

The Human-Digital Organization

Managing human and digital capacity as one operating system

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ABSTRACT

Healthcare organizations are deploying AI-enabled systems into mission-critical workflows faster than they are redesigning the institutions themselves. The main change is the creation of a mixed workforce of humans and Digital Workers, but the main question for management is not whether humans or AI should own the future. It is how an accountable institution allocates work, authority, supervision, evidence, and learning across human and Digital Workers within shared workflows. This article defines the Human-Digital Organization as an evolving enterprise form in which both contribute to operational outcomes through managed roles and a common operating infrastructure. Its central capability is a human-digital composition, deliberately designed to specify which functions are human-led, digital-led, shared, supervised, escalated, or prohibited. This composition is framed by Digital Operations, which provides the management discipline and infrastructure needed to coordinate the human-digital workforce composition across the organization.

Keywords: healthcare AI; Digital Workers; Digital Labor; Human-Digital Organization; Digital Operations; workforce design; sociotechnical systems; organizational memory; reviewer burden; appropriate authority

Key points

- Human-Digital Organizations emerge when Digital Workers become managed contributors to operational work rather than isolated AI deployments.
- The central management challenge is no longer deploying AI, but deliberately composing human judgment, Digital Labor, supervision, authority, and organizational learning into shared workflows.
- Digital Operations provides the management discipline for coordinating a hybrid workforce, enabling organizations to manage human and digital capacity as an operational system.

Organizations are built around labor

Healthcare organizations are essentially labor architectures. Their workflows assume that people will receive requests, interpret context, operate systems, notice exceptions, contact counterparties, document actions, escalate uncertainty, and retain local lessons. Software has long supported this work, but the operating model has continued to presume that people are the active workers.

That presumption is changing. AI-enabled systems can now retrieve information, classify documents, draft communications, operate software, monitor queues, and prepare transactions. Calling this automation is partly correct but managerially incomplete. Once a system performs assigned work under organizational authority, it changes the allocation of labor, the design of supervision, the meaning of capacity, and the evidence available to manage operations.

Research on earlier general-purpose technologies shows that productivity depends on complementary changes in process design, skills, management, and organizational structure, rather than on technical installation alone.¹⁻⁴ Practice-based and sociotechnical research reaches the same conclusion: organizational consequences emerge through the way people, technology, tasks, and local conditions are configured in

operation.⁵⁻⁸ Digital Labor therefore does not simply insert a new tool into an unchanged institution. It changes the institution's assumptions about who or what can perform work.

The Human-Digital Organization emerges gradually

Most healthcare institutions will not become Human-Digital Organizations through a single transformation program. The transition will begin with ordinary operating pressures. Documentation and administrative work consume substantial clinician and staff time, contribute to burnout, and account for a large addressable cost burden in United States healthcare.⁹⁻¹¹ At the same time, federal interoperability policy is making prior authorization and related administrative exchange more structured and machine-addressable.¹²

The early deployments will likely be led by a small team. One team uses an AI-enabled Digital Worker to assemble authorization packets. Another reconciles referral documentation. A revenue-cycle group classifies denials. A patient-access team gathers missing intake information. A clinical operations group uses supervised AI to draft follow-up messages. Each initiative may be justified and governed as a separate project.

Accumulation of Digital Workers begins to change the institution even when no formal transformation has been declared. Work is now performed by people, Digital Workers, or both. Supervisors manage not only staff performance but digital exceptions and approvals. Operations leaders now need to understand digital capacity, reviewer burden, error escape, context readiness, and shared dependencies, in addition to staffing and throughput.

The full accrual of benefits from this technology is likely to lag adoption until organizations build the intangible complements, such as new roles, redesigned processes, and new forms of measurement, that allow the technology to become productive.¹³ The introduction of these processes to manage Digital Labor is the hallmark of the emergence of the Human-Digital Organization.

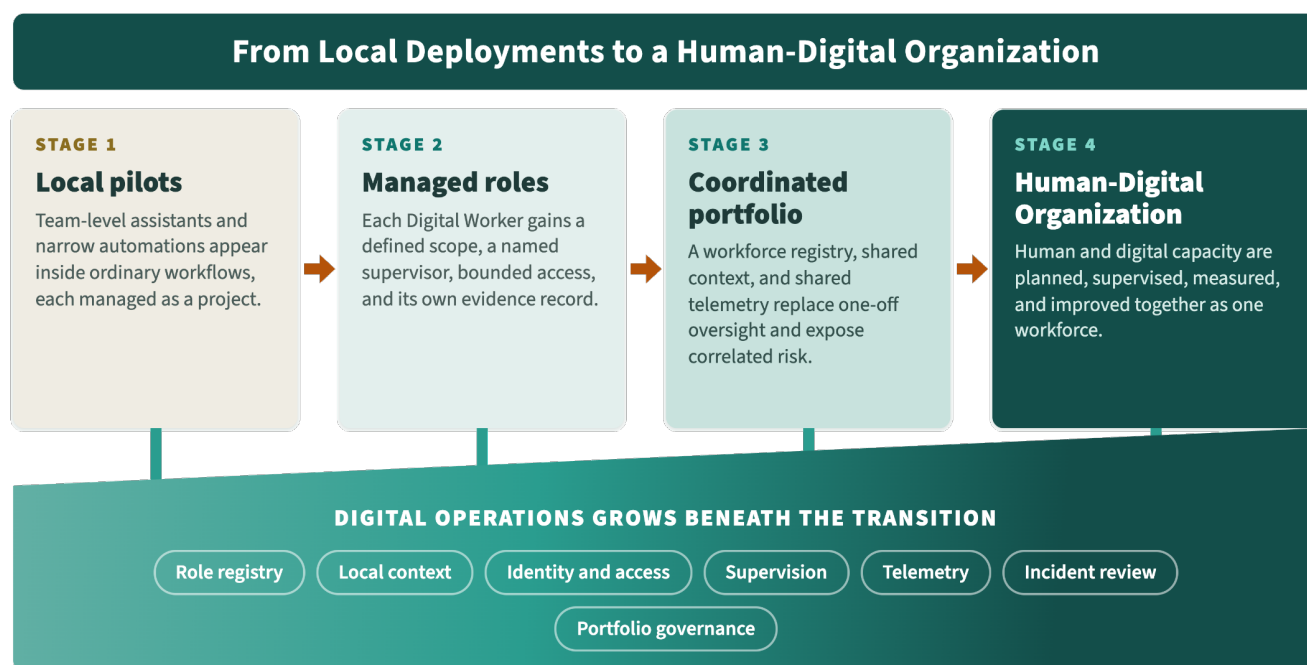


FIGURE 1 - From local deployments to a Human-Digital Organization. Digital Labor typically accumulates through pilots and managed roles. The transition becomes organizational when roles, context, supervision, evidence, dependencies, and portfolio decisions are coordinated through Digital Operations.

Projects become a portfolio

The first few Digital Workers can be managed as projects, but the twentieth should not. Once Digital Workers operate across departments, the executive question changes from whether an individual use case works to whether the digital workforce portfolio is coherent, observable, controllable, and insurable.

A portfolio view identifies which roles exist, which operating problems they address, which workflows and systems they touch, who supervises them, what authority they hold, and what evidence they have produced. Its practical instrument is a digital workforce registry which contains a current institutional record of Digital Workers, owners, supervisors, permissions, dependencies, performance, incidents, and lifecycle state. Without that view, useful local deployments can become a patchwork of duplicated controls, inconsistent role definitions, and unregistered shadow activity, which are typically not covered by business insurance policies.

Portfolio management also exposes correlated risk. Many Digital Workers may depend on the same model, vendor, policy source, credential pattern, interface, or workflow assumption. Shared infrastructure is often desirable, but shared dependencies must be visible and monitored as operational exposure. AI behavior should be evaluated in the environments in which it occurs, while that portfolio telemetry extends that principle from the individual system to the entire organization.¹⁴

Workforce planning changes

Digital Workers change workforce planning without making human work obsolete. The relevant question is not how many people can be replaced. It is what mix of capacity the organization requires when routine retrieval, preparation, drafting, and monitoring can be delegated while judgment, relationship work, prioritization, exception handling, and residual accountability remain human. Economic analyses of automation similarly show

that technology displaces some tasks while creating or increasing the value of others in which people retain comparative advantage.^{15,16}

The distribution of burden can nevertheless worsen. Automation changes the human role rather than simply removing it, which often leaves people with the most difficult residue of the work.^{17,18} Early health-system deployments of AI-drafted patient messages illustrate the point. Clinicians adopted drafts and reported lower burden or improved well-being measures, but response time did not fall; in one study, reading time and reply length increased.^{19,20} The organization should therefore measure reviewer time, override rates, escalation quality, handoff friction, and cognitive load, instead of simply focusing on automated task volume.

Workforce planning must also preserve expertise. If Digital Workers absorb routine cases, human teams encounter a higher concentration of ambiguity and exceptions. That concentration can be valuable when supervisors are trained, resourced, and given usable evidence. It can be harmful when teams inherit only difficult cases without sufficient capacity, practice, or authority. Appropriate reliance depends on matching trust and review to demonstrated system performance.²¹ The division of labor must therefore be designed and periodically revalidated, not allowed to emerge by accident.

The human-digital division of labor must be designed

A Human-Digital Organization decomposes workflows into material functions. Retrieval, document matching, queue monitoring, packet assembly, and structured drafting may be suitable for digital execution under defined controls. Conflicting values, patient distress, ambiguous clinical priorities, consequential exceptions, and acceptance of residual accountability generally require human leadership. Work-system design should account for the interaction of tasks, people,

technology, environment, and organizational conditions rather than treating allocation as a property of the model alone.

The most important design space lies between fully human and fully digital work. A Digital Worker may prepare an appeal while a person approves the argument. It may identify missing records while staff contacts the patient. It may classify a denial while a supervisor chooses correction, appeal, write-off, or escalation. It may draft a patient message while a clinician edits, approves, or rejects it. The unit of delegation is the material act within the workflow—not the workflow label.

Shared work requires interfaces, thresholds, and evidence. Reviewers need to know what the Digital Worker did, which sources it used, where uncertainty remains, what action it proposes, and what consequences could follow. It is important to note that human oversight is not inherently protective, as automation bias and verification complexity can weaken review when people cannot understand, calibrate, or act on the system's behavior.²²⁻²⁴ The objective should not be nominal human involvement, but effective human control at the points where judgment and accountability matter the most.

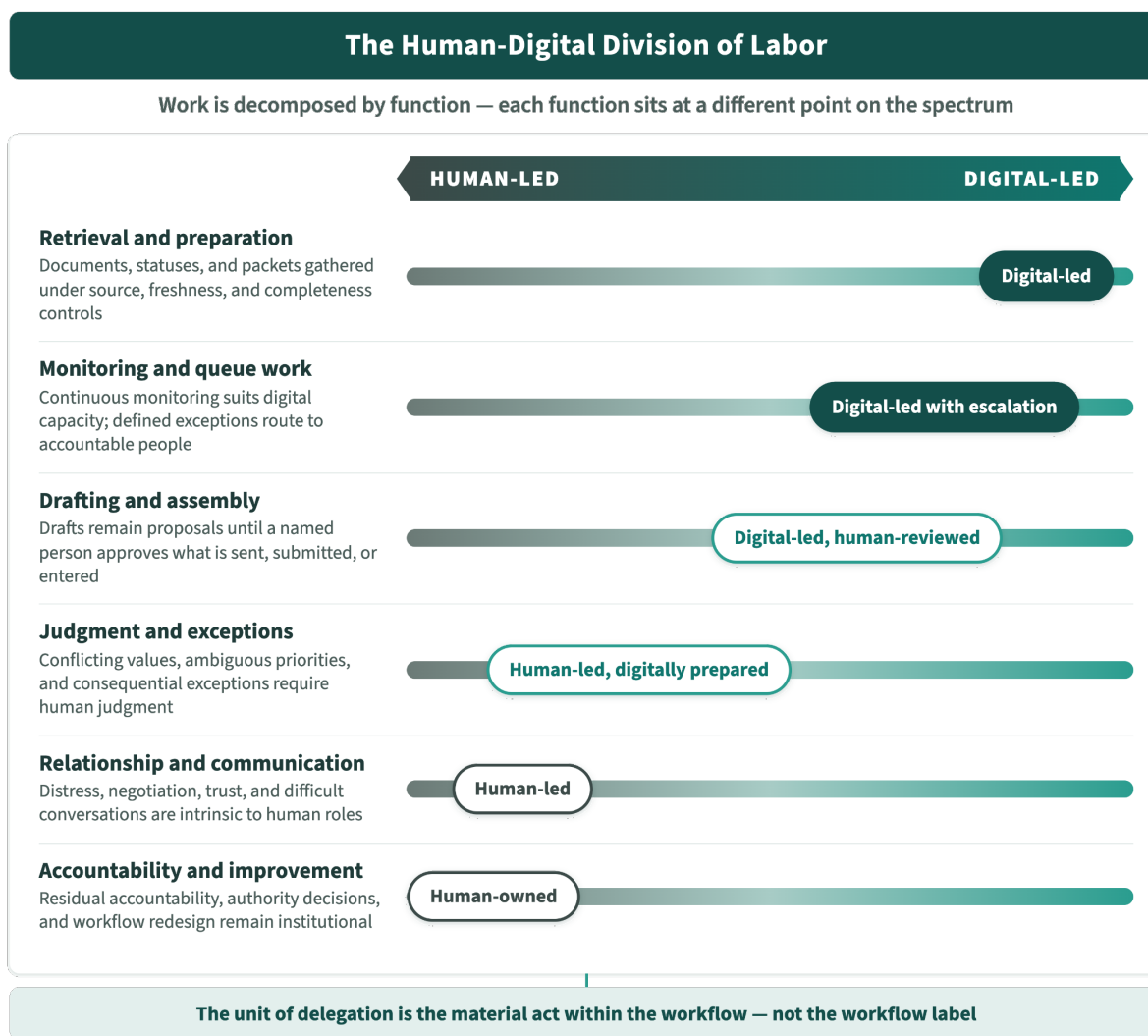


FIGURE 2 - Human-digital division of labor. Work is decomposed by function rather than by workflow title. Allocation reflects consequence, context, authority, evidence, and the value of human judgment, and should be revised as local performance data accumulate.

New human roles appear

Digital Labor creates new human work. Some is **supervisory**: reviewing proposed actions, resolving escalations, correcting outputs, and investigating incidents. Some is **operational design**: defining role scope, context requirements, escalation thresholds, and performance measures. Some is **evidence work**: reviewing traces, classifying near misses, maintaining source hierarchies, and deciding whether performance supports expanded authority. Digital Labor does not eliminate management work; it creates a new category of it.

These responsibilities may initially be distributed across existing positions. A revenue-cycle manager may supervise a denial-

management worker. A nurse leader may become the accountable reviewer for a clinical communication role. An analyst may steward payer-policy context. Compliance may define record and evidence requirements. Information security may own identity and access patterns for non-human operators. What matters is not the immediate creation of new titles but explicit ownership of the work.

Mature organizations will eventually need defined responsibilities, protected capacity, and formal preparation for these functions. Clinicians and staff want to understand an AI system's capabilities, limitations, and failure modes before relying on it, making onboarding and training part of the operating

model rather than an afterthought.²⁶ Treating supervision and context stewardship as informal additions to already strained roles will limit reliability and adoption.

Autonomy is not the goal; appropriate authority is

Human-Digital Organizations should not treat autonomy as a maturity trophy. The objective is not to remove people from every workflow. It is to grant the minimum authority needed for a defined function when local evidence supports that authority. Classic automation frameworks describe graded allocation of information acquisition, analysis, decision, and action between people and machines. They do not imply an all-or-nothing endpoint.¹⁷

A Digital Worker may autonomously retrieve claim status, require approval before sending an external communication, and be prohibited from making a patient-specific clinical recommendation. Another may operate with exception-based authority for low-risk administrative updates but require review when a case exceeds a financial threshold, involves a vulnerable patient, or presents conflicting source evidence.

This functional approach avoids two weak extremes: blocking useful work because full autonomy is unsafe, and over-delegating because a system appears generally capable. Appropriate authority is granular, evidence-gated, and reversible. It can expand, narrow, suspend, or terminate as performance, context, or consequence changes.

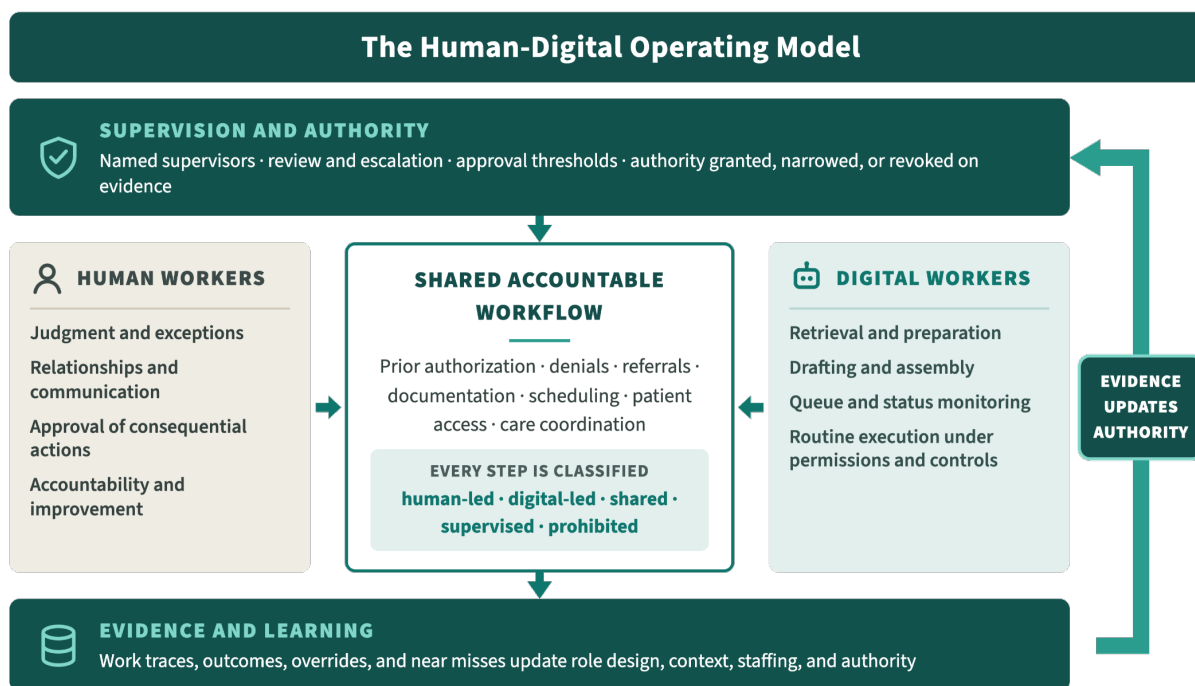


FIGURE 3 - Human-digital operating model. Human and Digital Workers are composed around shared accountable workflows. Supervision and authority set the operating boundary; evidence and learning update role design, staffing, context, and future authority decisions.

Organizational memory becomes a strategic asset

A Human-Digital Organization can learn from work with unusual granularity. Digital Labor can preserve sources, actions, approvals, overrides, escalations, timing, outcomes, corrections, and incidents. Traces are not automatically memory. They become organizational memory only when they are reviewed, structured, interpreted, governed, and incorporated into future work.

This principle extends the Learning Health System objective of integrating internal experience with external evidence and returning the result to practice.^{27,28} Digital Operations adds an operating mechanism: validated lessons can change role definitions, context requirements, escalation rules, evaluation cases, staffing patterns, and authority bands.

The strategic value extends beyond automation. Digital Worker telemetry can reveal how work is actually performed, where exceptions arise, where policies create friction, where external partners fail, and where human judgment should be protected. Repeated missing-document events may indicate a documentation or handoff problem rather than a worker defect.

Used well, evidence from Digital Labor becomes evidence about the organization itself.

Digital Operations becomes the management discipline

A Human-Digital Organization needs a management discipline that connects AI governance, IT operations, clinical operations, compliance, quality, risk, and workforce planning. Governance can determine whether a use is acceptable and who holds decision rights. IT can operate infrastructure. Compliance can define obligations. Operations can own workflows. None of these functions alone is designed to manage human and digital capacity as one workforce.

Digital Operations fills that gap. It coordinates role design, organizational context, identity and access, execution controls, supervision, telemetry, incidents, authority, learning, and portfolio governance. Its purpose is not to add bureaucracy to innovation. It is to make Digital Labor observable, accountable, and improvable as ordinary operating capacity. The discipline matures from basic visibility and registration, through standardized role and evidence management, to dynamic authority decisions connected to organizational memory.

Contemporary AI risk and management-system frameworks increasingly treat AI as sociotechnical and lifecycle-dependent.^{29,30} The Human-Digital Organization is the operating consequence of that premise. Its risks and benefits arise from the complete work system and must be managed continuously where work is performed.

The executive test for an emerging digital workforce

A board or executive team does not need a new theory to determine whether its institution is becoming a Human-Digital Organization deliberately or by accident. It needs evidence that accumulating Digital Labor is visible, composed, supervised, measured, and governed as an operating portfolio. The following questions provide a compact test.

Close: human and digital capacity must be managed together

The future institution is not human versus digital, and it is not a fully automated hospital, payer, clinic, or administrative back office. It is a healthcare organization that composes human and digital capacity around accountable work.

That composition will be uneven. Some functions will remain predominantly human. Some will become highly digital. Many will be shared, with Digital Workers handling retrieval, drafting, monitoring, and routine execution while people provide judgment, relationships, exception handling, approval, accountability, and improvement. The quality of the institution will depend less on the number of Digital Workers deployed than on how well these roles are designed and managed together.

Executive Test for an Emerging Digital Workforce

Six questions a board or executive team must answer — and the evidence each answer requires

1

VISIBILITY Where are Digital Workers already operating, including systems not yet labeled that way?

EVIDENCE A current registry covering roles, systems, owners, supervisors, authority, and lifecycle state

2

COMPOSITION Which material acts are human-led, digital-led, shared, supervised, or prohibited?

EVIDENCE An explicit division-of-labor design for each workflow rather than an emergent pattern

3

HUMAN ROLES Who is becoming a supervisor, exception handler, context steward, or incident reviewer?

EVIDENCE Named roles with the training, capacity, and authority to correct, narrow, or stop digital work

4

REVIEWER BURDEN Is the human cost of supervision measured?

EVIDENCE Reviewer time, overrides, escalation precision, handoff burden, and cognitive-load signals tracked with volume

5

PORTFOLIO RISK Which dependencies could impair many Digital Workers at once?

EVIDENCE A dependency map across models, vendors, sources, interfaces, credentials, and workflow assumptions

6

HUMAN-LED DECISIONS

Which decisions remain human because of accountability, relationship, values, or judgment?

EVIDENCE A protected list that changes only through explicit review, not by default as capability improves



Deliberate, not accidental: the emerging digital workforce must be visible, composed, supervised, measured, and governed

The organizations that navigate this transition well will not necessarily be those that adopted AI earliest or most aggressively. They will be those that made the emerging workforce visible, designed the division of labor, measured the burden of supervision, preserved evidence, and moved authority with demonstrated performance. The technology does not by itself create a Human-Digital Organization. Management does.

Glossary of key concepts

• **Human-Digital Organization.** A healthcare organization in which human and Digital Workers contribute to accountable workflows through managed roles, shared evidence, and coordinated operating infrastructure.

- **Human-digital composition.** The deliberate allocation of material acts, judgment, action, supervision, exception handling, and improvement across people and Digital Workers.
- **Digital workforce portfolio.** The set of Digital Workers operating across an organization, including their roles, dependencies, authority, performance, incidents, evidence, and lifecycle state.
- **Reviewer burden.** The human workload and cognitive demand created by supervising, approving, correcting, or escalating Digital Worker activity.
- **Appropriate authority.** Function-specific authority granted because local evidence supports it and designed to expand, narrow, suspend, or terminate as conditions change.

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