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Scott Latham
Beth Humberd

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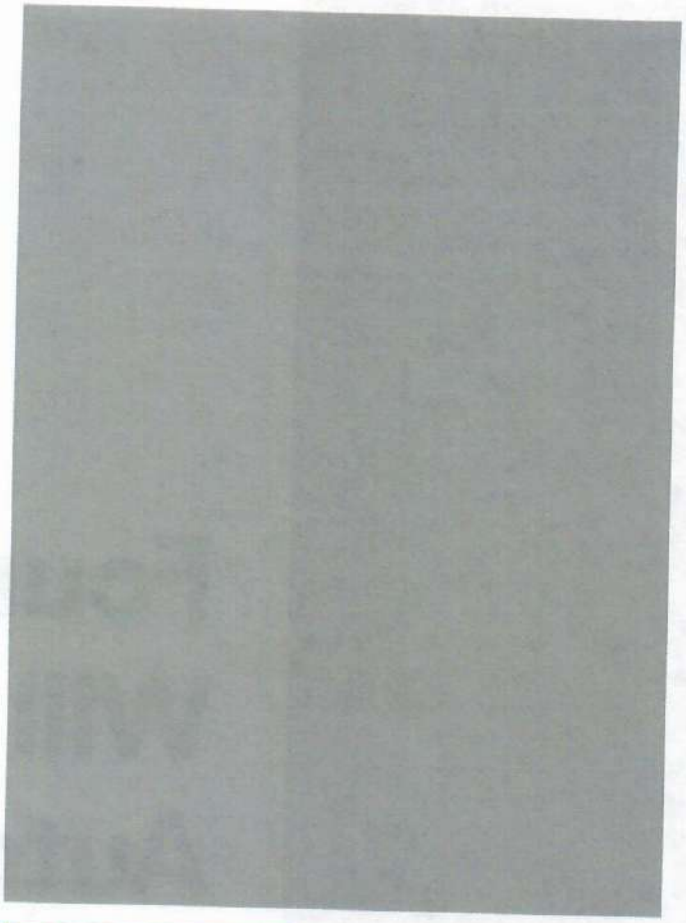

THE NEW WORLD OF WORK

Four Ways Jobs Will Respond to Automation

The level of threat to a given profession depends on two factors: the type of value provided and how it's delivered.

BY SCOTT LATHAM AND BETH HUMBERD

There is no question that automation is changing the nature of work. But are the robots really coming for your job?

One of the most popular narratives is that low-paying jobs are doomed, while college-educated professions will remain largely untouched. Analysts often focus on wages and education as the primary predictors of job evolution, along with organizations' potential to increase efficiency and reduce costs by changing or cutting jobs. But our research points to a more nuanced explanation.

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A review of the academic literature and public discourse on automation revealed limited consideration of risks by profession. So we did our own comparison, coding 50 professions (including many from our literature survey) according to the type of value jobholders delivered and the skills they used to deliver it, to create a framework that helps workers assess what kind of threat automation poses for them. We identified four paths of evolution — jobs will be disrupted, displaced, deconstructed, or durable — and found that value is more predictive of change than wages, education, efficiency, cost, or other factors.

Counter to popular belief, it's not necessarily blue-collar or non-college-educated workers who will be most threatened by automation in the coming decades. Our analysis suggests that a plumber may see less disruption than a legal professional. Simply instructing everyone to engage in continuous education and skill development is remiss. Workers must understand the four paths of job evolution — and the factors behind each path — if they hope to adapt.

Understanding the Four Paths

A jobholder uses a core set of skills to deliver value in some form to a recipient — either externally to a customer or within an organization. Jobs evolve as those consumers' perceptions of value fluctuate along two dimensions: core skills and delivery mechanism, or what we call value form.

For some jobs, core skill sets include a specific knowledge base or craft. Others involve people skills and the ability to build relationships rather than technical expertise. Skills that can easily be standardized, codified, or routinized are most likely to be automated. Those that involve hands-on or real-time problem-solving are less so, because developing tools sophisticated enough to handle such ambiguity is either too cost- and labor-intensive or technologically out of reach. For example, while an electrician's skills may seem vulnerable to automation, the application of those skills varies widely according to the unique circumstances of every client. This degree of customization would be difficult to automate.

A skill set provides value only when it is delivered to a recipient, however, and the delivery mechanism may be transformed. Here's an example: A professor's core skill set is expertise in a certain domain. Such expertise has traditionally been delivered to consumers (students) through in-person classes. However, online platforms and massive open online courses, or MOOCs, offer new vehicles through which learning can occur. The core skill remains the same, but technology is shifting the value form as adaptive software and virtual tutors offer highly personalized instruction and support to growing numbers of students with diverse needs. And computer-directed learning will continue to improve with the increasing sophistication of automation and AI.

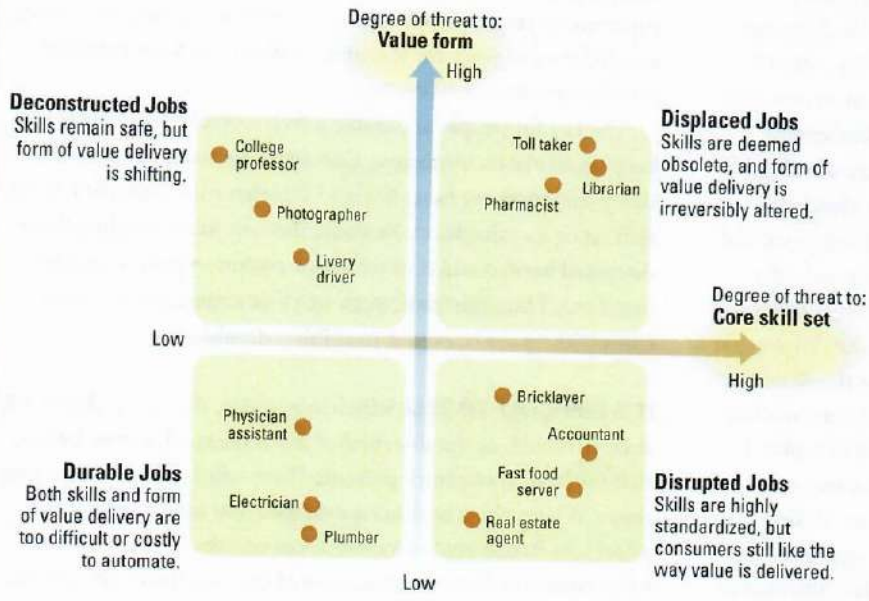
We identified the four ways automation will affect jobs by separately assessing the degree of threat to each profession's core skill set and value form. (See "Which Professions Are Most Vulnerable to Automation?") Here, we'll describe those paths to evolution and suggest strategies for navigating each one.

Disruption. Disruption occurs when the skills in a job are highly standardized yet the consumer prefers to receive value in the same form. It typically follows a reduction in the production costs of goods or services due to increased efficiency. For example, fast-food workers' core skill sets are highly threatened by the implementation of self-ordering stations and apps where customers place their own orders. Food preparation in this setting is also highly standardized and may eventually be automated as well, disrupting workers in both checkout stations and kitchens. Although these workers' skills are threatened, the consumer will continue to receive the same value form — fast food prepared consistently and quickly.

Some highly skilled professionals, such as real-estate agents and legal professionals, are experiencing similar disruption from house-hawking robots

WHICH PROFESSIONS ARE MOST VULNERABLE TO AUTOMATION?

Threats should be assessed along two dimensions: How replaceable are the core skill sets? And how much of a shift is there in the way value is delivered?



and the automation of document reviews and other routine legal tasks (although the more nuanced work of advising clients and negotiating in court requires human lawyers, at least for now). Accountants — another example — are seeing the automation of company ledgers and other types of financial data. Value form is not threatened because consumers still need access to their financials, but the skills used to generate those financials are vulnerable.

Finding transitional roles in which human involvement remains necessary is one adaptive solution. As large-scale automation continues to spread, consumers will have to learn to interact with nonhuman providers and adopt new routines. Disrupted workers can function as a bridge, ensuring that value is delivered to end users in its current form as processes are automated. For example, bricklaying robots are much faster and possess more stamina than their human counterparts. But for now, human bricklayers are necessary to complement and safeguard the robots' abilities, read blueprints, and do corners.

Displacement. With displacement, the core skills of a job are deemed obsolete and the value form is irreversibly altered. Toll takers and telephone operators have already experienced displacement, but even highly skilled professions are not immune. Take pharmacists. They fill prescriptions, deliver them to consumers, and answer questions at brick-and-mortar pharmacies. Yet as more prescriptions are filled online and delivered through the mail, the value form and core skills of human pharmacists are increasingly fulfilled by automated processes. Other jobs facing displacement include librarians (for similar reasons) and software developers (because the skill of writing code is easily standardized, and thus value form has shifted away from in-house development to open platforms such as the cloud).

Retraining is often recommended for displaced workers, but that doesn't always mean more formal education. They should focus on quickly acquiring the most relevant skills in an area with a relatively stable value form. In a volatile job market, lengthy programs that require years to complete (such as extra bachelor's degrees) are likely not the best approach. Micro-credentialing programs — competency-based certifications, mini-degrees, and digital badges — deliver qualifications more quickly and offer more options on the path to a degree along with a sense of accomplishment as individuals obtain marketable skills fast. We suggest targeting high-growth sectors that need workers. A timely example is cybersecurity — a rapidly growing field where trained workers (who can qualify through certificate programs) are in demand.

Deconstruction. In the case of deconstruction, the core skill set remains safe, but the value form is threatened. Take, for example, taxi or limo drivers, or anyone who operates a car service. Livery drivers' skills are central to the value delivered to customers — getting from point A to point B safely and efficiently. While those skills may be threatened by driverless automobiles at some point, human drivers will likely be a necessity in the near term. Yet the value form has already shifted. Traditionally, the value of livery transportation was offered as part of a centralized fleet — drivers were employed by a handful of taxi management companies within a city. Now, the same value is being delivered by Uber, Lyft, and others in the decentralized sharing economy. Photographers and professors are facing similar deconstruction. Their skills remain important, but consumer delivery preferences are changing.

When facing deconstruction, adapt your skills to new value forms. While this sounds easy enough, the biggest impediment is resistance to change. It is well-documented, for example, that many faculty resist online education as a new model for sharing knowledge and expertise with students. Livery drivers would be wise to adjust to evolving transportation norms instead of following these professors' lead. When a new value form becomes central to consumers' expectations, you have a choice: acclimate or fade into obsolescence.

Durability. Often lost in workforce analyses is the fact that many jobs will remain unchanged for the foreseeable future, including some lower-wage jobs. We refer to jobs as durable when neither the core skill set nor the value form is under significant threat. Electricians and plumbers are highly durable professions because the work is rarely routine and the cost to develop a technology that could deliver value in the same form — hands-on problem solving — is excessive. Another example is the physician assistant. The skills associated with this job — medical training, insurance industry insight, bedside manner — will likely become more important as broader technological advancements require fewer doctors to treat more patients. Doing much the same work for less money, physician assistants may just disrupt the role of doctors.

The key for people in durable jobs is to avoid complacency by keeping an eye on tomorrow. Consider whether consumers' future preferences are more likely to threaten your profession's core skill set or its value form. Be aware that any job (including those discussed here) could drift from one evolution path to another over time. Thus, the framework we've described is a tool to be consulted regularly, even if your job is durable now.

IT'S DIFFICULT TO TELL which jobs will be disrupted, displaced, deconstructed, or durable further down the road, but we believe that the basic framework presented here will hold up to changing times. While others have acknowledged that automation will affect jobs in different ways, our focus on jobs as a function of value creation offers an explanation of the underlying dimensions

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at play. Understanding core skills and value form as the key units of analysis will help jobholders of all types respond to workforce changes currently underway — and tackle those that are impossible to predict.

Scott Latham *is an associate professor of strategy at the University of Massachusetts Lowell's Manning School of Business, where* ***Beth Humberd*** *is an assistant professor of management. Comment on this article at http://sloanreview.mit.edu/x/60119.*

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