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Prince Alwaleed bin Talal speaks about his detention and why he's still investing in Saudi Arabia

p46

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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▲ Powering change: H.E. Suhail Al Mazrouei (left), the UAE's minister of energy and industry

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IN BRIEF

Asia

● India is attempting to sell a controlling stake in its state-run air carrier, along with two-thirds of the airline's

$7.8b

debt. Air India's buyer may be required to pursue a public stock offering, which would provide an opportunity for the government to sell off its interest entirely.

● "There's a lot of work that is still ongoing. The IPO is ongoing."

Saudi Aramco CEO Amin Nasser told Bloomberg the company should be ready for a public listing in the second half of this year. The next day, Saudi Crown Prince Mohammed bin Salman said the offering could be delayed until 2019.

● President Trump signed his first major trade deal, exempting South Korea from his 25 percent tariff on steel in exchange for an overall reduction in steel exports to the U.S., among other things.

● North Korean leader Kim Jong Un embarked on a surprise trip to visit President Xi Jinping in Beijing on March 25, ahead of planned talks with South Korea in April and an expected meeting with the U.S. sometime in May.

● Uber Technologies will swap its Southeast Asian ride-hailing business to rival Grab for a 27.5 percent stake in the combined business.

Americas

● The U.S. Federal Trade Commission confirmed it had opened an investigation into Facebook's privacy practices. At issue is whether the social network violated the terms of a 2011 consent decree in its funneling of user data to Cambridge Analytica without users' knowledge.

● As the gun control debate intensifies, America's oldest gunmaker, Remington Outdoor, filed for bankruptcy.

● Twitter erupted with calls from Brazil to #DeleteNetflix after the March 23 debut of *The Mechanism*, a fictional series based on the Car Wash anticorruption probe. Critics, including former President Dilma Rousseff, accused the story of "distorting reality."

BEIJING: KOREAN CENTRAL NEWS AGENCY/AP PHOTO. BEGOR: MIKE STEWART/AP PHOTO. PUIGDEMONT: FABRICE COFFRINI/AFP/GETTY IMAGES. MANDELA: COURTESY MARSTON WEBB INTERNATIONAL

● A federal appeals court ruled that Google's use of Oracle-owned code in its Android operating system infringed on the latter company's copyright. No award has been set, but Oracle is seeking

$8.8b

in damages.

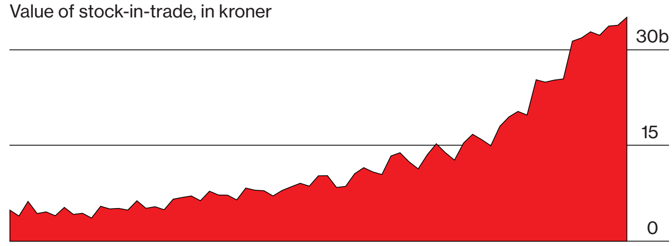
Europe

● Former Catalan leader Carles  Puigdemont was arrested on March 25 by German highway police.

Puigdemont has been in exile since declaring Catalonia's independence in October. The arrest came after Spain reinstated an international warrant against him and five others.

● H&M reported a record inventory backlogue worth more than $4 billion. The clothing glut has forced the Swedish fashion retailer to increase markdowns this quarter, pushing operating profit to its lowest level in more than a decade.

Value of stock-in-trade, in kroner



● California and 11 other states sued to block the addition of a question about citizenship to the 2020 census.

The lawsuits say the question will deter some from responding, leading to undercounting in states with large immigrant populations.

● Support for Poland's ruling Law and Justice Party dropped to 28 percent in a poll released on March 28, from 40 percent a month earlier. The authoritarian party faces criticism for allegedly excessive bonuses paid to former cabinet members and protests over restrictive abortion laws.

● The chairman of Deutsche Bank has held talks with potential candidates to succeed CEO John Cryan.

Cryan issued a memo to staff on March 28 saying he's "absolutely committed to serving our bank."

● U.S. diesel car drivers sued BMW, saying the carmaker, like Volkswagen, cheated on emissions tests and that its vehicles are actually polluting at up to 27 times the legal limit. BMW has said it installed the wrong software by mistake.

● Equifax named private equity and GE alum Mark Begor as its chief executive officer, seven months after the massive data breach that led to the resignation of then-CEO Richard Smith.

● Austria has so far opted out of the movement across Europe to expel Russian diplomats over the poisoning of a former Russian spy and his daughter in the U.K. Russia has denied responsibility, and Austria's government said it wants to "keep channels open" to Moscow.

Africa

● A collection of gold castings of Nelson Mandela's hands sold for $10 million—in Bitcoin.

● Ghanaian police arrested Koku Anyidoho, head of the country's largest opposition party, for suggesting President Nana Akufo-Addo would face a "civilian coup d'état" for approving a military cooperation deal with the U.S.

DATA: COMPILED BY BLOOMBERG

Weapons of the Trade War

● Tariffs and countertariffs may mark the start of an inevitable showdown between the world's two most important nations

● By Michael Schuman

Let's not sugarcoat it anymore. The U.S. and China are in a trade war. Two weeks after President Trump imposed broad tariffs on imports of steel and aluminum from China and other countries, he started the process of slapping punitive duties on tens of billions of dollars of Chinese imports and restrictions on Chinese investment in the U.S. In Beijing, President Xi Jinping was quick to retaliate, hitting U.S. exports of nuts, pork, and other products with tariffs and warning tougher measures could come. The Chinese Embassy in Washington, in a formal statement, pledged the country would "fight to the end."

Economists and Wall Street bankers are providing estimates of what a trade war would cost in economic growth, jobs, and corporate earnings. But the bigger, long-term consequences are harder to forecast. Perhaps this trade war will be resolved through negotiations, as U.S. Commerce Secretary Wilbur Ross, an architect of Trump's policy, has suggested. Talks between the two sides already appear to be under way, behind the scenes and without the hyperbole. The crisis might dissipate into a big nothing, with Xi tossing a few concessionary crumbs at an impatient and inconsistent Trump, who may prefer quick, tweetable wins to the hard work of changing the Chinese trade practices that really threaten U.S. business.

But a darker possibility cannot be ruled out: This trade war may be a critical turning point in history, the moment when the irreconcilable ideological and economic differences between the world's two most important countries burst into the open. In that case, the world may never be the same.

Some experts would argue that such a conflict was inevitable—that as a reigning superpower, the U.S. will at some point face a confrontation with an up-and-coming one, as has happened throughout history. Destiny or otherwise, today's trade war is a result of major policy changes in China and the U.S. Trump and Xi have both staked their political futures on making their nations "great again," resulting in a clash of nationalisms with potentially dire consequences for everybody. However the current trade spat works itself out, its fundamental causes aren't going away.

Trump is breaking with decades of U.S. foreign policy designed to avoid just such a conflict. Ever since Richard Nixon met Mao Zedong in 1972, Washington's strategy has been to coax China into the international order crafted by the U.S. and its allies after World War II. Trade and investment would bond the country to Western democracies. The U.S. opened its huge consumer market to Chinese exports and invited Beijing into the foundational institutions of the global economy—the International Monetary Fund, the World Bank, and the World Trade Organization—to give Red China a stake in the free world's economic system. The whole idea was to cooperate with Beijing's quest for economic development, to transform it from potential adversary to ally, and, possibly, from dictatorship to democracy.

To Trump, that strategy was an historic mistake that allowed the country to grow wealthy and powerful at the expense of the Western world. "I blame the incompetence of past Admins for allowing China to take advantage of the U.S.," he tweeted in November. Rather than encourage China to integrate further into the global economy, Trump is trying to limit its influence—and even reverse it.

Those opposed to his "America First" agenda may cringe. Advocates of the West's pro-integration approach can point to critical successes. China—now the world's largest exporter—did become an integral part of the global economy, and its momentous ascent has so far been remarkably peaceful. For much of the past 40 years, the country seemed to be moving in the "right" direction—toward a more market-oriented economy and a more open society.

That case has become harder to make. Part of the reason is purely political. Many politicians in the U.S. are fixating more on the perceived downside of China's rise—supposed losses of jobs, industry, and competitiveness—and less on the benefits of lower prices to consumers and expanding business opportunities to U.S. corporations. Also fueling Trump's change of course is real frustration at major U.S. companies over the slow pace of market-opening reform in China and their persistent ill treatment by Beijing's bureaucrats.

A much bigger factor is Xi. Newspaper headlines may blame Trump for setting off the current trade war. But that's not entirely fair. Xi is just as culpable, perhaps even more so. Like Trump, he's also broken with his predecessors. China was never really following the path the West anticipated. It borrowed the tools and trappings of capitalism while dispensing with the liberal political, economic, and social principles that have traditionally accompanied it. But earlier regimes were at least slowly allowing the market and private sector more influence in its still-state-led economy. Xi has turned toward more nationalistic policies. He's painted himself as a national hero, a defender of Chinese interests against a bullying West who's destined to return the country to its proper place on the world stage. Trump calls his program "Make America Great Again"; Xi labels his the "Chinese Dream."

Sure, Xi spouts the usual promises to continue "opening up" and to champion globalization. But in real life, he's dropped even the pretense that China is heading in the "right" direction. His regime is regressing into a one-man dictatorship. A national congress in March amended the constitution to allow him to serve for life. He shows little regard for the rules and norms of the global economic system, preferring to capitalize on the openness of Western economies while dragging his feet on reciprocating that ▶

ALAMY (4); GETTY IMAGES (2)

◀ openness. He's creating rival institutions to those of the West, such as the Asian Infrastructure Investment Bank, a multilateral lender akin to the World Bank. While blathering on about pro-market reform, Beijing is intensifying Communist Party influence over business and heavily subsidizing many high-tech companies to give them an advantage over Western competitors.

This dynamic—rising nationalism in China and defensiveness and grave doubts about globalization in the U.S.—will surely outlast today's trade tussle. No longer content to join the U.S.-led world economic order, China is striving to change it to suit its own interests. All Trump is doing is calling out what's become obvious: China is not a partner, but a competitor, and it has to finally be treated as such.

The big question is: Now what? There's a possibility that these two economies are so intertwined and interdependent that they simply must find ways of getting along. That implies that the old policies—of encouraging greater integration—will endure in some form and that disagreements between the U.S. and China will remain under negotiation and, thus, under control.

At the same time, China's trade practices are essential to its national agenda. Its leaders recognize that the country's economic future depends on their ability to upgrade its industries and foster technological innovation, and they're unlikely to significantly alter their industrial program under any circumstances. Trump may be able to pry open a market here or remove a regulatory hurdle there. Maybe he can even prod Beijing into treating U.S. companies more "fairly." But he's not likely to persuade Xi to give up his Chinese Dream.

Nor will his successors. Trump will eventually leave the White House, and the next president may take a softer approach. But the fundamental challenge from China isn't likely to vanish. The danger that the world could again degenerate into competing blocs—one democratic and free-market, the other authoritarian and statist—will remain a terrifying prospect. Washington invited China into its world order. Now China could destroy it. Ⓑ

■ VIEW

To read Scott Dorf on the bear market in bonds and Noah Feldman on the misguided call to repeal the Second Amendment, go to Bloombergview.com

Red Tape and U.S. Health Care

● Doctors, hospitals, and insurers need standardized electronic billing systems

The American health-care system has a unique problem with paperwork. The sheer number of participants—doctors, hospitals, clinics, insurance companies, patients—makes settling payments complicated, time-consuming, and expensive. The share of U.S. spending devoted to administrative costs, including billing, is roughly three times what it is in other affluent countries, and it's a major reason the U.S. spends twice as much on health care.

Some clinics employ more clerks than providers—not just to generate invoices but to send along the patient information insurers need to approve treatments, to dispute denied payments, to fix mistakes, to handle patient questions, and on and on. For every $1 billion in revenue, the health-care system employs the equivalent of 770 full-time people to settle the bills. That's almost eight times more than other industries. And doctors have to spend inordinate time dealing with red tape.

Of course, if the U.S. were to magically switch to a single-payer health-care system, these expenses would fall dramatically. The government would simply determine prices and write checks without dispute, as Medicare does for direct beneficiaries. But such a change is neither realistic nor desirable in a country where half the population has employer-sponsored insurance.

That said, it's possible to trim administrative costs within the system. The best way is for providers and insurers to standardize billing practices and modernize computer systems. The government has long pushed for such efficiency. A 1996 law set some preliminary standards for the electronic processing of claims. But they weren't nearly enough, and insurers could still complicate invoices by requesting additional patient data. More recent laws gave providers further incentives to adopt electronic records and make them more uniform.

Yet to a large extent, insurance companies continue to maintain distinct billing codes and forms, and providers still use separate computer systems for medical records and billing—making it impossible to automate claims processing. In this, health care stands apart from almost every other industry. Think of the way banks have standardized operations to allow all customers to use the same ATMs and credit card readers.

The government needs to keep pushing for standardized electronic health systems and to change how health-care prices are set. Bundled care and other alternatives to the fee-for-service model could greatly streamline billing.

Patients have increasing cause to demand such change. With premiums, copays, and deductibles rising, U.S. consumers now pay more for health care than their employers do. Administrative inefficiency adds another layer of needless expense. Billing shouldn't have to be so complicated, or costly. Ⓑ

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Sabic to Boost Chemical Output and Open U.S. HQ

● Middle East's dominant chemical maker eyes growth in production capacity and plans global expansion

Saudi Basic Industries Corp. plans to boost production capacity 70 percent by 2025 as the Middle East's dominant chemical maker works with new joint-venture partners and expands its footprint in the heart of the U.S. shale boom.

The company also proposed building a Houston headquarters for its Western Hemisphere operations as it seeks to capitalise on the U.S. shale boom.

Increasing chemical production is crucial to Saudi Arabia's "Vision 2030" blueprint, which envisions creating higher-value products and jobs, Yousef al Benyan, chief executive officer of the company known as Sabic, said in an interview April 7.

The kingdom has hired longtime Dow Chemical CEO Andrew N. Liveris to act as an advisor after he departs the Dow DuPont Inc. unit on July 1, al Benyan said.

A final decision on the Houston project will be contingent on receiving local and environmental permits, according to a Sabic statement. The announcement coincided with the final stop by Saudi Crown Price Mohammed Bin Salman on his three-week U.S. tour.

Sabic "has designated the United States as a focus of its future growth plans, capitalising on the abundance of shale gas," according to the statement.

At home in Saudi Arabia, a plant being designed with Saudi Aramco would turn crude directly into chemicals, yielding about 9 million metric tonnes of products a year. The $20 billion project would turn 45 percent of each barrel of oil directly into chemicals, a record-high conversion rate, al Benyan said in the interview outside Houston.

Sabic has formed a joint venture with Exxon Mobil Corp. to build an ethylene plant near Corpus Christi, Texas, with a final investment decision expected this year. The heart of the project features what would be the world's largest ethane cracker, capable of producing 1.8 million metric tons of ethylene.

The company is also pursuing a project with Shenhua Ningxia Coal Industry Group to convert coal to chemicals in China.

Acquisitions could supplement the company's organic growth, al Benyan. Saudi Arabia is increasing chemical production with demand for motor fuels expected to slow amid tightening fuel efficiency standards and the rise of electric vehicles.

In addition, Sabic is considering potential projects in Latin America and Africa, he said. North Africa could develop into a strategic market for the company, al Benyan said.

On the subject of its proposal to build a headquarters for its Western Hemisphere operations in Houston, the company said a final decision will be contingent on receiving local and environmental permits.

Sabic "has designated the United States as a focus of its future growth plans, capitalising on the abundance of shale gas," according to the statement. Bin Salman, the heir to the Saudi throne who has sought to broaden the kingdom's economy beyond oil, attended the announcement.

Saudi Arabia is increasing chemical production with demand for motor fuels expected to slow amid tightening fuel efficiency standards and the rise of electric vehicles. Fracking and horizontal drilling in shale formations have unleashed torrents of cheap U.S. natural gas that made the country among the most profitable places to produce chemicals, beating the Middle East in attracting projects.

DowDuPont Inc., Exxon Mobil Corp., and Chevron Phillips Chemical Co. are putting the finishing touches on multibillion-dollar factories along the Texas Gulf Coast, part of $188 billion in proposed and recently completed project, according to the American Chemistry Council.

Almost 20 factories are being built or expanded to convert gas liquids such as ethane and propane into ethylene, the most used petrochemical and the main ingredient in polyethylene plastic.

Most of the investment is coming from abroad. South Africa's Sasol Ltd. is spending $11 billion on a chemical complex outside Lake Charles, Louisiana. France's Total SA, South Korea's Lotte Chemical Corp. and Taiwan's Formosa Plastics Corp. also are investing in U.S. factories. — *Jack Kaskey*

THE BOTTOM LINE Saudi chemical giant Sabic plans to boost chemical production 70% by 2025 and is considering establishing a Houston HQ for its American operations.

Mubadala to Hire Rothschild for Cepsa Stake Deal

● UAE sovereign wealth fund preparing for divestment of Cepsa stake

Abu Dhabi's financial holding company Mubadala Investment Co. is close to hiring Rothschild & Co. to help divest a stake in Cepsa Trading SA, a Spanish oil company valued at about 10 billion euros ($12 billion), according to people with knowledge of the matter.

Mubadala is also interviewing more banks for roles in assisting with a sale or initial public offering for the wholly owned asset, the people said, declining to be identified as the deliberations are confidential. The listing in Madrid would be a preferred option, they said.

Mubadala is working with Cepsa's management "to assess a range of strategic options" including a listing, strategic partnerships and the involvement of other investors, a spokesman for the firm said in response to queries. "No final decision has been taken yet" regarding the banks, he said.

● Cepsa Trading SA

Representatives for Cepsa and Rothschild declined to comment. The Abu Dhabi firm may sell shares of Cepsa in Spain as early as this year, local daily The National reported in March, citing an interview with Musabbeh Al Kaabi, head of Mubadala's petrochemicals and petroleum unit.

The move comes as Abu Dhabi combines two of its investment firms - Abu Dhabi Investment Council and Mubadala - to create a wealth fund with assets of about $250 billion, clearing the way for the oil-rich emirate to consolidate state-controlled companies and accelerate economic diversification in the United Arab Emirates.

With the changes, Mubadala is poised to play a central role in the nation's efforts to turn oil revenue into profitable investments while also attracting technology and jobs.

Investments by Mubadala, created in 2002, include Globalfoundries Inc., a California maker of semiconductors, as well as stakes in Advanced Micro Devices Inc. and in EMI Music Publishing. The company is reviewing assets after merging with another state investment vehicle last year, giving it holdings in industries ranging from aerospace and energy to infrastructure.

Cepsa, founded in 1929, was acquired by one of Abu Dhabi's sovereign wealth funds in 2011.

The Madrid-based company, which has a large refining and petrochemicals focus, plans to boost sales to Asia, the only major region poised to see growth in the use of refined products and of the chemicals that go into consumer goods, Pedro Miro, chief executive for the oil processor known officially as Cia. Espanola de Petroleos SAU, said in an interview in Abu Dhabi in November.

The company is proving to be a good fit for its owner as Middle Eastern petro-states invest in downstream industries to ensure future use of their oil.— *Dinesh Nair, Manuel Baigorri and Ruth David*

THE BOTTOM LINE Mubadala is close to hiring Rothschild & Co. to help divest a stake in Spanish oil Cepsa Trading SA. The firm is a mulling options including a listing.

Amazon Makes Hiring Push in Riyadh

● After ceding China to Alibaba Group Holding Ltd., Amazon is looking for a win in the Middle East

Amazon.com Inc. is adding several jobs in Riyadh, Saudi Arabia, signalling Jeff Bezos's desire to expand in the country following a closely watched meeting with the crown prince.

Saudi Arabia Crown Prince Mohammad bin Salman met with Amazon's chief executive officer in Seattle earlier this month. The 32-year-old heir apparent to the throne had planned to discuss a potential project with the Ministry of Energy for Amazon to build a data centre in the country, which would be the first in the Middle East for the world's largest cloud provider.

While the status of the data centre proposal is unclear, Amazon began advertising at least five new full-time positions for e-commerce and grocery operations in Riyadh in the first week of April. Amazon-owned Souq.com also added three others in Dubai since April 3. Raf Fatani, Amazon's head of policy in the Middle East and Africa, promoted the jobs on his Twitter account on April 4, which includes a key role for a government relations representative. Amazon didn't immediately respond to a request for comment.

After ceding China to Alibaba Group Holding Ltd., Amazon is looking for a win in the Middle East. It's locked in expensive competition with homegrown online shopping sites in India, Brazil and elsewhere. Global expansion has been costly, with international operations losing $3 billion last year.

Amazon purchased Dubai-based retailer Souq.com last year to take out a main rival in the region. The Middle East has lagged behind the rest of the world in e-commerce, but mobile and online shopping is picking up in Bahrain, Qatar, Saudi Arabia, the United Arab Emirates and other more developed countries, where smartphone penetration is higher. Online sales in the Middle East and Africa are expected to reach $49 billion by 2021, up from $29 billion this year, according to research firm EMarketer Inc.

Amazon was not the only technology giant to meet Prince Mohammed. The Saudi delegation visited several Silicon Valley corporate campuses, including Apple Inc. and Facebook Inc. But two industry players stood out on the schedule: Alphabet Inc.'s Google and Peter Thiel, the billionaire venture capitalist who advises President Donald Trump.

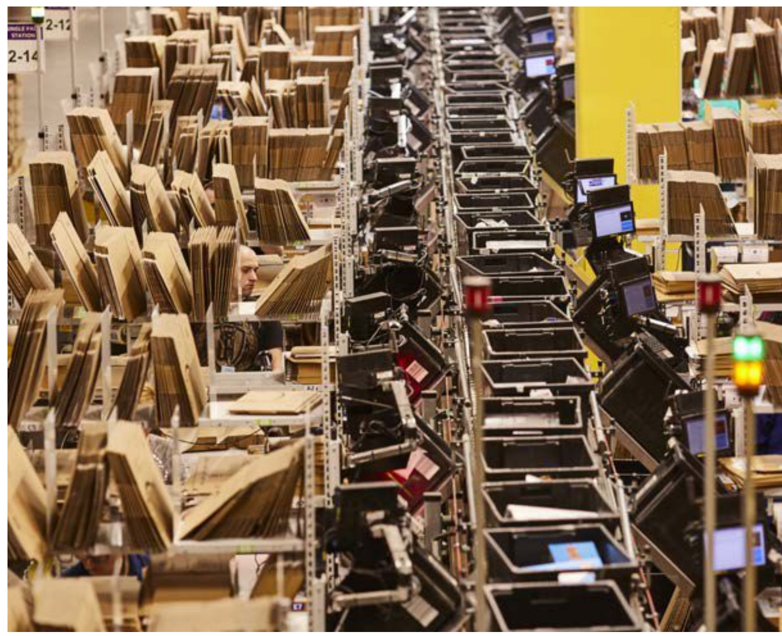
In addition to Facebook, where Thiel sits on the board, the Saudi delegation visited data-analysis startup Palantir Technologies Inc. and a trio of investment firms created by Thiel: Clarium Capital, Valar Ventures and Founders Fund. Thiel is chairman and co-founder of Palantir.

"Discussions concentrated on creating an attractive environment for emerging companies with innovative products," Saudi Arabia's embassy said in a statement. A representative for Thiel didn't immediately respond to a request for comment.

Prince Mohammed, known as MBS, also visited Google's headquarters in Mountain View, California, where he met founders Larry Page and Sergey Brin as well as Chief Executive Officer Sundar Pichai, according to the Saudi embassy.

—*Olivia Zaleski and Spencer Soper, Mark Bergen*

THE BOTTOM LINE Amazon, keen to strengthen its position in the Middle East, is planning to hire staff in Riyadh. Proposals for a data centre remain unclear.



● Amazon.com Inc is keen to gain a stake of the Middle East online retail market.

AMC Cinemas Tiptoes Into Saudi Arabia

● AMC and PIF set to give Saudis their first taste of the silver screen

AMC Entertainment Holdings Inc., controlled by China's Dalian Wanda, was granted the first cinema licence in Saudi Arabia and plans to open 100 theatres with the country's Public Investment Fund.

AMC, the world's largest exhibitor, and the Development & Investment Entertainment Co., a subsidiary of Saudi Arabia's PIF, plan to open as many as 40 cinemas within five years and 60 more by 2030, according to a statement April 4 from the Leawood, Kansas-based company.

There are no commercial theatres in Saudi Arabia and plans to open them present challenges for the conservative kingdom, such as whether men and women can sit together and what types of movies will play. The partners are aiming for "50 percent market share of the Saudi Arabian movie theatre industry," the parties said. The first AMC in Saudia Arabia will open in the capital Riyadh on April 18.

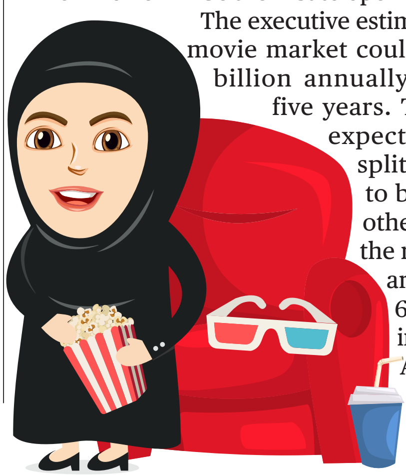
The goal is to open 30 to 40 movie theatres in 15 cities in the next five years, and a total of up to 100 in the next decade in 25 cities, Adam Aron, AMC's chief executive officer, said on a conference call. Cinemas won't initially be segregated by gender, though some showtimes may be exclusive for women or men, he said.

"The rules of operation are in formation as we speak," Aron said.

In terms of the types of films, Aron said AMC will exhibit all major releases from Hollywood studios that "are appropriate for the Middle East." Saudis are likely to see Hollywood's major hits coming out in the second quarter, he said, as well as home-grown fare.

"I expect to see a Saudi film industry emerge out of this," Aron said. The company is working on which movie will be the first to open in the country.

The executive estimated the local movie market could generate $1 billion annually in the next five years. The company expects its revenue split with studios to be in line with other countries in the region. Tickets are likely to cost 60 riyals ($16) including taxes, Aron said.



The Saudi crown prince, or MBS as he's known, met with Los Angeles Mayor Eric Garcetti and media industry leaders including Rupert Murdoch and Warner Bros. Chief Executive Officer Kevin Tsujihara. The Public Investment Fund is poised to take a $400 million stake in the Hollywood talent agency Endeavor as part of plans to diversify the kingdom's oil-based economy.

In March, Saudi Arabia said it was ending a three-decade-long ban on cinemas and planned to open more than 350 theatres by 2030. The industry is expected to contribute about $24 billion to the economy and add more than 30,000 permanent jobs.

Imax Corp. is also interested in opening theatres in the country - it operates the only cinema screen, which is housed in a science museum. — *Anousha Sakoui*

THE BOTTOM LINE AMC plans to open 100 theatres in Saudi Arabia with the country's Public Investment Fund after being granted the country's first cinema licence.

"I expect to see a Saudi film industry emerge out of this"

● The Saudi economy is expected to benefit from the film industry to the tune of

$24bn

Aramco, Total Plan Petrochem Complex

● Oil majors plan $5bn complex to aid growth in the Middle East and Asia

Saudi Aramco and French oil major Total SA plan to build a $5 billion petrochemical complex near their refinery in Jubail to tap growing demand in the Middle East and Asia.

The companies signed a preliminary deal for the construction of a 1.5 million tonnes a year steam cracker and petrochemicals units, Saudi Arabian Oil Co. and Total said in the joint statement April 10. The cracker will feed other petrochemical and specialty chemicals plants, to be built by other companies for $4 billion.

"Saudi Arabia is a growing market" and "it's also a place from where you can reach other markets in the Middle East and Asia," Total CEO Patrick Pouyanne said. "Some French companies have plans to join us," he said, citing water group Suez and tire-maker Michelin.

The project, to be built by the companies' Satorp venture, is likely to create 8,000 jobs. It is part of Aramco's plan to diversify from its core business of producing crude oil to expanding into value-added products as it plans the world's biggest IPO. — *Francois de Beaupuy and Caroline Connan*

THE BOTTOM LINE Saudi Aramco and Total plan to develop a $5 billion petrochemical complex in Saudi Arabia to tap demand in the Middle East and Asia.

Setting the Pace in Africa's Phone Market

Chinese unknown Transsion sells 3 in 10 phones on the continent. The flip side: Threats of civil war

No matter how many phones you sell, Yu Weiguo has learned, it's tough to keep to a schedule when the government declares martial law. During his eight years in Ethiopia, Yu has helped turn little-known Transsion Holdings, owner of the sleepy Chinese brand Tecno Mobile, into Africa's leading mobile device maker. Having sold at least 200 million phones on the continent, he picked the outskirts of Addis Ababa, Ethiopia's capital, as the site for a 280,000-square-foot factory. It was supposed to be pumping out as many as 2 million phones a month by July, but things aren't working out as planned.

Ethiopia's ruling coalition declared a state of emergency in mid-February after the surprise resignation of Prime Minister Hailemariam Desalegn destabilised the rest of the autocratic regime. For Transsion, the fallout has been a lesson in risk. The company profits from China's checkbook diplomacy in Africa but now faces the downside: public outcry against worsening inequality and repression. "There are many things that can't be controlled in Africa," Yu says. "Sometimes your plans don't work."

To say Transsion and its phones are little-known outside Africa is an understatement. Tecno has never cracked the top-10 smartphone brands in China and doesn't sell in the U.S. or Europe. Yet its parent accounts for 30 percent of African phone sales, compared with 22 percent for second-place Samsung, according to researcher Canalys. Reclusive founder Zhu Zhaojiang controls the private company via a string of related backers and funds, as well as some government-backed investment. Zhu, 44, has said he plans to go public at some point through a reverse merger with Shimge Pump Industry Group, a Chinese manufacturer of stainless steel pumps.

Transsion's rise in Africa comes at a time when the continent is undergoing rapid transformation, owing significantly to the convergence of technology, trade, urbanisation, and a huge swing in Chinese investment, including $60 billion since 2016. "What Transsion embodies is a kind of reading of the Chinese state, which beginning in the 1990s saw the opportunity that Africa represented," says Howard French, author of *China's Second Continent: How a Million Migrants Are Building a New Empire in Africa*. "Transsion had a discipline and stick-to-itiveness that allowed it to achieve results."

The company's origins were humble. Founded in 2006, it built its African business on cheap hardware and software tailored for customers who'd long gone underserved by companies from the U.S., Europe, and Japan. At Transsion's first assembly line in Ethiopia, Yu and five other Chinese expats slapped together phones on the ground floor of a three-story villa in the centre of town. "The place was very small, but we had everything we needed to produce a cellphone," he recalls.

Yu sold his first couple thousand Tecno flip phones in bulk to local resellers. He charged at least 10 percent less than rivals in the $20 to $50 range, according to analysts' estimates, and promised to handle customer service, including repairs. Within a few months, as demand hit the tens of thousands, he moved production from the villa to a proper factory and began focusing on custom features.

Transsion added slots for multiple SIM cards and made it easier for customers to toggle between wireless networks, saving money. Chinese engineers developed camera software that could better register darker complexions. A lack of electricity infrastructure shifted the focus toward longer battery life. "These are what you call micro-innovations," says

ILLUSTRATION BY JONATHAN DJOB NKONDO

Arif Chowdhury, an early Transsion staffer who now oversees expansion in Latin America, India, and Southeast Asia. “What made us different was that, from early on, we made a product just for the Africa market.” The company says it has about 5,000 staffers in Africa, and Chowdhury says more than 90 percent of them are locals.

The company expanded across Africa and into higher-end models. Today, it’s no longer perceived as only a knockoff. In the Tanzanian city of Moshi, Tecno owner Nicodemas Gobre says he spent $160 for the Camon CX’s strong camera, battery life, and air of trendiness. Now 1 in 6 people on the continent is a customer, and Transsion’s success has helped draw in Huawei and Xiaomi, China’s star domestic phone brands. “Tecno is changing the narrative that Africans can’t afford smartphones,” says Mbwana Alliy, a venture capitalist whose Savannah Fund focuses on local internet startups. “Facebook, WhatsApp, Instagram—all those apps owe a lot of their success to Tecno,” he says.

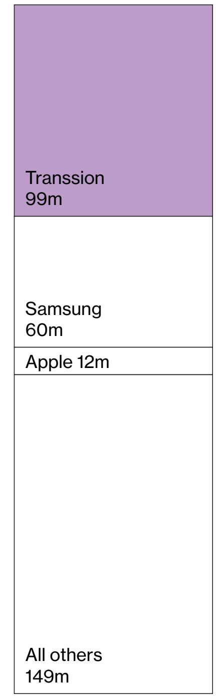
In Ethiopia it’s less clear if Transsion will benefit from growing demand for representation among the country’s largest ethnic groups, the Oromo and Amhara, or whether the company—having built its business under the oppressive regime—will suffer from perceptions of cosiness. “I find it quite incredible how China agencies, investors, and governments continue to promote Ethiopia as an investment destination,” says Gamechu Ibrahim, an activist in Oromia. “Think twice.”

Yu doesn’t see it that way. He argues that Transsion is bringing mobile and internet connection to the country and hiring and training locals, which all helps economic growth. “Political stability is a huge concern,” he says, but he’s optimistic. He says Transsion is investing for the long term, and the new Addis Ababa factory could be running by August, regardless of who’s running the country.

Jean-Pierre Cabestan, co-author of *Tanzania-China All-Weather Friendship in the Era of Multipolarity*, says Tecno would be wise to pay closer attention to politics. “The Chinese government and companies in general only establish ties with the ruling government. They engage little with opposition parties,” he says. “That could be a problem down the road.” —*Lulu Chen, with Yuan Gao*

THE BOTTOM LINE Transsion has sold 200 million phones in Africa over the past decade by piggybacking on the infrastructure China’s government paved. Now it faces the downside.

● Phones shipped to customers in Africa and the Middle East in 2017



DATA: IDC, BLOOMBERG INTELLIGENCE

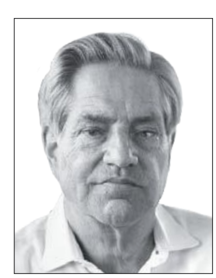
This Robot Can Detect Lung Cancer

● The founder of a $50 billion robotics company says FDA approval is the first step toward AI surgeries

Fred Moll was a young surgical resident when he assisted on his first keyhole surgery in 1982. The technique, otherwise known as laparoscopic surgery, requires doctors to use unusually slender, extra-long tools to perform operations through tiny incisions. Today’s laparoscopic surgeons use high-definition cameras to look inside patients’ bodies, but even the primitive version Moll used blew his mind. “Wow,” he recalls thinking. “This has to be a better way of doing things.” He withdrew from his residency and began working on medical devices.

Moll, 66, is best known for the da Vinci Surgical System, a large industrial robot that surgeons operate using electronic hand controls and a video monitor. The top-selling surgical robot, it retails for about $2 million and is used in thousands of hospitals. Its success has propelled Intuitive Surgical Inc., the company Moll founded in 1995, to a market value of about $50 billion. Thanks to his work, robotic surgery is now commonplace, but he argues it can be improved because it still depends on the precision of a surgeon’s hands. He believes robots, powered by machine learning algorithms and operating autonomously, are already capable of performing simple medical procedures. And after seven years of working in secret to prove it, he’s ready to take the first big step.

Moll’s Monarch Platform features a pair of arms with a long, blue tube attached, allowing a doctor to steer a camera and other surgical implements deep inside the body. This is a new kind of surgical scope, which he showed off to a *Bloomberg Businessweek* reporter in March at the headquarters of Auris Health Inc. in Redwood City, Calif. On March 22, the U.S. Food and Drug Administration told Auris it had cleared the device for use under a doctor’s control in human lungs. The company says it will be


● Moll

used to diagnose and eventually treat lung cancer.

The robot can be operated manually with a controller modeled on the Microsoft Xbox video game console. That's what the FDA approved, though Moll says the Monarch will also be able to work without human aid. "It's not science fiction," he says. "It's sort of like self-driving cars. People used to wonder if it was going to be 5 or 10 years. No, no, no: It's going to be 18 months."

Although Auris was spun out of Columbia University research in 2007, much of the Monarch technology comes from an earlier Moll startup, Hansen Medical Inc. Hansen's ill-fated system aimed to use robotic catheters to eliminate the need for open-heart surgery, but it proved too expensive compared with the cardiac stent, a competing technology that became popular around the same time.

Moll left Hansen in 2010, and the following year became the chief executive officer of Auris, which at the time was working on a robotic approach to eye surgery. The company struggled to win FDA approvals. "They get touchy when you talk about inserting tools in the eye and controlling them with robots," he says. So he acquired the ailing Hansen and adapted its probe for lung cancer diagnoses. The company has raised about $500 million from investors such as Lux Capital and Mithril Capital Management, controlled by billionaire Peter Thiel.

Backers were impressed by Moll's willingness to bring Silicon Valley sensibilities to a field in which

excellence largely remains a matter of fine motor skills. "The thing that everyone remembers is the control system," says Peter Hébert, a partner with Lux and an Auris director, referring to the Xbox-style console. "It's totally unique."

Moll says he focused on lung cancer for two reasons. It's the deadliest cancer, killing 1.7 million

▲ Auris's Monarch Platform allows a doctor to steer a camera and other surgical implements deep inside the body

◀ The lungs are a good proving ground for the Monarch, Moll says, because they require a lot of twists and turns

PHOTOGRAPHS BY JACK BOOL FOR BLOOMBERG BUSINESSWEEK people a year globally, according to the World Health Organization. (That's double the next-highest total, for liver cancer.) And it's the perfect proving ground for medical robots.

He blames lung cancer mortality rates partly on a current screening method's reliance on a manual bronchoscope, which has a limited range of motion and looks like something you might use to check your car's oil. The Monarch can navigate nimbly through the lung, which looks a bit like a network of tunnels, and the procedure doesn't require much decision-making beyond knowing where to turn.

No medical regulator in the world has approved fully robotic surgery, so for now surgeons who sign up for Auris's pilot program will drive the bot. Navigating on a video screen, the doctor guides the scope into the lung, starting in the trachea. A camera view is on the screen's left side, and a CT-scan-created map with turn-by-turn directions is on the right. Auris tracks the probe's precise location in part by comparing data from the camera view to the 3D map, and by using an electromagnetic sensor that works a bit like a miniature GPS. The idea is to collect data after every surgery and feed them back into the navigation software, improving it over time.

Once the doctor reaches a tumour, identified on the screen with a target, a needle can be run through the scope and used to take a tissue sample. Although the stakes were considerably lower, this reporter was able to drive the probe into a plastic lung after a two-minute training session, using the controller and a simulated version of the machine on an iPad.

Moll says amateurs won't be able to safely perform lung biopsies anytime soon, but he argues that the robot, operated under the watch of a surgeon, can do the driving for simple diagnostic procedures. There are plenty of reasons to be cautious about automating delicate medical treatments, but some surgeons are receptive. "I went in a skeptic," says Alexander Chen, a pulmonologist at Washington University in St. Louis who performs about 150 lung scope procedures each year. But in a test on a cadaver, the Monarch offered more control and reached deeper than a surgeon's wrists can, says Chen, now an Auris consultant.

Questions remain, he acknowledges, about how well the Monarch will perform. "There are a lot of moving parts," Chen says, and more research is needed to truly understand the robot's impact. But, he adds, "this is one of the most novel things in a while, and that gets me excited." —*Max Chafkin*

THE BOTTOM LINE Robot-driven surgery may sound iffy, but Moll has a strong track record and buy-in from the government and some surgeons for his first big step in that direction.

Man vs. Machine | Recruiting

A Russian startup is using Robot Vera, artificial intelligence software designed for recruiting, to help its 300-odd clients—including PepsiCo, Ikea, and L'Oréal—fill vacant jobs. (Yes, with humans.)

The Benefit

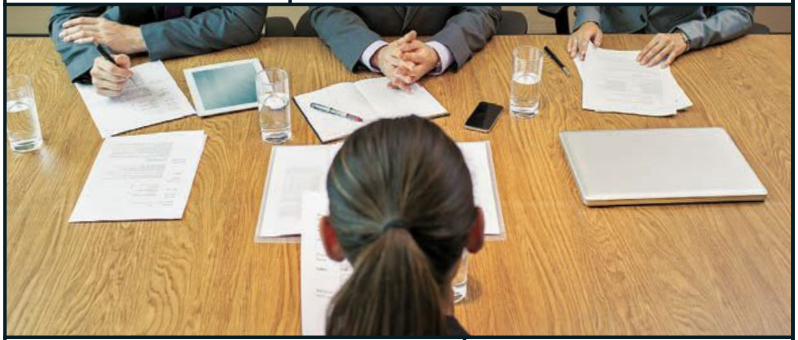
Vera speeds the vetting of high-turnover service and blue-collar positions (clerks, waiters, construction workers), cutting the time and cost of recruitment by as much as a third, according to its creators. The software can interview hundreds of applicants simultaneously via video or voice calls, narrowing the field to the most suitable 10 percent of candidates.

Innovators

Vladimir Sveshnikov (28) and Alexander Uraksin (30), co-founders of Stafory, a 50-person startup in St. Petersburg

Origin

The co-founders, with a background in human resources, two years ago found themselves making hundreds of calls to candidates who'd lost interest in the given job or couldn't be located. "We felt like robots ourselves, so we figured it was better to automate the task," Uraksin says.



Development

Vera, named after Sveshnikov's mother, combines speech recognition technologies from Google, Amazon.com, Microsoft, and Russia's Yandex. Programmers fed 13 billion examples of syntax and speech from TV, Wikipedia, and job listings to expand the software's vocabulary and help it speak more naturally and understand responses.

Deployment

The robot started working in Russia in December 2016, and Stafory has since added clients in the Middle East and pilot projects in Europe and the U.S. The company says its revenue will top $1 million this year.

The Verdict

Human recruiters still vet the candidates cleared by Vera. Sveshnikov and Uraksin are working to teach the bot to recognise anger, pleasure, and disappointment, but even if it can gauge emotions, Vera shouldn't be viewed as a substitute for traditional HR departments, says Mikhail Chernomordikov, a Microsoft Corp. strategist in Dubai. "Final decisions on hiring," he says, "are reserved for humans." —*Ilya Khrennikov*

ILLUSTRATION BY RAM HAN

Spring Is Coming For IPOs

● Some of the most valuable new companies are still private, but more may cash in soon

Don't be so afraid of a down round.

That may be the message Silicon Valley takes from the initial public offering of Dropbox Inc. on March 22. In the weeks before the cloud-storage company's stock market debut, it first targeted a price of $18 a share on the high end, giving the company a market valuation of $7.1 billion. That would have been about a third lower than the $10 billion it was valued at in its previous round of private fundraising—earning the IPO the "down round" stigma.

Things worked out better. Dropbox ultimately sold the stock for $21 a share, pulling its valuation past $8 billion. And by the end of its first trading day, it rose an additional 36 percent, to a total value of $11.1 billion. On the one hand, there's a chance Dropbox could have raised more money, since investors were willing to value the company a good bit higher than where the shares sold. But it was a sign that companies shouldn't see the risk of a valuation haircut as an absolute obstacle to going public. In recent years, concerns about not living up to lofty private valuations slowed the IPO pipeline.

Grumbles about the IPO market being broken have grown louder as tech giants such as Uber Technologies Inc. and Airbnb Inc. wait to go public. Jay Clayton, head of the U.S. Securities and Exchange Commission, and New York Stock Exchange President Tom Farley have both said the listing process dissuades companies from going public.

But IPOs have been making a quiet comeback. More than $12 billion in stock has been sold in new U.S. listings this year, up a third from the same period in 2017. January's $8 billion was the biggest month since Alibaba Group Holding Ltd. raised $25 billion in its September 2014 IPO. Maybe public equities aren't passé, after all.

A robust IPO market needs two things: favourable stock market conditions and companies that want to sell shares. Even with a record one-day volatility surge in early February and some more bumps in March, the stock market has been stable enough to get deals done. Meanwhile, investors are still hungry for investment opportunities, according to Michael Millman, JPMorgan Chase & Co.'s co-head of equity capital markets Americas and global head of technology banking.

That leaves the companies. The bread and butter of the IPO market still isn't the Dropboxes of the world. Since 2009 the average offering size is about $250 million, or a market value of about $1.7 billion. That's a fraction of the valuations for some of the biggest startups waiting in the wings. Uber sits at a $69 billion value, Airbnb at $31 billion, and WeWork Cos. at $20 billion.

All founded eight or more years ago, those companies have grown up in a funding world fundamentally different from their predecessors'—a world awash with cash for private companies. The startups have been able to go through their growing pains without the scrutiny of public investors, unlike Apple, Amazon, and Google (now Alphabet), whose IPOs all came within six years of their founding.

Last year saw $84 billion in venture capital investment, the most since the dot-com era, according to PitchBook-NVCA Venture Monitor. Masayoshi Son's conglomerate and investment vehicle SoftBank Group Corp., with its nearly $100 billion Vision Fund, has taken stakes in private companies at sizes that dwarf all but the biggest IPOs. It was the biggest buyer of a $9.3 billion sale of Uber stock; $4.4 billion went toward WeWork.

The private funding world has become crowded with some investors that usually play in the public markets. Mutual funds, hedge funds, sovereign wealth funds, and even private equity firms (which typically buy public companies and make them private again) have sought out these potentially high-growth investments because years of low interest rates and muted economic growth have limited returns elsewhere. "As more and more late-stage capital appears, the line of when companies go from private to public will keep shifting," says Neeraj Agrawal, general partner at tech-focused investment firm Battery Ventures.

While money has been plentiful, there have been unintended consequences to all this investment. Many private market valuations became inflated, especially in years such as 2014, when Dropbox last raised funds privately, through 2016, says Agrawal. Not all of these richly priced companies are ready for prime time. "Hypercompetition has made it so that the majority of venture capital's biggest fear is missing out on the next investment," Bill Gurley of Benchmark, which has invested privately in the likes of Uber, WeWork, and Snap, said in an interview with Bloomberg TV. "So they're afraid to have a reputation as someone who asks too many questions or pushes too hard," he said. "I think it's led to a situation where there's not a lot of stewardship for discipline and results."

Enter the down round. It's a bad look that can dampen employee morale and prompt a deluge of negative press coverage. Those immersed in the IPO industry point to payment-tech company Square Inc.'s 2015 offering as a deal that really stoked valuation concerns. The company, run by Twitter Inc. co-founder Jack Dorsey, listed at a $2.9 billion public market value, a far cry from the $6 billion valuation in its last private funding round.

● Venture capital investment in 2017

$84b

Two of last year's buzziest deals have disappointed post-IPO. Disappearing-photo appmaker Snap Inc. listed with a 44 percent pop in its debut but went on to let down investors with slowing user growth and an app redesign, leaving it to flirt with its $20 billion IPO market value, just above its $18 billion valuation in its last private round. Meal-kit delivery company Blue Apron Holdings Inc. is trading at just $354 million, less than a fifth of its 2015 private value, after fears of increasing competition, the resignation of its founder and chief executive officer, and disappointing earnings have dragged on the stock.

Still, there are signs that more large startups are willing to face the scrutiny. Uber's new CEO, Dara Khosrowshahi, the ex-Expedia Inc. chief who took over after its founder and CEO was ousted, has said he wants to take Uber public as early as next year. Nine-year-old Pinterest Inc. added its first chief operating officer, aiming to scale its advertising business internationally—a move seen as a step toward taking the $12 billion private company public. There's also the mammoth in the room outside of the tech industry. The Saudi Arabian government is hoping to raise a record $100 billion selling shares in its oil company, Saudi Aramco, though the deal's timing has become unclear.

In April all eyes will be on music streaming service Spotify Technology SA. It's skipping the marketing roadshow and valuation-setting process typical of an IPO in favour of a direct listing. Its opening public value will be decided on listing day based on how many shares existing shareholders want to sell, who wants to buy stock, and the price they agree upon. Unlike most IPOs, the move won't raise capital for the company but will give existing shareholders a chance to cash out. While Spotify ▶

◀ has tried to guide investors by disclosing its value based on the price of shares changing hands in private transactions, the range is very broad: From $6.3 billion to $23.4 billion since Jan. 1, 2017.

Despite the recent market volatility, public equities are riding high. That should lure more companies to take the leap into public markets and make it easier for them to justify richer IPO valuations. "We're now entering the phase where these companies are starting to go public," says Nick Giovanni, co-head of global technology banking at Goldman Sachs Group Inc. "There will be larger deals for much larger market cap companies. I think the story will be: It was worth the wait." Whether public investors on the other side of the transactions will be as pleased with the results is another question. After all, sometimes getting in on a stock that IPO'd "too soon" means snagging a better deal. Consider, again, Square: The stock is up more than sixfold in two and a half years. —*Alex Barinka*

THE BOTTOM LINE The massive startups of Silicon Valley are becoming less fearful of the risk of going public at a lower valuation than private investors were willing to pay.

Noto's Big Job at SoFi

● The new CEO, a Twitter veteran, has choices to make about how the fintech company lends

▲ Noto

As chief operating officer of Twitter Inc., Anthony Noto did a lot to calm the company's perpetually anxious shareholders. He started as the head of finance but became second in command after management shakeups. On Feb. 26, however, Noto took over as chief executive officer of a financial technology startup, Social Finance Inc., or SoFi. Once again, he's stepping into a leadership gap at a company with big ambitions—and some big headaches.

With an online-only business model, SoFi has become the largest student-loan-refinancing business in the U.S. And it's aiming for more: to beat traditional banks by targeting millennials with products ranging from insurance and mortgages to wealth management and checking accounts. But in early September, CEO Mike Cagney left SoFi after allegations that some managers sexually harassed employees. Amid the turmoil, the company withdrew its application for an industrial loan charter, which would allow it to collect FDIC-insured deposits.

Noto hasn't signaled any big changes in direction. "We're going to focus now on continuing to execute on the strategic plan and build out our muscle and strength that would give us the option to be a public company at some point," he told Bloomberg News on his first day on the job.

He'll be facing increasingly tough competition. SoFi sees Marcus, the consumer-lending business started by Goldman Sachs Group Inc. in 2016, as the biggest threat, according to people familiar with SoFi's thinking. The Wall Street behemoth focuses on clients planning to refinance credit card debt, and CEO Lloyd Blankfein has pointed to advantages it has over a lot of fintech startups: As a bank, it can use deposits as an inexpensive source of funding.

One question Noto will have to navigate is how much SoFi should use its own balance sheet—that is, hold on to the loans it originates as opposed to selling them to other investors. It currently keeps a slice of loans but sells off most of them. Holding loans allows a company to earn a stream of interest income, but investors generally put a lower value on financial firms than tech platforms. SoFi eventually has to decide "who are we, what can we sustain?" says Henry Coffey, an analyst at Wedbush Securities. "They want a high market valuation, but they have to deal with the realities of being a finance company." SoFi spokesman Jim Prosser says the company is confident it can grow with its current model.

"We think we can deliver products in a more personalised way"

The startup tries to build a loyal following among young "HENRYs" (high earners not rich yet) and then get them to buy other products and refer their friends. Expanding fee-based products such as wealth management would give the company a buffer if rising interest rates hurt demand for loans. Because SoFi doesn't have retail branches, it connects with customers by holding events such as career advice nights and celebrations for those who've paid off student loans.

Some get extravagant treatment. At a dinner in

PHOTOGRAPH: CHRISTOPHER GOODNEY/BLOOMBERG

New York City, "there was a place mat, and when you turned it over, you see a letter that the special person you took with you wrote for you about your journey to paying off the loans," says Imran Chadry, 29. "I sobbed like a baby." SoFi says it plans to hold 500 events in 2018, up from 41 in 2015. "We found that the return on investment is really quite good," Joanne Bradford, the company's chief marketing officer, says of the gatherings. People who go "refer at a higher rate, take more products from us, and are great at giving us feedback."

The wealth management unit, fully launched in May 2017, had $42.3 million in assets under management as of Jan. 18, according to Prosser. SoFi is arguably late to this particular game: Betterment LLC and Wealthfront Inc., digital wealth management startups, each has more than $10 billion under management. But that may also suggest there's room for the business to grow.

Using a partner bank, SoFi is also starting a service that provides checking and debit accounts. "There's an opportunity to build relationships with our members," Noto said in February. "We think we can deliver products in a more personalized way with better selection, better information, and better value." If SoFi can show investors it's still a threat to traditional banks, the IPO that was first expected in 2015 is still in the cards. —*Julie Verhage and Selina Wang*

THE BOTTOM LINE SoFi has done well by marketing loans to young professionals, but to keep growing, it wants to sell them other products.

Saudi Races to Bond Market

● Saudi Arabia raises $11 billion on the bond market

Saudi Arabia beat estranged neighbour Qatar to the bond market, raising $11 billion in the biggest dollar sale by an emerging-market nation this year.

The kingdom moved quickly to sell the bonds without a roadshow, forcing Qatar, which is being boycotted by Saudi Arabia and other Gulf states, to play catch-up. The smaller nation was due to meet investors in the U.S. and U.K. the week ending April 14 as *Bloomberg Businessweek Middle East* went to press, ahead of a possible offering. The country was hoping to get a deal away despite its isolation.

"There was likely some strategic thinking in the timing of Saudi Arabia coming ahead of Qatar," said Tim Ash, a senior emerging-market strategist at BlueBay Asset Management in London. "Qatar might have to price accordingly to draw investors. They also want to demonstrate continued market access, after its spat with Saudi and other Gulf states."

Saudi Arabia's sale, which eclipsed Argentina's $9 billion offering in January, received more than $50 billion in bids, including interest from joint lead managers, three people familiar with the deal said, declining to be identified because the information is private.

Saudi Arabia reduced the spread it was offering and still managed to sell the bonds, said Richard Segal, a senior analyst in London at Manulife Asset Management, which oversees $400 billion. "This still

◀ Saudi Arabia eclipsed Argentina's $9bn offering in January

left a good deal of value on the table for investors," he said.

The Saudi deal shouldn't impact the pricing on Qatar's upcoming bond, Segal said. Qatar's neighbours accuse the state of supporting terrorism – a charge it denies. Saudi Arabia has been one of the biggest issuers in emerging markets since a drop in oil prices prompted the kingdom to sell dollar bonds less than two years ago.

The kingdom plans to borrow the equivalent of $31 billion in 2018 to bridge an expected budget deficit of $52 billion and to fund growth plans after its economy shrank last year. Last month, it increased a $10 billion syndicated loan by $6 billion. –*Archana Narayanan*

THE BOTTOM LINE Saudi Arabia beat its estranged neighbour Qatar to the bond market earlier this month in the biggest dollar sale by an emerging market nation this year.

AAIB PERSPECTIVE

EGYPT'S POTENTIAL FOR TRADE SUCCESS

Egypt's geographical location and growing industries confer many advantages

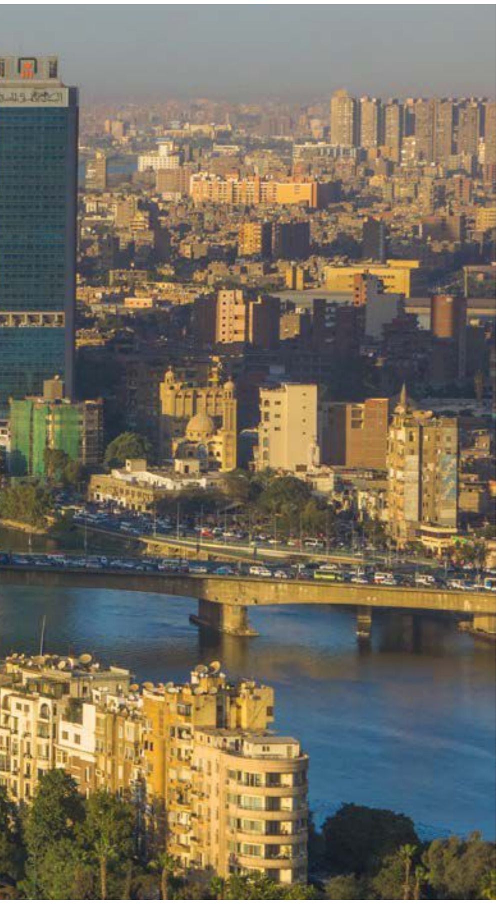
Egypt has no shortage of advantages when it comes to bilateral investment and trade with Africa and the GCC, and its geographic location is the jewel in the crown. Positioned in the North East edge of Africa, Egypt has large borders with Sudan, Libya and Palestine. It has extensive coastline on the Mediterranean and Red Sea, across which it faces the Middle East powerhouse of Saudi Arabia. The Suez Canal connects the Indian Ocean to the Mediterranean, and therefore links Asia to Europe confers advantages in terms of trade with the GCC and North Africa.

Egypt is ripe to play a significant role in leveraging synergies and harnessing efforts towards holistic continental economic integration. The government of Egypt is investing heavily to maximise these advantages and is also setting policies to boost bilateral trade with key African markets and the GCC. For example, the Egyptian government is developing free zone areas around the Suez Canal, which will help win business and investment from China as well as positioning the country to gain re-export business from major ports in the Arabian Gulf.

Globally, Egyptian exports have increased by 14% during the first four months of 2017 compared to 2016. According to the Ministry of Trade & Industry, the value of Egyptian exports reached $7.438 billion in 2017, compared to 2016 when they recorded $6.545 billion.

The Gulf region is the most forthcoming as a promising geographical base for investors approaching Egypt. Trade with the GCC performed well, with latest figures indicating a strong uptick in trade. The United Arab Emirates provides a prime example. Trade between Egypt and the UAE grew significantly in 2017, with a slight increase in Egypt's trade surplus with the UAE, which reached $1.5 billion compared to $1.4 billion in 2016, according to a recent report by the Egyptian commercial office in Dubai.

Hassan Abdalla, CEO of Arab African International Bank "AAIB", said: "The geo-economic advantage of Egypt – the nexus between the African and the Arab world's overlooking the Mediterranean, the Red Sea and the Suez Canal - is further boosted by the completion of the Suez Canal mega project of the twin canal." Abdalla added: "In addition, the establishment of the Suez Canal Economic Zone (SCZone) – which is a significant development that will transform 461 square kilometres and six maritime ports strategically located along one of world's most main trading routes into an international commercial hub - will further sharpen Egypt's competitive edge in advancing trade and investment between Europe, Asia, Africa and the Gulf area. In this, AAIB is perfectly



"The UAE is the biggest investor in the Egyptian market, with total investments amounting to $6.2 billion, in various projects both in the service and production sectors," said Tarek Kabil, Minister of Industry and Trade."

Many sectors experienced a rise in exports, including agricultural products, construction materials, textiles, food products, fertilisers and chemicals.

The main markets that Egyptian exports targeted in the first four months of 2017 were the EU, the US, Turkey, Saudi Arabia, the United Arab Emirates, and Lebanon.

Egyptian exports to the US recorded $381 million compared to $370 million, while imports decreased by 27% to $1 billion instead of $1.279 billion, according to a statement from the Ministry.

Egyptian exports to Turkey increased by 54% to $608 million compared to $395m a year ago. Meanwhile, imports decreased by 43% to $624 million compared to $1.093 billion in 2016.

Looking to Sub Saharan Africa, Egypt is also keen to boost investment and exports. It recently opened its first logistics office in Kenya, which led to a 239% increase in trade surplus between both countries during the first half of 2017. The trade volume between Egypt and Kenya increased by 30%, hitting 170 million dollars during the first 6 months 2017, up from 130 million dollars during the same period in 2016. On the other hand, Egyptian imports from Kenya decreased from 109 million dollars in the first half of 2016 to 79 million dollars this year, demonstrating the need for greater trade ties.

Egypt has also been working to increase trade and investment ties

"The UAE is the biggest investor in the Egyptian market, with total investments amounting to $6.2 billion, in various projects both in the service and production sectors"

with Morocco, one of North Africa's most successful economies and observers say there are huge investment opportunities in Egypt, especially in the fields of heavy industries, foodstuff, textiles, fertilisers and car assembly.

Egyptian authorities also aim to reduce the country's gap in the balance of trade by increasing Egyptian exports and rationalising imports. The achievement of this goal, which was outlined by the Ministry of Trade and Industry in May 2017, requires non-petroleum exports to rise by 10% a year between 2016 and 2020, bringing the total target of non-petroleum exports to rise to 61%. This sets a goal of achieving non-petroleum exports of more than $30 billion by 2020, up from $18.6 billion in 2015.

To achieve this, Egypt is working on the implementation of a number of incentives to increase exports. These consist of institutional legislation and procedures to support the business climate in general, including reviewing the legislation regulating import and export law and simplifying export and import procedures.

The country is also keen to help exporters enhance their competitiveness, particularly through pricing and improved promotion, whether in current or prospect markets. This particularly applies to exports sectors including agribusiness, food industries, construction and building materials, engineering industries, chemicals industries, iron and steel industries, and textiles.

KEY MARKETS

Egypt aims to increase product and service exports around the world. In Africa and the GCC, the focus on exporting the following products and services:

North Africa: Engineering goods, white goods, cables, televisions, receivers (Morocco, Algeria and Libya), ceramic, fruits and vegetables, food goods (Algeria and Libya), carpets and moquette (Algeria).

Africa: Food industries – chemicals including plastic, engineering industries (electronic industries, machines and equipment, car components, cables, wires, televisions and receivers, houseware, metal forming, means of transportation), textile and clothes, furniture, building material, white products, ceramic, aromatics, plastic, building materials, pharmaceuticals

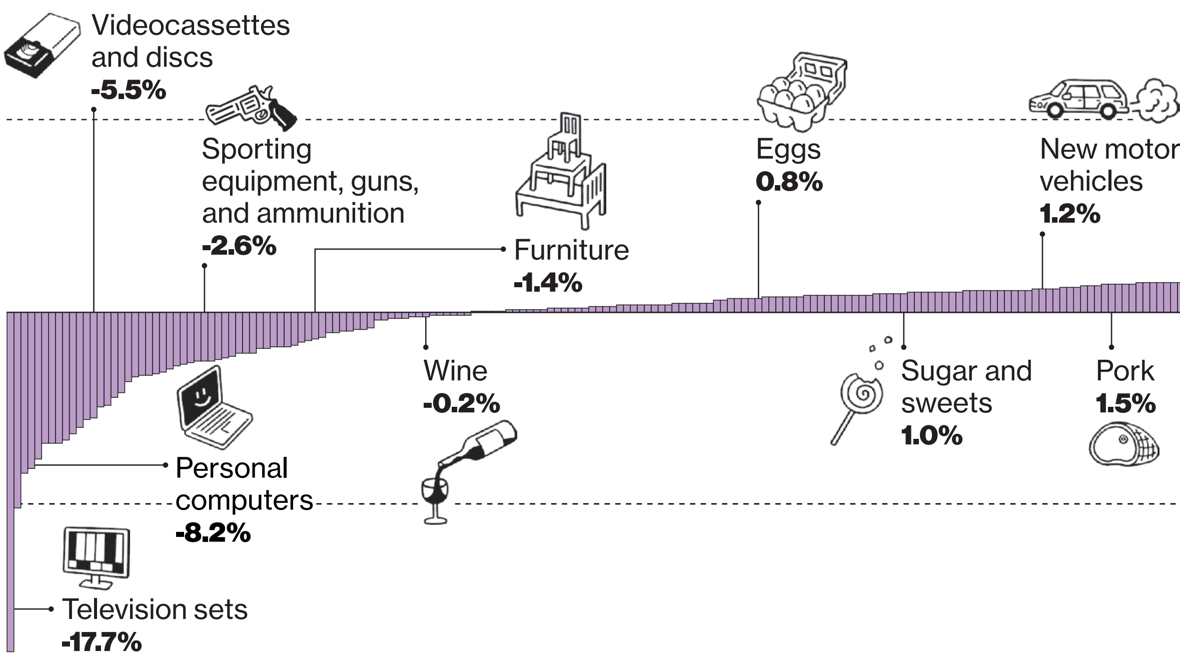
GCC: Food industries, agricultural crops, engineering goods, electronic industries, machines and equipment, automotive components, cables, houseware, metal formation, means of transportation

Jordan: White foods, chemical industries including plastic, construction materials, clothing and textiles, furnishings, furniture, crafts and traditional industries, cacao and chocolates, sugar candies

Syria, Palestinian Territories: dairy products and oils, vegetable and animal fats

What Is Infla

Average annual price change since the end of the recession*



● It's a key gauge for setting interest rates, but it's poorly understood

The first principle of war is "know thine enemy." But as Federal Reserve Chairman Jerome Powell and his colleagues raise interest rates to keep the U.S. economy from overheating, there's a lot they don't know about the foe they're trying to contain: inflation.

Here are some of the things about inflation the Fed and other central banks are uncertain of: what causes it; what effects it has; what to count in measuring it (stock prices?); how low, or high, it should be; and how to move it up and down.

The Fed, in other words, is driving blind. Daniel Tarullo, in a tell-all address at the Brookings Institution in October after his resignation from the Fed's Board of Governors, said, "We do not, at present, have a theory of inflation dynamics that works sufficiently well to be of use for the business of real-time monetary policymaking."

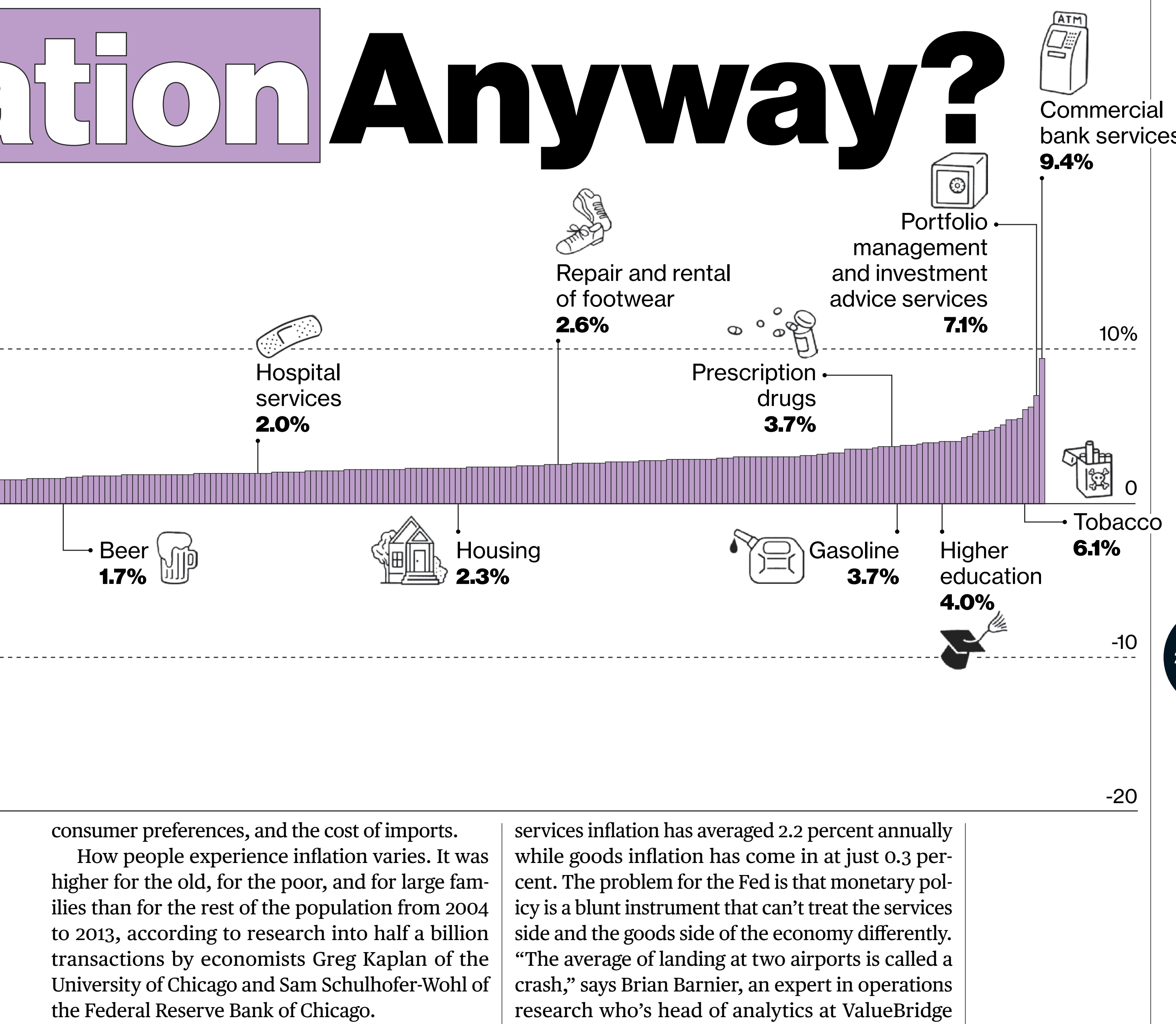
On March 21, the Federal Open Market Committee raised its target range for the federal funds rate to 1.5 percent to 1.75 percent. In his first press conference as chairman, Powell said, "There's no sense in the data that we're on the cusp of an acceleration of inflation."

Like a cook lowering the flame under a pot, the Fed is trying to reduce the pace of growth from a boil to a simmer to extend the life of the almost nine-year expansion. History shows that once the central bank begins to raise interest rates, it often goes too far. Five of the seven credit-tightening cycles since 1970 have choked growth and ended in a recession. But without understanding more about inflation, it's hard to know if the Fed is tightening too quickly, not quickly enough, or at about the right pace.

The chart above illustrates one problem facing the central bank: Prices don't rise or fall in unison. What the Fed calls "inflation" is just a weighted average of the ups and downs of the prices of all goods and services in a basket that reflects the spending of all American consumers. And those prices change for a variety of reasons, including technology,

*CHART SHOWS EVERY CATEGORY MEASURED IN THE PRICE INDEX OF PERSONAL-CONSUMPTION EXPENDITURES FROM 2Q 2009 TO 4Q 2017; DATA: BUREAU OF ECONOMIC ANALYSIS

ation Anyway?



consumer preferences, and the cost of imports.

How people experience inflation varies. It was higher for the old, for the poor, and for large families than for the rest of the population from 2004 to 2013, according to research into half a billion transactions by economists Greg Kaplan of the University of Chicago and Sam Schulhofer-Wohl of the Federal Reserve Bank of Chicago.

The sales channel matters, too. Inflation of goods sold online ran 1.3 percentage points lower than the Consumer Price Index for the same product categories from 2014 to 2017, according to research by Austan Goolsbee of the University of Chicago Booth School of Business and Pete Klenow of Stanford, who analysed data from the Adobe Experience Cloud, which includes 80 percent of the transactions of the top 100 U.S. retailers.

Another big divergence is between goods and services. Since the end of the last recession, the Fed's favourite measure of inflation–the change in the price index for personal consumption expenditures–has averaged 1.5 percent a year. But when you break the index into its two main components, services inflation has averaged 2.2 percent annually while goods inflation has come in at just 0.3 percent. The problem for the Fed is that monetary policy is a blunt instrument that can't treat the services side and the goods side of the economy differently. "The average of landing at two airports is called a crash," says Brian Barnier, an expert in operations research who's head of analytics at ValueBridge Advisors LLC in New York.

The problem with inflation theories is that they tend to rest on "unobservables," such as the concept of the natural rate of unemployment. "Attempts to estimate them have strongly suggested that they aren't constants," writes Edward Yardeni, the Wall Street economist, in a new book, *Predicting the Markets: A Professional Autobiography*.

The Fed's challenge with inflation isn't just a lack of knowledge; it's also a lack of power. The economist Milton Friedman asserted in 1963 that "inflation is always and everywhere a monetary phenomenon," implying that the Fed could exert near-total control over it by adjusting the supply of base money. He theorised that prices couldn't ▶

"The average of landing at two airports is called a crash"

ILLUSTRATIONS BY TOMI UM

◀ possibly rise unless the Fed pumped more money into the economy. But he was wrong. Even if the Fed does nothing, the opportunity for inflation can increase if banks make more loans and if money circulates through the economy faster.

There's even an argument that raising interest rates now, far from damping price pressures, could stoke them. The idea goes back to economist Irving Fisher in the 1930s, based on the simple equation that the nominal rate of interest equals the real rate plus inflation. For example, if the nominal rate is 2 percent and inflation is zero, the real interest rate is also 2 percent. If the Fed raises the nominal rate to 4 percent but the real interest rate stays at 2 percent, then inflation will have to rise to 2 percent to make up the difference: 2 + 2 = 4. Federal Reserve Bank of St. Louis President James Bullard said in a presentation in Germany in 2016 that "Neo-Fisherian ideas may have an important impact on our thinking about monetary policy in the future."

Many of the people asking the sharpest questions about the Fed's thinking on inflation aren't anointed doctors of economics. An extreme example of the self-taught econ skeptic is Matt Busigin, who dropped out of high school at 15 but has managed to have a dual career as a software engineer in Buffalo and a portfolio manager for Los Angeles-based New River Investments Inc. Running tests on 20 years' worth of data, he found a negative correlation between increases in the Fed's base money and future inflation: When one rises, the other falls, and vice versa. Theory predicts a positive correlation.

Closer to the centre of power is Patrick Harker, president of the Federal Reserve Bank of Philadelphia, an engineer by training with expertise in operations research, a scientific method for management of systems ranging from transportation networks to factory floors. Operations researchers tend to value data collection over theory-spinning. Thinking out of the box, Harker's bank is even toying with using the emerging science of machine learning to make macroeconomic predictions and policy. It sponsored a conference on the topic last year and hired an expert in the field to start work in August.

What can the Fed and other central banks do, given the uncertainty? A good start is to admit the problem exists. Powell's predecessor, Janet Yellen, kept the Fed "data-dependent"—dragging her heels on raising rates until she saw evidence of inflation, not just theories predicting it. Said Yellen last year in New York: "You have to keep an open mind and not assume you have a monopoly of truth." —*Peter Coy*

THE BOTTOM LINE The Fed has a preferred way of measuring inflation, but it's an open question whether the institution has the right tools to act on prices—and hence growth.

The Man at the Controls of China's Money Machine

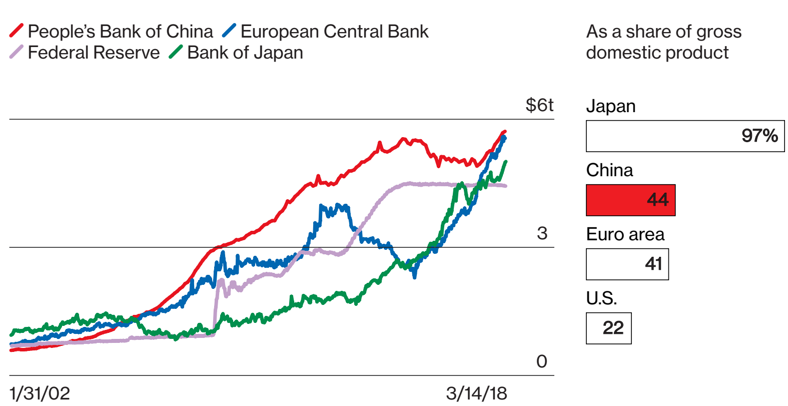
● The country's new central bank governor will have less room to maneuver than his predecessor

Yi Gang, who on March 19 was appointed head of the People's Bank of China, inherits a powerful money machine and a vast policy portfolio. Yet the central bank is only part of an apparatus that ultimately answers to just one man: President Xi Jinping. Interest rate calls and regulatory decisions need approval from Chinese officialdom, a reality that makes the PBOC far different from the more politically independent U.S. Federal Reserve and European Central Bank.

With an unspoken mandate to do whatever furthers China's economic agenda at home and abroad, the PBOC is an institution with awesome firepower. Its \$5.7 trillion in financial assets give it the biggest balance sheet among major central banks—the accumulation of years of balance-of-payments surpluses. About \$1.2 trillion of that is invested in U.S. Treasury bonds, which makes China the biggest foreign holder of American T-bills. That's potential

China Leads the Way

Central bank assets, in trillions of dollars



PBOC FIGURES INCLUDE FOREIGN EXCHANGE RESERVES.
DATA: PEOPLE'S BANK OF CHINA, EUROPEAN CENTRAL BANK, FEDERAL RESERVE, BANK OF JAPAN

leverage in any major trade conflict with President Trump. The central bank is also helping to support Xi's signature "One Belt, One Road" infrastructure initiative aimed at deepening trade and economic links with much of Asia, Europe, the Middle East, and Africa. "It certainly plays a large external role for China and more explicitly than any other major central bank," says Alex Wolf, a senior economist at Aberdeen Standard Investments in Hong Kong who previously worked for the U.S. Department of State.

The 60-year-old Yi, who has a doctorate in economics from the University of Illinois at Urbana-Champaign, is a seasoned financial policymaker, having served for more than a decade as No. 2 to Zhou Xiaochuan, the central bank governor for 15 years. He's seen as a reliable pair of hands to continue Xi's drive to reduce systemic risks and pare debt without derailing an economy that, according to a Bloomberg poll of analysts, is headed for 6.5 percent growth this year.

While Yi's succession is like-for-like from a policy perspective, his lower ranking in the Communist Party pecking order means he arrives without the political heft Zhou brought to the role. What's more, his appointment comes just days after China's legislature voted to repeal presidential term limits. The move allows Xi to keep power indefinitely and consolidate his grip on all aspects of policy, including managing the economy.

Yi at least will have a more muscular institution to steer after Xi's government recently announced plans to merge the bank and insurance regulatory agencies. Some of their functions, including drafting key regulations and conducting prudential oversight, will move to the PBOC. That ought to make the bank the most powerful voice in the Financial Stability and Development Committee created by Xi.

Even if the central bank has to answer to the top leadership, it has the tools to intervene directly in the economy in ways other such banks don't, including channeling cash to chosen banks or funding the redevelopment of shantytowns. Its decisions matter beyond China's borders, too, given that the country's $12 trillion economy was responsible for about a third of global growth last year, according to the International Monetary Fund. If Yi slows the pace of credit growth too quickly, the effects will be felt worldwide. "On Zhou's watch, a credit bubble of epic proportions expanded," Bloomberg economists, led by Tom Orlik, wrote in a note. "Now it's up to Yi to manage it down."

Yi is expected to carry on with his predecessor's efforts to internationalise the yuan. Although it won't dethrone the U.S. dollar anytime soon, the Chinese currency is making advances. In 2015 it was selected to join the dollar, euro, yen, and British pound in the IMF's elite club of international reserve currencies. However, China's ambitions to raise the yuan's profile took a serious hit from a botched move toward greater currency flexibility, which spurred an outpouring of capital. In August 2015, as the government intervened aggressively to halt a rout on the Shanghai and Shenzhen stock exchanges, the PBOC abruptly changed how the yuan traded day-to-day against the dollar, sending tremors through world markets. The disruption was cited by the Fed as one reason it delayed a widely anticipated interest rate increase the following month.

It may take Yi time to establish the same kind of influence within China's power structure that Zhou, a protégé of former reformist Premier Zhu Rongji, accumulated over the years. Abroad, he starts with an advantage: As a fluent English speaker well-known in central bank circles, he'll play an important role representing Chinese policy to foreign governments. "The PBOC for a decade has been the backbone of China's financial regulatory system," says Andrew Collier, an independent analyst in Hong Kong and former president of Bank of China International USA. "It has also played a role as the honest broker between China and the rest of the world's economies."

While the bank takes orders from the party hierarchy, that's not to say it hasn't been an advocate for key financial reforms. Zhou started liberalising interest rates, did away with the yuan's peg to the dollar in 2005, and championed a move toward a freer-floating exchange rate. Yi wants to cast himself in the mold of a reformer, too. "The main task is that we should implement prudent monetary policy, push forward the reform and opening up of the financial sector, and maintain the stability of the entire financial sector," he told reporters at Beijing's Great Hall of the People following his appointment.

One radical idea that's not on the table: independence for the PBOC. "The increasing complexity of the Chinese economy and financial system gives the Chinese central bank unique influence on the thinking of the top leadership," says Pauline Loong, managing director at research firm Asia-Analytica in Hong Kong. "After all, it is the institution with real-time information on what's happening in the economy and its financial institutions. But ultimately, it serves the party's goals." —*Enda Curran, with James Mayger and Yinan Zhao*

THE BOTTOM LINE With $5.7 trillion in assets, the People's Bank of China wields enormous economic power at home and abroad. But Yi will have to follow a course charted by the country's top leadership.

"On Zhou's watch, a credit bubble of epic proportions expanded. Now it's up to Yi to manage it down"


● Yi

IMAGINECHINA

Inside the Secret Plot To Reverse Brexit

● Chuka Umunna is trying to pull off the impossible—keep Britain in the EU

Early each Wednesday morning, 15 people leave their homes and travel separately to a secret location in central London, where, over coffee and cookies, they plot to stop Brexit. The group includes a mix of women and men, old and young, politicians and activists, though their identities haven't been formally released. The one idea uniting them is opposition to Prime Minister Theresa May's plan for Britain to make a clean break from the European Union.

They're aiming to engineer a new referendum so the British people can reconsider Brexit before it's too late. "I do not want to see Brexit happen. I think it will destroy the futures of the next generation in this country," says Chuka Umunna, the charismatic, 39-year-old member of Parliament who chairs the weekly gathering. "But it's not about what I think—and shouting 'Stop Brexit' is not a political strategy. I want the people to get a vote."

Anti-Brexit campaigners in the U.K. are getting organised because, for the first time since the 2016 vote, they believe they can win. Ever since May made a catastrophic gamble on an early election last June—and lost her majority in Parliament—it's been clear she's in a weak position to lead the country through withdrawal from the EU. In the six months after that fiasco, she's managed to hold her ruling Conservative Party together and navigate the first phase of Brexit negotiations, albeit only after agreeing to pay the other 27 member states a £40 billion ($56.4 billion) divorce bill.

Then came her first legislative defeat at the hands of fellow Tories. On Dec. 13, 11 party members defied her orders in a key vote in the House of Commons on whether Parliament should have a veto over the Brexit deal. The Tory rebels ensured lawmakers will get a binding vote to reject or accept May's final Brexit deal when negotiations with the EU end later this year. This means the prime minister must get an agreement good enough to please her own lawmakers. She can't simply impose her policy on the country.

It's this make-or-break vote, expected sometime in October, that the Brexit resistance is targeting. By lobbying legislators, they hope to block May's deal and trigger a referendum or perhaps a national election. The pro-EU alliance Umunna chairs—which includes Tory rebels in Parliament and thousands of activists around the country—played a crucial role behind the scenes in inflicting the December defeat on May.

Speaking in his office, which overlooks the Palace of Westminster, Umunna says campaigners across the country targeted different members of Parliament in the runup to that vote to persuade them to back the rebellion. The MPs got "an avalanche of emails and hundreds of visits" to their offices, he says.

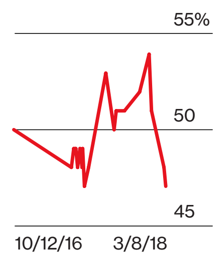
Umunna says the public and politicians increasingly see the dangers of Brexit and are changing their attitude as the risks become clear. A recent leak of a government analysis showed that Brexit could reduce growth by as much as 5 percentage points over 15 years if there's a free-trade deal, or by 8 percentage points if there's no deal at all. The most affected areas are likely to be some of those that voted heavily to leave the EU. "It terrified some people—what it was saying was going to happen in their communities," Umunna says. "If it does happen, and they are still the members of Parliament, they won't be forgiven."

Umunna is always immaculately dressed, a slick media performer who briefly stood for the leadership of his Labour Party in 2015, before what he calls "the added level of pressure" prompted him to pull out of the race. (It was ultimately won by socialist firebrand Jeremy Corbyn.) Until recently, he's been careful to keep quiet about the work of his Grassroots Coordinating Group, as the committee is known. He won't say where or exactly when they meet, since he doesn't want the gatherings to be mobbed by photographers and reporters.

Away from the cameras, Umunna and his allies have been seeking the help of European leaders. On Jan. 15 he joined senior members of the Conservatives, including Anna Soubry, a former business minister, and Dominic Grieve, who served as the U.K.'s Tory attorney general (before masterminding May's December defeat), to visit the EU's chief Brexit negotiator, Michel Barnier, in Brussels. They've met senior officials at other EU institutions, European foreign ministers, and ambassadors from the bloc's remaining member states—even heads of foreign governments. Some of those involved privately confide that the access to senior EU politicians has been "extraordinary."

While EU officials know they must tread lightly to avoid appearing to meddle in British affairs, they're privately feeding valuable intelligence on the unfolding negotiations to their British allies. On March 6, a day before the EU published its draft plan for the next phase of Brexit negotiations, Umunna was in his office, focusing on the bloc's future trade deal with the U.K. He told Bloomberg reporters something not even the British government officially knew at that point: The EU would make clear in its document that its offer of a limited trade deal, with poor access for services such as banks, could be improved—if May backs down on her own strict "red lines," which include leaving ▶

● Share of voting-age British citizens who say they'd prefer to remain in the EU



PHOTOGRAPH BY FELICITY MCCABE FOR BLOOMBERG BUSINESSWEEK; DATA: WHATUKTHINKS

◀ the EU's single market, its customs union, and the jurisdiction of the European Court of Justice.

Umunna's information proved accurate. When the bloc published its guidelines the next day, it said that if May's position "evolves," it would be willing to consider making a better offer. The EU's gambit, which became known as the "evolution clause," was seen as an attempt to divide U.K. strategists over May's hard-line stance. To some of the more paranoid anti-EU campaigners in the U.K., Umunna's prior knowledge of the clause will serve as evidence of an international conspiracy against Brexit.

May's defeat in December was a turning point for politicians in Europe, too. To many EU officials in Brussels and European capitals, Brexit seemed inevitable. Their only hope was to minimise the damage from the split and try to plug the €10 billion hole in the bloc's annual budget that the U.K.'s exit will leave. All that changed after May lost in Parliament. "They recognise that Theresa May does not necessarily have a mandate for her negotiating position," Umunna says. "They are very aware that actually she isn't in the driving seat of this. It is Parliament that will be in the driving seat."

Since January, European leaders have lined up to tell Britain it's free to change its mind. If May—or a different prime minister—were to write to European Council President Donald Tusk to say Brexit is off, the EU would welcome the country back without hesitation, they say. While the bloc continues to take the hardest line in the negotiations, officials have made clear privately that they'll agree to pause the Brexit process to allow for another referendum, and perhaps another election, according to Umunna.

Six of the 10 groups that attend Umunna's Wednesday meetings have moved into the same offices at Millbank Tower, a 10-minute walk from Parliament. Sharing space makes it easier for them to brainstorm and coordinate their campaign strategy. "We've got six months to change the game and get a people's vote on the Brexit deal," says Eloise Todd, chief executive officer of Best for Britain, one of the groups. Partly because it accepts large donations, including £400,000 from billionaire investor George Soros, Best for Britain has become a target of right-wing newspapers campaigning for the U.K. to leave the EU.

Todd reckons the press attacks backfired and fueled a surge of interest in—and donations to—her campaign. She puts the odds of engineering another referendum at "50-50." Her team has trained 2,000 activists in street campaigning techniques. They're gearing up for a massive Remain campaign to build support over the summer, believing only a new vote will have the legitimacy to halt Brexit.

The public is warming to the idea of having the final say, says James McGrory, executive director of Open Britain. With more than 500,000 supporters, his is the largest group attending Umunna's weekly meetings. "This is not a slam dunk, either with the public or Parliament," McGrory says. "People will holler and say, 'How dare you!' But what is absolutely critical is that the democratic argument is on our side."

"This is not a slam dunk, either with the public or Parliament"

But there's no clear evidence another referendum would deliver a different result. To bring about a new national vote, Umunna's alliance will need to persuade enough Conservative politicians to defy the prime minister on an issue that could topple her government. It must also persuade the Labour Party to back its cause. Corbyn doesn't support another referendum, though he hasn't ruled it out in the future.

The first task for the campaign is simply to make more noise so the public and politicians start to listen. Umunna is confident the Brexit resistance will be ready for the fight when it comes. "There is a role reversal now," he says. "We are not the Establishment anymore." —*Tim Ross and Kitty Donaldson*

THE BOTTOM LINE A coalition of anti-Brexit groups and politicians is gearing up for a campaign to force a second referendum by October on the final Brexit deal negotiated by Theresa May.

Finding Your Name On Russia's Hit List

● The nerve-gas poisoning of a former KGB agent in the U.K. has Moscow's foes spooked

It was just before 10 p.m. on Feb. 12, Boris Karpichkov's 59th birthday, when the former KGB agent got an unexpected call at his home in the U.K. It was a Russian secret service friend phoning covertly from mainland Europe to warn him of a hit list with eight names on it. Karpichkov, who'd defected to Britain in 1998, was on the list. So was Sergei Skripal, another ex-Russian double agent.

Karpichkov initially dismissed the warning—he'd faced death threats before. Three weeks later, he changed his mind. On March 4, Skripal and his daughter, Yulia, were rushed to a hospital after ▶

Russia

Battle of the Oligarchs

As Vladimir Putin settles in for a fourth term as president, two oligarchs with close connections to him are fighting for control of Siberian metals titan **Norilsk Nickel**.

The Feud

Oleg Deripaska and **Vladimir Potanin**, Norilsk's two biggest shareholders, are battling over what to do with the torrent of cash the company generates. Deripaska wants to pay out at least $2 billion annually in dividends, while Potanin favours increased spending on upgrades and expansion.

Deripaska

Emerged victorious from the violent battles over privatising the aluminum industry in the 1990s. Deripaska has made headlines for his ties to Trump's ex-campaign manager, Paul Manafort, and a sex scandal.

Potanin

Formed one of capitalist Russia's first banking empires. He befriended Putin when the future president arrived in Moscow as a midlevel official in the 1990s. The two Vladimirs still play hockey together.

Norilsk Nickel

Nornickel is one of the world's largest suppliers of the high-grade nickel that powers iPhones and Teslas, as well as palladium, platinum, and cobalt, three metals the U.S. just declared vital to national security. Its smelters and factories are spread across a part of Siberia that was home to many of Stalin's forced-labour camps. Putin has said he doesn't care how Nornickel is divvied up as long as its owners meet their commitments, particularly to a $2 billion project to clean up the decades of toxic discharges that have turned Norilsk, a city of 178,000 people, into one of the dirtiest places on Earth.

Abramovich

In 2012, Putin helped broker a truce between Deripaska and Potanin, who consented to sell some of their shares to another Putin ally and top oligarch, Roman Abramovich. Abramovich agreed to a five-year lock-up period for those shares, which expired in December. He now wants to cash out. Deripaska has filed suit in London to preserve the status quo and stop Abramovich from selling.

KIRILL KUHMAR/TASS/GETTY IMAGES; PETER MACDIARMID/GETTY IMAGES; BLOOMBERG; MIKHAIL SVETLOV/GETTY IMAGES

▲ Karpichkov

◀ collapsing in a crowded shopping mall in the sleepy cathedral city of Salisbury in southwestern England. British officials determined the two—who remain in critical condition and may never recover—were poisoned with a military-grade nerve agent in what the U.K. says is the first offensive use of a chemical weapon in Europe since World War II. A local policeman was also hospitalised, and as many as 130 other people in Salisbury may have been exposed.

The attack, which London and its allies blamed on Vladimir Putin's government, led the U.K. to expel dozens of Russian diplomats. The U.S., along with NATO and 25 other allies of the U.K., followed on March 26 and 27, kicking out about 130 Russian diplomats. Britain is facing calls to crack down on illicit Russian money. Russia, which denies responsibility in the Skripal attack, has vowed to retaliate in kind for the expulsions.

The Skripal case disturbingly echoes the 2006 death of ex-Russian spy Alexander Litvinenko, who was killed with radioactive polonium slipped into his tea in London. A week after Skripal's poisoning, a second Russian exile and Putin critic was murdered at his London home. Police are reexamining 14 suspicious deaths in the U.K., dating to 2003, of opponents of Moscow and others with links to Russia.

Karpichkov arrives for a secret meeting with *Bloomberg Businessweek* in London in a black hat and dark glasses, clearly anxious. He says he's suffering from post-traumatic stress disorder because he's living in constant fear and gets only four hours of sleep a night. He's installed closed-circuit surveillance cameras around his home at his own expense. "How long is it going to go on? Who is going to be next?" Karpichkov demands to know from the British authorities. "I can ask to be removed to Mars or to the moon. What will it change? Nothing."

While Prime Minister Theresa May scored a diplomatic coup by persuading many other nations to expel Russian diplomats, the trail of corpses raises the question: Why have British authorities been so slow to act? Billions of dollars of Russian money have rushed into the U.K. since the 1990s, but billionaire oligarchs with ties to Putin have been allowed to remain. Britain said on March 28 that it would review visas for 700 wealthy Russians. When she was minister in charge of interior affairs, May "fought like a tiger" to stop a public inquiry into the Litvinenko murder for fear of causing a total rupture with Russia, says Jeff Rooker, an opposition Labour member in the Upper House of Parliament. "London is the capital of money laundering," he says. May at the time said "international relations" were a factor in the decision not to allow a public inquiry into Litvinenko's death.

The 14 suspicious deaths have been attributed to suicides, natural causes, and accidents and not treated as murders. A British lawyer with links to Russia died in a mysterious helicopter crash in 2004. The badly decomposed body of another man, a British spy, was found in 2010 in a locked sports bag in the bathroom of his London apartment. In 2013, Boris Berezovsky, a Putin foe, was found hanged in his bathroom. In 2016 a U.K. scientist who helped detect the amount of polonium in Litvinenko's body was found dead in his kitchen from stab wounds.

Putin's spokesman, Dmitry Peskov, declined to comment on whether Russia was involved in the deaths, saying only that Moscow is ready to consider helping in the investigation if London asks. The Foreign Ministry on March 28 accused Britain of "systematically" failing to protect Russian citizens.

Mikhail Khodorkovsky, a former billionaire and Kremlin opponent who was freed after 10 years in prison and now lives in exile in London, believes there's worse to come. "A nuclear weapon has already been used, a chemical one, too, which leaves just a biological one in the arsenal, and this time no one will be able to do anything," he says.

Now living in an undisclosed U.K. location under an assumed name, Karpichkov already survived two attacks in New Zealand. After a beggar threw dust in his face in central Auckland in November 2006—a few weeks after Litvinenko was poisoned—Karpichkov lost 30 kilograms, one-third of his body weight, in two months. Four months later he fell ill again after finding mysterious amethyst-coloured crystals on the carpet in his home.

In the 1980s, Karpichkov rose to the rank of major in the KGB; he kept working for Russian intelligence in his home country of Latvia after it gained independence in 1991. He later was a CIA informant and defected to the West with boxes of secret documents. He says the British should offer him better protection. Chris Phillips, who from 2005 to 2011 headed the U.K.'s National Counter Terrorism Security Office, wants the police to

● Suspicious Demises

- Stephen Moss, 46, British lawyer, heart attack, 2003
- Stephen Curtis, 45, British lawyer, helicopter crash, 2004
- Igor Ponomarev, 41, Russian diplomat, heart attack, 2006
- Yury Golubev, 64, co-founder of Yukos Oil, heart attack, 2007
- Danny McGrory, 54, British journalist, brain hemorrhage, 2007
- Badri Patarkatsishvili, 52, Georgian businessman, heart attack, 2008
- Gareth Williams, 31, U.K. intelligence worker, found dead, 2010
- Paul Castle, 54, U.K. property tycoon, jumped under train, 2010
- Robert Curtis, 47, U.K. property tycoon, jumped under train, 2012
- Alexander Perepilichnyy, 44, Russian whistleblower, heart attack, 2012
- Boris Berezovsky, 67, ex-Russian oligarch, found hanged in his bathroom, 2013
- Johnny Elichaoff, 55, U.K. businessman, fell from shopping centre car park roof, 2014
- Scot Young, 52, U.K. property tycoon, fell onto railings, 2014
- Matthew Puncher, 46, U.K. radiation expert, stabbed to death, 2016

CHRIS RATCLIFFE/BLOOMBERG

ensure Karpichkov's safety. He says of the hit list given to the ex-spy, "I would certainly be concerned if I were them."

On the list are several other Russian defectors, as well as Bill Browder, a U.S.-born British financier who's become public enemy No. 1 for Russia's government since he started campaigning for sanctions against Russian officials over the death of Sergei Magnitsky, the tax lawyer for Browder's Hermitage Capital Management Ltd. investment fund. Magnitsky died in a Moscow prison in 2009 after uncovering an alleged $230 million tax fraud. Three years later, a Russian whistleblower who provided information to Swiss authorities about the same fraud died near his U.K. home. In one of the 14 suspicious deaths, he collapsed while jogging after ingesting a rare toxic Chinese plant that triggers cardiac arrest.

"My life has been at risk for years," says Browder, whose London office is accessible only to people escorted by security. He called for action to rein in illegal Russian money flows from corrupt officials and oligarchs into the U.K. The Skripal attack should be a "wake-up call for Britain," Browder says.

Complicating the task of the British police are the close links between organised crime and the Russian intelligence agencies. Five Berezovsky business associates died in mysterious circumstances from 2008 to 2014, one suffering a heart attack, two jumping under subway trains, one falling off the roof of a department store, and the last plunging to his death from an apartment to be impaled on railings.

Russian secret services can use all kinds of drugs to stage murders that don't appear to be homicides, according to former counterterrorism chief Phillips. "Any trained assassin knows there is more than one way to kill someone," he says.

Marina Litvinenko, the widow of the dead spy, who succeeded only after a lengthy legal battle to get a public inquiry that pointed the finger at Putin for the assassination, also urges a crackdown on dirty Russian money. "Do you want another incident like this? Or do you want British citizens to decide that their government can't protect them?" she asks.

Karpichkov, who was trained as a KGB assassin though he says he never killed, echoes that sentiment. "If it was me tasked to take someone out in this country, it is doable—not only in the United Kingdom, basically anywhere in the world," he says, before pulling on his hat and sunglasses and vanishing. *—Kitty Donaldson, Henry Meyer, and Irina Reznik, with Stepan Kravchenko*

THE BOTTOM LINE A defector says Skripal, the ex-spy who's in critical condition in the U.K. after being poisoned, won't be the last victim of Russian foul play—and that he may be next.

Budget Smoke and Mirrors

There's less than meets the eye to some of the victories Republicans and Democrats have claimed after passing the $1.3 trillion omnibus spending bill. —*Sahil Kapur*

The Border Wall

What they say	What the bill says
Republicans: The measure makes a down payment on President Trump's promised southern border wall, to the tune of $1.6 billion in funding.	Reality: Some of the money in the bill may be used for planning the development of a wall. But the law limits any construction of a physical barrier to fencing and levees.

Gateway Tunnel Project

Northeastern lawmakers: Amtrak funding of $540 million could be used for the tunnel connecting New York and New Jersey, along with $2.9 billion in grant money the project could bid on.	Reality: No money is specifically earmarked for Gateway, which Trump opposes, and the $2.9 billion is subject to approval by the Department of Transportation.

Gun Control

Proponents such as Republican Senator John Cornyn of Texas: By adding the Fix NICS Act to the spending bill, Congress took a rare step to combat gun violence.	Reality: The act makes no changes to gun laws; it merely gives agencies an incentive to comply with existing rules and report information to the background-check system.

"You want to make these win-win situations where everybody can talk about what they got and not how they got screwed."
—*Tom Davis, former Republican congressman from Virginia*

ILLUSTRATION BY TOMI UM

Suhail Al Mazrouei

Minister of Energy and Industry, UAE

"The issue is we need to invest trillions of dollars in this industry otherwise we will have a problem down the road. This is the bottom line and we are not seeing that level of investment yet."

The UAE government's minister of energy and industry tells *Bloomberg Businessweek Middle East* Editor Roger Field about all things energy, and why water security is the issue that keeps him awake at night.

The UAE has invested heavily in solar in the past couple of years and has an ambitious target to produce 50% of its energy using clean sources. How are the plans progressing?

We used to be almost 100% reliant on fossil fuels and I think the whole world today relies on fossil fuels for about 80% [of energy production] if you take everything. But there is a requirement, a demand and a logic to balancing the energy equation, and the diversification of our energy resources is going to lead us to around 50% fossil and 50% clean energy. The level of investment that we attracted in renewable energy has managed to reduce the price significantly from where we were a few years back to where we are today. In March we announced the 700 megawatt CSP project in Dubai and that alone is worth $3.8 billion. Last year Abu Dhabi announced $872 million [of solar projects] and this is just the beginning. If we put everything together we are at around 2.7 gigawatts of 45 gigawatts that we are aspiring for. So we are just at the beginning and much more is needed and much more is going to come to the financial world to be financed.

It's logical, it does make sense economically and I think the whole region has the potential to export solar. Whoever is going to install first will have the advantage to penetrate markets and offer prices that are cheaper, at least when it's available to the PV, than any other form of energy.

Do you envisage a time when solar energy is exported around the region?

There is a potential, but you need a network first. There is the GCC network; we are connected from Oman to Kuwait. We can exchange 1,000 megawatts reliably today. We are using that primarily for emergencies but we have seen some trade deals happening in the past few years. The potential once you have more energy, and cheaper forms of energy, is that it will allow much more trade. I was in Jordan yesterday [April 2] and talked about interlinking with Jordan. ▶


YEAR OF ZAYED

◄ Are there definite plans for a pan-regional grid?

It depends on the objective. If the objective is just interlinkage then it's an additional cost, and who is going to pay for it? But I think there is a rationale now, if we look at Saudi Arabia's 2030 Vision. The amount of energy that Saudi Arabia is going to install and the amount of energy that the whole GCC is going to have means there will be a potential to look at it not in the form of improving the reliability of the grid but rather in a form of exchanging power and making it make sense. There is a GCC committee to discuss this.

The network is expanding and I think what we need is more solar in order to be able to exchange energy when needed. It is something for the longer term; once we have those 40 gigawatts or more of solar PV I think that is the time when the UAE can and will be able to export.

The UAE is targeting 50% clean energy by 2050. In light of falling costs of solar, is there an opportunity to revise this up?

I see a potential to revise it. We said we would revise it in five years. Dubai has announced that they alone are targeting 42 gigawatts and yet we put the target for the whole country at 44 gigawatts by 2050. If Dubai is targeting 42 gigawatts that will increase the contribution from solar. Every five years we look at the prices. There is a healthy competition today among the different sources of energy, whether they are baseload or not. It's important not to mix the baseload with the intermittent. The intermittent load is there only 20% of the day and we cannot compare that with something like nuclear, which delivers 24 hours a day and that will remain for 60 years.

The target is to reduce C02 emissions by 70% and that is what everyone needs to keep in mind. The target is to make our cities more liveable and make the UAE one of the most environmentally clean countries in the world. We are not just bidding our future on the affordability or the economics. We believe that the challenge for the future is going to be whether you can make the inhabitant happy in a city, and that is going to be the challenge of our children and grandchildren. Any government that does not put that into the equation will not be developing the right energy mix for their future.

We've seen battery technology develop rapidly and a lot of talk about the use of batteries for utility scale energy storage. Do you see the potential to use batteries in this way in the UAE?

Batteries are just one way of storing energy. Storage of energy takes different shapes for different forms. In Dubai for example they have selected hydro – using solar energy to raise water in one of the dams and then use the natural fall of water to generate electricity at night – and that is one form of storing energy. Today CSP (concentrated solar power) offers a type of storage as it gives you 16-17 hours of energy instead of about eight hours from PV. But the ultimate question to the consumer or to whoever is purchasing that energy is how much it costs per kilowatt hour including storage.

The world is rallying towards cleaner forms of energy. Fossil fuels in the future are going to be much cleaner than they are today. I don't think we can spare any form of energy with the demand we see in the world. Forget the idea that one form is going to be eliminated. They told us that 30 years ago when all forms of fossil fuel were around 80% of the world's energy mix. They told us things will change, but 30 years after that we are still at 80%. Yes coal decreased and gas increased significantly but it's still fossil, so the cleaner forms of energy will increase and they will also find ways of making coal much cleaner. CCS (carbon capture and storage) is another way of making energy sources cleaner and we have this technology in the UAE.

The UAE is developing four nuclear reactors. Are you happy with progress?

First of all we need to remember that this is the fastest ever programme in the history of mankind. No one has delivered nuclear energy from concept to delivering 98-99% of the project in just over 10 years. I don't think any forecasted delay is due to the mechanical part of the project. We need to allow and give the independent regulator full-fledged decision-making to say when it will start. That is the competency and professionalism that the UAE has demonstrated. So FANR [Federal Authority for Nuclear Regulation] is going to decide that date and we are working with them. ENEC [Emirates Nuclear Energy Corporation] and its companies will announce the exact date, but that depends on operational readiness and the safety of the workers. We will deliver a project that is going to be world class, safe and will operate in a way that makes everyone working around it and in the region happy. It's the first reactor so we need to be extra assured. Our expectation is that the second and third reactors will progress much faster.

Looking at oil, how is the challenge of the current oil price and the threat from shale?

Oil is a unique commodity and it is sensitive to everything around it. There are people who say that if the oil prices were lower the world economy would increase, but that is not true. When the oil price went below $40 we saw a slowdown in world economic growth and when OPEC did their historical deal and stepped up to the challenge in 2017 we saw a recovery in the world economy. We are seeing it this year and we are all benefitting from it, so what is the right price? We are actually not concerned about the price; we are concerned about the market balance and that is when we have enough investment to ensure that we have a reliable supply in the future, but at the same time we have enough demand, so the price balance is when you achieve those.

We are continuing the correction process that we started in 2017 and we have moved more than 85% of the problem, which was the oversupply. We still have 10-15% to be taken. We will meet in June, OPEC and non-OPEC producers, and we will look at the market and look at what we need to do. We think the unexpected increase in the shale oil – which is under monitoring – will decide how much overhang exists above the five years' average we need to remove. That will be decided when we meet.

We are happy with the compliance rate. The price this year, if we take the average till now, is significantly above the average price of last year. That has incentivised the shale oil producers to produce more. But the issue is we need to invest trillions of dollars in this industry otherwise we will have a problem down the road. This is the bottom line and we are not seeing that level of investment yet.

Do you expect the cuts to go into 2019? What's your gut feeling?

The truth is no one knows until we meet and discuss the facts. We will meet in June and discuss the facts but the deal is for the whole year. So what are we going to do at the end of the year when we meet? I think that is going to be a decision for the whole group. My gut feeling is that if you have worked very hard for a couple of years to deliver that balance – and let's assume you achieve it – you are not just going to leave it and say 'I don't care any more'. The level of responsibility we have seen from all of the 24 members has assured us of the concern about the market balance and I am sure they will take the right decision to ensure we sustain that balance for longer.

Are there any new oil projects coming up in the next 12-18 months?

We have a very interesting conference and discussion in May coordinated by ADNOC and the objective of that is to achieve or to work with all stakeholders on the downstream petrochemicals. It will look at how ADNOC can double its refining capacity and triple its petrochemical capacity and I think that is an event to watch.

Other than that we have announced at the Supreme Petroleum Council around $109 billion of projects that are happening in the next five years and I think if you add that to what Saudi Arabia and Kuwait has done or announced, between the three countries there would be $320-350 billion in terms of projects, if not more.

Bahrain recently announced the discovery of huge shale reserves. Do you see potential for shale in the UAE?

Definitely all of the GCC countries have enormous reserves of shale as they have reservoirs. I think the potential for shale oil in the UAE and the region is enormous but it's about timing. First you finish the cheaper and the more reasonable-to-produce hydrocarbons and then you go to the shale. You don't do it the other way around. For us shale gas is of more interest as we are a net importer of gas. We would like to balance that equation through incentivising more investments in gas. This could give the UAE enough to satisfy our demand and even have some to export. As energy and industry minister, I would like to have more gas coming to the system to ensure that the electricity sector is well supplied.

Is that investment going on now?

Yes we are working with ADNOC and gas is becoming a priority. We are working to have reasonable gas prices to attract upstream work but I think there is, with the technology improvements, potential to achieve that.

The UAE is not always seen as the most energy efficient country. Are you keen to see greater emphasis on energy saving?

Yes, and it's at the heart of our energy strategy. We need to reduce the demand by around 40% by 2050. How can we do that? We are working in three areas: One is the standards of the new buildings; they need to be much more efficient than the buildings we are living in today and everyone now is working to achieve that. If you talk about including solar panels on buildings, then future buildings will not only conserve energy but also produce energy, and we are putting standards on that. Second is the retrofits; we need to retrofit some of the existing buildings. I recently asked FEWA, the Federal Electricity & Water Authority, to take 100 houses and do an energy audit on them and come up with a plan of how much it will cost economically if you introduce retrofits in a villa and how much money can be saved. In the UAE the lowest tariff is paid by nationals,

> "Today we burn gas to desalinate; economically and environmentally it does not make sense and we have to refrain from doing that and move to reverse osmosis or the other newer technologies such as forward osmosis."

which is 2 cents, but even at this rate you recover all of that expenditure from the saving in less than six years. So at the real cost of electricity you are talking about less than three years to recover your investment.

The third thing we are working on is behaviour and this is also linked to the tariffs that people pay and the slab system that we have. I am confident that that people will make the right choices, and whether they are nationals or expats we include them in all of those messages. We hope that the three areas will make the UAE one of the leading examples in reducing energy demand.

As Minister of Energy and Industry, what keeps you awake at night?

Water. I think the biggest issue and threat in the longer term is water security. We have produced a strategy on water but I think we need to do much, much more. We need to reduce our consumption of water. It's ridiculous what we consume here. In Jordan they use a fraction of what everyone uses here. Water is going to be the top priority for every country that doesn't have rivers. Even those that have rivers also have issues with water. We took a challenge a few years back to try to look at the overall system. The strategy calls for three things: One, we need to decouple power generation from desalination. Today we burn gas to desalinate; economically and environmentally it does not make sense and we have to refrain from doing that and move to reverse osmosis or the other newer technologies such as forward osmosis.

Second, we need to stop taking any water from the aquifer. We need to keep any droplets of water from rain in the ground because that is for generations to come. It does not make sense that we use it for agriculture, so we need to find a reasonable replacement. We are working now on using treated water for farms and in the streets rather than using desalinated water. Third, we are introducing efficiencies and ways to reduce the amount of water that we use. Ⓑ

Volkswagen's Peace Offering

By Matthew Campbell, Christoph Rauwald, and Chris Reiter
Photograph by Travis Rathbone

Can the German giant atone for its diesel scam by becoming the electric car maker of the future?

As the world's largest automaker, Volkswagen in some ways better resembles an army or a country than a mere corporation. Its flagship factory in Wolfsburg, Germany—a city built from scratch by the Nazis for the express purpose of manufacturing vast numbers of automobiles—spreads over an expanse the size of Monaco and produces more than 3,000 vehicles every day. It is electrified by not one but two Volkswagen coal plants. It is fed by a 3,400-person Volkswagen catering brigade and a sausage-making operation so comprehensive it sells to supermarkets. Here and at more than 100 other factories worldwide, the company's 12 brands make 355 models in millions of colour and trim combinations, employing more than 600,000 people who generate $284 billion in annual revenue.

It's hard to imagine that such a robust corporate edifice could ever be at risk of collapse, as it was less than three years ago, when Volkswagen AG was consumed by one of the largest scandals in automotive history. The revelation of a systematic effort to cheat on emissions tests—employees wrote software that made diesel cars appear cleaner than they were—brought the company to its knees, ended the career of its longstanding chief executive officer, and shattered a 70-year reputation for engineering-led competence. For a time it looked like Volkswagen might not survive, at least not recognisably, a prospect so alarming in Germany that Chancellor Angela Merkel stepped in to do damage control for what is arguably the country's most important industrial giant.

And yet today—$30 billion in compensation and repair costs and 11 million affected vehicles later—Volkswagen is, improbably, back on the offensive. Last year the Volkswagen portfolio of brands—including Audi, Porsche, and Bentley—comfortably defended its global sales crown from a challenge by archrival Toyota, in large part because revenue is soaring in China. Volkswagen's profits, and shares, have largely recovered to pre-catastrophe levels. It's even growing again in the U.S., a market its namesake brand considered abandoning. Consumers' willingness to forgive Volkswagen is remarkable, given the enormity of its wrongdoing: Scientists at the Massachusetts Institute of Technology estimated the extra pollution generated by its rigged cars will eventually contribute to more than 1,200 premature deaths.

Emboldened by this unexpectedly rapid rehabilitation, CEO Matthias Müller, 64—a Volkswagen lifer who received a battlefield promotion from running Porsche when the crisis claimed his predecessor—is attempting to reimagine the company for the electric vehicle age. Volkswagen late last year embarked on by far the largest program of electrification in the global car industry, pledging to spend €20 billion ($25 billion) to develop battery-powered or hybrid variants of every one of its models by 2030. Müller's goal is to make EVs, currently concentrated at the high end of the market, cheap and commonplace, inspired by Volkswagen's own 1960s Beetle, which was instrumental in bringing mass-market driving to postwar Europe.

Transformation won't come easily to Volkswagen. It's fighting thousands of investor and customer lawsuits that will keep it in court well into the 2020s, and criminal probes into some aspects of the diesel fiasco are still active. Its powerful unions have a de facto veto over any major strategic change and have long resisted efforts to reform a sprawling, costly corporate structure. And as the entire automotive world faces an unprecedented threat—the rapid shift of a car from something consumers buy to a service they order on demand, probably with no driver involved—Volkswagen's insular culture will make adapting to new ways of selling mobility a huge challenge.

The company is nonetheless in a much better position than was imaginable not long ago. Its leaders are even daring to suggest that the diesel crisis may ultimately prove to have been a good thing, at least from their perspective: a trauma that forced Volkswagen to ask hard questions about its operations and strategy and what a carmaker will need to look like to survive the 21st century.

The crisis was "an unmistakable wake-up call—a warning that things couldn't stay the way they were," Müller said in Berlin in March. "It told us there was a need for radical change," he continued, "change that would have previously been unthinkable or, at the very least, impossible to implement."

On Sept. 20, 2015—just after the U.S. Environmental Protection Agency accused Volkswagen of rigging software to make cars that generated 10 to 40 times the legal levels of smog-causing nitrogen oxide appear compliant with the rules—its top executives gathered for an emergency meeting in Wolfsburg. Virtually everyone present was male and German, most of them engineers or scientists by training—not an ideal team to handle a dramatic public-relations crisis playing out primarily across the Atlantic.

As one of its first decisions, the group dispatched then-CEO Martin Winterkorn to record a two-minute apology video. It was a disaster. Standing in front of a white background in a Wolfsburg studio and speaking in stiff, staccato German, an ashen Winterkorn said he still didn't know the full extent of what had happened, but described the cheating as a result of "terrible mistakes made by only a few." The strained tone and clunky production brought to mind a kidnapping victim's forced appearance in a ransom video, rather than a commanding corporate leader demonstrating control of the situation.

Things only got worse. The U.S. Department of Justice began laying the groundwork for criminal charges against some staff, and authorities in France, Canada, Germany, and South Korea began their own inquiries. Within a few days of the EPA going public, Volkswagen shares lost a third of their value. Winterkorn's attempts to blame the cheating on a few bad apples were widely ridiculed. A 30-year Volkswagen veteran with a doctorate in metallurgy, he was notorious for scrutinising the tiniest production details—chastising underlings when he deemed chrome parts inconsistently shiny or gaps between metal panels too large. After Winterkorn bowed to investor pressure and resigned in late September, Volkswagen's board emerged from a seven-hour meeting to

“You would have wondered a year ago to what extent Volkswagen was going to follow through on their headlines, but it’s really happening, and they’re serious”

CEO Müller

Chairman Pötsch

name Müller as his successor. (It later appointed a new chairman, Hans Dieter Pötsch.)

For Müller, it was a move from perhaps the best job in autos to the worst. He’d spent the previous five years as CEO of Porsche, delivering considerable profits and cultivating a reputation for cheerful informality—at least by the standards of German automotive executives—with stunts such as joining the Porsche pit crew at Le Mans, ditching his usual suit for a mechanic’s outfit. In his new job, he adopted a graver tone: “This crisis,” he told a tense gathering of workers in a hangar-size Wolfsburg production hall shortly after taking charge, “is about the very core of our company and our identity.” Volkswagen, he said later, was in for “a painful process.”

The beginning of Müller’s tenure easily lived up to that warning. He didn’t seem prepared for scrutiny; the German press lambasted him for turning up at a black-tie ball in Leipzig and an auto race in Bahrain as the crisis deepened. Meanwhile, the list of models alleged to have used rigged software kept expanding, eventually including Porsches—undermining Müller’s untainted image. In January 2016 he told an incredulous U.S. radio interviewer that the software spoofing was a “technical problem” and that Volkswagen hadn’t lied about its cars—hardly indicative of a grasp of the gravity of the situation. Not long afterward, the company took the extraordinary step of delaying its scheduled earnings release, an ominous sign that it didn’t have a handle on the damage. Industry analysts’ estimates of the final bill to recall rigged cars, compensate buyers, and pay fines ranged as high as $80 billion, significantly more than Volkswagen’s market capitalisation. Some predicted that a breakup of the group, with units put on the block in a fire sale to pay that bill, was a probable outcome.

Volkswagen, however, caught some very lucky breaks. In the U.S. it had the good fortune to be in trouble after previous megascandals, including BP Plc’s 2010 oil spill, had helped create an infrastructure for consolidating the claims of state and federal regulators, along with the bulk of customer lawsuits, into a single legal proceeding. That process, which was partly overseen by former FBI Director Robert Mueller—then working in private practice as a sort of unimpeachable referee for hire—allowed its U.S. outlay, while enormous, to become something of a fixed quantity relatively quickly. That meant executives could begin to plan for their ultimate exposure. (The main settlement cost Volkswagen $14.7 billion.) The company also benefited from a judge—Charles Breyer, of the U.S. District Court in Northern California—who guided the legal proceedings in an uncommonly efficient manner. Another advantage: the media spotlight rapidly shifted to a more sensational story than sneaky firmware, namely the presidential campaign of Donald Trump.

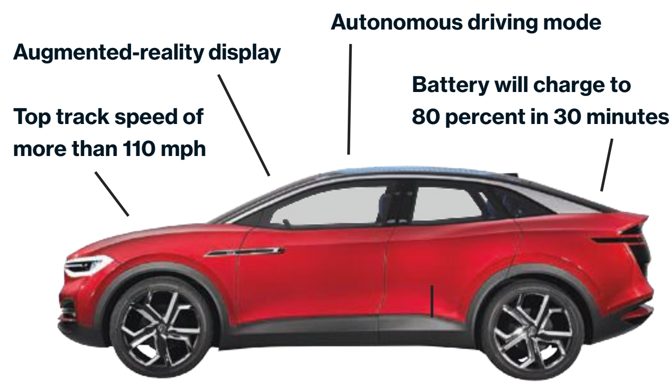
Volkswagen was also fortunate that the vast majority of the affected cars were sold in Europe, where rules on nitrogen oxide emissions, unlike those for carbon, are less stringent than in the U.S. European Union rules stipulate that the decisions of an automaker’s home-country regulator typically prevail across the 28-nation bloc, and in Germany, Merkel’s administration ruled that Volkswagen could simply modify the vehicles, instead of forcing it to offer the buybacks and compensation that were required in the U.S. As a result, Volkswagen is now coming to the end of a process to repair about 8 million European cars, mainly with inexpensive software upgrades that brought their emissions into compliance with the rules.

The scale of the crisis at Volkswagen nonetheless provided an opportunity for Müller and his team to eliminate some costly sacred cows. One of the first was the Phaeton, ▶

LINO MIRGELER/PICTURE-ALLIANCE/DPA/AP PHOTO

"It told us there was a need for radical change, change that would have previously been unthinkable or, at the very least, impossible to implement"

The SUV I.D. Crozz is one of three concept electric vehicles VW has slated for release in 2020. Planned features include:



◀ an ungainly luxury sedan beloved by former Chairman Ferdinand Piëch and seemingly no one else. Priced at almost €90,000 and assembled by hand in a factory with hardwood floors and glassed-in viewing stations for the public, the Phaeton represented a bizarre bet that high-end buyers would prefer an over-engineered Volkswagen to a BMW, Mercedes, or, for that matter, an Audi. Just 4,000 were made in the year before the model was killed off.

Müller handed over the Wolfsburg building that housed the Phaeton's engineering team to a new unit charged with rapidly developing EVs. He also began work on a new deal with Volkswagen's unions. Previously, they'd helped ensure that Volkswagen employed two-thirds more staff than Toyota Motor Corp. to produce roughly the same number of cars. Volkswagen's vehicles have far more components produced in-house than competitors' cars do: Items from seats to transmission parts are made internally, largely by well-paid German workers. The unions and Müller ultimately agreed to a 30,000-person reduction in Volkswagen's workforce. Out also went an events budget lavish even by the standards of the publicity-focused auto industry. Before the crisis, Volkswagen had routinely booked the likes of Justin Timberlake to appear at product launches; nowadays the music pumped in is recorded.

Moving Volkswagen into the future, rather than just past the immediate effects of the emissions scandal, would require more dramatic change. Diesel was at the core of Winterkorn's strategy, billed as sportier and better for the environment than gasoline. With "diesel" suddenly synonymous with "fraud" for many customers, Müller needed a different approach. He unveiled it at an event in Paris in September 2016: the I.D., a battery-powered hatchback with a range considerably longer than Tesla Inc.'s lowest-priced vehicle and intended to bring electric propulsion to the masses. The car, Müller said, was a symbol of "a new Volkswagen"—one that might still be apologising, repeatedly, but was ready to move forward, too.

While every automaker is pushing into EVs, levels of ambition vary widely. The Asian giants—Toyota and Hyundai Motor Co.—are betting on exotic technologies such as fuel cells while also investing in hybrids. U.S. automakers, on the whole, are moving slowly because of their home market's reluctance to reckon with climate change. None is committing nearly as much capital as Müller's Volkswagen. The company's goal is for EVs to account for as much as 25 percent of global sales by 2025—when they will still represent just a small fraction of worldwide demand. The Paris event kicked off 18 months of increasingly ambitious pronouncements on Volkswagen's EV plans, from a €10 billion pledge to develop new models in China to a €20 billion deal announced in March to secure battery deliveries through the early 2020s, part of a total of €50 billion earmarked for battery purchases. Such big spending is made possible, in part, by Volkswagen's unusual shareholding structure. The state of Lower Saxony, where Wolfsburg is located, owns 20 percent of the voting rights, and can almost always be counted on to support job-preserving expansion.

Volkswagen is "absolutely more ambitious on EVs than the other global giants," says Max Warburton, an automotive analyst at Bernstein Research in London. "You would have wondered a year ago to what extent Volkswagen was going to follow through on their headlines, but it's really happening, and they're serious."

Early on a Tuesday morning in February, a team of investigators from the Munich prosecutor's office arrived unannounced at Audi's headquarters in Ingolstadt, just outside the Bavarian capital—a hulking, glassy office block inscribed with the luxury brand's slogan, "*Vorsprung durch Technik*," or "Progress through technology."

Employees stood aside as the investigators fanned out, boxing up documents and pulling hard drives. The Audi staffers knew the drill: The raid was the second at the HQ in less than a year and followed searches of a half-dozen executives' homes a week earlier, part of an ongoing German inquiry into the unit's role in the diesel scandal. The investigation is distinct from probes into Volkswagen as a whole and is focused on whether Audi had its own software-based diesel-rigging program and could lead to criminal fraud charges.

Audi, which contributes more to Volkswagen's profit than any other brand, has been roiled by the investigation. One senior manager, who asked not to be identified discussing the internal mood, said workers are exhausted by the one-thing-after-another drumbeat of bad news. A certain gallows humour prevails across the Volkswagen group; some employees have taken to joking, when praised for doing a good job, "Yeah, well, I just modified my software."

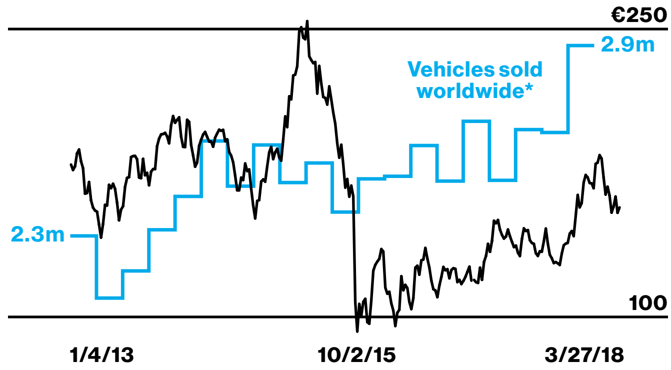
For Müller and his team, the Ingolstadt raid was an unpleasant reminder that the diesel scandal will have quite a long tail. BP provides a cautionary example. The oil producer is still paying for the Deepwater Horizon spill almost eight years on, and in January it announced a further $1.7 billion hit, bringing the total bill to about $65 billion. More than €9 billion in legal claims are outstanding against Volkswagen, including suits from investors who argue it disclosed the rigging program too late.

As it tries to limit the pain from those cases, Volkswagen must navigate another major challenge: persuading consumers to buy diesel cars again. Even with aggressive development, it will take another half-decade or more for EVs to be consistently profitable, especially at the lower end of the market—batteries are still simply too expensive. One example: An electric Volkswagen Golf starts at more than $30,000 in the U.S., compared with $21,000 for the conventional model.

Until prices come down, Volkswagen and other German carmakers need to keep selling diesels, which produce less carbon than comparable gasoline cars, to meet EU emissions requirements while still making money. With billions in capital investments sunk into diesel, "they don't want to have the transition happen too quickly and disruptively," says Stefano Aversa, a managing director at corporate advisory firm AlixPartners LLP.

For Volkswagen, this means trying to pull off a tricky two-step. It must sell consumers and investors on a shimmering electric future, while also restoring their faith in old-fashioned diesel—a technology that Müller, with exquisite Teutonic awkwardness, praises as "a very comfortable drive concept"—in the here and now. Current evidence suggests it's not working. Diesel cars currently account for about a third of sales in Germany, down from half before the cheating crisis. Many German cities have considered barring from their downtowns some older diesel engines, which can contribute far more to smog than gasoline counterparts. In Germany the issue has great political import;

VW's Share Price Plummeted. Sales Didn't



*QUARTERLY. DATA: COMPILED BY BLOOMBERG

Merkel convened two "diesel summits" last year with car-industry bosses and municipal leaders, at which she tried to come up with compromises to head off urban bans that would devastate German automakers.

Volkswagen in the meantime is trying to prepare for the future as best it can. At the Geneva International Motor Show in early March, Müller took the stage to unveil the I.D. Vizzion, an electric sedan that will be on sale from 2022. (It will follow the release of an SUV called the I.D. Crozz; apparently, nonstandard orthography will be another defining feature of 21st century cars.) From next year, the company plans to release a new EV or hybrid model every month. It's also investing in so-called mobility services through Moia, a new unit that will begin offering ride-sharing in Germany this year with a fleet of Volkswagen-built electric shuttles.

Yet as impressive as Volkswagen's recent performance may be, its ultimate success is uncertain and fragile. Until recently, access to natural light at its offices was determined by seniority; a company that hierarchical is an unlikely candidate to out-innovate Silicon Valley in data science and mobility services.

And its leaders still live in fear of the catastrophic damage that could result from another scandal, whether from fresh malfeasance or skeletons from its precision-machined closets. They had a taste in January, when reports surfaced of a series of tests, funded by Volkswagen and other German carmakers, measuring the effects of diesel exhaust on monkeys sealed in an airtight chamber. The experiments would have provoked outrage anywhere, but were especially horrifying in Germany, for obvious historical reasons. (Volkswagen condemned the testing and suspended an executive who had been aware of it.)

Müller, who's become noticeably less relaxed and approachable since leaving his job at Porsche, sometimes appears haunted by the responsibility of keeping Germany's industrial crown jewel clear of another disaster. At an all-hands meeting of managers in mid-March, he showed colleagues a bracelet he wears every day as a symbol of his stated priorities, a leather band engraved with the phrase "trust and honesty." Words to live by, certainly—and a reminder that despite its unexpected success, Volkswagen still has a long way to go to rebuild. Ⓑ
—With Elisabeth Behrmann and Dimitra Kessenides

COURTESY VOLKSWAGEN

‘Business as Usual’

Prince Alwaleed bin Talal, one of the world's richest men, speaks about his detention by the Saudi government

By Erik Schatzker
Photographs by Guy Martin

Prince Alwaleed bin Talal has taken a few knocks en route to becoming the richest investor in the Middle East and one of Saudi Arabia's most recognisable faces. In the 1980s, he went broke. In 2008, during the financial crisis, he lost billions of dollars on Citigroup. But nothing compares to the humiliation he sustained over the past few months. Last November, Alwaleed's uncle, King Salman, and his cousin, Crown Prince Mohammed bin Salman, engineered a government roundup of alleged fraudsters, embezzlers, and money launderers that landed Alwaleed in Riyadh's now-infamous Ritz-Carlton hotel. He didn't leave for 83 days.

I saw Alwaleed in late October, the week before he became a prisoner of the state. We spent an evening at his desert camp chatting about the financial markets and U.S. politics, watching a soccer match on TV, taking a walk through the sands, and eating a late dinner in the cool midnight air. Seven weeks after his release, in mid-March, I returned to the kingdom. Alwaleed had decided to break his silence and grant me an interview on Bloomberg Television.

We met informally the day before the interview at his palace in Riyadh. As I waited in the foyer, the prince descended the grand staircase from the second floor. He was dressed casually in a beige *thobe*, brown wool sports jacket, and sandals, and he struck me as relaxed. Over the next two hours, between sips of Arabic coffee and ginger tea, while his five granddaughters sang and danced to Katy Perry's *Hot n Cold* in the palace gym, he recounted his ordeal.

In the early hours of Nov. 4, Alwaleed, at his desert camp for the weekend, received a phone call summoning him to the royal court. Soon government officials were leaking the sensational details of an anticorruption purge, with news reports pinpointing Alwaleed as the most prominent among hundreds of tycoons, government ministers, and other princes who were being detained at the Ritz-Carlton. Shares of his main company, Kingdom Holding Co., plummeted 21 percent in three days.

Alwaleed was quite the prize for a government eager to show its people that ▶

no Saudi was exempt from an ongoing crackdown on freeloading and graft: His fortune of $17.1 billion places him 65th on the Bloomberg Billionaires Index. And his international profile—forged through friendships and business partnerships with the likes of Bill Gates and Rupert Murdoch—rivals that of Prince Mohammed. Kingdom Holding's portfolio includes Four Seasons Hotels & Resorts, Citigroup, Euro Disney, and Twitter. Rotana Group, which he controls separately, is the Arab world's largest entertainment company.

The government offered detainees a stark choice: pay up, sign an admission of guilt, and walk free—or refuse and languish. According to a *Wall Street Journal* report, the price for Alwaleed's release was $6 billion. Negotiations were held in secret, and the government never disclosed any charges or produced any evidence. Critics said due process was being denied and accused Prince Mohammed of conducting an intimidation campaign or simply a shakedown under the guise of fighting corruption.

Rumours of mistreatment at the Ritz-Carlton began to swirl, finding their way into regional news media. So when the prince, still at the hotel, surfaced in a smartphone video in late January, after more than 2½ months of confinement, appearing underfed and haggard, the speculation only intensified. He said he was being treated decently.

Since his release, hours after the video was shot, Alwaleed has regained some weight, and he seems as energetic, intense, and engaged as ever. But in conversation it's clear he's struggling mightily with the experience. Even if he's innocent—and he insists he is—the government lumped him in with a group it cast largely as a bunch of crooks. And to complain about that or otherwise fall out of line is to invite a wrath he's witnessed all too closely.

We recorded the interview on a makeshift set in Alwaleed's apartment on the 67th floor of Riyadh's Kingdom Tower. Walking in, I wondered how candid he could be. Would he be forthcoming about life inside the Ritz-Carlton?

The following is an excerpted version of our conversation, lightly edited for clarity.

Starting with the obvious: Why

Alwaleed's detention was more mysterious than most. Of all the princes who were brought in, he alone hadn't served in the Saudi government. And unlike other businessmen, he wasn't a government contractor and so couldn't have overbilled the state. He made most of his wealth transparently, in real estate and as an investor in public markets.

Why were you arrested in the first place?

Well, I would not use the word "arrested," because we were invited to the king's house and then asked to go to the Ritz-Carlton. So it was done with honor and dignity, and our prestige was maintained. Not only me; everybody else.

So the word "arrest" is fair to use for those who did commit a crime, admit their guilt?

Exactly. And reached a settlement with the government. But in my case, you know, it's very much different.

So were there never any charges? Were you ever accused of anything?

There were no charges. Because I have a fiduciary responsibility to my shareholders in Kingdom Holding, to my friends in Saudi Arabia, and to the world community, because we have international investments all over the place, it's very important to say that there was zero accusation and zero guilt.

You've described the whole ordeal as a misunderstanding. A misunderstanding over what?

When I say misunderstanding, it's because I believe I shouldn't have been there. Now that I've left, I would say that I've been vindicated. Yet I have to acknowledge to you, for the first time, that yes, we do have with the government a confirmed understanding, going forward.

What does that mean?

It is very confidential. I cannot get into that. But there is a confirmed understanding between the kingdom of Saudi Arabia and me personally.

Does that require you to do certain things?

Not necessarily. I cannot get into that, because it is confidential and secret between me and the government. But rest assured that this does not really handcuff me.

What did the government want from you?

I will not get into the discussions that took place between me and representatives of the government.

They must have wanted something.

I read what was written, that they wanted a chunk of A or B or C of what I have. This was all rumors.

According to one report, it was $6 billion.

I read $6 billion, I read more than that and less than that.

Did it cost you anything to leave? Did you have to pay the government any money, did you have to hand over any land, did you have to surrender any shares?

When I say it's a confidential and secret agreement, an arrangement based on a confirmed understanding between me and the government of Saudi Arabia, you have to respect that.

I'm a Saudi citizen. But I'm also a member of the royal family. The king is my uncle. Mohammed bin Salman is my cousin. So my interest is in maintaining the relationship between us and keeping it unscratched.

You maintain your innocence. You say you didn't sign a settlement

"I would not use the word 'arrested'"

"I've forgotten and forgiven the whole process completely. It's behind me"

acknowledging guilt and that you're different.

We signed something, yes, a confirmed understanding. Some others may call it a settlement. I don't call it a settlement, because settlement to me is an acknowledgment you've done something wrong.

You realise, of course, how important it is to be candid and honest with me about this, because the circle of knowledge is too wide. If a different story emerges, your credibility will suffer.

Sure.

So everything you've told me is 100 percent true?

I have a confirmed understanding with the government, and it's ongoing. I'll elaborate on that: It's an ongoing process with the government.

The matter of Alwaleed's reputation

Already, Kingdom Holding is talking to lenders about getting as much as $2 billion in debt financing–"firepower," the prince says, for his next deal.

This whole ordeal has affected your reputation. People will still believe, no matter what you tell me, that because you were in the Ritz-Carlton you must be guilty of something. You must realise that.

When you are detained, for sure some of the business community, some of the banking community will say they have doubts. That's my job right now, to interact, to meet with all of them individually or jointly and tell my story.

I understand it's not going to be easy at all, because some banks and some people in the business community will be doubtful. They'll say, "What's going on?" However, I assure them that everything is normal, everything is back to normal, and that we are functioning as we were before.

It would surely help if the government said, "Alwaleed did nothing wrong, it was a misunderstanding, he paid nothing to leave, he remains a Saudi citizen in good standing." That hasn't happened.

All of these points were covered in the confirmed understanding, the agreement between me and the government.

The fact that I'm speaking to you right now, and I'm saying everything truthfully and honestly, and the fact the government is not going to say, "Alwaleed is wrong," is an approval of what I'm saying.

So you feel you need to speak out to, what, clear your name, because you've been maligned?

I need to clear my name, No. 1, and to clear up a lot of the lies. For example, when they said that I was tortured, I was sent to a prison, you know, during my 83 days in the Ritz-Carlton hotel. All these were lies. I stayed there the whole time. I was never tortured.

Inside the Ritz-Carlton

Across three months, 381 Saudis were hauled in and locked up at the Ritz-Carlton, which boasts 492 rooms, 52 acres of land, and 62,000 feet of conference space. Many left quickly. Alwaleed's stay was among the longest. The prince says he was kept in Room 628, a 4,575-square-foot royal suite.

How did you spend your time?

A lot of sports, a lot of walking, a lot of meditation, a lot of watching news, a lot of praying.

What was a typical day like?

I would go to sleep at 6, 7 o'clock [a.m.] and then wake up around noon. We prayed five times a day.

You had access to television, to newspapers?

I had access to everything, everything.

So no one on the outside knew what was happening inside, but those of you on the inside knew everything about what was happening on the outside?

Exactly. That's why I was able to get information about this so-called torture.

So you were not harmed or mistreated in any way?

Not one iota.

You're certain that nobody else who was at the Ritz-Carlton suffered anything akin to abuse, torture, wasn't even roughed up?

Maybe someone tried to run away or do something crazy. Maybe he was put down and controlled. Maybe. But for sure there was nothing you could call systematic torturing.

Were you allowed to talk to other detainees?

No. No two people in the Ritz-Carlton could talk to each other. Even in my case. I did not see anyone. I did not talk to anyone.

You were allowed to make some phone calls. To whom and under what conditions?

I made my calls to my son, to my daughter and my granddaughters. And I talked to the heads of my companies, the CEO of Kingdom Holding, the head of my private office, and the secretary general of my foundation.

Were those calls being monitored?

Most likely, yes.

Dealing with the crown prince

For more than 70 years, the Saudi throne passed from one brother to another, but Salman broke with the past, first giving his son control over several government ▶

portfolios, then elevating him last year to crown prince. Prince Mohammed's plans include Vision 2030, an economic program that may see Saudi Aramco, the world's largest oil company, go public. Movie theatres, banned since the early 1980s, are back, and in parts of Riyadh women walk without an abaya covering their heads. Starting in June, they'll be permitted to drive for the first time since 1990.

What was it like being held captive by your own cousin?

It was not easy, I have to confess. It's not easy to be held against your will. But when I left, I had a very strange feeling. I gathered all the senior officers in my companies and all my close confidants and I told them, "I swear to you I have complete serenity, complete comfort, and no grudge and no bad feelings at all."

And sure enough, within 24 hours we were back in communication with the king's office, with the crown prince and his people. That's a very strange situation. But it's a fact.

That's because you simply had to move forward?

No. I'm a nationalist. I'm patriotic. I believe in my country. So I'm not going to have this, this irritation that happened to me create a vendetta and turn me against my uncle, my cousin, my nation, and my people.

How would you describe your relationship with Prince Mohammed?

It's stronger. That's shocking to many people, even to my people.

You've forgiven him?

I've forgotten and forgiven the whole process completely. It's behind me.

How often are you and he in contact?

Barely three days go by without me texting or calling or talking to him.

You and he talk almost every three days?

We text a lot, but we talk less frequently. Barely a week goes without us communicating.

Prince Mohammed has a grand plan for the transformation of the Saudi economy and Saudi society. Do you remain supportive?

Yes. His vision took a lot of my ideas, but he multiplied them. I had the sovereign wealth fund idea, I talked about Aramco going public. Women's rights, women competing in society, women driving, all of these things I called for.

He's establishing a new era in Saudi Arabia. Any person who does not support what Mohammed bin Salman is doing right now I say is a traitor.

Navigating the new Saudi Arabia

The crown prince has also become the biggest Saudi investor, plowing tens of billions of state dollars into Uber and funds run by Blackstone Group and SoftBank.

Does the government want you building and maintaining relationships with heads of state and CEOs of multinational companies?

When I left, there were zero conditions on me, which means life as usual. I've been in touch with many heads of states, in Europe and the Middle East. Everything's normal.

Can you travel?

Sure I can.

Do you know whether the government is monitoring your whereabouts?

I'm not worried about that.

And your bank accounts?

Everything's back to normal.

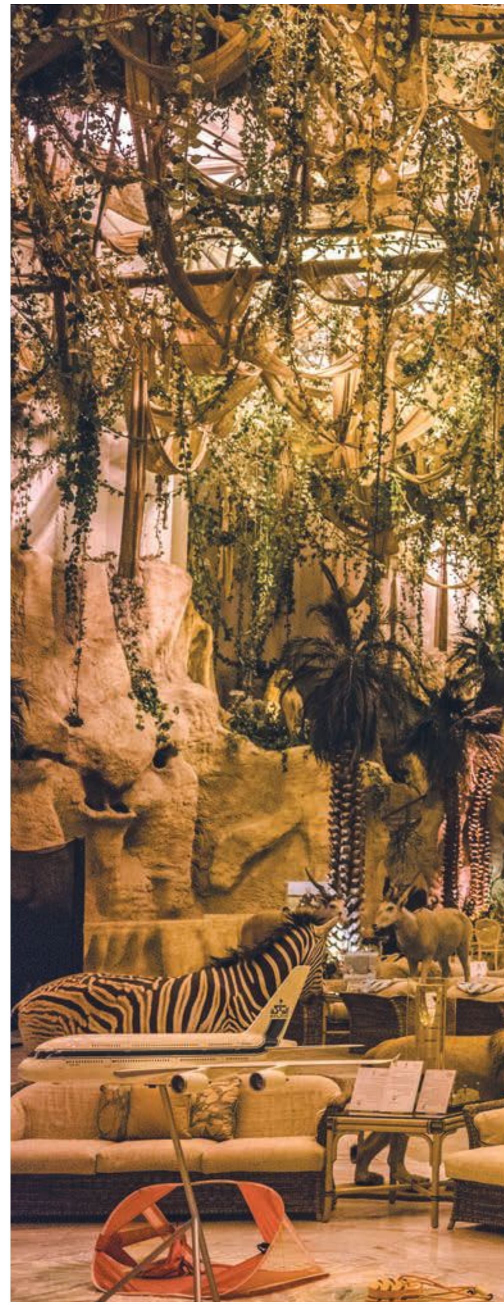
You're looking for foreign investments and so is the Public Investment Fund, Saudi Arabia's sovereign wealth fund. Doesn't that put you in competition?

Actually, we're in touch with the government to be involved in many projects. They're going to have a big project in the Red Sea with Maldives-type resorts. Four Seasons was invited to be there. We've also been invited to be part of another project in Riyadh, where there's going to be a huge entertainment centre. You know, Disney-type.

We're in hotels, we're in media and in entertainment, so we're invited. So no, no competition, we complement each other.

What about co-investment? Will the PIF invest together with Kingdom Holding, or perhaps Rotana, or Prince Alwaleed personally?

Yes, this will happen. We're in discussions right now with the PIF on certain projects.



Domestic projects or international ventures?

Domestically, to begin with.

The crown prince is touring the West. He's meeting President Trump at the White House, and he's trying to attract capital to Saudi Arabia.

Given your experience at the Ritz-Carlton, how good can you feel about presenting a common front with the government, the very same government that put you in the hotel?

I'm supportive of Saudi Arabia,

The games room at Alwaleed's palace in Riyadh

"Everything is back to normal and we are functioning as we were before"

supportive of my government, supportive of King Salman and Prince Mohammed bin Salman all the way. Before, during, and after detention.

People will find that hard to understand.

They don't understand that you're talking to a person who is a member of the royal family. We're all one party here. One party. The ruling family of Saudi Arabia.

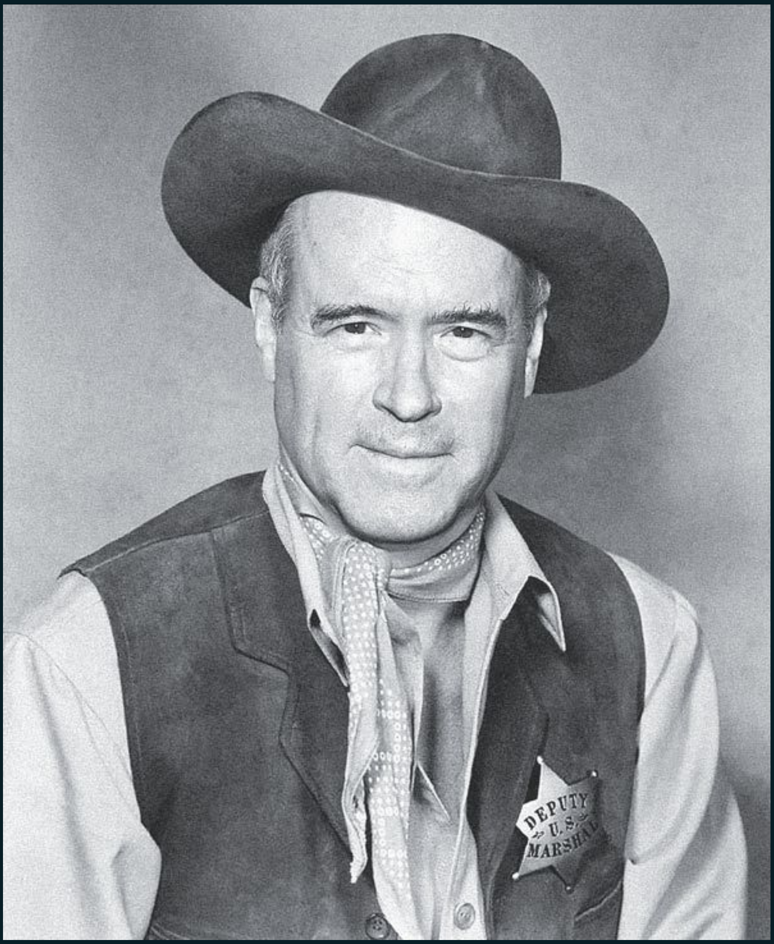
I understand it sounds weird to people. They'll say, "You've been detained by the king and by the crown prince and you're still supporting them?" You bet.

You have to wonder how comfortable CEOs will be investing in Saudi Arabia after seeing the Ritz-Carlton method of dealing with disputes.

They have to decide that. But I can speak on my own behalf, and I can tell you it's business as usual: We're going to invest in Saudi Arabia. B

Robert Mercer
is

THE RICHEST GUN IN THE WEST



The enigmatic investor was secretly volunteering as a cop in a tiny desert town. Why? To obtain an item that's impossible to buy

By Zachary R. Mider

Photo Illustration by 731

Robert Mercer probably would have flown into Roswell. From there—1,800 miles from home—he would've traveled south through the high desert plains of southeast New Mexico, flat as a tortilla, past abandoned homesteads and irrigation machines moving in slow circles.

His phone reception would've gotten spotty when he turned left off Highway 285. He would've seen the bare limbs of a pecan orchard and a graveyard decked in plastic flowers. At the town hall in Lake Arthur, population 433, he would've met Police Chief William Norwood, the department's sole full-time employee, a barrel-chested man with two spare rifle magazines on his belt. There, Mercer, the fabulously wealthy computer scientist who helped bankroll the election of President Donald Trump, would've reported for duty as a volunteer policeman.

If Mercer's trips to Lake Arthur resembled my recent visit, he might've climbed into the passenger seat of Norwood's police truck, whose black-and-white paint job is fading in the wind-whipped sand. He and Norwood might've rolled past the house where someone reported spotting a stolen car—a false alarm, it turns out. While monitoring radio chatter, the plutocrat and the chief might have jawed about the latest news in a town so small it has no stores: the recent pursuit of a motorist across half the county; the record of the high school's six-man football team; reports of stolen pecans. Pulling up a chair at an Italian restaurant in nearby Hagerman, the chief might've urged Mercer to try the lasagna.

For most of the past six years, as Mercer became one of the country's political kingmakers, he was also periodically policing Lake Arthur, according to the department. If he followed Norwood's protocols—and Norwood insists no volunteers get special treatment—he would've patrolled at least six days a year. He would've paid for travel and room and board, and supplied his own body armor and weapon.

Until a few months ago, Mercer, 71, ran what is arguably the world's most successful hedge fund. He employs a phalanx of servants and bodyguards and owns a 203-foot yacht named *Sea Owl*. He was the money behind Breitbart News and Steve Bannon, whose fiery populism helped propel Trump to the White House, as well as the data firm Cambridge Analytica, which shaped the campaign's messages. Shortly after the election, Mercer donned a top hat and welcomed the president-elect to a costume party at his seaside mansion on Long Island. What was a guy like that doing in the desert, wearing a gun and a shiny badge?

I was surprised when I first heard about Mercer's sojourns in Lake Arthur, but then I'm used to his surprises. During the two and a half years I've covered Mercer, I've come to think of him as a hard-right version of that guy in the beer commercials, the Most Interesting Man in the World. There seems to be an inexhaustible supply of incredible-but-true Mercer stories, including his pioneering research that begat Google Translate, his funding of a stockpile of human urine in the Oregon mountains, his million-dollar model train set, and his habit of whistling constantly, even during work meetings. The common threads in these stories are a fierce intelligence, a wide-ranging curiosity, and an utter indifference to the judgment of others. The story of his adventures in Lake Arthur, which hasn't been previously reported, adds yet another strand. It shows just how far a man of means will go to get something he can't buy: the right to carry a concealed firearm anywhere in America.

The Mercers don't talk to the press, and Robert Mercer wouldn't tell me why he started volunteering for the Lake Arthur police. When I went there to see for myself, I found that it was unlike any police department I'd come across. Norwood and three part-timers are buttressed by 84 reserve officers, most of whom live hundreds or even thousands of miles away. There are Lake Arthur reservists in San Diego and Virginia Beach. Several are among the most elite soldiers on Earth—former U.S. Navy SEALs. Many are high-dollar bodyguards or firearms instructors, and almost all of them are serious gun enthusiasts. On that count, Mercer fits right in. He once built a personal pistol range in his basement. Through a company he co-owns, Centre Firearms Co., he has a vast collection of machine guns and other weapons of war, as well as a factory in South Carolina that makes assault-style rifles.

Over our own lunch at Piccolino, the Italian place, Chief Norwood passed me a copy of his department's newsletter, the *Blue Heeler*. One picture shows reservists training in a two-man sniper-spotter team. The sniper is kitted out in a mesh veil for camouflage and appears to be firing from inside a kitchen. Another shows a door with a hole blasted through it, the result of an exercise in "explosive breaching." The newsletter gave the impression that Norwood was running his department as a sort of high-octane club for guys who subscribe to *Guns & Ammo*. It was hard to imagine these skills being put to heavy use in Lake Arthur, where reservists' official duties include finding lost pets.

Even the coolest drills wouldn't explain why Mercer would go to the trouble of getting a Lake Arthur badge. With his connections in the gun world, he wouldn't need to travel all the way from Long Island to have some weekend fun on the range. And if he just wanted to serve the public and wear a uniform, he could choose from several police auxiliary programs without leaving his home county.

Then I learned that in 2012 several of Mercer's associates had set up a nonprofit in Georgia blandly named the Law Enforcement Education Organization. Among the founders were Mercer's son-in-law George Wells and Wells's longtime friend Peter Pukish—both of whom were also Lake Arthur volunteers. Chairing the group was former Georgia Representative Robert Barr, a Mercer lawyer and National Rifle Association board member who got pranked in the 2006 mockumentary *Borat*. (The movie captures his sour expression when he's told the cheese he just ate was made from a woman's breast milk.) Tax records suggest Mercer gave the group's sister foundation more than $400,000, and his gun company became a sponsor. The purpose: to educate local authorities across the ▶

PHOTOS: SYLVAIN GABOURY/PATRICK MCMULLAN; STR/AFP/GETTY IMAGES

◀ country about the rights of off-duty police officers to carry concealed weapons. The group showed up at police conferences and handed out brochures and moon pies.

States vary widely in their approaches to regulating concealed weapons. But in 2004, Congress passed the Law Enforcement Officers Safety Act, declaring that police officers can carry concealed guns in any state with no need of a local license. The law applies to officers who are off-duty and out of their jurisdiction—and includes volunteer reservists.

The law made a police badge an immeasurably valuable item in places such as Suffolk County, N.Y., where Mercer lives, and where concealed-carry permits are granted only rarely. Applicants must prove they face "extraordinary personal danger"; in 2016 the county rejected the request of a man who had helped the FBI take down an outlaw biker gang. Even if Mercer did get a local permit, it wouldn't be valid if he traveled to New York City or to most other states. For people in Suffolk who want to carry, the Law Enforcement Officers Safety Act is a tantalising way to cut through all of that—if they can find a police force that will grant them its tin.

Since the law took effect, a few police and sheriff's departments around the country have been rumored to hand out badges to buddies or in exchange for cash. The gun community calls them "badge factories." Questions about whether Lake Arthur was such a place swirled last year on a popular gun chat room, after a noted firearms expert from North Carolina who was also a reservist got drunk and accidentally shot his brother-in-law in the leg. (Norwood quickly stripped him of his badge.) It's not clear exactly when or how Mercer became aware of Lake Arthur's reserve corps. But he became an officer on Dec. 10, 2011, and since then, Mercer and his son-in-law have supported the town generously. Their foundation underwrote a grant for some Lake Arthur officers to get SWAT training in Las Vegas. Separately, Wells helped start a reserve officers' association that apparently directed tens of thousands of dollars to the department.

At lunch, Norwood ordered a salad and insisted that his department was no badge factory. "It's a big help to me, I'll tell you that," he said of the reserve program. "It's better than going out to a domestic violence call way out in the county all by yourself." Norwood's head was closely shaved, and he had a hint of reddish stubble on his cheeks. He was dressed from head to toe in black tactical gear, and a patch on his chest gave his blood type as O+. Norwood refused to discuss Mercer or any other individual reservist but said that if a person simply wanted concealed-carry rights, volunteering for his squad wouldn't be worth the trouble: Department rules require 96 hours of patrol work and 20 hours of training a year. He added that while reservists are encouraged to carry their weapons off-duty for protection, they're not allowed to use their concealed-carry privileges for outside work. (Later, after I showed Norwood the LinkedIn accounts of two men who seemed to be doing just that—security contractors touting their ability to carry guns anywhere—the men faced "severe" disciplinary action, a department spokesman said.)

Norwood formed the reserve program in 2005, not long after he joined the department. With the nearest backup a half-hour or more away, he didn't like the idea of patrolling solo, so he turned to a couple of Army buddies for volunteer help. The program expanded by word of mouth. At one point a few years ago, there were almost 150 reserve officers—that'd be a ratio of one to every 2.9 residents—and Norwood, who prefers patrolling to paperwork, acknowledged he wasn't giving the program the oversight it needed. In 2016 a reserve captain took over administrative duties, tightened up policies, and cut the number of reservists almost in half. Last year, Norwood stopped accepting new members altogether. But even this smaller force is enough to provide him with a visiting reservist or two on any given day, free of charge.

"There may have been some abuses in the past," said the administrator, Oliver Brooks, who lives 200 miles away and joined us for lunch. "But whenever we find out about them, we take action."

After a formal request under New Mexico's open-records law, Norwood sent me documents showing that Mercer, Wells, and Pukish joined on the same day in 2011. Mercer and Wells left the department last September, and Pukish stayed on until February. Brooks said he didn't know why they left; Pukish declined to comment, and Wells didn't respond to inquiries.

Many of Mercer's links to the gun world flow through Wells, who's married to the youngest of Mercer's three daughters, Heather Sue. She deserves a beer commercial of her own. A talented placekicker, she made Duke University's football team in 1995 and then sued the coach for sex discrimination when he refused to let her suit up. She won. Later, after running a bakery in New York with her sisters, Heather Sue moved to Las Vegas and gambled for high stakes. She played $25,000 no-limit hold 'em six-handed at the 2010 World Series of Poker, placing 15th. She married Wells, one of the family's bodyguards, the next year.

Wells had previously worked as a firearms trainer and a security contractor in Iraq, and he once had a sideline making concealed-carry holsters out of elephant and ostrich skin. Soon after the marriage, he got a new job: Wells and Mercer joined with other investors to acquire Centre Firearms, a longtime Manhattan dealer that specialised in outfitting movies and TV shows, and Wells became its president.

Mercer and Wells wanted to expand beyond props, and they soon entered talks with Daniel Shea, a Nevada arms dealer who had a world-class collection of machine guns. His wares included 19th century antiques, a Stinger antiaircraft missile launcher, and the fake grenade launcher that Al Pacino wielded in *Scarface*, according to documents filed in subsequent litigation. He also rented guns to video game makers. If you play certain *Call of Duty* titles, you hear their thunder. But Shea was far more than a mere collector: He had brokered arms deals in Jordan and Serbia and trained U.S. commandos on obscure weapons they might face in the field.

Centre agreed to buy the assets of Shea's company, Long Mountain Outfitters, for as much as $8 million, with Mercer providing the cash, court documents show. Shea stuck around to introduce the new owners to his contacts in the U.S. government and foreign militaries. In a November 2013 business plan, Centre executives described their aim to become "the leading international supplier of arms and training." As part of their strategy, they wrote, they would "use our relations with government contacts and politicians."

Wells put his friend Pukish in charge of the Nevada operations, located in an industrial park in a Las Vegas suburb. Pukish is a martial-arts master who once ran a dojo, as well as a training business called Chaos International. In online profiles he claims to be expert in jiujitsu, kuntao knife fighting, and the Japanese healing art of reiki. Meanwhile, in early 2014, Mercer and his partners acquired a warehouse in the Ridgewood neighborhood of Queens, N.Y., and moved much of Centre's East Coast inventory there. (Ed Leiter, a former owner of Centre who visited the site recently, said the stash includes an Mk 19 belt-fed grenade launcher, capable of hurling 60 explosives per minute. Leiter said he thinks it's used for training.)

Lake Arthur, N.M.

Population

433

Reserve officers

150*

***roughly, at peak**

But Centre's partnership with Shea quickly collapsed. In November 2014, Centre sued Long Mountain Outfitters in Nevada, accusing Shea of keeping guns he was supposed to hand over. Shea denied that and countersued, alleging Pukish was running the business into the ground and that sales trips the two of them had taken to Washington, D.C., Israel, and Jordan had been a disaster. The parties settled the lawsuit on undisclosed terms. Shea left the company, and Centre kept most of his armory. (Through his lawyer, Shea declined to comment.)

While Mercer's foray into international arms dealing struggled, he moved in another direction: manufacturing guns himself. In 2016, Centre acquired South Carolina's PTR Industries Inc., the maker of a civilian version of a Cold War-era German battle rifle called the G3. PTR hasn't disclosed its investors and declined to comment for this story. But according to a person with knowledge of the matter, Mercer appeared at the plant one day in early 2016 and went on an hourslong tour, flanked by Centre executives and a woman said to be Mercer's nurse. He asked a few questions about the production process but was otherwise silent, the person said. Around plant employees, PTR's chief executive took to calling the visitor "Mr. M."

Trump's victory seemed to vault Mercer to the center of American political power. His two closest political advisers, Bannon and Kellyanne Conway, helped lead the campaign and then moved to the White House, and his daughter Rebekah, who oversees his political and charitable spending, won a leadership role on the transition team. But Bannon has since been cast out of the president's circle, and Rebekah tossed him from Breitbart News. Liberal activists hounded investors in Mercer's hedge fund, Renaissance Technologies, until he announced in November that he would step down as co-CEO. And Cambridge Analytica is at the center of a tech and political firestorm after revelations that it improperly harvested the personal data of 50 million Facebook users without their knowledge.

Trump's win appears to be, at best, a mixed blessing for Mercer's gun interests. The president supports a House measure requiring states to recognize concealed-carry permits regardless of where they were issued—essentially offering civilians the same workaround Mercer got from Lake Arthur—but after the school shooting in Parkland, Fla., the measure's chances in the Senate grew dimmer. On the corporate front, it's unclear if Mercer's gun company has won any government contracts. And with a gun-rights supporter in the White House, civilian purchases of assault-style rifles have plummeted from Obama-era highs. Remington Outdoor Co., among the nation's largest gunmakers, declared bankruptcy on March 25.

Mercer didn't get into the gun business to get rich; the Bloomberg Billionaires Index values his wealth at almost $1 billion. But his family seems to be having fun. They've shown off their guns to political allies, taking them to a vault deep under the streets of Manhattan or to the warehouse near Las Vegas and pointing out some of the more remarkable weapons. Visitors, speaking on condition of anonymity, say the spaces are laid out like high-end clubhouses, with fully stocked bars. And in January, Mercer's manufacturer rolled out a new product: a civilian version of the German submachine gun known as the MP5. It offers a 30-round magazine and an optional threaded barrel for attaching a silencer. It retails for $1,899.

Mercer would've used a more modest gun at the marksmanship tests he was required to pass annually to keep his Lake Arthur badge valid. To qualify, he might've headed to the local range, in a desolate part of Hagerman, where a bulldozer has piled up berms of earth on three sides. A fellow reservist would've planted a man-shaped paper target at a distance and called out instructions, timer and clipboard in hand: "Two rounds, kneeling position." Mercer would've dropped to a knee and fired. "Two rounds, center mass." Mercer would've taken aim, felt the trigger against his finger, and sent two more bullets out into the desert. Ⓑ —*With Joshua Green*

Lowe and Marina Abramovic in the Madrid studio of Factum Arte

INSIDE THE ART WORLD'S DREAM FACTORY

Adam Lowe gave up his own painting career almost 25 years ago. Today, his Madrid studio is the place where top artists build their greatest works

By James Tarmy

Photographs by Bego Antón

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Watches that are hip to be square

64
The man who maps your commute

On a sunny February afternoon in Madrid, the performance artist Marina Abramovic is going over a list of things she wants to create for her coming solo show at the Royal Academy of Arts in London. For starters, there's something she calls a "fountain."

"The fountain is me, made out of glass," she explains, speaking in a Slavic-accented English that's delivered in a soft near-monotone. "But out of everything–my nose, mouth, eyes, breasts, fingertips–comes blood."

Abramovic is most famous for her feats of endurance. In 2002 she lived in a gallery without food for 12 days. In 2010, for a piece titled *The Artist Is Present*, she sat in a chair in the atrium of New York's Museum of Modern Art for more than 700 hours, locking eyes with any stranger who sat across from her.

In Madrid, she's sitting in an apartment above Factum Arte, an art fabrication company, leveling her gaze at Adam Lowe, Factum's founder and the man who'll help her translate her art from performances to objects. For the next several months, she'll work with the company's 50 technicians and artisans to make dozens of artworks, including a table covered with 10,000 glass tears and a statue of the artist eating herself.

Another project will charge Abramovic with enough electricity that she can extinguish a candle by pointing at it. "It's generating a million volts of static," Lowe says. "If it goes wrong, it's a killing machine." In addition to the works that will be exhibited in London, some of what's produced at Factum will be sold through her various galleries.

Abramovic isn't known for her sense of humor, but she probably should be. When she notes, "I really hope not to put too much ego into anything that I do.… I like to keep it light," it's unclear at first if she's joking. But Lowe, who's been pecking away at a laptop while Abramovic talks, bursts into laughter. "You've just talked about making a sculpture of yourself with blood flowing out of every orifice," he says. "You can't then talk about 'keeping it light.'"

Since founding Factum in 2001, Lowe has established a similar repartee with a who's who of the contemporary art world: the sculptor Maya Lin, best known for designing the Vietnam Veterans Memorial in Washington; Anish Kapoor, who dreamed up Chicago's famous bean-shaped *Cloud Gate*; and Jenny Holzer, whose conceptual art includes the *Truisms*, one-line sentences splashed across building facades. Like a popular high school teacher, Lowe will bounce around possibilities with visiting artists, helping them to figure out how to make their ideas tangible.

What comes out of Factum's Madrid factory ranges from giant golf balls made out of marble by Paula Crown to a full-scale olive tree–including its root structure–cast in brass. When I visit, one room holds a towering fibreglass sculpture of interlocked circles by Mariko Mori. Steps away from it is a row of El Anatsui's *Benchmarks* print series, which captures the topography of his work tables.

The vast size of many of the artworks in Factum, combined

A three-dimensional rendering of Abramovic, carved in alabaster

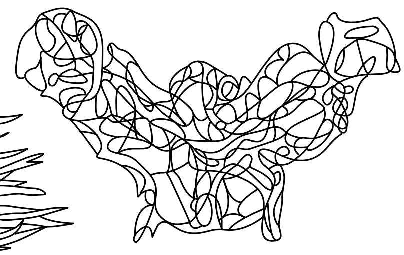
FACTUM'S FABULOUS FABRICATIONS

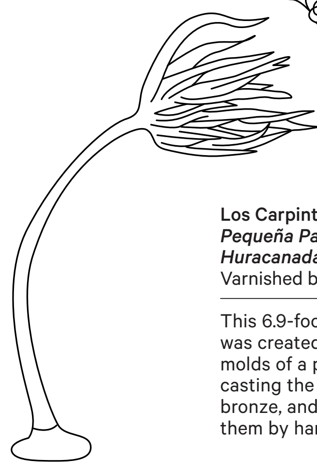
Three recent works highlight the studio's surreal skill

The Haas Brothers
Gorillas in the Mist
Copper, 2017

A fountain composed of three giant, playful gorillas and four trees was installed in the courtyard of the Aventura Mall in Miami

The primate sculptures can reach as high as 11.5 feet





Los Carpinteros
Pequeña Palma Huracanada
Varnished bronze, 2017

This 6.9-foot-tall work was created by taking molds of a palm tree, casting the pieces in bronze, and assembling them by hand

Mathias Bengtsson
Growth Lounge Chair
Tetrashell and bronze, 2016

First 3D-printed in Belgium, this 55-inch-long chair was designed as part of a "biomorphic furniture" collection and cast in bronze in Madrid

with the high-tech carving and 3D-printing machinery, gives room after room the air of a Willy Wonka factory, but one where art, not candy, is the treat of choice. Lowe, who presides over all of it, is here to make sure that the artists who enter have the tools, technology, and support staff to make whatever they dream up.

"There's a kind of community that's been built there," says Anatsui, who won the Venice Biennale's Golden Lion for Lifetime Achievement in 2015. "You explore making art with the team there—it's a process of exploration."

There's a common perception that "real" artists are in a garret somewhere working in tortured solitude. That idea isn't true today, and it wasn't 500 years ago. Rembrandt had a workshop so robust (and effective) that there's still an ongoing debate about which paintings are by him and which are by his assistants. Tintoretto devoted the last two decades of his life to painting the walls of Venice's Scuola Grande di San Rocco building and the interiors of the Doge's Palace; art historians agree that he rarely touched many of "his" studio's canvases during this period. Even John Chamberlain, the 20th century artist known for his crushed metal sculptures, rarely made them himself—he notoriously hated to weld.

Artists today still have studio assistants, but in the increasingly ambitious and moneyed world of contemporary art, they frequently turn to outside fabricators when the scale, complexity, or cost of their visions exceeds the scope of their studios. There are fabricators around the world: Prototype New York in Long Island City, Queens; Mike Smith Studio and MDM Props, both in London; and Carlson & Co. in San Fernando, Calif., to name a few. Often artists will use a few fabricators based on the location of the project.

Lowe and Factum Arte occupy an unusual place in many artists' practices. But when they work with him, regardless of the final destination of their projects, artists almost always come to the factory in person. "Casting fabricators look very similar to [Factum], but in other facilities, you do it, pay the bill, and it's done," Abramovic says. At Factum, "it's really a process of cooperation and research, which is very different."

Lowe attributes Factum's success to its ability to help artists test the limits of what's possible, sometimes through new technologies and materials but also conceptually. "By pushing boundaries," he says, "there's nearly always a commercial advantage for the people you're working with."

Lowe, 59, is tall with dark hair and is perpetually in motion. "I think I can persist in pretending I'm young quite successfully," he says. "I genuinely feel about 30." He favors loose-collared shirts and khakis, and he speaks, often quite breathlessly, with an upper-class English accent.

He was born in Oxford, and after studying at the Ruskin School of Art at the University of Oxford, he got a master's from the Royal College of Art in 1985. About that time, his paintings began to appear in the British art scene with the work of the so-called Young British Artists, a group of stars that included Damien Hirst, Tracey Emin, and Rachel Whiteread.

Lowe's paintings were well-received, and they were acquired by a few British museums, but his career never skyrocketed in the same way that some of his peers' did. By the late 1990s he'd begun to explore different pursuits. "I was always too restless to just spend all of my time in the studio," he says.

He began to experiment with new printing techniques, "and I spent rather a long time doing that." Having found fulfillment in experimentation in artistic techniques, he says, "I didn't want to go on exhibiting in galleries. I'd lost interest in it completely." Instead, to make money, he began to do work for other artists, including Kapoor and the pop artist Richard Hamilton, helping them create prints and editions.

Lowe founded Factum Arte in 2001 with the artists Fernando Garcia-Guereta and Manuel Franquelo—a partnership that lasted "about two weeks," he says, at which point Lowe took over the company himself. Everyone parted amicably.

The initial aim of Factum was to "build bridges between specific new technologies and high levels of craftsmanship," he says. If the mission sounds vague, that's because it was. Lowe generally is open to doing anything, even if—especially if—he's never done it before. "If he can't do it, he'll figure ▶

◀ out and invent a tool for you to do it," Lin says. "He's a bit of a mad scientist."

Lowe brings a sophisticated understanding of what certain technologies can accomplish, but the connections he makes with artists come from a deeply esoteric knowledge base. He bonded with the artist Shezad Dawood, who's made work at Factum, around their shared interest in ancient Egyptian magic.

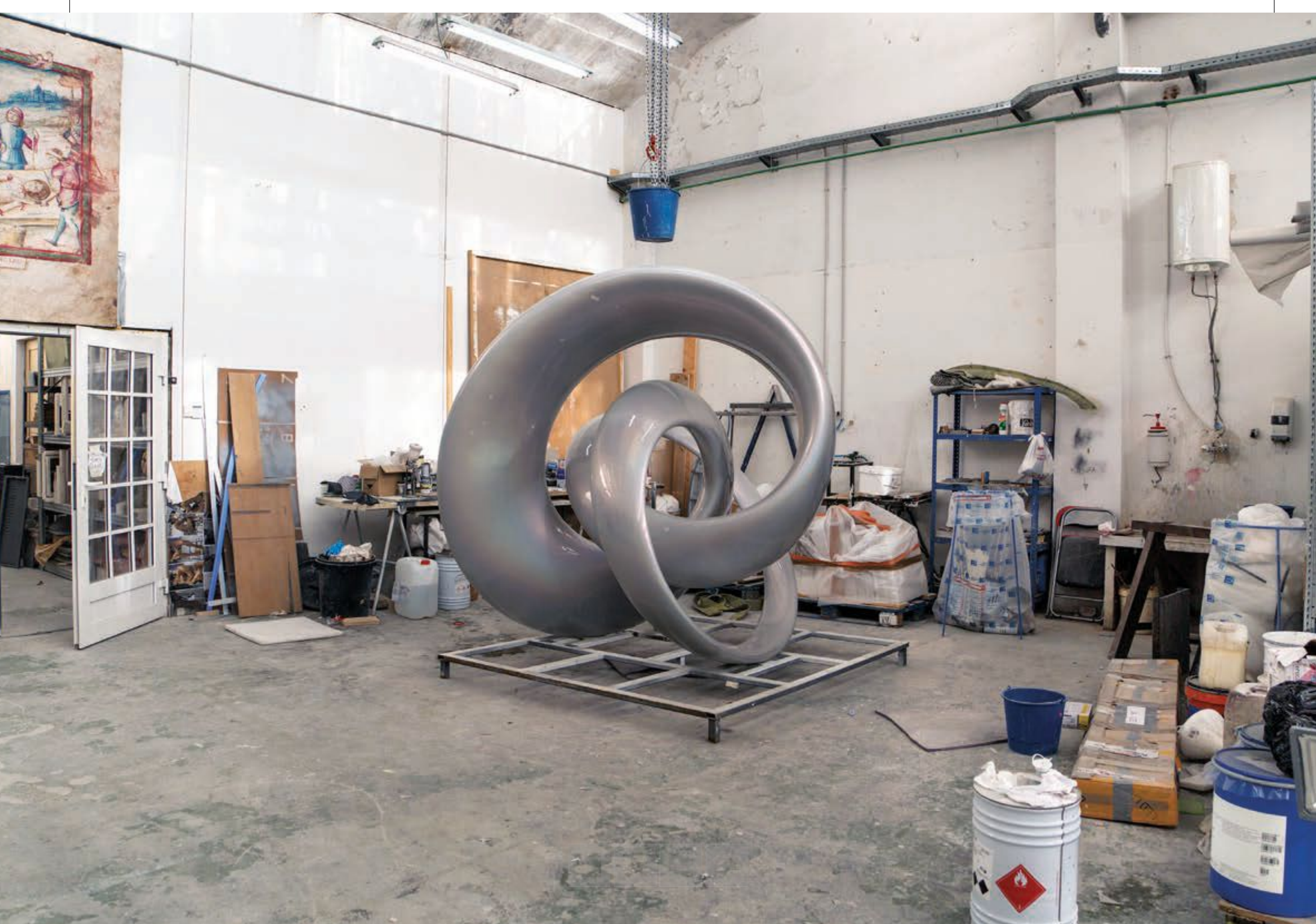
His first clients were drawn from his existing relationships—Kapoor, British sculptor Marc Quinn, Russian photographer Boris Savelev—and eventually through word-of-mouth he began to gain clientele beyond that first coterie of friends. His staff started at 4 people and now numbers 50 employees, along with about 60 contractors, including those who work at nearby foundries.

Such a substantial operation requires significant overhead, but Lowe doesn't talk about what it costs to produce work at Factum. "It's kind of like asking, 'How long is a piece of string?' " he says. "What I can tell you is that certain works' budget is not enough to cover their cost, while with other works, there's a profit margin in the job, because it's a repeat job—making an edition." When the factory makes editions, he says, "you can use the first [artwork] to work out a cost, and then you can say, 'Well, every other one will cost X.' "

But given that Factum is largely an extension of Lowe's own interests, he'll occasionally find himself paying for projects—or at least parts of projects—when they exceed their initial budget. Hrair Sarkissian, a Syrian-born, London-based artist, came to him with an idea for a work commissioned by a museum in Saudi Arabia, titled *Final Flight*. Sarkissian intended to chronicle the slow destruction of the northern bald ibis, a highly endangered bird whose nesting place was, to the horror of ornithologists, in the desert near war-torn Palmyra, Syria. His project entails a line of painted casts of the bird's skull in front of a laser-etched map of its former migratory route.

For most artists, the cost would be fairly manageable—€15,000 ($18,700) to make the casts of the birds' heads—but for Sarkissian, who isn't a well-known artist, that price tag "exceeded the budget by a lot," he says. The museum that commissioned the work said they'd have to scale it down. Rather than ask the artist to compromise on his vision, Lowe made the work at a steep discount.

A fibreglass sculpture by Mori



Workers in the Madrid foundry that Factum contracts with to create many of its artworks; from left: Charles Westgarth, Jenifer Vahos, and Carolina Ruiz

"I still get emotional about Adam's gesture," Sarkissian says. "He felt like there was something really important in the work and said, 'We'll do it. Don't worry about the money for the moment.' "

In 2009, in part to offset such costs, Lowe founded the Factum Foundation for Digital Technology in Conservation, which uses the company's resources to conserve and re-create some of the world's greatest cultural works. "We were doing more work on a bigger scale, and we needed the Factum Foundation to find its own identity and raise its own finances," Lowe says. It's grown to four full-time employees, who work on projects that can range from scanning the tomb of the Egyptian King Seti I to reconstructing a shattered plaster equestrian statue by the neoclassical master Antonio Canova. After scanning the pieces of the latter, the foundation used software to create a 3D model of the original in order to reproduce it.

Factum Arte and the Factum Foundation share floor space in the facility, and the endeavors benefit each other. If Lowe develops software or technology for one, he'll apply it to the other. The sheer variety of projects—and getting to feed off Lowe's enthusiasm for those projects—contributes to the appeal for artists. "I love all of the foundation's work," says Dawood. "That's part of what attracts me to Factum."

"BY PUSHING BOUNDARIES, THERE'S NEARLY ALWAYS A COMMERCIAL ADVANTAGE"

There's always a lot riding on each of Factum's projects, but even in this rarefied art world air, Lowe's current work with Abramovic will be an historic achievement when it's complete. Her exhibition at the Royal Academy will be the first time a woman has had a solo show in the institution's 250-year history.

Inside the factory, Abramovic steps into the Veronica Choreographic Scanner, a machine that does a 360-degree body scan, as Lowe stands off to the side, observing. The data gathered will be used to create a 3D cast of her face. The room is also filled with tapestries, computer equipment, plaster busts, and two different teams of technicians.

While assistants help Abramovic extricate herself from the machine after the process is complete, Lowe wanders to a group behind him working on a 3D map of J.R.R. Tolkien's Middle-earth. The project has been commissioned by the Bodleian Library at Oxford as part of the exhibition "Tolkien: Maker of Middle-earth," which opens on June 1.

The map, Lowe says, "is actually four dimensions." The topography of Middle-earth has been created out of translucent Perspex, a material similar to Plexiglas, and sits between two digital screens that project images and colours from above and below. The hills are green, the oceans are blue, and animations, including the path that Bilbo Baggins takes on his journeys in *The Hobbit*, appear to rise out of the ground.

Abramovic walks by and peers over Lowe's shoulder. "So if I wanted to make my own journeys through the world, with all the countries I've been to, I could do something like this?" she asks.

Lowe loves the idea. "We could do it large-scale," he says. "It could fill a whole room! And we've got the data to make the relief." As he figures out how he would make it, his voice keeps rising. "It could really be something special."

"See? This is how it works," Abramovic says. "We talk, then comes the work, then it goes back again. It's endless, and it's wonderful." B

Squaring the Circle

One of the earliest shapes in wristwatches is making a comeback

By Anthony DeMarco Photograph by Danny Kim

Shortly after the French-Brazilian aeronaut Alberto Santos-Dumont became the first European to achieve sustained flight in 1906, he complained to his friend Louis Cartier that he didn't want to be fumbling for his pocket watch to measure time in the air. In response, the legendary jeweler invented a small clock to be worn on a leather strap, one of the earliest wristwatches for men.

It was square.

Such pilot watches became popular in the early 20th century, but eventually they took on a round shape–like the dials and gauges in a plane's cockpit. The technology that makes clocks and pocket watches work had traditionally been round: The interlocking gears and springs in a watch movement are round by nature, and the rotating hands are best read against indexes arranged in a circle.

"About 80 percent of watches sold are round, so clearly the market prefers the round shape," says Paul Boutros, a watch historian and international strategy adviser for Phillips auction house. Pocket watches were so vital to navigation at the turn of the century, he says, watchmakers focused on developing technology to keep them precise through changes in temperature and humidity. They even accounted for body perspiration.

Again, a round shape was the better solution. "It was much easier to make a watch water-resistant in a round case than in a square or rectangular case," Boutros adds, because the case could easily screw tight to seal itself. "Material science has improved, but the industry still relies on the round shape."

Certain watches remained square over the decades: Cartier's Tank and Panthere collections, the Jaeger-LeCoultre Reverso, the Baume & Mercier Hampton, and several Bell & Ross timepieces.

Last year, Cartier revamped its Santos collection, named after the aviation pioneer, with a signature square case with rounded edges and visible screws (eight around the bezel, plus more in the bracelet). The idea was to capitalise on interest in heritage with modestly sized, angular timepieces that wear well with suits and dresses.

Hermès, like Cartier, is betting that customers want square watches, which offer lines that parallel the edges of the wrist and the cuff of a shirt. This year at the Salon International de la Horlogerie in Geneva, Hermès showcased its Carré H line, a chunky, simple timepiece that almost evokes the rounded-rectangular Apple Watch. The brand is also offering fresh colors and metallics in its Cape Cod collection, also squared-off.

Philippe Delhotal, artistic director of Hermès Horloger, acknowledges that the square watch isn't broadly popular. But the geometry appeals to those who value design.

"The square–even though strongly featured in other Hermès métiers, such as silk scarves–is not very widely used in watchmaking," Delhotal says. "Watches of this shape are less conventional for customers looking for singular objects. To compose these forms, you have to look for harmony and purity and perfection in details." Ⓑ

1. NOMOS GLASHUTTE TETRA NEOMATIK 39 SILVERCUT
German brand Nomos Glashutte is known for its minimalistic designs, and its high-quality, handmade movements are among the most affordable in the industry. This watch is powered by an ultrathin automatic movement—at only 7.2 millimeters. Its silver-gray rhodium-plated dial is topped with blued-steel minute and hour hands—but most noticeable is a small seconds subdial at 6 o'clock, finished with a red hand. *$3,980*

2. HERMES CAPE COD
To create the square-within-a-rectangle shape in 1991, Hermès's legendary artistic director Henri d'Origny took inspiration from Hermès's anchor chain motif. This year there are two new versions. The first features a dial coated with translucent lacquer and a Milanese mesh double-tour bracelet (pictured). The second one uses the anchor motif in the dial, in a black-gold or blue-lacquer finish. *$3,275*

3. RALPH LAUREN 867 COLLECTION
Named after the company's luxury flagship store at 867 Madison Ave. in New York, this watch comes with an off-white lacquered dial with Arabic and Roman numerals. It's powered by Swiss-made mechanics. The men's model comes in 18-karat rose gold or 18k white gold (pictured); a women's version is available with a diamond-set bezel. *$4,950*

4. TAG HEUER MONACO CALIBRE 11 CHRONOGRAPH
After its debut in 1969, the Monaco went on to become one of the most recognisable watches in the world. Steve McQueen wore one in 1971 in the film *Le Mans*, as did Bryan Cranston, more recently, in *Breaking Bad*. Tag Heuer has reissued a 39mm watch with many of the same design details—metallic blue dial, white highlights, and red minute hand—but it has a new Calibre 11 automatic chronograph movement with a 40-hour power reserve. *$5,900*

PROP STYLIST: KODY PANGBURN


1.
2.
3.
RALPH LAUREN
4.
MONACO
HEUER
AUTOMATIC
CHRONOGRAPH

Azmat Yusuf

The guy who helped make sense of public transit tries remaking the system itself. *By Arianne Cohen*

Azmat Yusuf grew up in Pakistan and Kuwait and has lived in New York, Singapore, and Washington without ever owning a car. But when he moved to London eight years ago to work at Google, he was flummoxed by the transit system, the maze of buses in particular. "I just thought, Why is it so hard to figure out?" he says. He decided to build an app to help himself out.

Yusuf started with Busmapper, which calculated the most efficient routes across town, and soon expanded it to include trains, subways, taxis, and bikes in its itineraries. Today, about 20 million commuters in 39 cities around the world use the app, renamed Citymapper in 2011. Whether you take a subway in Brussels, a streetcar in Toronto, a minibus in Moscow, a ferry in Amsterdam, or a bike in Seoul, Citymapper will efficiently get you to where you're going.

"There's a very strong emotional attachment between the user and the application," says Bernard Liautaud, managing partner at Balderton Capital, which led Citymapper's Series A funding in 2014. "There aren't many products where the testimony from the users is amazing. They say things like, 'I can't live without Citymapper.' "

b. 1980, Pakistan

-

Still tests Citymapper by travelling to far-flung corners of London and seeing how efficiently he's routed home

-

Is a die-hard reader of science fiction

Citymapper has so far routed about a billion trips, giving it an invaluable cache of data on how people ride public transportation. Yusuf is starting to use that to improve transit itself, starting with–what else?–buses. "Right now they're kind of stupid," he says. "They're not really tied to demand. This is not the future." Last summer, Citymapper began beta testing its own fleet of minibuses in London that respond to demand in real time, with trackable arrival times, tap-to-pay consoles, comfortable seats, and USB outlets. This was followed by CM2, a nighttime hop-on, hop-off service, and Black Bus, which isn't a bus at all, but rather a partnership with the ride-hailing service Gett to operate shared cabs running on underserved routes during rush hour. In March the company introduced SmartRide, a carpool service it's offering for a fraction of the price of Uber.

Any of these strategies could evolve into a way to monetise Citymapper, which has raised roughly $50 million so far. Yusuf is also open to licensing his software, but "cities are a bit slow to change," he says. "We think it's good for us to do this ourselves and actually make the whole thing work." B

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