expertise with organizational oversight. By embedding these elements into operational readiness programs, organizations can improve their ability to respond to emerging conditions and reduce the likelihood of failure.

The benefits of a sociotechnical approach to operational readiness are substantial. Organizations that successfully integrate human and technical dimensions tend to experience faster and more stable ramp-ups, fewer operational disruptions, and improved long-term reliability. They are better equipped to manage uncertainty, adapt to changing conditions, and sustain performance over time. In contrast, organizations that focus narrowly on technical completion often find themselves reacting to problems that could have been anticipated and mitigated through better alignment.

Ultimately, sociotechnical systems thinking transforms how operational readiness is understood and implemented. It shifts the focus from delivering assets to building capabilities. It emphasizes that readiness is not a point in time, but a process of alignment and integration that enables organizations to function effectively under real-world conditions. This perspective is particularly relevant in today's complex and fast-paced environments, where the ability to adapt and respond is as important as the ability to execute.

Operational readiness, therefore, should be viewed as a strategic capability that integrates people, technology, processes, and culture into a coherent operational system. It is the mechanism through which organizations translate project outcomes into operational performance. By adopting a sociotechnical approach, leaders can move beyond the limitations of traditional frameworks and build organizations that are not only technically complete, but truly ready to operate. In doing so, they redefine success. It is no longer measured by the completion of a project, but by the ability to achieve safe, reliable, and sustainable operations from day one, and to maintain that performance as conditions evolve.

Notes:

Note 1: Operational Readiness: An Expertise-Based Framework to Bring Projects to Life. Available at: <https://pmworldlibrary.net/wp-content/uploads/2025/05/pmwj152-May2025-Tain-Operational-Readiness-An-Expertise-Based-Framework.pdf>