SOCIOECONOMIC FALLOUT OF A PANDEMIC

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Forbes INDIA

Auto *Special*

BUCKING THE TREND

How **MG Motor** and **Kia Motors** are seeking to capitalise on their brisk beginning in India. New emission norms, weak demand and Covid-19-triggered supply chain disruptions, however, present fresh challenges

(From left)
Rajeev Chaba, president & MD, MG Motor India
Kookhyun Shim, MD & CEO, KIA Motors India

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A crisis is a good time to look at the opportunities for the Indian auto sector

Long and Winding Road

Wuhan in China, the centre of the outbreak of the coronovirus, is also the "motor city" of China, the world's biggest car market. From General Motors and Honda to Nissan and Renault, a clutch of car makers has their factories there. The World Economic Forum says Wuhan accounts for half of Honda's production in China and, in 2019, the Hubei Province, of which Wuhan is the capital, was the fourth-largest car producer in China. As car makers stopped production because of the nationwide shutdown, car sales in China fell 92 percent in the first half of February.

A month on, the pain has moved from China to the rest of the world. At the time of writing, car factories in Europe, the US, Canada and Mexico were preparing to temporarily shut down.

There's little choice, as supply chains—not only from China but most of the developed world—get disrupted, demand slumps and factory workers take the precaution of not turning up.

Cut now to India where the auto sector was feeling the heat of an economic slowdown before the pandemic broke out. Sales of passenger cars plunged by almost 14 percent in 2019 over a year ago, the worst dip in two decades. The woes of non-banking finance companies resulted in a slump in retail loans.

And, come April, the transition to BS VI emission norms will worsen demand as many models become more expensive and a few bow out of the market. The coronavirus crisis has disrupted the supply chain from China, on which Indian and multinational car makers are dependent on.

So that's the bad news—the spread of the virus, the consequent lockdowns and the fallout on economic growth, with the April to June period expected to be the worst. The exception may well be China, which bore the brunt in the March-ended quarter. As growth in new infections slows down and employees get back to work, economic indicators will slowly pick up. For the rest of the world, a recovery may be some time away, but the planning—and the resolve—to come back is evident.

As Oliver Zipse, chairman of BMW AG, put it in a mid-March press conference in Munich to announce the car maker's 2019 financial performance: "There will be a time during the coronavirus. And there will be a time after the coronavirus."

A crisis is also a good time to look at the opportunities for the Indian auto sector on the road ahead, and in this special issue on automobiles we have done exactly that. The cover story by Pranit Sarda is on two relative new kids in town: MG Motor India owned by SAIC, China, and the Hyundai-owned Kia Motors, who have blazed a trail in quick time. Consider Kia which, since debuting in India in August 2019, has sold 75,000 units of the mid-sized SUV Seltos. And then there's MG Motor, which has bucked the slowdown with the Hector SUV launch in June 2019.

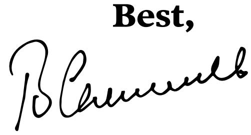
So where do these two go from here? After all, the Indian car market is no stranger to debutants who started with a bang only to flatter to deceive. Sarda reckons MG and Kia may be better placed than many of the multinationals that entered India earlier. To know why, go to 'Fast and Furious' on page 28.

In the other auto stories, don't miss Manu Balachandran's feature on the impending blitzkrieg from Chinese car makers, who may well see in India the opportunity to recover from the Covid-19 crisis. And Jasodhara Banerjee dives into what the new emission norms mean for Indian auto, who gains, and who loses. That's on page 30.

Brian Carvalho
Editor, *Forbes India*

brian.carvalho@nw18.com

Best,



STORIES TO LOOK OUT FOR

▲ (From left) Kookhyun Shim, CEO, Kia Motors India, believes that extensive market research has helped them plan their product better; China's Great Wall Motors has lined up investments worth ₹100 cr in India

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FAST AND FURIOUS

Amid India's worst automobile slowdown, two new entrants are trying to make it big. Can they sustain the success after the initial rush?

(LEFT) NISHANT RATNAKAR FOR FORBES INDIA; AMIT VERMA

Kookhyun Shim (left), managing director and CEO of Kia Motors India, and Rajeev Chaba, president and managing director at MG Motor India

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The chhappan bhog is made on special occasions in Vrindavan

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Network 18

TO OUR READERS
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COVID-19

Bearing Bad Times

Economists warn of recession as markets go into a tailspin following the outbreak of coronavirus

MARCH 2020—APOCALYPTIC. This is how history will record the collapse of equity markets across the globe, hurt by a precipitous fall in oil prices and business coming to a standstill because of coronavirus. Economists from Morgan Stanley and Goldman Sachs warn the spread of the virus will trigger a global recession.

India is already growing at its slowest in seven years (4.7 percent GDP growth for the December 2019 quarter) due to a weak domestic consumption demand. Most equity research firms have estimated a 10-15 percent cut in FY21 earnings for India. The price damage and volatility to Indian stocks have been so sharp in recent weeks that they have pushed the markets into a bear phase, with key indices having shed over 30 percent in 2020. The bad news is that the bears are not done yet.

For those who, from a price-perspective, find that some blue chip- and mid-cap stocks are available at a throwaway price, here is the fact: The bottom for the markets has not been found. "The intensity of the price fall is the worst ever," says Ridham Desai, head of India equity research and India equity strategist at Morgan Stanley. For those who reported or witnessed the impact of the Lehman Brothers collapse of late 2008, or even the 1999 crash "dubbed the dotcom bubble", the recent panic has never been so acute.

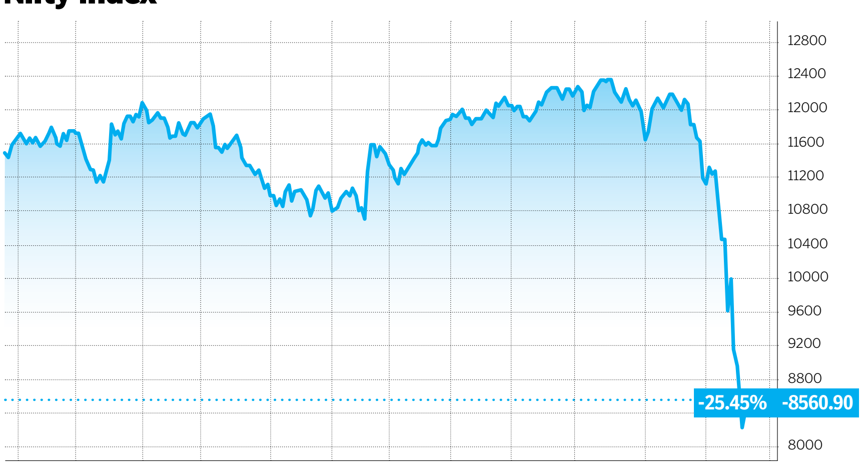
The BSE Sensex index shed 31 percent in 2020, including its worst ever fall of 2,919 points on March 12, and the Nifty50 32 percent, indicating that India is in a bear market. "The equity market could bottom out once the [Covid-19] infection numbers peak and start to recede," says Jitendra Gohil Credit Suisse's wealth management, India head of research. He agrees bottom fishing "could open up" in the next few months, led by the optimism of an effective cure for the virus or due to strong policy action.

Already several central banks have, in an emergency move, lowered interest rates or provided stimulus to revive their economies. India has also created a Covid-19 taskforce to draw up measures to combat the impact of the virus. "The RBI needs to also provide liquidity and introduce forbearance on stressed corporate loans. This needs to be combined with a fiscal response to stressed sectors as well as acceleration in loan growth," says Desai.

The government and the RBI have in several cases, including the reconstruction of Yes Bank, have acted to boost liquidity and lower tax rates. Almost every industry from airlines, hospitality and tourism to small- and medium enterprises, logistics, construction, chemicals and electronics has been impacted by the coronavirus outbreak. Clearly more and swift measures are required.

• SALIL PANCHAL

Nifty Index



Data as of 01:08:21 pm on March 20

‘The Public Health Crisis Is A Financial System Issue’

The global pandemic will redefine supply chains and investors’ focus on youth demographics, says Saurabh Mukherjea, founder of Marcellus Investment Managers

Q The coronavirus crisis started out as a supply side shock, but evolved to a demand side shock. When did the shift happen?

Every supply side shock necessarily becomes a demand side shock. It’s not unique to coronavirus. Whether you look at demonetisation or the US housing crash. Or say, we were to change the labour market rules in India tomorrow; on the face of it, it’s a supply side shock, but that also affects demand.

What’s interesting though is how this has mutated from an issue which was Asia-centric to a Western-centric one. The issue is no longer our dependence on Chinese imports... the question is can we insulate our financial system from the panic setting in, in the western hemisphere.

The issue is more about ‘Can our stock market and broader financial system wean itself of its dependence on the West?’ Because if we can’t, then regardless of how robust the Indian economy is, we will gyrate with the western stock market.

The Chinese stock market hasn’t been punctured at all because they are not dependent on western markets. Whereas in our case, it’s highly unlikely that Q4 earnings will show meaningful disruption. And yet the stock prices have been pulverised because foreigners have sold $5 billion in five days.

So while the coronavirus crisis started out looking like a real economy issue, it has become more a financial system issue. This is the first time we’re seeing this happen.

Q Which is why governments around the world are shoring up their economies with rescue packages worth hundreds of billions of dollars...

That’s right. While the US and Europe have not yet gone into a slowdown, governments are saying that even before it happens, preemptively, we will fiscally and monetarily stimulate the economy.

In India, the reason policymakers are confused is because they can’t figure out how much they should worry about the financial system shock. Within two months, they have gone from worrying about protecting our pharma supply chain from dependence on Chinese imports to worrying about saving some of our banks and larger NBFCs; from worrying about Chinese auto parts imports to whether we need a ban on short selling.

Q How will it redefine our supply chains and the way we invest?

The supply chain point is non-negotiable now. Fortune-500 companies will re-engineer their supply chains to reduce their dependence on China. The extent to which India can take a slice of that supply chain is subject to debate, but I’m sure we will get some slice of it.

To the second point, what will now enter the investor lexicon is the average age of the country. So far, investors would look at inflation, GDP growth, current account deficit. Now it will be impossible for an investor to avoid focusing on demographics. It’s a brutal reality of what coronavirus has hammered home. The demographic dividend will come home to roost for India in the most unlikely manner ever. You’ll see a lot of capital heading towards Asia once prices settle.

Q What are the similarities and differences between this crisis and the global meltdown of 2008?

The most obvious similarity is that both felt like a jump into the abyss. Everybody believed the world is going to come to an end.

Where the two are dissimilar is that this is quite obviously a temporary economic lockdown. In 2008, it wasn’t so clear how temporary it was. Back then the edifice of America and Europe’s financial system disintegrated and nobody understood how you could repair so much financial system damage.

• VARSHA MEGHANI

MEXY XAVIER

35%

Amount of global oil production by OPEC

Oil's Well for India

An increase in excise duty on oil can reduce the fiscal deficit by 4.9 percent

SHUTTERSTOCK

ACCOMPANYING THE FALL IN global economic activity on account of Covid-19 has been a sharp reduction in oil prices. Initial estimates put the government's saving in India's import bill at $35 billion (₹240,000 crore) in the next fiscal.

While consumers around the globe should see lower prices at the pump soon, on March 13, the government announced a ₹3 per litre increase in excise duty on petrol and diesel. This is in keeping with its past practice of not allowing retail prices to drift too low. The move should result in an additional ₹40,000 crore in revenue a year and help in keeping the fiscal deficit in check for FY21. At ₹8.07 lakh crore, the ₹40,000 crore increase should result in a 4.9 percent reduction in the deficit. This is assuming the fiscal deficit for FY21 stays at about the same level as FY20.

DEMAND, WHICH HAD BEEN RISING 1.6 MILLION BARRELS PER DAY OVER THE LAST FIVE YEARS, ROSE BY JUST 0.8 MILLION BARRELS PER DAY IN 2019

"Expect another increase in excise if prices stay at these levels for an extended period," says Miren Lodha, director at Crisil. Analysts have also pencilled in a significant reduction in the current account that has been under pressure due to foreign investors selling stocks.

Unlike past falls in 2008-09 (prices fell due to lower demand) and early 2016 that were primarily on account of higher supply, this time the slide in oil prices started on account of Russia not agreeing to cut supply along with Opec (Organization of Petroleum Exporting Countries). This was swiftly followed by news of Covid-19 cases spiking in Europe and the US, leading to lockdowns, lower consumption and a slide in prices to $25 a barrel. A combination of higher supply and lower demand could result in an extended period of lower oil prices, according to Crisil, which sees oil prices in the $30-35 range at least till September.

Over the next six months, the key will be to see how long the lower demand stays. Crude oil has, in the last two years, had to compete with new energy sources—renewables, gas and batteries. Demand, which had been rising 1.6 million barrels per day over the last five years, rose by just 0.8 million barrels per day in 2019. In this period, gas prices also fell by 35 percent to $1.63 per MMBtu, increasing the competition for crude. In India, an aggressive roll-out of CNG pumps is likely to keep demand in check.

For now, airlines are the only beneficiaries as aviation fuel prices went down by 8 percent in March compared to February. The most impacted are likely to be oil marketing companies hit by a double whammy of lower demand growth of just 2-3 percent next fiscal as well as inventory losses on account of the sharp fall that has come in prices since early February.

• SAMAR SRIVASTAVA

The Oil Math

57%
One-year fall in Brent crude

3.7%
One-year fall in price of petrol in Mumbai

₹3 per litre
Increase in excise

₹40,000 crore a year
Additional revenue

71,150

Number of coronavirus recoveries in China as of March 20, 2020

GETTY IMAGES

Inching Towards Normalcy

As China reports zero local cases for the first time since the coronavirus outbreak, people are trickling back to work

CHINA DAILY / REUTERS

AFTER WEEKS OF REMAINING indoors due to the coronavirus outbreak, Shanghai-based Ritwik Ghosh says his "life is inching back on track". As of March 19, China's capital Beijing and commercial centre Shanghai had seen 704 recoveries and 11 deaths due to Covid-19, according to the John Hopkins University. Ghosh, vice president of asset management firm CDH Investments, says apart from the lockdown of Hubei and its capital Wuhan [the epicentre of the virus], the government had adopted stringent measures to restrict people's movement in public places.

"Anyone entering the city was being mandatorily quarantined for 14 days in government facilities," says Ghosh, although the government on March 18 said all new cases involved people who came into China from elsewhere and not local residents. "Along with normal life, people's mental health has been affected badly. Things should be back on track in two to three months because all of us want to break free," Ghosh says.

So far, China has reported 80,928 coronavirus cases and 3,245 deaths, the latter making up over a third of the global toll.

The ruling Communist Party, which faced flak for its draconian containment measures, is gradually lifting them. Hubei authorities have partially opened their borders, excluding Wuhan, for healthy people to leave the province. The government expects China to be fully functional by June.

A recent report by research firm Euromonitor indicates that besides industry-wise impact, major changes are expected in the way China approaches work, industry and the service sector. Chinese consumers will focus more on shaping attitudes toward health and hygiene, the report says.

• DIVYA J SHEKHAR

Bitten By The Bug

Famous personalities affected by Covid-19

TOM HANKS
The two-time Oscar winner tested positive for coronavirus along with wife Rita Wilson when they were in Australia. They were in self-quarantine at their home there.

RUDY GOBERT
He was the first NBA player to be diagnosed with coronavirus. Prior to that, Gobert had joked with members of the media by touching all microphones and recording devices on the table before leaving a news conference.

IDRIS ELBA
The British actor tested positive on March 16 and has been in self-quarantine since then. "I feel ok... I have been isolated since I found out about my possible exposure to the virus," Elba tweeted.

IRAJ HARIRCHI
Iran's deputy health minister tested positive a day after he made a public appearance assuring his countrymen of the steps his government had taken in containing the disease.

SOPHIE GRÉGOIRE TRUDEAU
Canada's first lady tested positive on March 13 and was in self-quarantine. Canadian Prime Minister Justin Trudeau was also in self-quarantine as a precautionary measure.

NADINE DORRIES
The UK's health minister was diagnosed with Covid-19 on March 11 and was under self-isolation. "It's been pretty rubbish but I hope I'm over the worst of it now. More worried about my 84-year-old mum who is staying with me and began with the cough today," she tweeted.

MIKEL ARTETA
Arsenal FC's manager tested positive for Covid-19 on March 13. "Arsenal personnel who had close contact with Mikel will now self-isolate. We expect this to be a significant number of people," the English football club said in a press release.

KEVIN DURANT
One of the highest-earning basketball players in the world tested positive along with three other players from Brooklyn Nets.

• MANU BALACHANDRAN

#QuarantineAndChill

Social distancing in the age of social media

WE HAVE NO ANSWERS YET, BUT what we know for certain is this: We'll be seeing many moons from the isolation of our own homes, before we can crowd up the roads, gyms and our schedules again. For a generation that's used to its tiniest cravings appearing at the door, the slow game of wait-and-watch is mind-numbing, anxiety-causing. But while the world learns a new term, 'social distancing'—the recommended act of staying isolated to contain the coronavirus—is this concept entirely alien? Have we, who have glorified endless hours of Netflix fuelled only by Swiggy and Amazon deliveries, unknowingly been priming ourselves for this for years?

Social distancing is an interesting concept in the age of social media—where you're alone physically, but can virtually connect to anyone, anywhere in the world, as though the five senses have now been redefined: Text; call; FaceTime; DM; send a disappearing picture to.

On the first Monday of worldwide isolation, NGO Global Citizen and Coldplay's Chris Martin kickstarted a live Instagram concert series with the hashtag #TogetherAtHome, which hopes to feature one musician a day, taking questions and playing acoustic renditions from their homes to yours. People are sending each other 'Zoom party' invitations, to have a drink together at a designated hour, on video call. A Chrome extension syncs your Netflix show with that of your long-distance buddies, simulating the distanced-but-not-isolated phenomenon. It's a great time for old-school, quality content to thrive, without the frills of manufactured production.

After years of breeding trolls, toxicity and intolerance, is social media now circling back to its original purpose: Connecting people?

"Anecdotally, yes," says Raheel Khursheed, former head of news, government and politics at Twitter India and Southeast Asia, and currently co-founder of a streaming infrastructure platform called Laminar Global. "Even platforms that have had issues of toxicity are witnessing a moment where a large part of the user base is realising, from a mindset of divisiveness, that the virus has no political affinities. It does not respond to or respect any boundaries, or wealth generation systems that have been built to hold the world together. Tom Hanks or the average Joe on a bus—everyone's in the same boat."

The usual caveats aside—not excluding the still-alarming levels of fake news still being generated and circulated on social media—the virus has, perhaps, laid bare what it really means to 'go viral'. "Social media is giving us an outlet to articulate a unified experience. In this context, the virus has, ironically, really brought home the adage that there is more trust that unites than divides us," adds Khursheed. "It has underlined that in a way that nothing else has underlined it as far as global experiences go."

• PANKTI MEHTA KADAKIA

Take off Aborted

Grounded airlines face mounting losses

AIRLINES ARE GRAPPLING WITH grounding of flights, cancellations and massive monetary losses following the coronavirus outbreak. In March, GoAir announced that it has been forced to temporarily suspend all its international operations. The airline subsequently introduced a short-term rotational leave without pay programme.

IndiGo too has announced salary cuts and grounding of international flights. Ronojoy Dutta, chief executive officer of the airline, will take a 25 percent cut in salary while the other employees will have to deal with a cut varying between 15 percent and 20 percent depending on their designations. On March 12, the company said on a week-on-week basis, it has seen a decline of 15-20 percent in daily bookings.

A Press Trust of India report said the government-owned Air India may also cut salaries. Airlines in India have requested the government for immediate support.

Earlier in March, the Centre For Aviation estimated that by May 2020, most airlines in the world will be bankrupt. Kotak Securities in its research report dated March 13 has said it expects IndiGo's earnings to drop by 87 percent for FY20 and a loss in FY21.

• POOJA SARKAR

SHUTTERSTOCK; GETTY IMAGES (RIGHT)

$6.8 bln

Valuation of the Indian Premier League in 2019, as per Duff & Phelps

SHUTTERSTOCK

Play Date

How Covid-19 has impacted the schedules of global sporting events

GETTY IMAGES

OLYMPICS
WHERE: Tokyo
SCHEDULED: July 24–August 9
STATUS: On schedule. But the organising committee faces global pressure to cancel or postpone

INDIAN PREMIER LEAGUE (IPL)
WHERE: India
SCHEDULED: March 29-May 24
STATUS: Suspended till April 15

NBA
WHERE: United States
SCHEDULED: July 24–August 9
STATUS: Season suspended after a player tested positive moments before a game began

EURO 2020
WHERE: Across 12 European nations
SCHEDULED: June 12 to July 12
STATUS: Rescheduled to June 11-July 11, 2021

FRENCH OPEN
WHERE: Paris, France
SCHEDULED: May 24 to June 7
STATUS: Postponed to September 20-October 4

FORMULA 1 CHINESE GRAND PRIX
WHERE: Shanghai, China
SCHEDULED: April 19
STATUS: Suspended

WORLD ATHLETICS INDOOR CHAMPIONSHIPS
WHERE: Nanjing, China
SCHEDULED: March 13-15
STATUS: Postponed to March 19-21, 2021

GETTY IMAGES

SHOOTING WORLD CUP
WHERE: New Delhi, India
SCHEDULED: March 15-26
STATUS: Rifle and pistol competitions from May 5-12; shotgun from June 2-9

NAINI THAKER

TELECOM

Mobile Makers Feel GST Blues

GST on mobiles increased from 12 percent to 18 percent

SHUTTERSTOCK

ALREADY GRAPPLING WITH THE coronavirus outbreak, the smartphone industry now has to deal with another hurdle. GST on mobile phones has increased from 12 percent to 18 percent. According to the GST council, this is an attempt to correct the inverted duty structure in the smartphone industry, where the components were taxed at 18 percent and the finished products at 12 percent. Experts, however, believe that the GST for all components should have been brought to 12 percent instead. The tax increase—applicable from April 1—has been criticised by mobile manufacturers who say it will push up the prices of smartphones. "This can weaken demand and affect the mobile industry's Make in India programme. It could also impact internet penetration and the Digital India programme, as a majority of Indians access internet on smartphones," says Manu Kumar Jain, global VP, Xiaomi.

EXPERTS BELIEVE THAT THE GST FOR ALL COMPONENTS SHOULD HAVE BEEN BROUGHT TO 12 PERCENT

"At a time when coronavirus is spreading panic, economic slowdown is at its peak, consumer sentiment is battered and stock markets are in a free-fall, increasing GST is both counter-intuitive and insensitive. This will lead to immediate job losses and dampen future investments in manufacturing," says Pankaj Mohindroo, chairman, India Cellular & Electronics Association (ICEA). "Our domestic consumption target of $80 billion (₹6 lakh crore) by 2025 will not be achieved. We will fall short by at least ₹2 lakh crores."

"The coronavirus pandemic could have been an opportunity for India as smartphone manufacturers to look for avenues outside China," says Navkendar Singh, research director of IDC India, a market research firm. "But these kind of judgements don't board well when it comes to the ease of doing business."

NAINI THAKER

Talking Point

Banking With Uncertainty

The Yes Bank turmoil came with a one-off solution, but newer banks will not be spared from the contagion effect. And Covid-19 will only hurt retail lending more

By SALIL PANCHAL

As soon as the moratorium for Yes Bank was lifted on March 18, entrepreneur Jasjeet Kaur went online and withdrew most of her money from her proprietorship account. "If I keep the money any longer and some other crisis breaks out, I would be the biggest fool," says Kaur, whose company sources lighting equipment for hotels, private companies and banquet halls.

She also had a housing loan linked with Yes Bank whose EMI was being paid by ECS (electronic clearing service), which she has now switched to ICICI Bank. "I was never happy with the customer service of Yes Bank… it had new relationship managers [RMs] every two months. The moratorium was announced on March 5 when we usually plan for salary expenses and other business outflows. When I called up my RM, he said he was not aware of any such development at the bank," says Kaur, who had been banking with the troubled private sector bank since 2017 as it was close to her residence.

Kaur's experience is not an aberration. Yes Bank has seen a sharp 39 percent erosion in deposits in nearly 12 months—from ₹227,601 crore in March 2019 to ₹137,506 crore as of March 5, 2020. The bank also saw a considerable deterioration in asset quality and had to increase provisioning for bad loans. And alarmingly, its common equity Tier1 (CET1), a key matrix, was at 0.6 percent against a minimum regulatory requirement of 7.37 percent.

All these called for extreme measures. For the first time in India, the government and the Reserve Bank of India (RBI) got together to devise a reconstruction plan for the bank. India's largest public lender, State Bank of India, housing finance firm HDFC and six private banks—ICICI Bank, Axis Bank, Kotak Mahindra Bank, Bandhan Bank, Federal Bank and IDFC First Bank—have infused a combined ₹10,000 crore capital into Yes Bank (see: *Yes Bank Share Holding After Capital Infusion*).

The Yes Bank stock, in March alone, nearly doubled to ₹60.8 (as on March 18) at the BSE. Yet, this does not promise a stable future. While the bank will be in a position to raise bulk deposits (considering that corporates are still depositing funds with the entity), the true test will be its ability to raise low-cost deposits, under its new managing director and CEO Prashant Kumar.

FAILED INSTITUTION

Rating agencies are adopting a wait-and-watch approach with regard to how Yes Bank tries to resurrect itself. "[Credit rating agency] Fitch would view Yes Bank as a failed institution, in terms of its intrinsic viability. The fact that there was extraordinary support from seven banks through a public-private partnership to keep it going implies that it had failed on its own," says Saswata Guha, director and team head, Fitch Ratings in India. The agency does not rate Yes Bank but monitors its developments.

Yuvraj Choudhary, an analyst at Anand Rathi Securities, says the bank "will need to ensure that the quantum of erosion gets arrested quickly". Banks run on confidence and lending is a trust business and Yes Bank appears to have lost that confidence from the investor community over the past two years .

"Depositors will take a call [on the bank's future]," says Hemindra Hazari, an independent banking

CHAITANYA DINESH SURPUR

analyst who publishes his writings on Singapore-based research platform Smartkarma. Apart from UBS analyst Vishal Goyal in 2015, Hazari had warned in 2017 that all was not well with Yes Bank. This was after the bank, in 2016 and 2017, reported divergences in its gross non-performing assets (NPAs), which led to falsely inflating its profitability. The bank's board did not take action against founder-promoter Rana Kapoor, the bank's auditors or the senior management.

"If there is a learning from the Yes Bank episode, it is that promoters should not be CEOs. There should be a separation between ownership and management. The RBI must impose these practices strictly and apply them to all," says Hazari, referring to a legal battle that the RBI had with Kotak Mahindra Bank, which favoured its founder and managing director Uday Kotak. The RBI wanted him to reduce his stake in the bank from 29.9 percent to 15 percent by March 2020 as per bank licencing guidelines. After the agreement, Kotak will have to lower his stake by only 4 percent by June.

In the case of Yes Bank, the problems emerged publicly after the RBI denied an extension to Kapoor beyond January 31, 2019. The central bank highlighted "serious lapses" in corporate governance and "poor compliance culture" during his tenure. Kapoor has since sold his entire stake in Yes Bank; the family-owned entity, Yes Capital (India), holds a token 900 shares in the bank. His sister-in-law and co-promoter Madhu Kapur on March 18 sold 2.5 crore shares at ₹65 apiece.

CONTAGION EFFECT

The Indian banking sector will have to deal with the contagion effect of the Yes Bank fiasco. "Small regional banks could incrementally find it more difficult to raise deposits. They will not see a strong deposit growth. Small finance banks could also face similar challenges in the coming months," says Choudhary of Anand Rathi.

Fitch's Guha agrees. "We have seen deposit flight to safety before, during previous crises in 2008 and 2013. There is a contagion risk particularly on the funding side if the banking sector's health worsens. These banks could be more vulnerable due to their limited franchise and vintage," he says. Retail individuals particularly will now opt to park their funds with larger, well-established banks such as HDFC Bank, ICICI Bank and Kotak Mahindra Bank.

The pace of deposit growth is weakening for even new banks, which have showed impressive growth in recent years. AU Small Finance Bank, which was a vehicle finance company in 1996, has seen a fall in the pace of core deposit growth (Casa deposits and term deposits combined). The bank, which commenced operations in April 2017, showed a 63 percent year-on-year rise in deposit growth for Q3FY20 compared to a sharper 295 percent for the corresponding period in Q3FY19.

Similarly Equitas Small Finance Bank, which began operations in September 2016, has shown a slower pace in deposit growth at 42 percent year-on-year in Q3FY20 compared to 79 percent for the corresponding period a year earlier.

IDFC First Bank, led by its managing director and CEO V Vaidynathan, has shown an over-100 percent jump in core retail deposits (Casa and term deposits) for 2018 and 2019. Also, its core retail deposits, as of December-end 2019, constitute 43 percent of total deposits, which goes well with Vaidyanathan's aim to make IDFC First a focussed retail bank. However, it remains to be seen how the years 2020 and 2021 pan out for the bank, with annual losses and weakening asset quality becoming its major challenges in the near-term.

Despite red flags, the bank's board did not take action against Yes Bank founder-promoter Rana Kapoor

INDUSIND, RBL IN TROUBLE?

The mid-sized IndusInd Bank and RBL Bank—once the poster boys of India's promising banks—are facing the brunt of distress at the stock markets in recent months. The pain has been so acute that the management at these banks have separately made public announcements, highlighting their strong financials.

IndusInd Bank—Yes Bank's rival in size and profile—has, in just over three months, seen a 71 percent drop in market value to ₹459.8 at the BSE (as of March 18) while RBL Bank has lost 58 percent, trading at ₹166, from around ₹400 levels in early September. Hazari says a weakening stock market price suggests that a nasty surprise might emerge in the months ahead.

IndusInd appears to have crossed one hurdle by getting its succession plan finalised and approved. Its former consumer banking head Sumanth Kathpalia is now the new managing director and CEO for a three-year term. He succeeds Romesh Sobti, who retired on March 23, after leading the bank for over 12 years.

However, after the Yes Bank imbroglio, concerns of IndusInd's financial health continue to mount, particularly since it has a ₹3,995 crore exposure to debt-laden Vodafone Idea, besides additional exposure to the still-struggling real estate sector and the now-bankrupt IL&FS.

What is worrisome is that IndusInd's PCR (provision coverage ratio)— which indicates the provision the bank has made for bad loans from its profits—is still low at 53 percent, as of December 2019. This compares to 78 percent for Axis Bank, 71 percent for HDFC Bank and 76 percent for ICICI Bank.

But IndusInd Bank is confident about is financial health. "We have already provided for 73 percent of the IL&FS exposure and this will increase closer to 90 percent in the current [January-March] quarter," an IndusInd Bank spokesperson tells *Forbes India*. Regarding the

Yes Bank Share Holding After Capital Infusion

SHAREHOLDER	AMOUNT INFUSED AS PER SCHEME (IN ₹CR)	% SHAREHOLDING IN YES BANK	SHARES ELIGIBLE FOR SELLING (IN ₹CR)
Existing shareholders		20.3	
SBI	6,050	48.2	278.7
HDFC	1,000	8	25
ICICI Bank	1,000	8	25
Axis Bank	600	4.8	15
Kotak Mahindra Bank	500	4	12.5
Federal Bank	300	2.4	7.5
Bandhan Bank	300	2.4	7.5
IDFC First Bank	250	2	6.25

SOURCE JM Financial

Vodafone exposure, the bank said a package is being developed by the department of telecommunications for the sector's long-term viability. "That hopefully will be conducive to the welfare of all stakeholders, including banks," says the spokesperson, adding that the bank will soon unveil its three-year plan.

In the December-ended quarter, IndusInd Bank's gross NPA stood at 2.18 percent—the second lowest among large private sector banks. "We expect our net NPA of 1.05 percent as of last quarter to fall below 1 percent, in line with our ambition to take provision cover beyond 60 percent," the bank said.

IndusInd's exposure toward stressed sectors like non-banking finance companies, construction, real estate, telecom and gems & jewellery has been on a downtrend, with total fund and non-fund-based exposure declining to 14.1 percent in Q3FY20 from 16.7 percent in Q4FY19, says Gautam Duggad, head of research at Motilal Oswal Financial Services. Experts do not see IndusInd Bank going the Yes Bank way.

RBL Bank, meanwhile, in a statement on March 17, defended itself, saying it was "financially strong, well capitalised and profitable". Commenting on specific concerns, it said there were some withdrawals from institutional depositors and

The AT1Bonds Write Down Debate

Another set of investors—AT1 Bonds (perpetual bonds with no fixed maturity date)—have much to worry about. The RBI, through its reconstruction scheme of Yes Bank, decided to write off fully, which amounts to ₹8,000 crore issued by Yes Bank. The bondholders have now moved court.

two state governments, constituting about 3 percent of its total deposits in one week. "This issue is being addressed by us on a one-on-one basis with the state governments and also at the industry level by the RBI," the statement said.

Analyst Choudhary says in RBL Bank's case, the situation is "not similar or as bad as Yes Bank because it is well capitalised and most of its stressed book [including exposure to Coffee Day Enterprise] is already identified".

COVID-19 IMPACT

The operating environment for banks, which was already crippled by a credit squeeze, has aggravated due to the impact of the Covid-19 virus. India could have a second order impact, particularly if companies don't see demand due to weak consumption and economic activity, says Guha from Fitch.

Several corporates have started talking about implementing a business continuity plan. (This is where companies start creating a system of prevention and recovery from potential threats to a company. The plan ensures that personnel and assets are protected and are able to function quickly in the event of a disaster.)

In such a scenario, the retail loans segment—particularly personal loans, loans against property (LAP) and credit card businesses—will bear the brunt first, says Guha. Anand Rathi's Choudhary says some stress might be seen in LAP and also the LAS (loans against securities) books for banks, considering the sharp erosion in value at the stock markets in the past two months (see: *State of Retail Lending Repayments*).

Another risk that banks will face relates to vehicle/auto financing on the commercial side, towards Ola and Uber cars in tier II and tier III cities. Driver associations are hopeful that car financiers will now agree to waive off loans for at least two months due to lower earnings and fewer rides.

In such a scenario, Guha believes that most bank managements have a difficult time ahead. Fitch had downgraded the operating environment for banks in India in mid-2019 expecting deterioration following disruptions in the NBFC sector and subsequent credit squeeze by them. The risks have only worsened.

It will make business tougher for smaller banks such as the capital-strapped Lakshmi Vilas Bank or even larger public sector banks that are in the midst of mega-mergers, which Minister of Finance Nirmala Sitharaman had announced in September 2019. Leaders at banks have to face another tumultuous year that they'd want to forget. F

State of Retail Lending Repayments

Closing As Of:	Portfolio Current (in ₹bln)	SMA 1	SMA 2	NPAs
Mar 2018	46,374	1.55%	1.28%	7.32%
June 2018	48,316	1.41%	1.45%	7.43%
Sep 2018	49,726	1.43%	1.48%	7.58%
Dec 2018	52,622	1.63%	1.47%	8.02%
Mar 2019	54,012	1.79%	1.28%	7.86%
June 2019	55,152	1.58%	1.59%	8.32%
Sep 2019	57,751	1.59%	1.48%	8.37%
Dec 2019	57,190	1.50%	1.36%	8.10%

SOURCE CRIF High Mark

The data is derived from all pubic and private sector banks. Retail loans includes housing, auto/ vehicle and personal loans to individuals

SMA 1 - Principal or interest payment or any other amount wholly or partly overdue between 31 to 60 days

SMA 2 - Principal or interest payment or any other amount wholly or partly overdue between 61 to 90 days

NPA - If a loan is not repaid for more than 90 days

Special Report

Two Decades and Counting

As Odisha CM Naveen Patnaik completes 20 years in office, the state government is scripting another chapter in a series of developmental programmes for the state, this time focusing on knowledge-based industries and manufacturing

By DIVYA J SHEKHAR

Odisha was in darkness when the world was celebrating the dawn of a new millennium in 2000, says R Balakrishnan, an IAS officer who was then posted in Odisha. A cyclone had uprooted electricity poles and millions of trees; it had destroyed homes, swept away entire villages and killed over 10,000 people. In the preceding years, the parched district of Kalahandi in south-west Odisha had become globally infamous as a symbol of starvation, malnourishment and poverty. It was under these circumstances that the state had elected Naveen Patnaik as chief minister (CM). A man who, until then, had lived in the US, written three non-fiction books, and was a reluctant inheritor of the political legacy of his father, Biju Patnaik.

"People's self-confidence was at its lowest when Naveen Patnaik took over. The rest of the country bracketed Odisha as a backward state suffering from starvation, poverty and natural calamities," says Balakrishnan, now an advisor to the Chief Minister's Office (CMO). "In the last 20 years, breaking those stereotypes has been this man's greatest achievement."

At 74, Patnaik is today one of the longest-serving CMs in India. Through consistent welfare schemes, a clean governance image, sidestepping controversies and following development narrative, his party Biju Janata Dal (BJD) has defied anti-incumbency and people have re-elected him for five consecutive terms. In the 2019 Assembly elections, the party secured 113 out of 147 seats; the Bharatiya Janata Party (BJP) was a distant second with 23 seats.

Patnaik commemorated 20 years in office on March 5. In an exclusive interaction with *Forbes India* at his residence in Bhubaneswar, he admits that the longevity of his tenure has helped sharpen his focus over the years. An important principle, he says, is to consider winning elections as just a byproduct of the work that a party is supposed to do for people.

He has now started planning ahead, which is evident in the first political appointment he has made after being re-elected as party president for the eighth consecutive term. In March, he elevated Pranab Prakash Das to the post of organisational secretary, which means the 45-year-old Jajpur MLA will be second-in-command after the CM on taking decisions about the party's organisational affairs. Patnaik, however, continues to dismiss talks of succession planning, maintaining that "the BJD's successor will be chosen only by the people".

"When we came to power 20 years ago, the state was known for its bad disaster management, high poverty level and corruption. We have now set global benchmarks to handle disasters, have lifted 8 million people above the poverty line, and are known for our transparency," he says. His vision for the next few years, Patnaik explains, is to "take Odisha to the next level".

What he means is that besides concentrating on the minerals that

An iron ore mine in Kheonjhar district. The government is now aiming to earn more from its rich mineral deposits, and not merely statutory dues

ADAM FERGUSON / BLOOMBERG VIA GETTY IMAGES

the state is rich in, the BJD is setting ambitious new benchmarks to push tourism, heritage and sport. A step further in this plan of action will be to diversify and remodel Odisha as a destination for knowledge-based industries like technology and financial services; or, as certain senior officers of the CMO call it, "creating policy measures for the new world economy".

The state budget presented in February pegged Odisha's Gross State Domestic Product (GSDP) for 2019-20 at ₹533,822 crore, an increase of 7.7 percent over the previous year. The budget estimated a revenue surplus of ₹9,509 crore in the next financial year. According to Patnaik, the renewed focus on industry and manufacturing is expected to add further impetus to Odisha's revenue generation capacity.

INTENT ON INDUSTRIALISATION

Experts believe that Odisha needs to leverage its rich mineral assets to strengthen its manufacturing backbone instead of just becoming a raw materials supplier. The state has enviable coal, iron ore (accounts for more than 50 percent of the total production in India) and bauxite deposits, along with a long coastline.

Gyanranjan Swain, political

analyst and assistant professor at Ravenshaw University, Cuttack, adds that the government's push toward industry has intensified only over the last 15 months. The reason for the "delay", according to him, is that for many years after the BJD's 2000 win, its priority areas had mostly been mitigating natural disasters and consolidating power through flagship welfare schemes like food subsidies that distributed rice at ₹1 per kilo.

"Somewhere along the way, many crucial industrial deals just fell through," says Swain, pointing to how the South Korean steelmaker Posco pulled out of a memorandum of understanding with the Odisha government to set up a 12-million-tonne capacity steel project in Jagatsinghpur district in 2017, following public resistance and regulatory hurdles. The deal, worth $12 billion, was the biggest foreign direct investment in India at the time. There was also Vedanta's ₹50,000 crore aluminium project in Lanjigarh that struggled due to the lack of availability of raw materials like coal and bauxite on time.

"Most problems [with execution of industrial projects] happened because the government lacked negotiation skills and could not strike a balance between the needs of the local people and the companies," says Swain. "But in the last one year, the government has adopted a remarkably different, holistic approach, where it seems to focus not only on industry, but also on policies for education, job-creation and health care."

The state also has drawn up the numbers to back its intent. The Centre for Monitoring Indian Economy (CMIE) stated that during the April to September or the H1 period of FY20, Odisha received an 18 percent share of all fresh investments across states, the highest in the country, followed by Maharashtra at 16 percent. This was a jump from the meagre 4 percent share Odisha had cornered in FY19. A report by Care Ratings pegs the

"We have set global benchmarks to handle disasters, have lifted 8 million people above the poverty line, and are known for our transparency."

NAVEEN PATNAIK
CHIEF MINISTER, ODISHA

[redacted]

aggregate value of fresh investments received in H1FY20 at ₹1.9 trillion.

After coming back to power last year, Patnaik sought to reinvent the state's Industrial Policy Resolution, 2015, to unveil a new legislation that focussed on drawing fresh investments and boosting job creation. In the run-up to the annual Make in Odisha conclave to be held in November, he is planning new townships in the industrial regions of Kalinganagar, Jharsuguda, Paradeep and Angul-Dhenkanal.

In early March, the CM also inaugurated 23 new industrial ventures in the state, which he claimed will employ over 9,100 people. He launched three projects at the time—a solar power plant of Aditya Birla Renewables in Boudh, a vegetable oil manufacturing unit of AKM Agro in Khurda and the expansion of Jindal Stainless Limited's (JSL) cold rolling unit in Jajpur—collectively worth about ₹709 crore.

"The Odisha government is showing a renewed interest in handholding businesses and is trying to speed up its thinking to be in line with other leading manufacturing hubs. The bureaucracy is working hard to change the image of the state," says Vijay Sharma, director, JSL.

The Delhi-headquartered company has made a total investment of about ₹10,000 crore in Odisha, and believes that while the detailed and transparent policies of the state instil confidence in investors, the government will continue to work on improving ease of doing business, take quick decisions, and improve the supply and demand-generation ecosystem.

Patnaik claims that Odisha "tops the country in spending sanctioned funds across various sectors", primarily agriculture, rural housing, sports and skilling, countering the BJP's allegations that the state government does not spend funds released by the Centre. "Odisha was a rice-deficit state when we took over, and now we are the third-largest contributor to the Public Distribution System in India," he says.

While capital Bhubaneswar has been hosting a number of international events in hockey, tennis, football, rugby and athletics, as far as skilling is concerned, the state has reportedly trained 1.1 million people between 2014 and 2019, excluding engineering colleges and other higher education institutions, according to Mindtree Co-founder Subroto Bagchi, chairman of the Odisha Skill Development Authority (OSDA). It aims to train 1.5 million more youth in the next four years.

Odisha has earmarked nearly ₹1,400 crore to build a World Skills Centre to attract potential employers. "People get surprised to know that the Software Technology Parks of India [an autonomous society under the Ministry of Electronics and Information Technology] reports more exports from a 10 km-radius in Bhubaneswar alone than from Delhi," says Bagchi.

In the next few months, Bagchi will spearhead a Skill Vision, Strategy and Implementation Plan for the state, which will "predict where the world might be in 2030, what are the opportunities and discontinuities, how these will impact the notion of work, employment and entrepreneurship; and drawing from that, what preparedness do we need to build at a policy and implementation level".

To bridge the gap between skilling and industry requirements, the OSDA has set up Centres for Excellence in areas like artificial intelligence, augmented and virtual reality and Internet of Things.

BEYOND MINING

Minerals and metals have conventionally been Odisha's biggest revenue generators, and senior officials admit that the government was getting a raw deal by just collecting statutory dues (like royalty, taxes, contribution to district mineral funds etc) from mining operations. "Miners, on the other hand, were earning supernormal profits," says an official close to the CM.

So mining companies whose leases expire on March 31 participated in an auction where the government invited online bids through the tendering process. The technically qualified bidders quoted an initial price offer, which is the percentage of premium/revenue to be shared with the government. The final amount is calculated on the basis of the sale price of the mineral as prescribed by the Indian Bureau of Mines.

"We received a revenue sharing premium as high as 95 percent. So if the market rate of the mineral is ₹100, the government will get ₹95. This is over and above the regular statutory dues. A mineral-based industry with value addition is our biggest hope," the official explains. "With mining alone, we stand to earn ₹15,000 to ₹20,000 crore annually. This revenue will help us diversify into other businesses in the new world economy." In that sense, the official adds, it's like a hedge to move beyond mines, minerals and power, which are environmentally unfriendly businesses.

Senior journalist and political analyst Rabi Das cautions that while many of Odisha's mining operations have affected the local people—who are vulnerable tribals in most cases—the new auction process that classifies entire mineral blocks for specific end users might push away smaller standalone miners. "Ideally, the government should have conducted a capacity analysis to see how the mining activities will burden the respective districts, the tribals and local players," he says.

While the government increases its revenue, whether the bidders will be able to sustain and scale operations by paying high premiums remains to be seen. Businesses, however, seem to be looking at the bright side. In an interview with *The Economic Times* in February, Sajjan Jindal, chairman of the JSW Group that bagged four iron ore mines by bidding a premium as high as ₹132 for every ₹100 of ore produced, said he will be able to "afford high premiums" since having control over more than a billion tonnes of iron ore reserves

Sector-wise Growth in Odisha

	AGRICULTURE (%)	MANUFACTURING (%)	SERVICES (%)	OVERALL GSDP (%)
2017-18	-6	7.1	11.7	6.3
2018-19	12.1	7.9	6.8	7.9
2019-20*	5.6	5.5	6.8	6.2

SOURCE Odisha Economic Survey 2019-20; PRS *Numbers for 2019-20 are advance estimates

(From left) Girls from the Dongria tribe study at a government ITI college, while others attend the Skill Enhancement Workshop at Chatikona village in Rayagada district

PHOTOGRAPHS: VIPIN KUMAR / HINDUSTAN TIMES VIA GETTY IMAGES will eventually turn the economics in favour of the company. JSW declined to comment on *Forbes India*'s queries.

ArcelorMittal bagged an iron ore mine in the Keonjhar district of Odisha with estimated reserves of 179.26 million tonne in the recent auction.

Operating in the state for over a decade now, the multinational steel manufacturing corporation also has a 6 million tonne pellet plant in Paradeep, and is working to double it production capacity. "Our Odisha facilities are crucial to ArcelorMittal Nippon Steel [AM/NS] India's steel operations as they meet almost 50 percent of the company's pellet requirements," says Dilip Oommen, CEO, AM/NS India.

According to him, apart from rich natural resources, working in Odisha's favour are its deep draft ports, road and rail connectivity, and availability of reliable power. "The government is also supportive of strategic investments in the state," he says.

POLITICS BEHIND THE POLICIES

Patnaik calls his father a pioneer who inspired him to think differently about governance and the potential of industrialisation. In the late 1990s, following his father's demise, Patnaik was asked by then prime minister IK Gujral to contest from his Parliamentary seat in Aska.

Then in his 50s, Patnaik was perhaps the only second-generation politician in the country to not have been groomed for politics by his family, and was not even fluent in the local language Odia. When he broke away from the Janata Dal to form the BJD, he initially won general elections in alliance with the BJP, but broke away in 2008 following communal violence against minorities in Kandhamal.

The CM believes that the current communal unrest seen in Delhi and other parts of the country has only "further reiterated his decision to not ally with the BJP".

Economy in Numbers

Per-capita income

The per-capita GSDP of Odisha in 2019-20 is estimated at **₹1.16 lakh.**

This is **7%** higher than 2018-19

Unemployment

The unemployment rate in Odisha was **7.1 %**, higher than the national unemployment rate of **6.1%**, according to the Periodic Labour Force Survey (July 2017 to June 2018)

	REVENUE BALANCE (%)	FISCAL BALANCE (%)
2018-19	2.9	- 2.1
2019-20 (Revised Estimates)	1.2	-3.4
2020-21 (Budgeted Estimates)	1.6	-3

SOURCE Odisha Budget Documents, 2020-2021; PRS

State of Investments

Odisha had the major share of new investments in India between April-September FY20

STATES	FY19 (%)	H1FY20 (%)
Odisha	4	18
Maharashtra	21	16
Gujarat	2	9
Andhra Pradesh	7	7
Madhya Pradesh	4	2
Tamil Nadu	5	1

SOURCE Centre for Monitoring Indian Economy

He says, "Lack of jobs leads to a great deal of frustration among the youth and I see this [communal unrest] as a reaction to that."

While he has refused to incorporate the National Population Register (NPR) as part of the Census process that will start in April and will follow the 2011 format, he supports the Citizenship Amendment Act (CAA) since it "only deals with outsiders".

Analyst Das believes that Patnaik has remained in power for the last 20 years because "while there are no local leaders within or outside his party who match his level of charisma and popularity, he steers clear of commenting on national political controversies. He supports the Centre on key political issues—the scrapping of Section 370 in Kashmir, for example—which is why the BJP views him as less of a threat".

The appointment of Pranab Prakash Das as the BJD's organisational secretary reiterates how Patnaik has been testing the waters for the party's future by letting young party workers, bureaucrats and officers take charge, the analyst believes.

A similar example of trusting young officers could be seen through Patnaik's ambitious Mo Sarkar initiative to reduce red tape across all levels of state departments, and the Integrated Financial Management System that will take all government transactions online. The latter is expected to be rolled out for the next financial year.

Steering Mo Sarkar and the 5T (Teamwork, Technology, Transparency, Time leading to Transformation) initiative is 45-year-old V Karthikeyan Pandian. The IAS officer says the government's strategy primarily involves collaborating with stakeholders across various areas of expertise. "Apart from Bagchi, we have Sopnendu Mohanty from the Monetary Authority of Singapore helping to build financial services systems, and various professionals, including Public Health Foundation of India's K Srinath Reddy, providing insights on health care," he says.

Patnaik considers his work in encouraging women's participation across various levels of politics, and legislating for their education and health care as one of his major achievements in the last 20 years. "In a democracy, where you have to win over people's trust every five years, the government in power is often known to undo the work of its predecessor," notes Balakrishnan. "The sheer continuity of his tenure has helped Patnaik reshape the development narrative of Odisha to an extent that no other party will be able to reverse his work or overturn his legacy in the future." F

Fast and Furious

Amid India's worst automobile slowdown, two new entrants are trying to make it big. Can they sustain the success after the initial rush?

By PRANIT SARDA

"We entered India with exhaustive market and customer research. This has helped us plan our product and services better."

Kookhyun Shim, managing director and CEO, Kia Motors India

Kunal Doshi, 25, an importer and national distributor of nuts and bolts, booked the Kia Seltos GTX Plus 7 DCT in July 2019 and received the car in November. "The car has a bold style, good engine and performance, is comfortable like premium cars, and is loaded with tonnes of features that no other car in its category has," says Doshi.

Doshi's vote of confidence in the Hyundai-owned Kia Motors, South Korea's second-largest automobile manufacturer, is an exception in an otherwise downcast auto sector that is reeling under its worst slowdown since July 2018. Kia, which entered the Indian market in August 2019 with Seltos, a mid-sized SUV manufactured at their Anantapur plant in Andhra Pradesh, has since delivered 75,000 units, 32,000 of which were booked before its launch.

Not only has Seltos established Kia among the top five manufacturers in India, it has also become the highest-selling SUV in the country since its launch. The success of the Seltos managed to create enough buzz for the launch of Kia's second, luxury multipurpose vehicle (MPV) Carnival, at Auto Expo 2020. The seven-seater, along with Seltos, led to "record-high" sales of 15,644 units for Kia in February.

Kia emerged third beating market leaders and established automobile players like Tata Motors and Mahindra & Mahindra for the month of February 2020. With a 6.24 percent marketshare, Kia followed Maruti Suzuki and Hyundai Motors with 53.33 and 15.96 percent market share respectively.

Another international car maker that has begun its India journey with

(LEFT) NISHANT RATNAKAR FOR FORBES INDIA; AMIT VERMA

"Our product offering, customer experience, product assurance, all had to be different, and we had to connect the whole thing back to technology."
Rajeev Chaba, president and managing director, MG Motor India

a bang, thereby bucking the trend in the country, is Chinese-owned British automaker Morris Garages (MG). MG set up its India subsidiary MG Motor India in 2017 in Gujarat's Halol. The company, which launched Hector in June 2019 in India, has received over 50,000 bookings and 22,000 cars have already been delivered, averaging about 2,000 retailed vehicles a month. The numbers come at a time when the overall sales of vehicles, including passenger vehicles, saw a 13.77 percent decline in 2019, at 2,30,73,438 units, falling from 2,67,58,787 units in 2018. This is said to be the steepest decline since the Society of Indian Automobile Manufacturers (SIAM) started maintaining the sales records in 1997.

While the Seltos and the Hector are not direct competitors despite being in the SUV segment (Seltos being smaller in size), for both Kia and MG, technology is the key differentiating factor that's helped them swim against the tide. While entering India, MG wanted to distinguish itself as a brand to create its unique identity. Says Rajeev Chaba, president & managing director at MG Motor India: "Our product offering had to be different, our customer experience had to be different, our product assurance had to be different and we had to connect the whole thing back to technology. So, technology is our biggest pillar of differentiation." Hector, thus, has over 50 connected features like remote control, a mobile app where one can check the condition of the vehicle and even locate it through 'find my car'.

MG has also invested heavily in its two flagship stores in Delhi and Mumbai to provide a seamless retail experience to customers. The two stores house a café, an LED video wall that runs the company's brand videos, and are decked up with British-themed props like the Union Jack, the Big Ben and iconic London phone booths. The Delhi outlet also has a 1956 MG Midget to reflect its heritage.

Kia too has tied up with telecom services provider Vodafone Idea to set up internet connectivity in a vehicle through a smartphone app. Christened UVO Connect, it enables features like remote locking, navigation and switching the engine on and off, among others, through the app.

Another reason for Kia's success is the market research done by Hyundai, its parent company. "We entered India with exhaustive market and customer research and we identified the unmet needs of the customers here. This has helped us plan our product and services better. Seeing the response, we can say our research was right on point," says Kookhyun Shim, managing director and CEO of Kia Motors India. The company has invested $1.1 billion in its manufacturing plant in Andhra Pradesh that has a production capacity of 300,000 units per annum.

With the second largest market share in India, analysts agree that Hyundai's research and results pushed Kia to further succeed in the Indian market. "Kia is close to Hyundai, and Hyundai has [globally] established itself as a passenger vehicle brand," says Mitul Shah, vice-president, research, Reliance Securities. "The numbers for Seltos have continued to improve in the last six to eight months. Even when the numbers have become slightly lower [in December, when the car makers typically cut down production as buyers prefer newer units in a new year], Kia performed reasonably well selling 4,645 units."

While MG has left no stone unturned to provide a technologically advanced product for the Indian market, its product assurance also stood out. "We have packaged the entire product under a scheme called MG Shield, where even the cost of ownership is going to be reasonable," says Chaba. With MG Shield, the company assures customers a buyback price of minimum 60 percent after three years apart from providing various after-sales services and warranty.

Kia, too, is focussed on after-sales service. When the horn in Doshi's car malfunctioned, it was promptly replaced in the first service, he says.

"These companies are more similar to Maruti in terms of product range and understanding the consumer compared to a few other MNCs."
Mitul Shah, vice-president, research, Reliance Securities

Both Seltos and Hector gain with competitive pricing, starting at ₹9.89 lakh and ₹12.74 lakh (ex-showroom) respectively. It gives the two brands an edge in India's price-sensitive market against vehicles like Jeep Compass and Mahindra XUV500, which start at ₹16.49 lakh and ₹12.31 lakh respectively. While Hyundai Creta and Maruti Suzuki Vitara Brezza come cheaper, at ₹9.99 lakh and ₹7.34 lakh respectively, Seltos and Hector score higher over these two brands with their sophisticated technology offerings.

Says Shim of Kia: "The success of both Seltos and Carnival is proof that the love between Indian consumers and good cars hasn't faded away despite the slump in the industry."

While both MG and Kia started off well in India, recent global factors have dampened their initial euphoria. Hector's sales have pared down a bit in February, for instance. The company sold 1,218 units, a dip from their average of over 2,000 units sold per month. Says Shah of Reliance Securities: "The initial response for any product is high and it slowly goes down in most of the cases." One of the cars caught fire on the road in Delhi and brought bad press for MG, while Kia is said to have been facing problems with the availability of spare parts and quality service in India. *Forbes India* could not independently verify this claim.

Add to that the raging Covid-19 pandemic in China and Europe that might disrupt the supply chains for both these companies, as it has for their Indian counterparts. While China is on a recovery trajectory, the epicentre of the pandemic has moved to Europe, where multiple cities have gone under lockdown and the economy is expected to wobble for several months now. Says Chaba: "We have a global supply chain, where some components come to India through both Europe and China. If the coronavirus continues to wreak havoc in Europe, our supply chain will be affected. But China is recovering and we should be back in action within three to four weeks."

For Kia, which sold 15,644 units in February, Covid-19 hasn't yet impacted their production. "But we are keeping a watch on the development to gauge future impact," says a spokesperson.

Some auto experts attribute the falling vehicle sales in India to the introduction of the stringent BS VI emission norms from April 1 as well as the government's push for electric vehicles (EVs), auto's new 'sunshine sector'.

MG's BS IV inventory was close to zero at the time of *Forbes India*'s interaction with the company. They claimed to have their petrol BS VI available in the market and the diesel BS VI was expected to go on sale later in March.

Kia, right from the launch of Seltos in August 2019 to the more recent launch of Carnival, has complied with BS VI norms in both the petrol and diesel variants.

On a Roll

MG

Current models: Hector and ZS EV

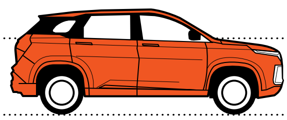
Units Sold

Hector

20,278

ZS EV

158



Pipeline: Gloster (unveiled at Auto Expo 2020; Diwali launch expected)

KIA

Current models: Seltos and Carnival

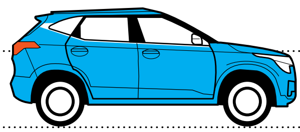
Units sold

Seltos

74,518

Carnival

2,070



Pipeline: Sonet (concept available at Auto Expo 2020, launch in the second half of the year)

But MG has caught on to the EV wave pretty early by launching the ZS EV in January across five cities. "When we had just announced the booking and not even the price, we got an overwhelming response. ZS EV has the same connected technology as Hector," says Chaba. ZS EV has seen over 3,000 bookings in India with 158 units being sold in February; it has a waitlist of almost nine months.

Kia has a thriving presence in the global EV market with cars like Niro and Soul, but it does not plan to launch the products in India yet.

The company claims that its Anantapur plant, with a production capacity of 300,000 a year that it plans to fully utilise by 2022 to be among the top three manufacturers in India, is fully equipped to manufacture EVs. "But," says Shim, "India needs some more time for EV adoption as there are many aspects like infrastructure, tax incentives and consumer awareness, which play a crucial role in making this transition a success. EVs are not a focus currently for Kia Motors India."

Once the initial high wears off, how do the two companies plan to hold on to the momentum? By going into overdrive mode to launch new products.

MG wants to launch at least one product every year, with Gloster during Diwali and another in the first quarter of 2021. It is also looking at expanding production at its Halol plant by 2021, up to 100,000 units from its current 80,000.

Kia is eyeing a launch every six to nine months, starting with a compact SUV, Sonet, in the second half of the year.

Says Shah of Reliance Securities, "Kia's Sonet will compete with cars like Maruti Brezza and Mahindra XUV300. That is a category people have recently shifted to from sedans. That product is likely to impact the market share of all the other products."

Adds Shah: "The success of Kia in countries like Korea and a few others, in terms of affordability and a few other parameters, is similar to the Indian market. So they would best understand the Indian consumer compared to other companies like Volkswagen." Both MG and Kia also have deep enough pockets to invest heavily in the Indian market in terms of marketing and brand building, usually a challenge for new entrants.

India has seen companies like Renault and Volkswagen launch cars like Duster and Vento, respectively, with a bang, only to have them fade out. Could MG and Kia also go the same route? It's too early to predict, but they seem to hold the potential to go the other way. Shah says, "Anything can happen, but it seems like these companies are more similar to Maruti in terms of product range and understanding the consumer compared to Renault and Volkswagen. The latter are present in countries where the products are slightly premium compared to India's, that's the reason they were not successful in India." F

The Big Shift

The BS VI emission norms are good for the environment, but the rising costs that will come along may dampen the industry mood

By JASODHARA BANERJEE

SAMEER PAWAR

From April 1, when the Bharat Stage (BS) VI emission norms come into effect, a lot more will change apart from the composition of exhaust fumes of new cars. Consumers of passenger vehicles will have fewer models to choose from while buying a car and the cars will cost more, as will their BS VI compliant fuel. The effect that the combination of these factors will have on the Indian auto industry—already struggling with the worst slowdown in sales for over a year—is yet to be seen. While some predict the continuation of tepid consumer response, others pin their hopes on the launch of new models to pique consumer interest.

On February 19, 2016, the ministry of road transport and highways had issued a draft notification of BS VI emission standards for all major on-road vehicle categories in the country, including light- and heavy-duty vehicles, as well as two- and three-wheelers. The government had confirmed that the country would leapfrog BS V level emission standards and move directly to the more stringent and robust BS VI (see: What's new with BS VI). There were two reasons for this switch: One, the rising level of vehicular pollution in India and the effect it had on public health (see: The burden of vehicular pollution); two, reducing the pressure and investment costs of oil refineries to first implement BS V and then BS VI.

The time frame, however, within which this switch was to be made was one of the toughest in the world. The European Union had implemented Euro IV emission standards in 2006, Euro V in 2011, and Euro VI in 2015. In India, nationwide implementation of BS IV standards took place from 2017, just three years before the country was mandated to switch to BS VI standards from this April.

While this has led car makers to invest more on their research and development (R&D) departments, it has also meant that the total number of BS VI-compliant models available in the market from April will be lower than that of BS IV models available earlier. This is because some car makers—such as Maruti Suzuki, Volkswagen Passenger Cars India, Hyundai and Nissan—will be discontinuing their BS IV diesel variants without replacing them with BS VI-compliant diesel versions; however, they may have BS VI petrol variants in their portfolios.

"Though there has been news that some companies will discontinue their diesel variants, lately some of these companies have also stated that they are open to looking at diesel options in the near future," says Rajesh Menon, director general of the Society of Indian Automobile Manufacturers (Siam). "Irrespective of diesel or petrol, the number of models available on April 1, 2020, will be lower. The time available to the industry to transit from BS IV to BS VI has been just three years, which is unprecedented anywhere in the world. Hence, it cannot be expected from all vehicle manufacturers to develop the entire BS VI portfolio in such a short time."

Car makers who are discontinuing diesel variants in the small and compact segments include Maruti Suzuki India (all models), Volkswagen Passenger Cars India (all models), Toyota (Etios, Etios Cross, Etios Liva and Corolla Altis), Tata Motors (Zest and Bolt), Nissan (Micra, Sunny and Kicks), Mahindra & Mahindra (KUV100) and Fiat (Punto and Abarth). The move is fuelled by the fact that car makers feel the cost of manufacturing BS VI-compliant diesel vehicles—which includes more expensive technological requirements—is not economically viable.

However, they also point to the falling demand for diesel variants in small cars. "There is no business for diesel variants among small cars," says Steffen Knapp, director, Volkswagen Passenger Cars India. "The total distance that most consumers drive within the city is small, and the price difference between petrol and diesel has been reducing over the years." He adds that three years ago, 60 percent of Volkswagen's small car Polo that was sold in India was the diesel variant, while in 2020 it is down to 10 percent. The company has now discontinued the diesel variant altogether, and has only the petrol variant of this model.

Knapp's views on demand for diesel cars is borne out by data from Siam, which shows that in 2013-14, the share of diesel models in the sale of new cars was about 42 percent, whereas in the period between April 2019 and January 2020, it has fallen to 13 percent.

Another company that will be discontinuing all its diesel variants is Maruti Suzuki, which had seen much success with models such as the Swift, Baleno and Ciaz. "The company announced in April 2019 that it would phase out diesel cars after BS VI implementation in April 2020," says a spokesperson for the

"The time available to the industry to transit from BS IV to BS VI has been just three years, which is unprecedented anywhere in the world."

Rajesh Menon, director general, Society of Indian Automobile Manufacturers

company. The compact segment accounted for 49.7 percent of Maruti Suzuki's sales in 2017-18. The segment comprises models such as the WagonR, Ignis, Celerio, Swift, Baleno and Dzire. "Currently, all petrol models offered by Maruti Suzuki are BS VI-compliant."

Although both Volkswagen and Maruti will have only petrol variants in their current portfolios, they are not giving up on diesel entirely. The new petrol models that Volkswagen has launched this year—the Tiguan Allspace and the T-Roc (both SUVs)—are fully built units being imported from Mexico and Portugal respectively, where the company has existing facilities to build Euro VI-standard cars. "Although we are launching both small and large SUVs with petrol engines, we will be investigating diesel options for the future," says Knapp. Similarly, Maruti Suzuki says it will continue to monitor customer feedback. "In case there is demand for diesel cars after the introduction of BS VI regulations, we may reconsider our decision. At present, we are closely monitoring customer feedback to BS VI diesel cars," the spokesperson adds.

The paucity of options in the small and compact segments, however, is contrasted by the continuation and introduction of BS VI-compliant diesel models in the large car and UV segments. Models such as Kia Seltos, Hyundai Venue, Creta and Tucson, Jeep Compass, Tata Harrier, and Ford Ecosport are UVs that will be available in diesel variants, as will be sedans such as Hyundai Elantra and Verna. Among the large UV makers, for instance, Toyota will continue its diesel variants for Fortuner and Innova. More than 60 percent of the company's sales came from these two models between January and September 2019, with diesel vehicles accounting for 85 percent of volumes.

Because of the price of vehicles in these segments, manufacturers feel they can assimilate the cost of introducing BS VI technology. For instance, MG Motor India, a new entrant to the country, has said it only makes sense to offer BS VI-compliant diesel options in vehicles that are priced over ₹15 lakh. The rapid growth in the UV segment is another reason why manufacturers are willing to bet on diesel variants in this category. Siam data shows the cumulative growth rate in the SUV segment has been 12 percent between 2013-14 and 2018-19, whereas the figure is 5 percent for small cars in the same period.

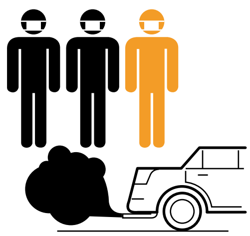
"Customers of the mid-size and executive segments are considering entry-level SUVs before making a purchase decision, as there are some additional benefits of SUVs," says Menon. "These include higher ground clearance that make them better suited for Indian roads, high-performance engines, higher seating capacities, and price points that are similar to the mid-size and executive category of sedans."

Hetal Gandhi, director, Crisil Research, adds that parking regulations—such as parking fees or towing penalties—in cities like Delhi and Mumbai are deterring people from buying multiple cars. "Instead, consumers are opting for single cars that are larger in size and serve multiple purposes," she says, adding that one of the reasons for slow growth in the small car segment is that first-time buyers are delaying their purchases. "Earlier, when people became financially eligible to buy a car, they would make a purchase within the next three years. However, that time frame has extended well beyond three years now. This is because of other alternatives such as taxi aggregators, the problems related to parking and higher cost of acquisition."

Although car makers are more enthusiastic about launching diesel variants in the SUV segment, this category will also see the steepest increase in cost. While the rise in costs for petrol variants of compact cars and SUVs will be between 3 and 5 percent, it is the larger diesel vehicles that will see a minimum of an 8 to 10 percent increase in price. So, a vehicle that costs ₹10 lakh now, could cost at least ₹80,000 more.

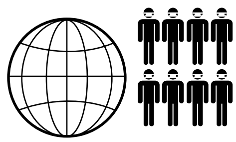
"The cost of upgrading a BS IV petrol car to a BS VI-compliant petrol engine costs between ₹8,000

The Burden of Vehicular Pollution



2 out of 3
Number of deaths from air pollution in India which can be attributed to exhaust emissions from diesel vehicles

385,000
Number of deaths caused worldwide by pollution from diesel vehicles in 2015



70%
Share of these deaths that occurred in 2015 in the four largest vehicle markets: **China, India, the European Union and the US**

Nearly **50%**
Of the health impacts of air pollution from vehicles worldwide were caused by on-road diesel vehicles in 2015

3.4 million
Number of premature deaths annually from heart and lung diseases and diabetes caused by ambient air pollution

$1 trillion
Global cost transportation-related health impact between 2010 and 2015

SOURCE International Council on Clean Transportation, George Washington University, University of Colorado Boulder, Global Burden of Disease study 2017

INFOGRAPHICS: SAMEER PAWAR

and ₹12,000. However, there are several other reasons for higher cost of ownership for new car buyers," says the Maruti spokesperson. "The cost of car acquisition has gone up substantially for several reasons, including implementation of new safety norms. The decision by some states to raise road tax, coupled with the implementation of the three-year insurance scheme in line with the Supreme Court guidelines have made cars expensive."

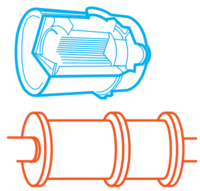
The cost of BS VI fuel is also expected to be higher than BS IV fuel. In February, Sanjiv Singh, chairman of Indian Oil Corporation (IOC), the country's largest oil supplier, had said there will "definitely be a marginal increase in retail prices of fuels" once the BS VI norms are implemented. However, he had added that the rise will not be a steep one.

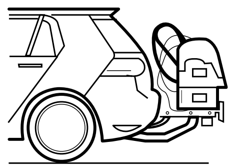
The reason for this increase in price is the cost of investments that oil refining and marketing companies have had to make in the refining and distribution processes. The main objective of moving towards BS VI emission standards is to reduce the level of sulphur in the fuel, which requires changing its physical and chemical components. Oil and gas companies, therefore, need to modify the refining and blending processes to produce fuel of the required composition. To manage costs and prices, they need to optimise their processes, as well as forecast market demand.

Singh said government-owned oil marketing companies have invested ₹35,000 crore to upgrade their refineries, of which IOC alone has spent ₹17,000 crore. BPCL said it has invested ₹7,000 crore, while HPCL has invested about ₹5,000 crore. For BPCL, the upgradation has resulted in a price hike of ₹0.70 to ₹1 per litre. However, more clarity on the actual increase in prices is expected after the new emission norms come into play, and the new grade of fuels are rolled out across the country.

What's New With BS VI

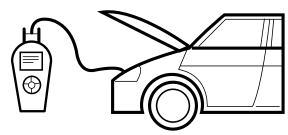
◆ Introduction of **Diesel Particulate Filter** (DPF) and Selective Catalytic Reduction (SCR)



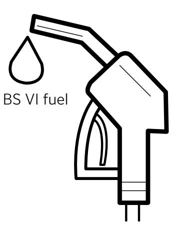


◆ Introduction of Real Driving Emission (RDE), which measures a vehicle's emission in real-time conditions against laboratory conditions

◆ Introduction of mandatory Onboard Diagnostics (OD) for all vehicles



BS VI fuel



◆ Use of **BS VI fuel**, which has significantly lower sulphur content (a maximum of 10 mg/kg as compared to a maximum of 50 mg/kg in BS IC fuel). Also, nitrogen oxide level for BS VI diesel engines and petrol engines will be brought down by **70% and 25%**, respectively

◆ A BS VI-compliant engine will require BS VI; if it uses BS IV fuel, it won't adhere to BS VI standards. Similarly, if a BS IV vehicle uses BS VI fuel, its engine will be affected and increase emissions

The Indian automobile industry has had one of its worst years in 2019, with passenger vehicles sales falling by 17.98 percent between April and November, according to Siam. The slump can be attributed to multiple reasons, including the slowdown in the overall economy, the crisis in the non-banking finance companies sector, a liquidity crunch, and the increase in third-party insurance and road tax in some states.

This slowdown in the world's fourth-largest auto market has also severely affected employment, with tens of thousands of workers losing their jobs at manufacturing plants and ancillary units. Media reports indicated that till August 2019, 40,000 to 50,000 contract workers in the auto hubs of Gurugram and Manesar in Haryana had been laid off. Similar situations were expected in other manufacturing hubs like Chakan, near Pune, and in Chennai.

Globally, too, the auto industry is slowing faster than expected and, according to the International Monetary Fund, it represented 20 percent of GDP slowdown in 2018 and about 30 percent of the year's drop in global trade. The declines come as wealthier countries reach maximum automobile saturation, while developing countries struggle with lagging sales.

Given these factors, the Indian industry had been pinning its hopes of a revival in the new financial year with the launch of new models that are expected to interest consumers. For instance, Kia Motors India in March announced that it had registered its highest-ever monthly sales of 15,644 units in February; it sold 14,024 units of the Seltos, and 1,620 units of the newly launched Carnival. But despite this optimism among some players, there is caution.

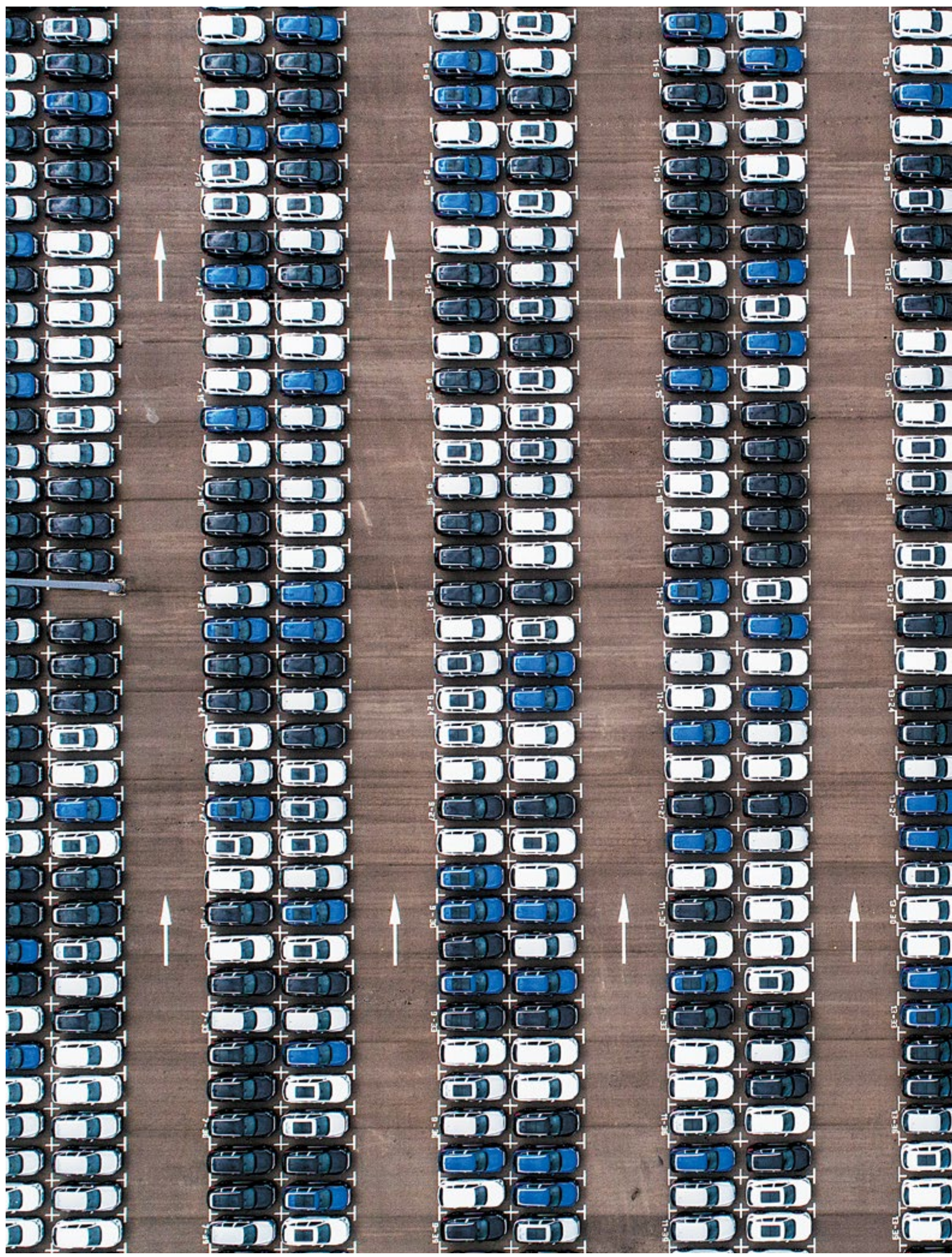
"Earlier, during the auto sector slowdowns of 2001-02 and 2007-08, the government had provided incentives to the industry to help it recover," says Gandhi. "However, this time around, the government wants the industry to recover on its own."

Menon of SIAM says it is too early to say what the effect of the increased BS VI vehicle and fuel prices will be on sales figures and consumer sentiments. "Where SUVs are concerned, however, the new norms would not be a determinant of demand, and new car models have been generating some excitement," he says. "However, we should keep in mind that India is a very price-sensitive market." F

China Drives In

With India showing the potential to become the third-largest automobile market in the world, car makers from China are revving up to sell their vehicles here

By MANU BALACHANDRAN


SERGEI BOBYLEV \ TASS VIA GETTY IMAGES

A Chinese storm is approaching India's automobile sector and it has the potential to change its landscape forever.

The automobile industry in India is dominated by homegrown automobile manufacturers in addition to Korean and Japanese brands. However, at the Auto Expo this year, two of China's biggest carmakers—Great Wall Motors (GWM) and FAW Haima—announced their intention to sell vehicles in India, across segments, entering into even the fledgling electric vehicle (EV) market. Many more are planning a similar foray into the world's fourth-largest automobile industry.

GWM, China's largest sports vehicle manufacturer, showcased its Haval range of SUVs at the Auto Expo, in addition to the Ora EV. FAW Haima showcased the FAW Haima 8S and 7X SUVs, and has firmed up plans with Delhi-based Bird Group to launch an EV priced at less than ₹10 lakh. In all, Chinese carmakers exhibited more than 20 models at the Auto Expo.

Shanghai-headquartered SAIC Motor has already been selling MG cars in India since last year. Changan

“India is expected to be the third-largest automotive market by 2025 and it is a critical part of Great Wall Motors’ globalisation strategy.”

Hardeep Singh Brar, director, marketing and sales, Great Wall Motors

Automobiles, a car maker owned by the China government, is also likely to begin operations in India by 2022, apart from other companies like Chery Automobile based in Wuhu and the Geely Auto Group from Hong Kong.

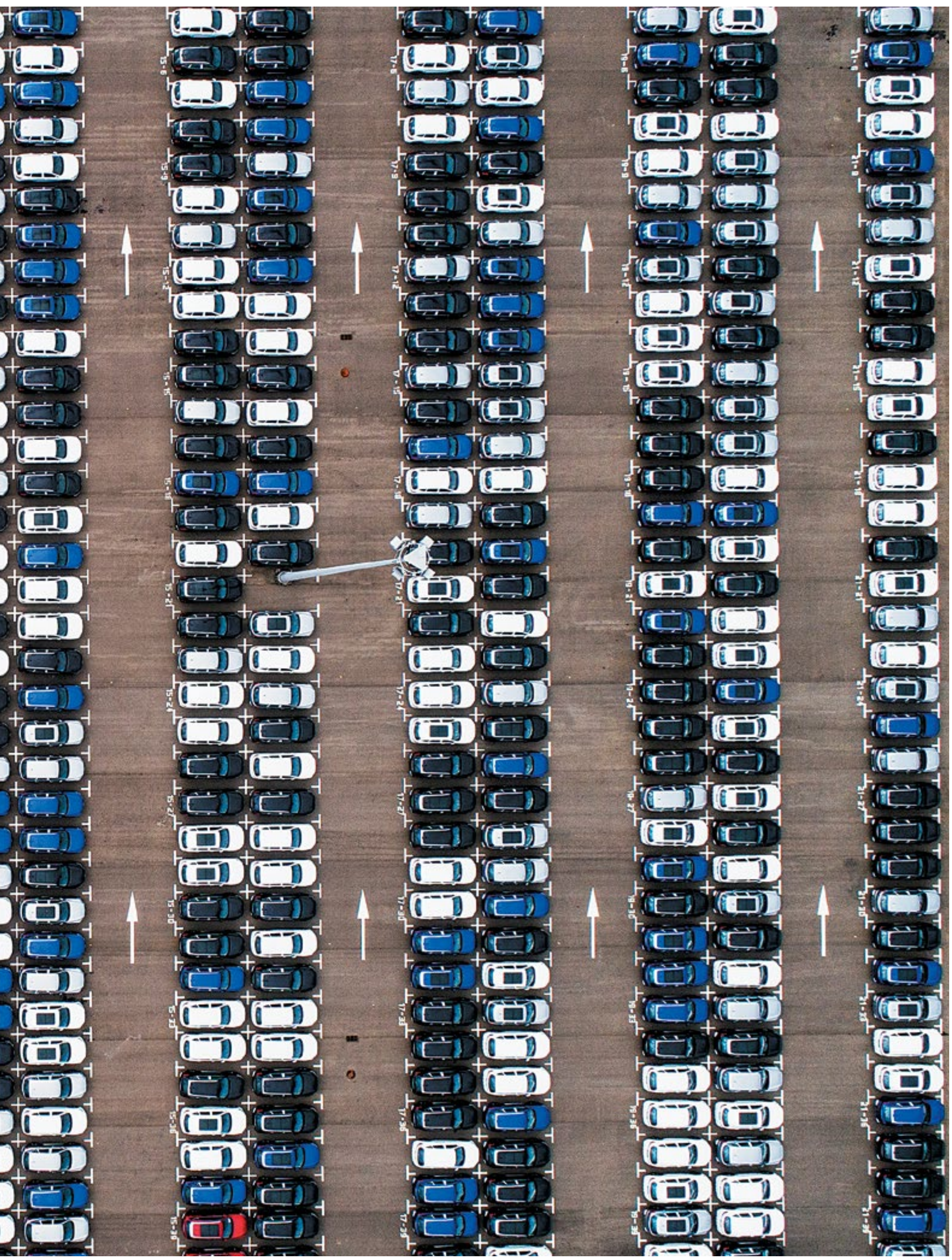
Their planned entry comes at a time when India’s automobile sales declined by 16 percent between April 2019 and February 2020. China also saw its market shrink, with vehicle sales falling by over 8 percent in 2019, forcing companies to look outside the world’s second-largest automobile market, which is behind only the US.

“India is expected to be the third-largest automotive market [overtaking Japan] by 2025 and it is a critical part of Great Wall Motors’ globalisation strategy,” Hardeep Singh Brar, director, marketing and sales, Great Wall Motors, tells *Forbes India*. “India is undoubtedly one of the most promising auto markets in the world. For foreign investors, the favourable investment environment in India enables it to be their preferred destination for direct investment,” he says, explaining that the Baoding-headquartered company has been paying attention to and studying India “with an objective of executing investment plans”.

According to government think-tank Niti Aayog, only 22 out of 1,000 people own a car in India [compared to 980 in the US and 850 in the UK]. The increasing number of first-time users enhance India’s potential to become the world’s third-largest automobile industry over the next few years.

The government push toward electric mobility through policy changes has also opened avenues for Chinese manufacturers to tap into the Indian market. Apart from reducing GST on EVs from 12 percent to 5 percent last year, the government has provided an income tax deduction of ₹1.5 lakh on interest paid on loans taken to buy EVs. It has also approved the setting up of 2,636 EV charging stations across 62 cities under the second phase of its FAME scheme.

GWM has lined up investments worth $1 billion (₹100 crore) for India and purchased General Motors’ manufacturing facility in Talegaon near Pune in January for an estimated $250 million (₹25 crore). “SUVs are growing at a much faster pace than the rest of the segments and contribute more than 25 percent to the overall



China’s Great Wall Motors has lined up investments worth ₹100 crore for India market [in India]," adds Brar.

"GWM's Haval is the number one SUV brand in China... and with the growth in the SUV segment, we feel this is the right time to enter India," he says. "GWM started as early as 2016 when we launched our R&D centre in Bengaluru... now we will be setting our manufacturing facility in India."

LINING UP

India's automobile industry is dominated by Maruti Suzuki, which controls nearly 50 percent of the market. Hyundai has 20 percent market share followed by others such as Kia Motors, Tata Motors and Mahindra. At the same time, many global car manufacturers, including Nissan [Japanese], Renault [French] and Volkswagen [German], haven't been able to find much success in India in recent times.

Much of the interest from Chinese auto makers—particularly at a time when American and European car makers are struggling to make inroads in India—comes at a time when SAIC-owned MG Motor India demonstrated the potential of the Indian market for Chinese companies. Since it set up operations here last June, the company has garnered over 50,000 bookings for its wildly popular SUV, Hector, with MG Motor India delivering some 3,000 units every month. At the Auto Expo, the company displayed 14 models.

"Today, the Indian consumer does not care about the country of origin of a vehicle," says Rajeev Chaba, president and managing director, MG Motor India. "They believe in value for money and are happy as long as their needs are fulfilled. Besides, the automobile industry is a global one, with parts being sourced from many places, and therefore a company isn't specific to one region alone. Besides, having Chinese resources offer the best proposition."

In 2017, MG Motor India had taken over a manufacturing facility previously owned by General Motors in Halol, Gujarat, after the American car maker decided to call it quits in the Indian market due to floundering sales. The company spent over ₹2,200 crore on the acquisition of the facility and expanding its capacity.

"For many global companies, India was just another market," says Vinay Piparsania, former executive director at Ford India, and consulting director–automotive at Counterpoint Technology Market Research. "Chinese companies, however, hadn't gone out of their own country and India is only one of the few markets that they are foraying into. With their resources, focus and the potential that the Indian market offers, the Indian automobile landscape is in for some big churn."

"Essentially, two companies dominate the Indian market," adds Piparsania, referring to Maruti Suzuki and Hyundai. "While there are challenges as far as perception goes, the success of MG Motor gives confidence to others as long as they can offer a feature-rich product and the right quality. He explains that the situation is somewhat similar to the mobile phone market in India, which was once dominated by domestic manufacturers and South Korean brands before the onslaught of Chinese smartphones led by Xiaomi, Vivo and Oppo.

The ongoing slowdown hasn't deterred companies from firming up their India plan because the market is expected to bounce back later this year. "We have been evaluating the market for a long time and are in the process of finalising the products, location and segments," says an executive involved in the launch of a Chinese auto maker. "The market will bounce back and there is a massive opportunity there. In 1998, nobody knew about Korean brands in India and today they are the second-biggest in India. There is a similar story waiting for the Chinese brands because the consumer is looking for the best value proposition, which these companies can offer."

Chinese companies are taking advantage of the cost consciousness of the Indian market as the domestic automobile industry undergoes a transformation. "The Indian automobile market is getting expensive, so much so that even Maruti Suzuki is becoming more expensive," says Puneet Gupta, associate director for automotive forecasting at IHS Markit. "With their deep pockets and innovative offerings, the Chinese players will be able to offer great features and style to consumers. Time and again, Indian consumers have shifted priorities and they aren't loyal to one brand."

EV POTENTIAL

The Chinese auto makers are also bringing to India their vast experience in the EV segment. China is the world's largest EV market, accounting for one out of two EVs sold globally. In January, MG Motor India launched its first EV for the Indian market, an SUV named MG ZS EV, priced at around ₹23 lakh; it has received over 3,000 bookings so far.

The Chinese Onslaught

CONFIRMED

- Great Wall Motors
- FAW Haima

IN THE WORKS

- Chery Automobile
- Geely Auto Group
- Changan Automobiles

THE CHINESE USP

- Feature-rich and technologically savvy products
- Competitive pricing
- Deep knowledge of the electric vehicle market

WANG CHUN / VCG VIA GETTY IMAGES

Shanghai-headquartered SAIC Motor has been selling MG cars in India since last year

The vehicle has a range of 340 km.

"Electric vehicles will be an integral part of our strategy," says Brar of GWM. "It's because GWM is quite strong in EVs in China. Also, there is a lot of thrust by the Indian government on EVs. Hence, GWM would like to use its expertise and be part of the growth story for EVs in India. We are exploring all forms of EVs at this stage, which include pure EVs, hybrid EVs, and plug-in hybrid EVs."

In February, Haima Automobile announced a joint venture with Bird Group to launch an electric hatchback, with range options of 200-300 km. The vehicle will be manufactured at a soon-to-be-set-up plant in Manesar in New Delhi.

"With the world moving towards clean mobility with least environmental impact, we are satisfied with the Bird Electric EV1," Williams Dong, general manager, Haima Automobile International Corporation, said during the launch. "We have entered the fastest-growing segment of the Indian automobile... Bird Electric EV1 will reinvent the game in terms of technology and economy, targeted at a wide set of customers across segments."

The gamble on the EV market could reap rich rewards, considering the government has been pushing for more EVs and is investing in creating the required infrastructure.

"Until a few years ago, we had not even heard about electric rickshaws," says Kanv Garg, director for renewables and electric mobility at consultancy firm EY. "The kits came from China and the market grew organically even without government support. Customers only care about high quality and minimum cost and with the Indian companies being in an inertia as far as EVs are concerned; the Chinese have a huge potential."

It isn't just car makers who are making a beeline for the Indian market. The two-wheeler market, currently dominated by motorcycles, could also see some serious threat from Chinese companies. Already, Chinese electric two-wheeler maker DAO EVTech has announced plans to set up a manufacturing unit in Andhra Pradesh, while Benling and CFMoto are gearing up to launch electric bikes in India.

Then there are truck and bus manufacturers, including Sinotruk and Foton, which have been operating in India since 2011. Beiqi Foton has tied up with Haryana-based PMI Electro Mobility Solutions Pvt Ltd for manufacturing electric buses, while the $20-billion Shenzhen-based manufacturer BYD Co Limited has a partnership with Hyderabad-based Olectra Electric to supply electric buses for various state governments.

"In many ways, MG Motor has given Chinese car makers the confidence that they will be able to find success in India," says Gupta of HIS Markit. "What matters is features and style... and the Chinese have been extremely competitive and innovative in that space."

Brar of GWM agrees. "GWM will bring in technology disruptions in terms of products that the Indian consumer has so far not seen and experienced," he says. "We will make a bold foray in India to place ourselves as a premium brand, offering the best-in-class fit, finish and interior quality, focusing on technology disruption as a target in the near future for an enriching experience for our consumers."

With the coronavirus crisis in China and across the world, concerns have risen over the supply chain network of Chinese companies. "The foray into India also provides companies with the opportunity to target export-oriented markets," says Piparsania. "Every player coming in will set up the ecosystem to remain competitive in the Indian market and supply chains should never be a major concern. In addition, companies are also laying groundwork on building a strong dealership and service network."

"For now, the focus is on getting the products for the Indian market right," says the executive working with the Chinese auto maker. "Dealers will always be there and sales and service network aren't a cause of concern." GWM, too, has laid out plans to set up its network across Tier I, Tier II and a few select Tier III cities to begin with. "We shall look at select but strong partners with a high degree of customer and brand orientation," adds Brar.

The Chinese onslaught has begun and India's auto sector could be in for some serious transformation. F

ROAD TO REVOLUTION

The future's electric. And Indian auto makers are launching newer models and building an ecosystem as the government offers favourable policies and financial incentives

By MANU BALACHANDRAN

The Indian automobile sector has endured some challenging years. Floundering sales on the back of an economic slowdown coupled with a transition to the more efficient BS VI engines with lower emission hit auto makers hard. Over the past year, sales of vehicles across categories fell by nearly 16 percent in the world's fourth-largest automobile industry. Now, with the Covid-19 pandemic causing the global economy to go into a tailspin, the sector could take over a year to recover.

Amid the despondency, however, there appears to be a silver lining for the industry. Since January 2019, India's top car manufacturers have been making a beeline to launch electric vehicles (EV). Last July, Hyundai, India's second-largest car maker, launched the Kona—its first electric offering in India—with a range of 425 km. In October 2019, Tata Motors announced the launch of its first EV, the Tigor, followed by the electric version of its popular SUV, Nexon. In January, Mumbai-headquartered Mahindra followed suit with its electric SUV, e-KUV, which has a range between 130 km and 150 km.

At the Auto Expo in New Delhi earlier this year, much of the attention was on EVs with Maruti Suzuki's Futuro-e, Tata Motors' Altroz EV and the Ora R1 from China's Great Wall Motors. Pune-headquartered domestic manufacturer Force Motors also announced its next-generation mobility platform featuring an electric powertrain while MG Motor India launched its electric SUV, its only second vehicle offering in India.

"Over the past two years, there has been a growing awareness in this space and the growth has been on the right path," says Shailesh Chandra, president of electric mobility business at Tata Motors. "If you look at Q1FY20, sales were around 300 vehicles... the number rose to 500 in Q2, 800 in Q3 and is expected to hit 1,400 in Q4. While the Q3 sales were on the back of the fleet segment, the Q4 numbers will be on the back of personal purchases."

The sudden spurt in launches by Indian car makers comes at a time when Chinese companies—with their deep expertise in the EV industry—are making plans to foray into the Indian market. In 2018, China sold over 1.2 million EVs and is currently the world's biggest EV market.

The Ora RI from China's Great Wall Motors is touted as the world's cheapest electric car

"With the Chinese auto makers getting ready to enter India, we will certainly see a huge shift in the landscape by 2022," says Puneet Gupta, associate director for automotive sales forecasting at market researcher, IHS Markit.

For long, India's EV industry found itself stuck in a quagmire, largely due to high prices of vehicles, fewer choices, unsteady policies and lack of a robust charging infrastructure. The last is essential to alleviate concerns of range anxiety, a fear that the vehicle will not have sufficient fuel to cover the distance it has set out to. "Now, there's a 'wow' quotient if you drive electric vehicles, particularly in metros," adds Gupta. "On an average, people who live in metros travel around 50 km a day... and with companies often providing charging stations, users have very few

RAMESH PATHANIA / MINT VIA GETTY IMAGES

reasons to worry as the range anxiety concerns have been addressed."

GAINING MOMENTUM

Much of India's EV journey began with the government's FAME scheme, launched by Prime Minister Narendra Modi in 2015 to incentivise the production and promotion of EVs. It is currently in its second phase—which runs until March 2022 with an outlay of ₹10,000 crore. The scheme is only for the shared mobility segment, but it has played a crucial role in improving the overall EV landscape.

Around the same time, the government roped in Energy Efficiency Services Limited (EESL), a public sector company formed in collaboration with four public sector entities to procure 10,000 EVs for government organisations. "Although the incentives were put in place by 2015, it was by 2017 that affirmative steps were taken... things moved fast with the tender from EESL," says Chandra of Tata Motors. "The EESL programme created the seed demand for commercialisation and activated the supply chain. The focus then was on keeping the total cost of ownership low."

The decision to offer supportive government policies and financial incentives was based on models adopted in countries such as China and Norway, which had seen a large adoption of EVs. "From 2013 to 2017, total subsidies on EVs amounted to about RMB 50 billion ($7 billion) in China," says Vinay Piparsania, consulting director—automotive, Counterpoint Technology Market Research. He explains that growth of EVs in China can be attributed to public procurement programmes, financial incentives reducing the purchase price of EVs, tighter fuel-economy standards and stringent emission regulations.

India is currently looking at having at least 15 percent of the total vehicles on its roads as electric by 2023. However, the country is grappling with charging infrastructure, forcing many players to turn their attention towards building their own ecosystem for EVs.

"The current charging infrastructure is almost nothing," SS Kim, Hyundai Motors India's managing director and CEO,

> **"The primary focus at present should be on targetting specific mobility segments that have high utilisation and minimum charging infra requirements."**
>
> **CV Raman,**
> **senior ED, Maruti Suzuki**

The Futuro-e from Maruti Suzuki will pave the way for more EVs from the company

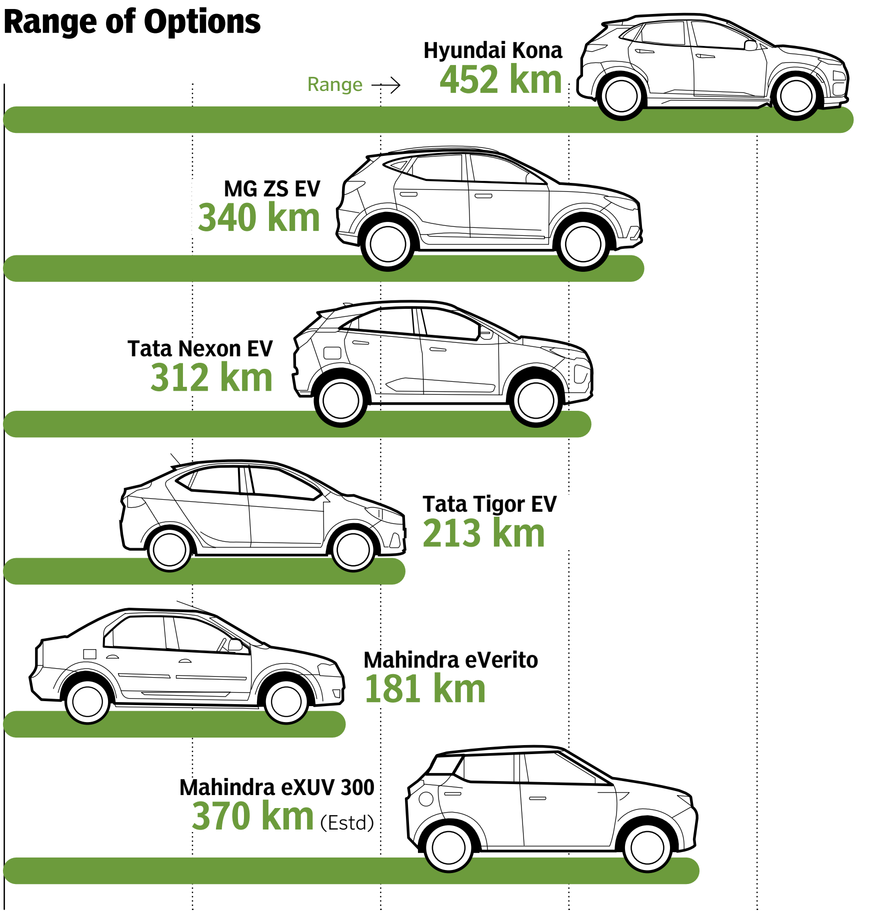
Mahindra charging station on display at Auto Expo 2020

told *Forbes India* in an earlier interview. "Even 1,000 charging stations will only cover a small pie. I expect the government to play a substantial role in extending the charging infrastructure. But we are developing more low-cost cars and vehicles with more range."

Others are following suit in building cheaper cars and providing the necessary infrastructure. "Globally, the trend is about moving towards new energy," says Rajeev Chaba, president and managing director of MG Motor India. "While we are still at a nascent stage, we are taking initiatives, including providing chargers for free to the buyers. MG is looking at launching another electric vehicle soon." The company has partnered with Fortum, Delta Electronics and eChargeBays, offering fast, normal and house charging infrastructure.

Tata Motors, meanwhile, is working on an elaborate EV ecosystem where Tata Power will step in with the necessary charging infrastructure while Tata Chemicals has begun work on batteries for cars. Tata Power, which has already set up 100 charging stations, will add another 650 in more than 20 major cities over the next year. "Our new platforms are all designed in such a way that we can electrify with them," says Chandra.

Range of Options



INFOGRAPHICS: SAMEER PAWAR

SMOOTH RIDE

Indian auto makers are enthused with the initial response to EVs despite the teething problems. "So far bookings have been encouraging," says Chandra about the demand for Tata Motors' electric variant of its popular compact SUV, Nexon. "While the range continues to be the focus, we have our eyes on the price too." The Nexon is priced at ₹13.99 lakh and goes up to ₹15.99 lakh depending on features. "We are constantly working towards improving the range. As emission norms become stricter for internal combustion engines and the price of EVs comes down, it makes more sense for buyers to tilt towards EVs," says Chandra.

MG, too, is "overwhelmed" with the 3,000 bookings for its new EV. "In fact, the response has been better than what we had for the Hector," says Chaba. Ahead of the EV launch, MG had set up 50 kW DC fast chargers at 11 of its dealerships across the country. They help charge the vehicle up to 80 percent in 50 minutes; it takes up to 8 hours to fully charge the car

Tata Altroz EV unveiled at the Auto Expo 2020

Kona is Hyundai's first electric offering in India

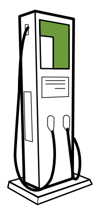
using home-based AC chargers.

Much of the reduction in EV prices could be a result of a decline in battery costs. "About 60 percent of the EV cost is batteries," says Kanv Garg, director, renewables and electric mobility at consultancy firm, EY. "The EVs have very little moving parts, ride better and have lower operational maintenance. With supply chains becoming smoother and scales improving, the future is clearly electric."

Indian auto makers have already invested a combined $6 billion to transition to BS-VI engines and many are expected to reap rich returns on them before focussing more on EVs. "That's where the startups are stepping up the game because they don't have investments on BS-VI. So, it becomes easier in the two-wheeler segment," says Garg of EY. Already, companies like Hero MotoCorp and Bajaj, apart from a host of new-age tech companies like Revolt Intellicorp, Tork Motors and Ather Energy, have started to focus on electric two-wheelers.

"One of our strategic priorities is to enhance our participation in the EV space by pursuing our internal EV programme in addition to partnering with the external ecosystem, including startups, in a meaningful way," says Bharatendu Kabi, spokesperson for Hero MotoCorp. "We see this as an important step in building the necessary ecosystem needed to support mass commercialisation of EVs in the country. It is with this objective that we have invested in Ather."

Charging Infrastructure



Target:
14,000 charging stations.

Sanctioned:
2,636 charging stations in 62 cities; 1,633 fast charging stations and 1,003 slow charging ones

SOURCE Press Information Bureau

Hero MotoCorp has set up a separate vertical that is entirely focussed on developing alternative mobility solutions. "This EV programme is working towards introducing mass-market products and solutions in a phased manner," adds Kabi.

Not everyone is blindly jumping onto the EV bandwagon. Some prefer a staggered approach instead. Take, for instance, Maruti Suzuki, which sells one out of every two cars sold in India. "We are not only looking at EVs... our focus is on electrification of the fleet, from mild hybrid to fully electric vehicles, which will not only make vehicles more fuel-efficient and hence better for customers, but also reduce oil demand, thereby reducing oil imports for India," says CV Raman, senior executive director and a member of the executive board at Maruti Suzuki.

Maruti Suzuki reckons that almost 90 percent of the sales in India in the passenger car segment is for models below ₹10 lakh, indicating the price-sensitive nature of the market. "At current prices, natural adoption of EVs without significant fiscal incentives will be a big challenge," adds Raman. "Natural adoption of EVs with significant range will happen only when acquisition price comes below ₹10 lakh. The primary focus at present should be on targeting specific mobility segments that have high utilisation and minimum charging infra requirements. It should be to target public transport comprising buses, three-wheelers, four-wheeler taxis and two-wheelers followed by personal segment cars."

Last year, the government reduced GST on EVs from 12 percent to 5 percent, in addition to providing income tax deduction of ₹1.5 lakh on interest paid on loans taken to buy EVs. Earlier this year, the government approved setting up 2,636 EV charging stations across 62 cities under the FAME scheme. Of these, 1,633 will be fast charging stations and 1,003 slow charging ones. The government aims to install around 14,000 charging stations across the selected cities.

"As of now, while we have removed range anxiety, the concern is on charging anxiety," says Garg, who has also advised the government and companies on the EV shift. "The government removed taxes, delicenced the charging infrastructure, allowing anybody to set up charging infrastructure and making it mandatory for residential and commercial complexes to allot 20 percent of their parking space for EV charging facilities. Now, private auto makers and power companies have to come together to ensure that the ecosystem is developed." F

How To Put EVs On Fast Track

From setting up charging points to domestic manufacturing, electric vehicles need an infrastructure push for faster adoption

By HARICHANDAN ARAKALI

E

"Electric vehicles (EV) are deemed to be the sunrise sector of the automobile industry as they are solely responsible for the sector's impending transformation into a renewable alternative over fossil-fuel-dependent vehicles," says Akhil Aryan, founder of Ion Energy in Mumbai. "India has shown considerable progress in the EV space with serious players spearheading numerous initiatives to promote EV adoption."

Ion Energy builds battery management technologies and an analytics platform that can assess an EV's performance based on data being fed into it. By exploiting software analytics, machine learning, and artificial intelligence, Ion can improve performance and extend the life of lithium-ion batteries by up to 40 percent, the company claims. The analytics software makes sense of battery data to provide insights that can ensure zero downtime and reduce the overall ownership cost.

"Battery cell and motor manufacturing, and charging stations infrastructure are critical in the near-term. Knowledge capacity building is significant in the longer term," says Rajat Verma, founder of Mumbai startup Lohum. The venture

is advancing India's EV ecosystem in three areas, Verma says: Lowest cost battery packs; creating battery raw materials feedstock through recycling to ensure geo-strategic independence; and domestic intellectual property and manufacturing for a seamless supply chain.

In Bengaluru, Yulu Bikes co-founder Amit Gupta says he is solving the 'chicken-and-egg' problem faced by the ecosystem in India, where the lack of charging infrastructure influences the adoption of EVs. Yulu has created a battery-swapping network by placing its proprietary Internet of Things-enabled charging box, called Yulu Max, at many mom-n-pop stores near locations where it operates mainly in Bengaluru. Yulu's on-the-ground operations team is able to locate the nearest Yulu Max through a dedicated app. The same app shows the set of vehicles that have a battery-charge level below a defined threshold along with their real-time location. This method is low cost and highly scalable, Gupta says.

SCHARFSINN / SHUTTERSTOCK

"If you look at what's really out there, it's not much... There is more intent than real action."
Ravneet Phokela, chief business officer, Ather Energy

Companies such as Ion Energy, Lohum and Yulu Bikes are part of India's nascent EV infrastructure ecosystem. The government's push to enable faster EV adoption through subsidies and tax benefits is expected to propel the growth of the sector. For instance, the Indian government plans to spend ₹10,000 crore under the Phase II of its plan, Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles or FAME-II, over a period of three years through March 2022.

The BS VI rules, which have more stringent emission standards for fossil-fuel burning vehicles, will become applicable from April 2020. BS VI-compliant vehicles are expected to be costlier, which will help reduce the price gap with the more expensive EVs. The government's plan to raise the proportion of EVs to 30 percent by 2030 will also provide impetus to the sector. NITI Aayog, the government think tank, has stated that India's fuel imports, which account for 80 percent of the country's import bill, can be reduced by $60 billion by 2030, through adoption of EVs.

The EV market stands to grow at a CAGR of 43 percent from 2019 to 2030, according to BIS Research, a market intelligence, advisory and research firm. The charging infrastructure installation is projected to grow at a CAGR of 42 percent, and the EV battery market at 60 percent. Alongside battery imports, local battery manufacturers such as Tata Chemicals and BHEL will also likely be present in the market.

With India's choked cities, especially the metros, solutions are needed to transport citizens in an eco-friendly way and hence the potential for shared e-micro-mobility is high. EV adoption is likely to take place across vehicle segments. However, unlike China, Europe, and the US, India has a very low penetration of cars.

In terms of adoption in the country, two-wheeler fleets and three-wheelers would be the first off the block, followed by intra-city buses, corporate taxis, and government fleets. Two-wheelers are expected to be one of the early adopters of electrification due to low cost, high vehicle utilisation, access to easy finance, powered by home or workplace charging options (currently limited, but evolving).

Two-wheeler fleets will also grow through the efforts of companies such as Drivezy, a bike-rental provider, based in Bengaluru. "Following our recent Series C fund raise, we shall commence listing EVs in Bengaluru and Hyderabad," says co-founder and CEO Ashwarya Singh. Eventually, Drivezy intends to enter markets like Mumbai, Delhi and Pune, which do not permit the rental of petrol-powered two-wheelers. The company will bring in 5,000 electric two-wheelers in the next three years, Singh says.

Currently Drivezy has a network of more than 250 parking locations which it will tap to establish public charging and battery swapping infrastructure, he says.

WHAT'S MISSING

A key differentiator between advanced markets and India is the speed-to-market in implementing vital infrastructure. Therefore, on one hand, the government's push is helping create an EV mindset in the industry and among consumers. On the other, various components of the EV infrastructure ecosystem are missing in India.

To build a robust EV ecosystem, says Ion Energy's Aryan, India needs enhanced manufacturing capability. Though the price of lithium batteries has reduced by almost 80 percent since 2010, the lead-to-lithium transition has not been beneficial to manufacturers. This is because India is dependent on expensive lithium imports, driving up the cost of production and subsequently the sale price of EVs.

The government also needs to formulate policies to encourage domestic manufacturing of battery cells that use battery chemistry to optimise cost and performance suited to Indian temperatures. About 80 percent of the battery cost is of the constituent cells in the pack. The government should set up its cell manufacturing facilities as it would decrease the cost as well as enhance the logistics efficiency by using reduced labour and utility rates to its advantage, says Aryan.

"Battery cell, motor manufacturing, and charging stations infrastructure are critical in the near-term; knowledge capacity building in longer term."

Rajat Verma, founder, Lohum

Encouraging companies such as Lohum will help as they are developing battery technologies locally. "Our focus is developing technology to accelerate EV adoption across price sensitive markets such as India by reducing costs throughout the life cycle of the battery," says Lohum's Verma.

Two core technologies anchor the venture's life cycle model—battery re-use (second life) and battery material extraction (recycling). For the second life capability, Lohum takes used batteries and then re-uses them to create new battery packs for low-power applications among vehicles such as e-rickshaws and storage applications. The startup has developed intellectual property in cell life prediction and adoption within Indian road and environment conditions.

When the battery reaches its end of lifecycle, Lohum's material extraction technology recycles the full cathode (lithium, cobalt, nickel, manganese, etc) and anode (graphite) to create individual oxides or sulfates that are used for new batteries.

The company says it is a global technology leader in each of these technologies. And, due to its downstream technologies, it is able to produce first-life battery packs with the lowest price point because it can generate additional revenues after the battery packs' initial use.

The industry is also facing a dearth of qualified talent as EV technology will need an amalgamation of more mechanical, chemical, electric, electronic and material sciences engineers. Currently, there are only about 1,000-odd engineers as opposed to the current demand pegged at 5,000 and likely to escalate to 15,000 in the next couple of years.

The ministry of human resources will also need to include EV-specific courses at the university level as Indian higher education in these areas lags by over a decade.

Besides, there are three major challenges to setting up charging infrastructure: Lack of access to land, electricity load connection, and capital. As per Bloomberg New Energy Finance, India had an estimated 650 charging stations for cars and SUVs in 2018. Whereas the largest EV market, China, has about 456,000 charging points. In addition to charging points, the lack of private parking spaces is also noted as a hindrance for EV adoption, and the lack of affordable renewable energy means charging EVs is further stressing out the coal-powered electricity grid.

Earlier this year, India approved setting up of 2,636 EV charging stations across 62 cities under FAME-II.

TOP CHALLENGES

With these missing components in the background, there are several challenges in the way of India evolving as a mature EV market. "If you look at what's really out there, it's not much," says Ravneet Phokela, chief business officer at Ather Energy in Bengaluru, which manufactures premium e-scooters. "There is more intent than real action."

On one hand, there is a degree of standardisation of charging hardware when it comes to cars, but on the other, India's car penetration, even for fossil-fuel-burning ones, is very low. "Two-wheelers will lead electrification in India," Phokela says, but there aren't any standards today for charging hardware for two-wheelers. This could be a deterrent for private investment in setting up charging points.

"EVs are deemed to be the sunrise sector of the automobile industry as they are solely responsible for its transformation into a renewable alternative over fossil-fuel-dependant vehicles."

Akhil Aryan, founder, Ion Energy

Ather has built its scooter charging infrastructure to its own specifications and is going ahead with setting up its public charging points and so on, as part of its Ather Grid plan. Today Ather has about 30 public charging points in Bengaluru and about a dozen in Chennai—the two markets where it is selling its scooters. In three years, Ather expects to be in 30 cities and have as many as 3,000 charging points.

Among other challenges is a need to reduce India's dependence on battery imports, which in turn increases production cost. One way of promoting domestic manufacturing would be through providing incentives to such ventures.

Reducing the price of EVs to encourage a shift from traditional automobiles will increase adoption. Availability of more models as well as more automakers entering the space would make EVs more price-competitive.

There is an immediate need to enhance electricity supply in various parts of the country for EVs to be considered as an acceptable mode of transport. Maintenance and repair options available should be of high quality to ease worries. Revival of the overall automobile sector would lead to increase in demand of EVs.

Yulu also made some suggestions to the government at a recent government-industry meeting that focussed on the EV industry in the country. These included: Considering loan guarantee schemes and urging banks to lend to EV manufacturers and operators with parity on lending terms; a national policy for parking infrastructure for shared mobility; driving adoption through school buses that need small batteries, etc.

Gupta says there are lessons that can be learnt from what the Europeans have done: It is critical to have a policy that permits a pay-per-click or subscription model—a policy for ease of doing EV business. Create an apex body to monitor carbon emissions and incentivise start-ups or companies contributing towards the reduction of carbon emissions — this can be a special division under current organisations such as Society of Indian Automobiles Manufacturers.

If India adopts the European way of doing things, all electric two-wheeler fleet owners for more than 12 months can be offered subsidised rates at various public charging stations and start-ups operating in the segment for over 18 months can be offered subsidies to pass on the benefit to the consumer.

India also needs a national awareness campaign, Gupta says. Just as a campaign was run with the tag line "mutual funds *sahi hai* [mutual funds are right]" to encourage people to invest in them, a campaign that says "EV *sahi hai* [EV are right]" would go a long way in enabling adoption. F

‘India Is A Price-Sensitive Market Driven By Sentiment’

Schaeffler India’s Harsh Kadam on the German component maker’s plans for the changing automotive landscape

By RAJIV SINGH

India is in the midst of its worst auto sector growth in over two decades and the coronavirus pandemic has only aggravated the situation. But Harsh Kadam, managing director of Schaeffler India, a subsidiary of German family-owned automotive and industrial component maker, is looking for positives. Slowdown, he says, is the litmus test for any organisation. “It’s during these trying times that a differentiation is made by successful companies.” Schaeffler’s Pune-headquartered Indian arm gets 60 percent of its sales from the bearings business. “There is a solution to almost every problem. If there isn’t, we strive to find or invent one,” says Kadam in an interview with Forbes India. Edited excerpts:

Q With the new emission norms coming into effect in April, how do you see the automotive landscape changing?
It is clear that for the next few decades, there will not be one clear technology, particularly in vehicle propulsion. We are preparing for whatever shape technology takes—hybrids, micro hybrids, pure electric vehicles or hydrogen or fuel cell propulsion systems. We have continuously made strategic investments and acquisitions which enable us to be a valuable business partner to our customers and supply partners. On the industrial front too, we are taking strides in the areas of reliability and performance improvement of our products as well as developing solutions in the area of Industry 4.0—digital industrial technology—leading to a connected industry and the world at large.

Q Is the industry ready for the transition?
We have been in touch with vehicle manufacturers and the companies have been working endlessly on this front. Before April, they will be ready with the required technologies. Towards reducing the overall emissions, one of the major trends is to make engines smaller and more efficient. In the meantime, engines are becoming more powerful per unit of displacement, in order to not compromise on driving performance. This added technology will call for managing the increased cost. BS-VI will bring in new functionalities. The number of functions that will go into a component will be more, in addition to new raw material and processes. Through automation, the process cost may be optimised but not the material cost. In the end, consumers will decide what are they going to pay for and how much.

Q The churn in the auto industry is unprecedented. New emission norms, costlier automobiles, falling demand and a push towards more electric vehicles…
Looking at the gradually rising trend of electric mobility in India, I feel the technology would initially exhibit itself in the two-wheeler market, followed by three-wheelers and the passenger bus segment. The two- and three-wheeler segments are considered high-volume segments and that may help Schaeffler India become a key contributor in the

JIGNESH MISTRY FOR FORBES INDIA

“Consumer preferences, regulations are changing, conventional players are getting challenged by new ones. From this perspective, it is far from gloomy.”
Harsh Kadam, managing director, Schaeffler India

company’s global electric mobility structure. In fact, Schaeffler India has come up with its patented two-speed transmission system for electric two- and three wheelers. Schaeffler in Europe has developed bio-hybrids keeping sustainable mobility for intra-city mobility and I see big prospects for such offerings in India too.

The automotive industry is going through a transition. Consumer preferences are changing, regulations are changing, conventional players are getting challenged with the advent of new technology and players. If we look at this perspective, it is far from gloomy. Having said that, the market has to improve and volumes need to come back.

Q How do you see your India business shaping up?
For Schaeffler, innovation and agility towards the business have kept the ball rolling, even during unfavourable conditions. In 2019, Schaeffler showcased agility in managing costs, reprioritising projects and responding to changing customer needs. In India, the economic fundamentals are strong, as our growth is driven by internal consumption-led demand. India is a price-sensitive market and driven a lot by sentiment. Customers truly value low-cost innovation. The key is to master the art of developing and supplying good quality products at competitive prices in a volatile and dynamic market. When it comes to developing new technology in the automotive market, India has been more of an adapter.

Q Where does India figure in the company’s global scheme of things?
In terms of revenue share, there is still a long way to go, but Schaeffler Group recognises the potential and strategic importance of India as a market. Therefore, we are continuing to invest in capacities and capabilities in a consistent manner. Till 2016, we were investing about €20 million per annum in India, but since 2017-18, we have almost doubled that.

With four manufacturing facilities and a strong distribution business, Schaeffler has a strong presence in India. The India business—which was earlier part of Schaeffler Europe Region—was made a part of Asia-Pacific region (China excluded) in January.

Q Do you have a slowdown strategy?
Our strategy is clear: Value creation for all stakeholders and growing profitably. Our ‘content per vehicle’ value has increased and this is contributing to our growth story. We continue to build and leverage our strong presence in the engine and transmission applications with better and new value products.

Despite economic headwinds last year, our balanced business portfolio between industrial (53 percent) and automotive (47 percent) ensured we ended the year on a decent note. Our aggressive localisation drive in the last two years helped us become more competitive which helped us gain market share in some high growth sectors and applications. The external markets remain volatile, but we are optimistic that 2020 will allow us to chart a better course as we prepare for the future. F

On A Familiar Terrain

Tata Motors, the maker of India's first SUVs, is back in the game with its aggressive line-up

By JASODHARA BANERJEE

The 1990s ushered in a new era in India's passenger car industry. There were just a handful of vehicles to choose from till the 1980s, but a freshly-minted liberalised economy brought winds of change that rapidly took shape in the form of numerous new models and options across new segments.

It was the decade that saw the launch of three cars that would go on to become popular icons. Tata Motors, known as the maker of trucks and heavy vehicles till then, took its first step towards becoming a maker of passenger cars with the launch of the Sierra, an off-road utility vehicle, in 1991. The Sierra was the first car produced in India with electric windows, air-conditioning and adjustable steering wheels; it was also the vehicle that saw the tachometer for the first time, now a ubiquitous feature in cars. The Sierra was followed by the Estate, a station wagon, in 1992, the Sumo in 1994, and the Safari in 1998. All four models were based on the Tata Telcoline, a commercial pick-up launched in 1988. The only other comparable vehicle launched in the 1990s was the Mahindra Classic.

"If you go back to the 1990s, there used to be only two car segments: Cars with a box and cars without a box. That was such a simple life actually," remembers Mayank Pareek, president of Tata Motors. "But as the industry matures, segments and sub-segments creep in, catering to the different choices and preferences of customers."

"Till about early 2000, the sports utility vehicle [SUV] segment was very nascent, with a limited number of people buying them," adds Pareek. "There was a perception that these cars were used in semi-urban and rural areas. But by early 2010-11, the new segment occupied about 10 percent of the market; there was a sharp jump." And hence, 26 years after the launch of Sierra, Tata Motors launched its first crossover SUV, the Nexon, in 2017, in a market that was dramatically different from the one in which it had launched its first SUV. An indication of this is the fact that the current year will see the launch of at least 20 SUV models, new and revamped versions, from companies such as Mahindra, Maruti Suzuki India, Hyundai, Kia, Skoda, Toyota, MG, Citroen and Volkswagen.

As the Indian auto industry has matured, its customers too have evolved. They can be segmented into those buying cars for the first time, those purchasing for their families and ones who are replacing their older cars. "The first-time buyers, which I would put at 40 percent of the market, usually purchase small cars," says Pareek, "but those who are buying an everyday car for their families or replacing their existing cars, prefer UVs."

He adds that UVs of today are not like those in the past. "Old UVs were tough to drive and difficult to manoeuvre. But technology has evolved, and UVs today are as good, if not better, to drive than high-value cars." Pareek attributes the rise of the segment to two factors: Aspirational reasons and convenience. "There is more space inside, the driving position is high, so you glide into the vehicle instead of crouching in it, and it makes you feel more confident because of the height, which makes visibility much better."

According to a business intelligence report released in February by Data Bridge Market Research, the global SUV market is expected to register a CAGR of 12.23 percent in the 2019-2026 period. It attributes this rise to higher levels of investments by manufacturers to develop innovative and technologically advanced vehicles, along with consumer preferences for safety, infotainment systems and comfortable off-roading options. The report says the global market is expected to be significantly driven by growth in the Asia-Pacific region, which is witnessing higher living standards.

In the Indian auto industry, which has been in the doldrums for more than a year, the UV segment has been a beacon of hope for manufacturers grappling with falling sales figures. Data from the Society of Indian Automobiles Association (Siam) shows the sale of cars in 2016-17 was at 21,03,847 while the sale of UVs was 761,998. By 2018-19, the sale of cars was at 22,18,549, an increase of 5.45 percent, whereas the figure for UVs was 941,461, an increase of 23.55 percent.

"Historically, we were big and

established as manufacturers of SUVs," says Pareek. "Even when the market was not there, we had iconic brands like the Safari... and now we are coming back big time into this segment again." Starting 2016, Tata Motors has launched three models in the UV category: The subcompact crossover SUV Nexon in 2017, the mid-size SUV Hexa in the same year, and the five-seater compact SUV Harrier in 2019. At the Delhi Auto Expo this year, it showcased the seven-seater SUV Gravitas and also a concept electric version of the Safari. "We understand that this market will get divided into sub-segments, and it will not be a one-shoe-fits-all situation. People have different tastes, and we need to provide a vehicle for every market and taste," he adds.

"Since the SUV segment has been the fastest-growing one in the auto industry, it makes sense for original equipment manufacturers to launch new products in this market," says Puneet Gupta, associate director, automotive forecasting, IHS Markit. "Tata Motors brings out fully loaded products, and with demand back in the ₹10 lakh to ₹20 lakh category, especially in the urban markets, the Nexon is a good attempt to initiate people into the SUV category."

With the Nexon, Pareek says, the company really pushed the envelope where its design was concerned. "In India, people buy cars 50 percent for themselves, and 50 percent for their neighbours. We wanted people to see the Nexon, and say 'Wow, what a car'." The subcompact SUV also became the first car from India to achieve the coveted five-star crash test rating from Global NCAP (New Car Assessment Programme) in 2018. "This car was entirely engineered in India and so it's not like it required technical

ABHIJIT BHAVSAR

Mayank Pareek, Tata Motors president, with the Harrier that was launched to compete with MG's Hector and Kia's Seltos

NITIN KELVALKAR / DINODIA PHOTO

(From left) The earliest model of Tata Sierra launched in 1991; the electric concept model of the car on display at the Delhi Auto Expo 2020

expertise from elsewhere," said David Ward, secretary general, Global NCAP. "It shows you what the Indian automobile industry is capable of."

"The Harrier, which is designed along the lines of the Land Rover—the gold standard of SUVs—has also done well, and is No 2 or 3 in its category. Now with the launch of the automatic and the petrol variant, we should be able to get the No. 1 position in this segment," says Pareek.

Gupta adds that Tata Motors incorporates a lot of value in its products, thanks to localisation and frugal engineering. "It has also been tying up with global players for navigation systems and music systems to make its products better."

While the company has made a re-entry in the SUV segment, Mahindra & Mahindra has maintained a relatively steady stream of models in the category for almost two decades. With the launch of the Scorpio in 2002, the Bolero in 2004, the XUV 500 in 2011, the TUV 300 in 2015 and KUV100 in 20116, the auto manufacturer—also one of the country's largest makers of heavy vehicles—has launched models that cater to varying price brackets and requirements.

However, Gupta says both these makers were caught off guard with the rise of the demand for urban SUVs. "The demand that we see now is for urban vehicles... they are not real SUVs that are meant to have serious off-road capabilities," he says. "This is not the segment in which Tata Motors and Mahindra earlier operated. The product life cycles of their earlier models were very long because customers also owned the same vehicles over several years. But now customers frequently want something new and different, and Tata Motors and Mahindra have had to change their game." This has required significant investments in research and development, and production facilities. For carmakers like Hyundai, it has been relatively easier since they work at a global level.

Tata Motors' push in the SUV segment comes at a time when the market has become highly competitive. For instance, Gupta adds, the Tata Harrier launch happened when the Indian market saw the entry of South Korean Kia Motors with the Seltos and Chinese MG Motor with Hector. Both entrants succeeded in creating significant excitement among customers, with the Seltos selling almost as much as the combined sales of Mahindra XUV 500, Tata Harrier and MG Hector *(see: How the big guns sell)*.

Tata Motors is continuing its aggressive push in the UV segment, with new models and variants lined up for the year. The Gravitas generated buzz about competition in the seven-seater SUV segment, with upgraded versions of the Hyundai Creta, Mahindra XUV 500 and the Jeep 'D-Low' expected later this year or in 2021 whereas the Nexon EV has spurred Hyundai to start building its own electric options in the UV segment. Mahindra also has its eXUV300 waiting to be launched.

Has Tata Motors come full circle with its UV play? "The UV market then and now are different, with all the sub-segments that we now have," says Pareek. "We now want to build a relationship with customers who can start in this segment with the Nexon, and move up as their requirements change. It's about acquiring customers for life."

For some loyalists who never let go of their Safaris from the 1990s, that would be a familiar feeling.

How The Big Guns Sell

	2017	2018	2019
Mahindra Scorpio	52,103	49,077	46,335
Mahindra XUV500	26,626	25,342	17,175
Mahindra TUV300	28,317	22,511	13,646
Tata Nexon	13,573	52,529	49,312
Tata Hexa	13,934	9,788	2,917
Tata Harrier			15,227
Kia Seltos			46,494
MG Hector			15,932

SOURCE IHS Markit

The New Upgrade

Lenovo is remoulding itself as a maker of more than laptops and phones

By RAJIV SINGH

Rahul Agarwal, managing director and CEO of the Indian arm of the world's biggest personal computer (PC) maker, Lenovo, starts his day at his Bengaluru headquarters by looking up the latest sales presentation on his ThinkPad laptop. The 46-year-old's Lenovo tablet is perched on his workstation, which also has a smart clock, a smart camera and a smart bulb. At his fingertips is a Moto Z2 Force mobile phone.

As he gets ready to talk about his new tech babies, he starts with Smart Display, launched last December. With the Google Assistant, it lets users control over 5,000 smart home devices, answer video calls, monitor the kids' room or check who's at the front door through a smart camera. "All this stuff without lifting a finger," he smiles. With Smart Bulb, Agarwal says, users can control its colour, temperature and brightness with their voice, while the Smart camera offers high-resolution images with a wide field of view for better visibility. "With infrared night vision at a distance of up to 20 mt, users can even see inside their homes," he adds.

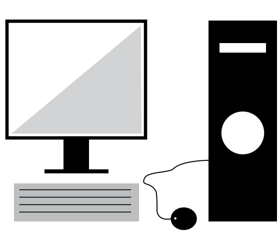
Welcome to Lenovo 3.0. "We want to be seen as a futuristic technology brand, not as a laptop or phone brand," says Agarwal, adding that as a leader in the Indian PC and tablet market, Lenovo is uniquely positioned to lead the growth of the smart device market by introducing new-age devices and Internet of Things products. Adding momentum to this mission is a strategic partnership with Google. "Our smart device portfolio is in line with our vision of bringing smarter technology to all," he adds.

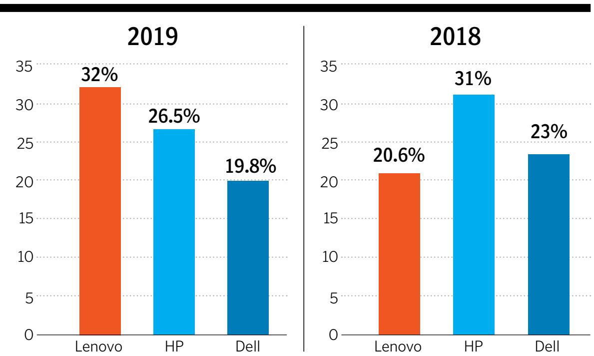
Tech analysts view the latest avatar of Lenovo as a natural progression, with digital transformation changing the lifestyle of consumers and influencing the way services and products are consumed. Jaipal Singh, lead analyst at IDC India for PC, smart homes and wearables, says the adoption of new technologies is bringing business and cultural transformations, and is nudging businesses to include technologies.

Another shift taking place in the computer business is the plateauing of PC sales, which is putting pressure on vendors. In 2019, India posted an 18.1 percent year-on-year growth in the PC business, including desktops, notebooks, and workstations, and shipped 11 million units. But the growth was largely driven by government-driven education projects and upgrade purchases for Windows 10, especially in the business-to-business (B2B) sectors.

New demand, Singh explains, is coming from companies that are either scaling up or are formed in the internet age; these companies are looking for affordable solutions that are optimised for their businesses.

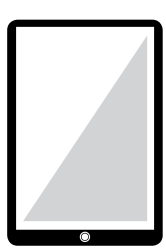
Top Three Players in Indian PC Market

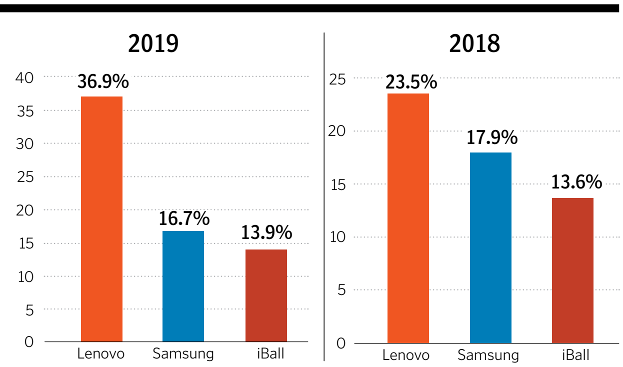




SOURCE IDC; PCs include desktops, notebooks, and workstations

Top Three in Tablet





SOURCE CMR

All these factors are forcing PC vendors, including Lenovo, to customise their offerings to the new demand, and introduce new device and solution categories.

With 3.0, Lenovo is trying to transform the organisation and reposition itself as much more than just a PC and device company. "It is trying to position itself at the forefront of new-age technologies like augmented and virtual reality, artificial intelligence and intelligent automation," Singh points out.

Agarwal recalls the first two versions of Lenovo. 1.0 was to make a success of its PC business and it started in 2005 with the acquisition of IBM's PC business. "There was no precedent of an Asian company buying a global organisation. So, it was a big risk," he says.

The task was not easy. The buyout expanded global reach and share, but also brought in its wake the task of building a common culture and establishing strong credibility with customers. Though the move paid off, the business hit a rough patch in 2008. "You always go down before you go up," says Agarwal, explaining how the company managed to survive the global economic crisis. The world, he says, discovered a

What Works For Lenovo...

- Ability to win and execute large government projects
- Aggressive pricing and strong portfolio for commercial business
- Strong presence among small and medium businesses

...And What Doesn't

- 2020 will be challenging as majority of Windows 10 upgrades are already completed
- Lingering concerns around component shortages
- Covid-19 is expected to impact supplies of PCs
- Plateauing PC sales
- Motorola lost the smartphone game to Chinese companies

"With its foldable phone Moto Razr, the brand would perhaps like to capitalise on the nostalgia and perceived loyalty of customers."

N CHANDRAMOULI,
CEO, TRA RESEARCH

different kind of Asian company, which was getting better and better.

Lenovo 2.0 was about diversifying the product lineup—from PC to laptops, tablets, data servers, and mobile phones. In 2014, Lenovo bought Motorola from Google for a little under $3 billion. "It was a pretty bold move," Agarwal says. The gambit seems to have paid off, at least globally. "We have achieved six straight quarters of profitability and five consecutive quarters of positive pre-tax income," says Prashanth Mani, country head of Lenovo Mobile Business Group and managing director of Motorola Mobility India. Though Mani declines to give Motorola's market share in India, he is betting big on the brand staging a comeback in the country where it used to be among the top five smartphone players before the entry of much more aggressive and nimble Chinese brands such as Oppo, Vivo, OnePlus and Realme.

What is reassuring is the strong legacy of Motorola in India. "It is still a loved and widely accepted brand in India," says Mani, adding that the brand is exploring new product categories, starting with Smart TV, which was rolled out last September. "Lenovo 3.0 is all about smarter and intelligent transformation," he says. "B2B is where there is more money and massive opportunity."

"Our device portfolio is in line with our vision of bringing smart technology to all."

RAHUL AGARWAL,
CHAIRMAN AND MANAGING DIRECTOR, LENOVO INDIA

Take, for instance, the November launch of ThinkBook laptop, which is especially designed for small and medium businesses (SMB).

Commenting on Lenovo's SMB and B2B play, Singh says what has worked well for the company is its ability to win and execute large government projects. This has come on the back of aggressive pricing and a strong portfolio in commercial businesses. In 2019, Lenovo was the fastest-growing large PC vendor in

NILOTPAL BARUAH

the SMB segment with 25 percent annual growth, and the only company to maintain double-digit growth for two consecutive years, he adds.

The challenge for Lenovo, though, is multi-fold. While the immediate one is to ensure that its supply chain remains steady in the face of the Covid-19 pandemic, the bigger and longer term challenge is to ensure it gets its mobile business back on track in India.

The aspirational positioning of Motorola is a difficult task for two reasons, explains N Chandramouli, CEO of TRA Research: One, while the brand still has some positive perceptions among Indians, once consumers change phones, their perception of the current phone invariably exceeds that of earlier ones; the second concern is that if Motorola is unable to live up to its aspirational positioning, it will not be able to settle for any other position in subsequent attempts.

For Agarwal, the bigger challenges include not repeat old mistakes, like under-investing in ThinkPad and, overall, in Lenovo. “Our investments could have been better,” he says. Another challenge is to keep the focus intact. “We’ve been growing market share, and we’ve been quite profitable,” he says. Lenovo India reportedly closed last fiscal with revenues of ₹7,181 crore, and a profit of ₹179 crore. “It’s a journey. And we have just started.” F

(From left) Ennoventure CTO Shalini V Nair and CEO Padmakumar Nair at the company's office in Bengaluru

HEMANT MISHRA FOR FORBES INDIA

Fight Against Fakes

Technology company Ennoventure applied cryptography to build an authentication tool that has been granted two US patents. The solution can benefit the pharma industry in combating counterfeiters

By **KUNAL TALGERI**

Shalini V Nair was reading a research paper on cryptography and steganography methods used by the Central Intelligence Agency to send images on internet messengers when her mobile phone rang. Steganography hides data by embedding it into an audio, video, image or text file. It protects secret or sensitive data from malicious attacks. Cryptography protects information and communication by using codes, so that only those for whom the information is intended can read and process it.

"I was running my own startup and doing AI (artificial intelligence)-related work for a client in Australia," says the 44-year-old engineer of that day in Bengaluru in October 2017. It was Paddy or Padmakumar Nair, 41, at the other end, calling from Dubai. They knew each other since their days as engineering students.

In his circle, Paddy is known for inquiring and scoping out details to define a problem, before posing it to 3-4 people. Paddy filled Nair in on the underbelly of large industries (counterfeit products) and the opportunity to build a software tool that can verify the authenticity of product packages, thereby preventing proliferation of counterfeit goods. "We need a solution that can be patented, unique and non-disruptive of processes at client's site. The solution has to be invisible (covert). And we need a way for only a smartphone to authenticate—not expensive scanners." Paddy told her. Over that week, Nair was coding.

In a few months, she co-founded Ennoventure with Paddy, and Joseph G Harb, who lives in the US. By August 2018, Shalini—who is also CTO—and Ennoventure applied for two patents in the US. "One patent is for the full flow—how we verify the authenticity of products using the mobile phone to scan labels which contain our invisible cryptographic code," she explains. "The other is specific to what we do: The profiling for design and how we optimise our cryptographic code for a particular design." One patent was granted on November 2018, and the second on February 2019.

PROBLEM OF COUNTERFEITS

The solution developed by the company can be applied in many industries, but Ennoventure has begun with pharmaceuticals. The authentication tool can be accessed by packaging departments of pharma companies easily as it is a SaaS (software as a service) tool that resides on cloud servers. It has started to get commercialised.

The packaging departments of pharma companies can upload an artwork (package design) on which the Ennoventure algorithm encrypts information proprietary to the client. This is invisible to the eye. The encrypted package design can then be printed on the packages of medicines made by Ennoventure's clients. After a batch of medicines leaves the factory, a distributor or retailer can download an app and use their smartphone to check the veracity of medicines.

The threat of counterfeit or falsified medicines is a stated risk factor in the annual reports of most pharma companies. The 2018 annual report of the $53-billion (by revenue) Novartis warns shareholders that

> **"The biggest loophole in today's technology is that there is no way for an end consumer to figure out if a drug is real or fake."**
>
> **PADMAKUMAR NAIR,**
> CEO, ENNOVENTURE

Top Threat ($ euro)

Top sectors of global counterfeiting market (2013)

Sector	$ euro
Prescription drugs	188
Electronics	158
Foods	46
Auto parts	42
Toys	32

Note: Sectoral list is not exhaustive

SOURCE NetNames, PwC

falsified medicines are visually indistinguishable from genuine ones and require a forensic authentication process of the packaging and/or the actual medicine to ascertain their falsified nature and likely impact on patient safety.

"Thefts of our genuine products from warehouses or plants, or while in-transit, which are then not properly stored and are later sold through unauthorised channels, could adversely impact patient safety, our reputation and business," the report states. "There is a direct financial loss when, for example, falsified medicines replace sales of genuine medicines, or genuine medicines are recalled following discovery of falsified products."

The World Health Organization (WHO) states that counterfeiting can apply to both branded and generic medicines, and counterfeit products may include products with the correct or wrong ingredients, without active ingredients, with insufficient active ingredients or with fake packaging.

In November 2013, Interpol (The International Criminal Police Organization) launched a three-year Pharmaceutical Crime Programme with 29 drug makers, including GSK, to build on its Medical Product Counterfeiting and Pharmaceutical Crime unit. In the same year, the US Senate brought to life the Drug Quality and Security Act to strengthen the prescription drug supply chain and save families from the menace of counterfeit drugs.

The European Union wasn't far behind. An EU Falsified Medicines

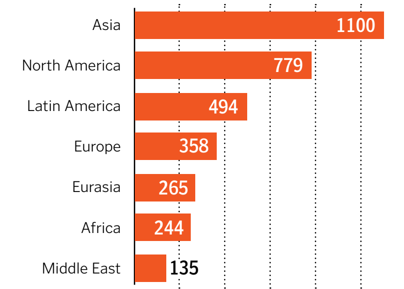
Directive has set up the first "end-to-end verification system" for drugs across the world. The deadline for implementation of the requirements across Europe was February 9, 2019.

As developed markets made the transition, so did India because of its considerable pharmaceutical exports. Track-and-trace became a buzzphrase, putting the onus on pharma companies to use barcodes to identify medicines.

"In India, instances of counterfeiting of drugs and nutraceuticals are quite high," says Shwetasree Majumder, managing partner of Fidus Law Chambers, an intellectual property law firm in Noida. "Counterfeit drugs pose serious health risks for patients, and damage a pharma company's reputation, impact its sales and make it vulnerable to probing from the drug authorities."

It can open up two types of disputes, she explains. First, trademark infringement. "Other companies using deceptively similar marks for the same or different drugs. This causes consumer confusion and poses serious health risks," Majumder says. Second, imitating of trade-dress. "Other companies may copy the packaging and 'look' of a particular medicine, which also leads to consumer confusion. This becomes even more serious as several patients may be illiterate or unable to read a particular language."

Counterfeiting Cases in the Pharma Industry



SOURCE PwC report 'Fighting Counterfeit Pharmaceuticals', 2017

Even as national regulators, WHO and agencies like IRACM (Institute of Research Against Counterfeit Medicines) have made it a discussion point, incidents go unrecorded when counterfeit drugs are seized because of the damage they do to the reputation of multinationals.

Forbes India spoke to a former legal head of an Indian pharma multinational and a senior manager (strategy) of a multinational giant. Neither was willing to come on record. "It's a much bigger issue for smaller pharma companies that have a fair bit of rural business. Companies with business around urban conglomerates don't really face this problem," says the strategy head. "Counterfeit drugs are segment-specific and don't affect more specialised products, say for cardiovascular diseases, anti-cancers etc. A lot of counterfeits are for mass-market products like pain killers, antibiotics."

The former legal head says combating counterfeit drugs became important for two reasons: To prevent pilferage by making packaging hard to replicate and because the US made track-and-trace packaging compulsory. "Special 'track and trace' packaging helps understand whether something was produced by a manufacturer or not, when it was produced, which batch, who it was sold to, etc," he says. "You can track the whole supply chain with track-and-trace packing."

COSTS FOR PHARMA

Padmakumar, who is CEO of Ennoventure, learnt about the anti-counterfeiting opportunity when he met Harb, 42, at MIT Sloan School of Management during their executive education programme in Cambridge, Massachusetts. Harb worked with Johnson & Johnson (J&J) in Africa then, and had experienced how counterfeit drugs were leading to financial losses.

"Joseph picked up a lotion stock that had been replenished by a different supplier. But he couldn't tell if the lotion was genuine or fake," Paddy recalls. "He sent it to J&J's labs in the US where they found that the lotions were counterfeit."

Typically, pharmaceutical companies train staffers to send drugs suspected to be counterfeit to the headquarters for verification. Second, 'mystery shoppers' purchase suspected items as civilians, and send them to the company lab. Third, government regulators also organise random checks. "If a government body finds even one product to be fake, the entire batch is taken out of the market," says Paddy. The officials check for falsified packaging and drugs manufactured for another geographic market being sold in their jurisdiction.

According to a June 2017 PwC report 'Fighting Counterfeit

HEMANT MISHRA FOR FORBES INDIA

Pharmacists have the onus to ensure that the drugs they sell are legal under relevant drug laws

Pharmaceuticals', counterfeit pharmaceuticals form a €188 billion ($200 billion) market, making it the largest segment of the fraudulent goods sold around the world.

If a regulator finds counterfeit drugs, the official sends a letter to the company asking for the stock to be cleared. "At this stage, a company can spend as much as $150,000 per investigation," says Paddy. At best, an investigation agency can find out which country the falsified stock has come from, and through which port.

Paddy wants to solve this and use the SaaS path to scale Ennoventure. And also allow pharmaceutical companies to have a proactive approach. For example, governments insist on serialisation, asking every pharma company to have a unique number for each product. This can be expensive, which has pushed pharma companies to invest in technologies to track their stock. With blockchain-based technologies, every time a batch moves from a factory to the warehouse, it gets scanned. There is a batch number for each set of medicines that is on the move.

But this can be replicated by counterfeiters too. "Once a counterfeiter figures out the unique batch number based on paper trail, it's only a matter of imitating the same batch number on a 2D barcode," says Paddy. The fake drugs are packaged with the batch number. "So now, you have the same number of fake units as genuine medicines with a common batch number. How will a distributor know which one is genuine?" he asks.

This is where a cryptographic approach will prove cost-efficient to deploy across a range of product packages, and as a potent method to combat counterfeiters. "Ours is an authentication tool rather than straight-out track and trace. It's more AI and cryptography," says Shalini. "When we do extend it to tracking, it will be entirely different. The US law mandates that every drug shipped to the US needs a tracking

Matters of Hygiene

Global and national thrust to tackle counterfeting in pharma industry

1992	WHO organises first international meeting on "counterfeit drugs"
1996	WHO prepares guidelines for Development of Measures to Combat Counterfeit Drugs
2006	International Medical Products Anti-Counterfeiting Taskforce (IMPACT) is established
2008	China's State Food and Drug Administration makes serialisation mandatory on saleable pharmaceutical product units for 275 therapeutic classes
2013	The Drug Quality and Security Act comes into effect in the USA
2014	India makes unique numbers and barcodes mandatory on export packaging for pharmaceutical goods
2016	European Union begins national enforcement of drug serialisation across the EU

SOURCE WHO, IRACM

number or barcode with specific details prominently displayed."

With a 2D barcode for tracking, pharmaceutical factories have to alter the workflow because they have to vary the process based on product packaging and size—to imprint the barcode. That won't be necessary with Ennoventure because the design can be provided by the manufacturer for the encryption to take place. It can't be replicated because the information is not visible. It's a cryptographic code, with a biometric reference (fingerprint of any company official), which ensures it cannot be copied.

A distributor or sub-distributor can check it with an app. "When you take a picture using the app, the AI system helps check if Ennoventure is working with the company," says Paddy. If it is, the validation process happens. "Then, the font and design get checked in line with the original artwork. Finally, there's a check of the decoded information." The encrypted approach can be rendered even on medicine strips, which none of the existing solutions can do. "2D barcodes are hard to design on strips. We check at a pixel level," says Paddy.

Ennoventure has begun to deploy the solution with the Chordia Group's Medopharm, and with some of the leading pharmaceutical and FMCG companies in India. "The biggest loophole in today's technology is that there is no way for an end consumer to figure out if a drug is real or fake," says Paddy.

In the pharma value chain, there is a medical store or pharmacy at the ground level. Above pharmacies, there is a stockist or distributor, and then the C&F (clearing and forwarding) agencies who get the stock from factories. "The C&F layer has morphed into a warehouse-like facility after the Goods & Services Tax has been introduced. They are more like master-distributors," says Mayur Shetty, director of Keweenaw Health Solutions, which specialises in stocking and supply of anti-cancer drugs.

In India, counterfeiting is rampant when distributors or customers buy medicines without a bill. "Purchases with a bill help in traceability, as long as the party issuing the bill pays back taxes due. But there are cases where rogue parties have sold counterfeit drugs after issuing bills, and then folded up their business because the counterfeit drugs have made them their money," says Shetty.

Mass-market or popular drugs get counterfeited, but even big pharma brands are not safe. "Being a big brand allows counterfeiters to get customers' buy-in more easily. Cardiovascular and diabetic molecules are often counterfeited," says Shetty. That's why traceability checks are essential at the retail level. "The onus is on pharmacists to ensure that the drugs they sell are legal under relevant drug laws, and not infringing third party IP rights," says Majumder of Fidus Law Chambers. "Under the Trademarks Act, there is no difference in the liability of a manufacture of infringing drugs and the distributor or pharmacist selling those products."

Ennoventure is betting on presence at the retail stage too. With scale and marketing, a SaaS product can pave the way for end-customers at pharmacies to check if the medicines are real or not. That'll happen by using a smartphone app to check the packaging. F

MIKE BLAKE / REUTERS

Elon's New Nemesis

Check your rearview mirror, Tesla. Rivian has a $3 billion war chest from Amazon, Ford and the Saudis, and is revving up production on its electric SUVs and trucks. Now all the secretive automaker has to do is start building cars and avoid the roadblocks that almost caused Tesla to crash. A rare interview with its 37-year-old founder, RJ Scaringe

By CHUCK TANNERT

RJ Scaringe, Rivian's CEO, introduces his company's R1T all-electric pickup and all-electric R1S SUV at the Los Angeles Auto Show in California

It's 8 o'clock on a January morning, and the temperature in Normal, Illinois, just a few hours south of Chicago, is well below freezing. The small pond in front of Rivian Automotive's assembly plant has turned to ice, the grass is covered with frost and there is snow in the forecast. It's not much warmer inside the plant. Nearly the entire 2.6 million-square-foot facility is a construction zone, undergoing a massive $750 million renovation to prepare for the end of the year, when it expects to start rolling out battery-powered trucks, vans and SUVs. So minor details like heat are not exactly a top priority.

The only finished area—a second floor at the front of the building that overlooks the factory—is where the plant's previous owner, Mitsubishi, had its executive offices. Back then, access to this floor was restricted to the suits. Now it's a giant open workspace, accessible to all, with a cafeteria, polished concrete floors and lots of natural light, just like the floor plan at Rivian's research and design centre in Plymouth, Michigan. The concept for both offices was to merge industrial and outdoor aesthetics that mirror the company's brand—an automaker that builds sustainable vehicles usable in off-road settings. Rivian, which was founded in 2009 but is finally releasing its first vehicle this year, also has operations in San Jose and Irvine, California, where it develops its technology and batteries.

"When we're done cleaning, painting and installing the equipment," says Rivian's 37-year-old founder and CEO, Robert Joseph Scaringe (better known as just RJ), "we will eventually be able to produce 250,000 vehicles per year by mid-decade."

Starting an independent car company is not easy. Among the roadkill in automotive history are Preston Tucker, who challenged Detroit in the late 1940s, and John DeLorean, who failed to take the Motor City back to the future in the early 1980s. Producing a line of mass-market vehicles in the 21st century is even more difficult than it was for Tucker and DeLorean, and considerably more perilous in the EV (electric vehicles) category.

With the emergence of Rivian, the electric vehicle market is no longer a one horseless carriage race. Indeed, the 2020s are gearing up to be the decade of the EV. According to research at Oppenheimer, EVs and plug-in electric hybrids accounted for a mere 2.2 percent of all US vehicles sold in the last quarter of 2019. And only a third of those were purely electric. But that is changing rapidly. While only 5.1 million electric cars were sold worldwide in 2018, that figure is expected to surge throughout the decade—21 million units are projected to be sold in 2020, 98 million in 2025 and 253 million in 2030.

Building a new EV, however, requires investing in cutting-edge research into components like battery packs and powertrains. The only company that has been remotely successful is, of course, Tesla—and even it has had a rough go of it.

"We spent a lot of time looking at and understanding how different [automakers] were built," Scaringe says. "And we spent a lot of time understanding the risks associated with how to build and scale a business, and the working capital that's [required]." Over the past 13 months, his team and he have raised $2.85 billion to fund Rivian's future. First Amazon (and others) invested $700 million in February 2019. Then Ford ponied up $500 million two months later. Cox Automotive, whose brands include Autotrader and Kelley Blue Book, came through with another $350 million in September. And if that weren't enough to turbocharge Scaringe's outsized ambitions, just before Christmas Eve, money management behemoth T Rowe Price led yet another investment round worth more than $1.3 billion.

That early infusion of capital—on top of investments of nearly $500 million, including from JIMCO, the investment arm of Abdul Latif Jameel, a Saudi corporation that has bet big on energy and mobility—has given Rivian a valuation just north of $5.5 billion. Scaringe is estimated to own slightly more than 20 percent of the company, making him the latest automotive billionaire. The funding has also allowed Scaringe to nearly triple the size of Rivian's workforce, from around 700 in 2018 to more than 2,000 today, which is how he can scale production this year.

The question is: Even with $3 billion, does Rivian have enough to realise Scaringe's electric dreams?

Until now, it's been a far smoother road than the one Musk faced with his

Drive Time

A brief history of Tesla and Rivian

TESLA

2003 Company founded by Martin Eberhard and Marc Tappenning

2004 Elon Musk joins as chairman after investing in its $7.5 million Series A

2005

2006 Roadster prototype unveiled

2007

2008 Musk becomes CEO; first Roadsters delivered

2009 Model S debuts

2010 Tesla goes public with $1.7 billion market cap

RIVIAN

2009 RJ Scaringe launches Mainstream Motors

Rivian's adventure SUV can accommodate seven people, but the company has also filed for a patent to adapt a seat for first responders

first vehicle. Tesla raised around $100 million between 2003 and 2008 to produce the Roadster, which was soon abandoned in favour of the Model S, and the Model S required more than $350 million in funding (including a 2010 IPO that valued the company at $1.7 billion). The journey of the Model 3 was particularly rocky. Supply-chain issues and Musk's desire to completely disrupt the manufacturing process led to a two year–plus delay in delivering cars to customers and a slew of quality-control issues. The fallout from these problems reportedly cost the EV maker hundreds of millions of dollars. (Tesla did not respond to multiple requests for comment.) The company then took on billions in debt as it scaled its production for the mass market.

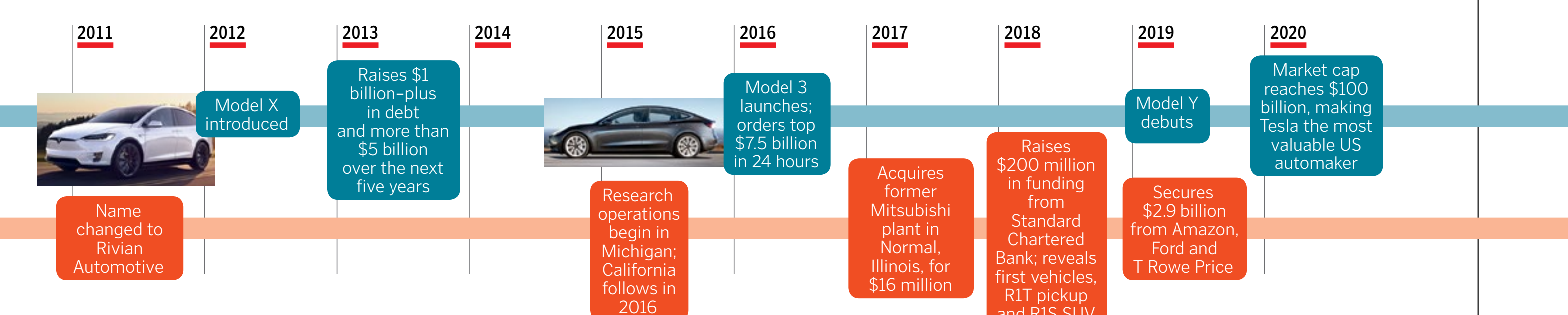
So if the mighty Tesla has faced so many detours and potholes, what makes Scaringe think that Rivian, which hasn't made a single car, can have a smooth ride? He doesn't. "Things will go wrong," admits the young CEO. And Scaringe, who comes across like a mild-mannered Clark Kent type compared to Musk's manic Tony Stark, is confident he can overcome any perils or roadblocks. After all, Rivian is built for treacherous terrain.

RJ Scaringe first dreamt of starting his own car company when he was in high school. But unlike most teenage gearheads with the same ambition, Scaringe backed it up by studying engineering. His vision changed in 2007 while attending MIT's prestigious Sloan Automotive Lab, where he attained a doctorate in mechanical engineering and the skills he would need to build the vehicle he imagined in his head. "As I became increasingly aware of how many problems were born out of the automobile—geopolitical, climate, air quality and more—it became a huge source of internal conflict for me," he recalls. So he scrapped his plan for a gas-powered sports car for one that was battery-powered, much like Tesla's original Roadster.

After graduating with his doctorate in 2009, Scaringe returned home to Melbourne, Florida, where he founded the company that became Rivian. His team and he spent four years developing a speedster-like EV before Scaringe found what he thought was an obvious gap in electric vehicles and one that spoke to his outdoorsy interests—a truck and a luxury SUV.

Scaringe also spent nearly a decade developing its innovative skateboard platform—a chassis that contains the battery pack, suspension, electric motors for propulsion and a computer to control it all. Finally, in November 2018, Rivian unveiled its two prototypes at the Los Angeles Auto Show: The R1S, an electric SUV that seats seven, and the R1T, an electric pickup truck. The so-called "adventure vehicles" look like the love children of a Range Rover—rugged, capable and luxurious—and are packed with the latest amenities such as internet connectivity and a host of driver-assist safety features.

The company expects to deliver an ambitious 20,000 units (combined truck and SUV) in 2021 and 40,000 in 2022, which could translate to approximately $1.4 billion and $2.8 billion, respectively, if all goes according to plan. By comparison, Tesla sold 25,000 units of the Model



X in 2016, its first full year of release.

Beyond its first two releases, Scaringe says there will be three more vehicles in the Rivian portfolio by 2024. Though he is cautious about providing details, Scaringe admits that one will be smaller in size and all will be considerably lower in price. It's a strategy akin to what Land Rover does with its Defender and top-of-the-line Range Rovers—that is, the same base model with fewer amenities. And if Scaringe can truly keep the price below $50,000, it will cause far worse headaches for Musk than a broken shatterproof window on his Franken-vehicle, the Cybertruck.

Tesla, of course, now dominates the EV market—by one estimate it represents nearly 80 percent of sales in the US—and Rivian will face stiff competition in the luxury battery-powered SUV segment from other automakers. The R1S SUV will enter a market in the fall that includes the Mercedes-Benz EQC (starting at $67,900); the Audi e-tron SUV ($74,800); the Jaguar i-Pace ($69,500); and, of course, the Tesla Model X ($84,990). Other automakers such as Hyundai and Kia will offer more affordable options, such as the Kona EV, starting at $37,190, and Niro EV, starting at $38,500, respectively.

Rivian should be without real competition in the truck category, however. Despite Tesla's highly public debut of the Cybertruck, it's not expected to be produced until 2022. And both Ford and General Motors have promised to release electric pickups in the next few years.

"The opportunities [in the EV market] are pretty substantial," says Ed Kim, a market analyst for AutoPacific, an automotive research and consulting firm based in California. If Rivian becomes a threat to Tesla dominance, it could energise the category and set up a true EV rivalry. "Some experts have been predicting this for a while, and I think there are a few key factors happening now that [are leading to further] penetration of the EV," says Steven Low, a professor of computer science and electrical engineering at Caltech. One is that vehicle range is expanding. Another is the availability of more charging facilities. And the third element is price.

Rivian claims its R1S and R1T will offer outstanding performance, including a range of just over 400 miles, or nearly 75 miles more than any other existing EV. Both will be able to sprint from zero to 60 mph in about three seconds. Above all, Rivian promises genuine off-road capability. Try driving your Tesla on the beach or into the woods.

The company also plans to build out a charging infrastructure, much like Tesla's Superchargers. "We are developing them in parallel," Scaringe says. As for the cost, Rivian's pickup will have a base price around $69,000, and the SUV will be $72,500 (and both come with a federal tax incentive). Scaringe hints that these prices will come down closer to release but wouldn't reveal a precise figure.

Much will depend on Rivian's new deep-pocketed partners.

Having built a $3 billion war chest from Amazon, Ford and Cox in a short time is certainly an impressive start for Scaringe, but if Tesla's history is an example, that won't be enough funding to scale production to compete with Musk. Then again, those brands see opportunity in Rivian that Tesla could never provide.

The partnerships Scaringe forged weren't just about the cash. In Ford's case, the two companies will also build an electric vehicle together. "We're providing the platform," Scaringe says. "They will provide the body and the interior." Although Scaringe is reticent in talking about the project, the vehicle will be a luxury SUV with Ford's Lincoln brand.

Rivian hopes the Ford alliance will allow the company to grow beyond its own consumer electric vehicle offerings. For its part, Ford is seemingly doing it to keep the company's options open, as it often does, to pursue the best option with which to achieve its electrification goals: 40 electric vehicle models by the end of 2022. Besides the Lincoln with Rivian, Ford is working on the electric Mustang-inspired Mach-E SUV and both a hybrid and all-electric version of the Ford F-150, America's best-selling vehicle. Ford is also working with Volkswagen to develop EVs on its new EV platform.

Amazon, meanwhile, is looking to Rivian to develop a battery-powered delivery van as part of its pledge to be net-zero carbon across all its businesses by 2040 and use 100 percent renewable energy to power those businesses by 2030. Consequently, Amazon ordered

Road Warriors

Elon Musk	**RJ Scaringe**
CEO, Tesla	*Founder/CEO, Rivian*
BORN	
Pretoria, South Africa	Melbourne, Florida
AGE	
48	37
NET WORTH	
$39.3 billion	$1 billion
CARS PRODUCED TO DATE	
900,000-plus	0
EDUCATION	
BS, University of Pennsylvania; BS, the Wharton School	BS, Rensselaer Polytechnic Institute; MS and PhD, MIT, Sloan Automotive Lab
MARITAL STATUS	
Twice divorced, five sons; now dating pop star Grimes	Married, three sons
SUPERHERO ALTER EGO	
Tony Stark	Clark Kent
TWITTER FOLLOWERS	
31 million	10,600
TYPICAL TWEET	
"And, no, I'm not an alien... but I used to be one."	"Great work team."

MIKE BLAKE / REUTERS; RIVIAN

The Fabulous Studebaker Boys

Electric-car companies have been short-circuiting for more than a century. Some 50 years after their company was founded, three of the Studebaker brothers—Henry, Clem and John—steered their family's prosperous wagon-making business toward automobiles. In 1902, Studebaker released its first battery-operated vehicle and would eventually add several more models, including a line of commercial trucks. But the cars were expensive—around $30,000 in today's dollars, or nearly 15 percent more than a Ford Model T—and slow, maxing out around 20 mph, a third of what a gas-powered car could do. The batteries alone weighed 970 pounds. After producing just 1,841 vehicles in 12 years, Studebaker ended its electric line in 1912 to focus on gas vehicles. The irony was not lost on Elon Musk, who in 2018 visited the Studebaker museum in South Bend, Indiana, and tweeted out John Studebaker's dictum about gas cars: "Clumsy, dangerous, noisy brutes, which stink to high heaven."

The Studebakers launched their wagon company in 1852. The last car to bear their name, the Studebaker Cruiser, rolled off the line in 1966

100,000 vans from Rivian. At least 10,000 should be on the road by late 2022, and all are expected to be operating in Amazon's fleet by 2024. The vans will presumably become part of an end-to-end logistics network that Amazon has been working on since 2015. If so, expect more Rivian orders to come down the road.

But it's the Cox partnership that could prove the most troubling for Musk. While Tesla has more than 100 service centres in 30 states, Cox handled more than 55 million service appointments in 2019 at its sprawling network of commercial and dealer partner service centres across the US. If something goes wrong with an R1T or R1S, the idea, presumably, is that a customer will be able to take the vehicle to a Cox service centre like Pivet to have it repaired correctly and in a timely fashion, something that Tesla has struggled with since its inception.

Cox is also playing the long game with Rivian—as more vehicles come to market, it wants to control secondary sales. "My hope is with the skills that we have," says Cox president Sandy Schwartz, "and with all the things that we're learning, that we'll be the chief wholesale remarketer for all Rivians someday."

Now they just have to build some.

The name of the Illinois town that Rivian calls home is the perfect adjective to describe Scaringe himself and differentiate him from Musk: Normal. Whereas Tesla's co-founder is all bravado and showmanship—he has weaponised his Twitter account and turned it into a de facto marketing division—Scaringe is soft-spoken and low-key. While Musk is photographed with models and pop stars, Scaringe is a family man, even if he rarely sees his family lately. These days, he lives out of a suitcase, spending five days a week travelling among the company's four offices to make sure things are on schedule. His wife, Meagan, and their three boys (all under five) see him from Friday night to Sunday evening in their unassuming three-bedroom house near Irvine. On Sunday evening, he boards a plane to Michigan and repeats the process to ensure that his larger vision is being realised: Thinking globally and acting locally.

When the Mitsubishi plant closed in July 2015, for example, the mood in Normal was decidedly funereal. "It hurt," says Mayor Chris Koos. "It left over 1,000 people out of work, which causes a ripple effect throughout the community."

Even after the plant was sold to Rivian for $16 million in 2017, residents remained sceptical. That negative sentiment soon changed, however. "Rivian showed interest in the lifestyle of the community, the quality of education, affordable housing and access to transportation," Mayor Koos says. The company even had a preview day in Normal last summer to answer any questions from local residents. It made a big impact on Normal's perception of Rivian and, not surprisingly, proved valuable when it came to recruiting employees.

With the town onboard, Scaringe is now on a mission to lead Rivian through its first production cycle and expand its line. Though it's too early to tell who will win the EV wars, Rivian is one of just a couple of companies that has a strong chance not only to survive, but also thrive, according to Navigant's Sam Abuelsamid. He thinks Rivian might even be in a better position going forward than Tesla: "If you're talking about who's going to have potentially the most volume, getting more vehicles to market in the near to mid-term, [I'd say] probably Tesla." But from an actual business standpoint, Rivian is "in the better position to succeed because of the nature of the products it has".

But first, the rubber has to hit the road.

STOCK MONTAGE / GETTY IMAGES; ALAMY

Switching Gears

How the next-gen at Polycab India is working on making the wires and cables leader an FMEG player to reckon with

By NAANDIKA TRIPATHI

It all started with a little shop in Mumbai's Lohar Chawl in 1964. Thakurdas Jaisinghani, who had moved to Mumbai from Pakistan after Partition, founded Sind Electric Stores in the city's epicentre for electrical goods and sold various products, including fans, lighting, switches and wires. Four years later, Jaisinghani met with an accident and passed away, leaving his wife and five children to pick up the pieces.

His eldest son Girdhari, then 16, had just completed his schooling and instead of pursuing higher studies, he had to take over the mantle of running the shop. Inder, then 14, was also told to drop out of school and join his

The Jaisinghanis of Polycab India: (From left) Ramesh, Ajay, Girdhari, Inder, Nikhil, Bharat, Anil and Kunal elder brother. Two other brothers, Ramesh and Ajay, followed suit.

The young guns learnt quickly. By 1975, they set up Thakur Industries and acquired a small piece of land from the Maharashtra Industrial Development Corporation in the Mumbai suburb of Andheri to set up a factory for manufacturing cables and wires. Eight years later, they set up another factory in Halol, Gujarat, to make and process PVC insulated wires and cables, copper and aluminium, and bare copper wire, and Polycab Industries was born.

"It was time for us to think big and differently. We had to take a leap of faith from trading towards manufacturing," recalls Inder, chairman and managing director of Polycab India. "We had to forward and backward integrate to ensure our margins improved consistently and gave us more cash in hand. We believed in the power of manufacturing and invested in it to grow our business."

As they continued to grow and set up more manufacturing plants, the second generation stepped in. Ramesh's son Nikhil and Ajay's son Bharat, both in their early 20s, joined the family business in 2006. Starting off by shadowing Inder, they underwent training and rotation in various departments from operations and purchase to finance. "It took us a few years to get the hang of everything. We were then only trying to support our chairman as much as we could since it was a family-run business and he had a lot on his shoulders," recollects Nikhil, 34, who completed his bachelor's in business from the University of Kent, UK.

In 2009, International Finance Corporation, the private equity arm of the World Bank, invested ₹401.75 crore in Polycab and the second generation took on bigger roles. "After this investment, our roles changed from being the export or procurement manager to change agents, where we started implementing new

"We had to take a leap of faith from trading towards manufacturing... we believed in the power of manufacturing and invested in it."

INDER JAISINGHANI
CHAIRMAN AND MD, POLYCAB INDIA

[redacted]

things in the company," says Bharat, 35. Changes ranged from introducing Enterprise Resource Planning to hiring a professional in the family-run business.

"The period when we were executing these changes... those were literally the toughest days of our lives," says Bharat, recalling how they had to convince the first generation to move with the times. "It took some time for the older generation to get used to the fact that the younger generation is going to say 'Look, we are not doing things in the right manner and this needs to be corrected'," adds Bharat, who has a master's in operations management from Manchester Business School. "Thankfully, they trusted us."

In 2011, Nikhil decided to pursue further studies at the Kellogg School of Management. "After I completed my MBA, I didn't want to come back to the business. I wanted to work, so I applied and even gave a couple of final interviews... somehow the family was not convinced and there was quite a bit of resistance. So I went back to the business. But I went back at a good time because a lot of things began to change in the company," says Nikhil, director, Polycab India.

Cut to 2014. The company diversified into Fast Moving Electrical Goods (FMEG), a sector pioneered by the late Qimat Rai Gupta, founder of Havells. The objective was to move from being a pure B2B player to a B2C one.

"As a company, we decided to increase our B2C product portfolio. We didn't want to rely on the B2B business so much because it is way too cyclical and the return on capital employed is a little lower because your inventory and payments are longer. Bharat and I focus mostly on the B2C side. We launched products that complement the business and the distribution network," says Nikhil. They also focussed on branding. "Four years ago, we hardly spent anything on branding, but now we spend almost ₹100 crore a year on it. Now about 35 percent of our business is B2C."

The brand got major visibility after it started advertising during the Indian Premier League in 2016. Polycab also roped in various stars as brand endorsers—from Paresh Rawal for wires since 2014 to R Madhavan for fans since 2018 and Ayushmann Khurrana for switchgear in 2019.

In 2015, the youngest from the second generation, Inder's son Kunal, 26, joined the company after completing his bachelor's in management studies from Mumbai University. "I started handling some key channel partners and contractors under my father's guidance. I continue to update myself across functions," he says.

The first generation continues to provide guidance and motivation, encouraging the second generation to take risks and learn from their mistakes. "Once I made a mistake in our export business. We supplied the wrong cable for an order due to a mistake by someone else, and lost around ₹30 lakh," recollects Bharat, executive director at Polycab. He went to his uncle Inder. "I told him it was my team's fault and took complete ownership of the mistake. He said, 'What's done is done, don't worry about it. As long as you know you've made a mistake... don't repeat it'. This approach has motivated us to perform better each day."

With an estimated 18 percent share of the organised market for cables and wires, Polycab is the largest manufacturer in India in this segment. The task for the next-gen is to expand the revenue share of FMEG—fans, lighting, switchgears, switches and pumps—which is at 8 percent now.

"Having made inroads into the FMEG market, the next task is to become a dominant player in the sector like we are in wires and cables, and to strengthen the brand," says Inder.

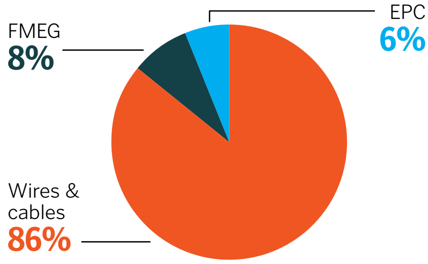
With the growth in residential, commercial and industrial infrastructure, the consumption of electrical goods has increased exponentially in India and companies are vying for market share in the sector, with Havells India currently leading with a 14 percent market share.

"Cables and wires remain a core business for Polycab, accounting for 90 percent of revenues. Despite the high competitive intensity in FMEG, the company's revenue from this segment has been growing at 40-50 percent on a small base," says Ashish Poddar, research analyst at Anand Rathi Share and Stock Brokers.

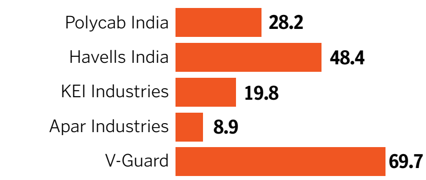
Last April, Polycab India made its debut on Dalal Street. The public issue was oversubscribed 92 times, and the stock currently quotes 56 percent higher than the issue price (the current carnage in the markets notwithstanding). The company continues to be in growth mode and an investor favourite. Revenues grew by 24 percent in the July to September quarter last year over the previous year, and operating profits grew by 26 percent because of higher government spends on infrastructure projects. Wires and cables revenue jumped by 21 percent in the September-December quarter on the back of strong demand from the institutional segments in the domestic and export market.

Polycab's growth has been in line with the industry and is expected to continue as the government is focusing on electrification and also rural development, adds Poddar.

REVENUE BREAKUP



PEER WATCH (price earnings multiple)



GROWTH SPREE

(April to December, figures in mln)

	9M FY20	9M FY19	YoY
Revenue	67,006	55,219	21.4%
PAT	5,505	3,601	52.9%

POLYCAB MARKET SHARE

Wires & cables	~12%
FMEG	Less than 1%

The company has 24 manufacturing facilities of which four are dedicated to FMEG and the rest to cables and wires. The Halol facility accounts for 64 percent of total capacity, with a utilisation rate of 80-85 percent.

Given the strong demand for wires and cables across industries and Polycab's competitive advantage among peers followed by FMEG traction, analysts from Dalal & Broacha Stock Broking Pvt Ltd believe Polycab will grow at a compound annual rate of 17 percent between FY19 and FY22. The opportunity for the company is immense seeing the government's visibility in implementing infrastructure projects worth ₹102 lakh crore over five years, they add.

What also augurs well for the wires and cables sector is that it is gradually moving from being a largely unorganised one comprising smaller regional players to an organised market comprising pan-India branded players. At an overall level, there were 519 organised players, accounting for 66 percent share of the wires and cables industry's production in FY18. The share of organised players is expected to increase to approximately 74 percent by FY23 because of GST implementation, which reduces the price gap between the organised and unorganised sectors, say analysts.

Samit Vartak, founding partner and CIO, SageOne Investment Advisors, reckons Polycab is strongly placed in the wires and cables sector. "The company will deliver strong earnings growth in the coming years considering its pan-India distribution network which helps it roll out new products swiftly," he says.

In December last year, Polycab announced a plan to set up 100 'Experience Centres' by 2021 to boost consumer experience with its range of electrical goods and appliances. "With the addition of FMEG and a wide range of cables and wires, it became important to showcase the entire range under one roof," says Inder.

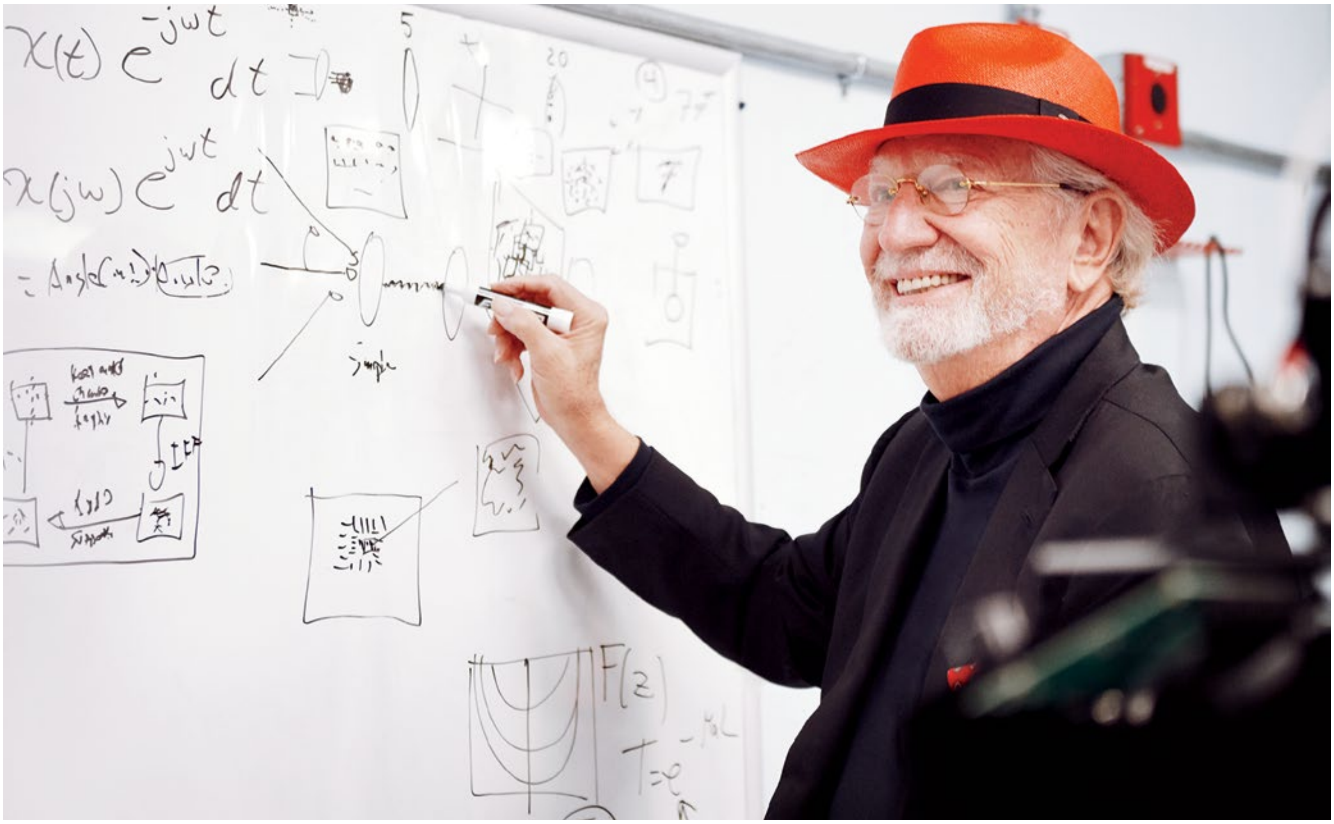
The first centre was inaugurated in Lohar Chawl where the first generation started off, while two more have been set up in Pune and Thiruvananthapuram . "This has helped consumers know our offerings well and our trade partners to experience the wide range and add it to their business. It's been a great experience for our dealers, retailers and consumers, and we intend opening more centres across India," he adds.

The foremost challenge for Polycab in the FMEG business is the competition in the sector, says Poddar. "The company will have to focus on winning over consumers with its products and quality. It is addressing the challenge by spending more on branding and advertisements, which is working well for the company," he says.

With uptick in revenue in the recent quarters, it looks like it is on the right track. F

Dr Herbert Wertheim occasionally lectures on engineering at Florida International University. He should be teaching finance

JAMEL TOPPIN FOR FORBES



Hold-’em Herbie

Amid stock market booms and busts, and game-changing innovations from ETFs to algorithmic trading, a Florida optometrist has beaten the odds to become a buy-and-hold billionaire

By **MADELINE BERG**

It’s 9 pm on the last Saturday night of the 2018 Art Basel in Miami Beach. On the first floor of the palatial Versace mansion, the well-dressed and well-Botoxed are dancing to remixes of Michael Jackson’s ‘Beat It’ and posing for Instagram by the mosaic-tiled emerald pool.

Upstairs, in a VIP room decorated in a mélange of styles that marry classical Greek and Roman touches, a well-dressed septuagenarian named Herbert Wertheim is sitting in front of a plate of smoked-salmon toast topped with gold leaf and shaved truffles, and scrolling through photos on his iPhone—scenes from what could only be described as a wonderful life. There are fan photos of him cooking pasta fagioli with Martha Stewart, on the slopes with Buzz Aldrin and fishing in Antarctica. There are many with his wife of 49 years, Nicole, on the luxurious World Yacht, where the Wertheims now live part of each year. He calls these extracurricular activities “Herbie time”.

If it weren’t for his trademark bright-red fedora, Wertheim, who is an optometrist and small businessman, would look like the typical senior living it up in South Florida.

But Wertheim, 79, has no need for early-bird specials. What the photos don’t reveal is that Dr Herbie, as he is known to friends, is a self-made billionaire worth $2.3 billion by *Forbes*’s reckoning—not including the $100 million he has donated to Florida’s public universities. His fortune comes not from some flash of entrepreneurial brilliance or dogged devotion to career, but from a lifetime of prudent do-it-yourself buy-and-hold investing.

Herb Wertheim may be the greatest individual investor the world has never heard of, and he has the Fidelity statements to prove it. Leafing through printouts he has brought to a meeting, you can see hundreds of millions of dollars in stocks like Apple and Microsoft, purchased decades ago during their IPOs. A $800 million-plus position in Heico, a $1.8 billion (revenue) airplane-parts manufacturer, dates to 1992. There are dozens of other holdings, ranging from GE and Google to BP and Bank of America. If there's a common theme to Wertheim's investing, it's a preference for industry and technology companies and dividend payers. His financial success—and the fantastic life his portfolio has afforded his family—is a testament to the power of compounding as well as to the resilience of American innovation over the last half-century.

"My thing is," Wertheim says as he reflects on his long career, "I wanted to be able to have free time. To me, having time is the most precious thing."

Born in Philadelphia at the end of the Great Depression, Wertheim is the son of Jewish immigrants who fled Nazi Germany. In 1945 his parents moved to Hollywood, Florida, and lived in an apartment above the family's bakery. A dyslexic, Wertheim struggled in school and soon found himself skipping class.

"In those days, they just called you dumb," he remembers. "I would sit in the corner sometimes with a dunce cap on."

During his teens, in the 1950s, an abusive father prompted Wertheim to run away periodically. He spent much of his time hanging around with the local Seminole Indians, hunting and fishing in the Everglades and selling game, like frog legs, to locals. He also hitchhiked around Florida picking oranges and grapefruits.

Eventually, his parents had enough. At 16, he stood in front of a judge facing truancy charges. Lucky for Wertheim, the judge took pity on him, offering him a choice between the US Navy and state reformatory. Wertheim enlisted in 1956 and was stationed in San Diego. He was only 17.

"That's where my life changed," he says. "They give you tests all the time to see how smart you are, and out of 135 in our class, I think I was in the top—especially in the areas of mechanics and organisation."

With a newfound confidence, Wertheim studied physics and chemistry in the Navy before working in naval aviation. This is about the time Wertheim began investing in stocks. It was the Cold War, the military-industrial complex was humming and American industry was on the move. The Dow Jones Industrial Average had finally recovered from the losses it suffered more than two decades before during the Crash of 1929, and aerospace stocks were leading the market.

Wertheim made his first investment at 18, using his Navy stipend to buy stock in Lear Jet, which at the time was known for making aviation products during WWII. Wertheim met its founder, Bill Lear, during a visit to a Sikorsky Aircraft factory in Connecticut, where the Navy's S58 helicopters were manufactured. Wertheim was attracted to Lear's inventions, like the first auto-pilot systems. (Later, the company would invent the 8-track tape and pioneer the business-jet market.)

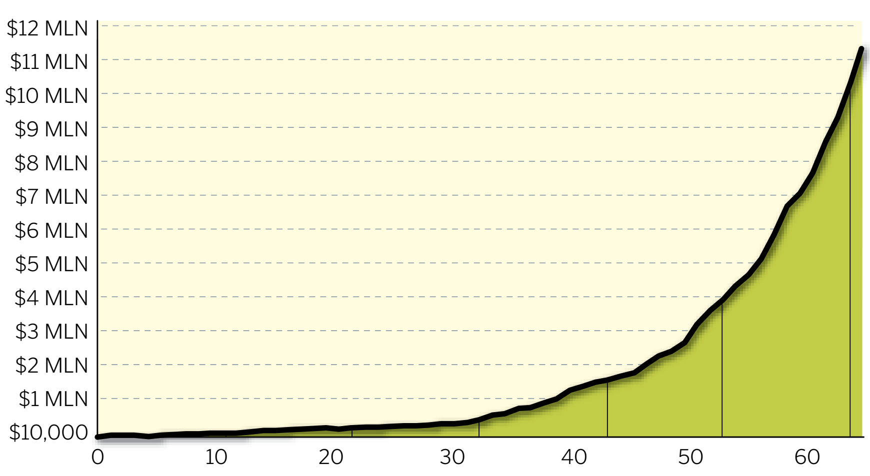
"You take what you earn with the sweat of your brow, then you take a percentage of that and you invest it in other people's labour," Wertheim says of his near-religious devotion to tithing his wages into the stock market.

Once out of the Navy, Wertheim sold encyclopaedias door-to-door before attending Brevard Community College and then the University of Florida, where he studied engineering but never graduated. In addition to taking classes, he worked for Nasa—then in its first few years—in a division that improved instrumentation for manned flights. This fuelled an interest in the eye and instruments optimised for vision.

In 1963 he received a scholarship to attend the Southern College of Optometry in Memphis and after graduation opened up a practice in South Florida. For 12 years he toiled away, seeing patients who were mostly working-class and who sometimes paid their bills with bushels of mangoes and avocados. Wertheim spent his evenings tinkering on

Compounding: The Most Powerful Force

Wertheim's returns are miraculous. But merely adding $200 per month to an initial $10,000 in the stock market over the past 61 years would have produced a $11 million portfolio



SOURCE INVESTOR.GOV

inventions, and in 1969, he invented an eyeglass tint for plastic lenses that would filter out and absorb dangerous UV rays, helping to prevent cataracts.

The Vietnam War was under way, and plastics had become the material of choice for eyeglasses and sunglasses. Demand for Wertheim's tint grew, and he sold it in a royalty deal for $22,000. But because of contractual breaches, the royalties never materialised.

So in 1970 Wertheim decided to get more serious about his inventions and set up a new company, Brain Power Inc. He founded it as a technology consulting firm, but Wertheim soon returned to his habit of researching and tinkering, developing tints, dyes and other technologies for eyewear.

A year later he concocted one of the world's first neutralisers, a chemical that restored lenses back to their original clear state. This meant opticians no longer needed to carry large inventories of different-coloured lenses or dispose of lenses that were improperly tinted. "I was still seeing patients, I had a little lab," recalls Wertheim. He showed his wife a coffee can containing his chemical concoction and said, 'Nicole, what's in this can is going to make us millionaires'."

It did. Between that chemical and the numerous other products Wertheim invented for lenses—some tints for aesthetics, others to help ease the symptoms of neurological disorders like epilepsy and still others to improve UV protection—BPI became one of the world's largest manufacturers of optical tints, selling to companies like Bausch & Lomb, Zeiss and Polaroid. The company also began making lab equipment, cleaners and accessories for opticians, optometrists and ophthalmologists. Today BPI has more than 100 patents and copyrights in the area of optics, 49 employees and annual revenues of about $25 million.

In less than two decades, Wertheim had gone from ne'er-do-well to inventor and entrepreneur. BPI never achieved hypergrowth, but it provided a steady net income amounting to some $10 million a year, according to Wertheim, more than enough to feed his passion for investing and the good life.

"I didn't want to have a big business," he says. "But today, I have a 5 or a 6 or an 8 billion-dollar corporation, each of which I own 10 percent of."

CHAITANYA DINESH SURPUR

BEAR SURVIVOR

Queens Road Small Cap Value

Manager: Steven H Scruggs

FORBES GRADES
Up: D **Down:** A+

Returns
Recent dip[1]: –13.2%
Long-term[2]: 9.6%

Expense ratio[3]: 1.18%
Winner[4]: Fabrinet
Loser[4]: Tenneco

Undiscovered fund will attract a following if the bear returns

[1]Return Sept 20, 2018–Dec 24, 2018. [2]Annualised, Oct 9, 2002–Dec 24, 2018. [3]Most expensive share class. [4]Big mover in portfolio, past 12 months.
SOURCE Morningstar; *Forbes*

With BPI cash flowing into Wertheim's brokerage account, he went to work buying stocks and honing a strategy that can best be described as a mix of Warren Buffett and Peter Lynch, with a touch of Jack Bogle, given that he dislikes fees and primarily uses two discounters, Fidelity and Schwab, to manage his massive portfolio.

With Lear Jet (later known as Lear Siegler) in the late 1950s, for example, Wertheim was practicing "invest in what you know", the strategy popularised by the famous Fidelity Magellan fund manager Peter Lynch in his 1989 book *One Up on Wall Street*.

Instead of concentrating on the metrics in financial statements, Wertheim is devoted to reading patents and spends two six-hour blocks each week poring over technical tomes. "What's more important to me is, what is your intellectual capital to be able to grow?" Thanks to his engineering background, the technical nature of optometry and his experience as an inventor, the patent library is Wertheim's comfort zone. Stocks he invested in based on their impressive patent portfolios include IBM, 3M and Intel.

Like Warren Buffett, Wertheim believes firmly in doubling down when his high-conviction picks go against him. He says that if you put your faith in a company's intellectual property, it doesn't matter too much if the market goes south for a bit—the product, he believes, has lasting value.

"If you like something at $13 a share, you should like it at $12, $11 or $10 a share," Wertheim says. "If a stock continues to go down, and you believe in it and did your research, then you buy more. You are actually getting a better deal." Whenever possible, he adds, dividends are useful in cushioning the pain of stocks that drift down or go sideways.

"My goal is to buy and almost never sell," he says, parroting a Buffettism. "I let it appreciate as much as it can and use the dividends to move forward." In this way Wertheim, like the Oracle of Omaha, seldom reinvests dividends but instead uses the cash flow from his portfolio to either fund his lifestyle or make new investments.

Wertheim points to Microsoft, a stock he has held since its IPO in 1986. "I knew a lot about computers and had been involved in building them," he says. BPI had been using Apple IIe's, but after Microsoft released its Windows operating system in 1985, Wertheim became convinced it would be a winner. "Only Microsoft had an operating system that could compete with Apple," he recalls. The Microsoft shares he bought during the IPO, which have been paying dividends since 2003, are now worth more than $160 million. His 1.25 million shares of Apple, some purchased during its 1980 IPO and some when the stock was languishing at $10 in the 1990s, are worth $195 million.

Not all of the hundreds of stocks he has owned have fared so well. He invested big in BlackBerry. "I believed in the new management and the recovery story," says Wertheim, who will generally sell if a position reverses on him by 25 percent. "I watched substantial profits disappear month after month until I decided enough was enough."

Wertheim sometimes uses leverage, but mostly in a limited way when buying high-yielding stocks. "By using the dividends to offset [the cost of] margin interest, the government is helping you increase your portfolio value," he explains.

But in 1982 Wertheim got caught in a margin call after Federal Reserve Chairman Paul Volcker raised the federal funds rate from 12 percent to 20 percent and the market sank 20 percent. The episode cost him $50 million and taught Wertheim a valuable lesson about the dangers of leverage and mark-to-market accounting. Like most other active investors, Wertheim strives for tax efficiency. In order to harvest tax losses in his portfolio, he doubles down on his losers to avoid the IRS' wash-sale penalties. "If I have a large loss in a stock I like," he says, "I will purchase more, usually twice to three times the original purchase, and wait the 30 days to sell the original position and book the tax loss."

As with Buffett, Wertheim says finding companies with strong management has been key to his success. A great example of this is Heico, a family-run aerospace and electronics company based in Hollywood, Florida.

Wertheim became friendly with Laurans "Larry" Mendelson during the 1970s, after Wertheim bought a condominium in a building Mendelson owned and docked his boat next to Mendelson's on Coral Gables Waterway. "He has two daughters around the same age as my two sons," Mendelson says. "We got to know each other socially."

A CPA by training, Mendelson was a successful real estate investor who had studied at Columbia Business School under David Dodd, co-author with Benjamin Graham of the seminal book on value investing, *Security Analysis*. Inspired by the wave of dealmakers getting rich from LBOs in the 1980s, the Mendelsons were looking to find an undervalued, underperforming industrial company to take over.

After they settled on Heico, at the time a small airline-parts maker, Wertheim used his aeronautical knowledge to informally help the family analyse its business and went on to purchase shares of the company—a penny stock priced as low as 33 cents.

"At that time Heico was a disaster, but he came up and understood what we would do to make it a non-disaster," says Mendelson.

Heico was making narrow-body jet-engine combustors, which the FAA mandated be replaced on a regular basis after a plane caught fire on a runway in 1985. Under the Mendelsons, Heico expanded its line of replacement parts, which undercut established original-equipment manufacturers like United Technologies' Pratt & Whitney and GE. After Germany's Lufthansa acquired a minority stake in the company in 1997, airline manufacturers and Wall Street took notice, and its share price rose sixfold to more than $2. But this was just the beginning. Heico enjoyed a proverbial moat as one of only a few

CHAITANYA DINESH SURPUR

BULL WINNER

Hodges

Manager: Craig D Hodges

FORBES GRADES
Up: A+ **Down:** F

Returns
Recent dip[1]: –40.5%
Long-term[2]: 9.9%

Expense ratio[3]: 1.18%
Winner[4]: NovoCure
Loser[4]: US Steel Corp

This trapeze artist displays good long-term results despite recent fall

[1]Return Sept 20, 2018–Dec 24, 2018. [2]Annualised, Oct 9, 2002–Dec 24, 2018. [3]Most expensive share class. [4]Big mover in portfolio, past 12 months.

SOURCE Morningstar; *Forbes*

FAA-approved airplane replacement-parts manufacturers. This translated into steadily growing orders as Heico expanded its product mix and as demand for air travel increased. For the last 28 years, Heico's sales have compounded at a rate of 16 percent per year and its net profits at 19 percent.

Today, Heico trades for $80, and buy-and-hold Herbie is its largest individual shareholder. His original $5 million investment is worth more than $800 million.

As Wertheim enters his 80th year, Herbie time has become his chief preoccupation. Besides his $16 million oceanfront home in Coral Gables, Wertheim has a 90-acre ranch near Vail, Colorado, a spectacular four-storey home overlooking the Thames in London and two sprawling estates in southern California. He spends many winters with his wife and family vacationing aboard World Yacht, the planet's largest luxurious residential ship continuously circumnavigating the globe, where he owns two luxury apartments.

A signee of Bill Gates and Warren Buffett's Giving Pledge, Wertheim has committed to giving away at least half his wealth, and he intends the bulk of the donations to go to public education—the very system of which he is a product.

"I would not have achieved the education and opportunities that I have had without the help of our public-university education system," he wrote when he signed the pledge.

Stroll around Florida International University's main campus, just minutes from Wertheim's Coral Gables home, and you can't help but notice buildings emblazoned with his name: The Herbert Wertheim College of Medicine, the Nicole Wertheim College of Nursing & Health Sciences, the Herbert & Nicole Wertheim Performing Arts Center and the Wertheim Conservatory. He has given $50 million to FIU and committed another $50 million to the University of Florida. Last year he pledged $25 million to the University of California, San Diego, to help create a school of public health. Beyond education, Wertheim says he's given to hundreds of domestic and foreign non-profits, including the Miami Zoo and the Vail, Colorado, public radio station.

The former truant and class dunce still gets giddy when he sees his name on the university buildings, asking passersby to take photos—posing in his signature red hat and new Nikes. At the medical school, he put on a stethoscope, excited to test out the latest medical dummies, which breathe, sweat and even talk. In a room designed to study obstetrics, he tries his hand at an ultrasound machine. At a lab that he helps fund, he is enamoured with laser imaging and how it can help measure retinal temperature in the eye. At the FIU performing arts center bearing his name, he suggests adding an outdoor amphitheatre.

"He's inspirational in the way he challenges people to think big and imagine what's possible," says Cammy Abernathy, dean of the Herbert Wertheim College of Engineering at the University of Florida.

Wertheim recently doubled down on British energy giant BP and now owns over one million shares. But rather than dwell on its sagging, crude-dependent stock chart, he's betting on its hydrogen fuel cells and enjoying its 6 percent dividend yield while he waits for the company to recover.

"They have important intellectual property in that area," he says of the cells, which create electricity by using hydrogen as fuel, a technology he believes is the future of both air and road transportation. "We're going to move to a hydrogen economy."

Contrarian Wertheim also likes the troubled stock of General Electric; he owns over 15 million shares and has been picking up more. He says he is making a long-term bet on GE's intellectual property; the 126-year-old company has more than 179,000 patents and growing. Wertheim is especially jazzed about some patents that involve the 3-D printing of metal engine parts.

"You can't look at what their sales are. You can't look at anything. What is the future?" he says. "I feel very, very comfortable with GE because of their technology."

And Wertheim isn't in any rush. Playing the long game is what he does best.

CHAITANYA DINESH SURPUR

BULL WINNER

T Rowe Price New Horizons

Manager: Henry M Ellenbogen

FORBES GRADES
Up: A+ **Down:** C

Returns
Recent dip[1]: –21.6%
Long-term[2]: 14.5%

Expense ratio[3]: 0.78%
Winner[4]: Tableau Software
Loser[4]: CBOE Global Markets

Famous growth fund tops the charts for performance over three market cycles

[1]Return Sept 20, 2018–Dec 24, 2018. [2]Annualised, Oct 9, 2002–Dec 24, 2018. [3]Most expensive share class. [4]Big mover in portfolio, past 12 months.

SOURCE Morningstar; *Forbes*

Trust Your Gut

On the bravest frontier in human health, scientists are using bacteria from the digestive system to create novel medicines for a huge range of ailments including Parkinson's, cancer and autism. Gates, Benioff and Zuckerberg are true believers, and the result could be blockbuster drugs that transform lives—and deliver massive returns for early investors

By SUSAN ADAMS AND WILL YAKOWICZ

MICHAEL PRINCE FOR FORBES

Mark Smith co-founded Finch Therapeutics in 2016 to develop a microbiota pill

Sharp pains shot through the patient's stomach, and he had constant diarrhea. Seven rounds of antibiotics over 18 months had only made him feel worse.

A previously healthy man in his 20s who wishes to remain anonymous, he had contracted a recurring case of *Clostridium difficile*, or *C. diff*, after having his gallbladder removed in 2012. Hospital patients are prone to *C. diff* since antibiotic treatment for other maladies decimates the infection-fighting capacity of what scientists call the gut microbiome, the trillions of cells that move through the human digestive system. "It didn't just affect my gut," he says. "I was exhausted all the time. I had really bad brain fog. I couldn't concentrate."

Desperate, he researched possible therapies and discovered articles about faecal transplants wiping out the infection. But his gastroenterologist refused to perform the procedure. So he took matters into his own hands. He asked his roommate to supply a stool sample, bought an enema kit from CVS, pulsed the mixture in a blender, strained it through a coffee filter and pumped it into his gut. As though a wizard had cast a spell, he made a full recovery within days.

Welcome to the most promising new frontier in medicine: Poop. By focusing on what's coming out of patients' rear ends, a growing body of scientific research over the last 15 years has highlighted the crucial role the microbiome plays in human health. That new understanding could lead to breakthrough treatments for a huge range of illnesses, from obvious ones like digestive ailments and food allergies to surprising ones like cancer and autism. A microbiome-derived drug is already in the works to prevent childhood asthma.

Put crudely, the idea is to use gut bugs as drugs. More than 50,000 scientific papers in the last five years have explored the microbiome's effects. Various kinds of gut bacteria appear to stimulate or suppress immune responses in the body, while others seem to fight off disease-causing microbes. A groundswell of cutting-edge research has the potential to deliver a burst of new therapies that will vastly reduce human suffering—and generate huge paydays for the field's pioneers.

When scientists transferred gut microbiome cells from obese mice into lean ones, the recipients gained weight. In one study, melanoma patients with the most diverse microbiomes had the best response to immunotherapy. And mice injected with gut bacteria from marathon runners ran longer distances. A new drug for obesity alone could be worth more than $20 billion.

So far, the most compelling microbiome-derived therapy is a live faecal transplant for *C. diff*, which strikes half a million Americans annually, killing 15,000. In 2013, the *New England Journal of Medicine* published a paper that caught the scientific community by surprise and jump-started investment in microbiome drug development. In a randomised trial, 94 percent of recurrent *C. diff* patients recovered after receiving faecal transplants. To put that in context, cancer drugs with efficacy rates as low as 10 percent have been approved by the FDA.

Billions of dollars are pouring into microbiome medicine. Gbola Amusa, a medical doctor and partner at Chardan, a health care-focused investment bank in New York, pegs the total amount invested since 2014 at more than $5 billion. Techie billionaires including Bill Gates, Salesforce founder Marc Benioff and Silicon Valley venture capitalist Vinod Khosla are funding microbiome startups, and Gates, Benioff and Mark Zuckerberg have all made donations to support microbiome research at institutions including Stanford, Washington University in St. Louis and the University of California, San Francisco.

The race is on for FDA approval of the first drug made from gut bacteria. But the science is young and unproven. At Oppenheimer in New York, Mark Breidenbach says investor enthusiasm in microbiome companies is on a downswing because "there is no consensus about what the microbiome can do". Amusa is more bullish. "The science is turning," he says. "When it comes through with proof, these biotech companies will be worth not hundreds of millions of dollars, but billions."

SUZANNE KREITER / THE BOSTON GLOBE VIA GETTY IMAGES

Bernat Olle co-founded Vedanta Biosciences, which has raised $112 million in funding

Somerville, Massachusetts-based Finch Therapeutics is one of the most promising startups developing microbiome drugs. Co-founder Mark Smith, 33, was a microbiology grad student at MIT when the 20-something *C. diff* patient begged him for help. "I had to tell him, I'm a microbiologist, not a doctor," Smith says.

The patient's ordeal motivated Smith to create OpenBiome, the equivalent of a public blood bank for human faeces, while Smith was still at MIT in 2013. The Cambridge, Massachusetts, non-profit, the first of its kind in the world, has since supplied stool for more than 53,000 transplants in 1,200 hospitals and clinics.

Inspired by the demand for transplants, Smith co-founded for-profit Finch (named for the diverse group of finches Charles Darwin discovered in the Galápagos Islands) in 2016 to develop an FDA-approved *C. diff* pill. Currently, most doctors perform faecal transplants through a colonoscopy, which can cost as much as $5,000. The procedure is not FDA-approved or reliably covered by insurance.

Smith and his 80 employees occupy two floors in an industrial park that formerly housed administrative offices and storage space for the Harvard Art Museums. Tall and slender with piercing blue eyes, he welcomes the inevitable jokes that come with being a human-faeces entrepreneur. On Halloween he wore a poop-emoji costume ("I was a pooper trooper") to the office, where the copiers have names like Squatty Potty and Magic Stool Bus. But he has raised serious capital. Venture funds have put in $130 million, and Finch has a partnership with Tokyo-based pharma giant Takeda to develop drugs for ulcerative colitis and Crohn's disease, which together have 10 million sufferers worldwide. Finch is also working on an autism drug.

Traditionally, scientists start with data gathered through experiments on mice. Finch is taking a "human-first" approach, skipping the rodents and analysing the stool of human patients who have recovered after receiving faecal transplants. "We're looking at what works in patients and figuring out how to make our drugs from the top down," Smith says. "It's called reverse translation."

For one of its *C. diff* drugs, Finch is extracting what Smith describes as the "full spectrum" of bacteria in a human stool sample from a patient who has been successfully treated, freeze-drying it and delivering the equivalent of a faecal transplant in a single pill. It's also working on simpler drugs made from five to 10 key bacteria. It expects results from its first Phase 2 trial (which demonstrates efficacy) of the full-spectrum *C. diff* capsule by the end of the second quarter of 2020.

"Even if only a few of the microbiome therapies scientists are working on come to fruition," Smith says, "it will have a huge impact on public health."

Another MIT Ph.D., Bernat Olle, 40, is running Vedanta Biosciences, a nine-year-old Cambridge, Massachusetts–based

SLAVEN VLASIC / GETTY IMAGES

Naveen Jain's Viome, which sells a "gut intelligence test" online, has raised $75 million

microbiome drug developer with $112 million in funding, including $10 million from the Bill & Melinda Gates Foundation. The Gates investment supports preclinical research at Vedanta aimed at developing a gut bacteria-derived drug that would prevent child malnutrition in the developing world. Nearly 200 million children under age 5 suffer from either wasting or stunting, resulting in at least 1.5 million deaths a year. "Malnourished children struggle to gain weight even when fed enough," Olle says. "Emerging research suggests that this is because their gut microbiota develop abnormally, and that beneficial gut bacterial strains may help correct this imbalance."

Vedanta also has two partnerships with big pharmaceutical companies, including Bristol-Myers Squibb, to develop drugs aimed at boosting the effectiveness of immunotherapy to treat melanoma and colorectal and gastric cancers. Like Finch, Vedanta is developing a drug to treat recurrent *C. diff.*

Inside Vedanta's maze of labs and storage rooms is an oversized freezer containing faecal matter from 275 donors on four continents, including an indigenous tribe in Papua New Guinea. Vedanta is isolating and then testing bacteria from each sample in the hope of determining which strains make the most effective drugs.

A wiry Catalan immigrant with close-cropped salt-and-pepper hair who bicycles to work, Olle came to the US in 2002 to study chemical engineering at MIT, where he focused on the emerging science of using live organisms like bacteria to produce drugs. In 2007, after earning both an MIT doctorate and an MBA from the Sloan School, he joined PureTech Health, a Boston biotech firm.

In 2010 PureTech backed him in launching Vedanta with five co-founders, all scientists, including big names such as Kenya Honda, a microbiology professor at Keio University medical school in Tokyo. Honda had published a groundbreaking paper on the connection between gut bacteria and regulatory T cells, known to prevent inflammatory diseases. "Think of them as the UN peace forces of the intestine," Olle says. "Honda's work suggested that the cells encoded in human DNA are influenced by the bacteria that live within you."

"This work has forced me to rethink what it means to be human," Olle says. "We are not just the product of the *Homo sapiens* genome."

Every gold rush attracts its share of charlatans and claim jumpers. More than a half-dozen startups are using the microbiome as a marketing buzzword to sell stool-analysis tests. The kits, which require the consumer to mail a small sample to a lab, purport to convey valuable personalised health data and nutrition advice. That despite a consensus among scientists that it's not yet possible to draw useful dietary recommendations from a person's poop. To avoid hostile oversight by the FDA, the kit sellers are careful to make no specific claims about diagnosing or treating particular diseases.

Four years ago, former InfoSpace billionaire Naveen Jain, 60, launched Bellevue, Washington–based Viome, which sells a $119 "gut intelligence test" online. After analysing a pea-sized stool sample, it sends customers a customised 60-page report with dietary recommendations "aimed at balancing your overall microbiome". It might recommend, for instance, increasing consumption of "superfoods" like alfalfa sprouts and anchovies or avoiding green beans and kombucha. Jain says Viome has sold over 100,000 kits and banked more than $15 million in revenue last year.

"Viome's claims are not supported by any scientific literature," says Jonathan Eisen, a medical microbiology professor who directs microbiome research at the University of California, Davis. "What they're saying is, in fact, deceptive." A dozen former Viome staffers say they believe the company was selling a product of dubious value. Six of those ex-staffers describe the food recommendations as "pseudoscience".

"Anyone who says this doesn't understand how our science works and how we make recommendations," Jain counters. "It's not my job to convince everyone; it's my job to continue to help make the world a better place."

A non-stop talker prone to enthusiastic, stream-of-consciousness self-promotion, Jain immigrated to the US from India in 1982 and worked at Microsoft from 1989 until 1996, when he founded InfoSpace, also in Bellevue, which delivered internet content to early cellphones. His net worth ballooned to $8 billion, then crashed to $220 million when the first internet bubble burst. A flood of shareholder suits followed, and the InfoSpace board fired him as CEO in late 2002. Before he left InfoSpace, he bought a $13 million stucco mansion on the shores of Lake Washington not far from Jeff Bezos' and Bill Gates' pads.

Despite having no background in science or medicine, Jain has managed to raise $75 million from investors including Benioff and Khosla. Both declined to comment on their microbiome investments. But Alex Morgan, a Khosla Ventures principal with an M.D. and Ph.D. from Stanford, suggests Khosla's decision to back Viome has nothing to do with nutritional advice. Instead, he says, the firm invested because Viome hired a team of scientists from the US Department of Energy's Los Alamos National Laboratory. In addition, Viome had made a deal with the lab to license a valuable tech platform that has a unique ability to sequence the biochemical activity in microorganisms.

So even if Jain is selling snake oil, Viome might have significant value. Indeed, British pharma giant GlaxoSmithKline struck a royalty deal with Viome in November 2019 to use its tech to help develop microbiome-derived vaccines. Jain's investors could make out handsomely.

At Caltech in Pasadena, California, microbiologist Sarkis Mazmanian, 47, is considered one of the foremost gurus of microbiome research. In 2012 the MacArthur Foundation gave him a

TIM PANNELL FOR FORBES

Caltech professor Sarkis Mazmanian is considered one of the foremost gurus of microbiome research

$500,000 "genius" grant for his work on the microbiome's role in disease. Since then, he's been exploring one of the most intriguing connections in human health: the "gut-brain axis." The working thesis is that the bugs in your belly have a direct impact on your neurological health, which has profound implications for autism, Parkinson's and Alzheimer's.

In 2008, two years after joining the Caltech faculty, Mazmanian published a cover story in *Nature* that documented his successful treatment of inflammatory bowel disease in mice with human gut bacteria. A Caltech colleague, Paul Patterson, who was researching autism in mice, saw a possible connection to the digestive problems suffered by as many as 60 percent of children with autism.

Together they started testing whether human gut bacteria could induce and ameliorate autism-like symptoms in mice. In the midst of their early work, Patterson was diagnosed with fatal brain cancer. In a hospital room at UCLA where Patterson was awaiting surgery in May 2014, Mazmanian signed papers giving Patterson a stake in a company that would develop drugs from their experiments. "I wanted Paul to get the recognition of his contribution," says Mazmanian. Patterson died the following month.

Mazmanian is carrying on their research in his sub-basement lab at Caltech, where 1,000 germ-free mice, delivered by Caesarean section in sterile conditions to ensure they are bacteria-free, live inside plastic-encased rectangular bubbles. Grad students douse the animals' food with various gut microbes to test which bacteria promote tremors and motor problems in mice that correlate with Parkinson's symptoms in humans.

In 2016, David Donabedian, a chemistry Ph.D. who was then a partner at Longwood Fund, a Boston venture capital firm, volunteered to raise the money and research power to move Mazmanian's biotech venture forward.

The company, Waltham, Massachusetts–based Axial Biotherapeutics, has $55 million in backing and 30 employees. Under Donabedian as CEO, Axial is in the early stages of developing synthetic drugs made of small molecules it hopes will absorb the particular gut-bacteria byproducts (called "metabolites") that appear to exacerbate autism symptoms. It's also working on a drug to treat the digestive problems suffered by many people with Parkinson's.

In the US, more than a million people suffer from autism, and there are no drugs to treat it; an additional million have Parkinson's. What would be the value of an FDA-approved drug for either condition? "I can't give you a market size," says Donabedian. "But if either one hits, it will be huge."

Chris Howerton, a biotechnology analyst at Jefferies, a New York investment bank, is less shy. "If every single microbiome paper turns into a proven therapy, it could impact the drug markets for most major categories of disease, which together were worth $350 billion in 2018 in the US alone," he says. "The breadth of the microbiome's potential application is really tantalising." F

PHOTOGRAPHS: NEIL GREENTREE / MEHRANGARH MUSEUM TRUST

SOUNDS of SOULS

With its serene atmosphere and intimate performance spaces, the centuries-old Ahhichatragarh Fort plays the perfect host to the Sacred Spirit Festival

By **UDAY BENEGAL**

Some two hours after touching down at Jodhpur airport in mid-February, I found myself at the gates of the Ahhichatragarh Fort, after making my way through the helter-skelter of Nagaur, a rather unremarkable town. Located halfway between Jodhpur and Bikaner, Nagaur is a typical old Indian town confused about its place in the modern world—it is choked with vehicles, shops and loudspeakers blaring everything from calls to prayer to sub-bass-pumping Bollywood hits. But although chaos engulfed the fort from all quarters, inside was a whole other world altogether.

▲ The Areej Sufi Ensemble from the Sultanate of Oman performing at the Sacred Spirit Festival

Row upon row of white tents were set within the sand-and-stone acreage of the 12th century fortress, looking like a luxe barracks: Each tent was outfitted with a double bed, heater, floor fan, converted electric 'laltains' and a bathroom with running hot water and toiletries by a luxury ayurvedic brand. Traditional Rajasthani designs and motifs brightened up the otherwise staid safari tents, lending a local touch to the bedspread, durries and curtains.

As I set off on a walkabout around the property, scaled a flight of stairs to the ramparts and circumambulated the site, the contrast

between the chaos outside the fortress walls and the serenity within became stark.

Ahhichatragarh Fort abounds in peelu trees, also called peelo vajradanti or toothbrush trees because of their twigs that are used to make natural teeth cleaners known as miswaak. Their cascading willow-esque leaves provide an effective camouflage for the posses of parakeets hiding within, who erupt in cacophonous union, scattering skyward at the slightest disturbance. From atop the bulwarks I got a bird's-eye view of the durbari halls, courtyards and mini mahals interjected by water channels, fountains and baths, beautiful even in their waterless state.

But the fort wasn't always this pristine. But by the 1980s it had fallen into considerable disrepair after years of neglect. The Mehrangarh Museum Trust (MMT), which also presides over the care and maintenance of Jodhpur's celebrated Mehrangarh Fort, set about a long and extensive restoration project along with a couple of generous patrons. Grants from the Los Angeles-based Getty Foundation and the London-based Helen Hamlyn Trust, along with contributions from MMT itself, resulted in the resurrection of the fort's architectural splendour more than two decades later.

By which time someone had the bright idea of using this relatively unknown but exquisite fort to host a yearly music festival. Evidently, the British pop star Sting had a role to play in the conception of what eventually became known as the Sacred Spirit Festival (he has attended but not performed at the festival yet). In its 13th year now, the festival has seen spiritual and classical musicians from India and around the world grace and uplift the air within these magnificent stone walls.

What began in 2007 as a single venue for a select audience turned into a two-city spectacle, with Jodhpur's Mehrangarh Fort being added as a second staging ground four years later. The reason was to open up the festival to a larger audience of international visitors and music lovers from India without giving up the intimate exclusivity of its original creation. Nagaur continues to remain small and contained. Only those residing within

▲ The Ahhichatragarh Fort was renovated in the 1980s by the Mehrangarh Museum Trust the fort, in one of the 200 tents or 30 rooms, have access to the music. So devoted are many of its long-time guests that the event sells out two years in advance. And you can't just buy a ticket. You have to know the right people to find your way in.

This year boasted a fabulous line-up of artistes from Africa, the Middle East, Asia and India. Over three days and five stages, 13 acts played for a delighted audience, with many of the artistes giving the eager aficionados more than one performance, occasionally spontaneous and unscheduled in some quiet corner of the fort. Eschewing a current festival trend, no performance at any stage overlaps with another; there's plenty of time to move from one stage to the next, sometimes to grab a drink, a meal or even a short snooze, so you never have to miss out on any of the music. The stages were all relatively small, the lighting never overwhelming and the performances easy and personal.

Every day's recitals were unique. Some were held under a gorgeous peelu tree in the mornings, as when Morocco's Walid ben Selim beautifully intoned the lyrics of revered Arab poets like Hallaj, Ibn Arabi, Abu Nawas and Mahmoud Darwich as China's Jiang Nan plucked surreal tones from her 21-stringed harp-like instrument known as guzheng. Others upped the visual drama a notch, like when the Tibetan singer Loten Namling and his collaborators, Ustad Daood Khan Sadozai from Afghanistan and a troupe of spirited Manganiyars, performed against the backdrop of Buddha's countenance-in-repose projected on a fortress wall. The sounds of the sarangi, sarod, khartal and Namling's large voice recounting the glories of Milarepa under a nearly full moon-lit sky were ethereal.

The sunset concerts were no less divine. Artistes like bansuri virtuoso Rakesh Chaurasia and the South Korean experimental pair known as Duo Bud enthralled and entertained the audience as the day gave way to night. It was the magic hour when we were reminded not to take the daytime heat for granted; those desert nights can get pretty cold.

The Areej Sufi Ensemble from the Sultanate of Oman were visually as much a treat as they were sonically, as they swayed in harmonious (and costumed) symmetry while extolling the Creator through impassioned calls and responses. And when Senegal's Sheikh Djimbira Sow began to sing, his vocal prowess, timbre and style reminded me of his fellow countryman, the great Youssou N'Dour, as the trio of drummers behind him

PHOTOGRAPHS: NEIL GREENTREE / MEHRANGARH MUSEUM TRUST

wrought infectious West African grooves and tones out of wood and skin. Which led me to think: Wouldn't it be a real treat if Sting were to reunite with past collaborator N'Dour at a future festival?

Each night's performance would end at the theatre of a hundred diyas (or perhaps a few hundred), at the sublimely lit Deepak Mahal, situated in a discreet corner of the fort. Danish Hussain Badayuni's ecstatic qawwalis and Kachra Khan Manganiyar's virtuosic renditions of Rajasthani musical lore could not have had a more romantic setting, though their words of love were directed not to human individuals but to the incorporeal and divine. Other performers at the festival included Iran's Mohammed Motamedi, as well as Sufi poetry expert Madan Gopal Singh, ghazal exponent Kavita Seth, Rajasthani devotional singer Mir Mukhtiyar Ali and Kashmir's Farooq Ahmad Ganie, all from India.

As with any festival of note, it was not only about the music. The breakfast tents and courtyard dinners provided meeting places and watering holes for old friends to reunite even as new bonds were made. Three days of cohabitation inevitably led to a familiarity of faces, as musicians mingled informally with their audience between performances. And though the crowd was rarefied and cloistered, away from the helter skelter of the outside world, the festival includes the local populace in a variety of ways. Artisans from the area have long been employed in the fort's restoration works. This year they went further, formalising that relationship with the craftspeople of the region by launching their own brand of textiles, clothes and jewellery, named Nagori in tribute to the town's history, which dates back to the Nagavanshi Kshatriyas, snake-worshipping warriors of medieval times who once reigned over the region.

Three days of spiritual music in the desert did not mark the end of it. After this leg was done, the festival shifted for another three days to the more grandiose Mehrangarh Fort in Jodhpur. For me, though, Nagaur was truly special, its smaller scale vastly more endearing than the opulence of a large, imposing venue. This intimacy of musical experience and soul connection far outweighs the scale of any big festival, no matter how high the fortress walls or impressive the marquee names. The more I think about it, the more I realise I might just become one of its devoted repeat visitors. F

(Facing page from top) The Nagaur fort houses 200 tents on its premises; Morocco's Walid ben Selim singing lyrics by revered Arab poets; Tibetan singer Loten Namling and his collaborators; (above) South Korean experimental pair Duo Bud

TESTIMONIES TO TIME

The architecture of Luxembourg City reflects centuries of styles and heritage

By **NEETA LAL**

SHUTTERSTOCK

L uxembourg City's Old Town is a haiku of Gothic architecture, mighty medieval fortifications, gurgling rivers, stony bridges and quaint streets and squares lined by steeply roofed houses. The Unesco-listed area is perched on cliffs, and is an amalgam of architectural styles, built and rebuilt over several centuries.

Nestled amid the deep gorges of the Alzette and Pétrusse rivers, pint-sized Luxembourg is wedged between Germany, France and Belgium. Between the 15th and 19th centuries, it was conquered by the French, Spanish, Austrian and again by the French, till it finally became an independent state in 1867. Today, the Grand Duchy of Luxembourg is a constitutional monarchy, with a Grand Duke as the head of state instead of a king.

"Luxembourg is named after a Saxon fortress called Lucilinburhuc ('little fortress') and was founded in 963 by Sigefroid, Count of the Ardennes. It is the world's only Grand Duchy," says our guide Romain Schwartz, as we stroll around Haute Ville, an area peppered with grand squares and heritage buildings. "After the defeat of Napoleon in 1815, the Congress of Vienna made Luxembourg into a Grand Duchy. The present Grand Duke is Crown Prince Henri who ascended the throne in October 2000."

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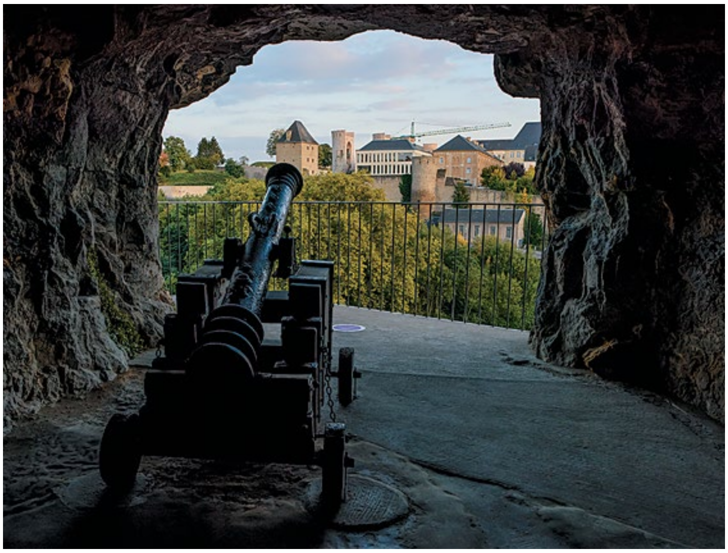

(From left) The Old Town of Luxembourg City is an amalgam of architectural styles; the underground tunnels of Bock Casemates are a Unesco World Heritage Site

L uxembourg is one of the smallest countries in the world, with an area spanning just 2,586 sq km, and a population of 500,000. But despite its size, it is a glorious mix of history, art, culture, gastronomy and entertainment.

Luxembourg City, the country's capital, is home to the Bock Casemates, a Unesco World Heritage Site. It comprises a warren of tunnels hewn from solid rock, and in the medieval times, it housed workshops, kitchens, bakeries and slaughter houses. "The 17-km tunnel was carved by the Spanish between 1737 and 1746. It was later used as an air raid shelter for 35,000 locals, and thousands of soldiers during the World Wars," Schwartz explains, as we negotiate labyrinthine passages and impressive rock stairways.

Ultimately, its demolition was ordered by the 1867 Treaty of London to defuse political tensions between France and Germany and mark the future neutrality of Luxembourg. The demolition took 16 years to complete, Schwartz adds. But because it was impossible to raze it completely without

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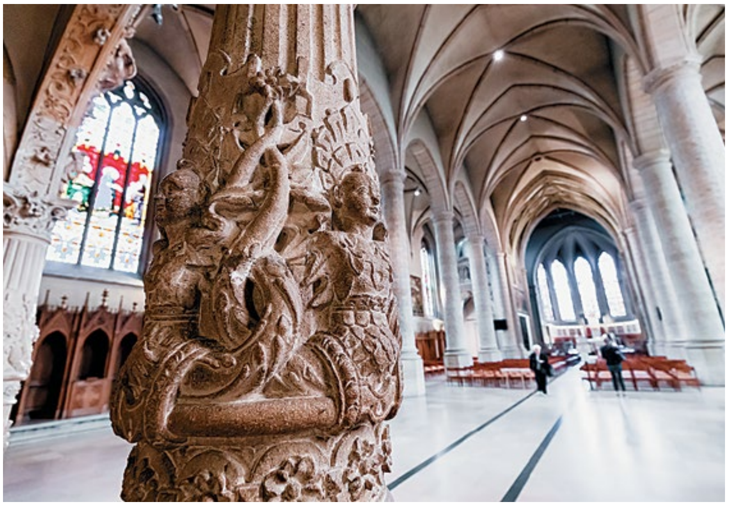

SHUTTERSTOCK

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(Clockwise from left) The Notre-Dame Cathedral is an important landmark located in the city centre; the Philharmonie is a concert hall known for its architecture and acoustics; the main city square is popular among tourists

demolishing a part of the city, some of the tunnel was left intact, with different parts at different levels, with stairways penetrating 40 meters into the rock.

Like many old cities, Luxembourg City has numerous examples of historical buildings being repurposed over the years. For instance, the Centre Culturel de Rencontre Abbaye de Neumünster, a multi-arts venue located in the Grund district, began life as a Benedictine monastery in the early 17th century. The building is a unique architectural ensemble of dun-coloured neo-classical facades with grey sliding roofs, and was reopened in 2004 following years of intensive renovation. Over the centuries, it has done duty variously as a police station, barracks and prison. Today, it is the city's signature cultural venue hosting plays, arthouse movies and events attracting global audiences.

However, the Big Daddy of all cultural landmarks is the Notre-Dame Cathedral located in the city centre. A late gothic, semi-Renaissance masterpiece, its interiors are illuminated by sunlight that filters through stained glass windows dating back to the 19th and 20th centuries. "The Jesuits built the cathedral between 1613 and 1621," our guide explains, as we take in the shrine's richly sculpted alabaster choir screen, columns decorated with arabesques, neo-Gothic confessionals and modern sculptures in bas relief. The two majestic lions that flank the cathedral's entrance, as well as its bronze gates, are the handiwork of famed Luxembourger painter and sculptor Auguste Trémont.

A musket shot away from the cathedral sprawls the Grand Ducal Palace, the official residence of Grand Duke Henri. The palace, with its 16th-century façade built in the Romantic and Gothic architectural styles, serves as the home and office of the Grand Duke, and is not open to the public.

Modern-day Luxembourg City is one of the four official capitals of the European Union, and home to the European Court of Justice. It is also a financial powerhouse, with the European Investment Bank and some of the world's major businesses houses—such as Skype, Deutsche Bank and KPMG—located here.

Peppering the commercial district are examples of contemporary architectural marvels such as the Concert Hall or The Philharmonie, designed by Christian de Portzamparc. Opened in 2005, the hall's stellar architecture and its impressive acoustics won Portzamparc many international architectural awards. The building includes 823 slender white pillars and an elliptical foyer that houses three different auditoria.

Then there is The National Museum of History and Art, located in the historic Fishmarket neighbourhood. Many of its sections are carved out of rock, which can be seen through glass walls.

In line with the modernity reflected in its contemporary architecture, is Luxembourg's recent move towards making all forms of public transport free. Coming into effect from this March, it is aimed to encourage residents and visitors to use public transports options and help free up congested roads in a country that has the most cars per person in Europe.

Tiny Luxembourg City sends out many important lessons to the rest of the world. Lessons in good governance, peaceful coexistence, preservation of culture and respect for the environment. Perhaps this is what makes this small city have such a big heart. F

THE INHERITANCE OF FLAVOURS

Tracing the food traditions of India's lesser-known cuisines

By **ANOOTHI VISHAL**

What was food in India before the Columbian Exchange (the exchange of plants, animals and ideas between the Americas, Europe and Asia in the 15th and 16th centuries) changed global and Indian gastronomy, and gave us ingredients such as potatoes, tomatoes and chillies, without which most modern-day Indian kitchens must flounder? We do get tantalising glimpses every now and then into kitchens of the past. For instance, the venerable food historian KT Achaya records in his book, *A Historical Dictionary of Indian Foods*, an incident when Warren Hastings, the first British governor of Bengal, visited Avadh in the mid-18th century and was gifted a basket of potatoes—a new, exotic delicacy.

The chhappan bhog is made on special occasions at the Sri Radha Raman temple in Vrindavan

PHOTOGRAPHS: MADHU KAPPARATH

Chillies too are not indigenous to India. Long before their large-scale cultivation thanks to Colonialism, pepper was considered to be black gold. It added heat to dishes and Ayurveda and Unani medicine systems ascribed therapeutic uses to it. The nihari, a pepper-laced stew of Shahjahanabad (as old Delhi was known), was created ostensibly to ward off disease brought by the cold waters of the Yamuna. In other parts of the country, pipli, a long variety of pepper, was used to give mild pungency. It still grows wild in Delhi, Rajasthan and Punjab, though it has fallen out of use in modern kitchens.

There are many such stories of lost ingredients and disappearing dishes through history. To find a continuous culinary culture that still cooks as it used to almost 500 years ago is thus a rarity.

▲ (Clockwise from top) Restaurant chefs sit for a sampling of 32 dishes from the chhappan bhog, a 56-dish spread that includes desserts like malpua and khurchan; devotees gather for the aarti; Holi at the temple

To experience one such example of continuity, and get a deeper understanding of lesser known cuisines of India, we head to the famous Sri Radha Raman temple in Vrindavan. The temple, one of the oldest in Vrindavan, was built around 1542 AD, and this is where 10 chefs, as part of my Chefs' Supper Club initiative, got a sampling of 32 dishes from the bhog, or offering. The food is cooked in a kitchen where the hearth fire has not been put out in more than 450 years.

The raj bhog that we sampled is offered to Krishna, the deity of Vrindavan, and his devotees every evening. Sometimes, devotees can sponsor the service and on special occasions, 56 dishes or chhappan bhog are cooked. The 32 dishes that we were offered, on plates made of lotus and saal

PHOTOGRAPHS: AMIT VERMA

leaves, included kachori, besan ke sev, malpua (one a dry pancake, the second soaked in syrup), boondi, sweetened bottle gourd mithai, peda, kadhi, colocasia and local bean preparations with hints of turmeric and black pepper, and even mildly-fermented, mildly-spiced pickles made in water instead of oil. All the food was cooked in ghee, an ingredient that ancient Vedic rituals prized and symbolically elevated as a 'purifying' medium.

This strain of thought—of the purifying effects of ghee—is also deeply ingrained in many traditional Indian kitchens. Pucca khana and kaccha khana are the two major categories of food prepared in this ritualistic way—pucca being fried food, sanctified by ghee, kaccha being food cooked primarily in water, like dal or kadhi.

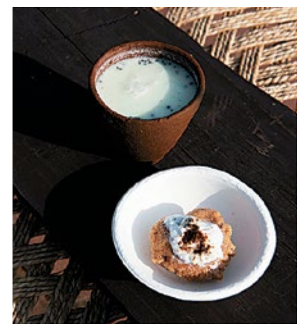
The temple follows this classification, and we get to sample a bit of both. The kaccha khana is cooked while observing strict norms by a goswami—follower of a sect of worshippers of the Bhakti saint Chaitanya Mahaprabhu (1486–1534)—who left Bengal to rediscover places of religious significance in Vrindavan.

This Bengali heritage is perhaps reflected in the mix of Braj ingredients like milk and milk-based products and local, seasonal vegetables with Bengali influences—evident in a sweeter taste to all dishes. No harsh, astringent or bitter ingredients are used; no mustard oil, or strong spices, including asafoetida, used generally in other parts of the country as a substitute to onion and garlic, while cooking 'pure veg' food. Instead, the food must have a sweeter rasa (an Ayurveda taste classification). The ritualistic explanation, of course, is that everything offered to the god of love must be sattvic (food inducing morally good qualities) and sweet.

▲ Shree Radhe Sweets in Orchha also makes gluten-free gujiya, a traditional dumpling

About 300 km away, Orchha in Madhya Pradesh is a little-known town, home to the Rajput Bundela rulers of the 16th century. A fort, temple and cenotaphs are all architectural marvels here, showing a blend of Indo-Islamic influences; the art and ambitions of the rulers, closely allied with the Mughals.

As the Betwa flows quietly past the town, witness to the ebb and flow of history, some things have endured—architecture aside, it is the quaint old food traditions of this town that lead you back to another era. I got a glimpse of some of these while curating the culinary experiences for Namaste Orchha, a recent arts festival, an initiative of Madhya Pradesh Tourism.



(Clockwise from left) A traditional thali cooked by Vandana Dubey, a local guide-turned-cooking instructor; Bundelkhandi cuisine, which includes dishes like mangore, sannato, local bada and gujiya, is a study in how seasonal ingredients can make for a flavourful plate

Orchha has a solid mithai tradition waiting to be sampled. The gujiya is a dumpling usually served drenched in syrup, but other unique versions, including flourless, gluten-free ones, are available in this town too. Then, there are unique laddoos from soft malai ones made from milk solids to those made from bottle-gourd and even saunth (dried ginger). The latter is apt since this is the ginger belt. In fact, in the local market, you may chance upon lesser-known ginger varieties such as the mango ginger, a rhizome which tastes of green mango.

Bundelkhandi cuisine is a study of how seasonal ingredients, sans rich additives, can make for an immensely flavourful plate. Vandana Dubey, a local guide-turned-cooking instructor, serves a thali that includes thadula (the local version of crisp urad dal kachoris), kadhi cooked with brinjal, seasonal vegetables like drumsticks, the local bada (a cousin of the dahi bada but soaked in salt water and thin buttermilk instead of creamy yoghurt), and a fiery chutney made almost like a Mexican salsa.

The Bundeli dialect is colourful and has been the language of poets—from the 12th century Chand Bardai, who wrote about the exploits of Prithviraj Chauhan in his epic Prithviraj Raso. The language lives on, and every now and then, is used to name daily dishes like the sannato, an epithet for a boondi raita with enough spice to make you, literally, go silent.

Then there are mangore, dal fritters seasoned with pounded coriander, available at every tea stall. What is more interesting is the buknu masala they sprinkled on these. I went back home to research this and found it is an ancient recipe—a mix of five to six spices, of which chief is dried ginger. Bring it back from your travel; sprinkle on your dal or on chaats, for a taste of the past. F

ON CARS

KEYSTONE / GETTY IMAGES

I couldn't find the sports car of my dreams, so I built it myself.

—FERDINAND PORSCHE

All of those cars were once just a dream in somebody's head.

—PETER GABRIEL

The best car safety device is a rear-view mirror with a cop in it.

—DUDLEY MOORE

If GM had kept up with technology like the computer industry has, we would all be driving $25 cars that got 1,000 MPG.

—BILL GATES

SHUTTERSTOCK

I don't run a car, have never run a car. I could say this is because I have this extremely tender environmentalist conscience, but the fact is I hate driving.

—DAVID ATTENBOROUGH

GETTY IMAGES

Everybody wants to be someplace he ain't.

—HENRY FORD

I would have probably stolen cars—it would have given me the same adrenaline rush as racing.

—VALENTINO ROSSI

Your car should drive itself. It's amazing to me that we let humans drive cars... it's a bug that cars were invented before computers.

—ERIC SCHMIDT

You can't stop everything from happening. But we've gotten to a point where we're certainly trying. If a car doesn't have four hundred air bags in it, then it's no good.

—CLINT EASTWOOD

SHUTTERSTOCK

Nobody wants to buy a $60,000 electric Civic. But people will pay $90,000 for an electric sports car.

—ELON MUSK

Cars let us out of the barn and, while they were at it, destroyed the American nuclear family. As anyone who has had an American nuclear family can tell you, this was a relief to all concerned.

—PJ O'ROURKE

I've always been asked, 'What is my favourite car?' and I've always said 'The next one'.

—CARROLL SHELBY

Flying a good airplane doesn't require near as much attention as a motor car.

—CHARLES LINDBERGH