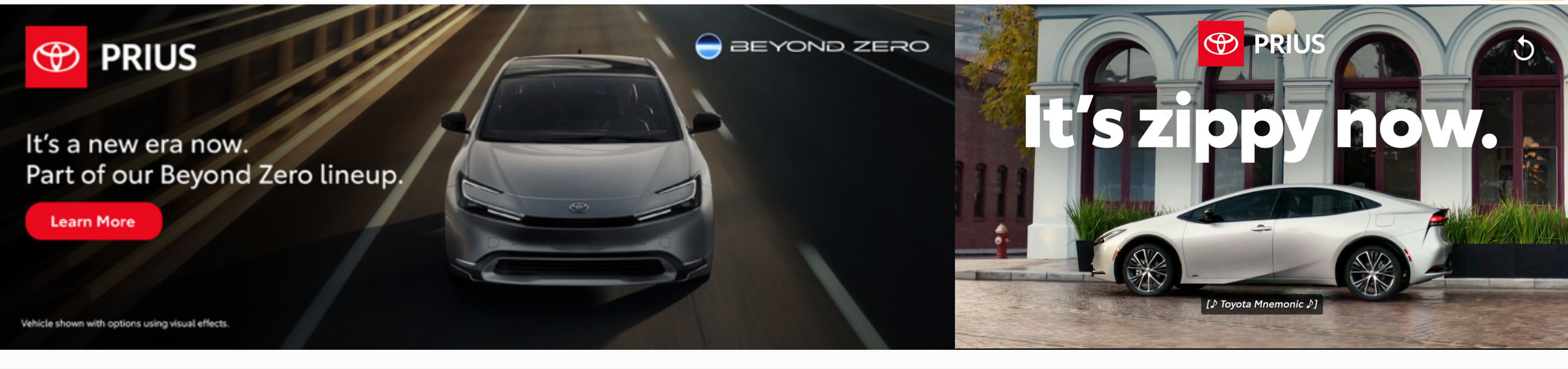

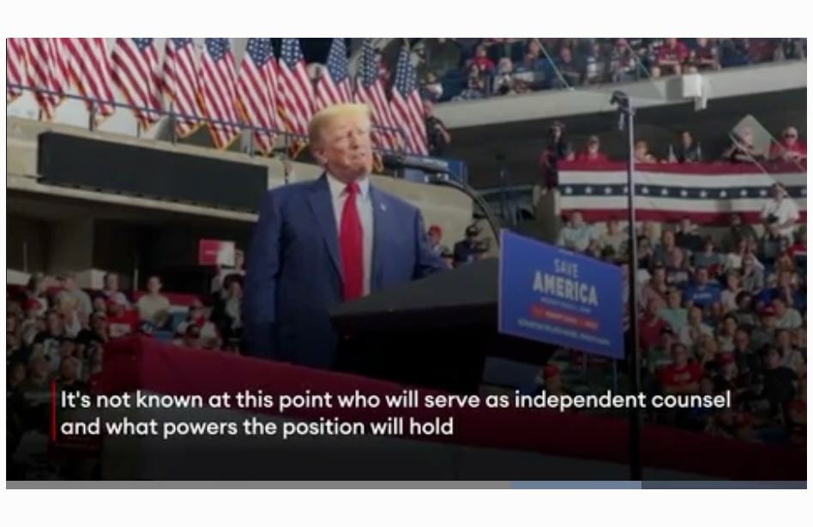

You Can't Have Industry 4.0 Without Training 4.0

Prasad Akella Forbes Councils Member
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Dr. Prasad Akella is the founder and chairman of Drishti, which uses AI and video to empower manufacturing workers and optimize production.

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As manufacturing moves toward Industry 4.0, in which operations are fueled by the constant flow of real-time information on process performance, manufacturers need to consider how they train employees. Achieving the promise of the digital revolution requires a new approach to training during the product life cycle, including the design, simulation and manufacturing phases.

Advanced artificial intelligence (AI) and video-based training help successfully train line associates on standardized work instructions. As a result, production can gain an accurate reference basis, become more efficient and meet world-class quality standards.

Standardized Work In Manufacturing And The Role Of Training

The architect of the Toyota production system (the precursor to lean manufacturing), Taiichi Ohno, has been quoted as saying, "Without standards, there can be no improvement." Ohno and his team defined standardized work, rightly concluding that a standard "golden" way to systematically debug and solve problems was key to continuous improvement.

Standardized work is collaboratively defined by line associates, team leaders and industrial engineers as the current best practice for performing a process. Productivity and quality improvements that provide a competitive advantage happen when line associates recognize the importance of standardized work and are trained to perform the process as defined.

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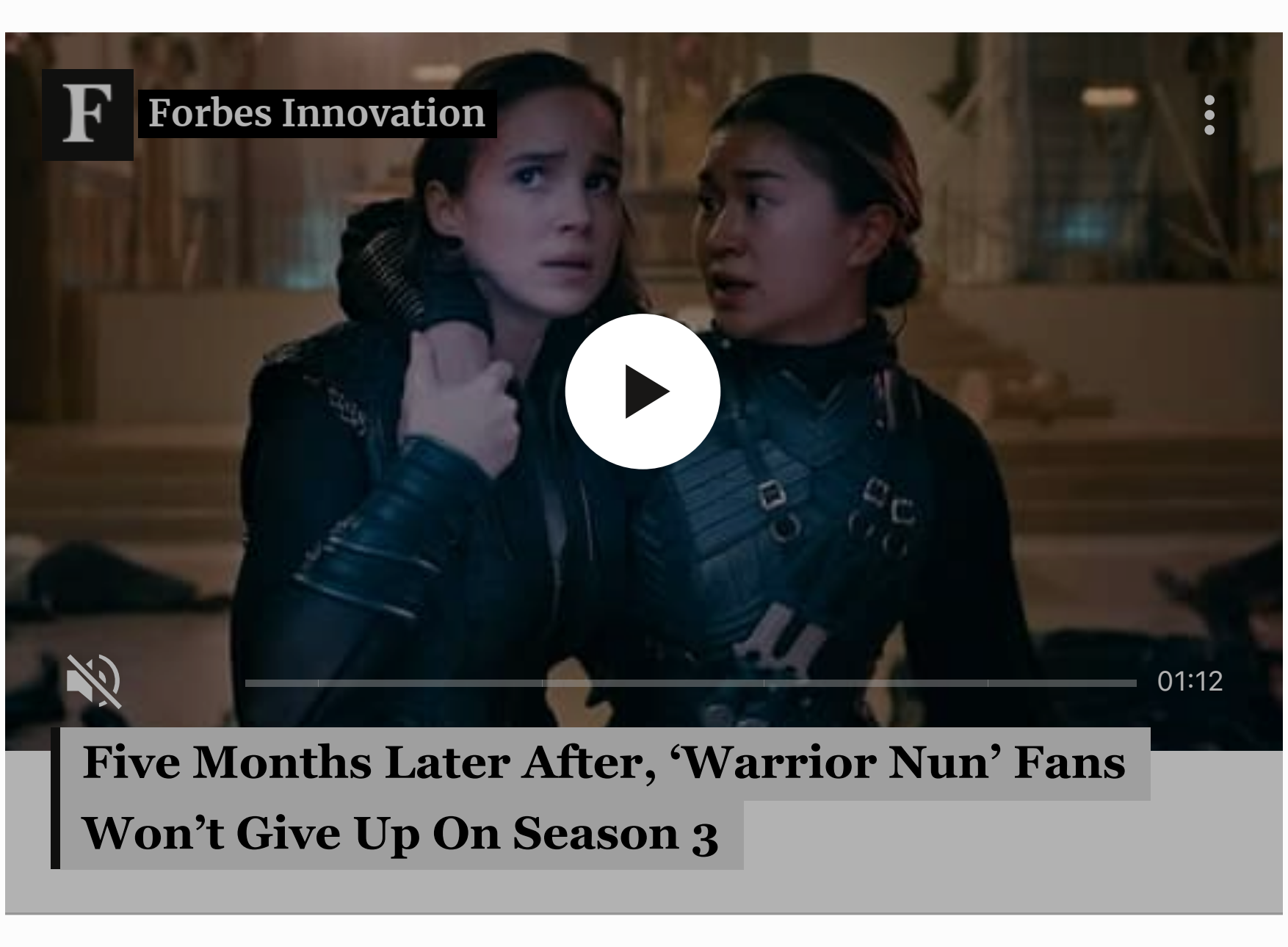
Given that, manufacturers have traditionally created training teams and designated *dojo* stations to train and cross-train staff. I see the benefits of this model every week in my woodworking class: It's much easier to learn by seeing and doing than by reading a set of written instructions. And training is enhanced when a master craftsman — the *Takumi* — demonstrates the tricks of the trade.

But is it really feasible for every manufacturer to train in person, particularly when the *Takumi* is in another country and a global pandemic prevents regular travel? We now know that alternative training methods are needed. Video offers a dynamic medium far better than manuals, captioned photos and presentations. Why? Because when we see, we better understand.



The Fundamentals Of Video-Based Training

Akin to a digital coach, video-based training and standardized work instructions are tools for sustainable process improvement that are language agnostic and are able to easily share best practices. They also can ensure that all participants are trained to the same standard with consistent information, in a common and easy-to-comprehend format.

With any new technology, it's important to understand the "gotchas." For video-based training, things to consider before moving ahead include:

- **Uploading and streaming video needs a lot of bandwidth.** In rural areas, even if there's enough bandwidth for one project, as training scales, bandwidth needs increase.

- **It's hard to hang a camera in a factory.** Physical connectivity requirements like ethernet cables may be hard to run, and there may not be structures in the perfect location from which to hang cameras.

- **Most video systems aren't tied to data.** Simply getting a constant video feed is just the first step. Unless the training system is tied to interpreted data that identifies points of interest, the user must review hours of footage to glean any value — a wholly impractical solution.

It's Never Too Late — Or Too Early — To Apply Video-Based Training

Video-based training can be valuable at all stages of an associate's career:

Initial Training/Onboarding: During initial training, video provides context for those new to manufacturing, along with clear instructions on how to perform a specific set of tasks. Doing it at a *dojo* station gives trainees a sense of the process, environment and expectations. Watching themselves side-by-side with a pre-recording of a *Takumi* doing the same job makes it easier to see differences that need to be addressed. A separate space keeps them safe while they're learning the work and environment.

On-The-Job Training/Feedback: Video shows trainees exactly how they perform the job. Just as before, showing an A/B comparison soon after completing the task provides invaluable, in-the-moment feedback that offers visual cues of what's working and what isn't.

Cross-Training On The Current Line: Video expedites cross-training and expanded tasks by making it easy to train associates on the rest of the tasks/stations on the first line, increasing employees' value and job security.

Cross-Training On Other Lines: For employees, this offers a path to expanding skills. For supervisors, it builds in flexibility to deploy resources based on market demand, absenteeism and growth-minded employee behavior. Finally, for employers, it creates a pool of well-trained employees.

Creating Training Skills Matrices: Using video makes it easier to identify the tasks that each team member is good at and the ones they need improvement on, and thereby helps determine where to invest in improving their skills.

Tips On Getting Started With Video-Based Training

The growth of massive open online courses and tons of DIY videos on YouTube show that video-based training is fast becoming a preferred way to learn how to do anything — from cake baking to satellite building. No matter the size of the organization, these tips offer ways to begin:

- Designate a cross-functional team, including line associates, supervisors and engineers, to define how to begin using innovation.

- Clearly establish that the videos will not be used punitively. There should be absolutely no shred of concern on this front.

- To start inexpensively, get a 32-channel home security system for about $2,500. Although clunky, it's enough to get the team familiar with the art of the possible.

- To ensure that all training is indexed to standardized work, start with videos of the *Takumi* executing standardized work on different stations.

- Be creative. For example, study golf video training apps to learn how they train their customers.

Initial customer validation suggests that the opportunity to significantly reduce training time using video is squarely in front of us. For manufacturers, when insight and video are combined, training is directed and actionable. Adding analytic-informed visual tools offers ways for both initial and continuous training through immediate feedback in the context of the day-to-day job, imprinting good behaviors from the get-go.

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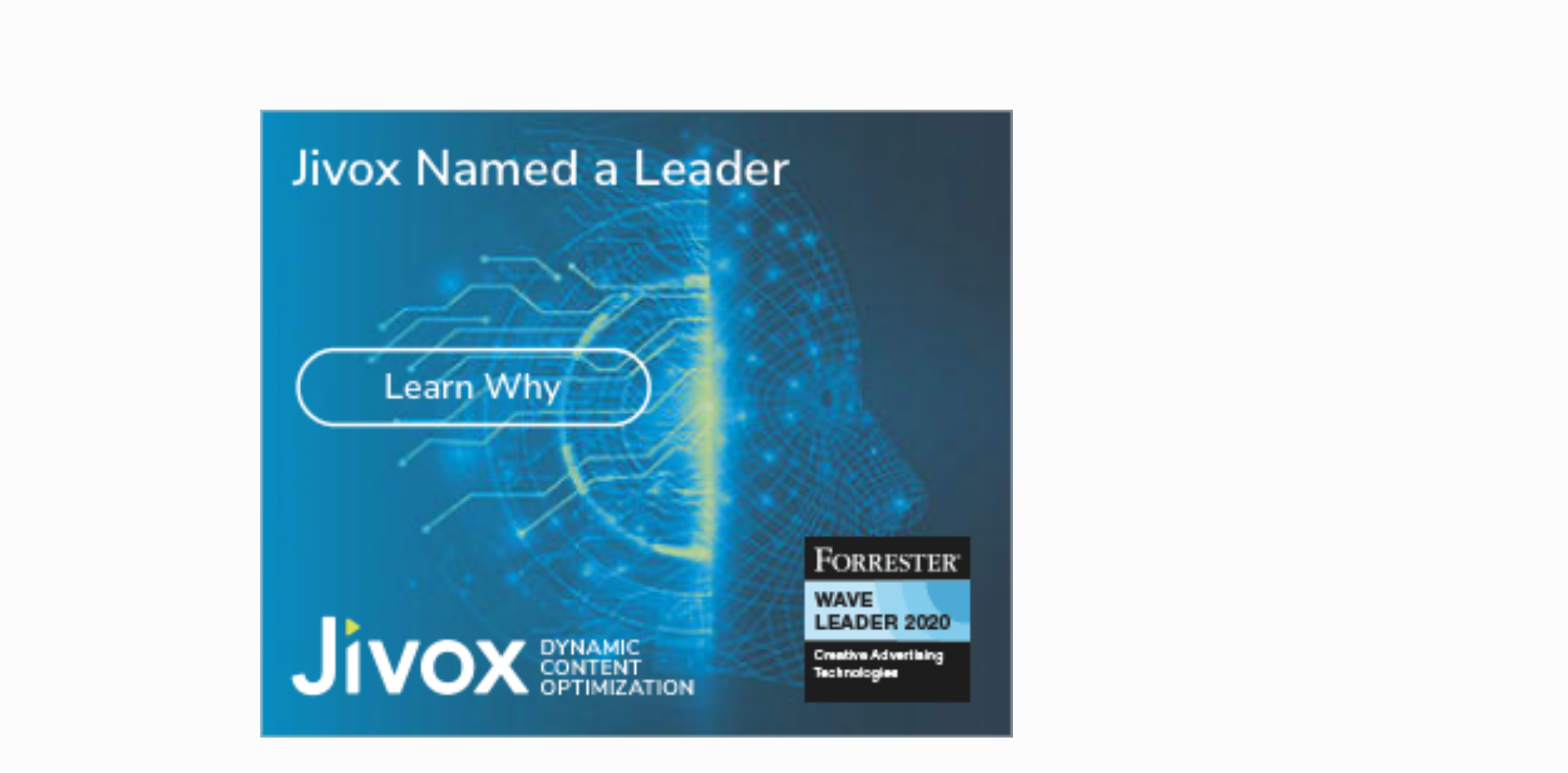
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