Bloomberg Businessweek® Middle East

1-15 May, 2018

In an age of uncertain oil prices, Gulf oil majors want to extract all the value they can

p12

Algeria DZD 215	Egypt EGP 18	Jordan JOD 2	Lebanon LBP 4000	Oman OMR 1	Saudi Arabia SAR 10	UAE AED 10
Bahrain BHD 1	Iraq IQD 3200	Kuwait KWD 0.75	Libya LYD 3.5	Qatar QR 10	Syria SYP 200	Yemen YER 600

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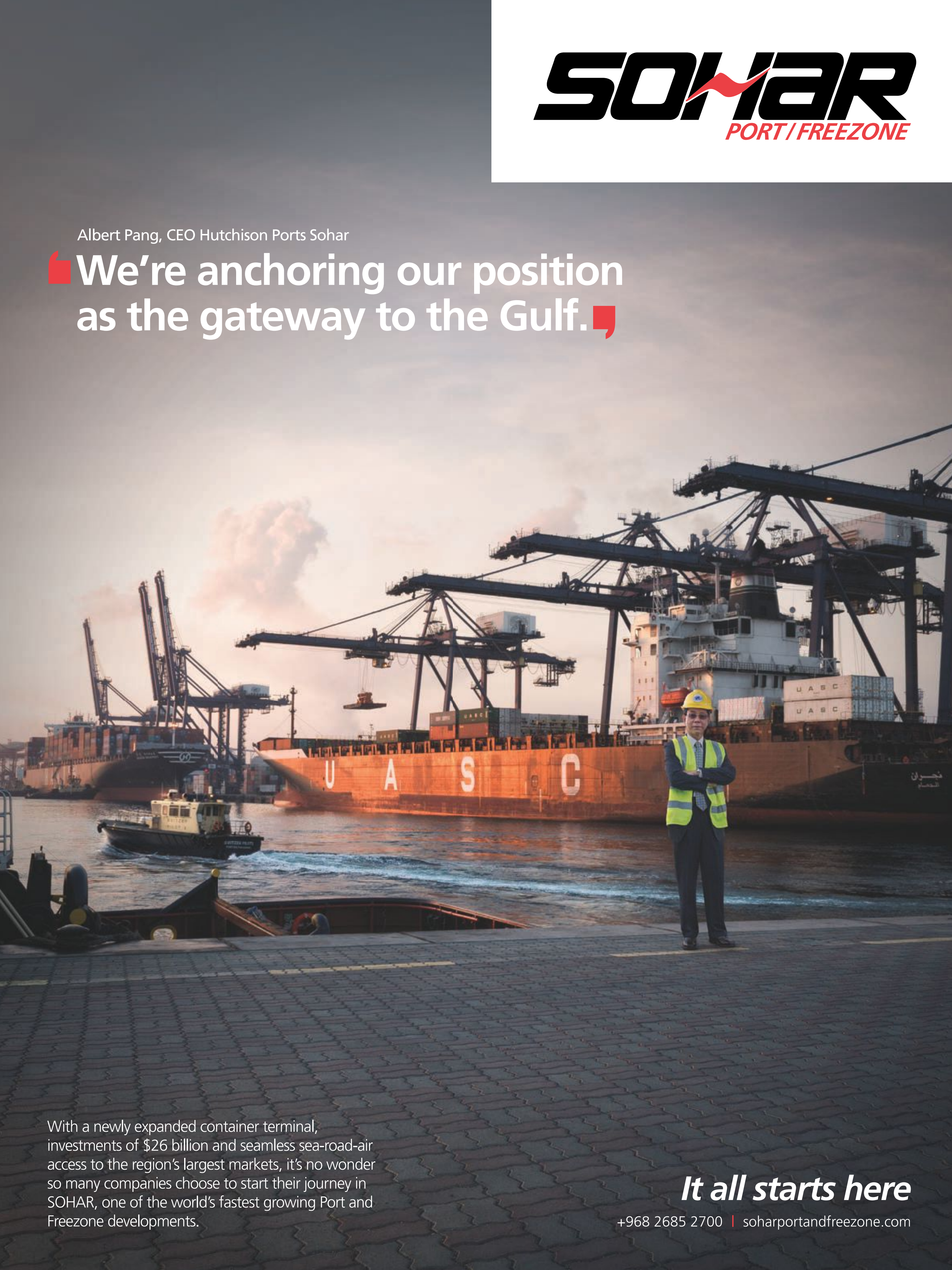
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▲ Border fencing near Nogales, Ariz.

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1

■ IN BRIEF

■ REMARKS

■ VIEW

1 BUSINESS

2 TECHNOLOGY

3 FINANCE

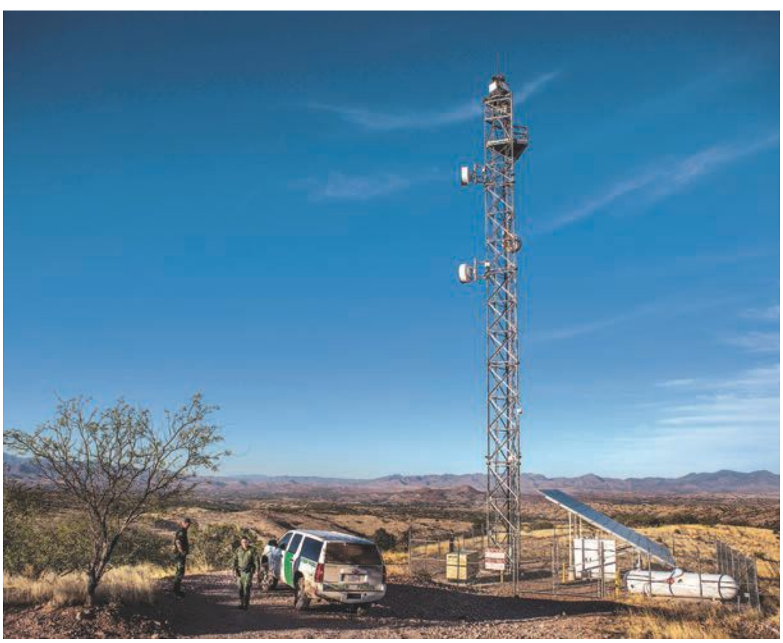
4 ECONOMICS

5 POLITICS


THE ACADEMY
AT DIFC

40 **“Palantir is twice the age most startups are when they cash out in a sale or initial public offering. The company needs to figure out how to be rewarded on Wall Street without creeping out Main Street.”**

FEATURES



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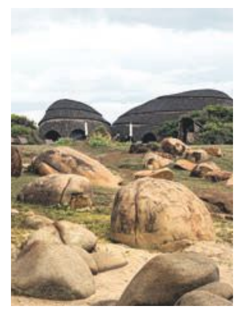

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IN BRIEF

Americas

● The IRS offered Americans an extra day to do their taxes after an error caused its website to tell e-filers that it would be down for a "planned outage" from tax day, April 17, through the year

9999

● "I don't get confused."

UN Ambassador Nikki Haley responded to Larry Kudlow, director of the National Economic Council, who said she was suffering from "momentary confusion" when she promised new sanctions against Russia. Kudlow later apologised.

● Telefónica hired investment bankers to handle an IPO of its Argentine unit. The debt-laden Spanish wireless carrier is hoping to raise as much as

$1b

in the offering, which is planned for next year.

● Barbara Bush, the wife of one president and mother of another, died on April 17 at 92.

While generally declining to discuss policy, she was a force in supporting literacy and civil rights. And she liked to walk her dog in her bathrobe.

● An independent auditor for MoviePass said it had "substantial doubt" that the popular subscription service could stay in business. MoviePass, which lets members see an unlimited number of films for $10 a month, posted a 2017 loss of

$151m

● Puerto Rico experienced yet another island-wide blackout on April 18.

AEE, the island's electric utility, tweeted that it would need 24 to 36 hours to restore service. Rhodium Group reports that Hurricane Maria has cost Puerto Ricans more customer-hours than the rest of the U.S. lost from all causes in the past five years.

● Protesters gathered on April 15 at a Philadelphia Starbucks where, days before, two black men were arrested while waiting for a friend. CEO Kevin Johnson, calling the arrests "reprehensible," will shut all 8,000 Starbucks-owned U.S. stores for four hours on May 29 to give employees racial-bias training.

Europe

● French oil giant Total, which is stocking up on traditional utility providers, agreed to pay $1.7 billion for a majority stake in Direct Energie. The deal brings 2.6 million customers; Total aims to provide power to 7 million homes and businesses.

● Britain joined the U.S. in alerting citizens of Russian cyberattacks on April 16. The rare joint missive said Russian operatives had seized control of routers to support spy activity, while urging households to change passwords.

● Shire agreed to sell its cancer drug business to France's Servier for

$2.4b

The deal could cool interest from Japan's Takeda Pharmaceutical, which had been weighing an offer for the Dublin-based company to bolster its own oncology business.

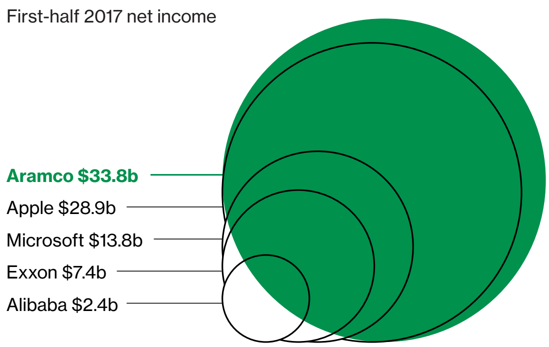
Asia

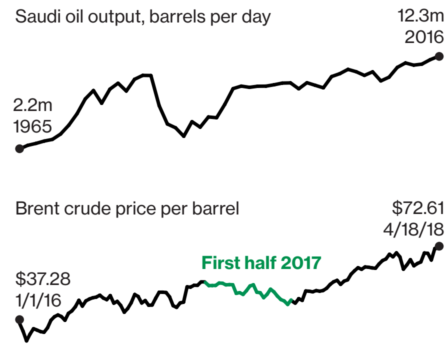
● London home prices posted their first annual drop since 2009, as Brexit spooked potential buyers and sent some to the Continent. The decline of

1%

contrasts with gains in rural parts of England.

● Saudi Aramco, the state-run energy giant whose financial reports were recently seen by Bloomberg News, is more profitable than some of the world's largest companies. If oil prices keep rising, its margins could grow.





● Advertising giant WPP began searching for a new CEO after Martin Sorrell abruptly stepped down.

A driving force behind the industry's frenzied consolidation, he was being investigated for personal misconduct, an allegation he's denied.

● North Korea's Kim Jong Un secretly met with CIA Director Mike Pompeo to discuss terms for a summit with President Trump. Meanwhile, U.S. troops practiced an emergency evacuation of American citizens in South Korea.

● Sixteen major designers wrapped up Saudi Arabia's first fashion week, putting Riyadh on the sartorial circuit alongside Milan, New York, and Paris.

A design by Mashael AlRajhi

● China promised to loosen rules for foreign companies making planes, drones, and electric cars within its borders.

Specifically, it will slowly ease requirements that General Motors, Volkswagen, and other companies partner with local manufacturers.

● A spell of good weather should take solar power production in Germany to a weekly peak of 25.6 megawatts, Bloomberg analysts say—close to the record of 27.8MW reached in May 2017. Wind power was also forecast to reach a record just a few days before Earth Day. Data for January showed that electricity from wind turbines in the country had increased 90 percent from a year earlier.

● BMW AG plans to begin producing its first all-electric sport utility vehicle, dubbed the iX3, in 2020 at its joint-venture in China and will sell the model abroad, according to partner Brilliance China Automotive Holdings Ltd.

Africa

● George Weah, president of Liberia, ordered a probe of Exxon's 2013 deal for coastal drilling rights. A report by Global Witness alleged in March that the sellers had acquired those rights illegally. Exxon has yet to comment on the probe but says it complied with all applicable antigraft laws.

● Uganda lawmakers are weighing a tax on social media use of 200 shillings, or 5¢, a day.

Champions of the legislation say it will boost productivity.

HALEY: OLIVIER DOULIERY/ABACA/SIPA/AP PHOTO. SAUDI ARABIA: MAYA ANWAR/THE NEW YORK TIMES/REDUX. STARBUCKS: MARK MAKELA/REUTERS. EARTH: COURTESY NASA. WEAH: THIERRY GOUEGNON/REUTERS. DATA: COMPILED BY BLOOMBERG, BP STATISTICAL REVIEW OF WORLD ENERGY

Thatcher's 1979 financial reforms transformed Britain. Is the People's Republic about to undergo the same?

By John Micklethwait

In 1984, I came to China as a grumpy, uninquisitive backpacker, dragged from crowded bus to uncomfortable hostel to inedible meal by two student friends who spoke Mandarin. The highlight of my trip was a visit to Maxim's, supposedly the only Western restaurant in Beijing. The coffee tasted like nectar, and I survived another week. The idea that China was five years into Deng Xiaoping's great opening shamefully passed me by.

I thought of Maxim's as I waited for a plane at Haikou Meilan International Airport earlier this month, nursing a cappuccino at yet another Starbucks; opposite me was a Jimmy Choo shop, each shoe worth several times the cost of a hostel three decades ago; on the other side stood a mountain of Lindt chocolate. These Western luxuries weren't there for international visitors. Haikou is a provincial airport–the place China's middle classes pass though on their way to the beach.

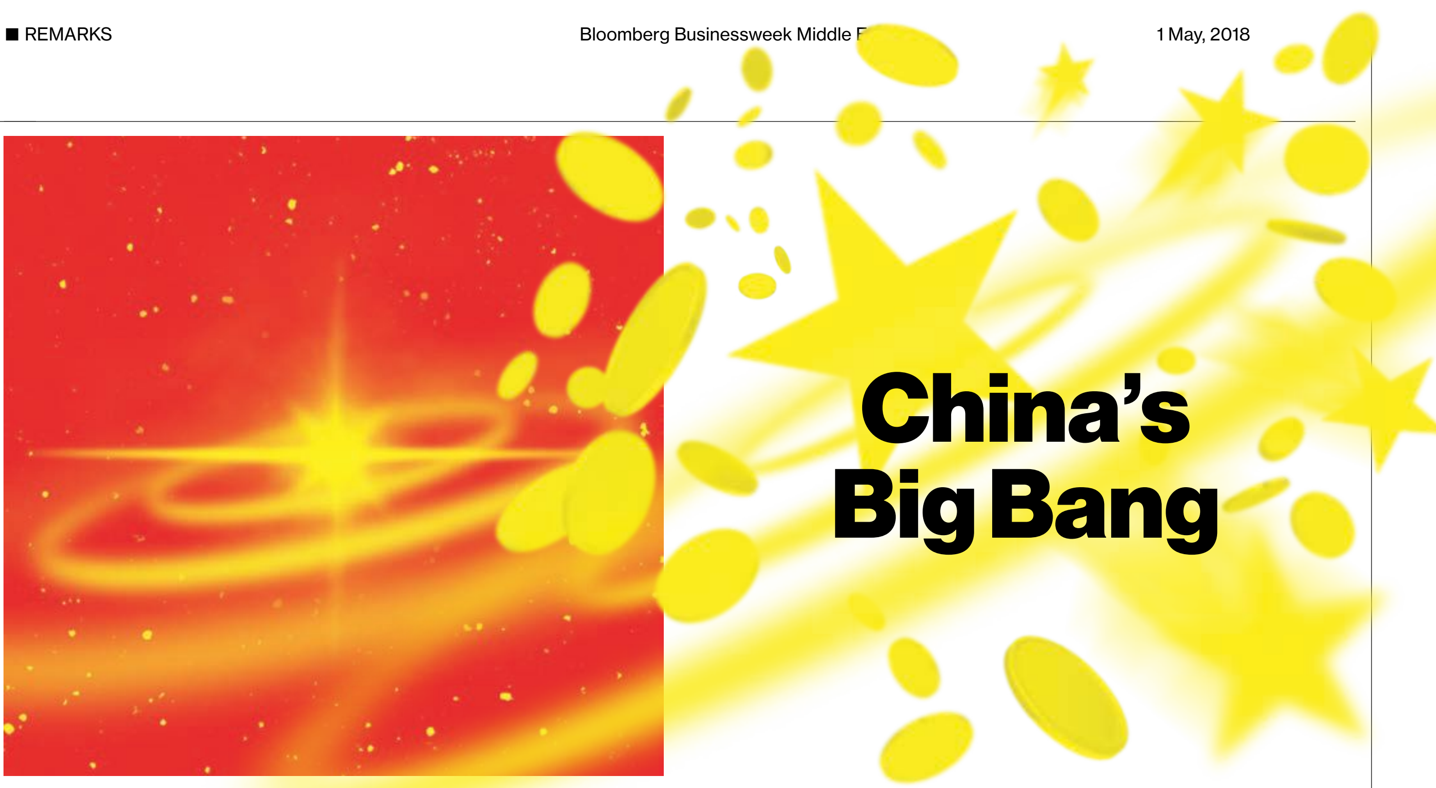
For the past month, everything to do with the Middle Kingdom has been seen through the prism of China's trade relations with the U.S.–and the chaotic tweeting of Donald Trump. At Haikou, I was on my way back from Xi Jinping's speech at the Boao Forum for Asia, China's humid (and slightly shambolic) version of Davos. Xi's success was being judged less on what China's leader actually said than whether the reforms he outlined had satisfied his American counterpart. So when the Donald duly tweeted his pleasure, the markets' concerns subsided.

Putting off a trade war (if that is what Xi managed to do in Boao) is no small accomplishment. But in terms of deeper change, the more significant announcement came at a side panel the next day. Yi Gang, the new governor of the People's Bank of China, unveiled a string of reforms giving far greater freedoms to foreign banks, insurers, and investment managers. Hitherto limited to joint ventures, foreign financiers will be allowed to hold majority stakes by the end of June–and all restrictions on ownership will go in three years. While China has embraced Western-style consumerism, its financial sector remains a bog, unable to satisfy the banking, insurance, and retirement needs of its growing middle classes.

Technically, the mild-mannered Yi was just setting a more explicit timetable for reforms announced last November. And don't expect Trump to make much of them: Nobody in the Midwest cares much about whether JP Morgan Chase & Co. or Goldman Sachs Group can operate more freely in China. But this could turn out to be the Chinese equivalent of Britain's Big Bang.

When Margaret Thatcher became prime minister in 1979, the City of London was a relatively insular, bowler-hatted affair. Exchange controls were in place. The City had its freewheeling parts–such as the euro markets–but the stock market was carved up by British brokers and jobbers, with Hogwartian names such as Ackroyd & Smithers. The Big Bang swept away many of these rules, let foreigners in, and created the modern cosmopolitan City of London, which until Brexit looked like a challenger to New York.

China starts from a very different position–it's the world's second-biggest economy. But its financial system faces many of the same restrictions as Britain's did–not only that foreign ownership is banned. There's a tortuous system of licenses and strict rules on capital flows, and nobody cares that local



China's Big Bang

consumers get a lousy deal. This is basically a state-run industry. Until recently, you could face the death penalty for taking deposits without the proper licenses.

Thatcher's reforms were rooted in ideology as well as economics. China's are being driven by a group of Western-educated technocrats. Liu He, the vice premier with purview of economic policy who has a masters degree from Harvard, has been given unusual autonomy by President Xi. Other reformers include Governor Yi, who studied in America; Guo Shuqing, a former visiting scholar at Oxford, who heads the PBOC's Communist Party Committee and runs the nation's banking regulator; and Fang Xinghai, the Stanford-educated economist overseeing the opening of China's stock market as deputy head of the securities regulator. Wang Qishan, the de Tocqueville-quoting vice president, is also sympathetic.

It's unlikely we will ever know how many of the reforms announced by Governor Yi were always in the works, but Trump's belligerence seems to have accelerated them. At the very least, Liu's technocrats have shown a skill in taking advantage of the trade crisis.

There's no shortage of people in China keen to play down the changes—not least Yi himself. He reacts in horror to the idea of a Big Bang. China is all about gradual change. And in the short term, not much will change. Foreign banks, insurers, and money managers won't be rushing in just because China is taking off the limit on foreign ownership. They will still need to get licenses, which may be slow in coming. Many foreign companies are happy with their local tie-ups. One leading Chinese hedge fund manager doubts whether foreign investment managers will ever master the Wild East of Chinese equities: Their main selling point will be the ability to get money out of the country. ("Though if they can do that," the hedge fund manager says, "I will be a customer.") The most recent estimate, from UBS AG, shows foreign companies had only 1 percent of the brokerage business at the end of 2016—though they've done slightly better in insurance and banking. Foreigners had 1.3 percent of the banking market and 5.2 percent of insurance.

But the lesson of financial revolutions is that they're cumulative. Yi talked about reform of the financial sector being linked to reform of the capital account and the currency. In May, China becomes part of the MSCI global indexes. There's a flood of foreign money interested in investing in the world's fastest-growing large economy and an equally huge amount of Chinese money wanting to get out. To get Western funds, Chinese money managers will have to follow the same rules about transparency.

In finance, local knowledge counts for a lot; but it can be bought. The British jobbers and brokers who thought the Yanks would never beat "Caz"—the long-established stock brokerage Cazenove—or the suave corporate financiers at Morgan, Grenfell & Co.—were right for a while. Foreign companies lost a fortune in the early parts of Big Bang. But Caz is now part of JP Morgan Chase and Morgan Grenfell disappeared into Deutsche Bank. It's hard to imagine China letting foreigners buy its biggest banks, as Britain did; but again, foreigners won't have to do that much to start changing Chinese markets.

At the very least, for competitive reasons, the pay gap between Chinese bankers and Western ones will narrow. At the moment, the head of the Industrial and Commercial Bank of China, China's biggest bank (and the world's most profitable), is paid $100,000 a year; at JP Morgan Chase, Jamie Dimon earns that every 27 hours.

One of Thatcher's least appreciated qualities was luck: She looked set to be a one-term prime minister until an Argentine generalissimo was stupid enough to invade the Falkland ▶

ILLUSTRATION BY 731

◀ Islands. China's reformers have three problems where they will need a lot of luck.

The first is that finance is by its nature a somewhat explosive business. Few banks seemed more stable in Britain than Barings Bank—until it collapsed in 1995 as a result of the dealings of a rogue employee in Singapore. The idea of, say, the Agricultural Bank of China, one of the oldest in the People's Republic, wandering into derivative trading isn't an appetising one.

Second, the technocrats already have a financial crisis to deal with: China's mountain of debt. Lending has grown by almost 100 percent of gross domestic product in the past nine years—the same sort of increase that took place in the U.S. before 2008. You don't have to go far up the coast from Boao to find unfinished empty apartment blocks. Banks have hidden a lot of the bad stuff off their books in the form of opaque instruments channeled through trusts and other financing vehicles.

Cleaning this up is an immense task. Some Chinese talk about the need for a controlled explosion—the government should let something significant go bankrupt to send a message to investors and other borrowers. That's a tricky business, even in the West, as the U.S. government discovered when it let Lehman Brothers fail. In China's opaque circle of influences, even private companies have their political protectors.

And that leads to the third problem. The technocrats are extremely clever, but they're not politicians. Their mandate comes not from the ballot box, but from the permission of one man. Xi has given them autonomy. A big bankruptcy, a securities scandal, or even just the arrival of Wall Street salaries may make him pause. He wouldn't be the first ruler to make scapegoats out of his know-it-all grand viziers.

So China's Big Bang may splutter a bit. But once you begin these things, they create their own momentum. Thatcher was fond of saying, "There is no alternative." China has an aging population that needs products such as pensions and life insurance. What may soon be the world's biggest economy needs a financial sector to match—and a financial centre. It would be odd if one of the main impacts of Trump's trade war ends up being the growing sophistication of finance in his main opponent. But as anyone who went to the Beijing branch of Maxim's in 1984 will tell you, things can change a lot. Ⓑ

Micklethwait is editor-in-chief of Bloomberg.

■ VIEW

To read Noah Smith on Airbnb's impact on tourism worldwide and Justin Fox on Mark Zuckerberg's monopoly, go to Bloombergview.com

The Importance Of Trump's Trust

● Whatever the merit of his policies, Mike Pompeo has at least one advantage over Rex Tillerson

If it's true that proximity to President Trump is the key to effective policymaking, then Secretary of State nominee Mike Pompeo stands a good chance to succeed—whatever the merit of his policies. That's as it should be. To think otherwise is to misunderstand the role of the secretary of state.

The job of this officeholder, fourth in the line of presidential succession, is to uphold the Constitution, execute the lawful policies of the president, and strengthen the effectiveness of the department he or she leads.

In short, as much as Trump's critics may wish it to be, Pompeo's job is not to restrain the president, but to let Trump be Trump—and thereby respect the voters who elected him. The Senate has to decide whether Pompeo has the competence and character to reflect the president's thinking—or instead deserves to join the fewer than 2 percent of cabinet nominees since 1789 it's rejected.

Unlike Rex Tillerson before him, Pompeo clearly enjoys Trump's trust. (He's already been to North Korea for the president.) The two are much closer on issues, including how to approach North Korea, Iran, and the Paris accord on climate change. When Pompeo speaks, U.S. allies and adversaries alike can be relatively sure he represents Trump's views.

As a lawyer, businessman, U.S. representative, and now director of the CIA, Pompeo has demonstrated his competence. During his confirmation hearing, he pledged to respect congressional oversight, fill empty Department of State positions, shepherd its budget, and restore the department's "swagger."

Senators were right to ask whether Pompeo would be willing to "stand up" to the president. They've also been right to raise questions about Pompeo's troubling remarks attacking Muslims and the legalisation of same-sex marriages. The job of representing American values to the world—not least human rights, which Pompeo has promised to champion—leaves no room for intolerance, bigotry, or discrimination. Character is as important as competence.

That said, the greatest foreign policy challenges facing the U.S.—in North Korea, Iran, Syria, Russia, and China—will demand robust and sustained diplomacy as a first resort. That's all but impossible when a president feels he can't rely on his diplomats. For better and worse, Trump often changes his mind. He's made two about-turns on the Trans-Pacific Partnership. Could there be more permanent and positive shifts—say, with the Paris accord—in the offing? The odds will be better if Trump is working with a team he trusts. Ⓑ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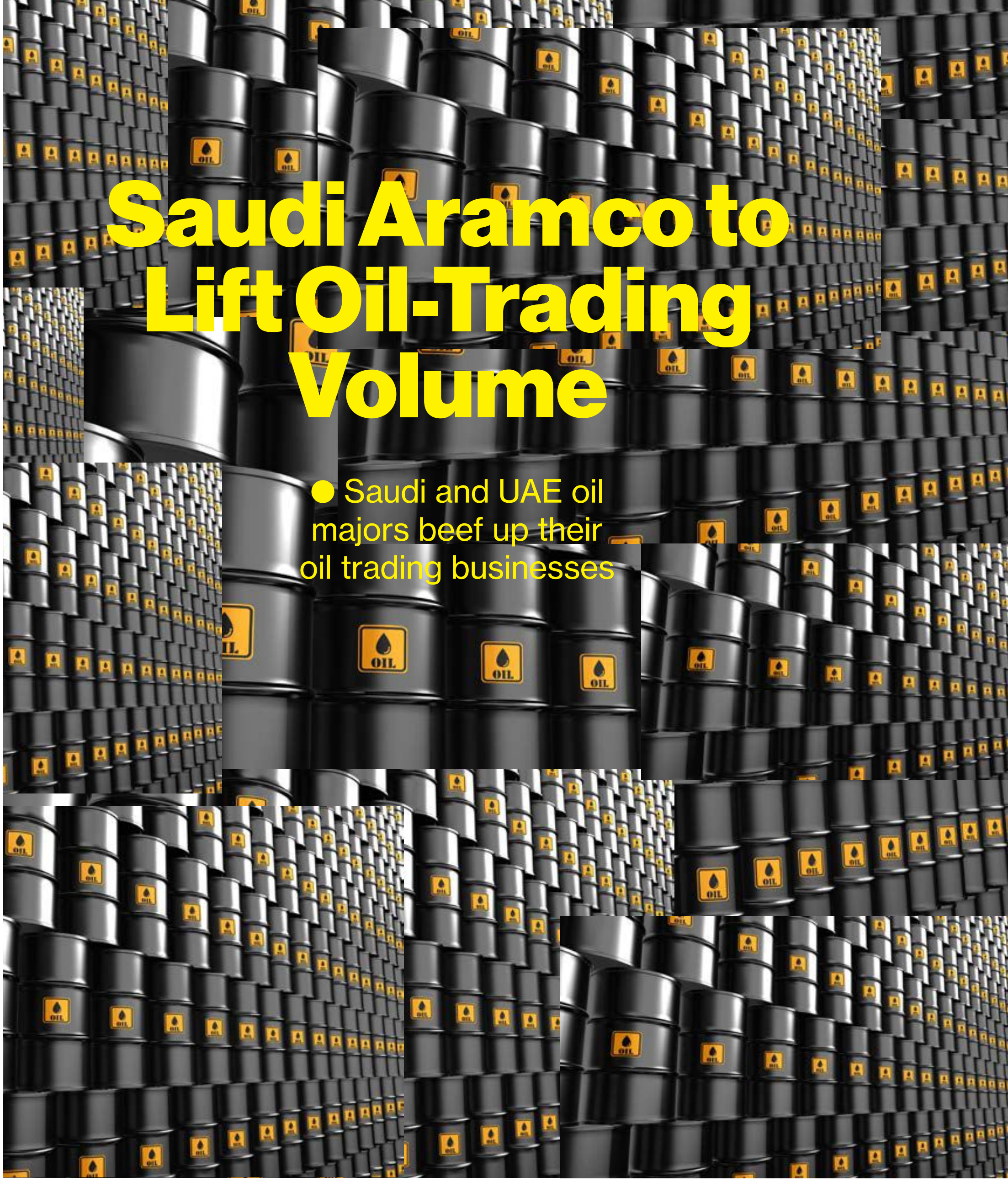


Saudi Aramco to Lift Oil-Trading Volume

● Saudi and UAE oil majors beef up their oil trading businesses

Saudi Aramco, the world's biggest oil exporter, plans to trade as much as 6 million barrels a day, a jump in volume that would put it in the top tier of companies that buy and sell crude and refined products.

The trading arm of the state-run giant known officially as Saudi Arabian Oil Co. currently handles between 3.3 million and 3.6 million barrels a day, Ibrahim Al-Buainain, the unit's chief executive officer, said in an interview in Abu Dhabi. Aramco Trading, as the business is known, targets 5.5 million to 6 million barrels a day by 2020 as its parent opens new refineries in Malaysia and Saudi Arabia, he said.

If it reaches its target, Aramco Trading would rival Vitol Group, the world's largest independent trader, which trades about 7 million barrels a day of crude and products. Royal Dutch Shell Plc buys and sells about 12 million barrels a day, and BP Plc deals in about 8 million. Shell and BP, like Aramco, are integrated oil companies engaged in production, refining and trading.

Middle Eastern oil producers are adding refining capacity through joint ventures and will need to find new buyers for their larger product volumes, according to Chris Bake, Vitol's head of origination. Bake and Al-Buainain both spoke on April 23 at the Middle East Petroleum and Gas Conference in Abu Dhabi.

Aramco Trading dealt only in refined products when it started operating in 2012. Last year it began buying and selling third-party crude -- oil pumped by other producers -- to supply its overseas refineries. Aramco Trading also sells Saudi crude to refineries that lack long-term supply contracts with its parent company, in return for products from those same facilities. Crude-trading volumes are still small, Al-Buainain said.

Aramco is not the only Middle East oil major to expand its oil trading business. Abu Dhabi

National Oil Co. last month hired Philippe Khoury, formerly an energy banker at HSBC Holdings Plc, to head up its new unit for trading crude oil and refined products.

Khoury was one of the HSBC executives working on the potential initial public offering of Saudi Aramco. Prior to joining the bank, he also worked for the French oil major Total SA in Russia, Africa and ran its trading business in the Americas, Khoury said in dinner remarks at a conference in Abu Dhabi on April 23.

State-owned Adnoc is bolstering its capacity to buy and sell crude and fuels as it expands oil-production and refining capacity and looks to buy crude-processing plants abroad, according to a statement on April 23.

“As Adnoc grows and expands its upstream and downstream businesses,” Adnoc Chief Executive Officer Sultan Al Jaber said in the statement, trading “will play an even more critical role.” The new unit will help to “maximise value from our domestic and, over time, international downstream operations.”

Adnoc has so far sold most of its refined products and crude on “free-on-board” basis, which means the buyer takes delivery at a port within the emirate, Khoury said. The company is setting up the trading unit to maximise profit and “gradually reclaim ownership” of those sales, while also preparing for an expansion of refining and marketing capacity at home and abroad, he said.

National oil companies in the world’s biggest crude-producing region prospered for decades by supplying the raw commodity to refiners and independent traders. Now they want to expand their refining and petrochemicals businesses to add value to their main export. By trading their oil and refined products, these companies hope to squeeze more money from each barrel they produce.

The trend is especially prevalent in the Middle Eastern where energy producers from Oman to Saudi Arabia and Iraq are expanding trading of both products and crude to claw back some of the profit traders like Vitol Group and Glencore Plc earn by buying and selling the region’s oil.

The regional trend toward trading began with Oman, the biggest Arab oil producer that’s not a member of the Organization of Petroleum Exporting Countries. Oman formed a trading company with Vitol in 2006, then bought out its partner in 2015. —*Anthony DiPaola*

THE BOTTOM LINE Saudi Aramco plans to trade up to 6 million barrels of oil per day as it seeks to move up the value chain. The UAE’s Adnoc is also seeking to burnish its trading credentials.

Saudis Delay IPO of Tadawul

● Saudi Arabia hopes to boost value of bourse with MSCI Inc. upgrade

Saudi Arabia’s willingness to delay the initial public offering of state oil company Aramco to 2019 has several motivations, from regulatory risk to competing projects in the government’s crowded agenda.

Saudi Arabia is delaying the initial public offering of its stock exchange on hopes that a potential MSCI Inc. upgrade could boost its value, according to people with knowledge of the matter.

The Tadawul, as the Middle East’s biggest stock exchange is known, has pushed back plans to sell shares to 2019 at the earliest, from this year, said the people, asking not to be identified because the information is private. Waiting until after a possible classification as an emerging market in June could improve trading volumes and help the bourse achieve a better valuation for its owner, the Public Investment Fund, they said.

“[Tadawul] recognises the importance of confidence-building and fair valuation in reflecting its capacity, infrastructure and liquidity.”

The exchange’s main stock gauge, the Tadawul All Share Index, is among the world’s top 10 best performers this year after FTSE Russell classified the country as a secondary emerging market in March. That helped boost the gauge’s 12-month price-to-earnings ratio to the highest since 2015, the most expensive compared to emerging-market stocks in almost three years.

The Tadawul “recognises the importance of confidence-building and fair valuation in reflecting its capacity, infrastructure and liquidity,” a spokesman said in an emailed statement. As the bourse moves forward with IPO planning and consultations with key stakeholders, the Tadawul will determine the best timing for a sale, he said. HSBC and the PIF declined to comment.

The Saudi stock exchange hired HSBC Holdings Plc’s local unit in 2016 to advise on the IPO. The potential offering is part of the kingdom’s privatisation drive to wean its economy off oil. It also includes plans to sell shares in oil giant Saudi Aramco, local soccer clubs and grain silos.

The bourse could attract $41 billion of ▶

◀ foreign capital if MSCI Inc. follows FTSE with an upgrade this year, according to Al Rajhi Capital. FTSE will implement the classification from next year, and MSCI is expected to do the same.— *Matthew Martin, Archana Narayanan and Glen Carey*

THE BOTTOM LINE Saudi Arabia is delaying the IPO of its bourse on hopes that a potential MSCI Inc. upgrade could boost its value.

MAF Plans $3.8bn Homes Project

● UAE developer MAF building its first residential development in Dubai

The developer of the Dubai mall housing an indoor ski slope plans to spend 14 billion dirhams ($3.8 billion) building its first residential development in the desert city.

Majid Al Futtaim Properties LLC will start selling homes this month in a 3 million square-meter (32 million square-foot) luxury development. It will include 6,500 homes, offices, shops, hotels and leisure facilities, Chief Executive Officer Robert Welanetz told reporters on April 19.

The developer's first foray into Dubai residential development comes at a difficult time for the city's real estate market. The Arabian Gulf emirate is struggling with an oversupply of homes that's pushing down values and rents. Demand from foreign investors, which had boosted the market in previous years, has waned amid currency fluctuations.

Luxury properties have been the worst-hit in Dubai's property downturn but that isn't dissuading Welanetz, who says well-built homes are still in demand.

"We are contributing to fill a niche in the market place" he said. "And we are here for the long term, so if it takes longer to build, we will be there to see it through."

The Tilal Al Ghaf project will add 800 homes in the first phase, set to be completed in 2020. The housing development will be centred on a man-made lake in the desert that will serve as beach front for families living there. — *Zainab Fattah*

THE BOTTOM LINE Dubai-based developer Majid Al Futtaim is turning its attention to residential developments in its home city with a $3.8 billion project in the works.

Jordan Plans 30MW Battery in Green Energy Push

● Electricity storage to bolster Jordan's expansion of solar and wind power

Jordan is pressing ahead with its first electricity storage project to bolster its expansion in solar and wind generation.

The Middle Eastern kingdom expects to sign a contract for a 30-megawatt battery in the third quarter, according to Energy and Mineral Resources Minister Saleh Al Kharabsheh. The project, which was tendered last year, will help ensure the country has green electricity day and night, he said in an interview at the Energy Transition forum in Berlin.

Jordan is focusing on renewables because it lacks the oil and gas reserves of its neighbors and has to import most of its energy. It's also one of the most water-stressed nations in the world, so a steady supply of green energy will help ease the cost of pumping water, which takes up about 15 percent of the nation's gross domestic product each year.

The influx of at least 1.4 million refugees from neighboring Syria has further strained Jordan's infrastructure.

Jordan aims to meet its target of securing 10 percent of energy from renewable sources by 2020. With costs of producing power from sun and wind falling, the next step is storage, Al Karabsheh said.

"The challenge now is how much we can expand in terms of renewables, making sure that our system continues to be reliable and available, so here comes the issue of storage," he said.

Jordan is now seeking to beat its 2020 targets, aiming to produce 25 percent of its electricity from renewables, he said at the conference. The kingdom is reviewing its 2007-2025 strategy with plans to establish even more ambitious targets toward 2030 and 2050.

Development banks are helping finance this programme. The European Bank for Reconstruction and Development recently lent $70 million to Alcazar Energy Ltd., a Dubai-based developer, for an 86-megawatt wind farm in Jordan. ACWA Power International of Saudi Arabia is also planning renewables projects in the country.

Jordan has about 20 investors in its power

● By 2020 Jordan hopes to produce a quarter of its energy needs from renewable energy

25%

generation projects, with six on conventional plants and 14 to 15 on renewables.

"We are following the development of storage technology," the minister said. "We need to solve the issue of the availability during the night time."

Batteries look set to become an increasingly important component of utility-scale renewable energy projects. In March, Saudi Arabia revealed plans for a $200 billion solar energy project which included plans for electricity storage with the biggest utility-scale battery ever made. — *Anna Shiryaevskaya, Anna Hirtenstein and Brian Parkin*

THE BOTTOM LINE Jordan plans to sign a contract for 30-megawatt battery in the third quarter of 2018 as it seeks to strengthen its green energy sector.

Hyperloop Industry Heats Up In UAE With Entry of Second Player

● HyperloopTT signs an agreement with UAE's Aldar Properties to develop Hyperloop routes across the UAE

UAE development firm Aldar Properties has signed an agreement with Hyperloop Transportation Technologies with the aim of developing commercial Hyperloop services in the UAE.

HyperloopTT's plans include construction of the Hyperloop line in several phases, starting within 10 kilometres and potentially leading to the creation of a Hyperloop network "across the Emirates and beyond".

Bibop Gresta, Chairman of HyperloopTT, said that the agreement creates the basis for the first commercial Hyperloop system in the world in Abu Dhabi. "With regulatory support, we hope the first section will be operational in time for Expo 2020," he added.

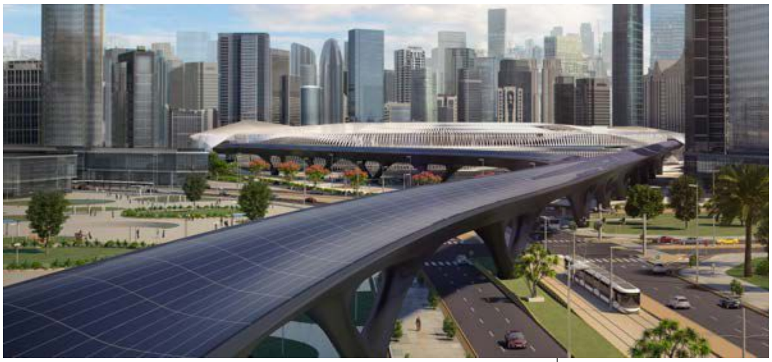
The two companies also intend to develop a Hyperloop R&D centre, a public demonstration and visitor centre, and an innovation hub.

Talal Al Dhiyebi, CEP, Aldar Properties, said: "Alghadeer sits at such a strategic point within the UAE - close to major growth areas of both Abu Dhabi and Dubai, that it makes sense to pair it with rapid transport opportunities."

Aldar and HyperloopTT will be competing with Virgin Hyperloop One which is developing a network to shuttle passengers between Dubai and Abu Dhabi in as little as 12 minutes.

The entry of Hyperloop TT into the region is likely to increase the pressure on Virgin Hyperloop One, which has been rocked by personnel changes. The company replaced three directors and a fourth was arrested, Bloomberg reported early last month.

A list of directors that was updated on the company's website showed three members stepped down from the 10-person board: Jim Messina, a former adviser to President Barack Obama; Jim Rosenthal, a former Morgan Stanley executive; and Peter Diamandis, founder of X Prize.



● An artist's impression of HyperloopTT's transport system

New board members are Bill Shor of Caspian Venture Capital; Yuvraj Narayan, chief financial officer of DP World; and Anatoly Braverman of Russia's sovereign wealth fund. A spokesman said Messina remains an adviser to the board; Diamandis is now an observer; and Rosenthal stepped down at the end of last year to focus on his cybersecurity startup.

A fourth board member, Russian billionaire Ziyavudin Magomedov, was arrested in Moscow on charges of fraud and embezzlement unrelated to Hyperloop. Magomedov is appealing the arrest, his lawyer told Russian news agency Interfax. Virgin Hyperloop One declined to comment on the arrest. —*Roger Field, with Sarah McBride and Giles Turner*

THE BOTTOM LINE Aldar Properties and Hyperloop Transportation Technologies plan bring the Hyperloop system to Abu Dhabi in time for Expo2020.

That Kid Playing *Bubble Shooter* Is a Pro

● Esports competitions, like the rest of the video game industry, are shifting to smartphones

For much of the past six years, Andrew Paradise felt like an outsider in esports—a new revenue source in the video game industry, built around enormous multiplayer competitions. Skillz, his mobile esports platform, was small in comparison and deemed fringe by his peers. They were focused on PC games with dazzling, hardware-hungry visuals. Not phones.

But things are different now. At the annual Game Developers Conference held each March in San Francisco, on the day dedicated to esports, one of the first panels focused on mobile game competitions. More than 200 developers visited the Skillz Inc. booth. "Mobile esports was the hottest thing at GDC," Paradise says. "The industry is shifting very quickly."

Esports contests have gone from peripheral affairs to massive spectacles, with investment from billion-dollar game publishers, broadcast TV networks, and venture capitalists pouring into teams adept at PC games. Mobile games such as *Angry Birds* and *Candy Crush* attract more players—2.2 billion worldwide, according to researcher Newzoo—but generally not the kind who'll train for tournaments. Now that phone hardware is good enough to run more complex games, even hardcore players are shifting their attention to phones. Six-year-old Skillz, the mobile esports leader, says it hosts more than 1 million tournaments a day and has doubled its monthly revenue, to $16 million,

PHOTO ILLUSTRATION BY 731; PHOTOS: GETTY IMAGES (2)

in the last nine months, putting it on pace to blow past $200 million in the next year.

Skillz is a central hub that can turn any game into a contest among friends or strangers, either by pitting players against one another or by ranking their scores. The company works with more than 8,000 developers to tweak their games for its 15 million players, who enter tournaments of as few as two people or as many as 10,000 and win prizes based on their results. (Average entry fee: about $2.) Skillz says it matches players based on ability. Cash prizes are paid via check or PayPal, and occasionally a new car or paid vacation is up for grabs. There are also free contests without cash-value prizes.

Newzoo predicts mobile games will account for a majority of game industry revenue, roughly $65 billion, by 2020. Paradise says he expects the $900 million esports business to do the same. "Software follows hardware," he says, "and mobile is the dominant hardware." The average Skillz gamer spends about an hour a day on the platform.

Unlike in traditional esports, most Skillz players are women, Paradise says, including 7 of last year's 10 biggest winners, who each collected more than $200,000. The No.1 player in 2017, who goes by the handle "yutourmaline," won just shy of $421,000; that would rank her among the top 25 in the better-financed PC esports.

Skillz's players include a diverse group of obsessives, many of whom drip candle wax onto their phones and scrape it off before each match, hoping the remaining residue will improve their grip on the screen. One member of last year's top 10, Harvard sophomore Jennifer Tu, estimates that she spends about 10 hours a week on Skillz as a study break or on the shuttle between classes. Her go-to game is *Solitaire Cube*. "You have to be crazy good to make it big on a popular PC game," says Tu, who also plays *League of Legends*. "Skillz is more low-key."

The son of two tech entrepreneurs, Paradise started coding when he was 6 years old. The following year he built his first video game from scratch in Pascal, an early programming language. He kept playing and thinking about games through the end of his 20s, when he sold mobile checkout startup AisleBuyer LLC to Intuit Inc. for $100 million. He started Skillz soon after with fellow AisleBuyer alum Casey Chafkin, now Skillz's chief operating officer. (Chafkin's brother, Max, is a *Bloomberg Businessweek* staff writer.)

Big-name competitors are moving in on Skillz's turf. In the past month, *Fortnite* and *PlayerUnknown's Battlegrounds*, two of the world's top-grossing computer games, released mobile versions. (As of April 11, they're the two top free apps in the iOS App Store.) Shortly after, Finnish game developer Supercell Oy, last year's highest-earning mobile publisher, announced the formation of a 36-team league that will compete using its superpopular game *Clash Royale*.

Some of the biggest esports teams signed on for the Clash Royale League, including NRG Esports, co-owned by Skillz investor Andy Miller, who's also part owner of the NBA's Sacramento Kings. "I'm really bullish on mobile gaming," says Miller, an entrepreneur who sold Quattro Wireless to Apple. "The tech is there, and everyone has a phone."

Microsoft Corp. and Amazon.com Inc. are experimenting with similar services. Microsoft recently bought PlayFab Inc., which helps developers make and publish games, and Amazon just launched GameOn, a direct Skillz competitor. Paradise says that's validation. "Amazon doesn't enter industries where they don't see massive market opportunities," he says. "And they won't be the last." —*Eben Novy-Williams, with Joshua Brustein*

● The number of (mostly casual) mobile gamers around the world tops

2.2b

THE BOTTOM LINE Skillz, the early leader in mobile esports, doubled its monthly revenue, to $16 million, in less than a year. But it faces tough competition, including from Supercell and Amazon.

Farm to Table? Check the Blockchain

ILLUSTRATION BY GABRIEL PUNSALANG

● Food giants are betting on digital ledgers to speed recalls and improve accountability

Did the chicken you buy at the supermarket have a nice life, roam free, and eat healthy grains? If you're the kind of person who cares, Carrefour SA, the big French grocery chain, has the bird for you. Every chicken it sells under its house brand can serve up its own life story, thanks to the wonders

◀ of blockchain software. All you need to do for the deets is scan the label with your smartphone.

This is the same technology that serves as the backbone of Bitcoin and other cryptocurrencies. The grocery giant isn't just trying to appeal to discriminating foodies. It wants to do whatever it can to ensure its products aren't tainted, part of a broader industry trend espousing the as-yet-unproven promise that blockchain can improve food safety.

Nestlé, Dole Food, Unilever, and Tyson Foods are working with their biggest customer, Walmart, to implement a blockchain platform built by International Business Machines Corp. Kroger and JD.com, China's second-largest e-commerce operator, are also using the IBM platform. Carrefour developed its own system in-house. "Blockchain will do for food traceability what the internet did for communication," says Frank Yiannas, vice president for food safety and health at Walmart Inc.

Yiannas cites estimates that for every 1 percent reduction in foodborne diseases in the U.S., the economy would benefit by about $700 million from increased productivity, thanks to reduced illness and fewer days lost at work.

Not everyone is so enthusiastic. Critics say blockchain can be a valuable piece of the food safety puzzle but caution that it can easily be gamed. The online ledger requires manual entries, leaving it prone to human error or intentional manipulation that could compromise the data chain, says Mitchell Weinberg, chief executive officer of Inscatech Corp., which investigates food sourcing for evidence of fraud. "Wouldn't criminals know how to cheat the blockchain?" he asks. "How would it help with anything fluid or ground-up or chemical in nature? Those can be easily adulterated, and blockchain will never know how, when, or by whom."

Issues beyond what the blockchain technology aims to cover were the problem in China in 2008 when melamine, a white crystalline compound used in plastics production, was added to water-diluted milk to raise its protein content. At least six infants died and almost 300,000 fell ill after consuming the altered milk, prompting a massive product recall.

By making suppliers more accountable, proponents say adoption of the technology would help reduce some of the headline-grabbing food tampering of recent years: wood pulp blended with Parmesan cheese, horse meat passed off as minced beef, and plastic mixed into frozen chicken nuggets. Health dangers aside, recalls resulting from such meddling cost the food industry as much as $49 billion a year, according to the Grocery Manufacturers Association. The Washington trade group estimates that 10 percent of the food purchased in the U.S. is adulterated, meaning it's a potential health hazard.

Reducing waste is another goal. Recalls contribute to the 133 billion pounds of food the U.S. Department of Agriculture estimates is lost in the country every year. Total food waste (including things like restaurant scraps) accounts for at least 30 percent of the U.S. food supply, the USDA says.

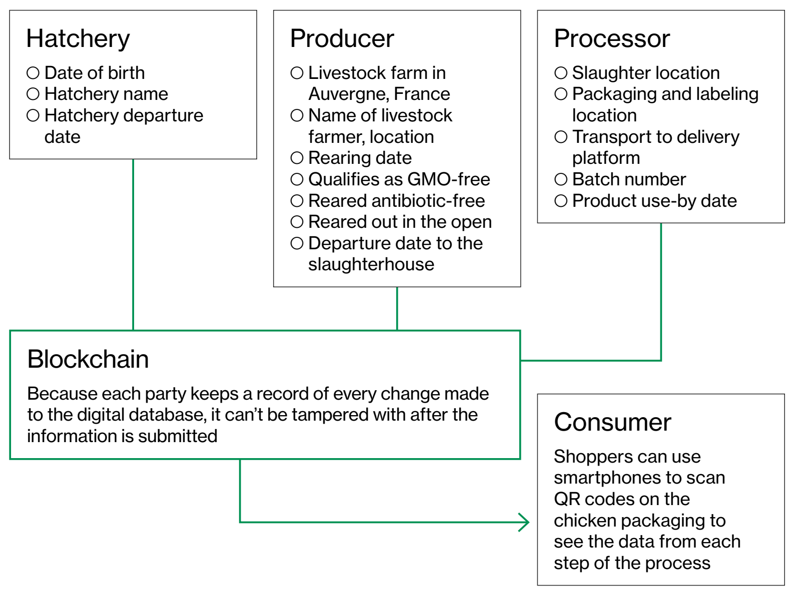
Let's say there's a norovirus or listeria outbreak associated with spinach at your local grocer. The current system may require recalling vast amounts of spinach from around the country, because it's difficult to identify the origin of contaminated food. With blockchain, grocers can quickly pinpoint the source in a single region or even on a single farm.

Once food is in stores, blockchain data–combined with sensors and computer models–could help grocers better gauge the shelf life of produce, according to Donna Dillenberger, an IBM research fellow. Historical information, collected from temperature sensors on the shelf, could be run through predictive models to determine the optimal temperature for, say, strawberries.

Blockchain is making its way to sea as well. The World Wildlife Fund is testing a combination of radio-frequency identification sensors and

Tracing Food Via Blockchain

Agriculture companies are testing the use of blockchain software as a way to establish their products' bona fides. Each party is supposed to provide details related to its link in the supply chain. Here are the data points for a single Auvergne chicken sold by French supermarket chain Carrefour.



DATA: CARREFOUR

◀ blockchain software to track the transport of a tuna from fishing boat to processing plant, according to Bubba Cook, the western and central Pacific tuna program manager. The idea is to discourage the introduction of illegally caught fish into the food supply. It won't be a foolproof system, Cook acknowledges, but it's at least an opportunity to cast some light on the food industry's often-shady supply chain. *—Luzi-Ann Javier*

THE BOTTOM LINE Carrefour is an early adopter of blockchain food safety tech. Walmart and most of its Big Ag partners are investing in similar gear for their livestock and produce.

Science Without the Scientists

● In pilot projects, AI software is filling in for graduate researchers

Inside a lab at Carnegie Mellon University in Pittsburgh, a robot arm lifts a bottle filled with chemical reagents and carries it over a bank of test tubes, where it dispenses a precise number of drops into each one. The arm swivels, replaces the bottle, swivels again, and picks up another container. Gracelessly, tirelessly, the machine thrums on, carrying out test after test. The experiments are part of an ongoing project to determine the ideal chemical makeup for high-capacity electric car batteries. Soon, machines won't just run the experiments–they'll devise them, too.

Over the next few months, an artificial intelligence algorithm will gradually take over the planning of experiments based on the battery test runs. Once fully functioning, this robot graduate student will decide how to modify the concentrations of the ingredients it's testing. "It's automating not only the manual part of doing the experiment but also the planning part," says Brian Storey, the Toyota Research Institute scientist leading the project.

Science has long been considered one of the human activities least likely to be farmed out to robots. That's changing as sensors, sequencers, and satellites churn out digital information by the terabyte. "We just cannot handle the amount of data anymore," says Manuela Veloso, who heads Carnegie Mellon's machine learning department. It's a daily concern for biotech companies and a wide range of other businesses struggling to make sense of the unprecedented swell of raw information.

AI software designed to identify and sort patterns has been deployed across a wide swath of science, from marine biology (identifying wild dolphin vocalisations from hydrophone recordings) to astronomy (detecting the presence of planets from subtle fluctuations in the brightness of thousands of stars). To discover the Higgs boson, the so-called God particle, an algorithm sifted billions of particle tracks generated within the Large Hadron Collider in Switzerland. AI is fast becoming an essential part of university science curricula.

Automating the process of discovery doesn't just free up researchers' time. It could potentially change what sorts of discoveries are made. "I can easily imagine cases in which AI would recommend experiments to try to synthesise a chemical molecule that you wouldn't think possible, but the AI will be able to do it," says Barnabás Póczos, a Carnegie Mellon machine learning professor collaborating on the Toyota project.

Unfortunately, generating novel predictions isn't all that useful by itself. What scientists are after is less what than why–the elegant theoretical formulations that let them understand how the universe works, such as Newton's first law or $E=mc^2$. So far, the neural networks underlying AI software can't really explain how they arrive at their answers.

"We just cannot handle the amount of data anymore"

Humans, in contrast, are pretty good at that. So in the near term, the most promising approach will be for humans and AI to work together. In February, Dutch publisher Elsevier announced a trial collaboration with software maker Euretos, using AI to assess millions of peer-reviewed scientific articles to suggest hypotheses in the field of biochemistry. Academics will cull these hypotheses online, basing experiments on the most encouraging ones. "The vision is that the discussion becomes a much more automated process," says Euretos co-founder Arie Baak.

And after that? "People have wondered if you could have the computer automatically figure out the principles underlying physics," says Toyota's Storey. "I don't think we're going that far out now." *—Jeff Wise*

THE BOTTOM LINE A new world of sensors and satellites has overwhelmed researchers with more data than they can meaningfully appreciate, so they're training software to do higher-order analysis.

Egypt Eyes Shift Toward Longer Term Debt

Falling interest rates open up the opportunity for cheaper, longer-term borrowing

Egypt is considering shifting away from costly short-term domestic debt toward longer-term borrowing, as falling interest rates provide cheaper options to finance the fiscal deficit, its finance minister said.

The government will increasingly rely on five- to seven-year bonds instead of Treasury bills that have shorter maturities and currently make up the bulk of local-currency borrowing, Amr El-Garhy said in an interview in Washington, where was attending spring meetings of the International Monetary Fund and World Bank.

The evolution of the government's domestic borrowing programme suggests El-Garhy is confident inflation will continue to fall, allowing the finance ministry to capitalise on any subsequent reduction in interest rates. Treasury securities have been a key part of the government's efforts to help bridge a fiscal deficit that it says will fall to 8.4 percent of gross domestic product by mid-2019.

"We're contemplating this but we're still waiting for better inflation figures and more action from the central bank," El-Garhy said. Next year, the government hopes to see inflation in single digits "that can convince the central bank of taking the interest expense down further."

Foreign investors have piled more than $23 billion into local-currency T-bills since Egypt removed currency restrictions and secured an IMF loan in late 2016. The flotation of the pound pushed inflation to above 30 percent and forced the central bank to raise interest rates, hurting businesses but attracting foreign interest in its short-term debt.

Egypt has cut its benchmark rate by 200 basis points this year, as inflation has eased to just over 13 percent. With interest rates falling, Treasury bond issuance is seen as nearly quadrupling in the next fiscal year beginning July 1 to more than 100 billion Egyptian pounds ($5.7 billion) from the previous 12 months.

The week ending April 21, the government sold 12-month T-bills at an average yield of 16.84 percent and 5-year T-bonds at 15.091 percent.

"Once the figures become more encouraging in terms of inflation, and then the move from the central bank to reduce interest, at this point in time we'll shift more into medium-term bond issuance," the minister said.

The government will look also to generate as much as $7 billion in dollar and euro-denominated bond sales on international markets starting in the first quarter of 2019, the minister said. Egypt has sold more than $13 billion in foreign-currency denominated bonds since the float.

El-Garhy said the government was pushing ahead with initial public offerings of state-owned companies that would increase the market capitalisation of Egyptian stocks to around 4 trillion pounds, from the current level of around one trillion pounds.

Banque Du Caire's offering will probably take place next year as part of the first stage of the program after which Egypt is mulling listing of other companies in logistics, power, hydrocarbons and mining, he said. —*Onur Ant*

THE BOTTOM LINE As interest rates fall Egypt will increasingly rely on five- to seven-year bonds instead of Treasury bills that have shorter maturities.

● Egypt has sold foreign-currency denominated bonds worth $13bn since the float

$13b

Saudi Central Bank to Drain Liquidity

◀ Ahmed Abdulkarim Alkholifey

● Bank will allow some deposits made in 2016 to mature without rolling over

Saudi Arabia's central bank plans to drain excess liquidity from the banking system to mitigate pressure on the riyal's peg to the dollar as U.S. interest rates rise, Governor Ahmed Abdulkarim Alkholifey said.

The Saudi Arabian Monetary Authority, as the central bank is known, will allow some deposits placed with commercial banks in 2016 to mature without rolling them over, he said, boosting a key interbank rate for riyals that has lagged Libor, its London equivalent for dollars, and raised the prospect of capital flight.

"Some amounts of deposits are maturing in the banking system," Alkholifey told Bloomberg in Washington, where he attended the International Monetary Fund and World Bank spring meetings. "We'll let them mature and they will be back to the central bank instead of the banking system, and this will siphon off the liquidity to the system."

Climbing U.S. borrowing costs pose a dilemma for SAMA, which must strike a balance between overcoming the worst economic slowdown since the global financial crisis a decade ago and maintaining its currency peg to the dollar.

Though it has tracked U.S. Federal Reserve decisions through its reverse repurchase rate, Saudi Arabia had, until March, avoided raising its benchmark repurchase rate due to concerns this would stifle growth.

It pre-empted the Fed by raising its benchmark rate on March 15 for the first time since 2009 after the Saudi rate, Saibor, fell below Libor.

The interbank rate is important because investors could turn away from Saudi assets if the yield becomes too low compared to what is available elsewhere, putting pressure on the currency.

"In order to protect the exchange rate arrangements that we have at this time, we have to keep under our eyes what is the difference between Libor and Saibor," said Alkholifey.

The difference between Saudi Arabia's three-month interbank offered rate and Libor has narrowed to 1 basis point since the Saudi rate increase, from 19 basis points in March, the biggest gap in a decade.

But analysts have said that SAMA would have to take further measures to soak up excess liquidity and push its interbank rate above Libor to avert the potential risk of capital flight.

Alkholifey said banks were also reducing the amounts they park at the central bank through its reverse repo facility, helping to support the interbank rate, adding that scaling back on deposits in banks should be enough to close the remaining gap, "which is what we want."

In any case, the bank has no fear of capital outflow and has no intention of changing its exchange rate arrangements.

"Fundamentals are good. The banking sector is strong and liquid and still profitable," he said. "So, we don't fear any capital outflow as we speak." —*Onur Ant*

THE BOTTOM LINE Saudi Arabia's central bank wants to drain excess liquidity from the banking system to mitigate pressure on the riyal's peg to the dollar.

Hedge-Fund Investors Pour Into Oil

● Investors predict oil will soon exceed $80 as commodity funds pile in

Hedge funds investing in oil are luring capital at the fastest pace in more than a year.

With crude climbing to levels not seen since 2014, commodity funds have recovered the client outflows they suffered last year. And if firms such as Westbeck Capital Management and Commodities World Capital are correct about prices soon exceeding $80 a barrel from about $68 currently, then the jump in allocations may just the beginning.

Until April 20 everything seemed to point to oil extending its gains, with confidence in the global economy building and geopolitical tensions and production shortages showing no signs of going away. Then U.S. President Donald Trump slammed OPEC on Twitter, saying prices are artificially high and will not be accepted. Prices slipped 19 cent a barrel.

Still, these funds are "desirable in times of expected market volatility" and will probably continue to see inflows in 2018, said Peter Laurelli, global head of research at data provider eVestment.

Investors allocated $3 billion to commodity-focused hedge funds from January through March, the most since the third quarter of 2016, according to eVestment. Last year they pulled $680 million from the strategy in the first net outflows since 2014.

Here's a summary of Westbeck and Commodities World Capital's oil forecasts and returns before Trump's comments:

Westbeck's energy fund recovered earlier losses from this year – including a double-digit decline in February – and is now up 11 percent through April 19, according to Chief Operating Officer Jari Habib. The fund lost 17 percent in 2017. The firm sees WTI crude climbing to more than $85 a barrel in the second half Commodities World Capital is about flat this year through April 19 after recovering losses that saw it drop 4.4 percent in the first quarter. It predicts oil will hit the mid-$80 area by the second half, though Chief Investment Officer Luke Sadrian said it's better to "trade around the volatility whilst maintaining a core bullish view" than to simply buy and hold.

▲ Saudi Arabia wants to push oil prices up to about $80 a barrel.

West Texas Intermediate crude climbed in January, only to plunge 13 percent in about two weeks - leading to particularly sharp losses by some bullish hedge funds in February. Now it's on the rise again and is more than double the price reached in early 2016 when concerns about a world economic slowdown were at their worst.

"As the direction of oil is very hard to predict, it's difficult for managers in this sector to deliver consistent performance,'' said Michael Gerber, head of research at investment adviser Fundana SA's fund of funds.

Trump's threat to pull out of the Iran nuclear deal - which allows the Mideast country to sell more oil in exchange for curbs to its nuclear program - had been pushing prices up. And Saudi Arabia, the world's biggest exporter, wants to push prices to $80 a barrel to help pay for the government's policy agenda.

Declining output in Venezuela and falling global inventories are also playing their part, as are the worsening tensions in Syria, which threaten to disrupt supply from across the region.

The "crunch year" for strong oil prices will actually be 2019, though, when the effects of five years of under-investment in new oil projects around the world have their full impact, Westbeck Chief Executive Officer Jean-Louis Le Mee wrote in his firm's February investor letter, seen by Bloomberg News. — *Suzy Waite*

THE BOTTOM LINE With a number of funds predicting oil will soon exceed $80 a barrel, a recent jump in allocations may just the beginning.

The Winding Road To a Long-Term Stock Market

● Eric Ries is trying to create a new kind of exchange. But do investors really want that?

Two years ago, Silicon Valley entrepreneurial guru Eric Ries hatched a plan to bring one of his boldest ideas to life. His Long-Term Stock Exchange, which he first suggested in the epilogue to his 2011 best-seller, *The Lean Startup*, would address the investor shortsightedness that drives startup founders crazy. Over time he sketched out rules. Companies listing on the exchange would give more voting power to shareholders who stuck around longer. They wouldn't be allowed to link executive pay to quarterly earnings. It turns out, however, that selling Wall Street on a more patient stock market can't be done in a hurry.

Compared with the technology sector, where "move fast and break things" has been the motto, in the realm of exchanges the attitude is more like "move painstakingly slowly and make sure nothing breaks, ever." LTSE has yet even to file a stock exchange application with the Securities and Exchange Commission, though it's taken a step forward by partnering with a small stock market, IEX Group Inc. Ries has faced skepticism not only from Wall Street veterans but also from the tech world. "In Silicon Valley, people don't think change is possible here," says Ries. "People think it's more likely we'll discover time travel."

LTSE recently moved into an office in San Francisco, keeping the neon lime-colored couches and swivel chairs left by the previous tenants. On a recent March day, the cubicles were almost bare, decorated only by copies of Ries's latest book, *The Startup Way*, a guide for large companies to thinking like scrappy upstarts. The LTSE project still exists more as a philosophy than as a business at this point, says Ries, who speaks in the carefully paced manner of a person who's accustomed to holding audiences rapt over PowerPoint presentations. "It is taking a long time," he says. "It has to."

Ries helped popularise the concept of the minimum viable product—a fast, cheap initial innovation to unleash on the market and improve later. But it can't really exist for exchanges: Every aspect of LTSE's model will need approval from the SEC, and the process can easily take more than a year, with regulatory inquiries and public comment.

The LTSE is supposed to be a place where companies and investors can communicate better. Ries is betting companies will pay a premium price—he hasn't said how much—to list on LTSE. The big exchange operators, NYSE Group and Nasdaq Inc., charge tens or hundreds of thousands of dollars for a listing. Some market forces may be at odds with his idea: Among money managers, quantitative stockpicking has gained ground. The importance of communication between management and investors has dwindled, according to Larry Tabb, founder of Tabb Group LLC, a capital markets research firm. "It's less about, 'I sat and I looked the CEO and management team in the eye and I trust them,'" Tabb says. "It's more towards, 'Show me the data, buddy,' and as soon as the data moves against them, they're out of there." At one level, LTSE is designed to insulate companies from such traders. But what if Ries is trying to give investors something they don't want?

Still, his plan alone has been enough to attract $19 million in funding from the likes of venture capitalist Marc Andreessen and Aneesh Chopra, former chief technology officer of the U.S. in the Obama administration. To get things started, LTSE is working with IEX to add a category on that exchange called LTSE Listings on IEX. The proposed standards for listings were filed with regulators in March. Along with the executive pay standards, voting rights, and other rules, they would require companies to have a board committee focused on long-term growth and to make disclosures about investment in research and development.

IEX is in some ways a cautionary tale. It rode to fame in Michael Lewis's book *Flash Boys* and championed a different kind of stock market ▶

▼ Ries

FROM LEFT: KRISZTIAN BOCSI/BLOOMBERG; PHOTOGRAPH BY CARLOS CHAVARRIA FOR BLOOMBERG BUSINESSWEEK; DATA: COMPILED BY BLOOMBERG

◀ reform—curbing the ability of the fastest traders to gain an edge. After a hard-won battle to turn itself into an exchange in 2016, IEX hasn't increased its market share beyond 3 percent of U.S. equity trading volume.

For now, stocks traded on IEX are listed elsewhere. Although IEX once said it could be ready to start its own listings as soon as October, that's been delayed. The biggest executive who said he'd transfer his company listing to IEX, casino mogul Steve Wynn, was ousted from his CEO role at Wynn Resorts Ltd. Sara Furber, head of listings for IEX, said in a statement that "our engagement with public companies continues to be strong and positive," and that its push for trading reforms "demonstrates what a different kind of exchange can achieve."

Ries waves away IEX's challenges. He says he'd consider LTSE a victory if it gets even one company to list. LTSE is focused on wooing initial public offerings and some dual listings, so it doesn't necessarily need to get companies to switch from their current exchanges. But if the big exchanges "thought raising listing standards would lead to more listings and business, I would expect them to give it a try," says Tyler Gellasch, executive director of Healthy Markets Association, an investor advocacy group. "So far, they haven't. In fact, they've kind of done the opposite." For example, NYSE President Tom Farley told lawmakers regulation is making it too difficult to raise money through IPOs.

If it's approved, LTSE will need to comply with strict rules around cybersecurity, manipulative trading, and other threats. Ries says LTSE is a proving ground. "One of the things I like about this process is that it forces me to address all these misconceptions" about his lean startup concept, he says. "Like you can't do lean startup in a highly regulated world, or you can't do lean startup if the thing takes a long time." —*Annie Massa, with Alex Barinka*

THE BOTTOM LINE The Long-Term Stock Exchange wants to encourage shareholders to focus less on short-term ups and downs, but the investment world is moving in the opposite direction.

● Funding raised for LTSE

$19m

Can Humans Understand How Bots Invest?

● A new ETF buys stocks picked by artificial intelligence. That requires a leap of faith

For a guy who built a robot he hopes will banish human emotion from the investing process, Chida Khatua spends a lot of time trying to figure out how it thinks.

Khatua is chief executive officer of EquBot, a San Francisco company that's built an artificial intelligence system for investing. In October, a day before the launch of an exchange-traded fund that uses EquBot recommendations, his team was going over stocks the computer wanted to buy. One name popped out: Brookdale Senior Living Inc., which operates retirement communities and nursing homes. This was when wildfires were burning parts of California, where some of Brookdale's facilities sit.

The trade looked off to Khatua, a former Intel Corp. engineer. But on a second look, it wasn't hard to put together what the computer might have been thinking. News reports and press releases—all fed into the system—showed how Brookdale was responding to the threat. "We found, hey, that senior living facility—they have a very good, organised setup" and could provide backup housing, Khatua says. The ETF bought the stock and made a small profit on the trade. Scanning news wires may not sound like a human equity analyst's idea of deep research, but for a computer it's all data that can be combined with other information to make statistical predictions.

That's the tricky thing about artificial intelligence and investing: If AI has an edge, that's because it's putting together a jumble of information in ways that humans wouldn't. But when people trust their money to a fund, they want to understand how the manager—or computer—makes decisions. A program reads about wildfires and buys a stock after deciding management will end up looking good in a crisis? Talk like that gets some AI purists' hackles up. "It's very important to separate the reality of what's going on from the marketing being put around it," says Andrew

Dyson, CEO of QMA, an investment firm that uses quantitative techniques and big data. "People love a story, right? And there's a real danger that these things are stories, and people have to get beyond the story and actually understand what's going on."

The fund EquBot's model makes recommendations for, the AI Powered Equity ETF, launched in October and has quickly amassed $136 million in assets, making it one of the most successful ETF debuts of 2017. Drawing computational muscle from International Business Machines Corp.'s Watson platform, EquBot's system assesses more than 6,000 U.S. publicly traded companies each day. It scrapes millions of regulatory filings, news stories, management profiles, sentiment gauges, financial models, valuations, and bits of market data. Then it chooses about 30 to 70 stocks for the fund, which is run by ETF Managers Group LLC. It's not the first ETF to use AI in some way—one employs it to spot changes in market sentiment—but backers say it's a pioneer in using the technology to look at multiple components of an investment to build a portfolio. "It's like employing an army of equity analysts," says Khatua.

Since the October launch it's beaten the S&P 500 in 12 weeks and trailed in 13 of them. A Bloomberg analysis shows that after being hurt early on by its bets on smaller and more volatile companies, the ETF recovered by buying bank stocks. Its 3.2 percent total return falls a bit shy of the S&P 500's 4.8 percent. So it's been about average—but that record is much too short to be meaningful. Luck and the behavior of the overall market are the main influences on a diversified portfolio's performance for much longer than most people realise, says James White, CEO of Elm Partners Management, an investment adviser. It could be a decade or more before anyone can say whether EquBot is selecting stocks with more skill than a dart thrower, White says.

EquBot's chief operating officer and co-founder, Art Amador, says he trusts the AI to make a decision and run its course. "From a principle standpoint, we don't want to intervene, we don't want to create any bias under any circumstance," he says. "We didn't tell it, 'Oh, no, you're not going to do this because it doesn't make sense logically.' "

Any AI system is likely to make investment decisions that look puzzling, says Zachary Lipton, an assistant professor in the machine learning department at Carnegie Mellon University. In the strictest sense, a model "is not operating according to logical rules. The model is just spewing out statistical correlations," he says. "It's not giving you logic—there isn't actually a chain of coherent logical reasoning that tells you how to invest in the stock market. If there was one, you wouldn't need the model in the first place."

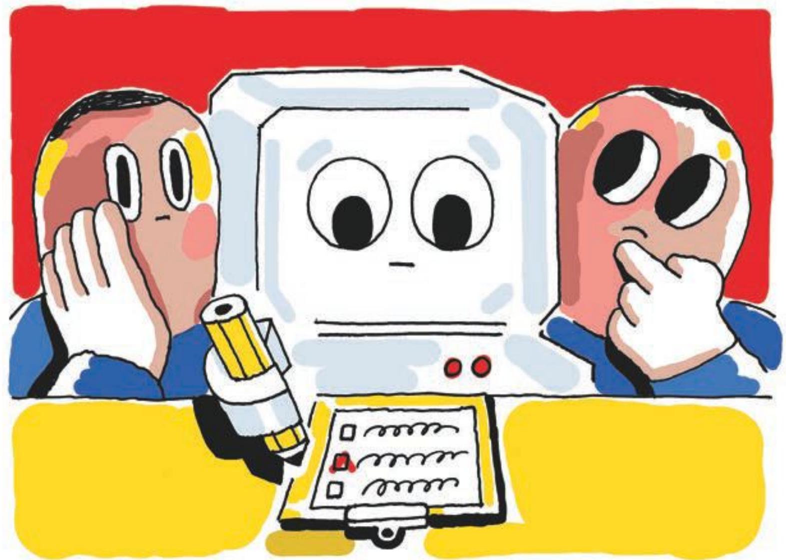


ILLUSTRATION BY THOMAS COLLIGAN

Even so, Amador and Khatua say they run additional checks on the bot's output. One is to make sure that the data is solid—for instance, that the computer isn't scraping a website that recently changed its format, which could cause the computer to misread it. The other is what they call a "sanity test" to see if the choices make sense, based on how the program was trained. "Our core philosophy is that we don't want to create a black box for AI," says Khatua. Their goal is to have a system that operates "the way a good rational investor would think about and go through the process," he says.

The EquBot system is also designed to learn as it goes, according to the team. In the early days of the ETF, small stocks that made sense as slivers of a $5 million portfolio proved too hard to trade when the portfolio's assets swelled. The program eventually learned how to account for a stock's trading volume when deciding what time to buy or sell it, and stopped picking up microcap stocks.

"It's very important to separate the reality of what's going on from the marketing"

Tammer Kamel, CEO of Quandl Inc., an alternative data platform, understands EquBot's system seeing opportunity in California's fire. "That's classic AI," he says. But he warns against caring too much about a program's reasoning. "As long as you persist in sanity-checking the output of your AI, then it will never be smarter than humans," Kamel says. "I get it. In the early stages, you want to see if this thing is incorrectly programmed or has bugs—yeah, you have to watch out for that. But sooner or later, you have to take the reins off and trust in the technology." —*Sarah Ponczek*

THE BOTTOM LINE Artificial intelligence doesn't make decisions exactly like a human stock analyst would, and the track record of an ETF that uses AI is too short to evaluate.

4

ECONOMICS

Venezuela's

Nicolás Maduro is trying to hold on to power by

Gold Diggers

handing even more of the country to the military

At an informal gold mill in El Callao

▲ Jose Brito at the grave of his son Carlos, who was killed in El Callao, with Iliana Marino, Carlos's aunt

In Venezuela's gold capital, national guardsmen block the roads. Military convoys and motorcycles circle while soldiers keep watch from behind sandbag-fortified checkpoints or patrol wearing balaclavas, rifles in hand.

The military has been fighting for months to superimpose itself over the violent gangs that control gold mining in El Callao, the most dangerous town in a nation fraught with danger. Should the soldiers succeed, President Nicolás Maduro's government will win a beachhead in the mineral-rich region known as Arco Minero del Orinoco. In turning over control of the territory to the armed forces, Maduro has granted them a handsome prize, which may help him secure their much needed support in elections scheduled for May 20. The military's campaign in El Callao, however, has been punctuated by bullets and bloodshed as soldiers raid neighbourhoods and attempt to bring gang lords to heel across the 70,000-square-mile region.

Arco Minero del Orinoco is a lucrative franchise, and through it the military has reaped profits both legitimate and illicit by charging miners for services. Soldiers "know that they can benefit from the uniform they're wearing," says Miguel Linares, a trucker who used to run gasoline to power water pumps and equipment at gang-infested mines in the region. "You have to pay," he says. "They can put you in jail."

According to a poll by Datanalisis, a market-research company based in Caracas, Maduro had the support of only about a fifth of the population as of mid-February. With 160,000 members, the military is one of the failing state's strongest blocs. Active and retired officers hold 14 of 32 cabinet posts, and soldiers have replaced many of the 80 leaders of the state oil company, Petróleos de Venezuela SA, whom Maduro began imprisoning in August. The ports have been militarised, and since 2016 the defense ministry has overseen the starving nation's food supply.

Then there's Arco Minero. "It's an incentive for loyalty," says Rocío San Miguel, president of Control Ciudadano, a watchdog group in Caracas. "It's indicative of where the forces of power lie in Venezuela. Military power is hegemonic."

Gold processing ground to a halt after the late President Hugo Chávez nationalised the industry in 2011. Illegal mining grew rapidly, and gangs quickly moved to take over the pits and tunnels to extort profits. Official production fell to a single ton in 2016, according to commodities researcher CPM Group, from a peak of more than 22 tons in 1997. In 2016, Maduro granted the armed forces wide-ranging security powers and allowed them to create a company to provide mining services. Arco Minero produced 8.5 tons in 2017, and Maduro hopes to almost triple that, to 24 tons, by yearend, according to Victor Cano, the mining minister. The military now controls gold resources the government claims are as high as 8,000 tons. If that number is accurate, that would give the country the world's second-largest gold deposits after Australia.

Venezuela desperately needs the revenue. Gross domestic product is projected to fall about 15 percent this year, according to the International Monetary Fund, part of a cumulative drop that will have almost halved the economy in five years. The central bank has been selling gold to keep the country afloat, drawing down reserves to $6.6 billion, from almost $20 billion at the beginning of 2012, according to Caracas Capital Markets, an investment bank. "Venezuela has been running on fumes for years and hoping the reserve tank would get them to safety," says Russ Dallen, the bank's managing partner.

The Venezuelan central bank buys gold from select brokers, mill associations, and groups of registered miners, dubbed "mining brigades." The state-owned gold processor, Minerven, handles most of the raw material, melting the ore into bars, which military planes take to air bases around Caracas. When the gold arrives, it's presented to officials in ceremonies broadcast on state television. Maduro has been photographed kissing a gold bar at one such ceremony. Armoured vehicles transport the bars from there to the central bank.

The gold from El Callao is hard-won. Last year the town ranked as the country's most murderous municipality, according to the Venezuelan Violence Observatory, which estimated a homicide rate of 816 per 100,000 residents. It sits amid mountainous jungle along the Yuruarí River, and gold brokers, jewelry makers, and tool shops line its thoroughfares. Speakers in open-air bars blare salsa music. The national guard controls commerce in the town, as well as the supply of gasoline for generators and water pumps. On the almost 120-mile drive from Puerto Ordaz, the capital of Bolívar state, which encompasses almost the entirety of Arco Minero, to El Callao, there are more than a half-dozen military and police checkpoints.

"It's an area that functions in a completely feudal sense," says San Miguel of Control Ciudadano. Low-ranking soldiers shake down miners and smugglers, while officers exact tribute from armed groups for the right to do business. Those gangs in turn extort anyone wishing to work.

Carlos Alfredo Brito, 27, had been delivering gasoline to illegal miners along with Linares, the trucker, and his brother before a February raid, trying to earn enough money to pay for his mother's epilepsy medication. Linares had negotiated a deal to supply 20 barrels of fuel to a gang leader at a mine called Cicapra, about 25 miles from El Callao. Typically the runners made trips to camps and towns surrounding the mines, for which they were paid in Venezuela's essentially worthless currency. The group of six making the delivery, which included Brito, would be going closer to the actual mine, potentially exposing themselves to gang violence. But they would also be paid in gold.

Brito's mother, Petra Rodriguez, last heard from her son on Feb. 8. She texted Brito to let him know she'd managed to find 11 boxes of medicine and hoped God would watch over him. "Amen, mommy!" Brito responded. "What relief. You have no idea how happy this makes me. I love you."

Linares had already returned home by the time night fell on Feb. 9. His brother and other companions—including Brito—decided to stay at the mine, surrendering their cellphones to the gangsters, who didn't allow them to be used in the area. The army arrived in the wee hours of Feb. 10 and sparked what was one of the deadliest clashes since the campaign's inception. According to a military communiqué obtained by Bloomberg, they killed 18 civilians—including a child. Many were shot in the head and face, according to police photos and death certificates. Soldiers recovered assault rifles, pistols, and grenades, according to the internal communiqué. The document claimed the El Callao residents were resisting authority, but families of the victims insist they were slaughtered. A defense ministry spokeswoman declined to comment.

Cano, the mining minister, says the armed forces respect human rights, but miners must put themselves on the right side of the law. "If they're doing criminal activities, they can't be expected to be treated like saints," he says.

"You have to pay. They can put you in jail"

Families came to collect the bodies from an overheated morgue near Puerto Ordaz; the naked corpses were stacked head to toe on metal trays, with numbers taped to their torsos. Brito had been shot repeatedly in the chest. His family buried him in Soledad, their hometown. —*Andrew Rosati, with Fabiola Zerpa, Ben Bartenstein, Danielle Bochove, and Luzi-Ann Javier*

THE BOTTOM LINE The takeover of Arco Minero del Orinoco is part of a larger effort by Venezuela's president to curry favour with the armed forces.

The Other North Korean Threat

● The nation's isolation won't contain multidrug-resistant tuberculosis

People in China like to joke that North Korea has two lethal weapons: nuclear missiles and tuberculosis.

While the rogue state's nuclear ambitions have long inspired angst—and led to economic sanctions—the threat of TB, the planet's biggest infectious killer, has garnered less attention. With an estimated 130,000 new and relapsed cases in 2016, North Korea is on the World Health Organization's list of nations with the greatest incidence of the deadly lung disease, and doctors warn that an explosion in multidrug-resistant strains could be coming.

In February the Global Fund to Fight AIDS, Tuberculosis and Malaria, a Geneva-based organisation that is the biggest financial contributor to TB control in the Democratic People's Republic of Korea, announced that it will close its programs there in June, citing the challenges of working in the country. The fund's withdrawal is likely to lead to "massive stock outs of quality-assured TB drugs nationwide," wrote Harvard Medical School doctors in an open letter to the Global Fund, published on March 14 in the British medical journal the *Lancet*.

Such privation in the past has "led to the rapid creation of drug-resistant TB strains, as doctors ration pills and patients take incomplete regimens," they wrote. Infections that can't be cured with standard drugs are already rife in the country. According to WHO estimates, 2.2 percent of North Korea's new TB infections and 16 percent of relapsed cases in 2016 were caused by bacteria ▶

PREVIOUS SPREAD AND LEFT: MANAURE QUINTERO/BLOOMBERG (2)

◀ resistant to the antibiotic rifampicin or at least two other key TB medications.

That may be a gross underestimate, according to a study published last year in the *Journal of Korean Medical Science* that analysed hundreds of patient sputum samples. More than three-quarters of those that tested positive for TB contained multidrug-resistant strains, and two samples contained extremely drug-resistant strains—a form almost impossible to treat in resource-poor countries such as North Korea. Treatment for patients with multidrug-resistant TB commonly lasts two years or longer and typically involves six months of daily injections and a regimen of about 14,000 pills.

Treatment regimens that are too short or rely on inferior or inappropriate medicines are the fastest route to drug resistance, says Jennifer Furin, a Harvard-trained doctor and researcher who's cared for TB patients for 23 years. The repercussions of cutting funding to programs in North Korea will be felt beyond the country, she says: "This is a politically created problem that will turn into a health catastrophe, not just for the people living in the DPRK, but for everybody in the region."

Chinese authorities are on alert for cases among migrant workers from North Korea. In Dandong, a city in China's northeast that is separated from North Korea by a river, quarantine officials identified 33 TB cases among 9,500 North Koreans screened from 2012 to 2014, according to a government report published in 2014 that recommended heightened surveillance in the area. Local authorities pledged in December to beef up border screening and epidemic management. However, many people who've been exposed to TB develop a latent infection with no symptoms, making it difficult to intercept them at the border.

Just as HIV has helped spread TB in sub-Saharan Africa, chronic malnutrition is fueling the epidemic in North Korea, according to Kwonjune Seung, who was among the authors of the letter published in the *Lancet*. Seung visits a dozen TB centres in North Korea twice a year as medical director of the Eugene Bell Foundation, a Christian charity focusing on treating North Korean patients. A spillover of multidrug-resistant TB from North Korea "would take decades to clean up and could detrimentally affect the public health of bordering countries like China and South Korea," Seung and his colleagues wrote in their letter.

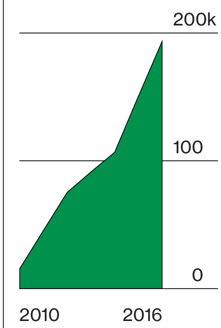
Kim Hyong Hun, North Korea's vice minister of public health, accused the Global Fund of bowing to the "pressure of some hostile forces" in a letter to the organisation published on March 13 by the Korean Central News Agency, the official news agency. The comments pointed a finger at a U.S.-led international effort to force the country through the application of economic sanctions to dismantle its nuclear arsenal. The U.S. and North Korea are slated to meet in an historic summit as early as May.

More than 38 countries contribute to the Global Fund, including South Korea and the U.S.; in late March, Congress approved $1.35 billion in funding for the 2018 financial year. In an email, the organisation said the decision to suspend programs in North Korea was not motivated by any pressures but rather influenced by concerns about the "unique operating environment" in North Korea, which makes it difficult to ensure that grants are used effectively.

Furin says it's difficult not to see the Global Fund's move as yet another facet of the campaign to isolate North Korean leader Kim Jong Un. "You can't help but think global powers are very concerned about North Korea's erratic behaviour, and this is a way to punish the country," she says. "But this is a weapon of destruction in and of itself. TB is an airborne disease. It doesn't stay within borders." *—Li Hui, Peter Martin, and Dandan Li*

THE BOTTOM LINE The withdrawal of crucial funds for North Korea is creating conditions for an explosion in drug-resistant strains of the planet's most deadly infectious disease.

● Cumulative tuberculosis cases in North Korea detected and treated



DATA: GLOBAL FUND TO FIGHT AIDS, TUBERCULOSIS AND MALARIA

A Solution to the Housing Squeeze

● U.S. cities are rewriting regulations to enable more granny flats

Alexis Rivas opens his Mac laptop and zooms in on a 3D rendering of a house in Echo Park, a hip neighbourhood in Los Angeles. Set off from the main house, there's a small, modern structure that his company, Cover Technologies Inc., hopes to build. "You've got the kitchen here, a little stovetop, fridge," Rivas says as he navigates around the 502-square-foot unit with his cursor. "And then we can take a walk around and go into the bedroom."

It's the kind of design that would typically cost a few thousand dollars in architecture fees, says Rivas, who co-founded Cover Technologies in 2014. The Los Angeles outfit can put together a proposal for just $250, using software to determine whether a specific property meets local and state requirements for adding a backyard unit. If building is allowed, the company designs one of its modular, factory-built structures to fit the plot. Homeowners often hesitate to take on a project like this, Rivas says over the whir of a drill in his company's workshop, because "they're expected to put a lot of time or money into the process without really getting a clear picture of what they can build."

The housing crunch in many West Coast cities has revived interest in an old idea: the granny flat. Often called "accessory dwelling units," or ADUs, the free-standing structures can be manufactured off-site and plunked in a backyard for about $150,000, including permits and site work. Some housing experts are promoting ADUs as a small way to address the affordability crisis in high-cost places such as Seattle, the Bay Area, and Los Angeles.

Lawmakers are warming to the concept, approving legislation to make it easier and cheaper to install ADUs. And unlike some other efforts to increase housing density, these measures generally haven't been met with fierce opposition from antidevelopment groups. Perhaps that's because ADUs can blend into single-family neighbourhoods and let homeowners profit by owning rental units. "They might be the single most promising means of upping the housing supply that is also politically feasible," says Issi Romem, chief economist at BuildZoom, a company that mines building permit data to help homeowners find contractors.

Seattle, Vancouver, and Portland, Ore., have all seen applications for ADU permits climb after issuing rules relating to their construction. California is playing catch-up: The state's legislature passed laws in 2016 and 2017 removing parking requirements for ADUs, eliminating some utility connection fees, and streamlining the approval process. Los Angeles issued 721 permits for ADUs last year, a fivefold increase from 2016, according to Attom Data Solutions. San Jose, San Francisco, Santa Barbara, and Oakland also saw upticks last year.

While that interest is notable, ADUs aren't a panacea for a state that for years has failed to keep pace with housing demand. California's economy added 2.3 million jobs over the past five years. But the state issued permits for fewer than 480,000 new residential units over the same period, or about one home for every five additional workers.

Building enough backyard units to narrow the gap between supply and demand in any noticeable way will be challenging. An ADU is "a construction project that needs to go through zoning, regulation, financing," says David Garcia, policy director at the University of California at Berkeley's Terner Center for Housing Innovation. "The typical homeowner's not prepared for that." Many who are considering a backyard unit, he says, will want a "one-stop shop."

A Portland-based startup offers a turnkey solution. Dweller Inc. covers the upfront costs of installing an ADU in return for a 25-year ground lease on the land where it sits. The company is responsible for finding a tenant and captures 70 percent of rental income. "We have the potential for this to be a very commonplace thing," says Chief Executive Officer Patrick Quinton.

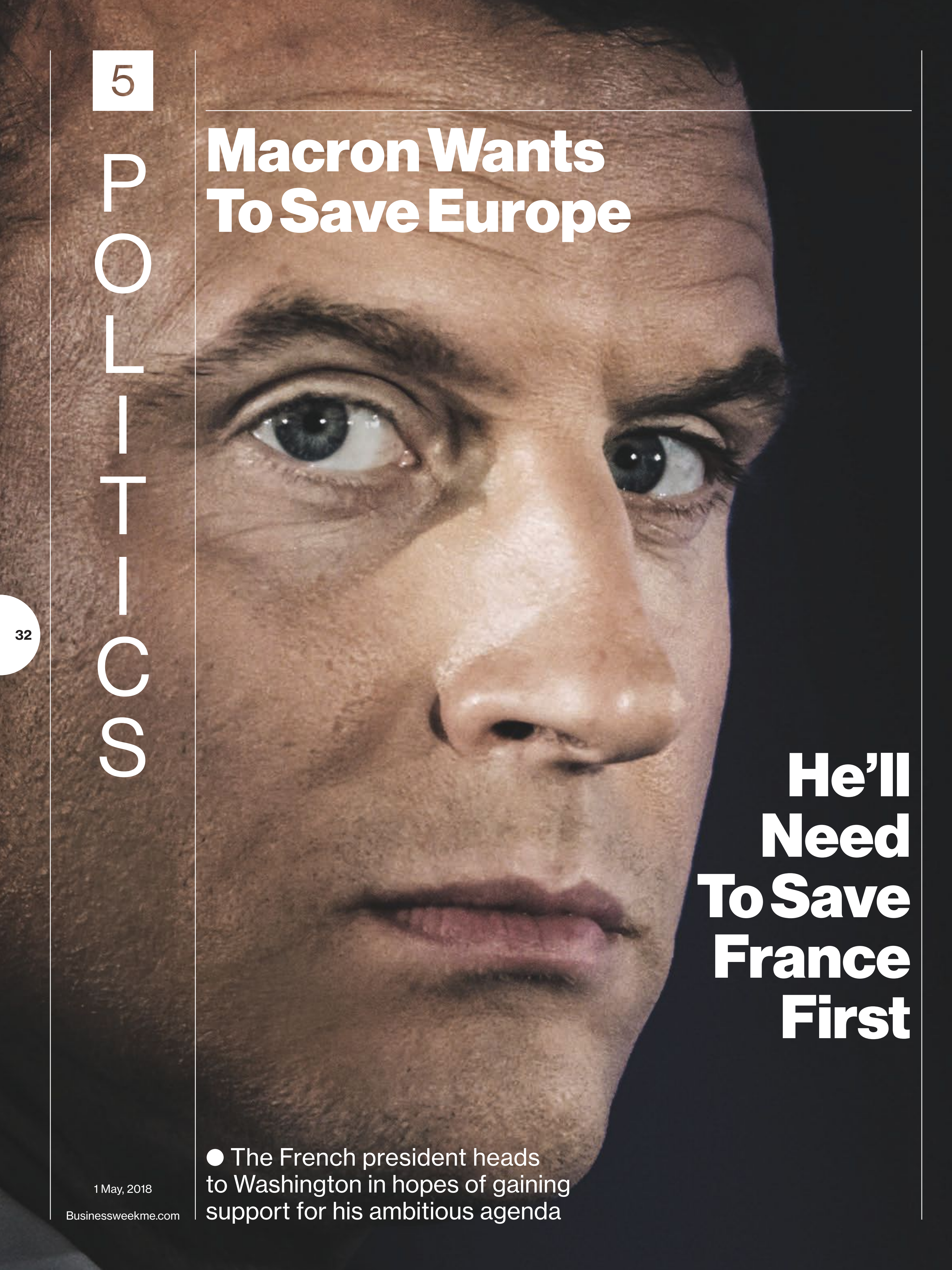
▲ A 320-square-foot backyard studio in Los Angeles designed by Cover

COURTESY COVER

Dweller's business model is untested—the company won't install its first company-financed unit until June—as are those of several startups targeting the market. Seattle's CityBldr started a service in March that streamlines the design and permitting process for ADUs. Cover, which has raised $1.6 million from Khosla Ventures, General Catalyst, and Fifty Years, has built only one of its backyard units, though Rivas says it has several in the pipeline.

As these businesses ramp up, they're likely to run into a problem vexing more experienced builders: competition for materials and labour. Steve Vallejos, whose Valley Home Development has been installing prefabricated units in the Bay Area for more than a decade, is building his own factory after his manufacturing partners got busy with bigger projects. Studio Shed, a Boulder, Colo., company that's installed more than 1,000 backyard units, including dwellings and workspaces, is concentrating on developing a network of builders, electricians, and plumbers to install ADUs. "There's almost no upper limit in terms of the available places where people could put them," says Jeremy Nova, the company's co-founder. "That's an opportunity for our business, but it's very hard to find contractors right now." *—Patrick Clark and Noah Buhayar*

THE BOTTOM LINE Seattle, Los Angeles, and Portland, Ore., have logged sharp increases in permits for accessory dwelling units following changes to zoning laws.



Macron Wants To Save Europe

He'll Need To Save France First

● The French president heads to Washington in hopes of gaining support for his ambitious agenda

Emmanuel Macron announced his arrival on the world stage last May by grabbing hold of Donald Trump and not letting go. France's youngest-ever president had been in office for 11 days when they met at a NATO summit in Brussels. Trump is known for trying to dominate fellow politicians with an aggressive grip, but Macron turned the tables on him, seizing his hand and holding tight even as Trump tried to pull away. Macron then gave his remarks in French, even though he's fluent in English. Trump, with no translation earpiece, nodded along earnestly. The point was plain: Macron was not going to be dominated.

His strategy seems to have worked. A senior official in the Elysée presidential palace says Macron and Trump have established a strong relationship. U.S. administration officials say the French president has become an influential voice for Trump on Iran, Syria, and trade. Despite their clear differences in character, both are political outsiders who have little patience for diplomatic niceties, the French official says. That allows them to get down to business, even when they disagree.

Trump has rewarded Macron, 40, with what will be the first official state visit of his presidency, set for April 23-25. Macron arrives in Washington in better standing with Trump than his German counterpart, Chancellor Angela Merkel—who visits the White House on April 27, but just for one day. The allied airstrikes against Syria were a diplomatic victory for Macron, who was the first and strongest advocate for a military response to the suspected chemical attack against civilians, confirming his position as one of Trump's most trusted foreign counterparts. Germany earned a rebuke from Trump's future ambassador to the country, Richard Grenell, for refusing to join the coalition. "Macron is the only major European leader to have a working relationship with Trump," says Martin Quencez, a fellow at the German Marshall Fund of the U.S. "That gives [France] a stronger position vis-á-vis Berlin."

If Macron can prevent Trump from advancing down the path to a trade war, it will earn him political capital he'll be able to deploy as he pursues his two grand ambitions: to reform a France that has resisted change for 30 years and to reverse the relative decline of Europe. His goal is to restore not just the Continent's economic muscle but the aspirational idea that the European Union can be a unified superpower.

That premise has been put to the test over the past several years, first by the sovereign debt crisis, then the influx of refugees fleeing war and terrorism in the Middle East, and finally the Brexit vote in 2016. Exhausted by the compromises required to contain those troubles, most European leaders are now eager to preserve their sovereign powers rather than embrace Macron's plan for a more federal union. "Europe's destiny is being decided now," Macron said in a French television interview on April 15. "My responsibility is to advance this ambition in the name of France, and that is why I am doing all these reforms, all these transformations."

While chasing his dreams for Europe, Macron has a lot of work to do at home. France has stubbornly high unemployment, the second-highest tax burden in the Organization for Economic Cooperation and Development, an outdated industrial base, and a restive populist movement. An accelerating economy helped him roll back labour protections and cut taxes for investors, but now he's facing the first big obstacles in his 10-year plan to transform France and Europe (yes, he seems to be banking on a second term).

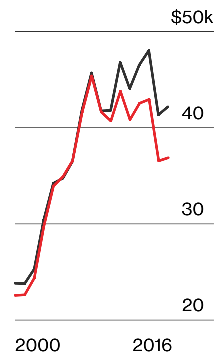
Workers at the state rail company shut down much of the train network in April and have scheduled weekly stoppages through June as they fight his plans to shake up the enterprise. Students are protesting reductions in their entitlements, and pilots and cabin crews at Air France are striking over pay. A survey published by France's most watched TV news channel shows 74 percent of respondents believe Macron's policies are "unfair" and 77 percent say they're dividing French society. His approval rating slipped to about 40 percent in early April after entering the year at 47 percent. Macron is not deterred. "I want to change things, and I will not let up," he told French television in another interview this month. He will push on "to the end."

A stronger France would help Macron challenge Merkel's vision of Europe as a community of nations and convince her that it could become a more integrated economic superpower. He envisions a sovereign entity—a United States of Europe in all but name—that can match the U.S. for innovation and entrepreneurship and use its clout to protect industries and workers. Macron's Europe would impose common labour and environmental protections across the bloc. It would force tech giants to pay their fair share of taxes and enforce external borders to control the flow of refugees and immigrants.

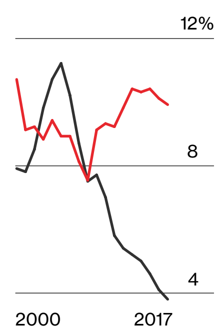
His fellow EU leaders aren't so excited about making Europe great again—at least not if it means falling in line behind a resurgent France and its precocious president. Dutch Prime Minister Mark Rutte openly defies him, leading a group of eight northern countries that insist member states need to do their own work to make the bloc stronger, rather than look for new forms of risk-sharing. ▶

● Economic factors
France
Germany

GDP per capita, current U.S. dollars



Unemployment rate



JEROME SESSINI/MAGNUM PHOTOS; DATA: WORLD BANK

◀ Germany's 37-year-old health minister, Jens Spahn, part of a new generation of German leaders jostling to succeed Merkel, said in March that the EU needs to "get real" and forget about "lofty speeches" and a "utopian vision" of grand projects.

Macron is starting to realise that Merkel may never sign up for his boldest plans, according to a person familiar with his thinking. In fact, senior French government officials suspect that his vaulting rhetoric is starting to annoy her. As a June deadline approaches for a joint Franco-German plan to let banks compete across Europe, Macron is struggling to win Merkel's support for a common deposit guarantee system. And his talk of European economic sovereignty sends shivers down the spines of German industrialists imagining foreigners defending their export interests.

Merkel, who scored only a narrow victory last year, has faced protests at home over the European Central Bank's decision to allow inflation to accelerate to encourage growth in the rest of the euro area. When Macron talks of European solidarity, conservatives in Berlin picture non-Germans gaining the power to funnel their tax euros to basket cases like Greece.

Macron's hubris doesn't help. In March he was almost an hour late for a meeting with Merkel in Paris—after spending much of the day in the south of France for a photo session with Annie Leibovitz. A few days later, Rutte was showing Macron around his office in The Hague as the French leader looked conspicuously uninterested, twice cutting off his host's historical explanations. Dutch daily *De Telegraaf* said the snub was "brutal," and video of the exchange went viral in the Netherlands. "I'm not arrogant, I'm determined," Macron told German weekly *Der Spiegel* in October (again cutting short an exchange).

That claim isn't entirely convincing from someone who celebrated his election last year not with the French national anthem but the European one. And, pointedly, he walked out to deliver his victory speech across the Louvre's Courtyard of Napoleon (another provincial guy who tried to conquer Europe, the Paris wags observed). Macron has entertained world leaders and corporate titans at the Palace of Versailles, inviting comparisons to the Sun King, Louis XIV, who dominated the 17th century. "When you are French, there is always an idea that you will be somewhat arrogant," says Jean Pisani-Ferry, a professor at Sciences Po in Paris and the Hertie School of Governance in Berlin, who advised Macron during the campaign. "You have to be aware of that and be careful. But being ambitious is not being arrogant."

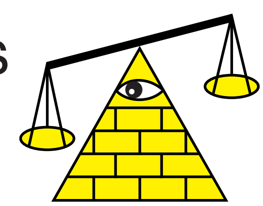
One force restraining Macron's ego: his 65-year-old wife and former high school drama coach, Brigitte. When the president's irritation with the constant press attention threatened to boil over during a visit to a Beijing art gallery in January, for instance, the first lady put a hand on his arm. She suggested he enjoy the exhibition first and then talk with the reporters. Macron smiled and complied.

Macron's trip to Washington is a reminder to his critics that he's becoming the most effective European leader on the world stage at the moment. He already has fans in the U.S. business community. In January, Macron entertained Goldman Sachs Group Inc. Chief Executive Officer Lloyd Blankfein at Versailles. Speaking at a panel in March, Blankfein said, "Right now the most central, important leader in Europe is Macron. He has the potential to be a real deal." —*Helene Fouquet and Ben Sills, with Gregory Viscusi, Jennifer Jacobs, and Margaret Talev*

"Macron is the only major European leader to have a working relationship with Trump"

THE BOTTOM LINE French President Macron wants to reform France and strengthen Europe. His relationship with Trump could help, but he'll have to win over his skeptics in Europe.

Trump's War on 'Deep State' Judges



● The Supreme Court could make it easier for agency chiefs to fire in-house jurists

For years, Ray Lucia was a nationally syndicated radio host and financial adviser who crisscrossed the U.S. touting his Buckets of Money retirement plan. Using data that regulators later argued were fake, he wowed audiences with presentations showing how his investment strategy would have protected nest eggs in the booms and busts of the 1960s and '70s. In 2015, endorsing an administrative law judge's finding that Lucia misled retirees, the Securities and Exchange Commission kicked him out of the financial advice business.

On April 23, Lucia's appeal will be heard in the U.S. Supreme Court, with Lucia arguing that the judge who first ruled against him wasn't appointed properly. Siding with him—and against the SEC's long-standing position—will be the Trump administration. The move amounts to a broadside aimed at the 1,900 administrative law judges (ALJs) who help federal agencies enforce laws and are a key

ILLUSTRATION BY 731; LUCIA, COURTESY YOUTUBE part of the administrative "deep state" that Trump has vowed to dismantle.

The case hinges on whether these judges are "officers," a constitutional designation that could make them easier for politically appointed agency chiefs to fire. White-collar defense lawyers, right-wing think tanks, and the Chamber of Commerce argue that they are officers. A November brief by Solicitor General Noel Francisco, the administration's top Supreme Court lawyer, marked the first time the White House agreed.

If successful, the challenge could erode the independence of judges at federal agencies. In a Supreme Court docket full of big cases, Lucia "may be the sleeper," says Brianne Gorod, chief counsel for the Constitutional Accountability Center, a liberal think tank in Washington. In a separate case in May, Judge Carlos Lucero of the 10th Circuit Court of Appeals wrote that the effort to attach the officer designation "threatens to unravel much of our modern regulatory framework" and "places the legitimacy of our administrative agencies in serious doubt."

Trump has made no secret of his antipathy toward Washington bureaucracy. Administrative law judges are integral to how the federal government operates. They hold hearings and make initial rulings on anything from SEC violations to black lung benefits. They're also judicial workhorses, handling five times as many cases—more than 1.5 million a year, according to the administrative judiciary's estimate—as are filed in federal district court.

Traditionally they haven't been considered officers, a designation that requires appointment by the president, the president's appointees, or a court. Until Trump, the federal position was that ALJs are employees without enough authority to fit that designation. Solicitor General Francisco reversed that, arguing on behalf of the SEC that its original position was wrong. The court then had to appoint a private attorney to defend the SEC's prior stance.

The critique of ALJs is that they're both too independent and not independent enough. They're hired on a merit basis through the Office of Personnel Management and can be fired only for cause by the Merit Systems Protection Board. Congress sets their pay. They aren't eligible for agency bonuses or subject to agency performance reviews.

That independence was on display the same day Francisco filed his Lucia brief. William Moran, the ALJ who reviews mine safety enforcement actions from the Department of Labor, sent back a proposal from Labor Secretary Alexander Acosta that reduced safety fines for a mining company by 82 percent. "As with virtually all of his settlement motions," Moran wrote of the secretary, the proposal was "fact free."

The opposite complaint—that ALJs aren't independent enough—is leveled most often at the SEC, where, according to a Chamber brief in the Lucia case, "increased use of in-house administrative proceedings" in lieu of litigation in federal court has had "one indisputable result: The Commission prevails much more frequently." The claim stems from an oft-cited 2015 *Wall Street Journal* article that said the SEC has a lopsided win rate in cases that begin before ALJs. Academics have since debunked that finding.

To Lucia, the bias is obvious. With an ALJ, "the Division of Enforcement brings a case and pretty much knows they're going to win," he says. Lucia argues that the SEC held his Buckets of Money presentation to a legal standard that didn't exist and found no victims: "A federal judge would have thrown this out. They would have said, 'Wait a minute, where's the proof that this person has misled someone?' "

Lucia's promotional presentation tracked what would have happened to four fictional families had they retired with $1 million in 1966 or 1973 and invested in different ways. The family using Lucia's strategy, which included real estate investment trusts, quadrupled their money. The others earned less or went broke. The presentation used inaccurate historical data that made REITs unrealistically attractive, the SEC said. Lucia's firm was paid by REIT issuers and also earned commissions through affiliated brokers, according to the SEC.

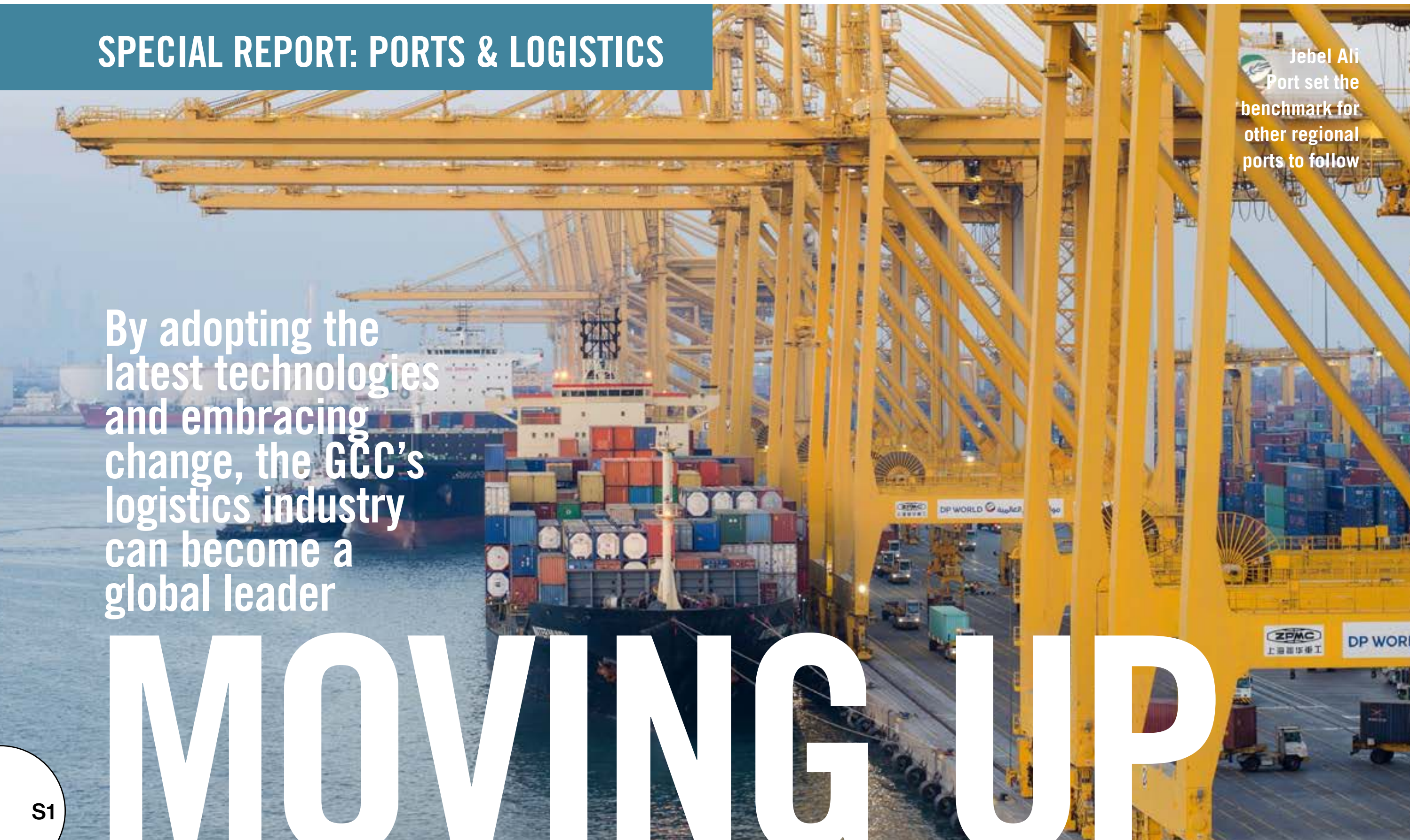

● Lucia

Should the court conclude that ALJs are officers, the ramifications could take a while to become clear. Lucia wants the case dismissed, but the SEC is unlikely to agree. The Supreme Court might let lower courts sort out what it means for pending cases. The bigger impact could be long-term, if and when the high court decides to let agency heads fire those who don't adhere to administration priorities, such as mine safety judge Moran.

That would make the ALJs more politically vulnerable and, as Francisco wrote, "safeguard the president's power to control and supervise the executive branch." A ruling for Lucia "could destabilise the modern federal government," says Gorod of the Constitutional Accountability Center. "It's not surprising that conservative opponents of the administrative state might welcome that outcome," she says. "But it's quite stunning to see the federal government itself push for this result." *—Margaret Newkirk and Greg Stohr*

THE BOTTOM LINE The Lucia case could redefine the role of administrative law judges and be the sleeper decision in a blockbuster term for the Supreme Court.

SPECIAL REPORT: PORTS & LOGISTICS



Jebel Ali Port set the benchmark for other regional ports to follow

MOVING UP

By adopting the latest technologies and embracing change, the GCC's logistics industry can become a global leader

With Gulf countries pushing ahead with plans to diversify their economies, the ports and logistics industries are viewed as being critical to success. Indeed, these two industries touch upon almost every other sector in some way, and without them global trade would, quite literally, grind to a halt. Globally almost one in 10 jobs is related to the logistics industry, underscoring the importance of the sector and highlighting the work involved in transporting goods to where they are needed around the world.

All of the GCC countries have been investing heavily in ports and logistics facilities, with Expo 2020 in Dubai, Saudi Vision 2030 and Oman Vision 2040 viewed as key drivers. There have also been major investments in new ports such as Duqm and Sohar in Oman and continued investments in major ports elsewhere around the region, according to Bushra Ali, business intelligence specialist at Logistics Executive. Added to this, a GCC-wide rail project, which is expected to start operating by around 2021, will add further value to regional ports by giving easier access to and from ports.

"The GCC's logistics industry is at a very interesting turning point at the moment due to the momentum for economic transformation within regional economies, particularly the UAE, Saudi Arabia and Oman, as well as for further economic integration and cooperation within the GCC bloc," Ali says. "The pace of development is truly inspiring."

The past 18 months have also been positive for the logistics industry, around the world as well as in the GCC. "Many regions recovered from the economic sluggishness of the past few years, and since a recovery in oil prices was a key driver, the GCC was gratefully no exception. Many stalled projects picked up pace, and several new initiatives were announced," Ali says.

Sohar Port on Oman is just one example of a GCC port that has experienced solid growth in the past year. Mark Geilenkirchen, the company's CEO, says Sohar Port averaged over one million tonnes of cargo handled per week. "Container traffic saw an increase of 37%, dry bulk volumes witnessed a 25% year-on-year rise

> "Container traffic saw an increase of 37%, dry bulk volumes witnessed a 25% year-on-year rise and the port also received 3,075 vessel calls" – Mark Geilenkirchen

and the port also received 3,075 vessel calls, marking a significant 17% year-on-year increase," he says.

Geilenkirchen adds that steady growth in aggregate cargo volumes and continued investment, which includes the upcoming Sohar Port South expansion, will provide additional cargo capacity and is a key aspect in boosting businesses at the port. "An additional factor for this increase in growth was the introduction of the food cluster, which secured significant public and private sector investments. Our focus on this cluster, which includes innovative methods of food storage, production and distribution, has allowed us to attract a large portion of the agricultural cargo trade in the region," he says.

But with ports around the region expanding, and new ports due to enter the fray, will there be sufficient demand to absorb the extra capacity? Ali sees strong demand in the region, with developments in retail and e-commerce also offering potential for the industry. The acquisition of Souq by Amazon and the launch of Noon.com signal "an impending boom" in e-commerce activity in the region, she says. More recently, the announcement of Saudi Arabia's public spending budget for 2018 – the country's largest ever – has reinforced optimism in GCC markets.

Michael Stockdale, CEO of consultancy firm B2CLogistics, adds that the GCC region has experienced substantial investment in logistics infrastructure projects, in technological advancements, and in social and workforce change in the past few years. In particular, he points to a few notable key trends that are impacting the industry positively. These include large-cap infrastructure development which is "maturing and interconnecting" with an advanced network of modern sea ports, airports, and highway networks. The industry and governments are also changing attitudes and practices, seeking better value, responsiveness and efficiency.

While technological disruption appears to be driving much of the evolution seen in the past year, large–scale infrastructure developments have driven the industry change, according to Stockdale: He points to key infrastructure gateways, such as KIZAD in UAE, KAEC in Saudi, and Sohar in Oman.

Ali points to consolidation in the lo-

NEVILLE BISSETT, CEO OF QTERMINALS, DISCUSSES DEVELOPMENTS AT HAMED PORT

TELL ME ABOUT THE KEY DEVELOPMENTS AT QTERMINALS AND HAMAD PORT IN THE PAST YEAR.

The progress made at Hamad Port since its opening in December 2016 is substantial. Monthly volumes have increased by more than twofold, from an average of just over 41,000 TEUs per month to 105,000 TEUs per month. To date, we have handled over 1 million TEUs, 1.95 million tonnes of general cargo and almost 80,000 vehicles (RORO), all within 14 months of the start of operations. This increase is driven by our ongoing efforts to maintain the highest levels of productivity and service delivery without compromising on safety and quality.

WHAT PLANS DO YOU HAVE FOR INVESTMENT IN UPGRADES AND EXPANSION IN THE NEXT 1-3 YEARS?

We have investments planned for the Container Terminal and General Cargo Terminals, the Multi-User Terminal (RORO & Livestock) and the Offshore Supply Terminal. These investments are necessary to ensure Hamad Port is well-positioned for future growth.

HOW IS TECHNOLOGY CHANGING LOGISTICS AND THE OPERATION OF PORTS?

Being a new development, Hamad Port has invested in and uses the latest and most technologically advanced equipment, Terminal Operating Systems (TOS), facilities and services. We have a world class IT infrastructure in place, and we are constantly updating our TOS, Jade and Navis N4, to maintain an operational advantage. Automated access and internal movement management systems will be online soon. Hamad Port is also developing a Port Community System (PCS), which optimises, manages and automates document transfer and port and logistics processes and procedures through a single submission of data. A PCS enables the intelligent, high-speed, and secure exchange of information.

WHERE IS MOST GROWTH COMING FROM GEOGRAPHICALLY?

Hamad Port's strategic geographical location offers opportunities to create cargo movement towards the upper Gulf, supporting countries such as Kuwait and Iraq, and south towards Oman. Qatar's major trade partners include China, the United States, Europe, and Japan. The world's largest shipping companies and other main line operators have started or have expressed interest in starting services to Hamad Port, and many are expanding their existing routes. New routes include services from China/the Far East and Bangladesh, and established routes that have expanded include the Far East, India/Pakistan, Oman, and Europe/the Mediterranean.

SPECIAL REPORT: PORTS & LOGISTICS

Sohar Port in Oman is developing rapidly as part of Oman's Vision 2040

gistics market is a key trend across the developing world. Regionally, this has resulted in increased M&A activity and joint ventures aimed at expanding geographic footprints and enhancing logistics capabilities, particularly on the technological side.

Another challenge that the industry faces, especially in the Middle East, is keeping up with ongoing transformations, whether political, economic or technological, according to Ali. Stockdale agrees, explaining that the investment appetite for short ROI in preference to longer term investments reflects the conservative risk-averse culture, limiting a more aggressive long-term development. He adds that rail infrastructure designed to connect the region is lagging and border crossing processes continue to frustrate free and efficient trade.

Another issue that has been gradually emerging over recent years concerns regulations. Stockdale says that regulations must change to keep up with technology such as drones, driverless cars, online customs clearance and international transactions.

Ali points to broader headwinds including looming geo-political risks in international trade. "The ongoing tariff war, for example, is a major cause of concern for global supply chains," she says. "Now is a good time for international logistics players to conduct supply chain health checks to identify their cost and value drivers, and also evaluate their ability to manage risks given current uncertainty in the global trade environment."

While the GCC's ports and logistics industry has already seen significant change in recent years, a lot more changes are afoot. Ali highlights a few specific areas: "Leading the charge is digitalisation, of course, with artificial intelligence and advanced data analytics driving competitiveness. It's also interesting to see how the supply chain industry globally is quickly embracing Blockchain technology, identifying its ability to deliver greater security and efficiencies across supply chains. Several recent reports have indicated that Blockchain in supply chain is a market that is set to experience quite significant growth this year," she says.

Stockdale adds augmented reality and automation to the list. Along with Blockchain and AI they are "simplifying and streamlining previously complex, lengthy or even hazardous activities" and present an opportunity for the industry, he says.

Ali adds that while the logistics industry is notorious for being slow to 'keep up' with digitalisation and change due to the level of investment that is often needed to upgrade infrastructure and re-train staff, the situation is better in the GCC. "Fortunately for the regional industry, there is a lot of institutional and government support for this transformation."

In terms of opportunities left to tap, there remain areas of the industry that are underserved by the regional industry, particularly niche sectors such as healthcare logistics, e-fulfilment, according to Ali. "These areas are actually quite sizable and growing rapidly. The opportunities that lie therein are quickly being recognised and responded to – by both older companies and logistics service providers and newer, more digitally-driven entrants," Ali says.

"There is immense appetite for growth in the regional transport and logistics industry. Ongoing infrastructural projects will see a massive improvement in domestic and intraregional connectivity via road, rail, port, etc. over the next decade. There are exciting possibilities for the region to integrate with China's Belt and Road Initiative, which will further catalyse cross-border trade with key regions, including East Asia, the Indian subcontinent and Africa," she adds.

"Large-cap infrastructure development is maturing and interconnecting, with an advanced network of modern sea ports, airports, and highway networks becoming more integrated and efficient" – Michael Stockdale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Your daily routine

Your social media posts

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Palantir Knows Everything About You

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Your credit history

Your web history

Your hobbies

Your savings account

Your persona emails

Your printer usage

Your keystrokes

Your résumé

Your politica contribution

Your interests

Your ATM usage

Your international flights

Your online relationships

Your friends

Peter Thiel's data-mining company is using War on Terror tools to track American citizens. The scary thing? Palantir is desperate for new customers

By Peter Waldman, Lizette Chapman, and Jordan Robertson

High above the Hudson River in downtown Jersey City, a former U.S. Secret Service agent named Peter Cavicchia III ran special ops for JPMorgan Chase & Co. His insider threat group—most large financial institutions have one—used computer algorithms to monitor the bank's employees, ostensibly to protect against perfidious traders and other miscreants.

Aided by as many as 120 "forward-deployed engineers" from the data-mining company Palantir Technologies Inc., which JPMorgan engaged in 2009, Cavicchia's group vacuumed up emails and browser histories, GPS locations from company-issued smartphones, printer and download activity, and transcripts of digitally recorded phone conversations. Palantir's software aggregated, searched, sorted, and analysed these records, surfacing keywords and patterns of behaviour that Cavicchia's team had flagged for potential abuse of corporate assets. Palantir's algorithm, for example, alerted the insider threat team when an employee started badging into work later than usual, a sign of potential disgruntlement. That would trigger further scrutiny and possibly physical surveillance after hours by bank security personnel.

Over time, however, Cavicchia himself went rogue. Former JPMorgan colleagues describe the environment as Wall Street meets *Apocalypse Now,* with Cavicchia as Colonel Kurtz, ensconced upriver in his office suite eight floors above the rest of the bank's security team. People in the department were shocked that no one from the bank or Palantir set any real limits. They darkly joked that Cavicchia was listening to their calls, reading their emails, watching them come and go. Some planted fake information in their communications to see if Cavicchia would mention it at meetings, which he did.

It all ended when the bank's senior executives learned that they, too, were being watched, and what began as a promising marriage of masters of big data and global finance descended into a spying scandal. The misadventure, which has never been reported, also marked an ominous turn for Palantir, one of the most richly valued startups in Silicon Valley. An intelligence platform designed for the global War on Terror was weaponised against ordinary Americans at home.

Founded in 2004 by Peter Thiel and some fellow PayPal alumni, Palantir cut its teeth working for the Pentagon and the CIA in Afghanistan and Iraq. The company's engineers and products don't do any spying themselves; they're more like a spy's brain, collecting and analysing information that's fed in from the hands, eyes, nose, and ears. The software combs through disparate data sources–financial documents, airline reservations, cellphone records, social media postings–and searches for connections that human analysts might miss. It then presents the linkages in colourful, easy-to-interpret graphics that look like spider webs. U.S. spies and special forces loved it immediately; they deployed Palantir to synthesise and sort the blizzard of battlefield intelligence. It helped planners avoid roadside bombs, track insurgents for assassination, even hunt down Osama bin Laden. The military success led to federal contracts on the civilian side. The U.S. Department of Health and Human Services uses Palantir to detect Medicare fraud. The FBI uses it in criminal probes. The Department of Homeland Security deploys it to screen air travellers and keep tabs on immigrants.

Police and sheriff's departments in New York, New Orleans, Chicago, and Los Angeles have also used it, frequently ensnaring in the digital dragnet people who aren't suspected of committing any crime. People and objects pop up on the Palantir screen inside boxes connected to other boxes by radiating lines labeled with the relationship: "Colleague of," "Lives with," "Operator of [cell number]," "Owner of [vehicle]," "Sibling of," even "Lover of." If the authorities have a picture, the rest is easy. Tapping databases of driver's license and ID photos, law enforcement agencies can now identify more than half the population of U.S. adults.

JPMorgan was effectively Palantir's R&D lab and test bed for a foray into the financial sector, via a product called Metropolis. The two companies made an odd couple. Palantir's software engineers showed up at the bank on skateboards. Neckties and haircuts were too much to ask, but JPMorgan drew the line at T-shirts. The programmers had to

PREVIOUS SPREAD: ILLUSTRATION BY 731; SOURCE: GETTY IMAGES; THIS SPREAD: JIM WATSON/AFP/GETTY IMAGES

agree to wear shirts with collars, tucked in when possible.

As Metropolis was installed and refined, JPMorgan made an equity investment in Palantir and inducted the company into its Hall of Innovation, while its executives raved about Palantir in the press. The software turned "data landfills into gold mines," Guy Chiarello, who was then JPMorgan's chief information officer, told *Bloomberg Businessweek* in 2011.

Cavicchia was in charge of forensic investigations at the bank. Through Palantir, he gained administrative access to a full range of corporate security databases that had previously required separate authorisations and a specific business justification to use. He had unprecedented access to everything, all at once, all the time, on one analytic platform. He was a one-man National Security Agency, surrounded by the Palantir engineers, each one costing the bank as much as $3,000 a day.

Senior investigators stumbled onto the full extent of the spying by accident. In May 2013 the bank's leadership ordered an internal probe into who had leaked a document to the *New York Times* about a federal investigation of JPMorgan for possibly manipulating U.S. electricity markets. Evidence indicated the leaker could have been Frank Bisignano, who'd recently resigned as JPMorgan's co-chief operating officer to become CEO of First Data Corp., the big payments processor. Cavicchia had used Metropolis to gain access to emails about the leak investigation—some written by top executives—and the bank believed he shared the contents of those emails and other communications with Bisignano after Bisignano had left the bank. (Inside JPMorgan, Bisignano was considered Cavicchia's patron—a senior executive who protected and promoted him.)

JPMorgan officials debated whether to file a suspicious activity report with federal regulators about the internal security breach, as required by law whenever banks suspect regulatory violations. They decided not to—a controversial decision internally, according to multiple sources with the bank. Cavicchia negotiated a severance agreement and was forced to resign. He joined Bisignano at First Data, where he's now a senior vice president. Chiarello also went to First Data, as president. After their departures, JPMorgan drastically curtailed its Palantir use, in part because "it never lived up to its promised potential," says one JPMorgan executive who insisted on anonymity to discuss the decision.

The bank, First Data, and Bisignano, Chiarello, and Cavicchia didn't respond to separately emailed questions for this article. Palantir, in a statement responding to questions about how JPMorgan and others have used its software, declined to answer specific questions. "We are aware that powerful technology can be abused and we spend a lot of time and energy making sure our products are used for the forces of good," the statement said.


Thiel addresses the 2016 Republican National Convention

Much depends on how the company chooses to define good. In March a former computer engineer for Cambridge Analytica, the political consulting firm that worked for Donald Trump's 2016 presidential campaign, testified in the British Parliament that a Palantir employee had helped Cambridge Analytica use the personal data of up to 87 million Facebook users to develop psychographic profiles of individual voters. Palantir said it has a strict policy against working on political issues, including campaigns, and showed Bloomberg emails in which it turned down Cambridge's request to work with Palantir on multiple occasions. The employee, Palantir said, worked with Cambridge Analytica on his own time. Still, there was no mistaking the implications of the incident: All human relations are a matter of record, ready to be revealed by a clever algorithm. Everyone is a spidergram now.

Thiel, who turned 50 in October, long reveled as the libertarian black sheep in left-leaning Silicon Valley. He contributed $1.25 million to Trump's presidential victory, spoke at the Republican convention, and has dined with Trump at the White House. But Thiel has told friends he's had enough of the Bay Area's "monocultural" liberalism. He's ditching his longtime base in San Francisco and moving his personal investment firms this year to Los Angeles, where he plans to establish his next project, a conservative media empire.

As Thiel's wealth has grown, he's gotten more strident. In a 2009 essay for the Cato Institute, he railed against taxes, government, women, poor people, and society's acquiescence to the inevitability of death. (Thiel doesn't accept death as inexorable.) He wrote that he'd reached some radical conclusions: "Most importantly, I no longer believe that freedom and democracy are compatible." The 1920s was the last time one could feel "genuinely optimistic" about American democracy, he said; since then, "the vast increase in welfare beneficiaries and the extension of the franchise to women—two constituencies that are notoriously tough for libertarians—have rendered the notion of 'capitalist democracy' into an oxymoron."

Thiel went into tech after missing a prized Supreme Court clerkship following his graduation from Stanford Law School. He co-founded PayPal and then parlayed his winnings from its 2002 sale to EBay Inc. into a career in venture investing. He made an early bet on Facebook Inc. (where he's still on the board), which accounts for most of his $3.3 billion fortune, as estimated by Bloomberg, and launched ▶

◀ his career as a backer of big ideas—things like private space travel (through an investment in SpaceX), hotel alternatives (Airbnb), and floating island nations (the Seasteading Institute).

He started Palantir—named after the omniscient crystal balls in J.R.R. Tolkien's *Lord of the Rings* trilogy—three years after the attacks of Sept. 11, 2001. The CIA's investment arm, In-Q-Tel, was a seed investor. For the role of chief executive officer, he chose an old law school friend and self-described neo-Marxist, Alex Karp. Thiel told Bloomberg in 2011 that civil libertarians ought to embrace Palantir, because data mining is less repressive than the "crazy abuses and draconian policies" proposed after Sept. 11. The best way to prevent another catastrophic attack without becoming a police state, he argued, was to give the government the best surveillance tools possible, while building in safeguards against their abuse.

Legend has it that Stephen Cohen, one of Thiel's cofounders, programmed the initial prototype for Palantir's software in two weeks. It took years, however, to coax customers away from the longtime leader in the intelligence analytics market, a software company called I2 Inc.

In one adventure missing from the glowing accounts of Palantir's early rise, I2 accused Palantir of misappropriating its intellectual property through a Florida shell company registered to the family of a Palantir executive. A company claiming to be a private eye firm had been licensing I2 software and development tools and spiriting them to Palantir for more than four years. I2 said the cutout was registered to the family of Shyam Sankar, Palantir's director of business development.

I2 sued Palantir in federal court, alleging fraud, conspiracy, and copyright infringement. In its legal response, Palantir argued it had the right to appropriate I2's code for the greater good. "What's at stake here is the ability of critical national security, defense and intelligence agencies to access their own data and use it interoperably in whichever platform they choose in order to most effectively protect the citizenry," Palantir said in its motion to dismiss I2's suit.

The motion was denied. Palantir agreed to pay I2 about $10 million to settle the suit. I2 was sold to IBM in 2011.

Sankar, Palantir employee No. 13 and now one of the company's top executives, also showed up in another Palantir scandal: the company's 2010 proposal for the U.S. Chamber of Commerce to run a secret sabotage campaign against the group's liberal opponents. Hacked emails released by the group Anonymous indicated that Palantir and two other defense contractors pitched outside lawyers for the organisation on a plan to snoop on the families of progressive activists, create fake identities to infiltrate left-leaning groups, scrape social media with bots, and plant false information with liberal groups to subsequently discredit them.

After the emails emerged in the press, Palantir offered an explanation similar to the one it provided in March for its U.K.-based employee's assistance to Cambridge Analytica: It was the work of a single rogue employee. The company never explained Sankar's involvement. Karp issued a public apology and said he and Palantir were deeply committed to progressive causes. Palantir set up an advisory panel on privacy and civil liberties, headed by a former CIA attorney, and beefed up an engineering group it calls the Privacy and Civil Liberties Team. The company now has about 10 PCL engineers on call to help vet clients' requests for access to data troves and pitch in with pertinent thoughts about law, morality, and machines.

During its 14 years in startup mode, Palantir has cultivated a mystique as a haven for brilliant engineers who want to solve big problems such as terrorism and human trafficking, unfettered by pedestrian concerns such as making money. Palantir executives boast of not employing a single salesperson, relying instead on word-of-mouth referrals.

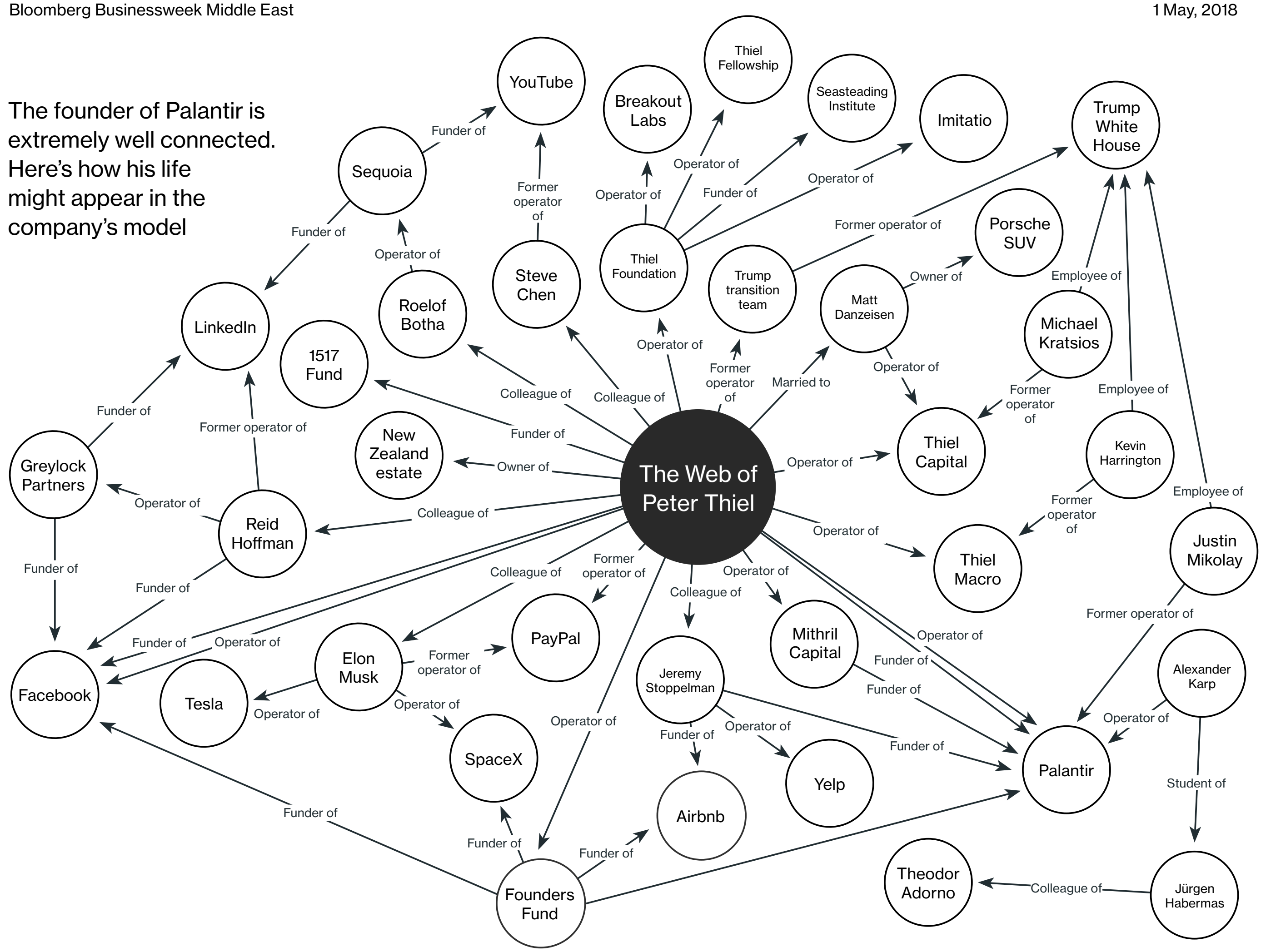
The company's early data mining dazzled venture investors, who valued it at $20 billion in 2015. But Palantir has never reported a profit. It operates less like a conventional software company than like a consultancy, deploying roughly half its 2,000 engineers to client sites. That works at well-funded government spy agencies seeking specialised applications but has produced mixed results with corporate clients. Palantir's high installation and maintenance costs repelled customers such as Hershey Co., which trumpeted a Palantir partnership in 2015 only to walk away two years later. Coca-Cola, Nasdaq, American Express, and Home Depot have also dumped Palantir.

Karp recognised the high-touch model was problematic early in the company's push into the corporate market, but solutions have been elusive. "We didn't want to be a services company. We wanted to do something that was cost-efficient," he confessed at a European conference in 2010, in one of several unguarded comments captured in videos posted online. "Of course, what we didn't recognise was that this would be much, much harder than we realised."

Palantir's newest product, Foundry, aims to finally break

As shown in the privacy breaches at Facebook and Cambridge Analytica, the pressure to monetise data at tech companies is ceaseless

The founder of Palantir is extremely well connected. Here's how his life might appear in the company's model



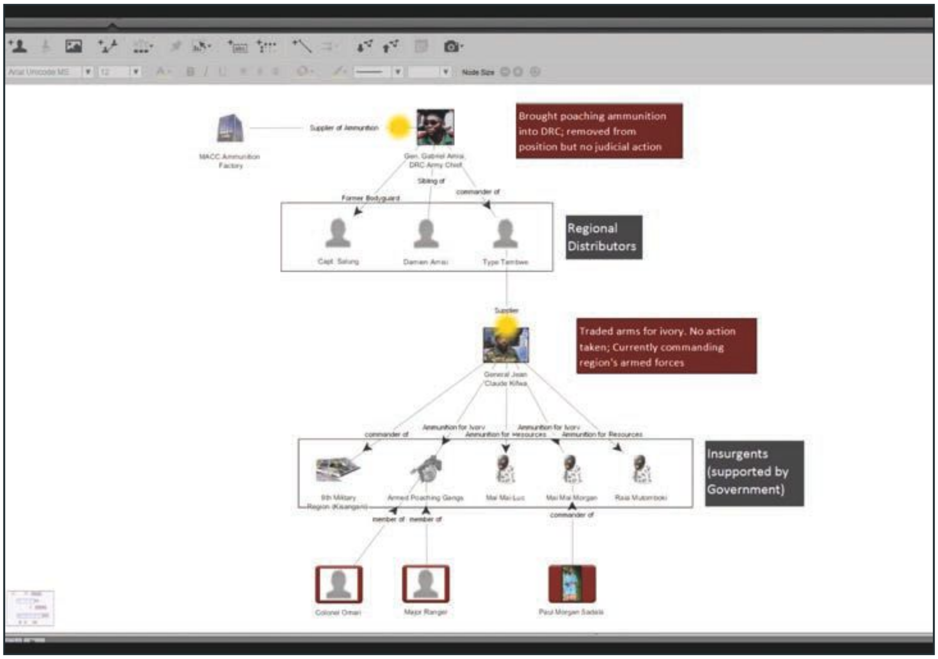
through the profitability barrier with more automation and less need for on-site engineers. Airbus SE, the big European plane maker, uses Foundry to crunch airline data about specific onboard components to track usage and maintenance and anticipate repair problems. Merck KGaA, the pharmaceutical giant, has a long-term Palantir contract to use Foundry in drug development and supply chain management.

Deeper adoption of Foundry in the commercial market is crucial to Palantir's hopes of a big payday. Some investors are weary and have already written down their Palantir stakes. Morgan Stanley now values the company at $6 billion. Fred Alger Management Inc., which has owned stock since at least 2006, revalued Palantir in December at about $10 billion, according to Bloomberg Holdings. One frustrated investor, Marc Abramowitz, recently won a court order for Palantir to show him its books, as part of a lawsuit he filed alleging the company sabotaged his attempt to find a buyer for the Palantir shares he has owned for more than a decade.

As shown in the privacy breaches at Facebook and Cambridge Analytica—with Thiel and Palantir linked to both sides of the equation—the pressure to monetise data at tech companies is ceaseless. Facebook didn't grow from a website connecting college kids into a purveyor of user profiles and predilections worth $478 billion by walling off personal data. Palantir says its Privacy and Civil Liberties Team watches out for inappropriate data demands, but it consists of just 10 people in a company of 2,000 engineers. No one said no to JPMorgan, or to whomever at Palantir volunteered to help Cambridge Analytica—or to another organisation keenly interested in state-of-the-art data science, the Los Angeles Police Department.

Palantir began work with the LAPD in 2009. The impetus was federal funding. After several Sept. 11 postmortems called for more intelligence sharing at all levels of law enforcement, money started flowing to Palantir to help build data integration systems for so-called fusion centers, starting in L.A. There are now more than 1,300 trained Palantir users at more than a half-dozen law enforcement agencies in Southern California, including local police and sheriff's departments and the Bureau of Alcohol, Tobacco, Firearms and Explosives.

The LAPD uses Palantir's Gotham product for Operation Laser, a programme to identify and deter people likely to commit crimes. Information from rap sheets, parole reports, police interviews, and other sources is fed into the system to generate a list of people the department defines as chronic offenders, says Craig Uchida, whose consulting firm, Justice & Security Strategies Inc., designed the Laser system. The list is distributed to patrolmen, with orders to monitor and stop ▶



Screenshots of Palantir's Gotham program, from a promotional video

◀ the pre-crime suspects as often as possible, using excuses such as jaywalking or fix-it tickets. At each contact, officers fill out a field interview card with names, addresses, vehicles, physical descriptions, any neighbourhood intelligence the person offers, and the officer's own observations on the subject.

The cards are digitised in the Palantir system, adding to a constantly expanding surveillance database that's fully accessible without a warrant. Tomorrow's data points are automatically linked to today's, with the goal of generating investigative leads. Say a chronic offender is tagged as a passenger in a car that's pulled over for a broken taillight. Two years later, that same car is spotted by an automatic license plate reader near a crime scene 200 miles across the state. As soon as the plate hits the system, Palantir alerts the officer who made the original stop that a car once linked to the chronic offender was spotted near a crime scene.

The platform is supplemented with what sociologist Sarah Brayne calls the secondary surveillance network: the web of who is related to, friends with, or sleeping with whom. One woman in the system, for example, who wasn't suspected of committing any crime, was identified as having multiple boyfriends within the same network of associates, says Brayne, who spent two and a half years embedded with the LAPD while researching her dissertation on big-data policing at Princeton University and who's now an associate professor at the University of Texas at Austin. "Anybody who logs into the system can see all these intimate ties," she says. To widen the scope of possible connections, she adds, the LAPD has also explored purchasing private data, including social media, foreclosure, and toll road information, camera feeds from hospitals, parking lots, and universities, and delivery information from Papa John's International Inc. and Pizza Hut LLC.

The LAPD declined to comment for this story. Palantir sent Bloomberg a statement about its work with law enforcement: "Our [forward-deployed engineers] and [privacy and civil liberties] engineers work with the law enforcement customers (including LAPD) to ensure that the implementation of our software and integration of their source systems with the software is consistent with the Department's legal and policy obligations, as well as privacy and civil liberties considerations that may not currently be legislated but are on the horizon. We as a company determine the types of engagements and general applications of our software with respect to those overarching

The Constitutionality Question

Why the courts haven't ruled on whether Palantir's analytical tools are legal

Civil rights advocates say the compilation of a digital dossier of someone's life, absent a court warrant, is an unlawful intrusion under the U.S. Constitution. Law enforcement officials say that's not the case. For now, the question is unsettled, and that may be no accident. Civil liberties lawyers are seeking a case to challenge the constitutionality of Palantir's use, but prosecutors and immigration agents have been careful not to cite the software in evidentiary documents, says Paromita Shah, associate director of the National Lawyers Guild's National Immigration Project. "Palantir lives on that secrecy," she says.

Since the 1970s, the Supreme Court has differentiated between searching someone's home or car, which requires a warrant, and searching material out in the open or shared with others, which doesn't. The justices' thinking seems to be evolving as new technologies rise.

In a 2012 decision, *U.S. v. Jones*, the justices said that planting a GPS tracker on a car for 28 days without a warrant created such a comprehensive picture of the target's life that it violated the public's reasonable expectation of privacy.

Similarly, the court's 2014 decision in *Riley v. California* found that cellphones contain so much personal information that they provide a virtual window into the owner's mind, and thus necessitate a warrant for the government to search. Chief Justice John Roberts, in his majority opinion, wrote of cellphones that "with all they contain and all they may reveal, they hold for many Americans 'the privacies of life.'" Justice Louis Brandeis, 86 years earlier, wrote a searing dissent in a wiretap case that seems to perfectly foresee the advent of Palantir.

"Ways may someday be developed," Brandeis warned, "by which the government, without removing papers from secret drawers, can reproduce them in court, and by which it will be enabled to expose to a jury the most intimate occurrences." —*P.W.*

YOUTUBE

considerations. Police Agencies have internal responsibility for ensuring that their information systems are used in a manner consistent with their policies and procedures."

Operation Laser has made L.A. cops more surgical–and, according to community activists, unrelenting. Once targets are enmeshed in a spidergram, they're stuck.

Manuel Rios, 22, lives in the back of his grandmother's house at the top of a hill in East L.A., in the heart of the city's gang area. Tall with a fair complexion and light hair, he struggled in high school with depression and a learning disability and dropped out to work at a supermarket.

He grew up surrounded by friends who joined Eastside 18, the local affiliate of the 18th Street gang, one of the largest criminal syndicates in Southern California. Rios says he was never "jumped in"–initiated into 18. He spent years addicted to crystal meth and was once arrested for possession of a handgun and sentenced to probation. But except for a stint in county jail for a burglary arrest inside a city rec centre, he's avoided further trouble and says he kicked his meth habit last year.

In 2016, Rios was sitting in a parked car with an Eastside 18 friend when a police car pulled up. His buddy ran, pursued by the cops, but Rios stayed put. "Why should I run? I'm not a gang member," he says over steak and eggs at the IHOP near his home. The police returned and handcuffed him. One of them took his picture with a cellphone. "Welcome to the gang database!" the officer said.

Since then he's been stopped more than a dozen times, he says, and told that if he doesn't like it he should move. He has nowhere to go. His girlfriend just had a baby girl, and he wants to be around for them. "They say you're in the system, you can't lie to us," he says. "I tell them, 'How can I be in the hood if I haven't got jumped in? Can't you guys tell people who bang and who don't?' They go by their facts, not the real facts."

The police, on autopilot with Palantir, are driving Rios toward his gang friends, not away from them, worries Mariella Saba, a neighbour and community organiser who helped him get off meth. When whole communities like East L.A. are algorithmically scraped for pre-crime suspects, data is destiny, says Saba. "These are systemic processes. When people are constantly harassed in a gang context, it pushes them to join. They internalise being told they're bad."

In Chicago, at least two immigrants have been detained for deportation by Immigration and Customs Enforcement officers based on erroneous information in gang databases, according to a pair of federal lawsuits. Chicago is a sanctuary city, so it isn't clear how ICE found out about the purported gang affiliations. But Palantir is a likely link. The company provided an "intelligence management solution" for the Cook County Sheriff's Office to integrate information from at least 14 different databases, including gang lists compiled by state and local police departments, according to county records. Palantir also has a $41 million data-mining contract with ICE to build the agency's "investigative case management" system.

One of the detained men, Wilmer Catalan-Ramirez,

> When whole communities are algorithmically scraped for pre-crime suspects, data is destiny

a 31-year-old body shop mechanic, was seriously injured when six ICE agents burst into his family's home last March without a warrant. He'd been listed in the local gang database twice–in rival gangs. Catalan-Ramirez spent the next nine months in federal detention, until the city of Chicago admitted both listings were wrong and agreed to petition the feds to let him stay in the U.S. ICE released him in January, pending a new visa application. "These cases are perfect examples of how databases filled with unverified information that is often false can destroy people's lives," says his attorney, Vanessa del Valle of Northwestern University's MacArthur Justice Center.

Palantir is twice the age most startups are when they cash out in a sale or initial public offering. The company needs to figure out how to be rewarded on Wall Street without creeping out Main Street. It might not be possible. For all of Palantir's professed concern for individuals' privacy, the single most important safeguard against abuse is the one it's trying desperately to reduce through automation: human judgment.

As Palantir tries to court corporate customers as a more conventional software company, fewer forward-deployed engineers will mean fewer human decisions. Sensitive questions, such as how deeply to pry into people's lives, will be answered increasingly by artificial intelligence and machine-learning algorithms. The small team of Privacy and Civil Liberties engineers could find themselves even less influential, as the urge for omnipotence among clients overwhelms any self-imposed restraints.

Computers don't ask moral questions; people do, says John Grant, one of Palantir's top PCL engineers and a forceful advocate for mandatory ethics education for engineers. "At a company like ours with millions of lines of code, every tiny decision could have huge implications," Grant told a privacy conference in Berkeley last year.

JPMorgan's experience remains instructive. "The world changed when it became clear everyone could be targeted using Palantir," says a former JPMorgan cyber expert who worked with Cavicchia at one point on the insider threat team. "Nefarious ideas became trivial to implement; everyone's a suspect, so we monitored everything. It was a pretty terrible feeling." Ⓑ —*With Michael Riley*

Insert Virtua

Trump's concrete wall is on pause, but attempts to seal the gaping border with a high-tech surveillance network lurch forward, again

1 May, 2018

By Lauren Etter and Karen Weise Photographs by Kirsten Luce

A border fence on a ranch west of Nogales, Ariz.

I Fence Here

Tony Sedgwick steers his red Nissan pickup to the edge of his vast Arizona ranch in the Sonoran Desert, unlocks a cattle gate, and continues rattling south along a dirt road until he reaches the U.S.-Mexico border. He climbs out of his truck and follows the undulating line of towering vertical steel beams as the ground slopes down into a dry riverbed. Here, the beams give way to crisscrossing shoulder-height iron bars. The white-haired cowboy removes his hat, hikes up his Wranglers, scissors over one iron bar, and ducks under the next. "I mean, I'm a 66-year-old man, and I have no trouble going through this fence," he gripes. "You can see the senselessness of this."

After ambling around for a half-hour, Sedgwick spots a white-and-green U.S. Customs and Border Protection (CBP) truck bumping up and down in a cloud of dust. It slows, and Sedgwick tips his hat and waves. The agents nod and drive on. He explains that we probably tripped one of the hundreds of sensors buried in secret locations under his pebble-specked ranch. Sedgwick points to another possibility on a hilltop about a mile away. "You see that little tower there?" he asks. A slender latticed edifice pokes into the blue sky, radar antennas and cameras affixed to the top.

This is the southwest border as it exists today. It's an open wound to President Trump and a significant contingent of his supporters, one that was freshly salted on March 23. The $1.3 trillion budget passed by Congress that day doesn't include the $18 billion Trump's administration requested for a concrete wall. Instead, it provides $696 million to replace old fences and $641 million to build new ones in areas where there aren't any currently–and solid concrete is prohibited.


Sedgwick in his barn in Nogales

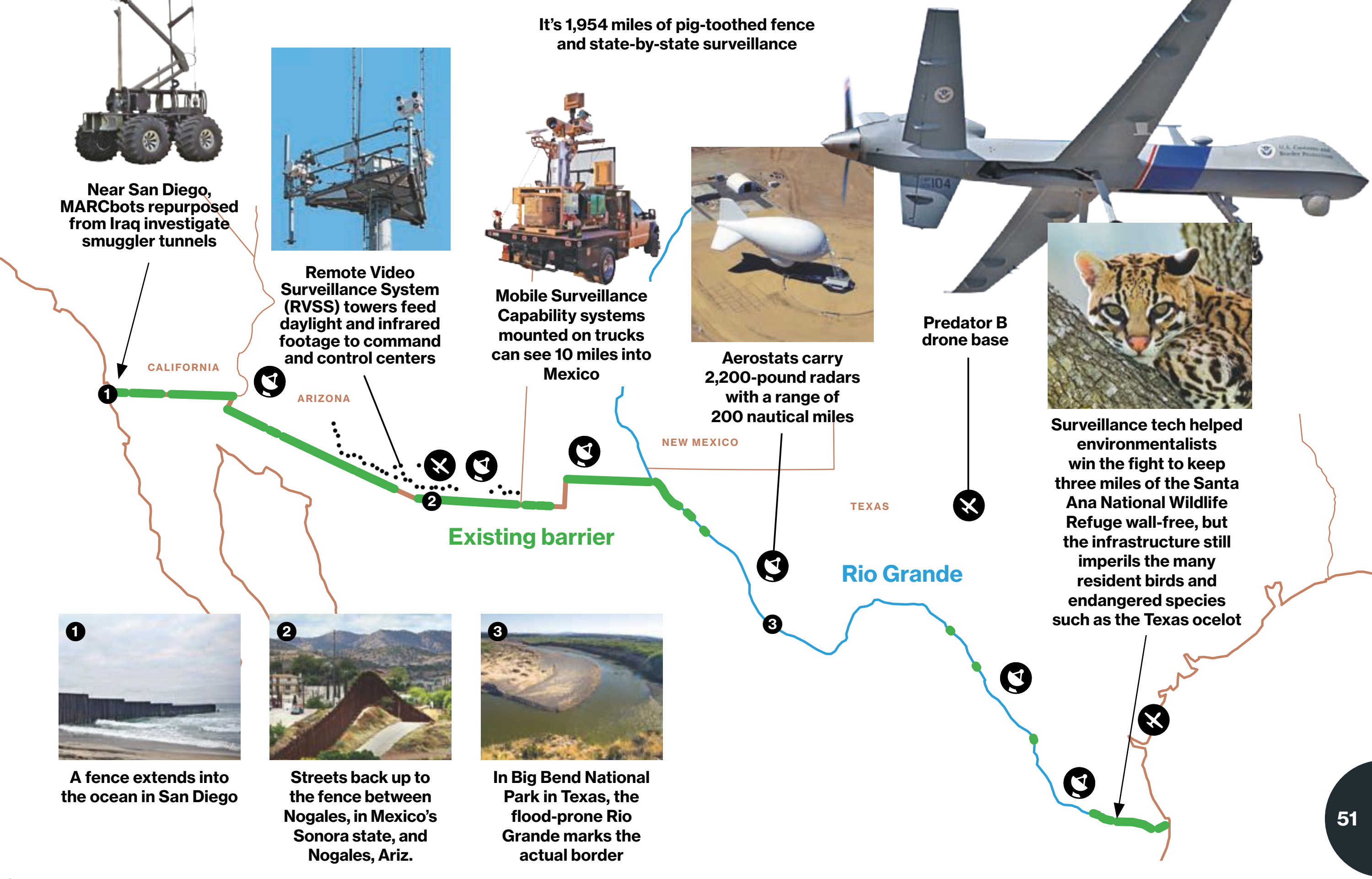
In response to the budget defeat, Trump announced angrily that he'll deploy the National Guard to police the border. He's followed up by signing a presidential memorandum to authorise the deployment of as many as 4,000 soldiers. Strictly from a geographical perspective, it's obvious why the dividing line between Mexico and the U.S. would drive a nativist a little mad. It occupies 1,954 miles of desert, mountains, cities, and valleys from the Pacific Ocean to the Gulf of Mexico and features a hodgepodge of iron bars, barbed wire, concrete blocks, sand levies, stone obelisks, rotting piles of logs, and plenty of wide-open land. An army of about 20,000 Border Patrol agents guards its length on foot and horseback, by all-terrain vehicle and truck, day and night, 365 days a year.

Layered unevenly into this tangle is an electronic perimeter of surveillance towers, 12,000 underground motion sensors, cameras that can spot a jack rabbit hopping through cactuses miles away, long-range radars mounted on distant towers, and Predator B drones whose advanced radar can detect footprints in the sand. Long before Trump signed off on the budget, those closest to him, including his chief of staff, John Kelly, were steering him away from his "big, beautiful wall." There's bipartisan interest in shifting toward more electronic surveillance. Democrats see technology as the wall's lesser evil, despite concerns for the civil liberties of people living within its range. Many Republicans in Congress, especially those from border states, say electronic surveillance promises greater security and, at least in theory, is more cost-effective. The new budget is a win for the tech believers, allotting about $400 million for border technology, including about $50 million for new towers and $20 million for more ground sensors. "Buy more surveillance equipment!" isn't a catchy rally chant, but it looks like reality for now.

Contractors and consultants have been positioning themselves to cash in. Peter Thiel, the PayPal Holdings Inc. billionaire, has raised money for a virtual wall startup founded by Oculus VR creator Palmer Luckey. Called Anduril Industries, after a powerful sword in *The Lord of the Rings*, the company says on its website that it's hiring engineers. Anduril has already paid Heather Podesta and her lobbying company, Invariant, $80,000 to keep tabs on border security funding. The U.S. Department of Homeland Security (DHS), which opened a small satellite office in Silicon Valley in 2015, recently solicited proposals for a miniature facial-recognition drone that could be operated by a touchscreen embedded in the sleeve of a border agent's uniform, as well as for energy-harvesting fabrics and 3D mapping technology. Military contractors whose technology was designed for overseas conflicts are investigating how their wares might be deployed along the border. Already, aerostats (a kind of tethered blimp) used to guard forward operating bases in Afghanistan are watching remote sections of

The Catch-as-Catch-Can Border

It's 1,954 miles of pig-toothed fence and state-by-state surveillance



CLOCKWISE FROM TOP LEFT: COURTESY U.S. ARMY; MIKE CHRISTY/ARIZONA DAILY STAR; COURTESY TELEPHONICS CORPORATION; COURTESY CBP (2); ROLF NUSSBAUMER/ALAMY; ROBERT DAEMMRICH/CORBIS/GETTY IMAGES; MIKE CHRISTY/ARIZONA DAILY STAR; DANIEL ACKER/BLOOMBERG

desert, and wheeled "MARCbots," tested on the battlefield in Iraq, are scouring smuggler tunnels.

Representative Will Hurd, a Republican whose district encompasses 800 miles of the Texas border, says sensor technology has come so far and gotten so cheap that the border should be blanketed with cameras, radar, and fibre-optic cable. "That is not a *Star Trek* scenario," he says. "That's something we should be able to do today."

Yet for all its promise, surveillance technology has become a Bermuda Triangle for border security. The government has devoted a half-century and billions of dollars to creating a virtual wall, but political leaders, America's biggest companies, and laboratories filled with rocket scientists have failed to deliver one that works.

As early as the 1940s government agents introduced a fleet of radio-equipped gyrocopters and built a network of radio transmitters and observation towers to fortify the barbed wire fences built to keep out cattle, immigrants, and bootleggers. But the first major technological experiment in border surveillance grew out of the Vietnam War. In 1970, a Department of Defense engineer traveled to San Diego to see if the seismic and magnetic sensors the Army was deploying to track Viet Cong along the McNamara Line could identify migrants on the border. The government ultimately installed 177 ground sensors, says Iván Chaar-López, whose dissertation at the University of Michigan at Ann Arbor focuses on technology along the border. Over the next half-century, officials came to envision what Chaar-López calls a "system of systems," in which physical barriers, patrol agents, and technology work in sync.

At one point the government deployed a gleaming new Ford Bronco outfitted with electronic surveillance equipment that bounced along stretches of the border. It stood out to the very smugglers the U.S. was trying to bust. One morning agents emerged from their motel room to find the Bronco missing. Soon they tracked it down—sunk in the middle of the Rio Grande. "The message was clear," retired U.S. Air Force Colonel Bill Grimes recalls in his book, *The History of Big Safari*, about secret surveillance missions. "We know who you are and what you are doing."

By the mid-1980s, with oil prices tanking and the Mexican economy sinking into recession, more than a million people a year were caught along the border. In 1993 the U.S. constructed fences—some made of military-surplus steel used for makeshift runways—along 14 miles near San Diego, the busiest point of entry. The following year, Congress, in a rare bipartisan moment, funded Operation Gatekeeper to pay for additional border agents. "We are a nation of immigrants, but we are also a nation of laws," President Clinton said to a standing ovation in his 1995 State of the Union address. "We must do more to stop them." Agents got night scopes to see in the dark, seismic sensors, and an electronic fingerprinting system.

The government also considered dropping invisible dye on immigrants from helicopters to track them and blaring ▶

◀ the sound of barking dogs over loudspeakers. Immigration officials asked Sandia National Laboratories, one of the nation's foremost defense research labs, to recommend other strategies. Officials sporadically plucked advice from the resulting three-volume, 695-page report, not heeding, for instance, the recommendation against investing in expensive advanced technologies that in Sandia's analysis typically "did not provide benefit commensurate with cost."

With the new fences and technology, migrant crossings did plummet in San Diego; instead, more people risked crossing in the deserts of Arizona. According to the Migration Policy Institute: "The Tucson morgue recorded an average of 18 migration-related deaths per year in the 1990s, while in the 2000s it saw almost 200 per year." Next, Congress plowed almost a half-billion dollars into a series of ever more ambitious surveillance programs, such as the America's Shield Initiative and the Integrated Surveillance Intelligence System, known by the unfortunate acronym ISIS. These efforts were plagued by technical problems. Some cameras couldn't pan and hold steady, while insects chewed through components. About 90 percent of ground sensor alerts were false alarms.

After Sept. 11, President Bush marshaled yet another push. The bipartisan Secure Fence Act of 2006 directed the DHS, which had been formed shortly after the attacks, to erect 700 miles of double-layered fencing with room for patrol cars to drive between. (Congress later scaled back the plan.) And Bush introduced the Secure Border Initiative, a multibillion-dollar program to create a bespoke virtual fence of 1,800 towers equipped with cameras and sensors lining the entire 6,000 miles of borders with Mexico and Canada, which would relay data to a central location in Washington, D.C. "We're launching the most technologically advanced border security initiative in American history," Bush said in an Oval Office address.

Boeing Co. won the contract, promising to detect 95 percent of illegal border crossings. Almost immediately, the project fell behind schedule and went over budget. Worse, it barely worked—sensors confused raindrops or leaves blown in the wind for people, an official from the U.S. Government Accountability Office told *60 Minutes*. During a congressional hearing, Joseph Lieberman, the Independent senator from Connecticut, said he was frustrated by the government's inability to "find that mystical point where parallel lines finally meet. It's always just over the horizon, but you never actually get there."

More than $1 billion later, in 2011, Homeland Security Secretary Janet Napolitano canceled the program. The technology ended up covering only 53 miles along the Arizona border. The government is decommissioning the towers and in the meantime has paid roughly an additional $200 million to maintain the program. Boeing has received almost 40 percent of that.

It took an economic shift to accomplish what the virtual fence could not. The Great Recession saw out-of-work migrants return home, and an improving Mexican job market has kept them there. From 2007, when the recession started, to 2011, the number of apprehensions along the border fell more than 60 percent. Last year fewer people crossed than at any point since the early 1970s.

For Trump, these statistics are no reason to claim success in sealing out the "drastic illegal activity" he says is putting the border in crisis. Hard-liners look to one country, and one country only, as a model of success: Israel. Making a pilgrimage to Jerusalem has become a rite of passage for lawmakers interested in border security.

In 2002 bulldozers began uprooting olive groves and pomegranate trees to make way for a system of fencing and barriers intended to prevent suicide bombers from crossing over from the West Bank. Israel's largest private defense contractor, Elbit Systems Ltd., helped design and build what Israel today calls the "smart fence," parts of which circumscribe Jerusalem. In some places the smart fence is a steel-mesh structure topped with razor wire and layered with integrated technologies including sensors, radar, and cameras, augmented by drones. In other places it comprises an invisible network of underground wireless sensors, each with a unique IP address.

"Think of it as IoT, the internet of things," says Haim Delmar, an Elbit senior vice president. "Every sensor has its own logic, it knows where it is, it knows where the other sensors are. They talk amongst themselves to create an understanding of what's happening." Data points picked up by the sensors, such as changes in magnetic fields, temperature, and vibrations, are fed into an algorithm that's grown advanced enough to distinguish between an intruder and an animal or a bush shaking in the wind.

As Israel was isolating Jerusalem, the CBP was formulating its latest modernisation scheme. Mindful of the Boeing debacle, the agency required that its new system, called the Arizona Border Surveillance Technology Plan, rely on integrating the feeds from off-the-shelf technology and aim to relay information to local stations rather than Washington. The plan was nothing close to Israel's skin of sensors and advanced capabilities. "Baby steps," says Jeff Gwilliam, a CBP deputy program manager. But it did draw on Israeli expertise.

In February 2014, armed with a proven track record, Elbit's independent U.S. division, Elbit Systems of America LLC, beat out America's largest defense contractors for a $145 million deal to build the most expensive piece of the Arizona plan—the integrated fixed towers (IFT). These 80- to 160-foot-tall structures were designed to carry daylight and infrared cameras as well as radar capable of spotting targets as far as 7.5 miles away, letting agents see if someone has a backpack or long-barreled weapon and track them as they move through bramble.

Elbit has since completed 43 towers in Arizona, including the one on Sedgwick's land. Raanan Horowitz, chief executive officer of Elbit Systems of America, foresees an opportunity to sell the government even more advanced technology, such as foliage penetration radar, and to add the kinds of sophisticated intelligence gathering and listening capabilities Israel uses. "It's not just a bunch of gadgets." Horowitz says.

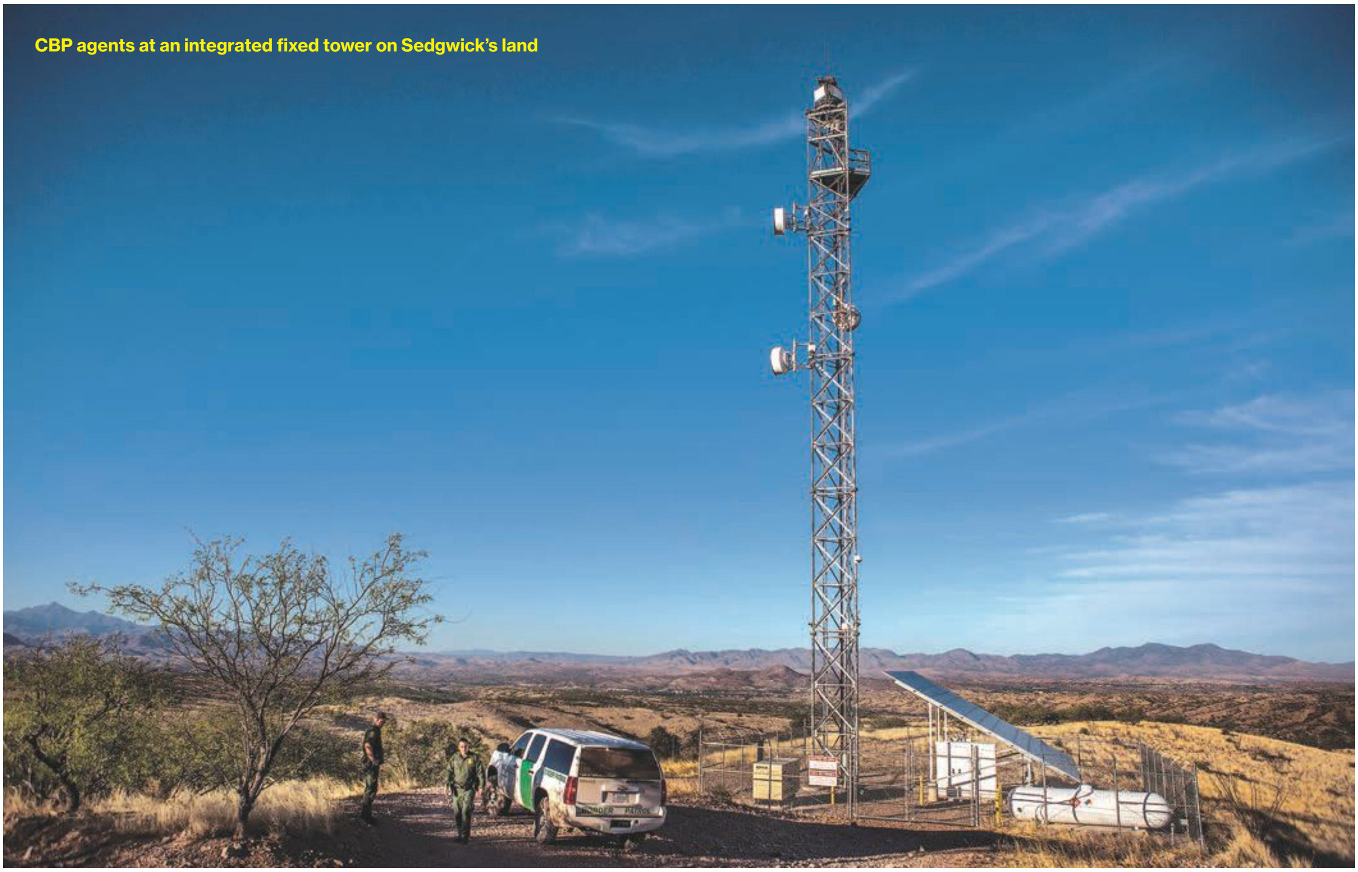
But America's border is five times longer and far more varied in its topography than Israel's. And there the goal is to prevent all border crossings—with deadly military force if necessary. "In the U.S., the main intruders are either smugglers or people that want to live in the United States," says Gabby Sarusi, an electro-optic engineering professor at Ben-Gurion University of the Negev and a co-founder of a company called SabraFence Technologies that develops sensors for Israel's barrier.

Near the crossing from Nogales, Mexico, into Nogales, Ariz., U.S. Border Patrol agents receive the data transmitted from seven of Elbit's surveillance towers in a cinder block building that once housed a clothing factory—the type of long-gone manufacturing work Trump says he wants to repatriate. The command and control center is at the end of a windowless corridor. "This room," says Public Information Officer Jake Stukenberg, "will go from zero to 100, like"—he snaps his fingers.

One wall is filled with dozens of monitors streaming footage from the seven towers and other cameras. The towers are designed to withstand winds of 10 miles per hour, but on this spring day, the wind is moving at 20 mph and gusting even faster. Red outlines flicker on screens lining the wall, indicating movement. A half-dozen men and women sit in front of workstations, each watching several monitors, panning around the desert miles away. Some of the images are crisp; others quiver enough to make someone beg for Dramamine.

The system depends on the human eye. When there are lots of alerts, the agents must quickly decipher what's happening. "The camera doesn't know," Stukenberg says. If we had triggered a sensor on Sedgwick's ranch, an alarm would have gone off at the Border Patrol station. From there, the agents manning the computers might have pivoted to a camera mounted on an IFT tower and zoomed in to see who was there. It's also possible agents were just cruising by on a routine patrol. Whether it took a half-hour to get to us because we were seen and identified as a low priority or they just stumbled upon us, the Border Patrol isn't telling. "That's the tricks of the trade," says John Mennell, a CBP spokesman.

Last year the Government Accountability Office said the CBP is getting better at procuring and deploying surveillance technology. Still, while the IFT system was under budget, it fell behind schedule, faced a funding shortfall, and didn't function consistently. "The agents are very impressed and very satisfied and highly appreciative of the operational tool they now have," the CBP's Gwilliam says. "Our system is so sensitive sometimes it can pick up birds." The GAO later reported that the DHS can't definitively say how technology has helped spot illegal crossings. A database tracks which systems assist agents in apprehensions, but the reporting is unreliable. Agents in Texas' Rio Grande Valley, for example, have credited IFTs with helping in almost 500 apprehensions. That's even though there isn't a single tower in the state. The parallel lines apparently still aren't converging. Ⓑ


CBP agents at an integrated fixed tower on Sedgwick's land

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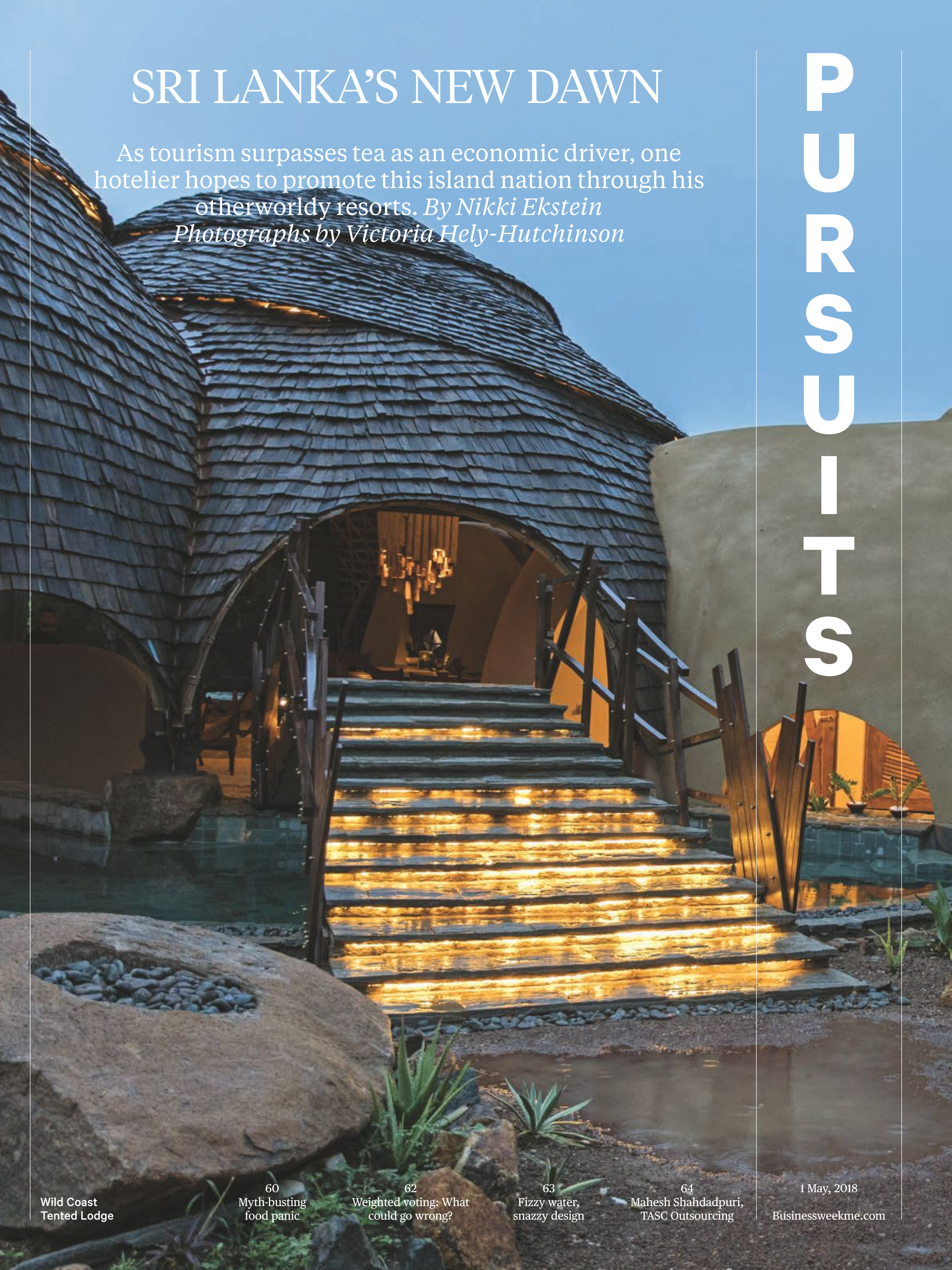
SRI LANKA'S NEW DAWN

As tourism surpasses tea as an economic driver, one hotelier hopes to promote this island nation through his otherworldy resorts. *By Nikki Ekstein*
Photographs by Victoria Hely-Hutchinson



Wild Coast Tented Lodge

In 2004 businessman Malik Fernando bought Castlereagh, a decrepit bungalow in the terraced, emerald hills of Sri Lanka's sprawling tea country. The structure had no roof. "It was in absolute shambles," he recalls. "There were cattle roaming through the whole house."

But it had one irresistible asset: "It was what was available," he says, shrugging and welcoming me to the neat, gingerbread-style mansion on a clear, 80F winter day. That was enough to make it the perfect place for the area's first luxury hotel.

When Fernando closed 13 years ago on Castlereagh, Sri Lanka's government was in a cease-fire with a secessionist militia, the Liberation Tigers of Tamil Eelam, and optimism was in the air. He saw an opportunity to cater to fans of his family's burgeoning tea farms, who were flocking here from around the world. It took him a year to update the colonial ruin, named after a long-ago tea picker who lived there, into a parquet-floored paradise with five bedrooms and a fleet of butlers in sarongs servicing a hillside pool. Over the next year, he did the same thing with three more bungalows, giving each a different style, its own restaurant, and rooms facing the tea fields. Then the cease-fire ended.

Standing with Fernando in front of Castlereagh, with its lakefront views and blooming purple gardens, it's hard to reconcile that it was just a decade ago that Sri Lankans hid for cover from daily bomb threats. But locals remember it like it was yesterday. The civil war stretched from July 1983, when the Tamil Tigers first struck the Sinhalese government's armed forces, until May 2009, when the militia lost its last fight. In between, Sri Lankan civilians were in the crossfire.

In the three years that followed the 2004-05 cease-fire, about 350,000 of them were displaced from their homes, 2,000 disappeared or were kidnapped, and 9,000 died. Fernando harbours memories of bomb warnings arriving during dinner, planes getting blown up at airports, and a constant current of fear for his wife and children. Serving jasmine-scented gin and tonics to tourists was a bit beside the point.

But he was among the lucky few business owners who could afford to hang on until better days, thanks to his family's tea empire, Dilmah. So he welcomed a trickle of visitors to what is now a 27-room resort complex he calls Ceylon Tea Trails—and waited for change.

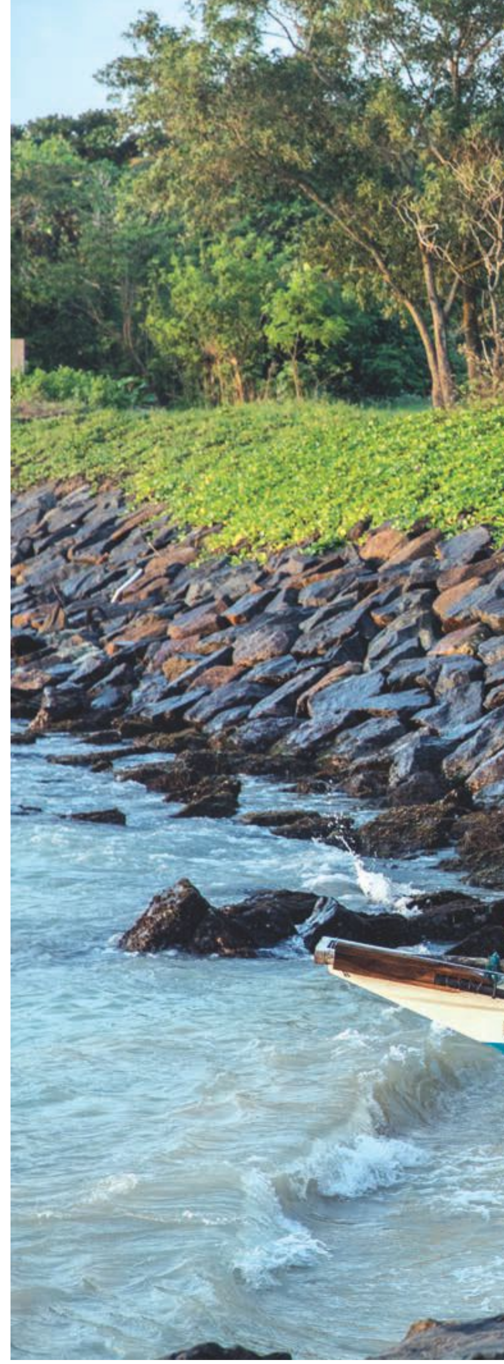
Today, Fernando's hotel company, Resplendent Ceylon, stretches from inland tea country to the palm-fringed beaches on the island's southwestern shore. Castlereagh remains the heart of it all: a place where lazy lunches can consist of finger-size prawns and single-estate silver-tip tea that sells for $1,000 per kilo, and where the perpetually sold-out hotel rooms start at $675 a night.

Excess isn't the intention. Rewriting Sri Lanka's narrative and casting a global spotlight on the country's assets—cultural, natural, and agricultural—is. There is a tremendous upside in doing so: Countrywide, the number of visitors has jumped from fewer than 450,000 in 2009 to more than 2 million in 2016. But with the luxury hotel industry in its infancy, the bulk of tourists traditionally have been backpackers at surf shacks. Sri Lanka is poised to welcome a wider audience.

Fernando, 52, had picked up my sister Jenifer and me in a seaplane in Colombo, the nation's capital and largest city. When we land in tea country, he escorts us through what he jokingly calls the CIA: Castlereagh International Airport, whose runway is a reservoir. Staffers wait at the end of a wooden pier to gather our luggage.

The unevenly paved, single-lane road to the resort passes packed terraces of *Camellia sinensis* bushes, crumbling 19th century colonial buildings, and rickety tuk-tuks that grant our van right of way. The road surveys the land that made Fernando's family famous: His father, Merrill, created Sri Lanka's first fair-trade tea company in 1988. Today, Dilmah sells in more than 100 countries worldwide. Its mission, then and now, has been to grow and package pure Ceylon tea at the source. (The company dramatically prunes the 140-year-old plants every few years, then manually harvests individual leaves every five to seven days.) Rather than blend small amounts of Ceylon with cheaper varieties from other countries, as its competitors do, Dilmah works only with Sri Lanka's prized crop. That means its talent and profits are fully retained within the country.

During the war, tea exports held steady, and to this day the industry remains a critical part of the economy, directly employing 1 million Sri Lankans (25,000 work for Dilmah alone). "From a GDP perspective, though, tea isn't as important as it used to be," Fernando



Fishermen unload their catch off Sri Lanka's southern coast

says. Tea has accounted for 2 percent of the country's gross domestic product for years; as of 2017, tourism claims 5 percent. In other words, tea allowed the country to survive, but tourism is helping it thrive.

Halfway up the road to Tientsin Bungalow, a squad of grinning young townsmen bursts from around a bend in the road, some dressed in plaid button-downs and some in sarongs, singing in Sinhalese and hoisting a float covered in a rainbow of flowers, tinsel, and embroidery. Inside is a gilded figurine of Surya, the Hindu sun god. Behind the men, an entire Tamil community spills out, singing and dancing for the Pongal harvest festival. We wait for them to pass. "You can't rush things here," Fernando tells us. "You just have to slow down and enjoy the ride."

Fernando has just brought his hotel company's head count to 450 with his latest endeavour, Wild Coast Tented Lodge, on Sri Lanka's southeastern tip. It opened in November with 28 spaceshiplike suites on stilts, set between Yala National Park, a haven for endangered leopards, and towering sand dunes that frame the Indian Ocean. After Tea Trails and a beach resort near Galle, Wild Coast is Resplendent Ceylon's third property; taken together, the circuit gets a jingle-ready tag line: "Tea, sea, and safari."

Although its resorts share the same attention to detail as the best properties in the world, what distinguishes Resplendent Ceylon from, say, the Aman resorts on Sri Lanka's beaches is a commitment to giving back: Fernando's operation is set up to funnel profits to MJF Charitable Foundation and Dilmah Conservation, his family's nonprofits. Together, they support more than 120 conservation and community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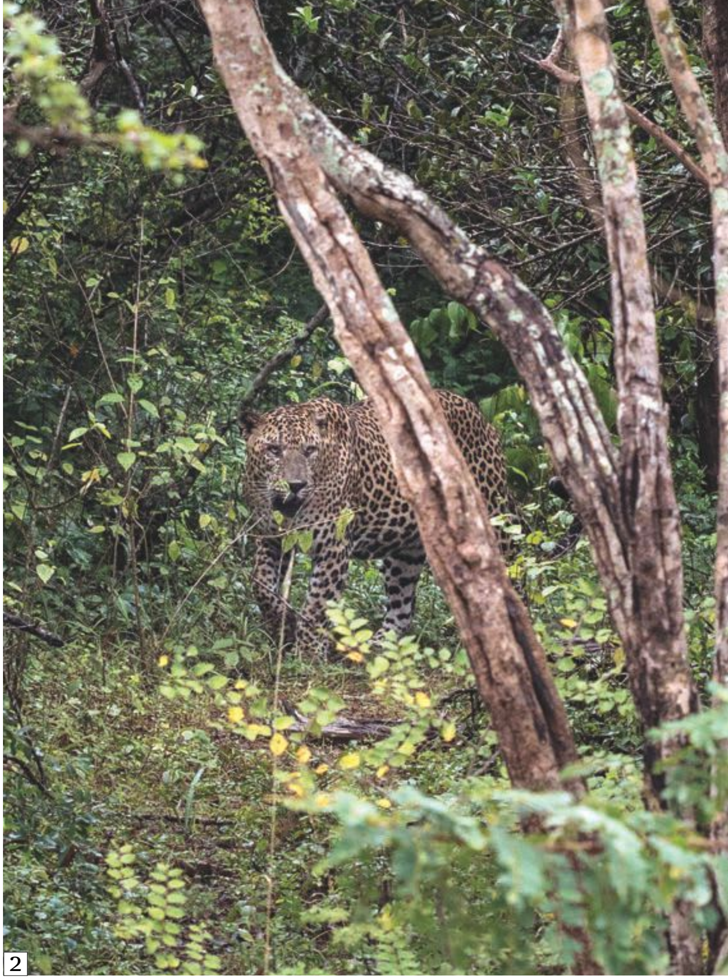
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◀ projects across the island. MJF itself is the largest private foundation in Sri Lanka. It contributes to entrepreneur mentorships, sustainable agriculture programs, and a culinary school for disadvantaged youth—initiatives that earned Fernando's father the prestigious Business for Peace Award, an annual prize granted by previous Nobel laureates. By 2020, MJF estimates it will have had an impact on 200,000 lives across the country.

Much of that is thanks to Fernando himself, who acts as a trustee at MJF and imbues his hotels with its ethos. Near Tea Trails, MJF operates a children's day care and a wellness clinic; its nature-focused counterpart, Dilmah Conservation, is creating a wildlife research station at Wild Coast where Sri Lankan scientists can compare findings and produce policy papers to inform future legislation.

Guests may not even realise that 10 percent of Resplendent Ceylon's profits go back into Fernando's initiatives. But that philanthropy is one thing that appeals to Philippe Gombert, president of Relais & Châteaux, the independent hotel group to which Fernando's resorts belong. "A commitment to the local community is one of the stronger pillars of the Relais & Châteaux brand," he says. Fernando's engagement, he adds, is among the best he's seen.

The next day we hop on a seaplane for a half-hour's flight down to the safari-style Wild Coast Lodge and watch the rippling landscape flatten along the way. Upon arrival, we're ushered into a dramatic, arching pavilion made from thatched bamboo that opens to the crashing waves of the Indian Ocean.

1. Resplendent Ceylon's breakfasts include fresh-squeezed juices and Sri Lankan egg hoppers

2. A leopard prowls in Yala National Park

3. Fernando tends to the grounds around Wild Coast

4. Villas at Wild Coast offer views of protected jungle

Our villa is a futuristic bubble, stitched in undulating waves from PVC-coated polyester and featuring oversize portholes that overlook the jungle. Outside, there's a private plunge pool. That night we dine on Sri Lankan shrimp curry, stewed okra, and lentil dal at a moonlit table in the sand.

On 2,000 acres between the property and nearby Yala, Fernando wants to establish his most ambitious initiative: a private wilderness reserve, like those dotting Africa. It's set to open next year and would help reduce congestion in the national park—which can see "jungle jams" of 50 Jeeps swiveling madly toward a single animal—while giving wildlife more protected room to roam.

Yala may be one of the world's best places to see leopards, but because of overcrowding, the staff at Wild Coast varies the expeditions. Along with a chef we go to a market in the tiny town of Kirinda on a muddy dock where fishermen unload king mackerel, marlin, and enormous jackfish from colourful boats. Locals—mostly men, with a smattering of women and children—shout prices at the vendors before swapping cash and loading up motorbikes. We choose a moderate-size halibut for lunch and throw it onto an ancient scale. It costs about $2, and the chef serves it steamed in a banana leaf with a dizzying array of local salads a few hours later.

When we finally head to Yala, it's with Chandika Jayaratne, an environmental lawyer who switched careers when luxury tourism made guiding a sufficiently lucrative career path. Job creation is one of the biggest benefits of tourism growth in Sri Lanka, says Tiffany Misrahi, who focuses on travel and tourism at the World Economic Forum. According to her research, it takes only 30 first-time visitors to the country to create one job for a local. This can slow the trend of young adults leaving their hometown for Colombo or Dubai.

Jayaratne adeptly picks out the page-flipping sound of peacocks mating, identifies birdlife—jungle fowl, bee eaters, striped painted storks—and schools us on the area's quirky geology, including massive boulders with evocative names such as Darth Vader Rock (it looks like it's wearing a helmet).

To avoid gridlock in the bush, he takes us to a relatively quiet part of the park an hour away from the lodge. Within moments of arriving, I hear a squawk and an angry series of snorts. Jayaratne floors the gas pedal to lurch the car forward through a dense, tangled forest.

As we swerve down the narrow dirt road, a herd of buffalo charges loudly in our direction, angrily frothing up a shallow pond. From their midst, a leopard darts out, leaping into a bristly bush. I see only the flash of her spotted hide, and then it's nothing but gnarled horns smashing into the greenery. "Holy shit," we all repeat in whispers like an incantation, hearts racing, not knowing whether to watch or look away. This is an apex predator with plenty to lose. Estimates indicate that there are only 250 leopards in all of Yala, and they're a main draw for tourists to the entire region. "Please get out, please get out, please get out," Jayaratne whispers to the cat, until finally she catapults herself out of the bush and onto a tree in a streak of spots. Eventually a lightly injured buffalo calf emerges from within the pack, and we piece together the drama. "They were both lucky to get out alive," he says.

By the time I plan my next trip to Sri Lanka—and I will definitely return—it's likely that Fernando will have brought his circuit to five hotels or more. Up next is a property he wants to build on pylons in the shadow of Sigiriya, the famous "lion rock" monument in the central part of the island. That will be followed by a Robinson Crusoe-inspired beach resort in Trincomalee. He estimates that within three years, Resplendent Ceylon will employ 800 Sri Lankans. That's nowhere near the size of Dilmah's workforce, but it's certainly significant.

"We're flying the flag for Sri Lanka the same way my family has at Dilmah over the years," Fernando says. In tourism as in tea, it's all about the positioning, the packaging, and the pricing. "My success is my country," he says, "and it's time to stop underselling it." Ⓑ

Don’t Panic!

High prices may grab headlines, but your favourite foods aren’t going extinct. Many have staged dramatic comebacks. Here, then, a case for optimism. (Except when it comes to eels. They’re screwed.)

By Kate Krader Photographs by Caroline Tompkins

Avocado

2.4 billion projected consumption in the U.S. in 2018, from 539 million in 2000

What you’ve heard
California’s five-year drought led to panic-inducing headlines like this one in *New York* magazine: “Have You Eaten Your Last Avocado?” Then in late 2017, devastating fires added to its woes.

The truth
The 2018 California crop is estimated to grow 50 percent from 2017. Supply also remains high in Mexico, which produces 75 percent of the fruit in the U.S. Ken Melban of the California Avocado Commission says confidently, “You will never eat your last avocado.”

Almonds

99 percent of all U.S. almonds are produced in California

What you’ve heard
In 2017 it was too much rain; this year, it’s a freeze. And then there’s the indisputable fact that it takes 1.1 gallons of water to produce one almond, while the Central Valley, the epicentre of almond production, suffered a five-year drought.

The truth
Daniel Sumner, an economist at the University of California at Davis, maintains that the drought didn’t affect production. In a nutshell, “we took water away from the cotton and kept it on the almond trees. And planted more.”

Maple Syrup

What you’ve heard
Maple trees have quit growing!

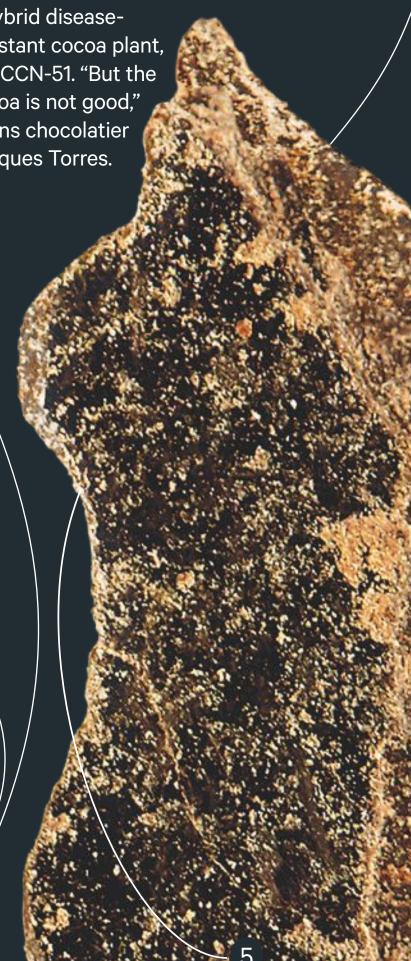
The truth
Size doesn’t matter like it used to, as smart tapping tech is revolutionizing production. Vermont syrup—40 percent of the U.S. supply—has grown in 10 years from 640,000 gallons to 1.9 million. Canada’s has climbed 225 percent, to 12.2 million gallons a year, over the same time.

Chocolate

$98.2 billion total retail sales worldwide

What you’ve heard
Climate change is happening, so your candy bars are in danger. Environmental shifts and fungal disease in Ghana and Côte d’Ivoire, which produce more than half the world’s cocoa beans, have pushed up prices almost 40 percent this year.

The truth
Cocoa can be—and is—grown outside of Africa; Brazil and Ecuador are ramping up production. Scientists are also at work on a hybrid disease-resistant cocoa plant, the CCN-51. “But the cocoa is not good,” warns chocolatier Jacques Torres.



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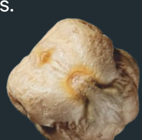
Peanuts

Prices rose 29 percent in 2016 following alternating droughts and floods in America's southern peanut-growing states. But the 2017 U.S. crop was 3.5 million tons, the largest ever.

Chickpeas

Earlier this year a drought in India led to a sharp increase in the cost of hummus in the U.K. The shortage appears to be short-lived, however: Indian production in 2018 should hit a record 11.1 million tons.



Octopus

Ubiquitous on menus, top-quality product from Morocco is getting harder to find. Ian MacGregor, owner of the Lobster Place in New York, has scrambled to find alternate sources. But there's hope for these suckers: Areas around North Africa have begun decreasing the size of catches to allow populations to rebound.

Vanilla

$278 wholesale price per pound, up from $40 in 2015

What you've heard
Last year's Cyclone Enawo devastated vanilla bean fields in Madagascar, which provides 80 percent of the world's supply. This, after demand spiked when major consumer food companies such as Nestlé SA moved from artificial to real vanilla.

The truth
It's not pretty. But Craig Nielsen, vice president for sustainability at Nielsen-Massey Vanillas Inc., says Madagascar hopes to increase production from 1,500 tons per year to 2,500. The market has weathered constriction before: In 2004 Cyclone Gafilo's destruction sent prices higher than $226 per pound. But normal levels returned.

Eel

$1,300 price per pound for baby eels, about the same as an ounce of gold

What you've heard
Eel populations have declined by 90 percent in 30 years because of illegal smuggling and this slinky fish's extreme vulnerability to changing weather conditions. In 2013, Japan designated freshwater eels as endangered.

The truth
The problem is serious but also partly cyclical. In late 2013 demand sent eel prices to $2,400 a pound. A poor 2017 harvest in Asia, coupled with a poaching crackdown in Europe, also pushed up prices. And in July, Japan will celebrate the Day of the Ox by eating grilled eel, when the country will consume 30 percent of its annual supply. Monitor closely.

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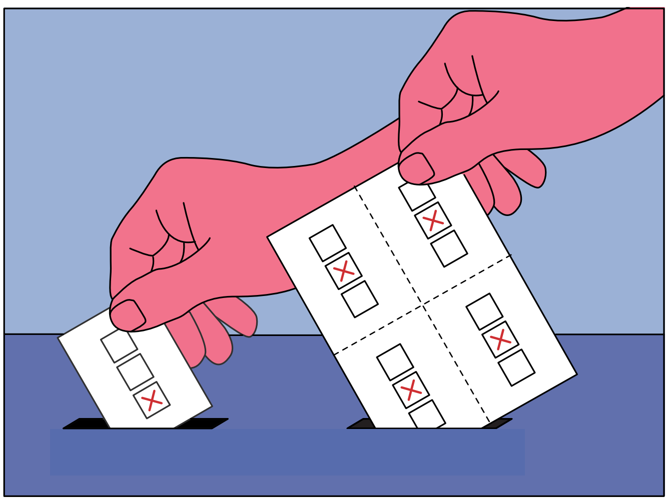
What's Your Vote Worth?

Economist Dambisa Moyo argues that to save liberal democracy, it's time to kill its core principle: One vote for one person. *By Peter Coy*



It's hard sometimes not to despair for the future of democracies. Voters can be tribal and poorly informed. Last year the Annenberg Public Policy Center at the University of Pennsylvania surveyed 1,013 U.S. adults and found that only a quarter could name all three branches of government (executive, legislative, and judicial). A third couldn't name any.

Dambisa Moyo has had that same sinking feeling. But unlike you, she wrote a book about it. In *Edge of Chaos: Why Democracy Is Failing to Deliver Economic Growth—and How to Fix It*, she argues that the public is too shortsighted to choose economic policies that will produce long-term prosperity. "Political myopia is the central obstacle on the path of growth in advanced economies," she writes.

Readers are likely to find themselves nodding along until page 198, which is where *Edge of Chaos* gets seriously edgy. At the end of a list of fixes, she calls for a system of "weighted voting," in which a ballot counts more or less depending on a voter's qualifications. Weight would be determined by a civics test or maybe by one's profession or education.

Weighted voting "will no doubt be seen as jarring and antithetical to the principles of democracy," Moyo concedes. Yet she argues that it "reduces the influence of those most likely to be apathetic or disengaged from public policy debates and thus to make poor electoral choices."

As a black woman, Moyo belongs to two groups that were long denied any vote in America, let alone an equal one. Women didn't get to vote in national elections in the U.S. until 1920, and the black electorate still faces obstacles. As recently as December, the American Civil Liberties Union accused Alabama of suppressing the black vote in its special U.S. Senate election by insisting on photo IDs while closing driver's license offices in predominantly black counties.

Yet Moyo presumably sees herself as one of the people who would get an overweighted vote: She holds a master's degree from Harvard and a doctorate in economics from the University of Oxford. Born and raised in Zambia, Moyo has worked for Goldman Sachs Group Inc. and the World Bank and expects to become a U.S. citizen this year. (She's published three other books, the best-known being *Dead Aid*, which argues that dependence on foreign aid has actually made Africa poorer.)

Moyo says her aim is to save democracy, not squelch it, through weighted voting and other tweaks to the political system: compulsory voting, higher salaries for officeholders, longer terms in office combined with stricter limits on the number of terms, etc. Because if something isn't done soon to boost growth, tyrants will arise. "In fact," she writes, "overwhelming evidence shows that economic growth is a prerequisite for democracy, not the other way around."

She's right that a stagnant economy is dangerous to civil liberty. Global freedom declined for a 12th consecutive year in 2017, the watchdog group Freedom House said recently, citing setbacks in Bahrain, Hungary, Turkey, and Venezuela, among other countries. With economic anxiety on the rise, 70 percent of the world's putative democracies have become "indistinguishable from authoritarian regimes," Moyo writes.

As is often the case, though, Moyo's solutions aren't as persuasive as her diagnosis. If you think about it, even devoted democrats draw the line somewhere on ballot box access: The right to vote is generally denied to prisoners, children, noncitizens, and people judged mentally incompetent. But imagine the envy and anger that would be unleashed if voting power were based on profession or education. Who would decide how to divide the public into first-, second-, and third-class citizens? Would biology professors be certified as "highly qualified" but high school history teachers ranked "standard qualified"? What about journalists vs. carpenters vs. actors vs. the unemployed? And how much of the public would be consigned to the lowest tier of "unqualified" voters—would it be 1 percent or 10 percent or more?

A civics test seems a more defensible way to implement weighted voting, but not really. It implicitly equates knowledge with good judgment, which experience tells us isn't a sound equation. As the conservative writer William F. Buckley Jr. once said, "I'd rather entrust the government of the United States to the first 400 people listed in the Boston telephone directory than to the faculty of Harvard University."

In the end, Moyo comes across as a well-meaning meritocrat. Democracy has its flaws, all right, but elitism isn't the way to cure them. Ⓑ

ILLUSTRATION BY JACI KESSLER LUBLINER

A Sparkling Solution

Make hydration a long-term investment with a minimalist water carbonator from Aarke
Photograph by Will Anderson

Most home carbonating machines are similar in their basic function. The $199 Aarke sparkling water maker, released in late 2016, occupies a unique position because of its stainless-steel construction and its small countertop footprint—just 6 inches deep, it's both taller and slimmer than other options. Its distinguishing feature, though, is a sleekly designed lever, instead of push buttons, that activates the CO_2 tank. Pull it down to add bubbles; let it go, and it releases the pressure in the bottle. It's as simple as turning on a faucet.

The Competition

- SodaStream is the biggest name in the market and works admirably well. The $150 Power, from design guru Yves Béhar, has push-button activation.
- The $199 KitchenAid, also made by SodaStream, uses a similar lever-activated system, but in a more vintage guise.
- ISi's Soda Siphon, at $99, is a water carbonator for those on the go; its tiny 1-liter CO_2 tanks are less suited for a family with a full kitchen.

The Bottom Line

The Aarke's best feature is the lever, which gives the act of carbonation the feel of pulling an expert cup of espresso. Its sturdy housing and Swedish good looks make for a reliable appliance that shouldn't go out of style. *$199; aarke.com*

PROP STYLIST: GOZDE EKER

Mahesh Shahdadpuri

The entrepreneur who set a new benchmark for outsourcing in the Middle East. *By Roger Field*

Mahesh Shahdadpuri is honest about his first business venture, a technology firm he launched in New York and Bangalore in 1999. “It was a disaster,” he says. The company - which failed in the downturn following the attack on the World Trade Centre in 2001 - may have been short-lived, but the experience of running the firm also provided its founder with the idea for a company that has since become one of the biggest outsourcing firms in the UAE.

Shahdadpuri, who completed an MBA at the University of Boston in 1995, established his current business, TASC Outsourcing, in the UAE in 2007. He spotted a gap in the market for an outsourcing player to provide professional, experienced staff in a range of industries. He was familiar with the process of outsourcing professional services from his previous failed venture, and so put the experience to good use.

Just 11 years later, TASC Outsourcing has in excess of 4,000 staff on its books and is helping its clients - in industries ranging from retail to telecoms and aviation - hire qualified staff without any of the challenges typically associated with recruitment, such as conducting multiple interviews and handling visas and other paperwork.

“I saw a gap here,” he says. “A lot of people understand the concept of staffing and outsourcing but it was a very fragmented market with few professional outsourcing players, and I saw this as an area where I could make an impact.”

Much of the company’s success is due to its willingness to invest in systems and services that help its clients. The latest advance is a service which Shahdadpuri likes to refer to as the “Uberisation” of recruitment: While hiring staff can typically take companies between 6-8 weeks, TASC offers to supply a candidate, ready to work, within two hours. Clients can visit TASC’s online database, view candidates - who have already been interviewed and vetted - select the person they want and pay online for the length of time they require the employee. “These are pre-qualified, prescreened professionals, ready to join candidates. It’s just a case of select, pay online and somebody will be at your doorstep within hours.”

TASC has since expanded to other markets and now covers the rest of the GCC, Lebanon, Jordan and Turkey, serving about 200 customers. But Shahdadpuri’s concerns go beyond profits and scale. With the memory of his own struggles following his early business failure fresh in his memory, he is committed to the welfare of his staff. “Back then nobody really cared about outsourced employees. We started an employee care department and are heavily focused on our employees. We even have an employee hotline and use technology to help ensure they are content.”

Has a Bachelor of Engineering degree from Mangalore University and an MBA from the University of Boston

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Launched TASC Outsourcing in the UAE in 2007

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Plays tennis and rides a Harley-Davidson in his spare time

PHOTO ILLUSTRATION BY SJC


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