Electric vehicles

Plugging away

Falling costs are opening opportunities for electrified commercial vehicles

ELECTRIC commercial vehicles were once a common sight in Britain's towns and cities. A fleet of 25,000 battery-powered milk floats roved the early-morning streets delivering a crucial part of the nation's breakfast. Short ranges and low top speed were unimportant for a milk round but near-silent running meant customers could sleep. Their demise came as supermarkets expanded, but electrification of business vehicles is gathering pace anew.

Just as better battery technology is bringing down the cost and boosting the range of passenger electric vehicles (EVs), those advances are making electrification of commercial vehicles more appealing. The purchase price is still far higher than a comparable vehicle with an internal combustion engine (ICE). But businesses are more focused than ordinary motorists on the total costs of ownership, and on other reasons to shift to electric power.

Much attention has been paid to battery-powered juggernauts. Tesla has 500 orders for a heavy-duty electric lorry (pictured). Promised (with the usual wild optimism) to hit roads in 2019, Tesla says a version with a range of 800km (500 miles) will cost $180,000—50% more than an ICE equivalent. Daimler, Cummins, an engine-maker, and others are developing similar vehicles. Yet the chances that batteries will rapidly displace diesel in trucking are slim. Haulage businesses run on slender margins and the economics do not appear to add up. As UBS, a bank, notes, American lorries can take 40 tonnes laden weight and typically 22.5 tonnes of that is given over to cargo. Even by 2022 a comparable electric system will weigh between four and nine tonnes depending on range; a diesel power-train weighs two tonnes.

Displacing valuable cargo is bad enough. Further questions remain over the durability of Tesla's powertrain (ICEs typically last 1m miles, but batteries degrade quickly and an expensive replacement may be required after half this distance) and also over the lack of a charging infrastructure along intercity routes. Lower fuel costs and maintenance of electric motors will not outweigh the upfront expense and

Pulls a heavy weight of expectation

inconvenience for some time.

Electrification is arriving far more swiftly for other types of large vehicle. Buses run on short fixed routes and their batteries, which can be rapidly recharged at either end, can be considerably smaller than in long-haul lorries. Electric buses are expensive but that could change quickly because of the speed of adoption in China.

Generous government subsidies both to clean up filthy city air and to help China become a global EV leader are having an effect. In December Shenzhen completed a switch to make its fleet of 16,500 buses electric. China is pushing other cities to do the same and, as more buy buses, battery and manufacturing costs are sure to fall. Peter Harrop of IDTechEx, a consultancy, reckons Chinese electric buses are on course to undercut diesel versions just on purchase price, and could soon flood the world.

The business case for smaller lorries and vans for local deliveries is also starting to stack up. These require smaller, cheaper batteries for shorter urban journeys and can be recharged at central depots. Britain's Royal Mail is testing larger trucks made by Arrival, a small British firm, and has a big fleet of electric vans. Daimler has begun delivering a few "eCanter" medium-sized trucks with a range of 100km to UPS, an express-package firm, and will make 500 more in the next two years. Delivery companies and mail services are also testing or deploying electric scooters, three-wheelers and other smaller vehicles.

Electricity could also find its way to other sorts of vehicle. Mr Harrop anticipates strong growth in electric construction, agriculture and mining equipment as costs fall and emissions regulations tighten. There are other benefits. Construction vehicles that are silent could work around the clock. Even ride-on lawnmowers could become quieter and more reliable with batteries. Quiet refuse lorries would be just as welcomed by sleeping residents as the floats that used to deliver milk across Britain. ■

Correction: In our article last week on the release from prison of Lee Jae-yong, vice-chairman of Samsung Electronics, we wrote that his father, Lee Kun-hee, chairman of Samsung, had received a pardon in 2009 while serving time for evading taxes. In fact Mr Lee did not serve time as he had been given a suspended sentence to begin with. Sorry.

Education technology

Tap, tap, learn

BANGALORE

Indian teaching startups make work for idle thumbs

TO ANY outsider it looks as if the children have been hypnotised by yet another smartphone game. As the spying elders in a TV ad try to break the spell, the sprogs flash a grin at their screens. "It's maths, dad," giggles a fifth-grader to her father. The company behind the ad, Byju's, sells an educational smartphone app which has been downloaded 14m times since its launch in 2015.

Byju's is one of many education technology (or "edtech") startups that have emerged in India in the past few years. Their target is vast—some 260m pupils in schools and over 30m graduates who train in order to pass entrance tests for a seat in medical, engineering and elite management institutes. KPMG, a consultancy, reckons the industry will grow eightfold to be worth around $2bn by 2021.

Much of the expected growth is due to India's woeful record in primary-school education, where teachers are scarce, infrastructure crumbling and the culture one of rote learning. Almost half of students from the fifth grade cannot read texts meant for second-graders. Private tutors are called upon. Buses are plastered with ads for cramming institutes claiming to have coached exam "toppers", a status that rivals cricket superstardom. (A rival to Byju's is inevitably called Toppr.) According to one estimate, a quarter of all Indian students attend private coaching classes.

Byju Raveendran should know. A few years ago, he used to attract 25,000 students to a particular stadium in Delhi, and fly to nine cities every week to teach high-school maths. Youngsters would learn shortcuts and tips to ace the fiendishly hard Common Admission Test for the best schools. Given the enormous size of the classrooms, it was impossible to make the sessions interactive, so Mr Raveendran came up with the idea of converting the lessons into video gobbets and hosting them online.

The business has 900,000 paid users who spend over 50 minutes on the app each day—metrics that media firms might envy. Around nine-tenths of customers of Byju's renew subscriptions despite an annual price tag of $350-450, not far from half the median annual income of an Indian. Sales for the twelve months to March 2017 reached $40.6m, and the firm says it expects to turn a profit in the current financial year. Prominent investors including Silicon Valley's Sequoia Capital and China's ▸▸

Tencent have put in a total of $200m, and Byju's has a punchy valuation of $800m.

That is despite a patchy record for Indian edtech firms. Indian schools are price-sensitive and tend not to be early tech adopters, says Kartik Aneja of Nayi Disha, which makes educational digital games. Educomp, a maker of technology-enabled classroom products, used to sell expensive digital content and multimedia equipment to schools and was valued at over $1.4bn in 2008, but filed for bankruptcy last year. Byju's managed to bypass schools by selling directly to students and parents.

Other challenges remain. The company has to send out physical memory cards to students who might not have sufficient internet bandwidth to download materials (a previous satellite-based method proved unreliable in bad weather). And a network of hundreds of agents is needed to collect cash from parents unused to paying digitally, adding to costs.

Smartphones will spread, broadband will improve and online payments should become simpler. Less certain is whether parents will allow their kids to learn chiefly from screens. Little verifiable evidence exists that methods devised by Byju's succeed as well as customers hope. It would be an unusual child, though, that could be left unmoved by one bit of maths content advertised by the firm—Shah Rukh Khan, a Bollywood star, guiding a troupe of dancers rhythmically laying out a proof for Pythagoras's theorem. ■

Customer service in Japan

Taking the gloves off

TOKYO

Cost-conscious Japanese businesses are struggling to keep up standards

KUMIKO HIRANO has noticed a disquieting change when she goes to her neighbourhood *konbini*, one of Japan's ubiquitous convenience stores. "No one is around and I have to use a loud voice to get someone to serve me," says the 48-year-old worker in Tokyo. "It irritates me."

This might not seem a big problem, but Japan prides itself on the standard of customer service, which approaches the level of bespoke attention elsewhere. Taxi drivers, who often wear white gloves, sometimes get out to bow when they drop off a passenger. Staff in shops and restaurants are unfailingly polite. Shoppers can order on Amazon and take delivery reliably the same day. Now Japanese are having slowly to adapt to levels of service long suffered by the rest of the world.

The human touch is becoming rarer. Lawson, another *konbini* chain, is automating payment during the small hours at selected stores. Some restaurants and supermarkets are following suit. Rakuten, an e-commerce giant, is testing if drones instead of immaculately uniformed delivery personnel can make deliveries. Firms are using artificial intelligence to interact with customers. People at Henn na Hotel (meaning "strange hotel"), an expanding chain, are checked in by robots.

Opening times of shops and restaurants are becoming ever shorter. Skylark, a company that owns several popular restaurant chains, has cut the number of its restaurants that are open between 22 and 24 hours a day from 1,000 to 400. Yoshinoya, a favourite haunt for *gyudon* (a bowl of rice topped with beef), has done likewise. Family Mart, another convenience-store chain, is experimenting with closing some stores at certain hours of the night. Last year Yamato Transport, a delivery company, said it would consider stopping same-day deliveries for Amazon Prime.

Japan's declining population and rising labour costs are one reason businesses are cutting customer service. Another is pressure from shareholders for better profits. On the labour side, some industries have had to raise wages to compete for staff; others cannot get them at all. In July last year the gap between the number of jobs on offer and the number of jobseekers hit a 43-year high. There are 1.59 jobs for every applicant, and not even Chinese students can fill the gap at *konbini* shops.

While service businesses account for three-quarters of Japan's GDP, all those bowing staff and long opening hours make firms inefficient. Japan ranks poorly for productivity among the OECD, a club of rich nations, especially for non-manufacturing industries. Minoru Kanaya of Skylark says recent changes the firm has made have raised productivity.

For some customers the changes are worrying, cutting to the heart of Japanese culture. Children grow up revering *omotenashi*, the philosophy of providing service without expectation of reward. This also draws foreign visitors, notes Yuki Takada of the Omotenashi Meister Association, which provides training and sets standards in hospitality. Many also fret over whether Japan's growing number of elderly will cope well with automation.

Yet in some areas people appear to want less frilly customer service. Some Japanese see it as defined by protocol rather than by what the customer actually wants. Waiters at Jonathan's, one of Skylark's restaurant chains, no longer show diners to their table after many said they would rather seat themselves. Mr Takada reckons that the number of people who are starting to feel that *omotenashi* is "fussy and inconvenient" is increasing.

There are few signs of a backlash yet. Japan, the home of robots, is more likely than European countries, for instance, to welcome automation. "We have to accept changes," says 31-year-old Miki, who notes that 7-Eleven, a convenience store born in Texas, is so named because it used to open from 7am to 11pm rather than operating around the clock. Yet opinion might shift if staff cuts and the new focus on productivity mean Japanese have to wait longer, be it for public transport or in queues to pay. "Time is the red line," says Mr Takada. ■