

## He's one of the only humans at work — and he loves it

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SHANGHAI — Inside a warehouse the size of seven football fields, hundreds of robots pack roughly 200,000 boxes each day and ship them to customers across China. Four humans babysit.

One is Zou Rui, 25, a soft-spoken engineer who stands for much of his eight-hour shift in New Balance sneakers, monitoring a milky-white mechanical arm. It plunges up and down like a pecking chicken, grabbing parcels with a suction-cupped hand and dropping them into containers on a conveyor belt.

If something looks odd, Zou rushes to fix it. Otherwise, he said, he jots notes in a binder, tracking the arm's performance for his remote bosses. Or he chats online with his colleagues: two men and a woman, all about his age.

Here, Zou is far from his family's cornfields in the eastern province of Anhui, far from the bustle of his old workspace with 100 or so people. But he doesn't feel isolated.

"I don't get lonely," he said, "because of the robots."

Zou works for the Chinese e-commerce giant JD.com, which lauds this warehouse on the outskirts of Shanghai as one of most automated in the world. Analysts say it's a peek at the future of manual work in China and beyond — a place where a chosen few tend to the machines, while most workers have been rendered obsolete.

Thanks to a "strategic partnership" with Google, that future could be coming soon to the United States.

But chief executive Richard Liu wants to take the high-tech concept even further in a country once known as a hub for cheap labor.

"I hope my company would be 100 percent automation someday," Liu [said](#) at an April retail conference in Madrid. "No human beings anymore."

Analysts say JD.com offers a peek into the future of manual work worldwide — small numbers of people tending to complex machines. (Yuyang Liu for The Washington Post)

The future of JD.com could now rest on shakier ground, analysts say, after [Liu was arrested](#) Aug. 31 in Minneapolis on suspicion of rape. He was released hours later with no charges filed. He returned to China while the investigation remains open.

The company has maintained that Liu committed no crime, and many social media users quickly jumped to his defense, asserting the billionaire had been framed. But the attention around the incident caught the eye of Chinese officials, who opened their own inquiry into Liu's arrest.

Entrepreneurs who grab negative headlines in China tend to draw heightened government scrutiny, which could thwart their long-term blueprints, said Simon Cousins, chief executive of Allegravita, a global public relations agency in Beijing.

“China’s private sector titans walk a very fine line between government censure, or worse, and their ability to pursue their business objectives,” he said.

Thus far, Liu has stuck to his regular schedule, snapping publicity photos with other executives in Beijing four days after his arrest — even as JD.com’s stock plummeted to an 18-month low.

His facility near Shanghai serves as a learning lab for the company — which reported a slim **\$18 million in profit** last year on revenue of \$55.7 billion. Executives hope it will prove to be a not-so-secret weapon against competitors Alibaba and Amazon, which are also racing to develop the next generation of e-commerce super machines.

JD aims to perfect its technology, spread it to the firm’s 500-plus other warehouses across China, Thailand and Indonesia, which still depend on thousands of people, and eventually sell the system to businesses that want to shrink their own labor costs.

As of today, JD employs roughly 160,000 full-time workers in Asia. Over the next decade, Liu said, he hopes to see that number dwindle to “less than 8,000” better-paid staffers who work two or three hours daily.

The jobs would be “easier, more fun and less dangerous,” the company head said this spring.

JD signed its deal with Google in June, and Google announced plans to **invest \$550 million** in the firm. “This marks an important step in the process of modernizing global retail,” JD’s chief strategy officer, Jianwen Liao, said at the time.

JD also opened its first Chinese grocery store this year **with Walmart**. Shoppers there can pay with their smartphones.

There are only four human beings in the massive JD.com shipping facility in Shanghai. This [handout video](#) from the company was edited by the Post for time. (JD.com)

The partnership with Google is expected to boost Google Shopping, a search engine for goods, and intensify the U.S. company’s domestic rivalry with Amazon, which has deployed more than 100,000 robots **of its own** around the globe.

Amazon, which launched its robotics program in 2014, doesn’t have any fully automated warehouses, but its fulfillment centers manage a wider variety of packages than JD’s four-person shop does. (Amazon’s chief executive, Jeffrey P. Bezos, owns The Washington Post.)

In the warehouse where Zou works, machines guided by image scanners handle all the goods, largely cellphones and cameras and other rectangular-shaped electronics.

Packages travel along a highway of belts. Mechanical arms stationed throughout the network place the items on the right tracks, wrap them in plastic or cardboard and set them onto motorized pucks dubbed “little red men” — a nickname inspired by the spunky creatures in the Minions films.

The little red men carry the parcels across a floor that resembles a giant checkerboard and plunk them down chutes to sacks. Computerized shelves on wheels retrieve the loads and transport them to trucks, which deliver most orders within 24 hours of a shopper's click.

While people still outperform robots on a range of tasks — lifting objects of various shapes and sizes, for example — economists predict that JD and other e-commerce businesses are leading a shift that will displace millions of workers worldwide in retail and manufacturing.

“This is the kind of technology I expect will disperse everywhere,” said Martin Ford, author of [“Rise of the Robots,”](#) which explores how artificial intelligence could reshape the labor market. “It’s absolutely inevitable that this will be a lot more disruptive than people imagine.” A swath of jobs that follow patterns will vanish, Ford said — the global consultancy McKinsey predicts that robots could replace almost [a third](#) of the American workforce by 2030 — and a new crop of highly skilled positions will emerge.

JD employs roughly 160,000 full-time workers in Asia, but chief executive Richard Liu wants to slash that number. (Yuyang Liu for The Washington Post)

Demand is expected to swell for workers who can program and monitor machines, as well as for managers with superior communication styles. (Artificial intelligence struggles with empathy.)

Peter Yu, chief technology officer of XYZ Robotics, a start-up that focuses on supply-chain automation, said workers shouldn’t fear the change.

Automation, he said, will swap boring jobs for better-paying and more stimulating work. The United States’ estimated [908,000 warehouse employees](#) (who don’t all work in e-commerce) hardly socialize anyway, Yu said.

“They have to run around here and there and pick up objects,” Yu said. “They don’t have much time to talk to other people.”

At JD, Cheng Hui, head of robotics research for the firm in San Francisco, said market forces propel the scramble to automate.

China is grappling with a [labor shortage](#), he said.

The country’s one-child policy, which was in place from 1979 to 2016, shaved down today’s number of young job seekers, giving workers [more leverage](#) to ask for higher pay and better benefits.

Government officials have admitted the policy stifled population growth, making it tougher and more expensive for companies to fill vacancies.

Yao Meixiong, deputy director of the census with the Fujian Provincial Bureau of Statistics, [has estimated](#) that China’s young workforce (20 to 34) in 2030 would total 221 million, down 104 million from 2010.

“The logistics talent pool is not increasing as fast as what we need,” JD’s Cheng said. “In that sense, automation will help to relieve that demand.”

Not everything is automated: A JD employee transfers packages to a truck. (Yuyang Liu for The Washington Post)

For Zou, landing a job at JD's first fully automated warehouse felt like a promotion. He started work in August, leaving another fulfillment center — only 90 percent automated — and the duty of ensuring orders shipped on time. (His contract, he said, prevents him from talking about his salary.)

“The robots reduce the jobs that are boring,” Zou said.

He doesn't share the fear that machines will take over. After all, he said, his role didn't exist a little more than a year ago.

Zou remembers making his first online purchase as a teenager: a custom-made basketball jersey.

“This is the future,” he thought, and it seemed more interesting than selling corn with his parents.

He went to business school near his hometown, but higher education didn't prepare him for the specifics of the JD job. Zou completes a training course every two months — the technology evolves that quickly.

Aside from work, he said, he likes noodles and countryside drives with his girlfriend. He hopes to get married, have kids someday and keep building his career in e-commerce, “an industry with great prospects.”

“I want to help popularize this technology,” Zou said. “I want to help spread it around.”

*Amber Wang contributed to this report.*