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COMMENTARY

Covarrubias: When the Marathon Isn't About the Marathon

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Dr. Daniel Covarrubias, director of the Texas Center for Border Economic and Enterprise Development. (Photo courtesy: TAMIU)

Posted Tuesday, April 21, 2026 8:50 am

By Dr. Daniel Covarrubias

A bright-red humanoid named Lightning crossed the finish line of a half-marathon in Beijing on Sunday morning at 50 minutes, 26 seconds. It clipped a railing on its way in, got helped back up, and still finished about seven minutes faster than the human world record. Its time was faster than every one of the 12,000 human runners in the same event. Lightning's two teammates took second and third in the robot category.

Lightning was built by Honor, a Chinese smartphone company. That detail usually becomes the story. It shouldn't be.

Two weeks earlier, BMW announced it was expanding its pilot with Figure AI after the California company's Figure 02 robots finished a ten-month run at the Spartanburg plant. In that window, the robots worked ten-hour shifts, five days a week. They loaded 90,000 sheet-metal parts onto welding fixtures within a 5-millimeter tolerance, on 84-second cycles. They contributed to the production of 30,000 BMW X3s. Hit rate on placement accuracy: 99%.

Spartanburg is the real number. The marathon was the ad.

The moment hiding inside the headline

The MHI and Deloitte 2026 Annual Industry Report, released this spring, surveyed more than 500 supply chain professionals around the world. The survey is in its thirteenth year. This year's numbers broke from the pattern. The share of respondents who rated AI's disruptive impact on supply chains as significant or transformational climbed 25 percentage points in a single year. Robotics and automation climbed 16.

Humanoid robotics shows up as its own category for the first time. Adoption today: 4%. Expected adoption within five years: 28%. That's a seven-fold increase in five years.

Supply chain professionals don't tend to overreact. They manage variability for a living. When 90% of them report talent and workforce challenges and 58% call those challenges major (up 9 points from last year), and when 65% say they'll invest in AI and 46% in robotics over the next two years, they're not chasing a headline. They're reading a labor curve they already feel.

In my view, this is where Logistechs stops being an idea about software and starts being an idea about bodies. I defined Logistechs a few years ago as the impact of exponential technologies on logistics: transport, handling, and customs clearance. Software has done most of the heavy lifting in that definition until now. Physical AI is the part that shows up in a warehouse, on a dock, in an assembly cell. It shows up with hands.

What deployment actually looks like

BMW is the clearest case because it's been documented in public. Figure 02 at Spartanburg ran a classic pick-and-place task, lifting sheet-metal parts from racks and placing them on a welding fixture before a conventional six-axis robot welded them in. The targets were specific: 84 seconds per full cycle, 37 seconds for the load phase, and greater than 99% placement accuracy per shift. BMW is now extending humanoid pilots to its Leipzig plant in Germany, with high-voltage battery assembly and component manufacturing as the next use cases.

Tesla is converting assembly lines at its Fremont factory this year to produce the third generation of Optimus, with a target unit cost under $20,000 and a stated ambition of 10 million units per year from a new facility at Gigafactory Texas. Mercedes-Benz is testing Apollo, built by Austin-based Apptronik, at its Berlin plant on logistics and quality checks. Hyundai, which owns Boston Dynamics, has signaled plans to deploy the new Atlas humanoid across its manufacturing network. Apptronik raised $520 million this year with Google and Mercedes-Benz among its backers. Bank of America projects that humanoid unit costs will be below $17,000 by 2030.

Then there's Réflex Robotics. Founded by MIT graduates. Announced in March by Nuevo León's governor: it will build the first humanoid-robot manufacturing plant in Latin America. The location: Nuevo León, about 140 miles south of the World Trade Bridge.

The pattern here is a deployment curve already running.

The marathon was a product demo

Lightning's real competitor on Sunday was the assumption that we still have time to plan for this.

The actual argument in Beijing was an engineering argument. Balance, terrain recovery, battery endurance, and thermal management under 13 miles of stress. Those are the four problems that have kept bipedal robots out of warehouses and off factory floors for twenty years. When a machine manages all four of them in public, in front of cameras, at competitive speeds, the venture math changes. The purchase math changes. The deployment timeline compresses.

The MHI respondents forecasting 28% adoption within five years aren't guessing. They're telling you what their suppliers are telling them.

Why this lands on the border first

In 1956, a North Carolina trucker named Malcom McLean loaded 58 metal boxes onto a converted tanker in Newark and sailed them to Houston. Within a generation, his invention had re-priced port labor from Brooklyn to Rotterdam, rewired global trade, and made the ports that adapted rich and the ports that didn't irrelevant. Physical AI is moving through manufacturing and logistics on a similar curve, and the corridor is where it first touches the ground.

Port Laredo processes over 6 million trucks and close to $400 billion in trade every year. Nearly a billion dollars crosses two bridges here every calendar day. What happens at this crossing previews what happens at every commercial port of entry from San Diego to Brownsville. This cross-border region's comparative advantage was built, and is still defended, on a specific kind of labor equation: competitive manufacturing labor in Mexico meeting American capital, logistics infrastructure, and market access, with Laredo as the hinge where the two sides meet.

That equation is being re-priced in real time, exactly like port labor was in the container era. The labor didn't disappear. The capital cost of replacing it just dropped 40% in two years, according to Goldman Sachs data cited in Deloitte's 2026 tech trends work.

The 2025 Texas A&M International University Texas Center trilateral employment vulnerability analysis found 9.9 million jobs across the United States, Mexico, and Canada are exposed to trade disruption. Texas alone carries 805,000 of that U.S. exposure. Most of the Mexican share sits in the northern border states, in the maquiladora light assembly and automotive component work that feeds the corridor. Those are exactly the tasks that Figure 02, Optimus, Apollo, and whatever comes out of the Réflex plant in Nuevo León are being designed to do.

Deployment at scale is a decade-long process, not a quarterly one. Humanoid robots still fail more than traditional industrial arms. Maintenance costs are high. Supply chains for high-torque actuators and tactile sensors are thin. The Deloitte 2026 tech trends study found that only 11% of organizations are actively using agentic AI systems in production, even though 38% are piloting. Most pilots don't scale. Most don't scale soon.

But that's the point. A decade-long process that's already started is one we should be planning around. The labor shortage driving adoption is structural: 1.9 million U.S. manufacturing jobs are projected to be unfilled by 2033, according to Deloitte and the Manufacturing Institute, with industry analysts estimating that roughly a quarter of the current workforce is nearing retirement. Mexico has become the second-largest industrial robotics market in the Americas, importing essentially all of the units it installs. The money is already moving. The hardware is already shipping.

What the corridor has to figure out

Three things matter for Laredo and Nuevo Laredo in this window, and for every binational metro that lives off cross-border trade.

The first is workforce. When a warehouse reduces cost per box moved from 20 cents to 3 cents, as MHI documented in a real deployment this year with a major U.S. retailer, the people who used to move those boxes don't disappear. They either get retrained into roles that manage, maintain, and improve the automation, or they end up in a worse version of the same economy. The supervision layer, the exception-handling layer, and the maintenance layer for physical AI all need people with skills that most regional training pipelines on both sides of the border are not yet producing at volume. The institutions that run those pipelines will have to develop curricula for roles that don't yet have job descriptions.

The second is physical infrastructure. Humanoid robots running three shifts need 5G coverage, edge compute, redundant power, and clean data pipelines. Our commercial bridges are designed for trucks, not data. Public policy conversations on both sides of the border will have to start treating digital infrastructure for the corridor

with the same seriousness as physical infrastructure, because you can't run physical AI on fiber that wasn't planned for it.

The third is USMCA itself. The 2026 Joint Review arrives just as humanoid deployment curves start to bend. The labor value content rules and the regional content requirements that sit at the heart of USMCA automotive provisions were written in 2018 under the assumption that a "worker" was a person. What happens to rules of origin when a Mexican maquiladora's 2031 workforce is 30% humanoid, and those humanoids were designed in Cambridge, manufactured in Nuevo León, and programmed by a model trained in Austin? Is the car that crosses the bridge a North American car? Does the agreement's labor enforcement machinery still mean what it meant seven years ago?

USMCA 2.0 requires institutional architecture, not just rule updates. The three proposals I've written about, the Binational Customs, the North American Industrial Coordination Council, and the North American Digital Infrastructure Coordination Initiative, were designed as the implementation layer for a continent that intended to be competitive. Physical AI is the case that proves why that architecture matters. Without NADICI-style coordination on AI-enabled trade interoperability, rules of origin in a humanoid-assisted economy become unmanageable. Without NAICC-style industrial policy coordination, the continent cedes humanoid manufacturing to companies and countries that built the institutional capacity first. Without a BCA, the customs system that has to classify, clear, and audit physical AI-produced goods remains two separate national systems talking past each other.

The race that actually matters

Borders, in my view, are laboratories. Societal petri dishes where the ability to coexist shapes economic and political prosperity. The Laredo-Nuevo Laredo corridor is one of those laboratories. NAFTA landed here first. USMCA's enforcement mechanisms landed here first. The physical AI transition will land here first, because this is where the goods move.

The question for Texas, for Tamaulipas, for Washington, and for Mexico City is whether they shape that transition or whether they have it shaped for them. The companies that adapt fastest tend to win the next decade. The same is true of regions.

Lightning crossed the finish line in 50 minutes and 26 seconds on Sunday. The clock on our corridor is less precise than that, but it's running at the same pace.

Editor's Note: The above commentary was penned by Dr. Daniel Covarrubias, director of the Texas Center for Border Economic and Enterprise Development at the A.R. Sanchez, Jr. School of Business at Texas A&M International University. His research focuses on cross-border trade, logistics, and the convergence of exponential technologies with North American economic integration. The commentary appears in the RGG Business Journal with the permission of the author.

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