

The background of the entire page is a grayscale photograph. In the foreground, a laptop keyboard is visible, with keys slightly out of focus. In the background, a large, circular fan or cooling system is prominent, with its blades and frame creating a sense of depth and motion. The overall aesthetic is technical and modern.

IBD Paper Series

The Nature of Knowledge Work and how AI Augmentation can support Knowledge Workers

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About this Article

This article was created with the assistance of ChatGPT (model GPT-4o) using OpenAI's deep research feature and the OpenAI Canvas platform. The structure and framework of the text are based on the author's original ideas and concepts. Paragraphs are a result of targeted prompting, manual correction and enhancement. However, the author fully endorses the final text, drawing on his personal experiences with artificial intelligence in his business context.



DID YOU KNOW?

What is Knowledge Work?

Defining the Domain: Knowledge work primarily involves the cognitive processing of information to create value. In contrast to manual labour, which involves working with physical materials and tools, knowledge work deals with goals, ideas, information, and expertise, mostly using digital tools. It typically requires advanced education and specialization and relies on mental abilities such as analysis, judgment, and creativity – rather than physical strength and manual skills¹.

Key Traits: The hard parts of knowledge work are often unstructured and non-repetitive. Some tasks have well-defined inputs/outputs (e.g. processing payroll, scheduling meetings) – these are structured procedures with predefined steps. But many knowledge tasks are unstructured: inputs or goals may be unclear, and processes are not fully specified in advance. Examples include resolving a client’s ambiguous request or brainstorming a novel product design. Few jobs are purely one or the other, most combine structured procedures with open-ended problem-solving².

Human-Centric: Ultimately, a knowledge worker “thinks for a living” (to borrow Thomas Davenport’s phrase) – deploying expertise to analyse information, solve complex problems, make decisions, work with peers and innovate. This work is often autonomous in execution, yet interdependent in impact (as we’ll see next). Knowledge work’s outputs are tangible or intangible deliverables (reports, plans, designs, decisions) that drive organizational value³.

Core Objectives and Tasks of Knowledge Workers

Even across diverse professions, knowledge workers tend to perform a common set of core tasks. These include both individual activities and collaborative processes:

Defining and Interpreting Goals: Clarifying project objectives, constraints, and success criteria. This often means translating high-level individual, organizational or project goals into concrete targets for a person or team. It requires understanding context and negotiating what success looks like. (*Strategic planning phase*)

Conducting Research & Information Gathering: Collecting relevant data, facts, and expert input – whether via web searches, reviewing internal documents, or consulting colleagues/clients. This feeds the knowledge worker’s understanding of the problem space. (*Knowledge finding task*)

Drafting Concepts and Documents: Creating initial solutions, concepts, or drafts. This could be authoring a report, designing a plan, or sketching a prototype. It’s a creative synthesis process, turning raw information into structured knowledge artifacts. (*Knowledge creating task*)

Communicating and Decision-Making in Teams: Exchanging ideas with stakeholders, holding discussions, and reaching decisions collaboratively. This includes virtual or in-person meetings, presentations, and informal conversations. Team decision-making leverages collective intelligence but also demands coordination and conflict resolution. (*Knowledge sharing task*)

Delegating, Tracking, and Controlling Tasks: Coordinating execution by assigning tasks to team members or subordinates, monitoring progress, and adjusting plans as needed. Knowledge workers often play a project management role for complex tasks – ensuring work moves forward and intervening to solve issues. (*Management and coordination phase*)

Creating and Approving Deliverables: Finalizing work products and outcomes. This might involve iterative refinement, quality checks, and obtaining approvals (from clients, managers, or regulators). The knowledge worker ensures the deliverable meets the

defined goals and standards before it’s considered “done”. (*Knowledge applying task*)

These steps form a logical workflow from goal definition to result delivery. In practice, they are rarely linear – knowledge work is iterative and flexible. One might loop back to refine goals after new insights or conduct additional research midway through drafting. Still, this list captures the major categories of knowledge-work activities, which align with known models (e.g. Davenport’s taxonomy of finding, creating, packaging, and applying knowledge). Understanding these tasks is a foundation for seeing where AI can plug in.

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The Nature of Knowledge Work: A Conceptual Framework

A Process of Discovery: Knowledge work can be seen as a cycle of problem-solving. It often begins with sense-making (grasping goals and context), moves through solution development (research, ideation, validation), and ends with implementation (coordinating execution and delivering results). Each phase draws on different cognitive skills and may require different collaboration modes⁴.

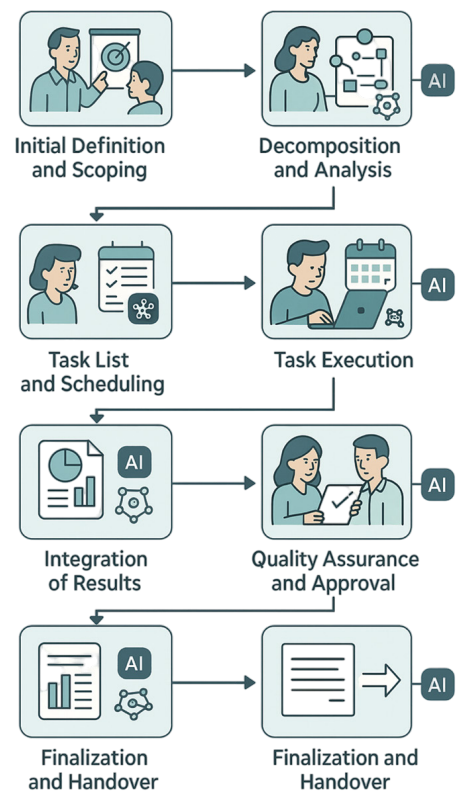


Figure 1 - Example knowledge-workflow (generated with GPT-4o)

Figure 1 shows an optimal linear process flow for knowledge work without iterative repetitions. In reality, however, such repetitions are very likely, and each step in the process can also be executed as a repetitive circular optimization sub-process, which can even lead to returning to the previous step and starting over. Support from AI systems – whether as a standalone solution or integrated into authoring tools – has become an integral part of each individual step in the process within the last three years.

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Key Characteristics: Several fundamental dimensions underlie all knowledge-work processes

Complexity & Judgement: Knowledge tasks range from routine to highly complex. Davenport (2005) classifies them by the level of interpretation and expert judgement required – from straightforward tasks with established procedures, up to tasks requiring novel thinking and deep expertise⁵. Most knowledge work skews toward the complex end, involving significant uncertainty and nuance.

Interdependence: Tasks also vary by how collaborative they are. Some can be done by an individual working solo (e.g. writing a memo), while others demand teamwork or cross-functional input (e.g. developing a business strategy or planning the construction of a highway). Complex knowledge work often has a collaborative character, as multiple perspectives enrich the outcome.

Tacit vs. Explicit Knowledge: Knowledge work draws on both explicit knowledge (codified facts, data, norms, procedures) and tacit knowledge (uncodified

know-how, intuition, experience). Tacit knowledge is especially crucial in interpreting goals, dealing with ambiguities, and exercising judgement. This makes many knowledge processes difficult to fully formalize or automate, since not everything the worker knows can be written down (Polanyi's Paradox).

Non-linearity and Iteration: Unlike a manufacturing assembly line, knowledge processes are dynamic. Goals may evolve, and workers frequently iterate – revisiting earlier steps as new information emerges. This non-linear nature requires flexibility and often defies strict step-by-step workflows. Tools and support systems for knowledge workers must accommodate this fluidity.

Bottom Line: Knowledge work is multifaceted and cannot be reduced to a single routine. It typically involves multiple overlapping communication channels, frequent context switches, and asynchronous collaboration across distributed teams. Research has shown that constant email communication and task fragmentation can contribute to perceived overload and coordination strain⁶. Any framework for supporting knowledge work (with AI or otherwise) must respect its complexity, the value of human judgement, and the interplay of multiple tasks and people.

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Enter AI: Augmenting Human Knowledge Work

Recent advances in Artificial Intelligence – especially machine learning and generative AI – have opened new possibilities to support or even automate portions of knowledge work. Rather than replacing knowledge workers, AI is emerging as a powerful assistant and collaborator. The question is: which parts of the knowledge work spectrum can AI handle, and which are best left to humans?

Automation vs Augmentation: In thinking about AI's role, researchers distinguish between full automation (AI takes over a task entirely) and augmentation (AI and human work together). In reality, most applications lie on a continuum. For each type of knowledge task, we must assess: Can AI do this alone? Or should AI provide support (recommendations, drafts, analysis) while a human remains in charge? Many experts advocate a “human-AI partnership” approach, where AI systems are designed to complement, not substitute, human strengths.⁷

Knowledge Work Meets AI – Recent Trends: Organizations have begun experimenting widely with AI tools for knowledge tasks. For instance, large language models can draft documents, summarize information, or generate ideas in seconds – things that used to take humans hours. Survey data show 75% of global knowledge workers are already using AI tools, and 85–90% say it helps them save time and focus on more important work⁸. Indeed, generative AI can and will automate some of the tasks of knowledge workers, freeing them to do more meaningful work. The impact is significant: early studies report productivity gains of 20–40% in certain writing and analysis tasks when humans use AI assistants.⁸

However, not all tasks are equally suited to AI.⁹ The following simple classification is proposed:

- Tasks fully automatable by AI (the human can largely step back)
- Tasks partially supportable by AI (AI handles aspects, human provides oversight/context)
- Tasks likely to remain human-led due to complexity, context, or creativity.

In the following sections, each category is explored with examples and highlight scientific insights on why those tasks fall into that category.

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Tasks Ripe for Full Automation by AI

Structured, Routine Tasks: The low-hanging fruit for AI are knowledge tasks that are structured, repetitive, and rule-based. These are tasks with clear procedures or decision rules that an AI can learn from data. Examples in the knowledge work context include:

Information Retrieval & Basic Research: AI agents can automatically gather facts, scan documents, or monitor news feeds. Instead of a human doing a manual web search and skimming dozens of articles, an AI can pull relevant information and even extract key points. (Think of a digital research assistant that never sleeps.)

Data Processing & Routine Analysis: Many knowledge workers spend time cleaning data, updating spreadsheets, generating standard reports or visualizations. AI can handle these predictable processes end-to-end. For instance, an AI tool might compile weekly sales metrics and generate a report without human input.

Scheduling & Coordination Logistics: Setting up meetings or workflows based on calendars and rules can be fully automated. Some companies already use AI schedulers that coordinate team meetings by finding optimal times, sending invites, and booking rooms – a task that used to involve email back-and-forth by a person.

Document Classification & Routing: In fields like law or finance, classifying documents (invoices, contracts, emails) and routing them to the right process is tedious but formulaic. AI systems (using natural language processing) can now achieve high accuracy in reading documents and taking appropriate actions. For example, an AI can scan incoming customer emails and forward each to the correct department or draft an immediate reply for simple requests.

Basic Content Generation: For well-defined content, AI can often generate a “first draft” with minimal or no human input. Examples: writing a meeting summary from a transcript, composing a boilerplate project update, or populating a standard contract template. The AI operates within known constraints (it has seen many similar texts).

Example – Customer Service Chatbots: A classic success story is AI chatbots handling routine Q&A with

customers. “In customer service, an AI-based chatbot can relieve humans of basic and repetitive tasks, enabling them to focus on more complex responsibilities”.¹⁰ The bot answers frequently asked questions and troubleshoots common issues automatically, often with no human needed unless the inquiry is unusual. This shows how AI automation of routine knowledge tasks can deliver value 24/7 at low cost.

Limitations: These fully automated tasks tend to be ones with well-defined inputs and outputs, leaving little room for ambiguity. The current generation of AI excels when patterns are clear, and large data exists to learn from. However, even here, oversight is wise: AI might occasionally err (e.g., misunderstanding a query or mislabelling an email). Therefore, many organizations deploy “human-in-the-loop” mechanisms for quality assurance, even on tasks largely automated by AI.¹¹ But by and large, the tasks on this list are prime candidates for handing off to our digital colleagues.

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Tasks AI Can Partially Support (Human-AI Collaboration)

The Sweet Spot of Augmentation: A huge portion of knowledge work falls in-between fully routine and fully novel – these tasks can benefit greatly from AI assistance but still need human judgement and context. In such cases, AI acts as an assistant or partner. Some key areas of partial AI support are:

Drafting and Writing Support: AI generative models can produce first drafts of documents, presentations, code, or designs. The human then edits, fact-checks, and adds the nuanced polish. For example, a marketing professional might ask an AI to draft a product description, or a press release based on bullet points – the AI’s draft saves time, but the human ensures tone and messaging are on-point. This collaborative writing process leverages AI’s speed and the human’s understanding of audience and intent.

Data Analysis and Decision Support: AI systems can crunch numbers or detect patterns far faster than a person. They can highlight trends, flag anomalies, or even suggest decisions. However, a human decision-maker will apply business context and ethics before acting. Think of an AI tool that analyses project data and “provides instant insights and recommendations by synthesizing large amounts of information” – managers use these insights in meetings but still debate and decide with human reasoning.

Knowledge Search and Q&A: Instead of digging through knowledge bases, workers can query an AI (like an internal ChatGPT) to get answers sourced from company data. The AI does the heavy lifting to retrieve and summarize relevant knowledge. The human uses the answer but will often double-check critical facts or adapt the answer to the specific situation. This is partial automation of the research task: the AI fetches and filters info, the human interprets and applies it.

Creative Brainstorming: AI can be a catalyst for creativity, generating numerous ideas or prototypes that a human might not have thought of. Designers, writers, and strategists use AI to broaden ideation. For instance, an AI image generator might create concept art options, which a human artist then selects and refines. The AI doesn’t replace the creative director, but it accelerates the divergent thinking phase. Research even shows AI can rival average humans in idea generation in some cases – serving as a creative partner.

Meeting Productivity: AI is entering our meetings in supportive roles: transcribing discussions, highlighting action items and transferring them into a task management solution of the user's choice and even providing real-time language translation. After meetings, AI tools can draft minutes or follow-up emails. The team benefits from accurate records and less administrative burden, but humans are still needed to validate key decisions and ensure the AI didn't miss any nuance (like sarcasm or implicit decisions made).

Human-AI Teams Outperform Either Alone: A consistent finding is that human + AI combinations can yield better results than either working alone. The AI contributes brute-force computation, recall of vast knowledge, and speed; the human contributes understanding of context, critical thinking, and moral judgement. For example, in healthcare diagnostics, AI image analysis plus doctor expertise leads to more accurate results than the doctor or AI independently. Similarly, in finance, an AI might flag unusual transactions, and a human investigator then examines them – together catching more fraud.

Example – “Centaur” Approach: This collaborative approach has been called the “centaur model” (after the half-human, half-horse creature).¹² Chess is a famous case: human-AI teams (centaurs) can outperform both grandmasters and standalone chess engines in certain formats. In knowledge work, centaurs are everywhere: analysts using AI to explore scenarios, lawyers using AI to research cases, scientists using AI to suggest hypotheses. One study notes “AI can extend humans’ cognition when addressing complexity, whereas humans offer a holistic, intuitive approach for uncertainty”¹³. In other words, AI handles the complex but defined parts, humans handle the uncertain parts – a powerful synergy.

Collaboration Challenges: For partial support to work, trust and usability are key. Knowledge workers need to trust AI outputs (which requires transparency and reliability), and they need to know how to effectively incorporate the AI into their workflow. Training workers to work alongside AI (“centaur skills”) is becoming important. When done right, AI augmentation can significantly improve performance and productivity, while keeping humans in control of critical decisions.

Tasks Likely to Remain Human-Led

The Human Advantage: Some aspects of knowledge work resist automation and even augmentation beyond a point. These are tasks steeped in context, creativity, ambiguity, or human values – areas where human cognition and judgement remain superior (at least for now). Such tasks include:

Strategic Decision-Making & Problem-Solving: Defining strategy, making judgement calls in novel situations, and solving problems with high uncertainty typically require a holistic understanding that AI lacks. These decisions often involve tacit knowledge, intuition, and the weighing of ethical or political factors. As Jarrahi (2018) notes, humans offer a more holistic, intuitive approach in dealing with uncertainty and equivocality¹³. Executives drawing on years of experience to pivot a business model, or a project manager intuitively re-scoping a project after a major change – these strategic leaps are difficult for AI which relies on past pattern data.

Leadership, Team Management and Empathy: Leading people – motivating teams, negotiating conflicts, understanding social dynamics – relies on emotional intelligence and human empathy. AI cannot (currently) replicate genuine empathy or cultural understanding. Tasks like mentoring an employee, bargaining a deal, or instilling a shared vision demand human connection. AI might analyse sentiment or suggest communication tactics, but human leaders excel at inspiring trust and loyalty. In essence, anything involving deep interpersonal interaction is firmly in human hands (AI lacks the “human touch” in sensitive social situations).

Creative Vision and Innovation: While AI can generate content and even surprise us with creative outputs, it still operates by recombining existing patterns. Truly groundbreaking innovation – envisioning a product that never existed, formulating a new scientific theory – often involves cross-domain insights and leaps of imagination grounded in life experience. Humans remain the primary source of truly original ideas and aesthetic judgments about creativity. One could use AI as a creative aid, but the final creative direction (e.g. a novel's theme, a marketing campaign's core message) is likely to be human-led for the foreseeable future. “AI cannot generate fundamentally new ideas on its own, but it can support humans by catalysing human creativity”.

Contextual Adaptation and Common Sense:

Knowledge workers continuously apply common sense and contextual awareness to adjust their approach. They understand implicit cues, adapt to changing conditions, and can work with incomplete information. AI struggles with context switching and lacks true common-sense reasoning. For example, if a project's priority suddenly changes due to a market event, a human manager immediately re-aligns the team's tasks; an AI would likely continue optimizing for the old goal unless explicitly re-programmed. As economist Autor (2024) observed, the “tasks hardest to automate have been non-routine, cognitive, and inter-personal tasks” – essentially those requiring common sense, expert judgement, and human interaction¹⁴. These are deeply human strengths.

Why Humans Still Lead Here: Modern AI is powerful but fundamentally narrow: it excels in bounded domains with clear goals. It lacks general intelligence and a grounding in the real world's complexity. Humans can draw on broad context, values, and lived experience. We effortlessly do things like apply ethical considerations, interpret unspoken intentions, or draw analogies from one domain to solve a problem in another – tasks that “people do on an ongoing basis, such as applying common sense to tease apart otherwise intractable problems” remain out of AI's reach.

Augmentation, Not Replacement: It's worth noting that even in these human-led tasks, AI can play a supporting role. For instance, an AI could simulate scenarios to inform a strategic decision (but not make the decision) or suggest creative combinations to a human innovator. The final call and the original inspiration rest with humans. In summary, as AI takes over more routine work, the residual tasks for humans will be those that demand context, creativity, complex judgment, and social intelligence. Indeed, “an increasing number of tasks are automated; therefore, workers are left with more complex and potentially more creative tasks that require human ingenuity and problem-solving skills”. This is where human knowledge workers will continue to shine.

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Integrating Research: Cognitive Impacts and Emerging Trends

Let's pause to connect our framework with recent scientific literature on knowledge work and AI in the workplace:

Cognitive Load and AI Offloading: Knowledge work can be cognitively intense (many knowledge workers face “information overload”). AI has the potential to offload routine cognitive burdens, allowing employees to focus on higher-level thinking. A recent study found that using AI tools for information seeking can reduce cognitive load and improve knowledge workers' daily goal attainment¹⁵. In essence, AI functions like an auxiliary brain for memory and computation, freeing our mental bandwidth for creativity and decision-making. However, researchers also caution that over-reliance on AI could weaken some human skills over time (critical thinking must be actively maintained when AI does the easy parts).

Human-AI Trust and Team Dynamics: As AI takes on roles in knowledge workflows, trust in AI has become a focal issue. Afroogh et al. (2024) examined how knowledge workers trust AI recommendations and found that providing “automated, real-time feedback increases the perceived trustworthiness of an algorithm” in high-task-complexity environments¹⁶. Building effective human-AI collaboration requires transparency (why did the AI suggest this?) and reliability. Interestingly, studies show knowledge workers tend to either over-trust or under-trust AI initially – calibration through experience is needed. Organizations are now training employees on how to treat AI

“teammates” – when to rely on them and when to double-check.

AI's Effect on Skill Requirements: Multiple papers suggest a shift in the skill profile of knowledge workers. Routine analytical skills may become less valued, while skills in prompting and guiding AI, interpreting AI outputs, and applying domain expertise become crucial¹⁷. In other words, “knowing how to ask the right questions of AI” could become as important as knowing how to manually do the analysis. Furthermore, uniquely human skills – communication, strategic thinking, leadership – see increased relative demand. Autor (2024) calls this “task reinstatement”: as automation displaces certain tasks, new tasks emerge that require human expertise to oversee the automation and to handle the exceptions¹⁸. Education and training will need to evolve to prepare future knowledge workers for this augmented workplace.

Productivity and Well-being: Early empirical studies in real companies (e.g. a field experiment by Harvard Business School in 2023) confirm notable productivity boosts when AI is introduced into knowledge work processes¹⁹. Yet the well-being impact is complex: some workers feel more empowered and engaged (focusing on meaningful work after delegating drudgery to AI), while others experience anxiety about job security or an accelerated work pace. Change management and ethical considerations (like ensuring AI does not embed bias in knowledge processes) are areas of active research and policy discussion.

Organizational Transformation: On a broader level, integration of AI is prompting companies to rethink workflows. Davenport & Kirby (2016) predicted that organizational structures will be reconfigured when AI is integrated, requiring employees to modify their activities to communicate with and work alongside AI systems²⁰. I am foreseeing the rise of “AI-fluent” teams where human roles are redesigned to maximally leverage AI tools. New roles like “AI facilitator”

or “knowledge engineer” are emerging to bridge between technical AI systems and business needs.

In summary, recent research underscores that AI's infusion into knowledge work is augmenting human cognition (extending memory, analytical, and creative capacities), but also changing the nature of work. It's not a simple substitution of humans with machines; it's a shift in how work is done and what humans focus on. The best outcomes – in productivity and innovation – occur when organizations deliberately combine human strengths (context, creativity, leadership) with AI strengths (speed, scale, precision) in a complementary way.

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Conclusion & Future Outlook

The Road Ahead: The nature of human knowledge work is fundamentally about applying human intellect – in analysis, creativity, and judgement – to achieve goals. AI is a powerful new tool that can amplify this intellect when used correctly. This analysis suggests a future where knowledge workers are supported by a digital workforce of AI agents, handling the busywork and providing insights at lightning speed. Rather than rendering humans obsolete, this augurs a transformation in the human role: from doing grunt work to orchestrating high-level problem solving.

Augmentation, Not Replacement: As one review put it, “the combination of humans and AI can lead to significant enhancements in work performance”²¹ and often yields more effective results than either alone. The ideal scenario is “intelligence augmentation” – AI systems designed to expand what humans can do, while humans focus on guiding the AI, handling exceptions, and injecting ethical and creative

judgement. We should aim to design workflows where mundane tasks are automated, and humans are engaged in the elements of work that truly require human insight (and that often make work more fulfilling).

Human-Centred Implementation: Executives and leaders should approach AI integration in a way that is human-centric. This means investing in training employees to work alongside AI, re-defining job roles to capitalize on human-AI synergy, and addressing concerns of employees openly. It also means setting clear ethical guidelines for AI use (transparency, avoiding bias, maintaining human accountability for decisions). The organizations that succeed will be those that treat AI as “colleagues” or tools for their knowledge workers, not as black boxes to simply shove work onto.

Harnessing Creativity and Context: There will remain frontiers that only humans can tackle. Embracing AI for what it does best, we can actually double-down on cultivating uniquely human skills. The value of creativity, emotional intelligence, and interdisciplinary thinking will increase in an AI-rich environment. Education and professional development should emphasize these, so that future knowledge workers excel at the parts of work that AI cannot do. In the long run, this could lead to more engaging jobs – with drudgery minimized and creative/problem-solving content maximized.

A New Partnership: In conclusion, the nature of knowledge work is evolving into a partnership between human minds and AI. I have classified tasks by their suitability for AI, but ultimately the entire workflow is best seen as a human-AI collaboration. When a knowledge worker in 2030 tackles a project, they might set goals and constraints, then supervise a fleet of AI assistants (for research, drafting, analysis), frequently checking outputs and providing direction, and finally synthesize everything into a coherent solution with a human touch. This vision aligns with the optimistic view that AI will free us to be more human in our work – to focus on creativity, strategy, and interpersonal aspects.

The coming years will be about learning how to balance and integrate these roles. As Dăniloia (2024) emphasizes, automation rarely eliminates all tasks within a job but reshapes them—raising the cognitive and interpersonal demands on human workers.²² He notes that “This evolution demands a rethinking of what it means to be a knowledge worker. The intellectual and cognitive skills that have long defined these roles are still important, but they must now be augmented by a strong understanding of technology, particularly AI.” (p. 113).²² This implies a growing need for human adaptability, judgment, and communication skills in increasingly AI hybrid work environments, reshaping the future of every knowledge-driven industry.

By staying informed on research and thoughtfully reimagining workflows, executives can ensure that AI truly augments their knowledge workers, driving productivity and innovation to new heights while keeping humanity at the core of work.

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