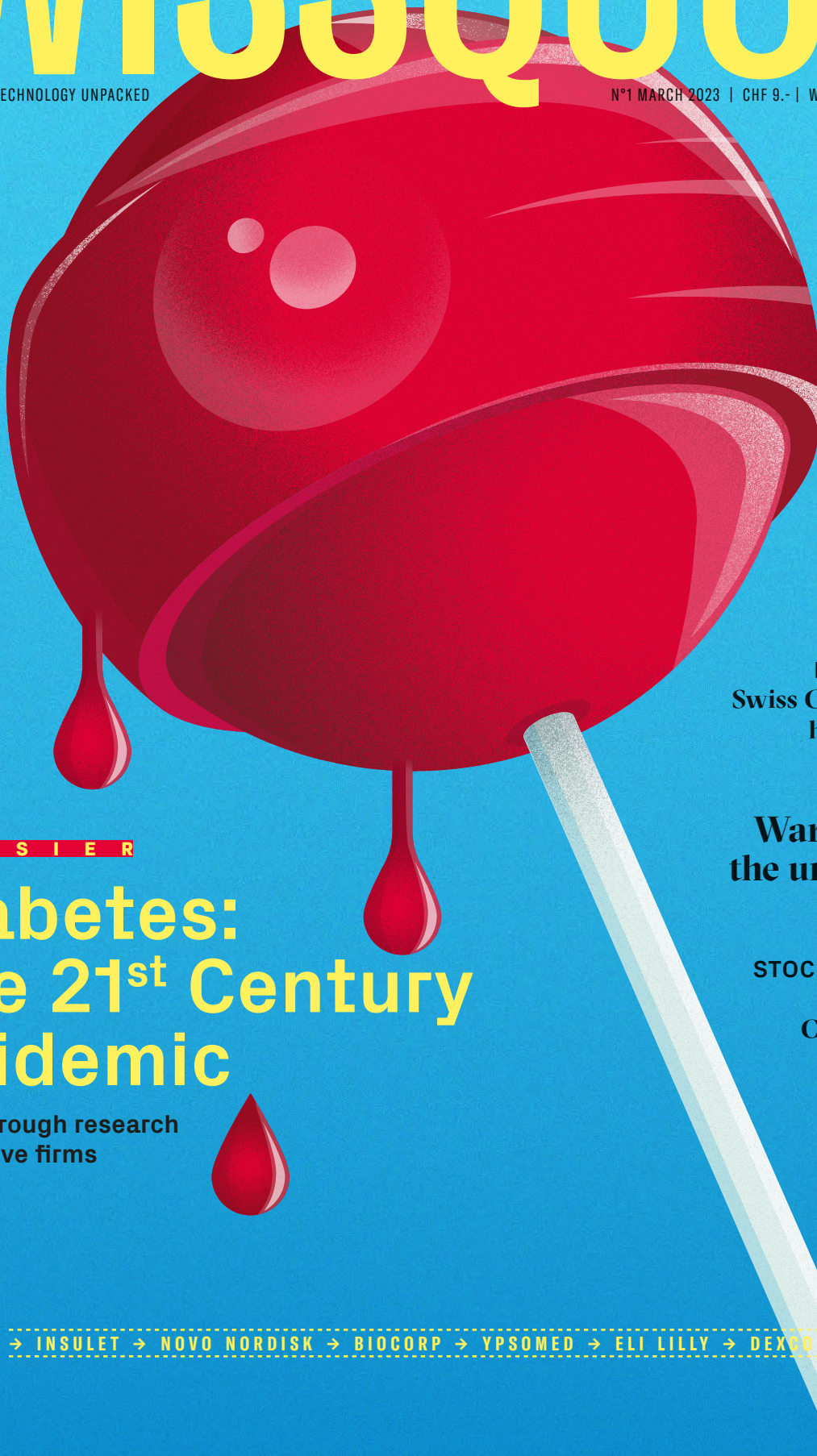


# M A G A Z I N E SWISSQUOTE

FINANCE AND TECHNOLOGY UNPACKED

N°1 MARCH 2023 | CHF 9.- | WWW.SWISSQUOTE.COM



D O S S I E R

## Diabetes: The 21<sup>st</sup> Century Epidemic

Breakthrough research  
Innovative firms

**BLOCKCHAIN**  
Swiss Crypto Valley  
holds its own

**GAMES**  
Warhammer,  
the unbeatable  
franchise

**STOCK EXCHANGE**  
SIX woos  
Chinese firms

→ INSULET → NOVO NORDISK → BIOCOP → YPSOMED → ELI LILLY → DEXCOM → MEDTRONIC →

ISSN 2296-3278

79



9 772296 327000





# HUBLOT

T H E A R T O F F U S I O N

## BIG BANG UNICO BLACK MAGIC

Black ceramic case. In-house  
UNICO chronograph movement.



hublot.com • f • t • i

  
HUBLOT





# Upgrade to Audi’s business class

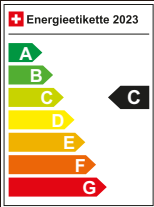
As an SME, you can benefit from special conditions on a range of models.

## Audi Q8 e-tron from CHF 479.–/month

including 15% SME discount

### Audi Q8 50 e-tron advanced quattro

Gross price	84 900.–
4.2% compensation	– 3560.–
11% EnterprisePlus (after compensation)*	– 8940.–
Your special price	72 400.–
Your discount	12 500.–
Annual interest for leasing	2,4%
Leasing rate per month	479.–



Displayed model: Audi Q8 50 e-tron Black Edition quattro, 340 hp, 23.2 kWh/100 km, 0 g CO<sub>2</sub>/km, category C. Chronos Grey Metallic, Audi Sport wheels, 5-spoke structure design, titanium grey, high-gloss turned finish, 9.5 J x 22, tyres 265/40 R 22, second charging socket, black roof rails, regular price CHF 98 180.–, compensation CHF 4120.–, EnterprisePlus discount CHF 10 340.–, cash purchase price CHF 83 720.–, down payment CHF 20 930.–. Leasing rate: CHF 499.–/month. All offers exclusive of compulsory comprehensive insurance. The granting of credit is prohibited if it leads to over-indebtedness on the part of the consumer. Financing provided by AMAG Leasing Ltd. Offer valid for contracts concluded by 31 march 2023 or until further notice. Subject to change. Applies to all vehicles imported by AMAG Import Ltd. Suggested list price of importer AMAG Import Ltd. \* EnterprisePlus: commercial offer, only available for vehicles registered to companies with an entry in the commercial register.

Further attractive offers for SMEs



It is no exaggeration to use the word epidemic when talking about diabetes, a disease that is spreading rapidly and silently across the planet: the number of people affected worldwide has increased fivefold since the 1980s. As our report shows, a handful of companies, mainly pharmaceutical laboratories and medtechs, share this booming market, which generates around \$120bn a year.

In fact, the term diabetes covers several different realities. First there is type 1, an autoimmune disease whose origin remains mysterious and which often affects young children. For these youngsters, digitisation improves daily management of the disease by facilitating the monitoring of blood sugar and automating insulin injections. Then there is type 2. This form appears later in life, encouraged by genetic factors but primarily by obesity and lack of exercise.

A real revolution is under way in this area, with the appearance of a new class of drugs (GLP-1), which in addition to regulating blood sugar levels also helps patients to lose weight. By treating two major modern scourges (diabetes and obesity), GLP-1s are opening up an enormous new market, which alone could be worth \$90bn by 2030.

This is good news for patients, but should not hide a darker reality. Once a disease of the rich, diabetes now affects

# A global health challenge









a majority of the population in low-income countries. Although less than 10% of the Swiss population is diabetic, the rate is above 20% in North Africa and the Middle East, for example. Yet insulin – a drug invented 100 years ago that is vital for almost 25% of diabetics – is still not available for half of those who need it around the world.

Even in Switzerland, type 2 diabetes is a fundamentally unequal illness. According to a study conducted in Geneva between 2016 and 2017, the prevalence of diabetes was 11.5% among people with the lowest monthly incomes (less than 5,000 francs per household) compared with 4.7% among the most well-off (more than 9,500 francs per household). Although we are fortunate enough to have a high-quality health system and all the necessary treatments, only prevention combined with public health measures will succeed in curing this epidemic in our society.

We hope you enjoy reading!



BY MARC BÜRKI,  
CEO OF SWISSQUOTE

C	O	n	D O S S I E R	t	e	n	t	s
3 Editorial by Marc Bürki								
6 Scans Economic survey	18 Portrait Accelleron: In turbo mode	Diabetes: The 21 <sup>st</sup> century epidemic 26				32 Diabetes goes digital	58 Portrait Warhammer, the unbeatable franchise	
	24 Stock Exchange SIX woos Chinese firms	27 Diabetes, the worldwide plague paying off big time				36 Antidiabetics that keep you trim	64 Auto Testdrive: Mercedes GLC	
14 The crypto gazette		30 Infographic The many forms of diabetes					72 Travel Indonesia, land of fire	
		40 10 firms on solid ground				78 Boutique		
		52 Insulin: A shameful oligopoly				66 A brand, a story Bic, making a lasting mark		
						80 A look inside the lab Bacteria-based green cement		
						68 Swissquote Beware of the fraudsters		

i m p r e s s u m

**Publisher**  
Swissquote  
Chemin de la Crétaux 33  
1196 Gland – Suisse  
T. +41 44 825 88 88  
www.swissquote.com  
magazine@swissquote.ch

**Manager**  
Brigitta Cooper  
  
**Editor-in-chief**  
Ludovic Chappex  
  
**Associate editor**  
Bertrand Beauté

**Editorial staff**  
Bertrand Beauté  
Stanislas Cavalier  
Ludovic Chappex  
Blaise Duval  
Angélique Mounier-Kuhn  
Gaëlle Sinnassamy  
Julie Zaugg

**Design director**  
Caroline Fischer  
Rue de la Navigation 5  
1201 Genève  
  
**Layout**  
Caroline Fischer  
Jérémie Mercier

**Editing (English version)**  
Ose Ayewoh  
  
**Photography**  
AFP, Keystone,  
Getty images,  
iStockphoto, Theispt,  
Unsplash

**Printing, Binding  
and Distribution**  
Stämpfli Ltd.  
Wölflistrasse 1  
3001 Berne  
www.staempfli.com

**Translation**  
Acolad  
  
**Advertising**  
Infoplus AG  
Traubenweg 51  
CH-8700 Küsnacht  
hans.otto@i-plus.ch

**Wemf**  
REMP 2022: 82,521 Ex.  
Print run: 108,400 ex



printed in  
switzerland

**SUBSCRIPTION**  
CHF 40 for 6 issues  
www.swissquote.ch/magazine



S  
.  
n  
.  
a  
.  
c  
.  
S

ENERGY

US gas firms  
are doing just fine



An LNG carrier, a ship carrying liquefied natural gas in its tanks, moored at the Revithoussa terminal, west of Athens.

As a consequence of the war in Ukraine, Russia has shut the taps on its pipelines. Now forced to diversify its energy sources, Europe has turned to American liquefied natural gas (LNG). LNG exports from the United States grew 8% in 2022, and 69% of the gas was sold to Europe, up from 35% in 2021. The boom is pushing American producers to invest in new infrastructure. Cheniere will pour \$8 billion into

its facility in Texas, and plans are firming up to build an LNG plant operated by Qatar Energy/Exxon Mobil. Freeport LNG will bring its Texas facility, damaged by fire, back online in June 2023. The increased capacity is likely to pay off. European LNG imports should continue to grow in 2023 due to non-existent Russian gas, even in this milder than expected winter.

→ LNG → XOM



“Those who truly believe in a capitalistic system will be flooding Ukraine with capital (...) It can be a beacon to the rest of the world of the power of capitalism”

**Larry Fink**, CEO of BlackRock, American asset management giant, on 19 January during the World Economic Forum at Davos.

RANKING

The five most innovative companies (based on the number of patents awarded in the US in 2022)

- 1. SAMSUNG ELECTRONICS  
8,513
- 2. IBM  
4,743
- 3. LG CORPORATION  
4,580
- 4. TOYOTA JIDOSHA  
3,056
- 5. CANON  
3,046

Source: Patent 300 report, from Harnity LLP

Top five best-performing mining companies (based on their market value mid-2022)

- 1. MA'ADEN, SAUDI ARABIA  
+74.7%
- 2. SQM, CHILE  
+58.3%
- 3. SHAANXI COAL, CHINA  
+40.5%
- 4. COAL INDIA, INDIA  
+38.1%
- 5. YANZHOU COAL, CHINA  
+33.3%

Source: Mining.Com

6,021

Number of vehicles sold by Rolls-Royce in 2022, an all-time record for the 119-year-old company and an 8% increase over 2021. The British firm's results were also driven by demand for bespoke models, pushing the average price of a Rolls-Royce over the €500,000 mark.

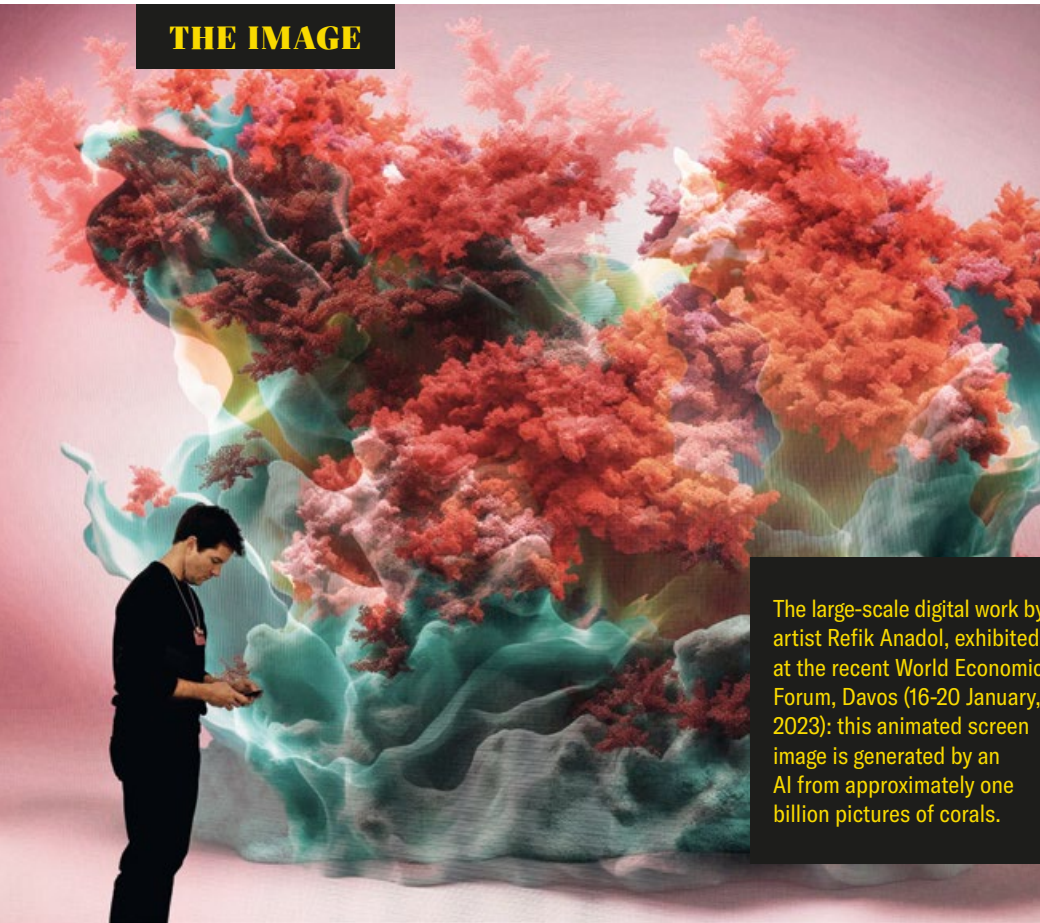
© SHUTTERSTOCK / DR / KEVSTONE



“We had across the globe 70 different, distinct versions of what a crispy chicken sandwich would look like”

**Chris Kempczinski**, McDonald's CEO, justifying his reforms to centralise operations at the fast-food chain, especially in developing menus.

THE IMAGE



The large-scale digital work by artist Refik Anadol, exhibited at the recent World Economic Forum, Davos (16-20 January, 2023): this animated screen image is generated by an AI from approximately one billion pictures of corals.



TOURISM

Travellers making their way back to Jungfrau

The little red Jungfrau Railway train, which takes passengers to the summit of Jungfrau Mountain, struggled through two difficult years during the pandemic, when the tourism industry came to a virtual standstill. But it was back in business in 2022. Last year it carried 625,000 passengers, 71%

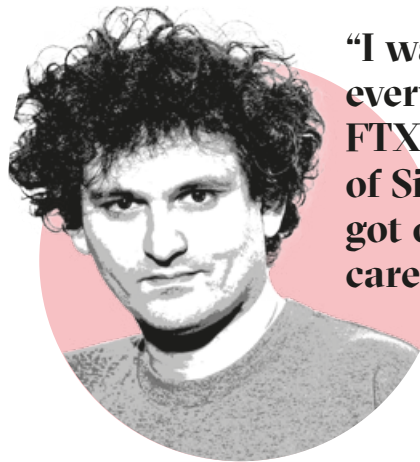
more than the previous year. That is still 40% below figures before the COVID-19 crisis, when more than a million passengers travelled the cogwheel train. Chinese tourists have not yet returned, and many air connections from other countries into Switzerland have not been reinstated. → JFN

FINANCE

Stock exchanges migrate to the cloud

Major stock exchanges are increasingly turning to cloud service giants to host their data. At the end of 2022, Microsoft announced a 10-year deal with the London Stock Exchange to provide cloud computing and data analytics infrastructure and services. In 2021, Google and leading futures exchange CME signed a contract to migrate the operator's data to the cloud. Meanwhile, Amazon Web Services has architected a similar arrangement with Nasdaq.





**“I was on the cover of every magazine, and FTX was the darling of Silicon Valley. We got overconfident and careless”**

FTX founder **Sam Bankman-Fried** about the collapse of his cryptocurrency empire.

**4.7  
BN**

The airline industry's total seat capacity at the end of 2022, up by a third from the previous year. Experts project that the number of passengers will not return to pre-crisis level until 2024.

© VOLOCITY / VERILY



PHARMA

## Breakthrough in Alzheimer's treatment

Lecanemab, a drug developed by the Japanese company Eisai and the US company Biogen, has been shown to slow cognitive decline by 27% in patients in the early stages of Alzheimer's, according to the results of a phase 3 clinical trial. The monoclonal antibody works by reducing the build-up of beta-amyloid plaques in the brain. This success comes after years of failures, such as the disappointing results with a similar drug by Roche, gantenerumab. Lecanemab was approved by the US health authorities in early January, making it just a jump away from market release in the US. But its high price – \$26,500 per year – could limit patient access.

→ 4523 → BIIB

HEARING

## Sonova joins forces with Sennheiser

Sonova has launched a new product somewhere between an earphone and a hearing aid, in partnership with audio brand Sennheiser. Designed for people with only slight hearing impairments, the earbuds make it easier for users to hear in a noisy environment. The main draw? As they are not a medical device, they do not require special approval from



the health authorities in the markets where it is sold. The launch of these headphones comes after the acquisition of the consumer division of Germany's Sennheiser by Zurich-based Sonova in 2021 for €200 million. → SOON

HEALTHCARE

## Laboratory mosquitoes eradicate dengue fever

Verily, Alphabet's life sciences division, is leading an innovative project in Singapore to eradicate dengue fever in the country. It has released millions of male mosquitoes infected with Wolbachia bacteria. When they mate with wild females, the resulting eggs do not hatch, thus reducing the population of Aedes aegypti mosquitoes, which transmit not only dengue but also other diseases such as Zika, chikungunya and yellow fever. In the neighbourhoods where



Two Verily employees in a larval-rearing laboratory.

these laboratory mosquitoes have been deployed, the number of Aedes aegypti has fallen by 98% and cases of dengue fever have decreased by 88%. → GOOD

**185%**

Current household debt-to-income ratio in Canada. That percentage stands at 202% in Australia and 203% in Sweden. The situation stokes fears that these countries could be reeling into a subprime-type crisis.

TRANSPORT

## Flying taxis for Paris by 2024

Europe's first vertiport recently opened at Pontoise-Cormeilles, a regional airfield northwest of Paris. Operated by Groupe ADP (formerly Aéroports de Paris), the facility will be home to air taxis developed by the German firm Volocopter. The aircraft looks something like a giant drone with electric rotors and a pilot. Passengers will be able to buy their ticket via an app and check in using a facial recognition system. By the Paris 2024 Summer Olympic Games, a dozen of these flying taxis will be operational on two routes. Aviation heavyweights, including Boeing and Airbus, are developing their own air taxis for a similar project in California. The aircraft could eventually become pilotless, freeing up the pilot's spot.

→ ADP



A flying taxi from the German firm Volocopter on the tarmac at the Pontoise-Cormeilles vertiport, near Paris.

## THE QUESTION

**Only 8.5% of companies in the EU and G7 countries have closed their subsidiaries in Russia, according to a study published in January by IMD and the University of St. Gallen. Why do most companies stay there, despite the pressure?**

“There are multiple reasons. A Western company operating in a sector not covered by official sanctions may decide that it is inappropriate to abandon its Russian customers. In some cases, companies stay due to the nature of their products (life-saving drugs for example) or because they don't want to lose long-standing relationships with employees and suppliers.

But even when a company has decided to pull out and has publicly pledged to do so, it still needs to sell its subsidiary. And once a buyer has been found and a price agreed, the Russian government may still put obstacles in place to hinder or delay the sale. The question raised by our analysis is to what extent are companies really aligned with policy-makers? And, even if they are, do they have the capacity to extricate themselves from Russia at the speed politicians expect from them without suffering massive losses?”

**Niccolò Pisani**, professor of Strategy and International Business at IMD.



## IPO

## VinFast targets the Nasdaq to enter the US market

Vietnamese electric vehicle manufacturer VinFast is revving up for its IPO on the Nasdaq. The automaker hopes to raise cash to finance the construction of a factory in North Carolina, which is expected to boost capacity by 150,000 vehicles per year and enable it to compete with US manufacturers in the EV market. With its battery subscription programme

prices, VinFast vehicles out-price those of its competitors. Launched in 2019 and owned by the Singapore-based conglomerate Vingroup, the company began delivering its first Vietnam-made electric cars last November. VinFast reports that it has logged nearly 65,000 orders globally and plans to sell 750,000 electric cars a year by 2026. → VFS

**\$40 BN**

This is the profit announced by Shell, the highest in 115 years of existence. However, the company will only pay the UK government \$134 million under the windfall tax introduced last year.



**“If the lesson was learned from Ukraine, we need cheap, reliable, safe, secure energy, of which 80% comes from oil and gas. And that number’s going to be very high for 10 or 20 years”**

**Jamie Dimon**, CEO of JP Morgan.

## CLIMATE

## Glencore under attack for coal operations

The Swiss mining group Glencore has no plans to get out of the coal business. In fact, its coal division is one of its most profitable, especially since the war in Ukraine. Prices have surged, enabling it to generate \$8.9 billion in the first half of 2022. But shareholders of the Zug-based group are now questioning this strategy. Several of them, including LGIM, HSBC Asset Management, Vision Super and the Ethos Foundation, have filed a resolution demanding that the firm disclose how much it is spending to develop its coal mines and how it will go about meeting its environmental commitments. Glencore currently generates 280 million tonnes of CO<sub>2</sub> per year in direct and indirect emissions, the same as Spain. The resolution will be discussed at the AGM in May. → [GLN](#)

A coal mine operated by Glencore in South Africa.

© GLENCore

GRAFF.COM ©2023



GRAFF

THE MOST FABULOUS JEWELS IN THE WORLD





CO<sub>2</sub>

### Holcim wants to make green cement

The cement industry is one of the biggest polluters. Alone, it gener-

ates 8% to 10% of the world's CO<sub>2</sub> emissions. In efforts to reduce this carbon footprint, operators have started to make its cement mixes with more environmentally friendly materials, such as fly ash, silica fume or calcium carbonate. For example, a plant can cut its CO<sub>2</sub> emissions 69% by adding just 2% of calcium carbonate to a cement mixture. This is the context surrounding Holcim's recent acquisition of the Italian firm Nicem. The firm has been operating a quarry near Bergamo since 1971 where it extracts calcium carbonate with a calcium carbonate ratio greater than 99.7%. Its products will complement the Swiss group's ECOPact concrete and ECOPlanet cement. → HOLN

BUST

### Mini iPhone fails to impress

The latest version of the iPhone SE, introduced in March 2022, is struggling to garner much enthusiasm among Apple fans. The device is aimed at people looking for a cheaper smartphone than the classic iPhone, but sales have been lacklustre since its launch in 2016. Few customers are even aware that a new iteration is available. First, Apple has not been running any special ads to promote the release of its latest generation iPhone SE. Also, the device has suffered from its small size. These days, audiences are migrating away from compact devices and flocking increasingly towards larger screens. Apple seems to have got the message. It will probably no longer offer models in a mini format. → AAPL

50.7%

Combined market share of the two Chinese electric vehicle battery makers, CATL and BYD, at the end of 2022. The manufacturers have widened their lead over their Japanese and Korean competitors on healthy demand for green vehicles in China and their capacity to absorb higher lithium and nickel prices.

“At our price points and our basket sizes e-commerce doesn’t just take some of the margin, it takes all of it”

George Weston, CEO of Associated British foods, which owns Primark, explaining why the brand doesn’t sell its clothes online.



© HOLCIM



SPACE EXPLORATION

### Europe struggles to reach the stars

The European Space Agency (ESA) has racked up a string of failures. At the end of December, the Vega-C rocket, built by the Italian company Avio, ran into a technical problem a few minutes after lift-off, destroying the two satellites it was carrying to complete the Pleiades Neo constellation of imaging satellites. The setback comes at a time when the programme to develop the Ariane 6 rocket, led by Airbus and Safran, is several years behind schedule. The ESA scouts out space exploration opportunities from the private sector, following the NASA model. For example, the US space agency has hired SpaceX to build and operate its rockets. For the ESA, Virgin Orbit is the likely candidate. But the British firm also lost a rocket in early January, which crashed into the Atlantic after the craft failed to reach sufficient altitude.

RADO  
S W I T Z E R L A N D

MASTER OF MATERIALS

RADO.COM



TRUE SQUARE OPEN HEART

Feel it!



# "The sector has become more mature"

**Swiss startups active in the blockchain sector are in great shape. Interview with Mathias Ruch, founder and CEO of venture capital firm CV VC.**

BY LUDOVIC CHAPPEX

→  
Mathias Ruch,  
CEO of CV VC

**C**V VC stands for Crypto Valley Venture Capital. This Zug-based company, founded in 2018, invests in startups in the blockchain sector. It also has branches in Liechtenstein, Cape Town and Berlin. Its founder and CEO Mathias Ruch is one of the top experts in the Swiss blockchain ecosystem, in which Zug and Zurich are the beating heart. More than half of Crypto Valley's 1,135 companies are based there. The others are mainly divided between Liechtenstein, the canton of Geneva and Ticino.

## Why do so many blockchain startups choose to be based in Switzerland?

The Swiss legal framework is at the forefront in this field, which is a major advantage. In addition, there's also the region's political stability and ideal positioning from a commercial perspective. The hubs of Geneva, Neuchâtel, Zurich, Zug and Ticino also give Switzerland an ecosystem that is unique in the world. Some obstacles do exist, however, such as the high cost of living and the difficulty hiring employees from developing countries, which can put off some startups.

© CV VC

**A report that you published in January shows that the overall valuation of Crypto Valley firms jumped in 2022, although at the same time the price of cryptocurrencies fell sharply... Isn't that paradoxical?**

No, because blockchain is about more than cryptocurrencies. We're now seeing companies that use blockchain technology thriving in their own right. In the cryptocurrencies sector, founders often propose a business plan in the form of a white paper and obtain money via an ICO, sometimes at a very early stage. The token is essentially used to raise funds. In the case of the entrepreneurs we support, they first build something functional based on blockchain technology, without necessarily issuing a token.

**the last five years. We are still waiting for truly mass-market applications to become widespread...**

When it comes to cryptocurrencies, it may certainly appear that things are not moving forward or that history is repeating itself. We're still seeing the same desire for a quick buck, the difference being that trading and investing opportunities have become more numerous and more accessible, with huge trading platforms. But this only concerns the speculative side. As venture capitalists looking for tech startups developing practical solutions, we come from a different angle. We see that the sector has become more mature. I agree that the tools deployed are not always user-friendly, but several companies offer profitable business

models, including those that don't – or don't yet – offer tokens to invest in.

## "The market correction has helped to sort viable projects from the rest"

**Isn't the entire sector threatened by the deluge of scams in 2022, such as the collapse of the Terra (LUNA) token and the high-profile bankruptcy of the FTX exchange platform? The Zug-based broker Covario, which went bankrupt in December, paid the price in particular...**

These events affect us indirectly as most people don't make a distinction between blockchain technology and cryptocurrencies. One of the real difficulties we face in our industry is explaining these activities to the public. I'm delighted that, so far, no Crypto Valley company has been involved in a similar scandal, demonstrating the importance of a clear legal framework →

The fact remains that Crypto Valley companies are in remarkable health given the current economic context. There are currently 1,135 companies, compared to 1,128 a year earlier and the total number of employees has remained almost stable (5,766 vs 6,002), even as tech giants made massive redundancies. Among the top 50 companies in Crypto Valley, the number of employees even jumped by 24% (1,248 vs 1,010).

**From the outside, however, the blockchain sector does not appear to have evolved much in**

## Crypto spotlight

### SOLANA (SOL)

**Rising from the ashes.** The share price of SOL – the native token of the Solana blockchain, presented as a serious competitor to Ethereum and Cardano – took a worrying tumble in the wake of the FTX scandal, dropping from around \$35 in early November to a low of under \$9 at year-end. That's a long way from its peak of \$260 in November 2021. What caused the share price to tumble was the Solana Foundation's financial relations with FTX, which had investors worried that the collapse would be contagious. The Solana Foundation said in November that it had tens of millions of dollars in cash or cash equivalents on FTX.com, and also held 3.23 million shares in FTX Trading Ltd. In addition, the sister companies FTX and Alameda Research had supported the Solana project by buying over 58 million SOL tokens.

**Despite this major blow,** SOL's price rebounded spectacularly in the first two weeks of January, up to around \$25. This momentum continued with the price staying above \$20 at the start of February, amid a general upward trend in the market.



The

crypto

gazette

More broadly, the market correction has helped to sort viable projects from the rest. That's a positive. The current situation is attractive to us. As a venture capital company, we invest for the long term, over eight or 10 years. And although the blockchain sector is still in the deployment phase, our portfolio is already growing.

The top 50 Crypto Valley companies are mainly fintechs. Why is this sector so prevalent?

It's probably due to the fact that blockchain emerged with bitcoin, followed by other means of payment. And let's not forget that, as a financial centre, Switzerland has always been very successful thanks to its capacity for innovation. For the first time this year, however, more than half of the startups ranked in the top 50 are from outside the

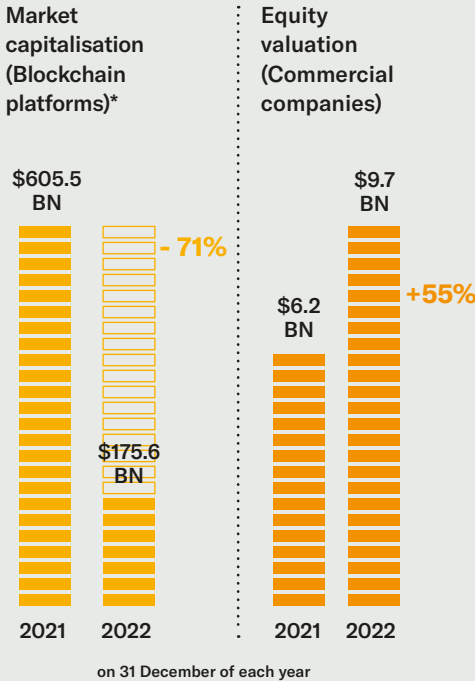
financial sector. Previously, the proportion was more like two-thirds fintechs.

Which non-fintech Crypto Valley startups are you investing in?

A few come to mind. AdHash, a company based in Zug, is developing a solution to monetise online advertising much more efficiently, for example. The idea is to offer better prices, both for the platform and the advertiser, by cutting out unnecessary technical intermediaries. The company is working with Ringier, among others.

Cybera is another very interesting example. It's tackling cybercrime in the crypto industry. Its head office is in New York but the founders are Swiss. We should also mention Utopia Music, based in Zug and founded by Swedish entrepreneurs, which is current-

Crypto Valley in figures



Although the size of the cryptocurrency market fell sharply in 2022, the valuations of Crypto Valley companies active in blockchain increased significantly. Among large valuations, Sygnum, SEBA Bank and 21.co, the first global issuer of products denominated in cryptocurrencies, raised almost 200 million Swiss francs between them last year.

\*Top 50 entities headquartered in Crypto Valley, including giants such as Ethereum, Cardano, Solana, etc.

Source: CV VC TOP 50 REPORT 2022



ly one of the fastest-growing European tech startups. It offers a solution allowing fairer and more efficient remuneration for artists. Also based in Zug, Vereign is developing an online digital identity management solution.

↑ Mathias Ruch on stage at the World Economic Forum in Davos on 17 January.

Outside Switzerland, what are the most notable trends in the sector?

Silicon Valley remains extremely powerful. The venture capital ecosystem for startups is much more developed there than anywhere else in the world. If the United States manages to come up with a clear legal framework for blockchain and cryptocurrencies, there will be a strong concentration in that area. There's also the fact that uses of blockchain technology

vary by region, and that Africa really stands out. The volume of cryptocurrency transactions is growing faster there than anywhere else and we're seeing a large number of remittance-related applications. In our last funding round, we received more applications from Africa than from the rest of the world put together. The quality of applications was also higher than those from developed countries and the startups were at a more advanced stage, too. Among the startups in our portfolio is a company called Mazzuma, based in Ghana, which specialises in mobile payments. It already offers its customers an app and is in the process of integrating blockchain technology into its service. ▲

cryptos express

Visa teams up with Ethereum

Visa has been taking its cryptocurrency payment trials to the next level in recent months. On the sidelines of an event in Tel Aviv this February, Cuy Sheffield, head of crypto at Visa, said his company had been testing how to accept payments in USDC (a digital stablecoin pegged to the dollar) starting on Ethereum, adding that these were "large value" payments. Sheffield also said that the ability to convert digital currencies into traditional currencies and vice versa would be essential in the future of global transactions.

Pyongyang is using "increasingly sophisticated cyber techniques to gain access to digital networks involved in cyber finance." American firm Chainalysis is even more bleak, estimating that the amount stolen in 2022 by North Korea is up to \$1.4 billion.

Staking in the sights of the SEC

The rumour mill was becoming ever more insistent. The Securities and Exchange Commission (SEC), the powerful American finance regulator, has decided to clamp down on staking for private individuals in the United States. Pressure began to mount last autumn when Ethereum transitioned from Proof of Work to Proof of Stake. SEC officials suggested that staking made ETH a security rather than a currency and that this definition could apply to other cryptocurrencies using Proof of Stake. On 10 February, the rumour became reality: the SEC claimed its first victim by imposing a fine of \$30 million on American exchange platform Kraken, and ordering it to close its staking service in the US. A story to follow.

North Korea: experts in crypto theft

\$630 million in cryptocurrencies. This is the staggering sum that North Korean state-sponsored hackers allegedly stole online in 2022, according to a UN report. This isn't the first time North Korea has engaged in cryptocurrency theft, but the report – seen by news agency Reuters on 6 February – says the country appears to have stepped up its efforts last year. UN investigators revealed that



PORTRAIT

# Accelleron: In turbo mode

Created in 2022 as a spinoff from ABB, the Swiss firm is a leader on the market for high-power turbochargers. And concerns about sustainability in shipping are fuelling its performance.

BY JULIE ZAUGG

**T**en times a day, the fast ferry operated by the Danish company Molslinjen crosses the Baltic between the island of Bornholm, Denmark, and the town of Ystad, Sweden, in 80 minutes. Performing the feat is the world's largest diesel-powered catamaran, powered by turbochargers from the Swiss company Accelleron. But servicing those turbochargers is a real challenge. The ship only docks for five hours in the middle of the night, so the engineers at Accelleron, the group formed after ABB spun off its turbocharger business in 2022, therefore hatched a plan, timed down to the minute.

The engineers would take the necessary measurements during the day, while the ship was in service, and perform a blitz overhaul during the night. By proceeding this way, they managed to service the ferry's eight turbochargers without disrupting operations.

The team also spotted parts that could be replaced with new components, reducing the ship's CO<sub>2</sub> emissions by an amount equivalent to planting 35,000 new trees a year. Molslinjen's energy bill was also slashed by \$200,000 per year.

Invented in 1905 by Swiss engineer Alfred Büchi, turbochargers were first installed on the engine of a ship built in 1924 by Brown Boveri & Co, which later became ABB. They are designed to optimise the performance of combustion engines. "The system consists of attaching a turbine to a compressor," says Ricardo Martinez-Botas, professor of Turbomachinery at Imperial College London. "Engine exhaust gases are fed into the turbine, activating the compressor and thereby forcing more air through the engine."

As combustion occurs when fuel interacts with air, the more air you have, the more power you produce. "With a turbocharger,

↑  
An Accelleron A 200-H turbocharger. This model is used in particular on stationary generator sets.

## IN NUMBERS

**180,000**  
Number of Accelleron turbochargers deployed worldwide through its 6,000 customers.

**2,300**  
Number of employees in over 50 countries.

**405,000 tonnes**  
CO<sub>2</sub> emissions reduction achieved by the shipping industry every year using Accelleron turbochargers.

© ACCELLERON

**"With a turbocharger, the same amount of power is achieved with a smaller engine"**

Ricardo Martinez-Botas, professor at Imperial College London

the same amount of power is achieved with a smaller engine," the engineer says. And that increases efficiency. "A smaller engine consumes less fuel because it is lighter and causes less friction," he explains.

At first, turbochargers were mainly installed in aircraft, to facilitate air compression at high altitudes, and were later introduced on lorries, ships and trains to boost their cargo capacity. "In the 1970s and 1980s, they started going onto cars to improve performance and reduce CO<sub>2</sub> emissions," says John Allport, professor of Automotive Engineering at the University of Huddersfield. In the mid-1990s, a new generation of turbochargers was developed alongside the emergence of supertankers used in maritime shipping.

From the beginning, ABB and now Accelleron have played a central role in the industry. "We invented the turbocharger,"

Daniel Bischofberger, Accelleron's CEO, says, "and have continued to invest in the technology for the past 100 years." In 2021, ABB's turbocharging division spent 7% of its revenue on research and development.

Today, Accelleron specialises in medium- and high-speed engines for the marine and power industry. "Our equipment is installed in cargo ships, cruise ships, power plants and emergency generators, such as those used by hospitals, nuclear power plants and data centres," says Bischofberger. Delivering some 10,000 devices per year, the company sells 40% of the turbochargers on the market, which has secured it a leading position.

"Its machines are the Rolls-Royce of turbochargers," Ricardo Martinez-Botas says. "Their quality, efficiency and durability are second to none." Accelleron's turbochargers can significantly increase the power of a ship's engine and reduce its CO<sub>2</sub> emis-





↑  
The Express catamaran ferry from the Danish company Molslinjen. This giant of the seas is equipped with Accelleron turbochargers.

**“We are targeting 2% to 4% organic growth per year, in an industry that’s growing 1% to 2% per year,”**

Daniel Bischofberger, Accelleron’s CEO

sions by 10%. Their resilience is also unparalleled. “Our turbochargers can last for at least 30 years, but that’s only limited by the life cycle of the ship itself,” says Daniel Bischofberger. This is a key advantage, considering that it is extremely expensive to dock a ship if a breakdown occurs.

However, turbo-charger sales only represent a quarter of Accelleron’s revenue. The rest mainly comes from service agreements, such as the one with the Danish ferry operator Molslinjen. “We have 100 service centres, with 500 engineers specialising in servicing, and a warehouse with 15,000 spare parts in Switzerland,” Accelleron’s CEO says. “We can deliver those parts to any airport in the world in less than 48 hours.”

Two categories of service agreement are employed. For ship engines, which can weigh up to 2,000 tonnes and be as large as a multi-storey building, the Swiss firm’s engineers provide on-site servicing and repairs. For smaller engines, such as those used in the power industry, Accelleron replaces the turbo-charger that needs work with an exchange unit. “Instead of being forced to take their engine offline for one or two months, which is the usual amount of time required for turbo-charger service, our customers wait no more than a few days,” Bischofberger says.

Accelleron also sells software to optimise the efficiency of its turbochargers and the vessels they operate on. The solution Tekomar Xpert calculates an engine’s fuel consumption and CO<sub>2</sub> emissions, while providing insight into ways to improve performance.

“For older engines, the software can suggest adjustments to achieve efficiency close to that of a new aircraft,” says the CEO. “On ships, it indicates when the hull and propeller need cleaning to reduce drag in the

© MOLSLINJEN / YVONNE BOLLMANN



water and therefore energy losses.” Tekomar Xpert is currently installed on some 2,000 ships, representing 5% to 10% of the potential market for this type of software.

Accelleron hopes these advantages will attract market share away from the competition. “We are targeting 2% to 4% organic growth per year, in an industry that’s growing 1% to 2% per year,” Daniel Bischofberger says. The firm’s competitors are few. “Only about 10 turbocharger manufacturers exist worldwide, and most specialise in the automotive industry,” Ricardo Martinez-Botas says. “The Japanese firm Mitsubishi Heavy Industries is the sole operator with a line-up of turbochargers for large engines like that of Accelleron.”

John Allport points to the high barriers to entry. In the early 2000s, Bosch and Continental both tried to enter the turbo-charger market and failed. “These are extremely complex devices,” the expert says. “When a turbocharger engineer graduates from university, it takes another three to

four years of in-company training before becoming operational.”

John Allport nevertheless believes that the days are numbered for this 100-year-old contraption. “Pressure is mounting in the maritime industry, one of the world’s biggest polluters, to reduce its CO<sub>2</sub> emissions,” he says. “This means moving away from combustion engines.” For example, the International Maritime Organization has announced a target to cut CO<sub>2</sub> emissions by 70% by 2050, compared to 2008. The energy sector has pledged to be carbon neutral by the same year.

This transition is already under way in the automotive sector, somewhat of a role model. “Practically no investment is going into research, development or innovation in turbochargers for cars, because the industry is banking on a transition to electric vehicles,” John Allport says. Ricardo Martinez-Botas agrees and anticipates that the turbocharger industry will start to gradually decline as of 2030. →

↑  
Daniel Bischofberger, CEO of Accelleron since March 2022. This mechanical engineer, graduate of ETH Zürich and holder of an MBA from INSEAD, previously held management positions at Alstom, ABB and Sulzer.





↑  
The Accelleron  
headquarters  
in Baden  
(3 October,  
2022).

But Daniel Bischofberger is convinced that the sectors in which Accelleron has chosen to develop will be spared. “An electric motor on a cargo ship is not a viable option because the batteries are too heavy,” he says. A container ship on the month-long route from Asia to Europe would have to carry batteries weighing a total of 200,000 tonnes, equivalent to almost its entire shipping capacity.

Similarly, power plants and emergency generators cannot provide a secure and continuous supply of energy from intermittent sources such as wind or solar, and storage solutions are not yet developed.

Bischofberger predicts, however, that the efficiency gains resulting from Accelleron's turbochargers will open up new markets in a world increasingly alarmed about CO<sub>2</sub> emissions. “Up to now, the energy performance of emergency generators has gone largely unregulated, but that is starting to change,” he says. Accelleron has recently developed a new

product specifically for this segment.

The maritime and energy industries are likely to eventually transition towards engines running on synthetic hydrogen or biofuels, such as methanol, he says. But they will still require turbochargers. “Improving their energy performance will be even more crucial, as synthetic hydrogen costs 8 to 10 times more and biofuels twice to three times as much as fossil fuels,” the CEO adds.

The Accelleron CEO feels there is still promise for the future. “We cannot yet produce enough carbon-neutral fuels to power the entire maritime and energy sector,” he says. And then he closes, “The internal combustion engine has not had its last hurrah. ▲

#### ANALYST ADVICE

#### Encouraging results and impressive profitability

Listed on the Swiss stock exchange since last October, after the spinoff from its parent company ABB, Accelleron has experienced a rise in its share price from 18 Swiss francs at the time of the IPO to more than 22 francs (at end-January). Deutsche Bank analyst John-B Kim believes that the share price could climb to 24 Swiss francs in the medium term, fuelled by Accelleron's upbeat results. Its service agreement activity is the main driver, as this segment, which accounts for 75% of the firm's revenue, is more or less impervious to economic fluctuations. In 2021, revenue totalled \$756 million.

Accelleron also benefits from higher demand for natural gas, which is pumping demand for its turbochargers for gas compression stations and for ships that can transport liquefied gas. For 2021, the company believes its revenues will be up 6%. Its operating margin is expected to reach 24%, meaning it enjoys a better position than its competitors. A dividend payout of around \$75 million will go to its shareholders in the first half of 2023. John-B Kim has issued a Buy recommendation. Most analysts recommend buying or holding shares. — ACLN

# 48<sup>TH</sup> INTERNATIONAL EXHIBITION OF INVENTIONS GENEVA

UNDER THE PATRONAGE OF  
THE SWISS FEDERAL GOVERNMENT,  
OF THE STATE, THE CITY OF GENEVA AND  
OF THE WORLD INTELLECTUAL PROPERTY  
ORGANIZATION WIPO

## 26-30 APRIL 2023 PALEXPO

INVENTIONS-GENEVA.CH

Bilan

LE TEMPS

Inventions  
Geneva

palexpo





## STOCK EXCHANGE

# SIX woos Chinese firms

**Nine Chinese companies have floated on the Swiss stock exchange since mid-2022, and some thirty others are thronging to join them. The exchange owes its success to the tensions between Beijing and Washington, and to the simplicity of its procedures.**

BY JULIE ZAUGG

There's something of the gold rush about it. Since the launch of the "Connect" programme between the Swiss stock exchange and the Shanghai and Shenzhen stock exchanges last July, nine Chinese companies have floated in Zurich, raising a total of \$3.2 billion. "Some thirty other companies have expressed an interest," says Wang Hang, a partner at Baker McKenzie, who assisted with the Swiss IPOs of most of those companies.

"Most are big companies, and some even have a dominant position in their respective markets and are already listed on the Shanghai or Shenzhen exchanges," says Patrick Förg, head of origination at SIX Swiss Exchange. They joined the Swiss exchange by listing global depository receipts, which are financial instruments representing A shares of companies listed on a Chinese exchange. It's their only option. "At the moment, companies that are domiciled in China

can't be directly listed on the SIX," says Förg.

Among the Chinese companies drawn to the Swiss exchange were lithium-ion battery makers Gotion High-Tech, Sunwoda Electronics, GEM Co and Ningbo Shanshan, and pharmaceutical groups Lepu Medical Technology and Joicare Pharmaceutical. Several companies in the semi-conductor industry have expressed an interest in going public in Switzerland, says Wang. Battery giant CATL, which has 35% of the global EV battery market, reportedly also wants to float in Switzerland and is hoping to raise \$5 billion.

If Chinese companies are looking to list abroad, it's because they need to raise funds. "It allows them to gain access to global financial markets,

diversify their pool of investors and expose themselves to other currencies," says Förg. Matthias Courvoisier, partner at the Zurich office of Baker McKenzie, says that a large share of the funds raised are spent in Europe, often to expand the company's footprint in those markets. "Exporting capital from China is complicated, because of limits on currency outflows set by the government," he says.

But why Switzerland? "Traditionally, Chinese companies looking to list abroad have turned to the US or Hong Kong," says Wang. "But since 2018, the American option has lost traction, owing to tensions between Washington and Beijing." According to data firm Refinitiv, the value of Chinese listings on US stock exchanges over the first 10 months of 2022 was just \$152.5 million, versus \$12.8 billion in 2021.

"The Hong Kong stock exchange, on the other hand, is suffering from the recession that struck the small territory as well as the higher requirements – particularly in terms of financial profitability – it imposes on companies looking to list there," Wang adds. Since 2022, companies have been required to show that they

generate at least 80 million HKD (9.3 million Swiss francs) in cumulative profits over three years to join the Hong Kong exchange.

In Europe, Chinese companies can choose between London, Frankfurt and Zurich. But London and Frankfurt are struggling to attract companies from China. "It takes at least six months to complete an IPO on those exchanges, versus three to four months in Switzerland," says Wang. This is thanks to Switzerland's simpler procedures. "Switzerland only performs a formal examination of the firm's prospectus prior to its IPO, whereas in Germany and the UK, the prospectus undergoes several rounds of consultations," he says.

Chinese companies also like the fact that the Swiss exchange accepts accounts audited under Chinese standards, which is not the case in London or Frankfurt, Wang adds. In 2020, US authorities announced that Chinese companies must make their accounts available to American auditors. Those that refuse to do so will be delisted.

Ultimately, however, Switzerland will not be able to compete with giants such as the Nasdaq or the New York Stock Exchange, says Drew Bernstein,

co-chairman of the accounting firm Marcum Asia. "The depth and diversity of sources of capital are unparalleled in the United States, as are the volume and levels of available liquidity,"

he says. The biggest Chinese listing on SIX – chemicals group Jiangsu Eastern Shandong – raised 718 million dollars. In the US, IPOs for Chinese companies are often in the billions of dollars.

But Switzerland has a strong hand to play, says Bernstein, that could attract mid-size Chinese

companies looking to expand their presence in European markets by building a factory or developing their distribution network. SIX CEO Jos Dijsselhof recently echoed this point a bit more colourfully: "The Swiss exchange is perfect for companies that would rather be a big fish in a small pond than a small fish in a big pond." ▲

**"A large share of the funds raised are spent in Europe"**

Matthias Courvoisier, partner at the Zurich office of Baker McKenzie



R  
E  
I  
S  
O  
D  
D

# Diabetes, the worldwide plague that pays off big time

- 30 Infographic:  
The many forms  
of diabetes
- 32 Diabetes goes  
digital
- 36 Antidiabetics  
that keep  
you trim
- 40 10 firms  
on solid  
ground
- 52 Insulin:  
A shameful  
oligopoly



Driven by higher patient numbers, the global diabetes market, currently valued at \$120 billion, is expected to reach nearly \$320 billion by 2030.

BY BERTRAND BEAUTÉ



“It is very exciting to see how these innovations will change management of the disease”

Marina Record, investment manager at Baillie Gifford

643 million people in 2030 and 783 million by 2045.

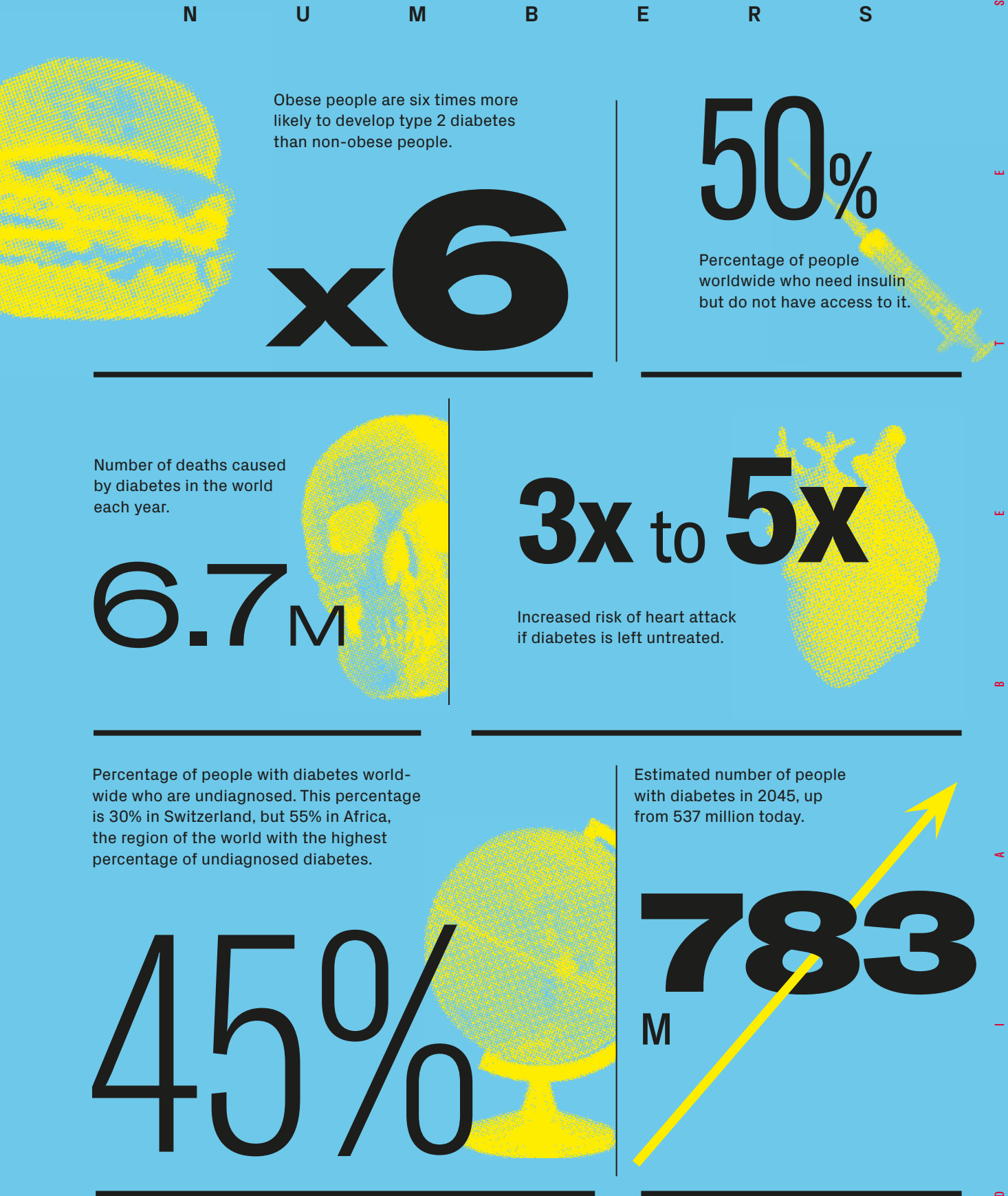
“The world, including Switzerland, is facing a diabetes epidemic,” says Dr Karim Gariani, head of the diabetology unit at the University Hospitals of Geneva (HUG). “The prevalence of this disease is increasing everywhere.” Characterised by a chronic excess of sugar in the blood (hyperglycaemia), diabetes exists in two main forms. Type 2, which accounts for 90% of cases, is the form that is increasing the most, because onset is driven by excess weight and a sedentary lifestyle. Obese people are six times more likely to develop type 2 diabetes than non-obese people. “To avoid developing type 2 diabetes, you should eat a balanced diet, keep your body mass index (BMI) below 25 and get regular exercise,” Dr Gariani says. “Unfortunately, today’s sedentary society is not conducive to this lifestyle, and the prevalence of type 2 diabetes just keeps growing.”

However, for type 1 diabetes, an autoimmune disorder, no preventive measures can be taken. Its causes remain largely unknown, but onset can be sudden, generally before age 20. The number of people with type 1 diabetes is also increasing, but at a slower rate than type 2, around 3% to 4% per year (see p. 34).

“Whatever its type, diabetes is chronic. Patients have to

take medication for the rest of their lives,” says Arelis Agosto, senior healthcare analyst at Global X ETFs in New York. “In the United States, for example, diabetics spend an average of \$12,000 a year on their care.” As a whole, the global diabetes market is currently worth \$118 billion a year. Allied Market Research estimates it will reach \$317.9 billion by 2030, which comes out to annual growth of more than 10%.

“Growth in the global market stems from the higher number of patients, as well as innovations that will increase the price of treatments,” says Pierre Corby, healthcare equity specialist at Union Bancaire Privée (UBP). “New treatments and devices have been launched on the market in recent years. They are expected to generate significant revenues in the future.” Experts agree that two major revolutions are currently disrupting diabetes management: digital care, mainly for type 1 patients, and the emergence of new classes of drugs for type 2 patients. “A lot of changes are happening,” says Marina Record. “It is very exciting to see how these innovations will change management of the disease.” ▲

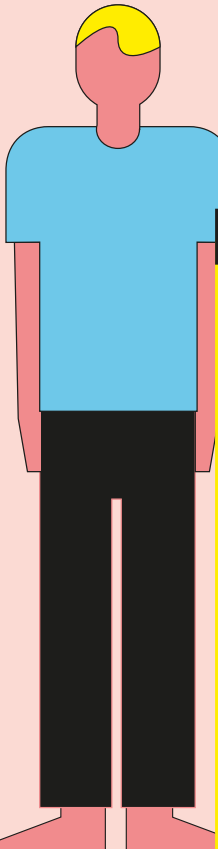




# The many forms of diabetes

A chronic metabolic disorder, diabetes is characterised by abnormally high levels of sugar in the blood. The disease is divided into three main types.

During a meal, the body ingests food that the stomach partially transforms into sugars (glucose and fructose). Glucose then passes into the blood and blood sugar rises.

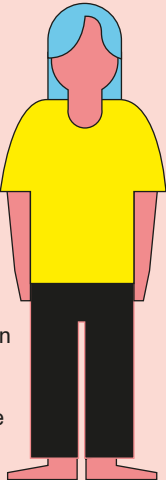


## Normal situation

Beta cells in the islets of Langerhans produce insulin.

Insulin allows cells to absorb glucose in the blood. Glucose is taken up by the liver, muscles and fatty tissue to be used or stored.

Blood sugar levels drop and return to normal.



## Type 1 diabetes

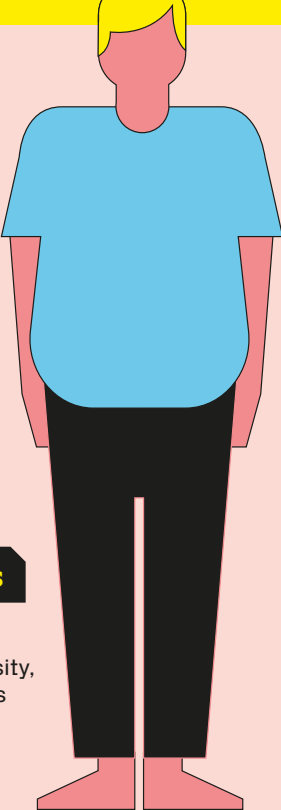
The immune system has destroyed the beta cells in the islets of Langerhans. In 50% of cases, onset of the disease occurs before age 20.

The body cannot produce any insulin at all.

Without insulin, blood sugar levels rise. The body is in a state of persistent hyperglycaemia.

Chronic hyperglycaemia eventually leads to serious complications (cardiovascular, renal and ocular).

The only treatment is regular injections of insulin to lower blood sugar levels. If too much insulin is injected, the patient can go into hypoglycaemia. If left untreated, the disease leads to death.



## Type 2 diabetes

Lack of exercise, obesity, and hereditary factors interfere with insulin production.

Beta cells in the islets of Langerhans cannot produce enough insulin, or cells do not react effectively to insulin (known as insulin resistance).

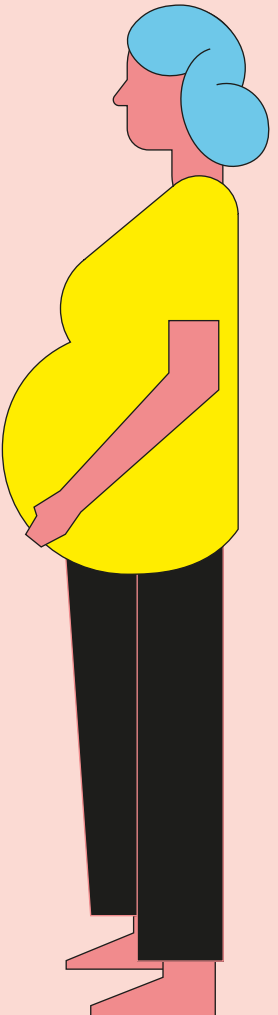
Depending on the stage of the disease, little or no glucose is absorbed by the liver, muscles and fat tissue.

Blood sugar levels remain high. This prolonged hyperglycaemia is toxic for the heart, brain, retina and kidneys.

In the early stages of the disease, type 2 diabetes can be controlled through a healthy diet and exercise.

If it reaches the intermediate stage, non-insulin antidiabetic drugs are prescribed.

In the most severe stage of the disease, insulin injections are required. Type 2 diabetes then resembles type 1 in all respects.



## Gestational diabetes

10% to 15% of women develop gestational diabetes, making it one of the most common complications during pregnancy.

Hormonal changes during pregnancy increase the mother's need for insulin. But the pancreas does not produce enough of it.

Glucose levels rise in the mother's blood.

Due to the mother's high blood sugar, the baby produces more insulin. This increases the risk of developing several complications for both the mother and the baby.

In more than two-thirds of cases, gestational diabetes can be managed by changing eating habits and getting regular physical activity. If lifestyle modifications are not adequate, insulin therapy is required.

In most cases, gestational diabetes goes away after the placenta is released.

## Glycaemia: the master index

Constantly monitored by people with diabetes, glycaemia (blood sugar level) serves as a barometer.

### Hypoglycaemia



Blood glucose level below 70 mg/dL

### Normal fasting glycaemia (on an empty stomach)



Blood glucose level between 70 mg/dL and 110 mg/dL

### Fasting hyperglycaemia



Blood glucose level above 110 mg/dL



R  
E  
-  
S  
S  
O  
D

# Diabetes goes digital

Continuous glucose sensors, insulin pumps and closed-loop systems are tremendously improving quality of life for diabetes patients.

BY BERTRAND BEAUTÉ

Patients with type 1 diabetes need to keep their blood sugar levels (glycaemia) within a range of 70 to 180 milligrams of glucose per decilitre of blood. But you still need to know your precise blood sugar levels. For many years, diabetics had to prick their fingertip and place a drop of blood on a test strip several times a day. Continuous glucose monitoring (CGM) systems, which measure glucose “in real time”, have changed all that. CGMs work using a sensor, which is usually attached to the arm, upper buttock or abdomen, that measures blood sugar several hundred times a day. The latest versions of these devices have an alarm that goes off if the person’s blood sugar is too



40,000  
Number of people  
with type 1 diabetes  
in Switzerland

© AMÉLIE-BENOIST, AFP

## “The market for continuous glucose monitoring systems currently totals \$8 billion per year”

David Kägi, portfolio manager of the RobecoSAM Sustainable Healthy Living Equities strategy

low or too high, then send all the data to the patient’s smartphone via Bluetooth.

“The emergence of CGM systems has been a tremendous step forward for us diabetics,” says French composer Bertrand Burgalat, who has had type 1 diabetes since 1975, when he was 11 years old. He is also the author of the book *Diabétiquement vôtre* (Diabetically yours) published in 2015. This view is shared by those in the medical profession. “Pricking their fingertip was painful for some patients, even stigmatising,” says Dr Karim Gariani, head of the diabetes unit at Geneva University Hospitals (HUG). “In addition to improving quality of life, CGMs help patients to be more aware of their blood sugar levels and therefore stay in the target range longer.” Studies have shown that the use Abbott Freestyle CGM reduces the risk of hospitalisation for diabetes patients by 67%.

Abbott, which has more than four million users, and Dexcom’s G6 (see company fact sheets on p. 40 to 51).

“More and more type 1 diabetics are choosing to pair CGM systems with pumps, so that they no longer have to do injections with an insulin pen,” David Kägi says. As a result, the CGM sends the data it collects to the patient’s smartphone as well as to an automated insulin delivery (AID) system. An algorithm built into the AID then analyses the blood glucose patterns and automatically decides whether insulin should be delivered and how much. A smartphone app displays graphical summaries of glucose and insulin measurements.

“The market for automatic insulin pumps is currently worth \$3.5 billion, with growth of 10% per year, slightly less than that of CGMs,” says Kägi. Two products lead the AID market: the t:slim X2 insulin pump from Tandem Diabetes and the Omnipod 5 by Insulet (see company fact sheets on pages 40 to 51).

When glucose monitors and insulin pumps are linked in this way, it is called a closed-loop system. “Closed-loop systems can increase the amount of time spent in the target blood glucose range to 70% to 80% over a 24-hour period, which is 10% more than for a diabetic using traditional technology. Also, the number of hypoglycaemic episodes drops by 50%”, says Dr Karim Gariani from the HUG. And the practitioner sees another benefit. Patients feel more at peace. “People with type 1 diabetes often don’t sleep well, because they experience and fear nocturnal hypoglycaemia. They have to get up several times a night to check their blood sugar level,” Dr Gariani explains. With →

“The CGM market currently totals \$8 billion per year,” says David Kägi, portfolio manager of the RobecoSAM Sustainable Healthy Living Equities strategy. “So it’s still a nascent market, but it’s growing fast, at around 22% per year. That makes it very attractive to investors.” The leading CGM systems on the market today are the FreeStyle Libre 3 from

← Diagnosed at the age of nine with type 1 diabetes, Manuella is equipped with a glucose sensor and an insulin pump. She is pictured here at the age of 13, for a report on her daily life for the weekly magazine, *Le Point*.



closed-loop systems, they no longer have to. They sleep better as the night is not broken up.”

Plus, other people than the patient, such as family members, relatives and the attending physician, can check data via an app, thus further improving management of the disease. While type 1 diabetics are the main users of these devices, type 2 patients in the most severe stage of their condition can also use them, as they also require regular insulin injections. Twenty-five percent of type 2 patients are insulin-dependent and can therefore use closed-loop systems. “Closed-loop systems are great for patients,” says Pierre Corby from UBP.

However, these devices are no cure-all solution. “Only 10 to 20% of patients use this technology,” Karim Gariani says. “Others don’t want to, either because wearing these sensors all the time changes the way they feel about their body, or because they don’t like to do certain tasks such as replacing the sensors or inserting the catheter that injects insulin. In fact, these technologies can even cause anxiety in some people who get obsessed with their data.”

Closed-loop systems are also not as automatic as their manufacturers would like us to believe. “The technology is increasingly accurate, but patients still have to enter data into the device and inject additional doses of insulin (boluses),” Dr Gariani says. “I think they will be much more automated within the next five to 10 years.” ▲

# A curious rise in child diabetes

**Over the past 20 years, the incidence of type 1 diabetes has increased by 3% to 4% a year in developed countries. But the cause of that trend, which was amplified by COVID, remains a mystery.**

BY STANISLAS CAVALIER

An unexpected effect of the COVID pandemic was the increase in cases of type 1 diabetes among minors. A study published in the scientific journal *JAMA Network Open* in November 2022 showed that American children who had had COVID were 83% more likely to develop type 1 diabetes than those who had not caught the disease. Another study conducted by researchers at the Norwegian Institute of Public Health on a cohort of 1.2 million children during the first two years of the pandemic confirmed those findings. According to the Norwegian researchers, 0.13% of children and adolescents were diagnosed with type 1 diabetes one month

or more after being infected with COVID-19, versus 0.08% for children who were not infected with COVID-19. That’s a 63% increase in relative risk.

## There’s still hope of curing type 1 diabetes once and for all

But even before COVID, the incidence of type 1 diabetes was on the rise in developed countries. France’s National Institute of Health and Medical Research (INSERM) has noted that the number of people with type 1 diabetes has increased by 3% to 4% a year over the past 20 years, and that the onset of the disease is starting earlier and earlier, with a significant increase in prevalence in children under five years old. The reasons for the trend remain unexplained.

That’s because the reasons for the onset of type 1 diabetes are still a mystery. What we do know is that it is an autoimmune disease, which occurs when a person’s T cells (immune-system cells) start to identify pancreatic beta cells in the body as foreign and begin attacking and destroying them. Symptoms appear several months – or even years – later, when most of the insulin-producing cells have been destroyed. Although it was long believed to appear mainly in children, type 1 diabetes may appear at any stage of life.

People with diabetes treat the disease by injecting themselves with insulin several times a day throughout their entire life to compensate for the fact that their body no longer produces insulin. It can be a big ordeal for parents with young children, for whom the advent of closed-loop systems (see p. 33), which deliver automated injections in response to blood sugar levels, has come as a great relief. And it is important to remember that, particularly for children, closed loops offer the chance for better health over the long term by starting more effective treatment early.

Today, the only way to cure type 1 diabetes is to undergo an islet of Langerhans transplant. But this major operation requires subsequent immunosuppressive treatment for life to avoid rejection of the transplant. That’s why this treatment is used only in extreme cases, such as patients with end-stage renal disease, who need a transplant anyway. But there’s still hope of curing type 1 diabetes once and for all. Several promising technologies are in the pipeline. In 2021, for instance, US biotech firm Vertex Pharmaceuticals removed blood stem cells from a 64-year-old diabetic patient, transformed them in vitro into pancreatic beta cells, and then reinjected them into the patient’s bloodstream. Ninety days later, the patient, who previously had to inject himself with 30 to 34 units of insulin to survive, needed just three units. French company Adocia is working on a different approach, which involves encapsulating a donor’s beta cells to protect them from the diabetic recipient’s immune system. This new type of transplant has been shown to be effective in diabetic mice. ▲



© AMÉLIE-BENOIST, AFP

← The father of Oscar, a three-year-old with type 1 diabetes, replaces his son’s continuous glucose monitoring system. They are photographed here during a report by *Le Point* magazine on their daily lives.



# Antidiabetics that keep you trim

A new class of drugs for type 2 diabetes causes dramatic weight loss.

BY BERTRAND BEAUTÉ

460,000

Number of people with type 2 diabetes in Switzerland.

← Developed by Novo Nordisk, Rybelsus is the first GLP-1 agonist available in pill form. It was authorised by Swissmedic on 24 March, 2020 for the oral treatment of adults with type 2 diabetes.

“Today, people are recommended to be screened regularly for diabetes as of age 35. All it takes is a simple blood test,” Dr Karim Gariani suggests. “If diagnosed early enough, diabetes is treated by eating a healthy diet, getting regular physical activity and possibly reducing excess weight.”

When these lifestyle changes are not enough to durably control the patient’s glycaemia, non-insulin antidiabetic medication is prescribed (mainly metformin and sulphonylurea). Although these drugs produce excellent results in controlling blood sugar in the short term, the treatment generally becomes less effective in the long term, and blood sugar levels rise again. Another therapeutic agent is then added. And this is where major disruptions are taking place, with the development of glucagon-like peptide-1 (GLP-1) analogues.

## “GLP-1s are revolutionising diabetes care”

Pierre Corby, Healthcare Equity Specialist at Union Bancaire Privée (UBP)

“GLP-1s are revolutionising diabetes care,” says Pierre Corby, the Healthcare Equity Specialist at UBP. Like other antidiabetic →

type 2 diabetes is a progressive condition, which usually gets worse with time. “In the early stages, the symptoms are subtle, sometimes even invisible. That means that many people are diabetics that don’t know it yet,” Dr Karim Gariani says. “In Switzerland, it is estimated that 30% of type 2 diabetes patients do not realise that they are living with the disease.” The rub is that diabetes leads to numerous complications, such as visual impairment, kidney failure and cardiovascular problems. The later type 2 diabetes is diagnosed, the more severe these complications will be and the more difficult it is to treat them.

© NOVO NORDISK



## The GLP-1 market could be worth \$90 billion a year by 2030

The two pharmas are now eyeing a much bigger market than diabetes: obesity. In 2021, the Food & Drug Administration (FDA) approved Wegovy by Novo Nordisk to treat patients with overweight and obesity. Wegovy is the sister drug of Ozempic and contains exactly the same compound, semaglutide. It simply contains a higher dose than Ozempic, giving it unprecedented effectiveness –

it is associated with a median weight loss of almost 15 kg in one year. Eli Lilly was quick to react. Approved in May 2022 for the treatment of type 2 diabetes, its new GLP-1, Mounjaro, should be cleared by the FDA for overweight and obesity in 2023. Taking it is said to be associated with weight loss of 20 kg in one year, although with some side effects, such as digestive disorders (nausea, diarrhoea and vomiting).

“GLP-1s give a comparable result to a gastric bypass – a surgical procedure performed to reduce the size of the stomach – but are less invasive for the patient and less expensive for healthcare systems,” says Arelis Agosto, senior healthcare analyst at Global X ETFs. “It is very exciting to see how this new class of drugs will change the way diabetes is managed, with more emphasis on preventing the disease through managing obesity, as opposed to treating its symptoms.”

“GLP-1s open up a whole new market. They bring hope to treat pre-diabetics, diabetics and obese people,” says Pierre Corby, an analyst at UBP. “The most optimistic analysts predict that the GLP-1 market could be worth \$90 billion a year by 2030, with \$50 billion to \$55 billion of that for obesity. For investors, pharmas with a GLP-1 in their portfolio look very attractive. The GLP-1 market is expected to grow by 20% to 30% per year for several years.”

According to the World Health Organization (WHO), 650 million

adults worldwide are obese and 1.9 billion are overweight. These figures should be correlated with the price of these new treatments. In the United States, type 2 diabetics on Mounjaro pay around \$1,000 per month, and obese people who take Wegovy pay a monthly bill of \$1,350.

The question remains, however, whether health systems will reimburse these drugs. “It’s the way it should be,” Pierre Corby says. “Obesity is so expensive for society that I think these treatments will be covered.” ▲

→  
Tip of the  
NovoFine plus  
injection pen,  
from Novo  
Nordisk, used  
to administer  
Ozempic.



# The Ozempic craze: All about the weight-loss drug

**Sales of Novo Nordisk’s antidiabetic drug have jumped 77% in 2022. But misuse of the drug for its slimming properties is causing a shortage.**

BY STANISLAS CAVALIER

“Hollywood’s worst kept secret.” That is what media outlets in the US have dubbed Ozempic since billionaire Elon Musk confessed in a tweet last September that he had used the drug to achieve his weight loss and current physique. But the hype all started long before that on social media, especially on the favourite among teens, TikTok. Last spring, videos of people taking the drug began circulating with various hashtags, such as #ozempic and #ozempicjourney. The videos mainly feature young women injecting Ozempic and then display their spectacular weight loss since they started taking the drug.

However, Ozempic is not approved as a drug to treat excess weight or obesity. The Danish laboratory Novo Nordisk developed it as a therapy to control blood sugar level for people with type 2 diabetes. It was by chance that doctors later realised that the drug had an effect on satiety and weight. Then, boom.

A whole generation of people who are slaves to the standards of beauty on social media and the worship of a slim body shape knew about it.

**It was by chance that doctors realised that the drug had an effect on satiety and weight**

The phenomenon has grown to such enormous proportions that Australia experienced a shortage of Ozempic in May, pushing the Australian Therapeutic Goods Administration (TGA) to take action. In a statement issued on 17 May, the drug regulator called on health professionals to limit dispensing of Ozempic to confirmed cases of type 2 diabetes. “The increased demand is due to extensive prescribing for obesity management, for which Ozempic is not indicated,” the TGA wrote. “There are lots of issues people need to be aware of but most importantly, it’s not yet approved... for weight loss. It’s being used off-label, which means that this huge demand is now stopping

people who have a genuine need for the medication for their diabetes,” Karen Price, Royal Australian College of General Practitioners president, told *The Guardian*.

Evolving out of Australia, the Ozempic craze has spread to the rest of the world. In September, the French National Agency for Medicines and Health Products Safety (ANSM) sounded an alarm in France: “Stories from the field have indicated that these drugs are sometimes being misused, otherwise referred to as off-label use, by people who do not have diabetes and are not ill, in a bid to lose weight,” said the ANSM, which reported supply issues due to high global demand and urged doctors to “prescribe these drugs only to patients with type 2 diabetes.”

The same thing has happened in the United States and elsewhere. A shortage of Ozempic has gripped the planet since mid-2022, depriving some diabetics of their treatment. To deal with these supply problems, Novo Nordisk invested €3 billion in 2022 to build three new factories in Denmark, and announced in November that €740 million would go to expanding a Danish facility that produces active ingredients. In 2022, Ozempic’s sales jumped 77% compared to 2021, to €5.7 billion. That is by far more than anyone expected. ▲



# 10 firms on solid ground

Three big pharmaceutical giants and a handful of medtech companies control the global diabetes care market. That can make it difficult for newcomers to needle their way in.

BY BERTRAND BEAUTÉ



<b>Novo Nordisk Number 1</b>	<p>The Novo Nordisk stock has risen more than 200% over the past five years. That trend is likely to persist, as most analysts uphold a buy recommendation. Celebrating its 100-year anniversary this year, the Danish company has skilfully reinvented itself over the past century. Novo Nordisk's story begins in 1923, when Nobel Prize winner for Medicine August Krogh and his wife Marie, herself a diabetic, returned from Canada with the patent for insulin (see also</p>	<p>p. 53). They founded Nordisk Insulinlaboratorium, which later became Novo Nordisk, to manufacture and commercialise the precious hormone in Europe.</p> <p>Over the years, the company has developed a wide range of insulins for different treatments (long-acting, rapid-acting, ultra-rapid), evolving into the undisputed leader of diabetes management. Novo Nordisk currently dominates over 40% of the market, ahead of the French firm Sanofi and the US pharmaceutical company Eli Lilly. But it has not stopped at this sure-fire revenue stream. The group has</p>	<p>instead expanded while remaining focused on diabetes. In 1985, the company introduced the first insulin pen and in 1999 one of the first continuous glucose monitoring device approved by the US Food and Drug Administration (FDA), which, however, required a needle to monitor blood glucose levels. The company now sells its own connected systems. In a context of mounting pressure on insulin prices, Novo Nordisk has also reduced its reliance on the hormone by launching a new class of type 2 diabetes drugs (see p. 36). These GLP-1 analogues are now its biggest money-maker, ahead of in-</p>	<p><b>Novo Nordisk controls 40% of the global insulin market</b></p> <p>sulin. In 2021, the FDA approved one of Novo Nordisk's GLP-1s, Wegovy, as a weight loss treatment. This is expected to open up an even bigger market for the Danish pharma than diabetes, considering that the World Health Organization (WHO) estimates there are almost one billion obese adults and teens worldwide.</p>
<p>FOUNDED: 1923 HEADQUARTERS: BAGSVAERD (DK) EMPLOYEES: 55,000 REVENUE 2022: \$25.06 BN → NVO</p>				





An individual with type 1 diabetes checks her insulin pump, made by Tandem Diabetes, in 2021.

Tandem Diabetes  
The insulin pump under control

In a mere 15 years, the US med-tech company Tandem has established itself as a key player in diabetes care, boasting nearly 400,000 customers worldwide. How? By developing one game-changing product. The t:slim insulin pump considerably improves quality of life for patients with type 1 diabetes, who represent 90% of Tandem's customers. For diabetics, insulin is a life-saving drug that

must be injected several times a day. Since the 1980s, they have been administering injections with an insulin pen, a procedure that can leave them feeling stigmatised. The pump, like the one developed by Tandem, is a small device that attaches to the body, usually on the upper buttock or stomach, and delivers insulin automatically or on demand. When connected to Dexcom's continuous glucose monitoring system via Bluetooth, the Tandem insulin pump creates a kind of artificial pancreas that uses an algorithm to adjust insulin release based on the patient's glucose level.

Tandem's stock has increased more than 1,400% over the past five years

While not yet fully automated – patients still have to adjust insulin dosage according to their food intake and physical activity – the resulting system has empowered people with type 1 diabetes towards greater autonomy. Most analysts recommend buying Tandem stock, which has shot up more than 1,400% in the past five years.

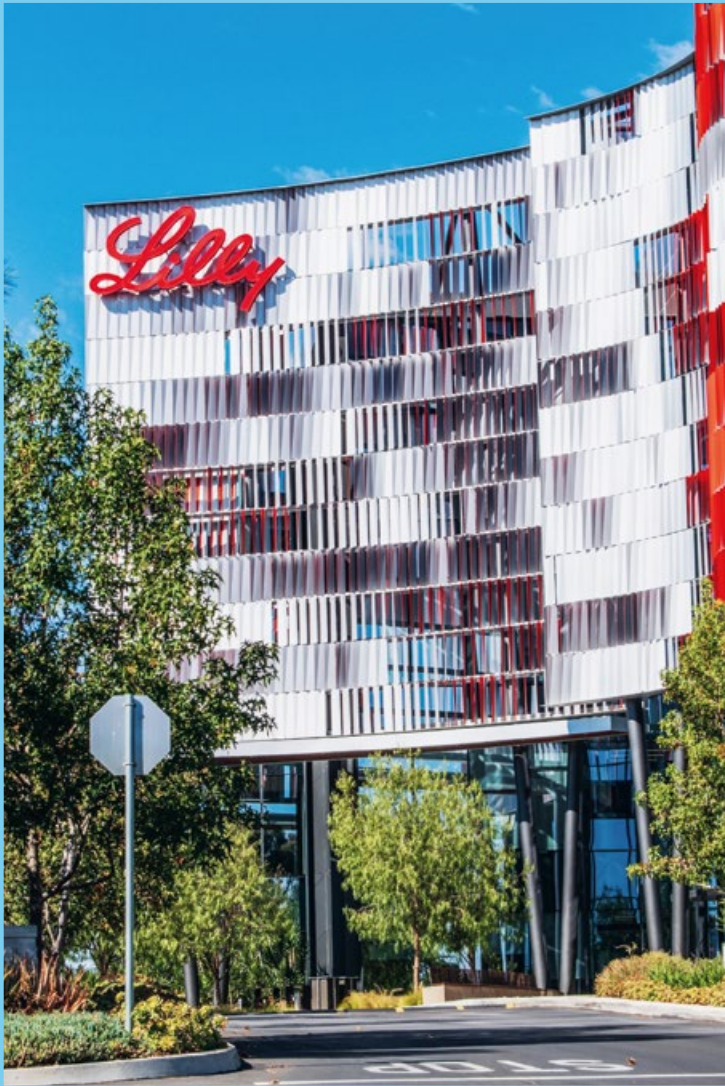
FOUNDED: 2006 HEADQUARTERS: SAN DIEGO (US)  
EMPLOYEES: 1,500 REVENUE 2021: \$702.8 M → TNDM

Eli Lilly  
The future king of obesity

One tweet, nine words, \$15 billion up in smoke. That actually happened to Eli Lilly. An unfortunate mishap. Created by stealing the US firm's identity, a fake account certified by Twitter announced on 10 November, "We are excited to announce insulin is free now." Immediately, the Twitter account of the real Eli Lilly reacted, apologising to "those who received an incorrect message from a fake Lilly account". But the damage had been done. Eli Lilly's shares plunged 4% that day, a reminder of the US lab's dependence on insulin. The various insulin formulations commercialised by Eli Lilly account for nearly 20% of its revenue. However, the little stock market scare should not mask the company's auspicious outlook in diabetes management, which is expected to soon be less dependent on insulin. In 2016, Eli Lilly launched the GLP-1 analogue Trulicity to treat type 2 diabetes. The drug quickly became the company's star product, with sales hitting a record high of \$7.4 billion last year. Analysts expect Mounjaro, another GLP-1 analogue developed by Eli Lilly, to be an even bigger hit. After clearing the drug for type 2 diabetes in May 2022, the FDA is expected to approve Mounjaro in 2023 to treat obesity

FOUNDED: 1876 HEADQUARTERS: INDIANAPOLIS (US)  
EMPLOYEES: 37,000 REVENUE 2021: \$28.32 BN  
→ LLY

An Eli Lilly research facility in San Diego, pictured here in 2020.



(see also page 39). In a note published in early January, Goldman Sachs analyst Chris Shibutani estimates that Mounjaro could generate \$2.3 billion in 2023 and \$27 billion in 2032. Like most analysts, he recommends buying the stock.

The various insulin formulations marketed by Eli Lilly account for nearly 20% of its revenue

PROVENTION BIO  
Delayed symptoms

The first of its kind! Last November, the FDA approved Tzield, an innovative new treatment for type 1 diabetes deve-

loped by Provention Bio. Administered through intravenous infusion over two weeks, the drug promises to give

children several months, or even years, of normal life before disease onset and insulin injections. Priced at \$193,000,

Tzield will be commercialised by Sanofi.

FOUNDED: 2016 HEADQUARTERS: NEW JERSEY (US)  
EMPLOYEES: 80 REVENUE 2021: 0  
→ PRVB

ADOCIA  
Innovative insulin

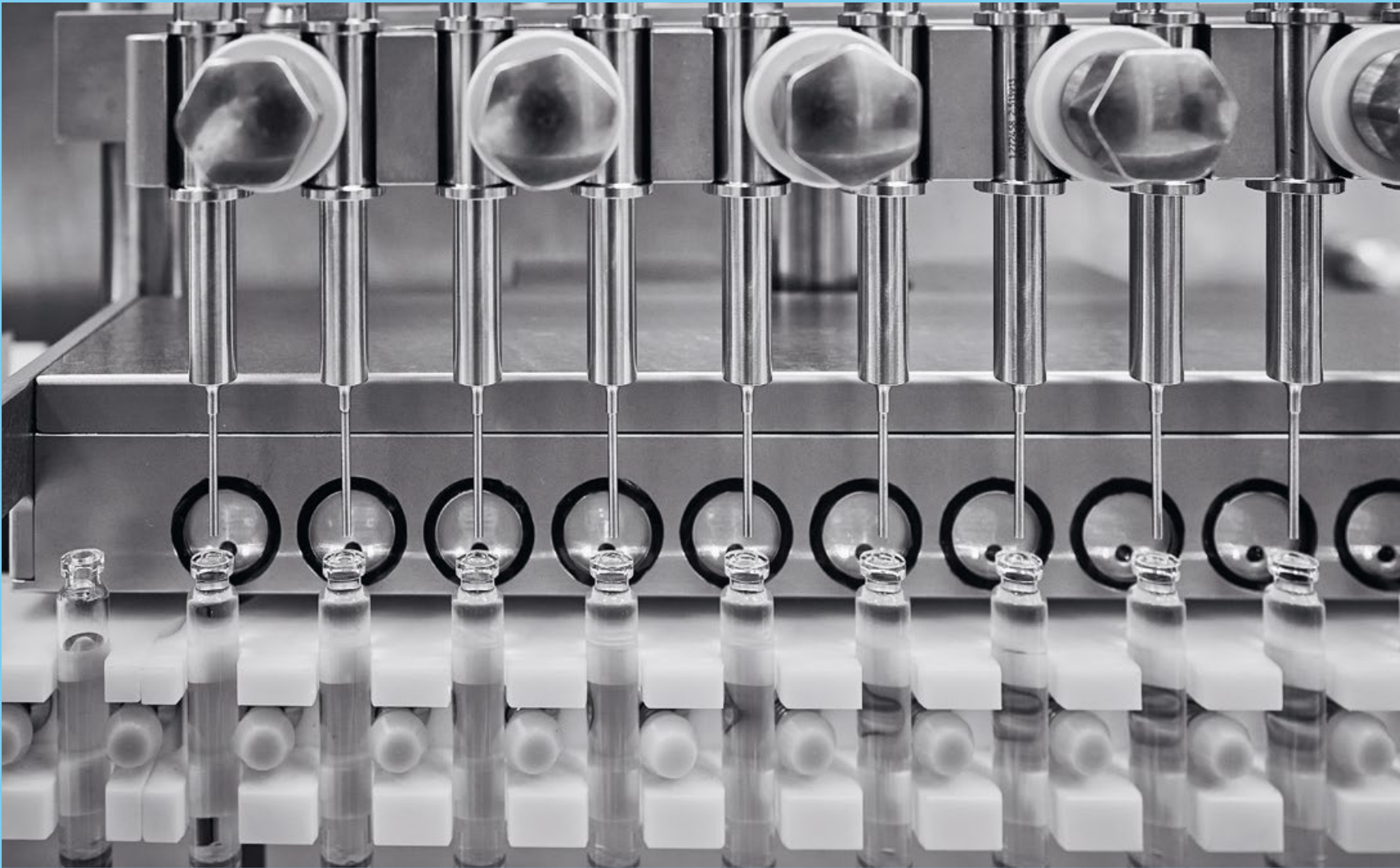
The French biotech is developing a new ultra-rapid acting insulin, currently undergoing

phase 3 trials in China. To develop the medication, Adocia joined forces with the Chinese pharmaceu-

tical company Tonghua Dongbao. The company has other less advanced drugs in its pipeline.

FOUNDED: 2005 HEADQUARTERS: LYON (FR)  
EMPLOYEES: 100 REVENUE 2022: € 1.45 M  
→ ADOC





**Sanofi**  
**Misfortunes abound**

Sanofi has accumulated a string of setbacks in recent years. Despite being the world's leading

vaccine manufacturer, the French pharmaceutical group lost the race for a COVID-19 vaccine. Its formulation did not get the green light from European authorities until November 2022, almost two years after the release of

vaccines by its competitors Moderna and Pfizer-BioNTech. In cancer treatment, the company announced in August 2022 that it would discontinue development of amcenestrant after disappointing results in a phase

© SANOFI

↑  
Insulin being manufactured under absolutely aseptic conditions at a Sanofi production site.

3 trial. That was quite a blow, as amcenestrant, the flagship drug in Sanofi's pipeline, had reached its final development phase prior to market launch. Making matters worse, the outlook is not so bright in diabetes care. Sanofi, the world's No. 3 insulin leader, is facing increasing pressure from authorities to lower the price of this life-saving drug (see also p. 52).

**World number three in insulin, Sanofi faces ever-increasing pressure from the authorities to lower the price of this vital drug**

Sales of Lantus, Sanofi's best-selling insulin, fell from €3 billion in 2019 to €2.66 billion in 2020 and €2.49 billion in 2021. Revenue for its Diabetes division overall came to €4.5 billion in 2021, down 1% from a year earlier. Unlike its competitors Eli Lilly and Novo Nordisk, Sanofi has no drugs in its pipeline to boost sales from diabetes solutions. Despite all that, most analysts recommend buying shares, particularly due to the performance of its best-seller, Dupixent (prescribed for the treatment of dermatitis). The drug's sales reached €5.249 billion in 2021, up 52.7% in one year.

**FOUNDED :** 1973 **HEADQUARTERS :** GENTILLY (FR)  
**EMPLOYEES :** 100,000 **REVENUE 2021 :** €42.3 BN → SAN

**Insulet**  
**The American success story**

Insulet's story is almost too good to be true. It began in the late 1990s when the American entrepreneur John Brooks III received the heart-wrenching news that his three-year-old son Robert had type 1 diabetes. Brooks then looked at the various options on the market for insulin injections for his child, but none of them satisfied him. So what did he do? Just like in a Hollywood film, the business man rolled up his sleeves and got to work.

**Today, Insulet's turnover exceeds \$1 billion**

Since the device he wanted for his son did not exist, he created it himself! He co-founded the company Insulet, which developed an insulin pump called Omnipod. The first version of the device was approved by the FDA in 2003. After a rocky first few years, Insulet really took off in 2015. Today, the company's revenue tops \$1 billion dollars, turns out 20% annual growth and is at its fifth-generation Omnipod. Most analysts recommend buying the stock, which has climbed 275% in the last five years.

**FOUNDED :** 2000 **HEADQUARTERS :** ACTON (US)  
**EMPLOYEES :** 2,300 **REVENUE 2021 :** \$1.1 BN → PODD

**POXEL**  
**Little company, big ambition**

Poxel's drug imeglumine was approved in Japan in 2021 for the treatment of type 2 diabetes. The

compound is commercialised in the country by a local partner, Sumitomo Pharma.

Poxel is looking for partners to conduct the required trials to clear imeglumine for market

sale in Europe and the United States.

**FOUNDED :** 2009  
**HEADQUARTERS :** LYON (FR)  
**EMPLOYEES :** 55  
**REVENUE 2021 :** € 13.4 M  
→ POXEL

**BIOTON**  
**Polish insulin**

Bioton, the world's eighth-largest producer of human insulin, operates in the shadow of

big pharma. The company supplies a low-cost insulin to markets in a few Eastern European

countries (Poland, Belarus, Bosnia-Herzegovina), Asia (China, Indonesia)

and Africa (Tunisia, Nigeria).

**FOUNDED :** 1989  
**HEADQUARTERS :** WARSAW (PL)  
**EMPLOYEES :** 400  
**REVENUE 2021 :** € 34.6 M  
→ BIO





# “We’re more agile than the insulin giants”

The French company Biocorp has developed a smart sensor for the insulin injection pens used daily by diabetics. Biocorp CEO Eric Dessertenne discusses the benefits of the device.

BY BERTRAND BEAUTÉ

@ BIOCORP

## Biocorp 2023, the year things will take off

The Maylla smart system records the doses of insulin injected by the user, then transmits them to a dedicated application.

A million units a year for the next four years. That is Biocorp's sales target for its Maylla smart sensor. The device attaches to insulin injection pens, transforming them into connected objects. At €50 apiece, the solution could generate €50 million in revenue by 2027 for the French company, with a gross margin of 55% to 60%. The two analysts who cover the firm agree with this forecast, and both recommend buying the stock. To grow, Biocorp can count on its partnerships with industry giants (Sanofi, Novo Nordisk and Roche Diabetes Care). The Maylla sensor is compatible with most disposable insulin injection pens, including Sanofi's Solostar,

the Eli Lilly Kwikpen and the Flexpen by Novo Nordisk. But the SME still has to contend with mass industrialisation to achieve its goals. The company has invested €2 million in its manufacturing system, which will increase its production as of June 2023. In doing so, it will be able to supply the European market and especially the United States – the world's largest diabetes market in value – where its device has just been cleared to market. If successful, Biocorp could end up being swallowed by a giant pharmaceutical firm. “A takeover could eventually turn into an opportunity for the company,” says Eric Dessertenne, Biocorp's CEO.

FOUNDED : 2004 HEADQUARTERS : ISSOIRE (FR)  
EMPLOYEES : 80 REVENUE 2021 : € 10.2 M → ALCOR

Eric Dessertenne, CEO of the French company Biocorp, has reason to celebrate. In December, the US Food & Drug Administration (FDA) green-lighted the Maylla smart sensor for the United States market. This electronic device attaches directly to insulin injection pens, like a ring, converting them into connected objects, or smart pens. The small company has already signed partnerships with most of the industry's big names (Roche Diabetes Care, Novo Nordisk and Sanofi) to integrate the device into their products. This is one example of the growing use of digital technology in diabetes management.

### Everyone is talking about how diabetes care is going digital. How does digital technology improve the lives of patients?

For four years now, eHealth has been gaining traction. The pandemic showed people that patients can get better care using digital tools. For diabetes, the most notable innovation in recent years has been the emergence of continuous glucose monitoring devices, which

allow diabetics to measure their blood sugar levels throughout the day and store the data on their smartphone. This has improved their care, because diabetes drugs are effective, but only if used properly. Before these devices, patients did not have the tools to know when to inject the right amount of insulin. Numerous studies have shown that continuous glucose monitoring systems improve patients' control of their blood glucose levels. Another advantage is that the data is shared with doctors. And that improves management, because doctors no longer work with patient reports but with cold, hard data.

### Your product, Maylla, turns insulin pens into connected devices. How is this useful?

Diabetics must constantly monitor four parameters: their blood sugar, their physical activity, their diet and the doses of insulin they inject. Software programmes recommend an insulin dose based on their blood sugar level, diet and activity. With our sensor, which connects to most disposable insulin pens, they make sure they're inject-

ing the right dose. The device also records injection date and time, which means data can be tracked accurately over time.

## “Worldwide, between 50 million and 60 million diabetics use insulin pens”

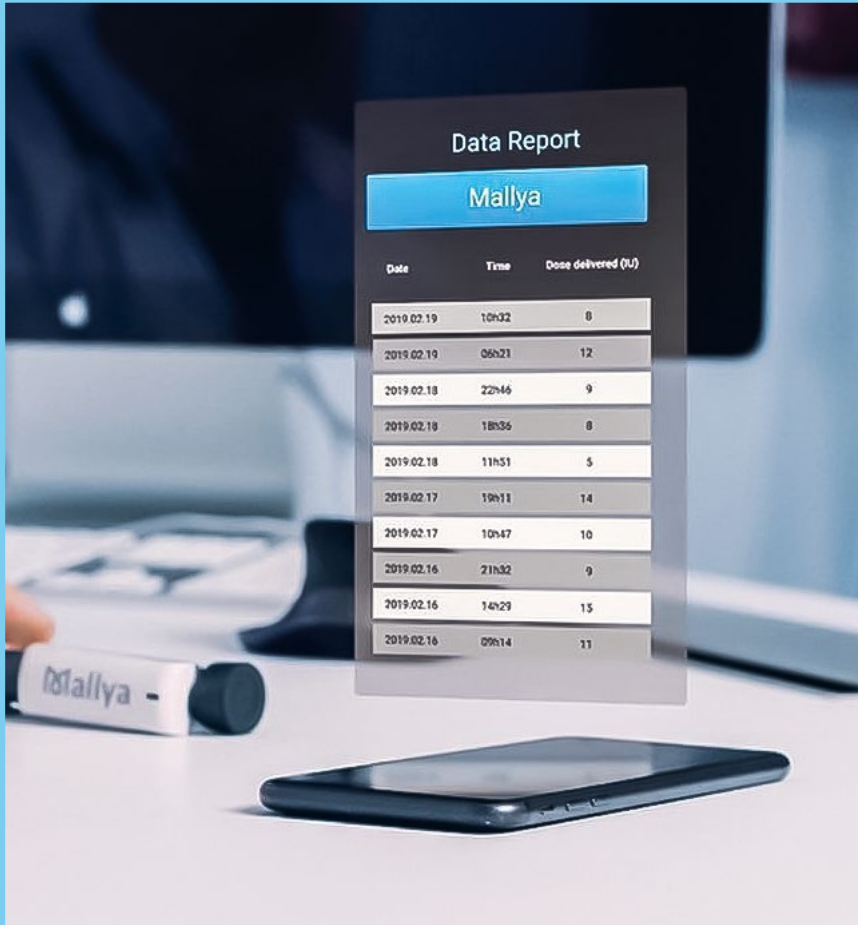
So-called closed-loop systems (see p. 33) go one step further. Blood sugar level is continuously monitored, and, based on that data, an algorithm automatically releases insulin via a pump. No need for a pen...

Closed-loop systems are a fantastic innovation. But they are mainly used by people with type 1 diabetes, who have been injecting insulin multiple times a day since childhood. Type 2 diabetics start injecting insulin around age 55 and initially only need one injection a day. They do not necessarily want to wear

an invasive device that constantly reminds them of their disease. Worldwide, between 50 million and 60 million diabetics use insulin pens. That's a huge market for our solution. Another advantage is that our device is much cheaper than closed-loop systems.

### Why haven't the insulin giants, which make these pens, developed a product like yours?

The three biggest companies in the industry (Novo Nordisk, Sanofi and Eli Lilly) all had internal programmes to develop smart pens. But that is a totally new business for them. Typically, it takes seven to eight years to develop a new insulin pen. But that's much too long in electronics. You have to develop a product in two years at most, or it'll be obsolete before it reaches the market. That's why being a small company is an advantage for innovation. We're more agile than the giants. As it turns out, out of the three companies mentioned, only Eli Lilly has managed to come out with a product that works like ours, the Tempo Smart Button.





<b>Ypsomed</b> The Swiss gem	<p>Injection systems from Ypsomed, pictured here at the company's production site in Burgdorf, in 2018.</p> <p>↓</p>	<p>change since 2004, Ypsomed remains active in diabetes solutions, offering an insulin pump (YpsoPump), a blood glucose monitoring system (Unio Cara) and therapy management software (mylife). Ypsomed has also entered into partnership with the US firm Dexcom to commercialise a closed-loop system that combines Dexcom G6 glucose sensors with Ypsomed's pump and application. The three analysts covering Ypsomed recommend buying the stock.</p>	<p><b>Disetronic was one of the first companies in the world to market a micro insulin pump</b></p>	<p>FOUNDED : 2003 HEADQUARTERS : BURG DORF (CH) EMPLOYEES : 2,400 REVENUE 2022 : CHF 403.7 M → YPSN</p>
				

© KEYSTONE / MEDTRONIC

<b>Medtronic</b> Branching out	<p>Medtronic, a US company based in Dublin, is known worldwide for its cardiovascular devices (pacemakers, defibrillators, stents and valves), but it is also active in diabetes management. In 2017, Medtronic dominated industry headlines as the first company to receive clearance from the US Food &amp; Drug Administration (FDA) to bring to market a closed-loop system for type 1 diabetes. The MiniMed 670G pairs a continuous glucose sensor with an insulin pump, and the system is managed by an algorithm that automatically delivers insulin according to the patient's needs. Since then, however, many competitors have entered the market, nibbling away at the company's market share. For the financial year ended August 2022, Medtronic's revenue from diabetes care fell by 3%. However, that revenue represents a mere 7% of the company's total. To reinvigorate the sale of diabetes products, the company has recently come out with the MiniMed 780G, a next-generation system to follow up on its illustrious predecessor. Most analysts recommend holding the stock.</p>	
<p>FOUNDED : 1949   HEADQUARTERS : DUBLIN (IE) EMPLOYEES : 95,000   REVENUE 2021 : \$31.69 BN → MDT</p>	<p>↑ The MiniMed system consists of a blood glucose sensor attached to an insulin pump.</p>	<p><b>Medtronic's diabetes revenue fell 3%</b></p>

<p><b>GAN &amp; LEE</b>  <b>The Chinese pioneer</b></p> <p>Founded in 1998, Gan &amp; Lee was the first Chinese company</p>	<p>to develop an insulin analogue in China. The company currently sells</p>	<p>five different insulins in China.</p>	<p>FOUNDED : 1997  HEADQUARTERS : TONGZHOU (CN)  EMPLOYEES : 3,000  REVENUE 2022 : CNY 2.35 BN  → 603087</p>
---	---	--	--

<p><b>BIOCON</b>  <b>The Indian champion</b></p> <p>Biocon, India's largest pharmaceutical company, has developed</p>	<p>and launched several insulins and injection pens, available mainly</p>	<p>on its domestic market and elsewhere in Asia.</p>	<p>FOUNDED : 1978  HEADQUARTERS : BENGALURU (IN)  EMPLOYEES : 15,000  REVENUE 2022 : INR 83.97 BN  → BIOCON</p>
---	---	--	---



<p><b>Dexcom</b> The new champion in sensors</p> <p>Unlike many of its competitors, such as Abbott, Medtronic or Roche Diabetes Care, the US company Dexcom is unique in that it focuses on a single area: continuous glucose monitoring (CGM) using a sensor placed under the skin. The experts we talked to say that the new Dexcom G7 device has the most advanced technology of any CGM system currently on the market. And that has won over analysts, who re-</p> <p><b>The new Dexcom G7 device features the most advanced technology of any CGM system on the market today.</b></p> <p>soundingly recommend buying shares. The stock has sky-rocketed more than 640% over the past five years. The company now boasts 1.7 million customers, and that base is growing rapidly. The company's revenue increased almost 20% in 2022, with an operating margin of 16%. Compared to the best-selling CGM sensor on the market, the Freestyle from Abbott Laboratories, Dexcom's star has the advantage of being approved for use within a "closed-loop" system (see p. 33), by linking with the leading insulin delivery systems developed by Tandem Diabetes and Insulet.</p> <p><b>FOUNDED:</b> 1999 <b>HEADQUARTERS:</b> SAN DIEGO (US) <b>EMPLOYEES:</b> 7,000 <b>REVENUE 2022:</b> \$2.91 BN → DXCM</p>	<p><b>Abbott Laboratories</b> The leader in glucose sensors</p> <p>"Our FreeStyle Libre will be a \$10 billion-a-year business within the next five years," announced Robert Ford, the CEO of Abbott Laboratories, at the J.P. Morgan Healthcare Conference in early January. He made no secret of the high hopes he has for the group's third-generation sensor-based glucose monitoring system, Freestyle Libre 3. FDA-approved in 2008, the first device changed the lives of millions of diabetics around the world. Patients no longer had to prick their fingertips several times a day to check their blood sugar levels.</p> <p><b>The Abbott stock has already risen by 70% in the past five years</b></p> <p>It could all be done, easily and automatically, by applying a simple patch. This third iteration of the device was cleared by the FDA in June 2022. Its improvements include a feature that transfers data to the user's smartphone in real time, on the guidance of a useful app. Due to its long history in the market, Abbott has the largest patient</p>	<p>community, with more than four million diabetics using the Freestyle system. But the US company is up against fierce competition encroaching on its territory, from Roche Diabetes Care with its Eversense E3 sensor and especially Dexcom with its G7 sensor. Still, most analysts recommend buying Abbott shares, which have risen 70% in the</p> <p>© KEYSTONE</p>	<p>A Swiss diabetic places a Freestyle sensor, from Abbott, on his arm in July 2018 in Zurich. The Freestyle allows you to measure the level of glucose in the blood.</p> <p>↓</p>	<p>past five years. However, it is worth noting that medical devices, including the Freestyle, account for only 33.6% of the company's revenue. Abbott is also active in nutrition, diagnostics and pharmacology.</p> <p><b>FOUNDED:</b> 1888 <b>HEADQUARTERS:</b> CHICAGO (US) <b>EMPLOYEES:</b> 113,000 <b>REVENUE 2022:</b> \$43.7 BN → ABT</p>



**ZEALAND**  
The Danish biotech company

Zealand Pharma produces several innovative treatments against diabetes and obesity.

In September 2022, the company partnered with pharma giant Novo Nordisk to commercialise Zegalogue,

an FDA-approved medication to treat severe hypoglycaemia

in diabetic children and adults.

**FOUNDED:** 1998  
**HEADQUARTERS:** SØBORG (DK)  
**EMPLOYEES:** 350  
**REVENUE 2021:** € 39.33 M  
→ ZEAL

**WOCKHARDT**  
Insulin made in Mumbai

Wockhardt is a global pharmaceutical company that sells three types

of insulin, as well as injection pens, mainly for the Indian market.

The company also produces generic drugs for western markets.

It generates 83% of its revenue outside India.

**FOUNDED:** 1967  
**HEADQUARTERS:** MUMBAI (IN)  
**EMPLOYEES:** 8,600  
**REVENUE 2021:** \$378 M  
→ WOCKPHARMA





© DANIEL GARCIA / DR

# Insulin: A shameful oligopoly

As the world celebrates the 100<sup>th</sup> anniversary of insulin, nearly half of diabetics worldwide do not have access to this vital hormone, which is sold by three multinationals at exorbitantly high prices. BY BERTRAND BEAUTÉ

A promise is a promise. The price of insulin is now capped at \$35 a month in the United States for senior citizens. President Joe Biden's campaign promise became a reality as of January this year. About time. According to a study published in *Annals of Internal Medicine* last November, at least 1.3 million Americans, or 16.5% of US adults with diabetes who take insulin, ration their use of the medication to save money. For a vital drug that has been around for over a century, it's an abomination.



**“Insulin does not belong to me. It belongs to the world”**

Frederick Banting, inventor of insulin in 1922

Insulin dates back to 1922. That year, Leonard Thompson, a 14-year-old boy with type 1 diabetes, had slipped into a coma at Toronto General Hospital. To save him, his parents agreed to let Dr Frederick Banting inject him with an experimental preparation made from alcohol and an extract from a →



cow's pancreas, created by scientist John Macleod. The results were spectacular. In just a few days, Leonard was putting on weight and getting his strength back. He was saved. That was the first "miracle" of insulin. Millions of similar cases followed, transforming type 1 diabetes from a deadly disease into a chronic condition. Aware of the potential of their discovery, Frederick Banting and John Macleod – who were awarded the Nobel Prize in 1923 for their work – sold the patent to the University of Toronto for a symbolic one dollar, because they felt that insulin, a life-saving medication, was a common good for humanity. "Insulin does not belong to me," said Banting. "It belongs to the world."

But today, insulin, which has been on the World Health Organization's (WHO) list of essential medicines since 1977, is not free. Far from it. In fact, it's anything but free. According to an article published in the medical journal *The Lancet* in September 2022, the price of insulin in the US increased by 200% between 2007 and 2018 – with uninsured individuals having to pay nearly \$1,000 a month for the drug.

→ Insulin vials being filled at the Novo Nordisk factory in Hillerød, Denmark.

The WHO estimates that worldwide, half of the people who need insulin do not have access to it. Meanwhile, three giant corporations are enjoying comfortable profits: Novo Nordisk (Denmark), Sanofi (France) and Eli Lilly (US), which together control 90% of the global insulin market. "Diabetes is a very lucrative market," says David Beran, assistant professor at the University of Geneva (UNIGE) who specialises in the issue of access to insulin. For example, Danish company Novo Nordisk, the largest player worldwide with a market share of more than 40%, has operating margins that also top 40%. "Insulin is a great invention that was completely corrupted," says Bertrand Burgalat, French musician, author of the 2015 book *Diabétiquement vôtre* and long-time advocate for access to insulin. "I think it's scandalous that a handful of companies are making huge and unjustified profits from this vital hormone."

How did we end up here? "The first reason has to do with the global market," says Beran. "Insulin production is concentrated in the hands of three multinationals, which considerably reduces competition and

A THOUSAND AND ONE INSULINS

1922

The first-ever insulin, produced from a cow's pancreas, saves the life of a 14-year-old boy.

1923

US firm Eli Lilly becomes the first manufacturer of insulin.

1955

The DNA region coding insulin is sequenced by British biochemist Frederick Sanger. It's the first protein to be fully sequenced.

1978

US company Genentech genetically modifies the bacteria *Escherichia Coli* to get it to produce synthetic "human" insulin.

1982

Synthetic insulin is renamed "human insulin" to distinguish it from insulin of animal origin, which gradually disappears.

1996

Eli Lilly markets the first insulin analogue. Compared with human insulin, its genetic code is slightly modified to change its properties.

in turn minimises the possibility of lower prices." The WHO agrees, stating on its website: "Despite an ample supply, insulin prices are currently a barrier to treatment in most low- and middle-income countries. Three manufacturers control most of the global market for insulin, setting prices that are prohibitive for many people and countries."

Insulin is not a molecule that can be synthesised through a chemical process, which makes the appearance of generics difficult

Worse still, those three manufacturers are often accused of taking advantage of their oligopoly to boost their revenue. The state of Minnesota even filed a lawsuit against them in 2018. The state singled out three insulin products whose prices skyrocketed for no apparent reason in the US: Sanofi's Lantus insulin rose from \$99 per vial in 2010 to \$270 in 2018, a 171% increase; Eli Lilly's HumaLog rose from \$123 in 2011 to \$275 in 2017 (up 124%), and Novo Nordisk's Levemir rose from \$121 in 2012 to \$294 in 2018 (up 144%).

But the three pharma groups won their legal battle in 2021. The situation in the US is unique: drug manufacturers are allowed to set whatever prices they want, which is not the case in Europe. But that's not to say that insulin prices are a problem only in the US and poor countries. "Even though in Switzerland, treatments are reimbursed through compulsory insurance and all insulin-dependent patients can receive treatment, the cost of insulin does weigh on the health system," says Beran. "Its high cost has an impact worldwide."

In that case, why aren't we seeing low-cost generics appear on the market? Because unlike other drugs, insulin is not a molecule that can be synthesised through a chemical process, which makes the appearance of generics difficult. Each new insulin is created through a biotechnological process, →

© NOVO NORDISK / DR

Do it yourself!

Diabetics turn their backs on pharma firms

"The profits explain the laziness!" For diabetic Bertrand Burgalat, author of the book *Diabétiquement vôtre*, the vast profits that Eli Lilly, Novo Nordisk and Sanofi generate from insulin have made those companies less innovative. And so diabetics are taking control of their own destiny. The Open Insulin Foundation was set up by biohackers and is currently in the process of creating an open-source production method for insulin. The goal is to enable insulin production in parts of the world that don't have the necessary skills to produce it so that those communities can free themselves from big pharma.



→ Dana Lewis, who developed an open-source closed-loop system, pictured here at a TED-X talk in 2018.

In another field in 2014, independent researcher and diabetic Dana Lewis developed a closed-loop system all on her own, combining an insulin pump and a continuous glucose monitor, as no such product was available on the market (see also p 32). Her system was then made freely available under the name Open Artificial Pancreas System, which means that anyone – people and companies alike – can now use it. Lewis's success spurred companies to react, as many closed-loop systems are now available on the market. Moreover, in January 2023, the FDA approved Tidepool Loop, the first do-it-yourself closed-loop system to receive approval.



R  
E  
-  
S  
S  
O  
D

which makes it impossible to replicate them identically, as is the case for chemical products. Every new insulin must therefore undergo safety tests, the famous clinical trials, before being authorised for the market. It's a long and expensive process that hinders the arrival of new entrants.

“The diabetes market is similar to the iPhone market. Anything new is considered to be better and must be sold at a higher price”

David Beran, assistant professor at the University of Geneva

“We have seen that other companies are producing insulin,” says Beran. “But they don’t carry much weight on the global market – their production is often for their own local market, because it’s too expensive for them to undergo the clinical trials needed to enter the US and European markets, which are the most lucrative. In parallel to the regulatory element, there is also the marketing machine of the big three, their links with opinion leaders and diabetes associations that block the entry of competitors.” Bioton (Poland), Gan & Lee (China) and Wockhardt (India) are all companies that have started to develop and market their own insulins in recent years, but those products are mainly for their own internal markets (see company profiles on p. 40 to 51).

To justify their prices, the three big pharma groups are also playing the innovation card, releasing new insulins yearly and marketing them as more effective because of their longer duration of action or ultra-rapid effect. “The diabetes market is similar to the iPhone market,” says Beran. “Anything new is considered to be better and must be sold at a higher price.”

Originally, insulin was extracted from the pancreas of a pig or cow. Those preparations were replaced in the late 1970s by human insulin – in other words, an exact copy of the hormone secreted naturally by humans. Nowadays, human insulins have been replaced by biosynthetic insulins,



↑ Protest outside the offices of Eli Lilly in New York, September 2019, honouring diabetics who have lost their lives due to the high cost of insulin and demanding lower

which differ slightly from natural variants. In 2000, synthetic insulins (or “insulin analogues”) made up 12% of total consumption. That figure reached 85% in 2010, even though scientific

studies have not shown significant improvement for patients. Only the prices have changed: “Insulin analogues are not better than human insulin, but they are sold at a higher price,” says David Beran.

Insulin pens are another asset for big pharma. “Most patents filed nowadays are for injection pens, not the insulins themselves,” Beran says. “Once a patient adopts a brand (pen and insulin), they’re committed for years, a bit like with coffee capsules or printers. The machine doesn’t cost much, but the margins are significant on the refills. And once you’ve bought the machine and are used to it, your hands are tied.”

So what can be done to ensure that more patients worldwide can access this vital drug? “It’s a complex problem. In 100 years,

the issue of insulin accessibility has not been resolved,” says Beran. But the University of Geneva assistant professor says progress has been made in recent years. The WHO, for instance, launched a prequalification programme for generic insulins in 2019 supposed to help lift the regulatory barriers faced by small manufacturers. But since the programme’s launch, only Novo Nordisk has taken advantage of it.

The three pharmaceutical giants use their manufacturing costs to justify their prices, cloaking themselves in good intentions. Since 2008, Eli Lilly has been participating in the “Life for a Child” programme, which provides insulin to children in developing countries. Novo Nordisk has mounted a similar charm offensive with the “Changing Diabetes in Children” mission, launched in 2009. “These insulin donations are a good thing,” says Beran. “But they don’t solve the the fundamental problems which are the domination of the global insulin market and the weaknesses of the health systems in low- and middle-income countries.” ▲

© GETTY IMAGES

Interview

“We have to enter into partnerships”

Small French company Adocia is developing new insulins in the shadow of giants. We interviewed the company’s CEO, Olivier Soula.

Can a small company like yours compete with big pharma by bringing a new insulin to market?

No. We don’t have the resources to do that. How we’re positioned is we provide innovation. We develop insulins, and then we enter into partnerships – or licence agreements – with bigger players that finalise the development and then market the product, paying us royalties. That is exactly what we are doing with our Chinese partner Tonghua Dongbao, which is currently finalising the phase III clinical trials for our BioChaperone Lispro insulin. We’re looking for another partner for this product for the European and US markets, where these trials need to be replicated in order to obtain marketing authorisation.

What does your insulin offer compared with other insulins already on the market?

BioChaperone Lispro is an ultra-rapid insulin. It enters into the bloodstream faster and clears more quickly. After a meal, for instance, a diabetic’s blood sugar level increases sharply, and an ultra-rapid insulin allows the individual to regain control of their blood sugar level more quickly. This is particularly useful for parents with young children

suffering from type 1 diabetes. Our solution allows them to inject the insulin a bit later, which offers flexibility.

But there are already ultra-rapid insulins on the market...

It’s an incremental innovation: we are improving an existing product.

Wouldn’t it be better to develop a low-cost product that’s accessible to everyone?

Both are necessary. We shouldn’t sacrifice innovation because part of the world’s population doesn’t have access to insulin. For example, we’re developing a breakthrough insulin that combines insulin with a satiety hormone in the same formulation. The results of the phase II clinical trials were incredible, with weight loss in the order of 5.6 kg in four months. For patients with type 2 diabetes, who are sometimes overweight, this is a very important step forward. And it shows that innovation should not be abandoned. At the same time, however, the price of insulins invented long ago should be reduced. That’s what patents are for. They protect an innovation for a certain amount of time, and then they expire, and prices drop.



PORTRAIT

# Warhammer, the unbeatable franchise

Sales have exploded for Games Workshop, the UK company that dominates miniature wargaming. Its success comes from the rise of geek culture and the pandemic.

Here's the latest. BY JULIE ZAUGG, IN LONDON

Space Marines stand eight feet tall (2.5 m), are half-human, half-robot, and are genetically engineered to develop superpowers. They are in battle against Necrons, another faction in the futuristic space universe of *Warhammer 40,000*. The blue space marine player rolls the dice. A five. The player can move a set distance, determined with a ruler or tape measure. The player rolls again to make an attack. A three. That means it worked. Another roll of the dice determines the number of wounds inflicted. A sword strikes under the Necron's armour. It is the Necron's turn. He manages to hack off his enemy's arm. He then uses his weapon, a ray gun that shoots balls of green nuclear energy, to finish him off.

This skirmish (in the game's jargon) took place in a *Warhammer* shop, located in a large arcade in the centre of London. Before the demon-

With each turn, the roll of the dice allows players to advance their pawns a certain distance (Northampton, 27 February, 2022).  
↓

stration, the plastic figures had to be assembled and painted with an acrylic gouache. The store also sells figures from *Warhammer Age of Sigmar*, another game set in medieval times with elves and orcs, along with video games, novels and comics that draw on the *Warhammer* universe.

These fantasy worlds are the creation of Nottingham-based Games Workshop, a company listed on the London Stock Exchange. Founded in 1975 by three school friends, the company was long characterised for its anaemic growth but has watched its sales start taking off as of the middle of the last decade.

The firm's revenue rose from £118million for 2016 to £386.8million for 2022, a 228% increase over the period. Even more dramatically, its share price has soared from £560 in January 2016 to currently more than £9,000.

"It's a spectacular success story," says analyst Russ Mould, who covers the company at AJ Bell. "Everything is up: revenues, profits, →

## IN NUMBERS

**2,650**  
Number of Games Workshop employees.

**530**  
Number of shops worldwide.

**£386.8 MILLION**  
The firm's revenue in 2022.

**£22 MILLION**  
Licensing revenue alone in 2022, a stream that has grown significantly in recent years.





margins, customer numbers.” The trend began in the mid-2010s, as fantasy worlds grew increasingly popular. “Series like *Game of Thrones* and films from the Star Wars and Marvel franchises have popularised geek culture and by extension games like *Warhammer*, which were once seen as a niche genre,” says Mikko Meriläinen, a researcher at Tampere University’s Centre of Excellence in Game Culture Studies in Finland.

In 2020, the pandemic gave the movement a boost. “People were stuck at home and started playing board games,” Russ Mould says. The trend has continued even after the lockdowns, he says. In the first half of the current financial year, which closes on 31 May, Games Workshop’s revenue rose 7.1% to £226.6 million.

The firm’s revenue is driven by the sale of miniatures. A starter set including two armies and citadel pieces costs £65. The full

## “Everything is up: revenues, profits, margins, customer numbers”

Russ Mould, analyst at AJ Bell

An army of Necrons ready to fight. These extremely resilient metal beings have the ability to regenerate themselves.

set of figures costs £180. “Warhammer fans often discover their passion as teenagers and keep it throughout their lives,” says Charles Hall, an analyst covering Games Workshop at Peel Hunt. “They add to their collection as the years go by and new models are released, guaranteeing a steady revenue stream for the game’s creators.”

In addition to its two main hits *40K* and *Age of Sigmar*, Games Workshop produces other games, including *Necromunda* (a fighting game with fewer figures set in the *40K* universe), *Blood Bowl* (which allows *Age of Sigmar* characters to compete in American football) and *Middle Earth* (featuring the heroes from *Lord of the Rings*). There are also books with the rules of the game, paint to decorate figures and myriad derivative products.

© AFP

The company also organises an annual event, called Warhammer Fest. The next one is scheduled for the end of April in Manchester. Near Nottingham, Warhammer World is a centre where fans can get together to play games, explore special exhibitions and, of course, buy action figures.

“For some fans, the social aspect, i.e., getting together with friends to play games, is the main attraction,” says Mikko Meriläinen, who surveyed 127 fans of miniature tabletop games. For others, the best part is the DIY, i.e., painting and displaying miniatures, whether in glass cases or on Instagram. Still others are drawn by the game itself, in its strategic aspect.

And they are mostly men, often also fans of video games and role-playing games like *Dungeons*

The best “Wargamers” regularly compete against each other in team competitions. Here, an international tournament between teams of 5 players, on 27 February, 2022 in Northampton, north of London.

& *Dragons*. Games Workshop actually has very few direct competitors. “The company dominates miniature wargames,” Charles Hall says. “The other firms active in the sector are very small businesses.” They include independent studios that raise funds on Kickstarter, as well as a handful of small companies such as WizKids, Warlord Games, Fantasy Flight or Avalon Hill.

### A hostile environment

Despite its success, Games Workshop is up against strong headwinds. “All products are made in the UK,” Charles Hall points out. “But with the supply chain challenges and rising freight costs caused by the pandemic and Brexit, the company has struggled in recent months to deliver its products.” Soaring energy costs pose another threat.

These factors have naturally impacted the books. In the first half of the 2022-2023 financial year, pre-tax profits fell 5.2% →

Many Warhammer enthusiasts paint their miniatures themselves, often during competitions. Here is a Great Devourer, a fearsome member of the Tyranid faction.





to £83.6 million, offset by rising operating costs, which increased 6.5% over the period. And there is no guarantee that sales will remain high. "Inflation will put a strain on the finances of miniature game enthusiasts, limiting the amount of money they can spend on their hobby," Russ Mould adds. The crisis affecting cost of living is particularly acute in Europe, where Games Workshop generates 40% of its revenue.

In the medium term, the company's dominance in miniature manufacturing could also be challenged. "The widespread availability of cheap 3D printers makes it easier to produce these plastic or resin parts, whether they are small competing companies or fans of the franchise," says John Curry, a games development specialist at Bath Spa University.

#### **Dream deal with Amazon**

However, Games Workshop's business

opportunities remain both real and tangible. Analysts believe that its future revenues will increasingly derive from its intellectual property. "Licensing rights, mainly to video game designers inspired by the worlds of Warhammer, currently only account for 16% of profits, but the segment is growing rapidly," Charles Hall says. It generated £28 million in 2022, compared to £11.3 million in 2019. In 2021, Games Workshop launched Warhammer Plus, a streaming service providing access to exclusive content for £4.99 a month.

In December 2022, the UK firm announced a deal with Amazon that will allow the US tech firm to produce films and series based on the Warhammer universe. "This partnership takes Games Workshop to the next level, boosting its licensing revenue and bringing the Warhammer brand to a much wider audience," Charles Hall says. The Space Marines are about to hit the jackpot. ▲

#### **Dungeons & Dragons, the inspiration**

Miniature wargames date back to battle simulations by the Prussian army in the 18<sup>th</sup> and 19<sup>th</sup> centuries. But it wasn't until the release of *Dungeons & Dragons* in the mid-1970s "that a new hybrid tabletop genre came out, blending wargames and fantasy," says Zachary Horton, a gaming expert at the University of Pittsburgh. The first edition of *Warhammer* was released in 1983. At the time, Games Workshop was a small company that produced classic games (*Backgammon*, *Go*) and imported *Dungeons & Dragons* to the UK. Then its sales took off, and the variations of *Warhammer* multiplied, launching the 40,000 version in 1987 and *Age of Sigmar* in 2015.

© WARHAMMER

Illustration of the *Warhammer Age of Sigmar* game. This fantasy universe franchise is inspired by the fictions of JRR Tolkien.



# Make-A-Wish<sup>®</sup>

## SWITZERLAND

**We create life-changing wishes for children with critical illnesses**

**Donate today: IBAN CH26 0027 9279 2794 5940Y**

**makeawish.ch**



AUTO



# Head of the class

**The new GLC, Mercedes' bestseller, is in a class of its own in terms of comfort. We tested its good old diesel version, the 220d.**

BY BLAISE DUVAL

MERCEDES GLC

ENGINE  
2.0-LITRE INLINE  
FOUR-CYLINDER ENGINE  
WITH 48-VOLT MILD  
HYBRID

HORSEPOWER  
197 HP (DIESEL) + 23 HP  
(ELECTRIC)

COMBINED FUEL  
CONSUMPTION  
5.9 L/100 KM

ACCELERATION  
0 TO 100 KM/H: 8  
SECONDS

PRICE  
STARTING AT  
CHF 65,800.-

Should we even be talking about diesel in 2023? We thought it was a valid question when we contacted Mercedes to test its new family SUV. The latest GLC is available in various plug-in hybrid forms, as it should be, but the 220d piqued our curiosity. Not many premium SUVs weighing more than two tonnes can go for almost 1,000 km on a single tank. That is worth considering in a climate of soaring energy costs. And the bonus is that its 2-litre engine emits significantly less CO<sub>2</sub> than the GLC's petrol variants. Although this may be positive for the climate, diesels will eventually be banned. So, we're basically dealing here with an endangered species.

On the outside, the aesthetic enhancements are subtle. The front and rear headlamps have been discreetly refined and reshaped, as have the bumpers. However, the interior has been completely redesigned. The added 6 cm in length, for a total of 472 cm, have gone to increasing the spaciousness of the rear seats and boot. The 620 l in rear space capacity surpasses most specs in the category.

In the cabin, the dashboard is almost identical to that of the C-class sedan launched in 2021. Drivers averse to touch-screen interfaces will just have to get used to it. Almost everything is done through the central panel and the handsome spread of shortcut buttons on the steering wheel, including air conditioning and audio volume controls. We still think that premium brands go too far in this respect and that physical buttons offer a far better experience (Tesla being the exception in our opinion). Duly noted. The finishings are fine quality, as is the comfort.

Now for the engine. The rumbling startups and restarts during city driving leave us with no doubt; this is definitely a diesel. Nothing shocking, but the rough noise sharply contrasts with the smooth feel of everything else. Even though the diesel block works with a 48-volt mild hybrid system, in practice the technology has little impact on driving. Our test car features Airmatic air suspension and rear-wheel steering. These two options are worth it, guaranteeing the comfort of a limousine and the handling of a compact car.

Outside an urban setting, performance rises to the next level. At a steady speed, the diesel sounds are but a distant memory, and the GLC glides forward in majestic silence, everything under control. Well-behaved drivers can achieve reasonable fuel consumption of about 7l/100 km. And this cosy cocoon encourages you to take it slow. Those who spend a lot of time on the road be warned. ▲



AEROWATCH  
SWISS WATCHES SINCE 1910



MILAN COLLECTION  
Ref. A 60998 AA01 M

Now also available at Beyer Chronometrie Bahnhofstrasse 31 8001 Zurich

[www.aerowatch.com](http://www.aerowatch.com)



# Bic

## Making a lasting mark

Now more than 70 years old, the French company has managed to make a name for itself worldwide with a simple pen. Here's the latest.

BY ANGÉLIQUE MOUNIER-KUHN

A

clear, hexagon-shaped body, 147 mm long and 8.3 mm in diameter, weighing 5.64 grams. Who else, at age 70, can boast that it has retained its youthful figure so effortlessly and also features in the permanent collections at the MoMA in New York and the Centre Pompidou in France? The Bic Cristal was born in 1950 at a workshop in Clichy, just outside Paris. Eleven years later, its creator stamped it with a small schoolboy with a ball for a head. To this day, that logo distinguishes it from its countless copies. The invention by Marcel Bich, a stalwart captain of French industry in the 20<sup>th</sup> century, remains today the bestselling Biro in the

world, with almost 4,000 units sold per minute. Ink with a ballpoint, instead of a fountain pen. The idea for this instrument that would eventually revolutionise the way people write emerged in the United States in the late 19<sup>th</sup> century. The first prototypes were inconclusive. It was not until the Hungarian Biró brothers improved the pen that it started selling on the market during World War II. But the product still had some defects: the ink leaked and the pen was expensive.

Marcel Bich, who ran a workshop that made parts for fountain pens and mechanical pencils, purchased the Biró patent. He reworked the design and incorporated Swiss watchmaking tools. They were the only manufacturing machines that could deliver the precision necessary to produce the perfect ball that would glide over the page and let the ink

flow without smearing. The ball was first made of stainless steel and then, from 1961, of tungsten carbide, which made it even more wear-resistant. Each reservoir tube contains a confidential ink formula that dries instantly and guarantees at least 2 km of writing. The new pen was named Bic Cristal, as in Bich without the h. The crystal was for transparency and longevity.

The invention by Marcel Bich remains today the bestselling Biro in the world, with almost 4,000 units sold per minute

Affordable for any budget and popularised by an impressively effective advertising campaign,

the Bic pen shook up the monopoly of nibs and inkwells in France before setting out to conquer the world. After Belgium, Bic moved into Switzerland in 1954, the United Kingdom in 1957, and the United States in 1958. Then came the Scandinavian countries, Africa and Japan. In France, the Bic name became a household word for ballpoint pen, regardless of the brand: “Can I borrow your bic?” Globally, it became an archetype of mass consumption, used by all generations, in all settings, on all continents.

“The Bic Cristal is the sole example of socialism in practice. It cancels out all the rules of ownership and social distinction”

Umberto Eco, writer, who died in 2016

↑ The BIC Cristal pen, original model from 1950.

Italian academic and writer Umberto Eco spoke to its universal nature: “The Bic Cristal is the sole example of socialism in practice. It cancels out all the rules of ownership and social distinction.” “The product has made everyday life easier for consumers,” Bruno Bich, Marcel Bich’s successor, stated more solemnly in one of his rare television interviews.

In February 1972, Bic was listed on the Paris stock exchange. The following year, it launched into a new market with the disposable

lighter. Reliability, affordability, large-scale production, worldwide distribution and powerful marketing. The ingredients that made the Bic Cristal formula work triumphed once again. Success flourished a third time when the firm introduced the first single-piece disposable razor in 1975, shaking up a sector that had until then been dominated by the US company Gillette. Management professor Olivier Meier explains Bic’s success by peeling back the misconception that assimilates Bic products with gadgets simply because they are disposable. “It’s actually quite the opposite. The business philosophy conveyed by Marcel Bich is mostly based on (...) the value of use, durability, quality and savings,” analyses the expert in his book, *Diagnostic Stratégique*.

Since the 1980s, several attempts to diversify further have ended up as commercial flops. The most resounding failure was in 1991, when Bic withdrew its range of low-cost perfumes. But the French company has

consolidated its positions in its traditional businesses. Bic claims to be leader in lighters, which accounted for 39% of its 2021 revenue, and holds the number two spot worldwide in the other two branches of writing and shaving (39% and 22% of sales respectively). “One unique aspect of the group’s viability is that it has developed through self-financing, not with bankers and debt. With this philosophy, Bic has avoided taking (excessive) risks that could threaten the company when decisions turn out to be poor ones, while benefiting fully from the profits when it has been successful,” Meier says.

Another key is that the brand, which has 10,500 employees, jealously guards its manufacturing secrets. It manufactures all of its products in its own automated factories across the world. After Marcel, then Bruno, in 2018 Gonzalve Bich took over as head of the group, which is still 45% owned by the family. Between the changes in consumer habits – to which Bic is responding by venturing into new territories, such as digital writing and ephemeral tattoos – tight competition, and pressure on profits due to the rise in raw material and energy costs, the third generation Bich has plenty of challenges to work out. But analysts continue to trust its strategy, most of whom recommend buying shares in the company. And Bic continues to write its story. ▴

### KEY DATES

1950

The Bic Cristal pen is created in a workshop in Clichy, a suburb of Paris.

1972

Société Bic is listed on the Paris Stock Exchange.

1973

The company launches its first disposable lighter, which becomes a worldwide bestseller.

1975

Bic introduces the disposable razor.

FOUNDED: 1945 | HEADQUARTERS: CLICHY (FRANCE)  
EMPLOYEES: 10,500 | CAPITALISATION 2020: € 1.83 BN  
→ BIC



# Beware of fraudsters!

Email scams have been on the rise in recent months. Claudio Erni, head of Customer Care at Swissquote, reminds us of how to protect ourselves.

SWISSQUOTE.COM/PHISHING

You'll almost certainly have received emails that claim to be from one of your service providers asking you to enter your login details. Sound familiar? If so, you've been targeted by a fraud attempt known as "phishing". Some of these scams are becoming increasingly credible, meaning we all need to be ever more alert.

**What is phishing?**

A portmanteau of the words "phreaking" (telephone hacking) and "fishing", phishing refers to fraudulent calls or emails designed to obtain victims' login details in order to steal their money. Cybercriminals usually pose as representatives of companies, including banks.

**Are criminals' methods evolving?**

We are seeing their techniques being perfected. In recent months, we've been struck by the marked

increase in the credibility of some phishing emails. The usual typos and clumsy wording have disappeared. Some emails can appear remarkably authentic, and so it's essential to be extremely vigilant.

**So how can you guard against this type of scam?**

If you only remember one thing, it should be this: Swissquote will never ask you to share your personal data by email or text, such as your password, your L3 card number or any other personal information (see also box opposite).

We also advise our clients not to use a search engine to access our login portal. Typing "Swissquote login" into Google, for example, could lead to a fraudulent website. Criminals are clever at getting their sites to appear high up in the

search results. And the appearance of these fraudulent websites has also improved. You have to look very carefully to notice that they are fake.

More generally, there are certain warning signs that point to a phishing attempt. For example, you might be pressured into making a quick decision with the promise of huge profits, or you may be approached about an alleged update to your account information or contacted about "unblocking your account". Also beware of people posing as Swissquote employees, whether by email or phone, sometimes using the names of real employees.

**What measures has Swissquote implemented?**

We adopt the highest security standards. And we advise you

to use the tools available. On a smartphone, our clients have the option of activating "Mobil Level 3", a two-factor authentication feature that lets them use their smartphone to confirm logins, transactions and other important actions. This function is integrated into the Swissquote Trading app and allows fast and secure authentication. Facial and fingerprint recognition technologies are also offered for greater convenience and security. ▲



Claudio Erni  
Head Customer Care  
Swissquote Bank

**Swissquote will never ask you...**

- to share your personal data with us (your complete password, L3 card or personal information) by email or text
- to carry out a "test" transaction online
- to log in to websites not approved by Swissquote
- to make a decision immediately or pressure you to respond, particularly via unsolicited messages
- to call us on a new telephone number
- to download an attachment, install software or allow anyone to remotely connect to your computer or other devices during or after a call
- to transfer cash to a new bank account (payment instructions can be checked in your online account at any time) or pay in funds in cash



# Mortgages at their best

Are you looking for advantageous financing for your real-estate asset? **Jürg Schwab, head of Strategic Relations, explains the benefits of choosing Swissquote.**

**Just over a year ago, Swissquote entered into a partnership with Luzerner Kantonalbank for its mortgage services. What is your assessment of that decision?**

We are delighted with the new partnership. It has been tremendously successful and is popular with our customers. By taking out a mortgage loan with Swissquote, our customers also gain access to Luzerner

**Mortgage interest rates have risen significantly in recent months. How do you explain that?**

The rise in interest rates is due to monetary policy implemented by central banks. And over the past year, policy has been dictated by the sharp rise in inflation. The current situation is the result of many factors, including higher commodity prices, supply chain problems, the war in Ukraine and soaring energy prices. However, we should put things into perspective. The near-zero interest rates in recent years were exceptional in many ways. By historical comparison, the current 10-year interest rate of less than 3% is still reasonable.

**What services does Swissquote provide for clients who want to buy a property?**

First, we offer very attractive interest rates. Second, our clients enjoy a very simple and quick process, which is done entirely online. A response is sent in under 24 hours

directly to the client's account. The platform is accessible 24 hours a day, seven days a week.

**What are the steps?**

Just go to our website and under the "Credit Solutions" tab, click on "Mortgage". As a first step, clients can use our simulation tool to find out if their asset can be financed, based on its value, amount of personal funds and net revenue. Then, clients fill out a questionnaire that only takes a few minutes. And of course, if they have any questions, they can always call one of our experts. ▲



**Jürg Schwab**  
Head Strategic Relations  
Swissquote Bank

**"All our forms are now available in full in French or in German"**

Kantonalbank AG (LUKB), which has a proven track record in mortgage expertise. Our French-speaking customers can now go through the entire loan application process in French, end-to-end. All forms are available in both French or German, as the customer prefers.



# Can ETFs outsmart the index? Yes.

Based on the index, made smarter by expert research: trade J.P. Morgan Asset Management's active ETFs at a competitive price with Swissquote.

[swissquote.com/JPMAM](https://swissquote.com/JPMAM)

The value of investments may go down as well as up and investors may not get back the full amount invested.

JPM53941J096v220712095940



**J.P.Morgan**  
ASSET MANAGEMENT



T R A V E L

# INDONESIA

LAND OF FIRE

Located in the Pacific Ring of Fire, the 17,500 islands of Indonesia are home to more than 140 volcanoes – 130 of which are currently active.

The volcanoes of Indonesia offer some spectacular hiking experiences. Options abound for all interests and fitness levels. Let's take a look at the incredible craters of this archipelago. BY JULIE ZAUGG

## GUNUNG BROMO A car trip

This is one of the most visited volcanoes in Indonesia, because of its ease of access. Located in the middle of a rock desert in eastern Java, Gunung Bromo can be reached by Jeep. Adventurers drive to a scenic viewpoint, where they can see the sun rise behind Mount Bromo and Mount Semeru, its larger cousin whose summit is perpetually clouded by a plume of smoke. Then, visitors can climb a staircase built into the side of the volcano and reach the summit in approximately 10 minutes. More adventurous hikers can climb Mount Semeru, a difficult two-day ascent.

## GUNUNG RINJANI An epic hike

The second highest volcano in Indonesia, this perfect cone towers over the island of Lombok at 3,726 metres high. It takes three days to reach the summit and the arduous journey can only be completed by people with a good level of physical fitness. The first day is a hike through thick jungle before emerging onto a savannah that gradually turns into a rocky path. The first night is spent on a narrow strip of land at the edge of the caldera. The second day is spent descending into the volcano, admiring the turquoise lake, and then climbing up the other side. On the third day, walkers climb back down into the valley.



GUNUNG KELIMUTU  
Multicoloured lakes



Nestled on the island of Flores, this extinct volcano is made up of three craters, each of which has a different coloured lake in its centre due to the various types of minerals. Depending on sunlight levels, the lakes can appear green, turquoise, red or blue, and to see them, visitors can take a motor-cycle or Jeep from the village of Moni, about 30 minutes away, after which it is a 30-minute walk to the viewpoint.

GUNUNG AGUNG  
The largest temple in Bali



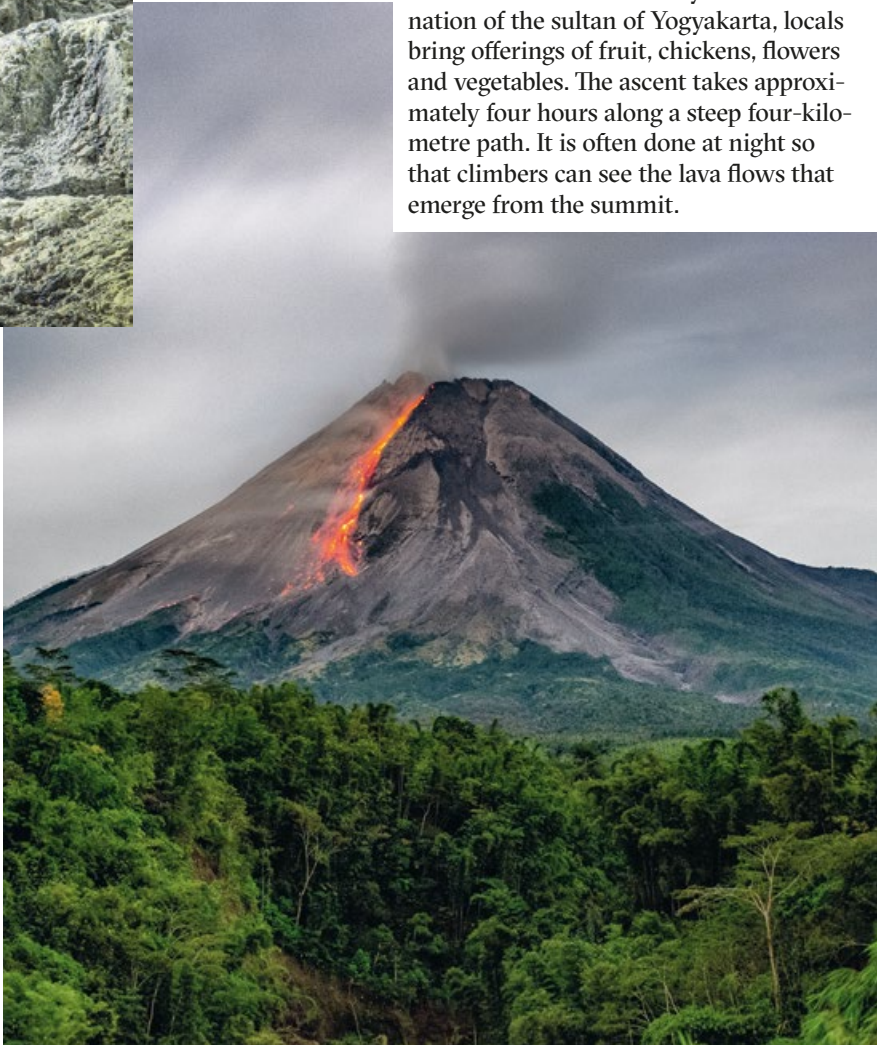
Located on the island of Bali, this volcano, which stands 3,031 metres high, can be climbed in six to seven hours with the help of a guide. But its main attraction is on its southern side: Besakih is the largest temple on the island and serves as proof that Bali residents revere the sacred mountain. The temple, to which the first written reference dates back to the year 1007, has a long staircase, lined with flowers and small rock statues of gods, that leads to the summit. Every April, Besakih temple hosts a Hindu ceremony called ‘Odalan’, with many dances, songs and colourful offerings.

© ISTOCK / ANDREY BOND / MARIO LA PERGOLA / ISTOCK



GUNUNG IJEN  
Blue lava

This volcano is particularly unique in that it produces blue lava due to its high sulphur content. In fact, it serves as a quarry for sulphur, which is used to produce fertilisers, batteries and matches. This crater is located in east Java and is known for its sulphur carriers, who descend the mountain with two baskets filled with heavy yellow rocks hanging from a bamboo cane. The climb happens at night and takes approximately two hours. Once at the summit, hikers descend into the caldera to admire the blue flames and then climb back up to the rim of the volcano to see the sunrise.



GUNUNG MERAPI  
The volcano of myth

Nicknamed the “mountain of fire”, this volcano is one of the most active volcanoes in the entire archipelago. It dominates the village of Yogyakarta in central Java, and is forever in the minds of local residents. Each year, to celebrate the anniversary of the coronation of the sultan of Yogyakarta, locals bring offerings of fruit, chickens, flowers and vegetables. The ascent takes approximately four hours along a steep four-kilometre path. It is often done at night so that climbers can see the lava flows that emerge from the summit.

3 TOP TRAVEL AGENCIES

Aventure et volcans

This French agency organises volcano-themed trips complete with volcanologist guides. Its Indonesian trips range from 11 to 25 days, starting at €1,650.

Indotravelteam

This local agency offers shorter trips of one to three days. Travellers can explore a volcano accompanied by a guide, who organises transportation, meals and lodging.

Base Camp Adventure Indonesia

This local organisation was founded in 2008 by hiking enthusiasts. It offers trips of one to three days to explore Indonesian craters.

GETTING THERE

There are several daily flights to Jakarta from Geneva and Zurich. The best connecting flights pass through the Gulf countries on Etihad Airways, Qatar Airways or Emirates. From the capital of Indonesia, there are many domestic flights to the rest of the archipelago.

WHERE TO STAY

Plataran Bromo

Located at the edge of the *Gunung Bromo* caldera, this luxury resort is home to spacious rooms with elegant decor. It offers various tours to explore the region while maintaining all creature comforts.

The Phoenix

Located in the former home of a Chinese sugar merchant built in Yogyakarta in the 1890s, this hotel boasts impressive colonial architecture. A beautiful outdoor pool is located within the courtyard and the hotel restaurant offers an inventive fine dining experience.

Tugu Lombok

Located on the shores of a white sand beach with fantastic views of *Gunung Rinjani*, this hotel looks like something straight out of an explorer's imagination with its wooden statues and engraved archways.

Ijen Resort & Villas

Several small villas surround a pool nestled in the heart of rice fields and traditional villages east of Java, a few kilometres away from the blue flames of *Gunung Ijen*.





GUNUNG KERINCI

The peak

Standing at 3,805 metres high, this is the tallest volcano in south-east Asia. Gunung Kerinci is on the island of Sumatra, one of the wildest islands of the archipelago. Climbing to the summit takes two days and requires good physical fitness. But the view from the top is spectacular, and hikers can even see the Indian Ocean from afar. The flanks of the volcano are mostly jungle, home to many rare species such as mitred langur, a white monkey with a grey-black back, siamang gibbons, known for their powerful guttural cries, Sumatran tigers and rhinoceroses, and many types of lizards and birds.

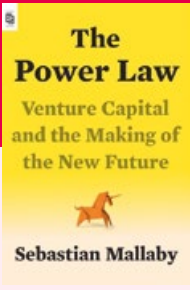


© ISTOCK / SHUTTERSTOCK

GUNUNG KRAKATAU

The still-active survivor

This volcano, located in the sound between Java and Sumatra, lost much of its elevation after a massive eruption in 1883, which led to tsunamis in several Asian countries and even affected the global climate for months. Today, visitors can reach the volcano by taking a high-speed boat from Carita Beach, not far from Jakarta. The most popular trip is to hike Anak Krakatau (a smaller volcano created from the 1883 earthquake) and then camp on the beach at the foot of the crater. This highly active volcano often emits lava flows that campers can admire under starry skies. Visitors can also explore the waters around the island, which are home to very beautiful coral gardens.



R E A D

The Power Law

Venture Capital and the Making of the New Future  
BY SEBASTIAN MALLABY,  
PENGUIN PRESS, 2022

This book delves into the world of venture capitalists, from when it all started in Silicon Valley to their current penchant for Chinese companies. In this riveting tale, the author interviews a broad cast of colourful players and features plenty of juicy, detailed anecdotes. Stories include one about financiers coddling up to a young Mark Zuckerberg as he pitched in his py-jamas, and another about venture capitalist Bill Gurley's mission to boot Uber founder Travis Kalanick. A must-read for anyone who wants to understand how Silicon Valley evolved into what it is today.

CHF 30.-  
HARD COPY  
CHF 15.-  
DIGITAL COPY



L I S T E N

EconTalk

BY RUSS ROBERTS

Created in 2006, this weekly economic podcast has logged over 800 episodes to date and is considered one of the most influential shows available. The host is Russ Roberts, a research fellow at Stanford University's Hoover Institution. Most often solo guests are featured, typically economists (more than a dozen Nobel Prize winners have appeared on the show), as well as doctors and psychologists.

[RUSSROBERTS.INFO/ECONTALK](http://RUSSROBERTS.INFO/ECONTALK)



F O L L O W

MarketWatch

@MARKETWATCH  
News, personal finance & commentary from MarketWatch

TWITTER 227 FOLLOWING 4.4 M FOLLOWERS

The Twitter feed of MarketWatch, the financial news website and subsidiary of Dow Jones & Company, provides news and commentary from the worlds of business and finance. It also delivers real-time market updates (every minute). This feed is recommended for savvy traders and seasoned stock market actors.

BeReal.

D O W N L O A D

BeReal

The anti-Instagram

This French-speaking social media app, created out of Alexis Barreyat's contempt for Instagram, appeals to those who sympathise with authenticity and down-to-earthness. BeReal allows users to post only one photo daily within a limited window of time. Once a day, the app sends a notification to all users at the same time – but the time frame is different each day – and users have just two minutes to post a selfie and their location, with both shots taken simultaneously with the front-facing and back-facing cameras on their smartphone. Content can therefore not be curated in advance, i.e., with filters, music, emojis, etc. Other ways that set BeReal apart include the lack of information on the number of followers, and users have to post to view other people's content. Also, photos are deleted after 24 hours.

GOOGLE PLAY, APP STORE  
FREE



**Get snow-boarding in one click**

Finally, what the snowboarding community has been waiting for: Swiss family company Nidecker has launched the Supermatic, the first universal automatic snowboard binding. With three locking ratchets in the front and back and a roller at the heelcup, the system allows riders to clip in easily and safely on the first try. A simple lever releases the board. Snowboarders can finally step in just like skiers.

nidecker.com  
CHF 449.95



**Syrup with a Swiss twist**

Created in 2020 by Canadian-Swiss duo Nadine Ringgenberg and Alexandre Guimond, the brand Mawoo (a port-manteau of 'maple' and 'wood') offers Swiss-made products that use organic maple syrup from the couple's maple farm in Quebec. Mawoo's best-seller is maple butter, a spread made by hand in Morat that is vegan and rich in nutrients – perfect for breakfast. The granola and peanuts are also particularly delicious.

mawoo.ch  
CHF 13.70

**Bring warmth to the outdoors**

Inspired by the "Gazzetta" newspapers that professional cyclists placed under their jerseys to add a protective layer before starting a descent, the Italian brand Q36.5 has created the Wind Shell. This windbreaker made from technical fabric allows warm air to build up next to the skin while simultaneously wicking away moisture. Weighing in at a mere 40 g, it is lightweight and easily packable, offering ideal thermoregulation for high-altitude mountain hikes or training in adverse weather conditions.

q36-5.com  
CHF 50.-



**Clean and wrinkle-free**

Hang your coats, suits, jeans, down pillows and other textiles right inside. In just 30 minutes, the high-tech wardrobe from Chinese start-up Coucoq neutralises unpleasant odours and refreshes and presses fabrics via a steam cleaning system. The wet garments are dried gently and delicate UV technology disinfects, sterilises and eliminates mites and bacteria without the use of chemical additives. It'll make trips to the dry cleaner a thing of the past

coucoq.com  
CHF 3,290.-

**The watch without a screen**

Don't bother to look for hands or a screen. The Nowatch is no ordinary smart watch. Instead of the usual dial, its face is made up of interchangeable gemstones, without any buttons or touchscreen to interact with. Just an item of jewellery? A very useful one if so. According to its manufacturer, the Nowatch is able to measure its user's stress level, thanks to a technology developed by Philips. It also delivers small vibrations throughout the day, designed to fix the wearer in the present and reduce stress. An associated app collects all physiological data and offers well-being advice.

nowatch.com  
CHF 339.60



**Return of the Walkman**

First released by Sony in 1979, the Walkman has been brought into the modern day by French start-up We Are Rewind. With an aluminium case available in three colours – orange, blue and grey – the new generation cassette player boasts a clean design, and even features a record option for creating your own mix-tapes. Compatible with Bluetooth headphones, the cassette player from We Are Rewind is now equipped with a rechargeable battery for the first time, with up to 12 hours of play time. Now all you need to do is dig out your old cassette tapes.

wearerewind.com  
CHF 146.70



A LOOK  
INSIDE  
THE  
LAB

## Bacteria-based green cement

**An EPFL laboratory has developed a building material that harnesses the phenomenon of natural calcification. Dimitrios Terzis, the engineer who coordinated this research, explains the process...** BY JULIE ZAUGG

**T**he construction industry is one of the world's biggest polluters. The manufacture of cement alone, one of the components of concrete, generates 8% of anthropogenic CO<sub>2</sub> emissions. And this fact prompted the soil mechanics laboratory at the EPFL (École Polytechnique Fédérale de Lausanne) to develop a biological cement, under the leadership of Dimitrios Terzis, a civil engineer.

The material is produced by mixing *Sporosarcina pasteurii* bacteria with urea, a non-toxic synthetic molecule. These micro-organisms break down urea for food, generating calcium carbonate (CaCO<sub>3</sub>) crystals. These are used as a binder for the aggregates (sand and gravel) that are one of the components of cement, rather than the more usual clinkers (lime, industrial resins and limestone).

"The process can be carried out at room temperature, whereas for the manufacture of conventional cement, the materials need to be heated to over 1000 degrees," explains Terzis. "And so it saves a lot of energy." By reproducing a calcification process that takes place in the natural environment, the process developed by the civil engineer also avoids the soil and groundwater contamination that clinkers can cause. Another advantage is that "this material does not affect soil permeability, unlike cement, which makes soil impermeable and encourages flooding", Terzis adds.

Along with Professor Lyesse Laloui, Terzis has founded a startup called MeduSoil to market this biocement. The firm, which has seven employees, has raised 2 million Swiss francs and has a plant in Tolochenaz (VD) capable of producing *S. pasteurii* bacteria on an industrial scale using processes borrowed from the food industry. "We can generate 100,000 litres of biocement each year, the equivalent of 100 kilometres of road," says Terzis. The first batch was produced in 2022.

At present, the main application envisaged is ground stabilisation. "In the event of heavy rains or prolonged heat waves, cracks may appear in soil, roads, dykes or dams, and these can be filled using our biocement," says Terzis. For example, it was used to stabilise sloping ground threatened by erosion near a station platform in the canton of Fribourg. In an urban environment, this cement could be used to help stabilise land that is currently unsuitable for construction.

Terzis hopes eventually to produce cement blocks that can be used in building construction. "For now, our processes are still too expensive," he explains. "First we will need to increase our volumes to achieve economies of scale."

Although the manufacturing process invented at EPFL is unique, other startups are also looking into this field. Biomason and Prometheus Materials in the US and Dutch company Basilisk all produce bacteria-based construction materials. In Singapore, meanwhile, Nanyang Technological University has developed a biocement that's able to slow beach erosion. ▴

↑  
*Sporosarcina  
pasteurii*  
bacteria

# TRADE IN YOUR OWN STYLE

Traditional? Bold? Diversified?  
Embrace your investment style,  
with the security of a bank.

swissquote.ch

 **Swissquote**





## ALPINE EAGLE

With its pure and sophisticated lines, Alpine Eagle offers a contemporary reinterpretation of one of our iconic creations. Its 41 mm case houses an automatic, chronometer-certified movement, the Chopard 01.01-C. Forged in Lucent Steel A223, an exclusive ultra-resistant metal resulting from four years of research and development, this exceptional timepiece, proudly developed and handcrafted by our artisans, showcases the full range of watchmaking skills cultivated within our Manufacture.

*Chopard*

THE ARTISAN OF EMOTIONS – SINCE 1860