

# QUANTUM LEAP

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### CITING WONDROUS EFFICIENCIES

gained through artificial intelligence programs, Amazon, Alphabet, Microsoft and many other technology companies have

laid off thousands of workers in recent years. And they are not hiring at the pace they used to. Unemployment among recent college graduates, especially those with computer science degrees, is higher than the overall unemployment rate.

This sacrifice-the-young business strategy is being justified as a boost to profits (and share prices). However, the practice imperils a corporation's long-term success by depriving its future workforce of vital experience. This behavior has yet to spread to the aerospace industry, but it might soon.

A host of companies are developing artificial intelligence (AI) applications for aerospace, including several that say their programs can engineer an entire spacecraft using text prompts and voice commands. NASA sees great promise in trials with its Text-to-Spaceship program (*AW&ST* April 7-20, p. 46).

AI may bring a big productivity boost to aerospace, and that should be welcomed, but not without weighing the hidden costs and limitations.

Although AI is relatively effective at capturing, sharing and manipulating explicit information, such as documents, designs, code and recordings, that is only the tip of the iceberg of human knowledge within a business. Below the surface, inside employees' brains, exist massive amounts of tacit knowledge collected person by person and shared in informal conversations or absorbed through observation.

Consider a master machinist adjusting milling speeds when hearing certain chattering sounds while cutting a special alloy, or an engineer who designs a composite structure with a little extra strength, above regulatory guidance, because of experience with past failures. These best practices are often not written down but learned on the fly by individual employees and shared ad hoc between co-workers.

Such tacit knowledge can be immensely valuable. In fact, corporations often sue, citing trade secrets, to stop employees from using internal know-how at competitors. Allowing these prized skills, best practices and processes to fade away is foolish.

Maintaining and building tacit and tribal knowledge is not cheap. It requires continually hiring and training new employees as well as keeping a close eye on what a company might lose when staff leave or are laid off. Paradoxically, as AI levels the playing field for explicit knowledge, implicit human knowledge will become even more cherished for its ability to give a company an edge. Fortunately, implicit knowledge can be cultivated and transferred to new workers.

"You have to start investing more in your employees, the human aspects of the work," says Dana Daher, executive research leader with HFS Research, which is studying the workforce impact of AI. "Things like communication, collaboration [and] critical thinking" are at the core of human expertise, she says.

Returning employees to the office, formal mentorship programs and encouraging employees to constantly ask "why?" of corporate processes are key to building cognitive capital.

In the technology sector, some software developers are declaring "no-AI days," when they write code without assistance to strengthen their foundational programming skills, boost creativity and deepen their problem-solving abilities.

"Brainstorming, leadership discussions [and]

critical analysis should be deliberately AI-free to preserve and strengthen human reasoning," Daher adds.

Managers must be patient and deliberate with new employees, resisting the temptation to use the AI shortcuts that Wall Street rewards. "You have to remind people that they also started somewhere; you were also that person that was struggling to understand the tribal knowledge, the tools and everything else," Daher says. "It's just returning back to being human." 🗨️

## Hidden Knowledge

Tacit expertise can be **immensely valuable**

