

Cover story



Above: Robotic waiters serve at a restaurant in Weifang, Shandong province. **Below:** A boy examines a cellphone-controlled robotic hand in Tianjin.

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countries with lower costs, they also face competition from Western countries in high-end manufacturing.”

Robots may be the answer to the squeeze on China's manufacturing sector, he says.

Zhang Xiangmu, director of the equipment department at the Ministry of Industry and Information Technology, says Chinese robot manufacturers cannot afford to develop gradually.

“We have time pressure, as the foreign makers are occupying not only the high-end market, but also the low-to-medium market. Chinese companies must make some breakthroughs otherwise we will always trail others.”

But wresting market share from countries with established robotics industries will not be easy.

Last year, the German robotics and automation sector had a record turnover of 11.4 billion euros (\$12.8 billion), a 9-percent increase on 2013.

This year, further growth of 5 percent is expected, says Hans-Dieter Baumtrog, chairman of VDMA Robotics and Automation, one of Europe's biggest industrial federations.

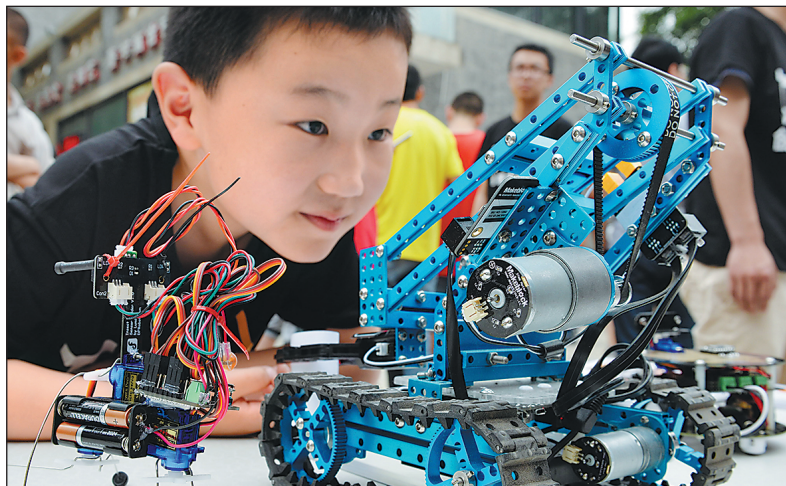
“Prospects are good that the industry will reach the turnover mark of 12 billion euros by the end of the year,” Baumtrog said recently.

VDMA says that most of that growth in the German robotics industry came in the form of increasing sales in China.

Exports accounted for 55 percent of sales last year. In the first four months of this year, demand from abroad jumped a further 11 percent.

Last year, the number of new robots installed grew 4 percent in Europe and 8 percent in North America. In Asia, robot installations rose 42 percent, and Baumtrog says most of that growth was in China.

“China does not content itself with employing robots,” he says. “It is the



express strategy of the Chinese government to become a strong and innovative robot country.”

Li Guang, chief economist and executive director of Liangjiang New Area in Chongqing, agrees that this is exactly what China hopes to become.

In the past two years, Yongchuan district in Chongqing has attracted 65 robot makers to its Phoenix Lake Industrial Park, and it plans to have 200 robot companies by 2020.

Li says that the timing is right for China to push ahead.

“China is going through an economic restructuring process. It's difficult. The key is readjusting the technological systems (of Chinese industries), to rebuild them using intelligent manufacturing and automation. This is being driven by both the market situation and the government. Labor costs are rising, so we don't have that advantage anymore, but at the same time the costs for making robots are falling, so many companies can now afford them.”

With about 2.6 million cars and 120 million laptops being made in Chongqing each year, the business environment is perfect for encouraging further growth in robotics manu-

facturing, Li says.

“The development of the robot industry is actually market driven here.”

But beyond rhetoric, how does China plan to help local producers gain more market share? Education is part of the plan, Li says.

In Chongqing, several universities are preparing to launch master's degrees in robotics. In addition, a robot training college, funded by the local government, will open this year with an initial intake of 500 students.

“Many companies want to adopt a robot system in their factories, but they lack the human talent to operate and maintain it, so we are opening a robot training college,” Li says.

“We plan eventually to increase the number of students to 3,000.”

Finance is another area where the government is prepared to pitch in.

Li Hongjun, vice-president of Chongqing Liangjiang Robots Leasing Co, says his company offers leasing options for companies keen to automate their operations, helping businesses that lack the capital necessary to secure a bank loan in China to get the robots they need. Customers are charged a higher repayment rate compared with

standard bank loans, but do eventually own the robots they lease.

Jointly financed by the government and private shareholders, in addition to increasing demand for local robot producers, CLRL also provides loans to domestic companies keen to expand their operations. Again, the onerous capital requirements demanded by the banks are waived.

“We have signed leasing agreements with three companies, and 20 other companies have applied and are now being assessed,” Li says.

“There is one company that we helped in Chongqing that had 52 workers,” Li says. “It is a company that makes screens for phones and laptops. They bought 20 million yuan of equipment with our help and were able to cut their workforce by 38 people and triple their production.”

“Many cities across China are following in our footsteps with this model. Shenzhen is one that will have this model very soon.”

Established in December 2013, Chongqing Huashu Robotics Co Ltd is among the first wave of local manufacturers hoping to make an impact in the western municipality.

On the company's factory floor, a senior worker casts a critical eye over two squat robotic arms that rear up and down in a test pattern like a pair of metal cobras.

“These types of robots are generally used in the auto manufacturing, electronics and plastics industries,” he says. “We sold a lot of robots here in Chongqing last year.”

He gestures at the robotic arms. “These can each do the work of three people,” he says. “We're testing them for spotwelding. In 18 months, a company that buys these has made its money back.”

Non-industrial robots, which the industry refers to as domestic, are also growing in popularity across China. At



Li Guang, chief economist and executive director of Liangjiang New Area in Chongqing



Gu Yuehua, an employee at Changan's Chongqing factory, is responsible for maintaining the robotic appendages

the Dalu Robot restaurant in Jinan, Shandong province, customers are served hotpot meals by motion sensor-activated droids that circle the eatery on a conveyor belt.

It is a far cry from the latest breakthrough in Japan, where Yaskawa Electric Corp's new sword-wielding robot, Motoman-MH24, this month reportedly duelled and defeated the renowned swordsmen Isao Machii. But it is still early days for Chinese researchers.

Back in Changan's Chongqing factory, in an area far from the clamor of the company's giant human workforce, the future has already arrived.

In a vacuum-sealed room, 36 robotic appendages spring to life, ferrous, arachnid limbs and blocky, nozzle-studded obelisk-like machines closing in on cars trundling along a conveyor belt, painting each car's exterior at blistering speed.

Guo Yuehua, 25, is one of four employees responsible for maintaining the machines.

He is the new generation of Chinese worker: The robot wrangler.

A common fear is that robots will replace humans and cause mass unemployment, but Guo believes robots will ultimately benefit Chinese workers.

“My father had to squat on the ground all day and weld these long struts which were used in machinery,” Guo says. “My mother was a cleaner. I think it's a good thing these types of jobs are being done by robots now.”

As to whose robots, local or foreign, will be doing the work in China, Baroncelli says it will probably be both, with an increasing number of joint ventures.

“China wants foreign direct investment from robotics and manufacturing companies,” he says. “Many, many European companies are now present (manufacturing) in China. You produce the robots there, they are already there. You're closer to the market.”

On the Changan factory floor, the lone robot continues to apply sealant to windscreens. It is clear that one day this robot will have a legion of mechanical co-workers — even if their nationality remains in doubt.

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