

SWISSQUOTE

FINANCE AND TECHNOLOGY UNPACKED

MEDIA

Tamedia is making moves

SPACE

Walking on the moon once again

PETS

Nothing's too good for Fido

DOSSIER

THE OPEN SOURCE BONANZA

How Facebook, Microsoft and Google are using free software

Linus Torvalds, creator of Linux

▶ CLOUDERA ▶ ELASTIC ▶ MONGODB ▶ ORACLE ▶ RED HAT ▶ TALEND ▶ WALLIX ▶





Cartier

SANTOS-DUMONT COLLECTION

The future is open



By Marc Bürki,
CEO of Swissquote

Here we are in 2019 and market mainstay Microsoft is more popular than ever among financial analysts. But although its share price has been trending upwards over the past few years, it's no thanks to Windows. Few people know this, but the iconic operating system now only generates barely 15% of Microsoft's profits.

While it's true that Windows is still the king in the regular PC market, open source software **reigns supreme** for servers and cloud services. Linux, the most famous open source software, is running on millions of servers used by web giants such as Google, Amazon, Facebook and eBay. In fact, a significant portion of Microsoft's revenue now comes from cloud-based products and services running on... Linux.

Ironically, for a long time the open source development model was the number one enemy of proprietary software giants, which eventually realised they couldn't compete with the wealth of tools developed by communities. And for digital companies, open source solutions provide enormous productivity gains and the

reassurance of knowing the latest innovations will always be available. For example, more than 80% of services provided by Swisscom are now based on open source solutions.

This inevitable trend convinced IBM to spend an astronomical \$34 billion in October to acquire Red Hat, a US company specialising in open source software. Earlier last year, Microsoft spent \$7.5 billion acquiring GitHub, another major US player in the industry. These companies developed a solid business model based on sales of their solutions (since "open" doesn't mean "free"), as well as training and support. Several similar **companies**, all public, are profiled in this issue.

Beyond the commercial aspect of open source, our feature report also delves into its fascinating **background** and history. For many, this movement born in the 1980s champions a humanist approach, in the sense that IT programmes are like a common good that everyone can use, study and modify. While open source has lost some of its benevolence, its spirit hasn't disappeared completely.

Happy reading!



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Chopard

THE ARTISAN OF EMOTIONS – SINCE 1860

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p. 36



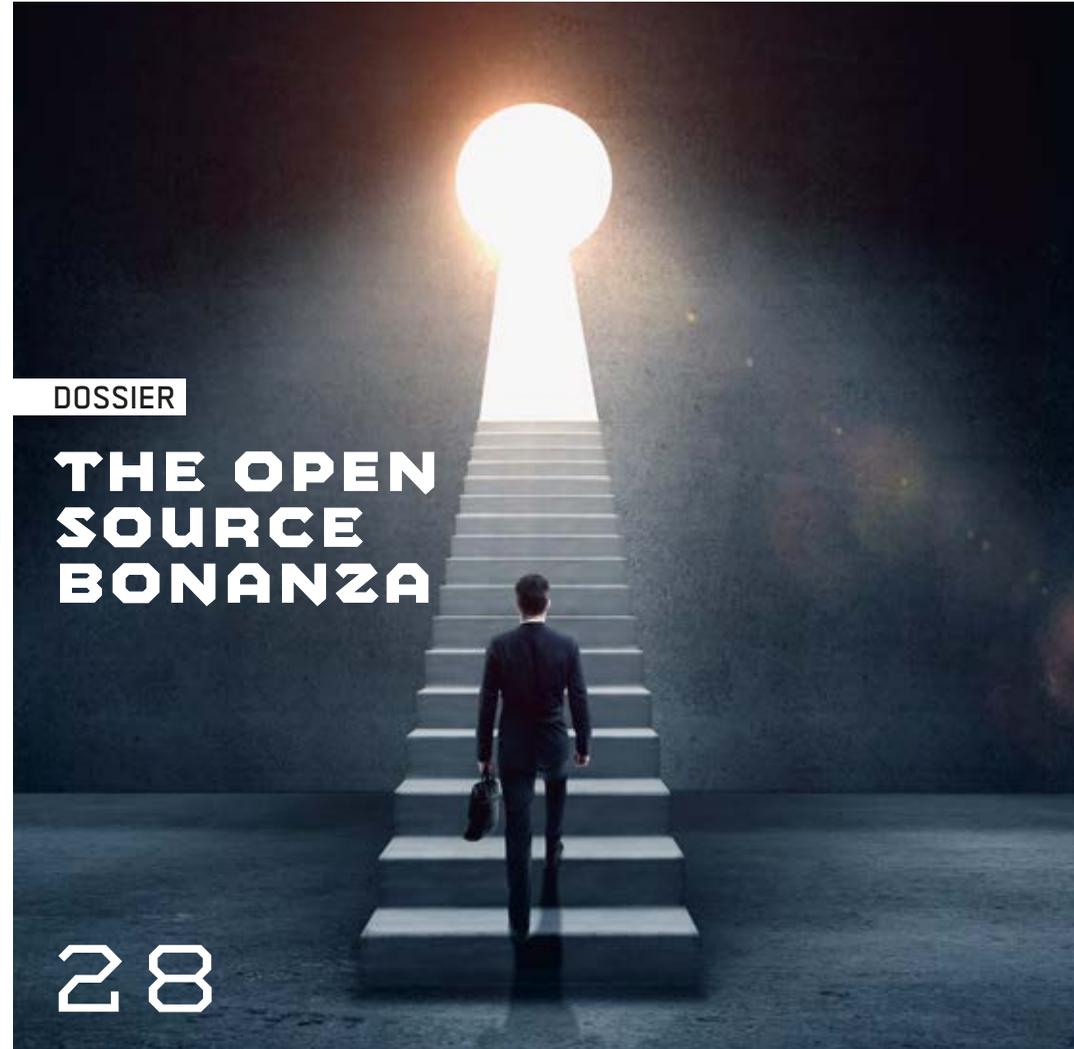
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CONNECTED HOME



18

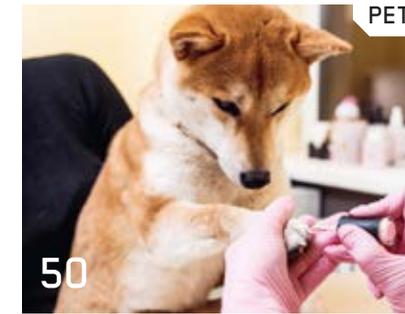
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“Blockchain technology is ingenious but bitcoin has no unique value”

Warren Buffett, in an interview with CNBC.



ISTOCK

SWISSQUOTE MAY 2019

SCANS

SWISSQUOTE MAY 2019

RANKING

FIVE RECORD-BREAKING FINES IMPOSED BY THE EU ON TECHNOLOGY FIRMS

1. APPLE
\$14.8 BILLION (IN 2016)
2. GOOGLE
\$5 BILLION (IN 2018)
3. GOOGLE
\$2.7 BILLION (IN 2017)
4. INTEL
\$1.45 BILLION (IN 2009)
5. QUALCOMM
\$1.2 BILLION (IN 2018)

Source: The New Economy

THE FIVE US FASHION RETAIL CHAINS THAT ARE CLOSING THE MOST STORES

(by number of physical stores that will be closed down in 2019 and 2020)

1. PAYLESS
2,000
2. GYMBOREE
800
3. GAP
230
4. SEARS
80
5. VICTORIA'S SECRET
53

Source: Yahoo Finance

THE FIVE LARGEST COMPANIES IN THE VIDEO GAMING INDUSTRY

(by earnings generated from gaming in the first three quarters of 2018)

1. TENCENT
\$15 BILLION
2. SONY
\$9.85 BILLION
3. APPLE
\$6.9 BILLION
4. MICROSOFT
\$6.2 BILLION
5. NETEASE
\$4.5 BILLION

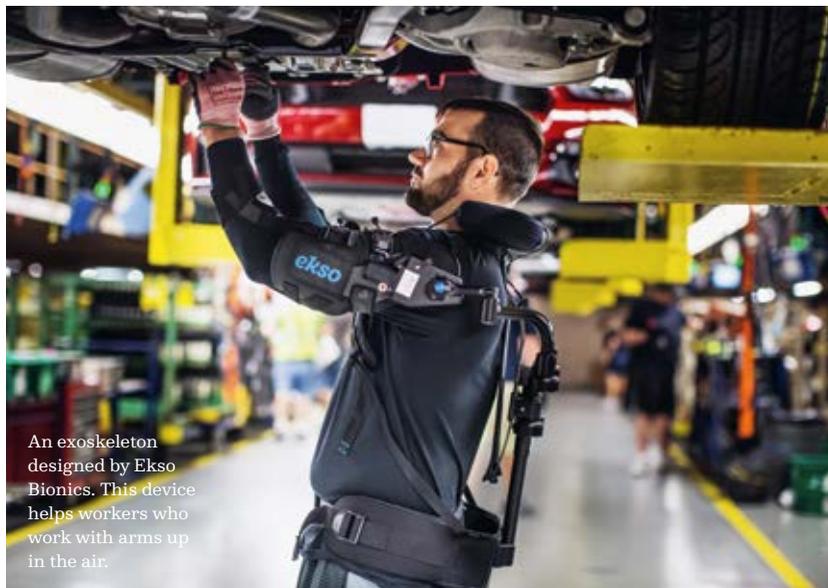
Source: Newzoo

biotech CRISPR TREATS ITS FIRST PATIENT

US group CRISPR Therapeutics has announced that it has treated its first patient using CRISPR-Cas9, an enzyme that edits genes in the DNA sequence. CRISPR-Cas9 has been used to remove the gene responsible for thalassaemia, a blood disorder that stops oxygen from being carried around the body. This announcement immediately caused CRISPR Therapeutics' share price to jump by 25%. Shares in other biotechs working on CRISPR-Cas9 saw similar increases, with Editas up by 5% and Intellia by 6%. Up until now, investors feared that they would have to wait years until these therapies were brought to market.

CRSP EDIT NTLA

robotics AUGMENTED WORKERS



An exoskeleton designed by Ekso Bionics. This device helps workers who work with arms up in the air.

FORD

Robots are not going to replace humans for good – at least not in assembly line work. More and more companies are providing their workers with exoskeletons that will help them perform repetitive tasks without injuring their backs and joints or help them lift heavy loads.

Hyundai, Ford and Volkswagen have already started introducing exoskeletons in factories in the US and Slovakia. According to ABI Research, the industrial exoskeleton market is set to total 300,000 units by 2028 and generate profits of \$5.8 billion.

food LONZA CREATES THE INFANT FORMULA OF THE FUTURE



ISTOCK

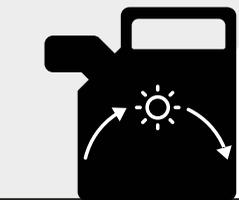
The US firm DuPont has developed an ingredient called Care4U which, when added to infant formula, can replicate almost 100% of the properties of breast milk. However, it is Lonza – a company based in Basel, Switzerland – that will be DuPont's exclusive provider of this ingredient, which has been approved for use in Europe and the US. Care4U's primary ingredient is oligosaccharide 2'-FL. This oligomer stimulates a newborn's immune system and aids digestion. Friesland-Campina Domo, Abbott, Ingredion and Nestlé have also recently marketed products based on oligosaccharides.

DD LONN



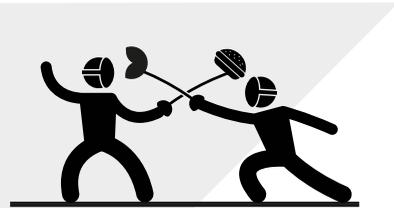
“We made a principled decision that we're not going to withhold technology from institutions that we have elected in democracies to protect the freedoms we enjoy”

Microsoft CEO, **Satya Nadella**, on the company's augmented reality system which the company supplied to the US army.



1 million

The number of barrels of oil that ExxonMobil predicts that it will extract each day in the Permian basin in Texas by 2024. Chevron also estimates that it will extract 900,000 barrels per day in 2023. Both companies have revised their forecasts upwards thanks to improvements in drilling techniques.



\$4.4 billion

The monthly cost to the US economy of the trade war with China, according to a study carried out by the Federal Reserve and Columbia and Princeton universities. US firms are often obliged to absorb new import taxes themselves.

entertainment
A KOREAN NETFLIX IN THE PIPELINE

Four South Korean telecommunications companies (SBS, MBC, KBS and SK Telecom) have joined together to create a shared streaming service. Their aim is to rival Netflix, whose popularity is continuing to grow across South Korea. In September, the Netflix mobile app had 900,000 monthly users, three times more than in 2017. The four companies will bring together their existing streaming platforms, Oksusu and Pooq, and co-finance original content. They also have pan-Asian ambitions, which they hope to make a reality thanks to partnerships developed by Pooq with its Malaysian and Chinese counterparts, iFlix and iQiyi.

TILRAY

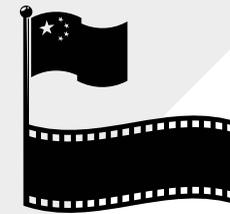
retail
IKEA IS INNOVATING THANKS TO CEVA LOGISTICS



CEVA LOGISTICS

The Zug-based company CEVA Logistics has been selected by IKEA to operate a 96,000 sq. m mega-distribution centre on Staten Island in New York. The Swiss group will be responsible for implementing the Swedish furniture giant's new sales strategy. The aim is to encourage

clients to order products online or in IKEA showrooms that have recently opened in the city centre, and then to go and pick up their items from a distribution warehouse located on the outskirts of the city. It's a way of matching consumer purchasing habits. — CEVA



¥11.1 billion

The amount that China's box office took in February 2019 (1.7 billion Swiss francs). This is the highest amount ever registered by the film industry in a given country. In comparison, the US box office generated \$479 million in the same period.



"They don't have to care about the legacy. They don't have to care about the next generation of gasoline in motors and so they can really focus on the future"

Herbert Diess,
CEO of Volkswagen, when asked for his thoughts on Tesla.

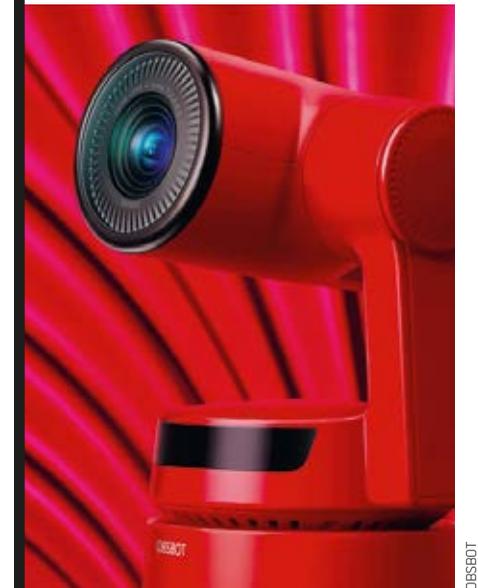
well-being
CBD COSMETICS ARRIVE IN THE SHOPS

At the end of 2018, the US Congress revised the Farming Bill to legalise hemp-derived cannabidiol (CBD), an oil with slight psychoactive properties. This sparked interest from companies that are marketing cosmetics containing this substance. The Canadian company Green Growth Brands has begun to sell its line of Seventh Sense body creams in outlets of shoe retailer DSW and has opened shops in three states. Its compatriot, Tilray, is developing a line of cosmetics specifically intended for the US market. Many supporters of CBD in the US prefer consuming it topically, rather than smoking or eating it.

— GGB — 2HQ

Employees of the company Tilray at work. The Canadian company is now specifically targeting the US market.

KICKSTARTER



OBSBOT

OBSBOT THE INTELLIGENT CAMERA

This mini camera, called Obsbot Tail, uses artificial intelligence algorithms. A sequence can be started and stopped by a simple pre-defined hand gesture. What's more, the user can choose a target for the camera to track and film cleanly from 40 metres away, even when the target is moving, is against a complicated background or if there is poor light. The camera can move autonomously on its base. It analyses filmed images in real time and then suggests which are the best sequences and offers to extract them. The Obsbot Tail is particularly suited to vloggers, who are often both in front of and behind the camera, and for filming sports events.

FUNDS RAISED
HK\$3,192,752

AVAILABLE
APRIL 2019

SCANS

banking

MOZAMBIQUE ACCUSES CREDIT SUISSE

Three Credit Suisse bankers were charged in the US for assisting Mozambique's former Finance Minister, Manuel Chang, with taking out hidden loans between 2013 and 2016 that were used for maritime projects, including a tuna factory, at an over-inflated price. The accused are also suspected of having taken kickbacks. Mozambique, one of the poorest countries in Africa, was left with a debt of \$2 billion, which led the IMF to suspend lending to the country and created a serious economic crisis. In February, the Mozambique government also pressed charges. — CS&N



“We need to hit a firm bottom before we get a neutral, let alone a positive cash dynamic in that business”

Larry Culp,
CEO of GE, talking about the energy division's poor performance.

leisure

HARLEY DAVIDSON TRIES TO ATTRACT YOUNGER FANS



STACYC

Harley Davidson is having a hard time reinventing itself. The majority of the Milwaukee-based legendary bike manufacturer's clientele is white men over the age of 50. Last year, sales fell by 6%, following a 7% decline in 2017. This decline convinced the manufacturer that it needed to broaden its customer base. It has recently acquired StaCyc, which manufactures electric bicycles for children, in the hope of winning over the next generation of potential Harley Davidson fans. It has also introduced a series of bikes that are smaller and lighter, to attract women and people living in major cities in Asia. — HOG

transport

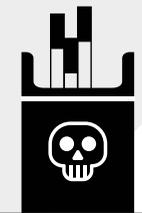
ABB PROVIDES BATTERY CHARGERS TO THE FIRST DRIVERLESS BUSES



ABB

The Volvo 7900 bus, equipped by ABB, has begun to circulate in the streets of Singapore.

The first fully autonomous electric bus was unveiled in March in Singapore. It is the result of a partnership between Nanyang Technological University, Volvo and ABB. The Swiss group has provided the battery chargers for the vehicle. These chargers are capable of providing 300 kilowatts of energy, enabling the battery to be recharged in just three to six minutes. The aim is to charge the batteries each time the bus arrives at the terminus so that passengers' journeys are not interrupted. Two vehicles have currently been equipped with this technology, and will be rolled out for a full-scale test. — ABBN



\$12.8 billion

The sum that BAT, Japan Tobacco and Philip Morris have been ordered to pay by a Canadian court. These damages were awarded as part of a double class-action lawsuit filed in 1998 by more than a million smokers due to the effects on their health.

energy

A GAS EL DORADO IN THE MEDITERRANEAN



YIANNIS KOURTOGLOU / REUTERS

ExxonMobil has discovered a gigantic gas field in the waters off Cyprus. Known as Glaukos, this gas field may contain between 142 and 227 billion cubic metres of gas. In February, the Italian firm ENI and the French company Total had already found another giant deposit, named Calypso, just off the coast of Cyprus. These two fields are in addition to Zohr, located in Egyptian waters and discovered by ENI, and Leviathan and Tamar, in the waters off Israel. These discoveries have made the Eastern Mediterranean an El Dorado for gas, with sufficient resources to supply a significant portion of southern Europe and North Africa's energy requirements. — XOM — FP — ENI

THE IPO

LEVI'S IS EXPERIENCING A RENAISSANCE

The famous 501 manufacturer entered the New York Stock Exchange on March 21, raising \$623 million. The US brand hopes to take advantage of jeans being back in fashion, which helped the denim market to grow by 4% last year. The market is now worth \$100 billion. Levi's saw its profits rise by 14% in 2018, reaching \$5.6 billion. Founded in 1853, the group has reinvented itself over the

last few years by investing in non-denim and women's clothing lines as well as an in-store customisation system that enables customers to add patches or embroidery to their jeans. Levi's has also entered into partnerships with cutting-edge fashion brands such as Off-White and Re/Done. The firm has been floated on the stock market before, from 1971 to 1985. — LEVI

food

GOATS' MILK IS THE NEW WHITE GOLD



EMMI

The production centre of Redwood Hill Farm in Sebastopol (USA). This high-end firm was bought by Emmi in 2015.

Emmi has seen its profits rise by 8.6% in 2018, with sales increasing by 2.8% to 3.45 billion Swiss francs. This performance is due to the Lucerne-based group's decision to refocus on high value-added products - notably, goats' milk. This delicate and rare product, prized by those allergic to cows' milk,

has become one of the company's flagship products thanks to an ambitious acquisition strategy. Over the last few years, Emmi has acquired Spanish firm Lacteos Caprinos, US-based companies Jackson-Mitchell, Cypress Grove and Redwood Hill, and Swiss firm Le Petit Chevrier. — EMMN



\$1,600

The price per ounce of palladium in March - a record. Demand for this metal, which is used in catalytic converters in cars, has increased due to stricter CO₂ emissions regulations in several countries. Stocks of the mineral, mostly located in Russia, are also starting to run out.



“There is definitely an ever-present threat in the Internet of Things. It’s not just on the endpoint, it’s also in the network, it’s in the IoT, and it’s in the home”

Greg Clark,
CEO of Symantec.

raw materials

CHINA'S DOMINATION OF THE COBALT MARKET



A cobalt processing plant in Lubumbashi, Congo (16 February, 2018).

SAMIR TOUNSI / AFP

Chengtun Mining, a Chinese mining group, is buying out Australian-based Nzuri Copper for \$79 million. The group will be taking over a cobalt deposit that Nzuri Copper was preparing to mine in the Democratic Republic of the Congo (DRC). This deposit should produce 3,700 tonnes of the metal per year. The

mineral is one of the key components in lithium-ion batteries used in electric vehicles, sales of which have grown exponentially in China. Last year, Chinese firms Citic Metal and China Molybdenum also invested in cobalt mines in the DRC, making Beijing a key player in the cobalt mining industry.  600711  NZC

THE FLOP

Iqos: the cigarette that isn't any safer than its competitors

The pitch was promising: Iqos cigarettes, which heat tobacco rather than burning it, were meant to allow smokers to indulge in their vice without damaging their lungs. A study published in March in the *European Respiratory Society* review just put paid to this dream. Australian researchers exposed lung cells to smoke from Marlboro and Iqos cigarettes for

72 hours. This research showed that Philip Morris's new system, which was first marketed in 2014, caused the same distress in lung cells as a classic cigarette. It is a significant blow to the tobacco giant, which has invested heavily in marketing its system and has opened dedicated stores. The system is currently used by 6.6 million people.

 PMI



\$865 million

The amount of revenue generated by eSports last year. In 2019, the industry is set to make \$1.1 billion. The number of spectators will also continue to grow, with Newzoo estimating that numbers will increase from 395 million to 454 million.



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Audi A6 40 TDI quattro S-tronic, 204 ch, 4,6 l/100 km, équivalent essence: 5,2 l/100 km, 122 g CO₂/km (Ø des véhicules neufs: 137 g/km), mise à disposition d'énergie: 20 g CO₂/km, catégorie de rendement énergétique: A. Prix de vente brut: CHF 72 300.–/modèle illustré: Gris Vésuve Métallisé, jantes en aluminium coulé avec design à cinq doubles rayons, Gris Contrasté, partiellement polies, taille: 8,5 J x 19 avec pneus 245/45 R 19, phares LED Matrix HD avec clignotants dynamiques, vitres teintées (vitrage Privacy), pack Extérieur S line, prix de vente brut: CHF 83 350.–, déduction de la prime spéciale CHF 9850.–/CHF 9990.–, déduction de la compensation CHF 2623.–/CHF 3081.–, prix à payer: CHF 59 830.–/CHF 70 300.– pour le modèle illustré. Tous les prix s'entendent TVA incluse. Action valable pour les contrats de vente conclus entre le 1.3 et le 30.6.2019. Prix conseillés par l'importateur. Valable pour tous les véhicules importés par AMAG Import SA.

TRENDS



the figure

BOB SWAN



the country

PAPUA NEW GUINEA

The Tiger of the Pacific

Papua New Guinea is an isolated country in the middle of the Pacific but is flush with natural resources. According to the World Bank, its economy is set to take off in 2019, forecasting 5% growth this year, and 3% to 4% over the next few years. Exports of oil, gas, palm oil and minerals (copper, gold, nickel and cobalt) are expected to rise. The country will also benefit from the high price per barrel. Infrastructure has been refurbished in its capital Port Moresby in the wake of the Asia-Pacific Economic Cooperation summit meeting held there in 2018. Roads and the airport were upgraded, and hotels and a conference centre were built. A 7.5 magnitude earthquake that struck in February 2018 took a heavy toll on mining infrastructure, which is just now being rebuilt. The country is also cripplingly indebted to China: it owes nearly \$590 million to Beijing, i.e. one-fourth of all its cross-border debt.

Population
8.2 million

GDP per capita
\$2,340

Growth
+0.3% (2018)

Main economic industries
oil, gas, mining, palm oil, farming

Intel picks a financial ace

Title
CEO of Intel

Age
58

Nationality
American

Annual salary
\$4.68 million

For the first time in its history, Intel has a boss who does not have an engineering background, and his name is Bob Swan. The 58-year-old New Yorker is tasked with making sure that the chip manufacturer keeps its leading position alongside Nvidia. Competition has become increasingly vigorous with Chinese manufacturers HiSilicon, Tsinghua Unigroup and Shenzhen Huiding Technology, but Intel now also faces competition from its own clients, including Google, Facebook,

Apple and Amazon, which have started making their own chips. As CEO, Mr Swan will have to sustain the breakneck growth of the division that produces processors for cloud computing, which has reached 14% in the past five years. Bob Swan has extensive experience in finance. After studying economics, he joined General Electric in 1985. He moved on to hold several posts as CFO, including at Northrop Grumman, HP and eBay. In 2016, he was appointed CFO of Intel, and at the end of January this year, he became CEO.



the innovation
THE HIGH-TECH PILL

Company
Novo Nordisk

Launch
within the next 10 years

Estimated cost
not shared

Tortoise shell-shaped devices

The Danish pharmaceutical group Novo Nordisk, collaborating with the Massachusetts Institute of Technology, has developed a swallowable high-tech device that could replace the insulin injections that diabetics are subjected to. Its shape is inspired by the leopard tortoise, an African species that can flip back over by itself if it ends up on its back. When the device hits the

bottom of the stomach, the curved side is always pointing upwards. Out of the other side pops a tiny needle made of solid, compressed insulin. Stomach acid dissolves the sugar surrounding it, and it settles into the stomach's lining to deliver insulin directly into the bloodstream.

This innovation prevents the stomach juices from digesting

the medicine before it can take effect. This method of administering the drug will mainly be useful for older people who develop diabetes late in life and are not used to injecting insulin. Trials on pigs are already under way, and testing on humans should begin shortly.

MONT
BLANC

Reconnect.



Montblanc 1858 Geosphere

montblanc.com

39° 35' 0.478" S 71° 32' 23.564" W

Tamedia's brazen resistance

Swiss media companies are suffering from the decline in print media and the collapse of the advertising market. But with a successful diversification strategy, particularly with classified ad sites, the Zurich-based company stands out from the rest.

BY SOPHIE GAITZSCH



1.01 BN
2018 revenue
in Swiss francs.

1,332,000
Number of readers
of 20 Minuten.

3,594
Number of employees.

69.11%
Percentage of shares
held by the Coninx
family, owner of
Tamedia.

Tamedia is no stranger to headlines. In 2018, the front pages were filled with stories about the company on what was not its best day. Editorial boards consolidated, employees laid off, the end of the paper version of the iconic French-language daily *Le Matin*, strikes, the departure of the editor-in-chief of the *Tribune de Genève*: massive restructuring at the Zurich-based newspaper giant sparked public debate about the future, diversity and quality of the press in Switzerland. Some believe the criticism is justified and Tamedia should have shown more consideration to its journalists and the sensitivities of the country's regions. But from a financial perspective, most observers agree that these cost reductions are a logical decision.

Tamedia's Paid Media segment, which includes paid newspapers such as the *Tages-Anzeiger* and the *Tribune de Genève*, is by far the company's most important segment, but its revenue and profitability keep falling. The rise of the internet has led to a decline in newspaper readership and a dramatic drop in advertising revenue. In less than a decade, profits from advert sales in Swiss newspapers are down by 50%, falling from 2.4 billion Swiss francs in 2009 to 1.1 billion Swiss francs in 2017, according to figures from the Swiss Foundation for Advertising Statistics.

Fierce

"In this context, Tamedia is the most durable media group," says Philippe Améz-Droz, media economist at the University of Geneva. The company's Chairman of the Board, Pietro Supino ▶

JÜRGEN STUKER

– who represents the fifth generation of the Coninx family that owns Tamedia – is closely involved in its operations. “He has taken a silo management approach and doesn’t hesitate to make fierce moves and restructure things that aren’t working,” adds Amez-Droz. In 2018, the company’s revenue was up 3.7%, reaching 1.01 billion Swiss francs, with an operational margin (EBITDA) of 20.4%. By way of comparison, Tamedia’s main competitor Ringier also made 1 billion Swiss francs in revenue, but had an operational margin (EBITDA) of 11% in 2017.

How did the company get to where it is today? Let’s take a look into its past. The history of Tamedia began all the way back in 1893, the year the *Tages-Anzeiger* was founded as a general newspaper independent from political parties – a novelty at the time, and the paper quickly became popular with readers. In the

20th century, the company acquired heavyweights in the magazine press industry such as *Schweizer Familie* and *Annabelle*, and founded the Sunday weekly *SonntagsZeitung*. But business really picked up in the late 1990s.

This successful diversification fails to address an underlying question. How does Tamedia see the future of its dailies and magazines?

Tamedia went public on the Swiss exchange in 2000 and acquired the free *20 Minutes* and Bern dailies *Bund* and *Berner Zeitung*. In 2009 it acquired Edipresse, the Lausanne group that owned the major papers in French-speaking Switzerland.

With that, Tamedia was a national giant. With the 2018 acquisition of Basel daily *Basler Zeitung*, it is now present in all major economic regions in Switzerland.

Classified adverts and television

Tamedia diversified significantly in the 2000s. It acquired classified ad sites such as *ricardo.ch*, *homegate.ch* and *jobs.ch*, as well as meeting scheduling platform *Doodle* and internet television site *Zattoo*. “There are three main channels for selling adverts on the internet: search engines, social networks and classified advert sites,” says Matthias Künzler, a professor specialising in Swiss media at the University of Applied Sciences HTW Chur. “Tamedia doesn’t have access to the first two, as they are monopolised by American digital giants. So it focused on the third, and was very successful.” In 2018, the Market Share and Equity



Tamedia journalists (*Le Matin*, *24 hours*, *Tribune de Genève* and *20 minutes*) on strike in Lausanne (4 July, 2018). The Zurich publisher increased budget cuts last year.

VALENTIN FLAURAUD / KEYSTONE



Tamedia's elegant premises on Werdstrasse in Zurich.

TAMEDIA

ANALYST ADVICE

“A LOT OF MONEY FOR THE DIGITAL TRANSITION”

In 2018, Tamedia saw its revenue grow by 3.7% compared to the previous year, reaching 1.01 billion Swiss francs. But its net profit fell 23.9% to 129.5 million Swiss francs, due in particular to the fall in revenue from print advertising. Despite the drop in profit available to shareholders, dividends have remained unchanged. Tamedia has not provided forecasts for the current financial year.

The group’s annual results are in line with predictions from analyst Daniel Bürki, who covers the company at Zurich Cantonal Bank. “Tamedia’s digital activities, with platforms such as *homegate.ch*, are doing very well. In this segment, Tamedia has a very successful portfolio. But these successes are overshadowed by the hardships in the Paid Media segment, which is under increasing pressure. I was surprised by the investment of 30 million Swiss francs over three years in the newspapers’ digital development. It’s a lot of money, though it’s obvious that Tamedia has to act in order to accelerate the digital transformation of its press businesses. Investors also penalised the company for this decision.” The day that the 2018 figures were announced, Tamedia shares fell 4.27% on the Swiss exchange. The drop was too significant to be caused by the figures alone, according to Bürki. He is “neutral” in terms of recommending shares.

segment brought in 252 million Swiss francs for Tamedia – a quarter of its total revenue – and remains its most profitable.

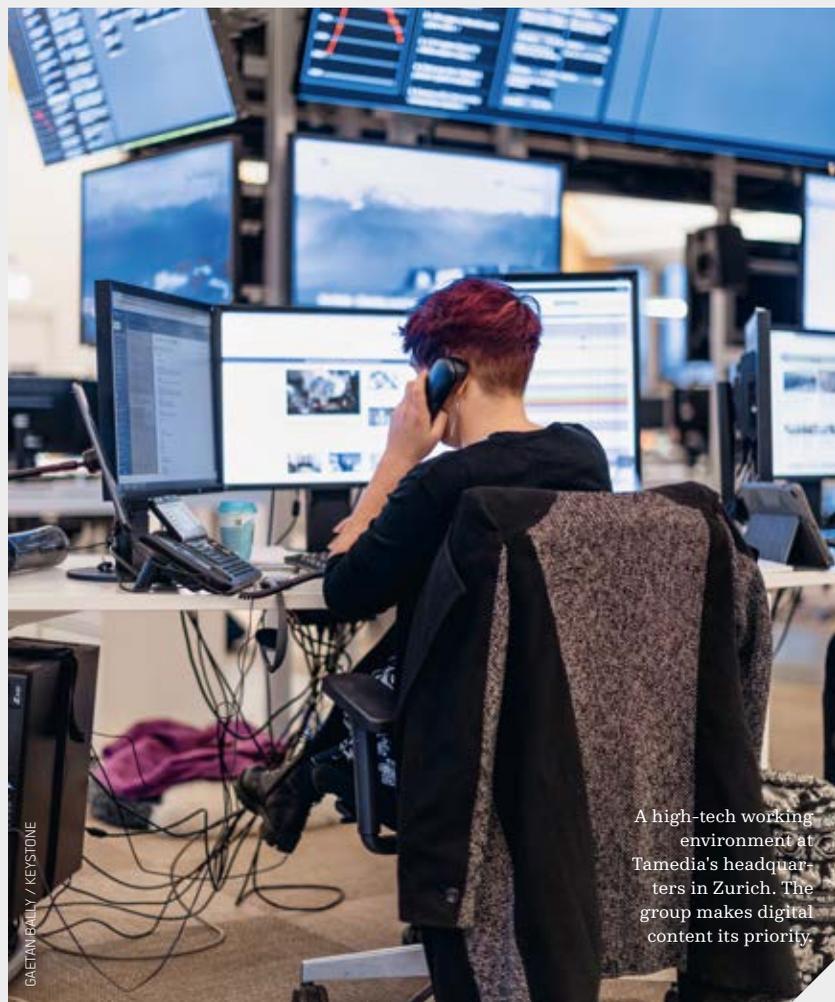
Recently, Tamedia’s ad offensive has increased even further. In 2016, its competitor Ringier partnered with Swisscom and SSR to create advertising firm Admeira. Faced with this partnership – and even though SSR has since stepped down – the Zurich group made moves. In 2018 it acquired Goldbach, which made three quarters of its turnover of 511 million Swiss francs through selling television adverts. “Until then, Tamedia didn’t have access to this outlet, which offers remarkable high-level stability,” says Künzler. “It can now offer a cross-media approach and become the best-positioned media

group in the advertising market.” Last year, Tamedia also took a majority stake in Neo Advertising, a Geneva-based company specialising in exterior advertising – signage, both analogue and digital, in public spaces.

Digital subscriptions

But this successful diversification fails to address an underlying question. How does Tamedia see the future of its dailies and magazines? Is it focusing too much on profitability at the expense of quality? According to an annual study on the quality of Swiss media published by the University of Zurich, the *Tages-Anzeiger*, its flagship paper, is ranked 17th, far behind *NZZ* or *Le Temps*. To arrive at their ranking, researchers judged publications on four criteria: relevance, perspective, professionalism

and diversity. *Tages-Anzeiger* is ranked behind its two competitors across all of these categories. But it is notably the lack of diversity that hinders the Tamedia daily: with the consolidated editorial boards, the proportion of shared articles has now risen to 62%. According to Pietro Supino, “concentrating resources improves quality, even though diversity suffers.” But the authors of the study believe that ▶



A high-tech working environment at Tamedia's headquarters in Zurich. The group makes digital content its priority.

tions are less reliable than paper subscriptions," says Künzler. "Studies show that half of all digital subscribers don't renew after one year."

30 million for innovation

Serge Reymond, head of the Paid Media segment at Tamedia, is nevertheless confident. He highlights the fact that revenue from digital subscriptions increased 50% in 2018, but does not share the amounts. Furthermore, newspaper subscriptions exceeded the 100,000 mark. "We're convinced that people are ready to pay online for quality content." Over the next three years, Tamedia will spend 30 million Swiss francs to "accelerate and support the digital transformation" of its papers. Twenty million Swiss francs will go towards improving the papers and their editorial processes. "This includes reviewing production modes in order to satisfy readers who consume information on their mobile phone, such as offering more videos, infographics and audio content."

Tamedia will also continue to develop what it calls "augmented journalism", or the personalised production of content based on algorithms. During the referendum on 25 November, the Tobi tool produced nearly 40,000 articles in mere minutes. This initiative attracted more than 100,000 readers, who received detailed information about the election results in their commune. "We want to use this technology for various votes and elections, as well as for sports results and economic information. It's not about replacing journalists, but rather it's about allowing them to use artificial intelligence to improve the quality of the content and to produce it more efficiently." In terms of sales, Tamedia will allocate an additional 10 million Swiss francs to "better take advantage of the incredible potential of technology to win readers." The challenge: identifying what readers are willing to buy and when. ▲ ▽ TAMM

diversity in itself is a sign of quality. They believe that the homogenisation of topics and perspectives is problematic, particularly from a democratic standpoint, and that there is an increased risk of journalistic errors because of reduced scrutiny across publications.

For now, the sale of adverts on newspaper sites and online subscriptions are unable to overcome the trend.

"Digital subscriptions are less reliable than paper subscriptions, half of all digital subscribers don't renew after one year"

Matthias Künzler, professor in Swiss media at the University of Applied Sciences HTW Chur.

The decline in print media continues relentlessly. "For the time being, print is still an essential product for brand positioning and a company's identity," explains Philippe Amez-Droz from the University of Geneva. "And there is still a generation of people who are willing to pay 400 or 500 Swiss francs a year to receive their newspaper in their letterbox. But the concentration of titles is expected to continue, as is the homogenisation of content."

A total of 24% of subscriptions to *Tages-Anzeiger* are digital, 23% for the *Tribune de Genève*, 13% for *24 heures* and 16% for *Finanz & Wirtschaft*. These numbers aren't likely to change: "Digital subscrip-



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THE GREAT PROMISE OF SMART HOME APPLIANCES

Although first announced years ago, connected household appliances have been slow to enter homes. But manufacturers have not yet had their last word.

BY JASMINE LECKER

For 10 years now, we've been hearing promises of the "smart" fridge that can detect when a butter shortage is looming or yoghurt is getting low, and then automatically places an order at the local supermarket. Many have boasted about this fabulous fridge that will prevent us from waking up one fine morning and realising we have forgotten to buy milk. But it still does not exist, and it probably never will. This case alone illustrates all the challenges facing the connected home appliance market.

"I've been writing about the Internet of Things for 10 years and ended up scrapping the fridge example," chuckles Oliver Bäcker, Senior Manager in the digital division of audit and consulting firm Deloitte in Switzerland. The specialist points out that the two main reasons behind its failure are a lack of standardisation and an excessive cost.

"First of all, all the players involved, from agri-food companies to appliance brands, would have to agree on standards for identifying foods," explains Bäcker. In practice, the ideal solution would be to use RFID

chips (ed. note: these electronic tags emit a signal that is automatically recognised by a receiver) rather than manually scanned barcodes, but the price of this technology is too high compared to that of food products. It's not a cost-effective solution."



"All the players involved would have to agree on standards"

Oliver Bäcker, senior manager of Deloitte Digital in Switzerland

And the shelves full of products imported from around the world complicates the situation, as Olivier Ezratty notes. For 14 years, this independent consultant has been writing a particularly exhaustive report on the Consumer Electronics

Show in Las Vegas, a Mecca for those working with consumer technologies. "The only way to overcome this problem would be to standardise products at the global level," says the Frenchman. He also identifies yet another pitfall: "For it to be worthwhile, such a system must operate at 100%, that is, no product can be left out – because if consumers have to start sorting what the fridge does and doesn't recognise, it becomes even more complicated than before."

SIMPLICITY AND ADDED VALUE

In short, the smart fridge is the prime example of what doesn't work. It doesn't meet the three key criteria a household appliance needs to meet to have a chance of becoming a kitchen essential: standardisation, ease of use and added value for the user.

This is why few products thus far have established themselves as a permanent fixture in homes. The legendary robot vacuum cleaner is perhaps the one that has had the most far-reaching success. "This product sells very well and many companies offer it," explains Ezratty. Much like its gardening counterpart: the robot lawnmower. "I had one, but stopped using it because it didn't work well ▶

on rough ground,” admits the French consultant. “It was also very slow and left grass behind, which I had to pick up.”

Currently, it’s the kitchen in which innovations are becoming the most widespread and the most compelling, with food processors proving very successful. Almost all major brands sell them in one form or another. The device, often equipped with scales, works by listing the ingredients and the quantities to be added, and then prepares the dish all by itself. The star in this field is the Thermomix by the German group Vorwerk (see inset on this page).



“The robot vacuum cleaner sells very well and many companies offer it”

Olivier Ezratty, specialist independent consultant in connected devices

In a similar vein, Ezratty highlights the smart oven from Californian start-up June. He also mentions the sous vide cooking machine from Anova, another start-up from San Francisco, which was bought by the Swedish giant Electrolux in 2017. As for fridges, you can now find them with touchscreen tablets built into their doors and internal cameras. In the culinary field, the cultural aspect plays an important role. For instance, the majority of rice cooker sales are, unsurprisingly, in Asia.

ALL TOGETHER NOW!

Beyond adding smart functions, the other big challenge is networking

THE FRIDGE THAT YOU CAN CHECK REMOTELY

NAME RB7500

COMPANY SAMSUNG

Price: CHF 5,999



SAMSUNG

It might not order yoghurt by itself, but the Samsung fridge is bursting with technological features. For instance, its three internal cameras allow you to view the shelves remotely. It also has a touchscreen tablet fitted in its door, called Family Hub, with various apps (such as a calendar, recipes, notes, photos, etc.). Meanwhile, LG is marketing a refrigerator whose door becomes (partly) transparent when you knock on it twice, thus allowing you to check its contents without having to open it.

THE STAR OF ALL PRESSURE COOKERS



VORWERK

NAME THERMOMIX

COMPANY VORWERK

Price: CHF 1,450

No idea how to prepare a soufflé? Do your pasta bakes look like soups? “Be guided” by the Thermomix, as proclaimed by its manufacturer. An absolute star of “smart” kitchen robots, the Vorwerk pressure cooker can help you create more than 4,000 recipes by following the instructions on the screen. It weighs, mixes, simmers, stirs, heats – you name it, it does it. This lucrative device alone generated €1.1 billion in sales in 2017, more than a third of the German company’s revenue.

THE OVEN WITH ITS EYE ON THE PRIZE



JUNE

NAME JUNE OVEN

COMPANY JUNE

Price: \$599 (only available in the US)

The connected oven by June – a Californian start-up founded in 2015 – operates in a similar way to pressure cookers. With an internal camera, it can supposedly recognise over 50 food categories and suggest the most suitable cooking setting. A specially-designed app provides users with remote control, gives them access to the camera and notifies them when the food is ready. Electrolux had also announced an oven fitted with a camera, but there is no sign of it today.

THE ROBOT VACUUM CLEANER THAT SEES ALL



ELECTROLUX

NAME PURE I9

COMPANY ELECTROLUX

Price: CHF 1,199

Electrolux was the pioneering brand of robot vacuum cleaners. Its Trilobite was the first to come on the market in 2001. Nearly 20 years later, the Swedish giant has made many changes to its product. The company’s newest creation, the Pure i9, has an embedded 3D vision system that allows it to see “all opportunities” (*sic*) and to get around obstacles. Its triangular shape enables it to clean corners more efficiently – and naturally, it’s linked to an app, meaning it can be controlled remotely.

devices together. “Everything needs to be manageable from a single platform,” says Oliver Bäcker from Deloitte Digital. All manufacturers are working on this, from the German Siemens – which has promised to have all of its appliances connected by 2020 – to the Swiss V-Zug, owned by the listed group Metall Zug. For its software, the Zug-based company has set its sights on the German-Swiss platform digitalSTROM, which recently merged with Belgian company Smart Control. This group’s objective is to establish itself as the European leader in smart homes.

Essentially, the owner of a V-Zug washing machine can receive a notification on their tablet or phone via a dedicated app, alerting them when the washing cycle is about to end. This same app can also notify the user when dinner is ready and can even adjust the heating. The devices are connected via the house’s Wi-Fi network. Since late 2018, connectivity is no longer an option for V-Zug customers. “This is a standard function for all product lines,” says marketing manager Jasmin Riesen. The digitalSTROM platform is compatible with Google, Amazon, Philips, Siemens and Logitech products, but not Samsung or LG, which use other ecosystems (SmartThings and SmartThinQ). “At the moment, there is no platform that can connect all systems,” notes Bäcker. “This is a very big challenge.”

There remains another major challenge – data protection. Networking home appliances opens a window into the home. “Customers still approach connected devices with caution,” admits Riesen. “There is certainly scepticism surrounding data.” However, the marketing manager believes that consumers will be convinced by the benefits over time, and that this will become the norm, as in other industries. “Can you think of any TVs today that don’t include a Wi-Fi connection module?”

Dossier prepared by:
Bertrand Beauté,
Ludovic Chappex
and Martin Longet



DOSSIER

WHY OPEN SOURCE HAS ALREADY WON

Around since the 1980s, open source software is ubiquitous these days: on our phones, on our computers and on the web. Today, the market is worth billions of dollars.

BY BERTRAND BEAUTÉ

- 34. Essential software packages
- 36. A return to source code
- 40. Nine open companies
- 46. Linus, the creator of Linux
- 47. A question of licences
- 48. The auto industry goes open source

Thirty-four billion dollars – the amount sounds absurd for a company that produces ad-free code that can be downloaded for free. But that is what IBM paid for Red Hat back in October. Founded in 1993 in Raleigh, North Carolina in the United States, the firm – which is listed on the New York Stock Exchange – provides open source software. Unlike proprietary software, such as the Microsoft Windows operating system, the source code of these computer programs is open to anyone. In other words, anyone can read it, change it and redistribute it (see glossary, p. 31). ▶

TOP CONTRIBUTORS TO OPEN SOURCE*

Company
Employees



MICROSOFT
5,308



IBM / RED HAT**
3,114



GOOGLE
2,322



INTEL
1,070



AMAZON
971



ALIBABA
687



FACEBOOK
647



TENCENT
614

*Ranking of top contributors based on the number of employees officially active on GitHub, the largest community of open source software, in 2018.

**IBM rose considerably in the ranking with the acquisition of Red Hat.

“It’s a bit similar to food,” says Pierre-Yves Gosset, director of Framasoft, a non-profit organisation that develops open source software. “You have ready-made meals – proprietary software – whose ingredients you’re vaguely aware of and that you can’t change. Then you have free software and open source software programs, where you know what all the ingredients are, where they’re from and how they were prepared. Plus, you can change them, improve on them to suit your taste, and share them with friends.”

DAYS SEEM LONG GONE WHEN STEVE BALLMER, THEN CEO OF MICROSOFT, SAID “LINUX IS A CANCER”

Ever since it was started in the 1980s by the American Richard Stallman in response to the patents filed by big software developers like Microsoft, the free software movement has grown steadily. Mainstream users, the extreme vast majority of whom use Windows and Mac OS (operating systems owned by Microsoft and Apple), are not always aware of it. But these programs are now everywhere. They form the basis of Android, the operating system from Google that powers most smartphones, in cars such as Tesla, BMW and Mercedes, and in computers aboard the International Space Station (ISS) and Airbus flight simulators.

Open source has a particularly dominant position in web infrastructure, the Internet of Things and the cloud. It has become so omnipresent that the days seem

long gone when Steve Ballmer, then CEO of Microsoft, said “Linux is a cancer,” and likened free software to communism. That was in 2001. Since then, despite being the ultimate defender of closed software, the tech giant has come to embrace open source. In June 2018, the Redmond-based firm bought the open source software development platform GitHub for \$7.5 billion and joined the Linux Foundation, which finances the development of the Linux kernel operating system, in 2016.

And Microsoft is not the only one. All the long-standing industry giants are now dealing in open source. For example in 2010, the American firm Oracle, known for its proprietary enterprise software, bought Sun Microsystems, which developed the open source programming language Java, available under a free licence, for \$7.4 billion.

Only after its beginnings, rampant with utopian and charitable ideas, did open source software programmers figure out a business model. Red Hat, for one, is a very profitable company. It started out distributing a free version of Linux, developed as an alternative to Microsoft software. Then the firm split its range in two, developing a paid version, called Red Hat Enterprise Linux AS (RHEL), which co-existed alongside the free version (Fedora). Red Hat also provides paid services, including integration, training and support. In 2018, the paid business generated turnover of \$2.9 billion for the company.

“If traditional, big-name software developers like IBM are buying pure open source players like Red Hat, it’s obviously to take over their direct competitors before they become too big,” says Gosset. “But that’s not the only reason. It’s also because the best developers and codes are now in open source.” Open source has evolved into a

GLOSSARY

Open Source

In simple terms, open source refers to any software program whose source code is freely licensed, granting users the right to use, distribute and change the software. In practice, open source can be interpreted in various ways depending on context and, in particular, on the licences used.

Free software

This software ensures users have the freedom to study, change and redistribute the software. These freedoms are legally and technically guaranteed through access to the source code. Free software is almost always open source, but the notion also encompasses

the ethical and philosophical tenets held by the Free Software Foundation. The term “free” in this definition does not mean free of charge, as nothing prevents its commercial sale.

Source code

Source code refers to code written in a programming language before it is compiled and executed on a computer, similar to how a recipe is used to prepare a meal.

Freeware

As the name indicates, freeware can be distributed and used at no cost to the user. But freeware may differ from free and open source software in that the software can be both available

free of charge and proprietary, meaning its source code is patented and cannot be accessed. Examples of closed source freeware: Adobe Reader, Internet Explorer, Google Maps.

Closed source software

Also called proprietary software, closed source refers to any software whose source code is not available or is protected by copyright. In practice, this software is distributed in executable form (machine language) without the ability to study or change its source code (programming language) and therefore to understand what it really does. Examples of closed source software: Microsoft Office, Windows.

very efficient production model. “It’s a long and costly process for a company to develop powerful software on its own,” says Stéphane Fermigier, co-chairman of France’s French National Council for Open Source Software (CNLL) and CEO of the software development company Abilian. “But if you release your code freely online, a community of developers will get together and work on developing it. The openness brings much faster and less costly innovation.”

The system is so efficient that it has pushed traditional developers to use it for their own products. For example in 2014, Microsoft announced that it was open-sourcing its .NET Framework ecosystem, and one of its trademark software programs is set to follow suit in March 2019: the Windows 10 calculator. “Our goal is to build an even better user experience in partnership with the community,” Microsoft said on its official blog.

“Microsoft did a complete 180. They realised that by sharing the recipe they can build better quality programs faster and cheaper,” says Gosset from Framasoft. “They are now the world’s biggest contributors to open source. But it’s also slightly for show, because they’re not ready to open-source the code of their star products, like the Windows operating system and Microsoft Office suite.”

IT'S AS IF TECH GIANTS FOUND A FREE RECIPE

“Industry giants have clearly understood the advantages of ‘shared digital goods’ built by communities

of developers. They use them for their non-differentiating aspects, i.e. where there is no competition,” says IT consultant Raphaël Bauduin, founder of the Free and Open Source Developers’ European Meeting (FOSDEM) held every year in Brussels.

Silicon Valley firms also significantly benefit from open source. Facebook jokingly said in a post published in 2006 on its official page something everyone already knew: “Mark Zuckerberg didn’t write all of Facebook in his dorm room at Harvard. (Sorry, Mark, your secret is out). He had a lot of help [... from] open-source and free software. Without it, there’d be no Facebook,” the company wrote. The same could be said of Google, Amazon or Twitter, which use abundant amounts of open source modules.

To go back to the food analogy, it’s as if tech giants found a free recipe ▶

concocted by the developer community, then added a secret ingredient to sell it as a ready-made meal and generate substantial profits. That approach is starting to irritate open source developers. In August 2018, Redis Labs, which develops the popular open source database management system NoSQL, sounded the alarm.

“[Some cloud providers are taking] open source projects and repackaging them into competitive, proprietary service offerings. Cloud providers contribute very little (if anything) to those open source projects,” the American firm wrote. “Instead, they use their monopolistic nature to derive hundreds of millions [of] dollars in revenues from them. Already, this behaviour has damaged open source communities and put some of the companies that support them out of business.” Basically, Redis Labs doesn’t want big-name cloud providers to make more money than the original designer, in this case Redis. Amazon Web Services, Google Cloud Platform, IBM and Microsoft Azure, which all use Redis, were the main targets in its statement.

“It’s now harder for small developers that only do open source

to sustain their business model due to competition from GAFAM (Google, Amazon, Facebook, Apple, Microsoft),” says Bauduin. A case in point, the French gem Mandriva (formerly Mandrakesoft), which developed the Mandriva Linux open source operating system, closed its doors in 2015. To avoid the same fate, Redis Labs has decided to place some of its modules under a proprietary licence to keep them from being picked up by the big leaguers without anything in return. MongoDB and Confluent, two other open source leaders, made similar moves in 2018.

"END CUSTOMERS (BUSINESSES AND GOVERNMENTS) ARE INCREASINGLY TURNING TO OPEN SOURCE"

Marc Palazon, chairman of the Syntec Numérique Open Source Committee and CEO of Smile

THE SHIFT IS PICKING UP PACE
The average user hasn’t been affected by these upheavals. “That’s where the paradox lies,” says

Pierre-Yves Gosset. “The open source movement has won, because virtually all proprietary programs contain fragments of open source software, but unfortunately nothing has really changed for the end user. Windows and iOS are still closed, and Android is only partly transparent. From that standpoint, open source hasn’t managed to assert its philosophy.” Bar some rare exceptions, such as the browser Firefox, VLC media player or the LibreOffice suite, end users (individuals, businesses, governments) use few open source programs. Why? “For individuals, open source programs are less accessible than their proprietary counterparts,” says Gosset. “And in the business world, no IT manager has ever been punished for choosing IBM as a service provider. It’s choosing continuity over open source, which is perceived as riskier.”

Marc Palazon, chairman of the Syntec Numérique Open Source Committee and CEO of Smile, has a more tempered opinion: “Although there is a clear shift towards concentration, as seen in the recent takeover of Red Hat and GitHub, there are still a lot of pure open source players out there. And there will be more of them because end customers (businesses and governments) are increasingly turning to open source solutions to avoid having to pay for proprietary software.”

A report published by Report-Buyer in February 2018 estimates that the global market for open source services will grow from \$11.4 billion in 2017 to \$32.95 billion in 2022. These amounts may look paltry in relation to the overall IT market, but they are growing, and at an annual rate of 23.65%. Maybe it isn’t so far-fetched to wonder if one day, open source software could very well take over for good. ◀

SWISSCOM: A TEXTBOOK CASE

Like many technology companies, Swisscom bases most of its infrastructure and services on open-source solutions. This is the case for its main server, Swisscom TV and the Internet box, which run on GNU Linux. The national provider says it applies the 80/20 rule, i.e. 80% open-source software and 20% proprietary developments tailored to specific needs. Jacques Van der Merwe, principal security architect at Swisscom,

explains: “Open-source solutions are significantly faster and less costly to deploy than proprietary software, while enabling the latest innovations to be implemented on an ongoing basis. Our cloud services, for example, are based on the open-source applications Cloud Foundry and Open-Stack.” And there’s more: Swisscom is increasingly relying on open-source hardware, particularly for its selection of network components.

KEY STRENGTHS OF OPEN SOURCE

Open source solutions have notable advantages compared with their proprietary equivalents. A five-point summary.

1 LOWER COSTS

Contrary to popular opinion, open source software does not mean free. Open source solutions still involve costs, which may materialise at the point of sale, during use or maintenance. But the overall bill proves to be much lower than with a proprietary equivalent.

2 TAILOR-MADE TOOLS

Access to the source code of an IT program means it can be modified as you like. For companies, this is an opportunity to personalise or customise software, to adapt it perfectly to their own needs. Whereas adaptations to proprietary software are often at best limited, and at worst totally excluded by the publisher.

3 PROGRAMS BUILT TO LAST

What happens when a proprietary software publisher goes out of business or decides to abandon one of its products because it is not viable? Clients find themselves trapped, with a product that will never be updated again. Open source solutions are not an eternal guarantee, but they address this issue. If the publisher disappears, the community can then continue to develop programs where the code is open. Furthermore, these generally adhere to standards better and it is easier to add plug-ins, which makes them compatible with most proprietary solutions.

4

MORE INNOVATIVE SOFTWARE

There are hundreds of thousands of open source projects on sites like GitHub, GitLab, Gogs or SourceForge. It would be absurd to pretend that they are all good quality. Most have also been abandoned halfway for lack of an audience. But unlike proprietary software, developed by a limited number of employees, successful free software attracts a strong community of developers around it, enabling the more rapid development of programs. This is the principle of open innovation, drawing in experts from across the world.

5 SECURITY FIRST

“Security through obscurity is not a good solution.” Supporters of open source are convinced that hiding a program’s source code to protect it from computer pirates is not an attractive option. The argument goes: letting the community audit software by analysing its source code means weaknesses can be identified. In practice, research shows that free software has a similar security level to proprietary equivalents.

ESSENTIAL SOFTWARE PACKAGES

Among the thousands of actively developed free and open-source software packages, only a handful are known to the general public. Here are some examples:

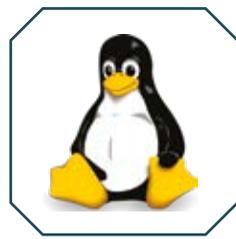
BY MARTIN LONGET



FIREFOX

THE ALTERNATIVE TO GOOGLE CHROME

Firefox was developed by the Mozilla foundation as a successor to the defunct Netscape and since its launch in 2002, the web browser with the red fox has become a serious free software alternative to Internet Explorer, which had a near-monopoly on the market. Firefox achieved 30% market share in 2010 but has since lost ground to Google Chrome, which has become the number-one web browser in the world.



LINUX

THE DEVELOPER'S FRIEND

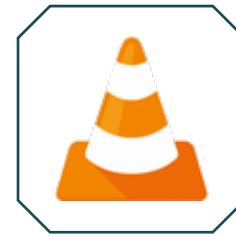
This is the largest open-source software project, both in terms of its size and its age. Linux consists of an operating system kernel, i.e. a program that manages the communication between software packages and hardware, and allocates the system resources (memory, processing power) between other complex and fundamental tasks. Linux was initially developed as a hobby by Linus Torvalds, a 22-year-old Finnish IT student. Little by little, it became increasingly professionalised until it was a key element of the open source universe. Today, dozens of companies, including Microsoft, Google and IBM, participate in its development. The complete operating system associates the Linux kernel and programs developed by the GNU project in the form GNU/Linux, of which there exist hundreds of different variants, known as "distributions".



APACHE HTTP SERVER

THE STAR WEB SERVER

This free web server software, created in 1995, manages HTTP requests, i.e. it provides local web pages for remote clients, who log in most often with web browsers. Apache is published by the Apache Software Foundation, and runs on nearly 35% of the top 1,000,000 most-visited websites and 44% of all known websites. Its main competitor for a number of years is Nginx, another open-source HTTP server.



VLC

THE MULTIMEDIA READER

Completely free and distributed under a GNU GPL licence, the multimedia reader VLC is available on nearly 20 different platforms, including macOS, Windows, GNU/Linux, Android and even Apple TV. VLC was developed by VideoLAN, a French non-profit association, and is appreciated for its light footprint, ease of use, and wide range of functionalities.



MYSQL

THE KING OF DATABASES

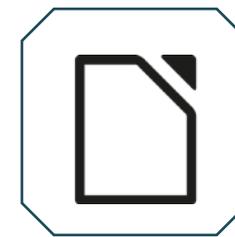
MySQL is a database management software package and essential web tool, which is often found used alongside the Apache web server and the programming language PHP. It was developed by Oracle Corporation, and is unique in that it is available both under GPL licence and proprietary licence, depending on whether it is distributed with an open-source product or a proprietary one.



ANDROID

THE SMARTPHONES' OS

The operating system developed by Google is used on more than 80% of smartphones worldwide. Based on the Linux kernel, and distributed free in its pure form, in practice Android is delivered with a set of proprietary software packages, such as certain integrated Google services and applications that are specific to different developers.



LIBREOFFICE

THE FREE OFFICE SUITE

LibreOffice is an open-source, free-of-charge alternative to Microsoft Office. It is an office suite previously derived from OpenOffice.org. With a word processor, a spreadsheet package, an equivalent to PowerPoint and a drawing tool, LibreOffice is available on a wide range of platforms, including Windows, macOS, GNU/Linux and Android.

KEY FIGURES

\$33 BN

The projected value of the open source services market in 2022, vs. \$11.4 billion in 2017.

\$50 BN+

The value of mergers/acquisitions and stock exchange listings in the open source segment in 2018 alone.

+7.2%

The increase in the use of open-source solutions by companies in Switzerland between 2015 and 2018.

80%

The percentage of US companies that used at least one open-source software package in 2015, according to a large-scale study conducted among thousands of companies.

1911

The date of the first open source project, when US car manufacturers, with Henry Ford at their head, launched an initiative for sharing patents with no royalties.

25 M

The number of lines of code included in the Linux kernel at the end of 2017. It is modified at a rate of 8.5 corrections per hour.

A RETURN TO SOURCE CODE

Before becoming the norm, free access to source code for computer programs was long considered a utopia for dangerous activists. We take a closer look at this development within the IT world.

BY MARTIN LONGET



When, one beautiful day in 1980, the new Xerox printer in the MIT artificial intelligence laboratory suffered yet another paper jam, Richard Stallman, a young programmer aged 27, thought he would solve the problem as he had always done: by directly modifying the machine's code. But there was a problem – the manufacturer had not made the printer's source code available, and the engineer who had programmed the machine was bound by non-disclosure clauses that prevented him from sharing it. And so Stallman threw himself into the fight of his life: an IT crusade to defend and promote free software.

This famous story highlights the face of the free software movement in its early years: a community of libertarian programmers faced with code's growing inaccessibility under the protection of trade secrets. "In the early days of computer science, the concept of 'proprietary' code did not exist," recalls Raoul Delpech, a partner at Linagora, a leading French free software publisher. "Code was regularly shared by manufacturers of huge infrastructures, who relied on feedback from customers in order to improve their settings and fix various bugs. This wasn't born of a desire to do good, it was simply a form of pragmatism; in any case, there was no real software market back then, nor the concept of portability. So it was impossible to design code exchanges between users of different machines."

Until the late 1960s, machines were rare and expensive, and code, considered little more than an ornament, was virtually never sold. The narrow range of backgrounds among early users – primarily members of academic circles, for whom the sharing of knowledge was the norm – encouraged code's exchange and modification. It was in this context that the term "hacker" was born, a nickname later appropriated by rogue users of a future era.

TWO KEY EVENTS EVENTUALLY ACTED AS CATALYSTS IN THE DISTRIBUTION OF FREE SOFTWARE: THE CREATION OF LINUX, AND THE WIDESPREAD ADOPTION OF THE INTERNET

But this period of relative freedom was not to last. "With the rapid development of computing and the emergence of portability, it became profitable for small companies to reuse their code to market competitive machines, cheaper due to the cost savings of these software developments," explains Delpech. "Faced with this risk, made greater by the expanding PC market, computer manufacturers stopped disclosing their software source code and imposed non-disclosure clauses on their developers."

A drastic development in American law came in 1984 with the Computer Software Protection Act, which extended the concept of copyright

to computer programs. Proprietary software thus became the norm, and paved the way for significant profits for a large number of companies in a rapidly expanding market. Businesses such as Microsoft, IBM, Adobe and Apple benefited greatly, guarding their patents jealously and enjoying the protection of legions of lawyers.

Enter Richard Stallman, the MIT programmer frustrated by his Xerox printer and its proprietary code.

Leaving his job permanently in order to found the Free Software Foundation (FSF) in 1985, Stallman – better known by his initials RMS – developed the fundamental concepts of his philosophy, in particular the four freedoms that would define free software: the freedom to run the program, whatever the purpose; the freedom to study its operation and adapt it to the user's needs; the freedom to redistribute copies (even for a fee); and, finally, the freedom to improve the program and distribute these improvements. Combining words with action, Stallman and his supporters launched the GNU project, aiming to create an operating system composed entirely of free software. But the real conceptual revolution >

came in 1989, when Stallman published the first version of his copyleft licence, the GNU General Public License (GNU GPL). “Copyleft uses the legal norm of copyright to protect free software,” explains Delpech. “Free software is published under a licence that guarantees the four fundamental freedoms, under one condition: any distribution of the same program or a modified version must guarantee the same freedoms to others.” In other words, copyleft ensures the preservation of free software, whilst enabling legal action against non-compliance with the GNU GPL licence through copyright law.

A WORRYING CONCENTRATION

Good news or bad news? IBM’s takeover of Red Hat, shortly after Microsoft’s acquisition of GitHub, triggered many questions among supporters of free software, some of whom see these purchases as the death knell for the open-source model. “We are currently witnessing a concentration of the market – and this is just the beginning. Further takeovers are soon to come,” explains Marc Palazon, chairman of Syntec Numérique’s Open Source Committee and CEO of Smile. “These mergers must be carefully monitored, as new owners may be tempted to change the model by ‘closing’ code – though I must say I don’t set too much store by this hypothesis.

“If Microsoft or IBM were to take such a step, the developer community could simply respond by creating a fork, i.e. new software created from the code that existed before the takeover.” Companies acquired for billions would then lose all value.

Though the foundations of free software were laid in the late 1980s, the movement concerned only a small number of enthusiastic supporters and activists. Information technology, which was undergoing a period of significant growth among both businesses and the general public, remained almost entirely under the thumb of proprietary software. Two key events eventually acted as catalysts in the distribution of free software: the creation of Linux, and the widespread adoption of the internet.

“By the early 1990s, the GNU project had already successfully developed a range of software products, but it still lacked a central piece, a core to make it a fully-functional operating system,” explains Dr Matthias Stürmer, head of the Research Center for Digital Sustainability at the University of Bern and vice-president at CH Open, a Swiss organisation that aims to promote free and open-source software. This missing piece was the kernel, a fundamental element controlling access to the various components of an operating system, be they hardware or software.

It was then that Linus Torvalds, a 21-year-old computer science student from Finland, published online the code of a rudimentary operating system developed during his spare time, asking for feedback from other developers (see portrait on p. 46). Very soon, the project gained a great deal of support, with users contributing to it on a voluntary basis. Linus decided to publish his kernel under the GNU GPL licence the following year. “This decision enabled the rapid development and distribution of the Linux kernel and its transformation into a fully-fledged operating system, thanks to the programs developed by the GNU project,” continues Stürmer.

The combination of the Linux kernel and the software published by the GNU project represented the creation

of a complete and entirely free operating system. GNU/Linux was born – and with it, an initial ecosystem of technical distribution and support, as well as a significant ideological clash that is still relevant today.

"WHEN OPEN SOURCE STARTED TO GROW, COMPANIES LIKE MICROSOFT INITIALLY FELT THREATENED"

Matthias Stürmer, head of the Research Center for Digital Sustainability at the University of Bern and vice-president at CH Open

“In the late 1990s, free software began to attract interest from business circles,” explains Stürmer. “The term ‘open source’ was coined then, because the political implications of free software and the Free Software Foundation scared away investors.” Unlike the FSF, supporters of open source emphasised the practical advantages of access to source code, including reduced development costs and improvements in quality and efficiency. Taking a more pragmatic approach, they permitted the use of less restrictive licences, allowing combinations of free and proprietary code (see p. 47).

The rapid development of the internet gradually encouraged the use of free licences and collaborative approaches, and free and open-source software gained more and more ground with developers – a cause for concern among traditional software publishers, Microsoft in particular. Eventually, the Redmond firm changed its attitude and embraced the movement: “When open source started to grow, companies like Microsoft initially felt threatened, but before long they

recognised the competitive advantages of collaborative development. Ultimately, they had no choice but to follow and support the movement,” explains Stürmer.

The reason? Open source had become so omnipresent that overlooking it posed a considerable risk for companies in the IT industry. “Today, open source is the technological foundation of just about everything on the internet,” adds Raoul Delpech. “The GAFSA companies built their success on open source, and continue to be major contributors. For instance, 85% of smartphones run Android, itself

an open-source operating system. Microsoft too has joined in on a massive scale, for fear of becoming completely outdated and overlooked by young talent, who learn their trade using open technologies. Open source has won, that’s for sure.”

Yet there remains a fundamental opposition between the supporters of free software and those of open source, resulting in frequently bitter confrontations, be it over terminology – the FSF categorically refuses to be associated with open source – or fundamental issues, such as the use of proprietary code for access to

certain peripheral devices. “However, from a technical point of view, this opposition no longer has any real impact. Today, free and open-source licences are almost all 100% compatible,” says Delpech.

It looks like free and open-source software has a bright future ahead of it: “In Switzerland, the use of open source is increasingly prevalent in the banking and pharmaceutical industries,” notes Stürmer. “We are living in a new period of acceleration,” agrees Delpech. “For the adoption rate of these technologies, the only way is up.”



American Richard Stallman, father and idol of free software. Here at a photo session for *New Scientist* magazine.

9 OPEN COMPANIES

From pure open source firms to traditional IT companies, all tech players benefit from open source software. We feature some of the best.

BY BERTRAND BEAUTÉ

ELASTIC

THE SUPER SEARCH ENGINE

It was the early 2000s in London. Shay Banon, then unemployed, spent his free time developing a search engine to help his wife organise her impressive list of digital recipes. He created Elasticsearch for her and published the code in open source. The developer community loved it and downloads were off the charts.

Banon decided to co-found Elastic in 2012 to develop an open software suite around Elasticsearch. The system is able to find the most relevant information from a gigantic mass of data spread across thousands of servers. For example, Elasticsearch can find the two most suitable Tinder profiles and match them, or give an Uber driver the most efficient route for a client.

Besides Tinder and Uber, Elastic has other big name clients such as Netflix, Cisco, NASA and the *New York Times*. While Elastic's

software suite, which includes Elasticsearch, Logstash, Beats and Kibana, remains entirely open source, the company sells additional paid modules under a proprietary licence. These, along with revenue from technical support and services, are the company's sources of income.

Since its creation in 2012, Elastic products have been downloaded more than 350 million times. But this success hasn't yet made it to the company's bottom line. Listed on the New York Stock Exchange since October 2018, Elastic isn't making a profit yet. During financial year 2018, the company recorded a loss of \$52.7 million for a revenue of \$160 million (+80% over one year). Elastic is up against the proprietary solutions of competitors such as Amazon, Google and Splunk. Most analysts recommend purchasing shares, with a target of \$95 per share in three months, compared to \$82 at the end of March.

FOUNDED	2012
HEADQUARTERS	AMSTERDAM (NL)
EMPLOYEES	1,100
TURNOVER (2018)	\$160 M
CAPITALISATION	\$6.4 BN
ESTC	

MONGODB

A COLD SNAP FOR DATABASES

Business was booming. In 2018, shares of MongoDB went up by more than 240%. This enthusiasm from investors demonstrates the company's revenue growth – turnover was up nearly 75% in 2018 compared to the previous year and MongoDB products had very strong potential. The company, listed on the Nasdaq, distributes the very popular open-source database MongoDB, which was downloaded more than 40 million times since the company started. MongoDB's clients include big names such as Adobe, Amazon, AstraZeneca and eBay.

Until recently, MongoDB generated revenue from its paid services that

accompany the database. But tired of seeing many firms like Amazon offering their clients the NoSQL database without paying MongoDB, the company decided to revisit its business model. On 16 October 2018, it established a new licensing system to protect itself from "big cloud providers that want to capture all the value without giving anything back to the community."

Companies providing public access to a service using the software will now be required to make public the entire code used to operate the software, including user interfaces, backup software, etc. Following this decision, Red Hat announced in

November to remove MongoDB from programs on the next version of its operating system and the Open Source Initiative (OSI), the industry's umbrella organisation, stated that "MongoDB was published under a non-approved licence and therefore was no longer an open source software." It was a critical blow to the company: if the developer community turns its back on MongoDB, a fork (a new software created from the free code) could be created and become a competitor for the database. With this in mind, analysts are split: half advise purchasing shares whereas the other half recommend holding.

FOUNDED	2007
HEADQUARTERS	NEW YORK (US)
EMPLOYEES	1,000
TURNOVER (2018)	\$267 M
CAPITALISATION	\$7.8 BN
MDB	

CLOUDERA

THE KING OF BIG DATA

It was a major transaction in the US open source world. In early October 2018, Cloudera and Hortonworks announced their merger, which should be finalised in Q1 2019. The merger ends the battle between these two direct competitors for providing solutions that can analyse colossal amounts of data. Cloudera and Hortonworks both offer versions of Hadoop, an open source software managed by the Apache foundation that has become a standard in the big data universe. In addition to its free version, Cloudera also sells paid extensions to manage launches, configurations and security.

After the merger, the new company will still have a direct rival: US-based MapR. It is also up against cloud mastodons (Amazon, Microsoft and Google primarily) which also have solutions similar to Hadoop. The new entity generated approximately \$760 million in revenue (Q3 2018), with more than 2,500 clients. It is hoping to save \$125 million per year in synergies. Is that enough to compete with its rivals? Everyone is asking the same question, especially as the two companies have significant operating losses (\$78 million for Cloudera, \$55 million for Hortonworks).

FOUNDED	2008
HEADQUARTERS	PALO ALTO (US)
EMPLOYEES	3,000
TURNOVER (2018)	\$479.9 M
CAPITALISATION	\$3 BN
CLDR	

WALLIX

THE GOLDSMITH OF CYBERSECURITY

FOUNDED
2003

HEADQUARTERS
PARIS (FR)

EMPLOYEES
100

TURNOVER (2018)
€ 12.6 M

CAPITALISATION
€ 58 M

WALLIX

In March 2018, French company Wallix won the “2017 Bossie: The Best of Open Source Software Award” for its Awless CLI application. This award, given by benchmark magazine *Infoworld*, recognises the best open source solutions in the world. Launched in February 2017, Awless CLI is a command line interface for steering tasks in Amazon Web Services (AWS) that also strengthens the infrastructures’ security and administration.

Founded in 2003 in Paris, Wallix develops cybersecurity software and specialises in managing and protecting “privileged” access. In other words, when a company processes sensitive data, some

of which is shared in the cloud with external providers, the company needs different access levels depending on the employee (internal or external). The proprietary software suite Wallix Admin-Bastion can do this. More than 400 companies, including Dassault Aviation, McDonald’s and Michelin use the software.

In 2018, Wallix generated €12.6 million in revenue, up 9% compared to financial year 2017. But the company’s shares weren’t as lucky: its value dropped to one-third of its highest point in February 2018. But analysts believe Wallix will recover and they recommend purchasing shares.

ORACLE

PRINCE OF DARKNESS

“If an open source product becomes sufficiently good, we take it, simple as that. For example, we went after the Apache software when it became better than our own service. The big advantage of open source is that no one really owns it – a company like Oracle can take it for free, include it in one of its own products and charge for support, and that’s what we will do.” In a 2006 interview with the *Financial Times*, Larry Ellison, co-founder of Oracle, summed up Oracle’s open source strategy in just a few sentences: use open source to generate as much cash as possible.

In 2010, the US giant acquired Sun Microsystems, an older company known for its many open source projects, for \$7.4 billion.

Then Oracle acquired the Solaris operating system, as well as OpenOffice, the MySQL database and the programming language Java. Most of its portfolio went under a proprietary licence just after the acquisition of Sun Microsystems, except for MySQL: Oracle decided to develop two versions, one open source and the other proprietary.

Fleeing this upheaval, Solaris employees created a fork called Illuminos and OpenOffice engineers created LibreOffice. While Oracle also contributes to Linux, it has a very bad reputation in the open source world. Larry Ellison, whose fortune was estimated at \$52.2 billion by *Forbes Magazine* in 2017, is nicknamed LPOD: Larry, Prince of Darkness.

FOUNDED
1977

HEADQUARTERS
REDWOOD (US)

EMPLOYEES
137,000

TURNOVER (2018)
\$39.83 BN

CAPITALISATION
\$190 BN

ORCL

MICROSOFT

THE (ALMOST) 180° SHIFT

FOUNDED
1975

HEADQUARTERS
REDMOND (US)

EMPLOYEES
135,000

TURNOVER (2018)
\$110 BN

CAPITALISATION
\$900 BN

MSFT

Proprietary software giant Microsoft isn’t yet ready to make its flagship products, such as the Windows OS, open source. But it would be an understatement to say that the Redmond company has made a radical change to its procedures under Satya Nadella, CEO since 2014. The company was strongly opposed to open source software under Steve Ballmer, CEO of Microsoft between 2000 and 2014, but has

since done an about-turn to become the top open source contributor on GitHub, ahead of Red Hat and Google. Before joining Microsoft, Satya Nadella worked for Sun Microsystems, one of the pioneers of open source.

In June 2018, Microsoft acquired the main free software forge GitHub for \$7.5 billion. This platform, an essential resource for developers around the world who freely ex-

change lines of code, contributes to the development of open source software. GitHub has nearly 28 million developers that work collaboratively on more than 60 million open source projects. With this acquisition, Microsoft became a key player in the industry.

But it remains to be seen if it will clean up GitHub. In fact, many lines of code on the platform conflict with its own commercial interests.

One example: several Xbox gaming console emulators are hosted on GitHub. These homemade programs allow users to play Xbox games on their PC without purchasing the console sold by... Microsoft. If the US giant removes these conflicts, the developer community could leave and join another software forge, such as GitLab. But letting these developers go would be against Microsoft’s best interests. It will be an interesting dilemma to follow.

TALEND

THE DATA PROCESSOR

Virtually unknown by the general public, the French start-up Talend is now an important company in Silicon Valley. Listed on the Nasdaq since 2016, the company left Suresnes in Île-de-France and moved to Redwood, California, a city that is more fitting for its international ambitions. But its original mission hasn't changed: it seeks to homogenise and process

data for better analysis. With the rise in big data, many companies receive huge amounts of data on their clients or suppliers. Talend's tools, which are distributed via open source, allow for a company's data to be used more easily in order to maximise its benefits.

Like Red Hat, the company generates revenue from the paid versions

of its software that include additional functionalities, support, training and assistance using the tools. Talend's clients include Air France-KLM, Bayer Pharmaceuticals and Domino's Pizza. Most analysts recommend purchasing shares, which dropped in late 2018 but are starting to pick up again.

FOUNDED	2005
HEADQUARTERS	REDWOOD (US)
EMPLOYEES	1,000
TURNOVER (2018)	\$204 M
CAPITALISATION	\$1.54 BN
	TLND

GOOGLE

TEMPTED TO RESTRICT ACCESS

Google's experience with open source software is a bit similar to Dr Jekyll and Mr Hyde. On one hand, the Mountain View group exists today in large part because of open source software, such as Linux or MySQL. It built its empire on these tools (in fact, Alphabet, Google's parent company, widely contributes to many open source projects). On the other hand, Google keeps its sensitive products under proprietary licences.

For example, Android, the operating system used in nearly 80% of smartphones around the world, is entirely open source. But the

available source code doesn't include the company's flagship products like Google Maps, Gmail and Google Play, which are all under a proprietary licence. Without these products, Android's potential would be significantly limited. Furthermore, most telephones use proprietary forks from Android that are modified by the builders.

"Google changed its approach," said Pierre-Yves Gosset, head of the Framasoft association. "It went from being an outsider that kept its software as open as possible to being a dominant player that's trying to restrict access."

FOUNDED	1998
HEADQUARTERS	MOUNTAIN VIEW (US)
EMPLOYEES	99,000
TURNOVER (2018)	\$136.82 BN
CAPITALISATION	\$852 BN
	GOOG

RED HAT

THE GLOBAL LEADER

Legend has it that Red Hat got its name from one of its founders, Marc Ewing, who often wore a red hat at university. Twenty-five years later, the company has become a major player in the IT world. As proof: IBM paid \$34 billion to acquire Red Hat in October 2018, one of the most expensive acquisitions ever made in the industry.

Little known to the general public, Red Hat specialises in developing and distributing open source software, particularly its own version of the famous Linux operating system, an open source compe-

tititor to proprietary solutions such as Windows (Microsoft). Red Hat is growing quickly and revenue increased year over year, reaching \$2.9 billion in 2018, up 21% compared to 2017 for a total of \$472 billion in profits.

Comparatively, the older IT player IBM has been on the decline for several years. With this acquisition, IBM hopes to reverse the trend and strengthen its cloud services. It remains to be seen if a partnership between a traditional company and a young innovative start-up will be successful.

FOUNDED	1993
HEADQUARTERS	RALEIGH (US)
EMPLOYEES	12,600
TURNOVER (2018)	\$2.9 BN
CAPITALISATION	\$32.11 BN
	RHT

LINUS: THE CREATOR OF LINUX

From computer science student to emperor of Linux, Linus Torvalds is the incarnation of the rising power of open source: a geeky hobby becomes a multibillion-dollar industry. We take a closer look.

BY MARTIN LONGET

“I’m building a free operating system (just a hobby, nothing big or professional). I’ve been working on it since April, and it’s almost ready.” This message from founder Linus Torvalds, posted on 25 August 1991 on Usenet (a forefather of the internet), is the beginning of the Linux adventure. It describes what will be the project’s defining features: free, full access to the source code, and community development.

Nearly 30 years later, the Linux kernel is the basis of the vast majority of IT servers in the world, as well as all Android phones and millions of smart objects. Its eccentric creator Linus Torvalds is still at the helm, exercising a theoretically unlimited personal power thanks to his falsely ironic title “benevolent dictator for life”.

The source of this international saga was the solitary pastime of a Finnish computer science student, who was then 21 years old. Seeking to better use the capacities of his new processor (an Intel 80386) but unable to afford the exorbitant price of a UNIX licence (the system used at his university), Torvalds began to develop his own operating system. To his great surprise, what

was then just a prototype quickly garnered enthusiasm from many fans who encouraged him to continue his work.

LINUS TORVALDS SURPRISED HIS WORLD LAST SEPTEMBER WHEN HE APOLOGISED FOR HIS “UNPROFESSIONAL” BEHAVIOUR

The development was exponential, accelerated by community participation made possible by the internet and the adoption of the GNU GPL free licence in 1992: with just over 10,000 lines of code in its first published version, the kernel grew to over 300,000 lines in 1995 and approximately 25 million today.

Chronicling the smashing success of this decentralised project in his 1998 book *The Cathedral and the Bazaar*, Eric Raymond, an American developer who co-created the term “open source”, described Linux’s horizontal organisation (a bazaar), in contrast to

the vertical style (a cathedral) that many large companies use. But despite this impression of chaos, Linux’s management is highly organised, with specialised developers often employed by large IT companies who are responsible for entire sections of the kernel. But Linus Torvalds has the last word on everything. A California resident since 1997, (he has been a US citizen since 2010), he is officially employed by the Linux Foundation, a non-profit institution that develops and promotes Linux.

Famous for his directness and brutal, often personal insults against developers he deems incompetent or companies like Nvidia, which he castigated for lack of collaboration, Linus Torvalds surprised his world in September 2018 when he apologised for his “unprofessional” behaviour. He announced he would take a few weeks off to get help “understanding people’s emotions and responding to them in an appropriate way”. Since then, Linux has adopted a new code of conduct with the goal of humanising relationships between employees and avoiding behavioural abuse. ▽

A QUESTION OF LICENCES



Far from being a legal no-man’s-land, open-source software is legally protected by dozens of licences of varying levels of restriction. We take a closer look.

BY MARTIN LONGET

Not all software can be open source. Assuming such a status first requires a licence that has been duly approved by the community. The Open Source Initiative recognises over 80 licences, of which only a handful is used in the vast majority of cases. “Choice of licence is never a trivial issue, as it determines what users will be able to do with the source code,” explains Pierre-Yves Gosset, director of the Framasoft association, a publisher of free software. Indeed, contrary to popular belief, software that is open-source is not necessarily royalty-free or open to redistribution without conditions; everything depends on the licence used. A variety of complex factors are behind the large number of licences in existence, but they can generally be divided into two broad groups: “restrictive licences” and “permissive licences”.

Among restrictive licences, the most common is the GNU General Public License (GNU GPL), which dates back to the early days of the free software movement. Written

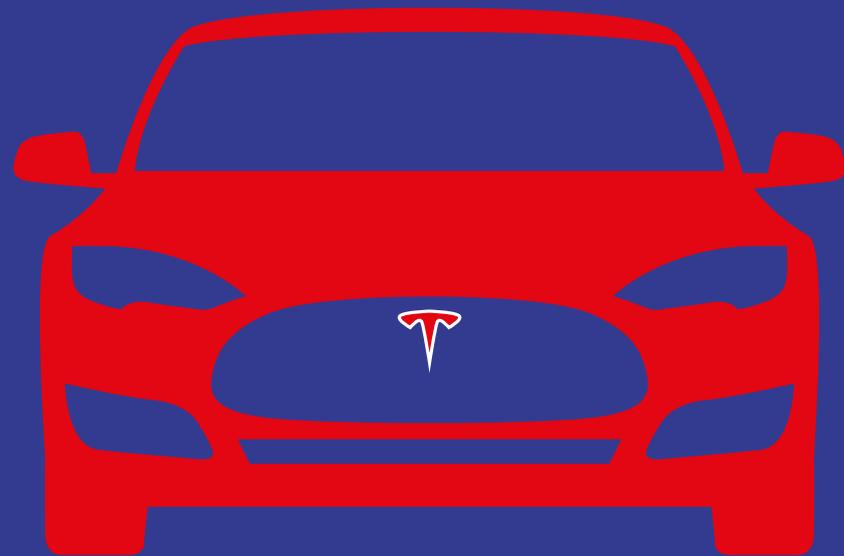
for the first time in 1989 by Richard Stallman, the founder of the Free Software Foundation, this licence introduced the concept of copy-left. The inverse of copyright, this authorisation by the software’s creator allows users to freely modify, redistribute and market the software.

APPLE IS EMBLEMATIC OF THIS PRACTICE

But there is one condition that users must respect: to uphold these rules for others. Thus, a company that chooses to publish its modifications to a GNU GPL software must do so under the GNU GPL licence. Violating this principle runs the risk of provoking legal action, just as a violation of copyright would. “This type of licence prevents people and companies from taking ownership of work produced by others,” says Gosset. “Source code cannot be integrated

into proprietary software for resale.” It is understandable, then, that some companies, siding with commercial logic, prefer more permissive licences, such as MIT, Apache 2.0 and BSD. These licences place very few restrictions on the distribution of software, making it possible for users to generate greater profits. Apple is emblematic of this practice. Although a large part of macOS (the operating system on which the company’s computers run) derives from the FreeBSD kernel, Apple – perfectly legally – markets it under a proprietary licence. This is possible because the BSD licence authorises the integration of the original code into proprietary software.

In practice, large-scale projects generally call for a variety of licences, depending on the parts that constitute them. Android is a good example of a hybrid project: its Linux kernel is published under GNU GPLv2, but Google keeps the complementary applications, the famous Google Mobile Services, in proprietary format – meaning their source code is kept secret. ▽



THE AUTO INDUSTRY IS GOING OPEN SOURCE

The concept of open source isn't just for the IT world. In June 2014, Elon Musk announced that Tesla patents would be available to everyone. It's a very deliberate strategy that other auto manufacturers are now following.

BY BERNARD BEAUTE

Elon Musk knows how to get attention. Just after disappointing results were released, the charismatic founder of Tesla tweeted on 31 January 2019: "All our patent are [sic] belong to you". While this announcement made headlines and helped to eclipse Tesla's difficulties, it's not exactly new news. In fact, the Palo Alto manufacturer released all its patents back in June 2014. On its official blog, Tesla said it was committed to not going after competitors who wanted to use its technology "in good faith".

"Patents serve merely to stifle progress, entrench the positions of giant corporations and enrich those in the legal profession, rather than the actual inventors," wrote Musk, who admitted that he did obtain patents before this: "At Tesla, we felt compelled to create patents out of concern that the big car companies would copy our technology and then use their massive manufacturing, sales and marketing power to overwhelm Tesla. We couldn't have been more wrong."

Translation: it's better for Tesla to be copied in order to propagate its own standards, rather than fail at implementing them alone. In Tesla's case, the number of available recharging stations is still largely inadequate. Its supercharger can recharge a Tesla S in only a few minutes (270 km range in 30 minutes), so by making the supercharger patent available to the public, Tesla has scored double. It means that competitors have every interest in adopting Tesla's standard, and as such, they will contribute both to the cost of launching recharge stations and to the electric car boom, which will ultimately benefit Tesla.

Opening its patent portfolio also means that Tesla can share the costly investments that are needed to launch electric vehicles. "We believe that applying the open source philosophy to our patents will strengthen rather than diminish Tesla's position in this regard," said Musk.

And indeed, other auto manufacturers have followed in Tesla's footsteps.



"PATENTS SERVE MERELY TO STIFLE PROGRESS, ENTRENCH THE POSITIONS OF GIANT CORPORATIONS AND ENRICH THOSE IN THE LEGAL PROFESSION, RATHER THAN THE ACTUAL INVENTORS"

Elon Musk, CEO of Tesla

In May 2015, Ford announced it would release 650 patents associated with electric vehicles to other manufacturers. "Innovation is our goal. By sharing our research with other companies, we will accelerate the growth of electrified-vehicle technology and deliver even better products to customers," explained Kevin Laydon, Ford's direc-

tor of electrification programmes, in 2015. "As an industry, we need to collaborate while we continue to challenge each other."

Toyota, on the other hand, is focused on a competing technology: hydrogen fuel cell batteries. The Japanese company has made 5,600 electric vehicle-related patents available – subject to certain restrictions – until 2020, when the company plans to stop sharing its knowledge for free. The Japanese manufacturer, which sells the Mirai (a hydrogen electric car), has invested heavily in this technology. Hoping for a return on its investment, it needs to optimise all the relevant technical aspects and establish a network of hydrogen charging stations. To do so, Toyota is relying on co-innovation, a process that helped make hybrid vehicles so successful. To use the patents, engineers must notify Toyota, which favours players in its ecosystem and encourages its partners to provide other innovations in exchange.

"It started in the IT world, but open innovation will spread to many industries," says Marc Palazon, president of the Open Source committee at Syntec Numérique, "because this method of research and development reduces costs and accelerates progress."▲

OPEN SOURCE HARDWARE IS EVERYWHERE

Open data, open cloud, open government... After breaking into the software world 30 years ago, open source is now ubiquitous, including for physical materials. At the 2017 CES in Las Vegas, Renault surprised everyone with its POM concept car. Designed in partnership with Italian start-up OSV (Open Source Vehicle) and UK-based firm ARM for the software, the small electric car is entirely open source, which means that anyone can download

the blueprints and build it in their garage. Similar examples abound in every field. They include: Arduino's open source electronic microcontroller boards, smartphones from Finnish start-up Necunos and 3D printers such as the RepRap models. The approach is sometimes philosophical and sometimes purely commercial, but always focuses on benefiting from contributions from the community. It's a way to encourage open innovation.

Nothing is too good for Fido

The pet market is growing spectacularly, particularly in emerging countries. Pet owners will spare no expense to provide their furry friends with organic patés, hotel stays and even heart transplants.

BY JULIE ZAUGG

It's an ordinary shopping street in China. In the heart of Foshan, an industrial city between Guangzhou and Shenzhen, the street is home to a variety of shops built into faux historic buildings that still smell like fresh paint. All of these shops are for pets. There is a bungalow selling puppies and kittens in the window, a veterinarian and an accessories shop overflowing with studded collars and booties for dogs printed with Burberry plaid. There's even a spa for animals.

The pet market has exploded in China in recent years, much like in many other emerging countries. In the west and Japan, growth is sustained as well. "In 2018, this market reached \$125 billion worldwide,"





A surfing competition for dogs at Imperial Beach (California).

MIKE BLAKE / REUTERS

said Jared Koertner, an industry specialist at Euromonitor. "Growth has averaged 6% in the last five years."

This good performance is the result of a double phenomenon. "As the population ages, more and more seniors find themselves alone at home," said Philip Cooper, an expert in the pet market. "Simultaneously, millennials are having children later." These two population groups are filling the void with pets that they treat like a substitute for a baby.

"Dogs are no longer just something kept attached to a leash in the back of the garden, but rather a pampered member of the family that sleeps in the same bed as its owner," he said. And both millenni-

als and ageing baby boomers are ready to spend unlimited amounts on their companions.

"Dogs are no longer just something kept attached to a leash"

Philip Cooper, expert in the pet market

This has not gone unnoticed by industry giants. Mars, the global leader (but not listed publicly), and Nestlé, a close second, have grown their range of pet products in recent years

and made several acquisitions. In 2018, this segment made up 14% of sales for the Vevey-based group, reaching 12.8 billion Swiss francs, up 4.5%. This booming market has also attracted companies that have traditionally focused on human food. In 2018, General Mills acquired Blue Buffalo, the pet food and supplement manufacturer. US-based J.M. Smucker acquired Big Heart Pet Brands and Ainsworth Pet Nutrition. Even Amazon has thrown its hat into the ring, selling \$1 billion worth of pet food in 2018. There's also a handful of start-ups that sell their products directly to consumers.

But the pet market is not only experiencing strong growth – it is reorganising.

FIVE-STAR MENU

"Cat and dog owners have begun to reproduce for their pets some of the behaviours they have adopted for their own food," said Leslie May, founder of Pawsible Marketing. "This trend makes owners gravitate towards natural, organic, local and environmentally friendly ingredients." Furthermore, a contaminated wheat flour scandal in 2007, which led to renal failure in many cats and dogs, made pet owners much more vigilant when it comes to feeding their pets, explained May.

As a result, it is now common to see cat food made from New Zealand lamb, dog food from wild salmon and sweet potatoes, or even vegetarian patés made from organic vegetables. "Some compa-

nies such as Nestlé are considering insect proteins in order to be more environmentally friendly," said Koertner.

Several start-ups have launched subscription services and pet owners can have a complete menu delivered to their door each week for their four-legged friend. "These menus can be adapted based on breed, weight and potential allergies," said the expert. Last year, Nestlé acquired meal service Tails.com, which has 100,000 customers in the UK.

Pet shop chain Petco has equipped 300 of its locations with kitchens. "It will offer fresh meals prepared on the spot for pet owners to buy when they leave work," said Cooper.



PETCO



THREE FIGURES

\$95 BN

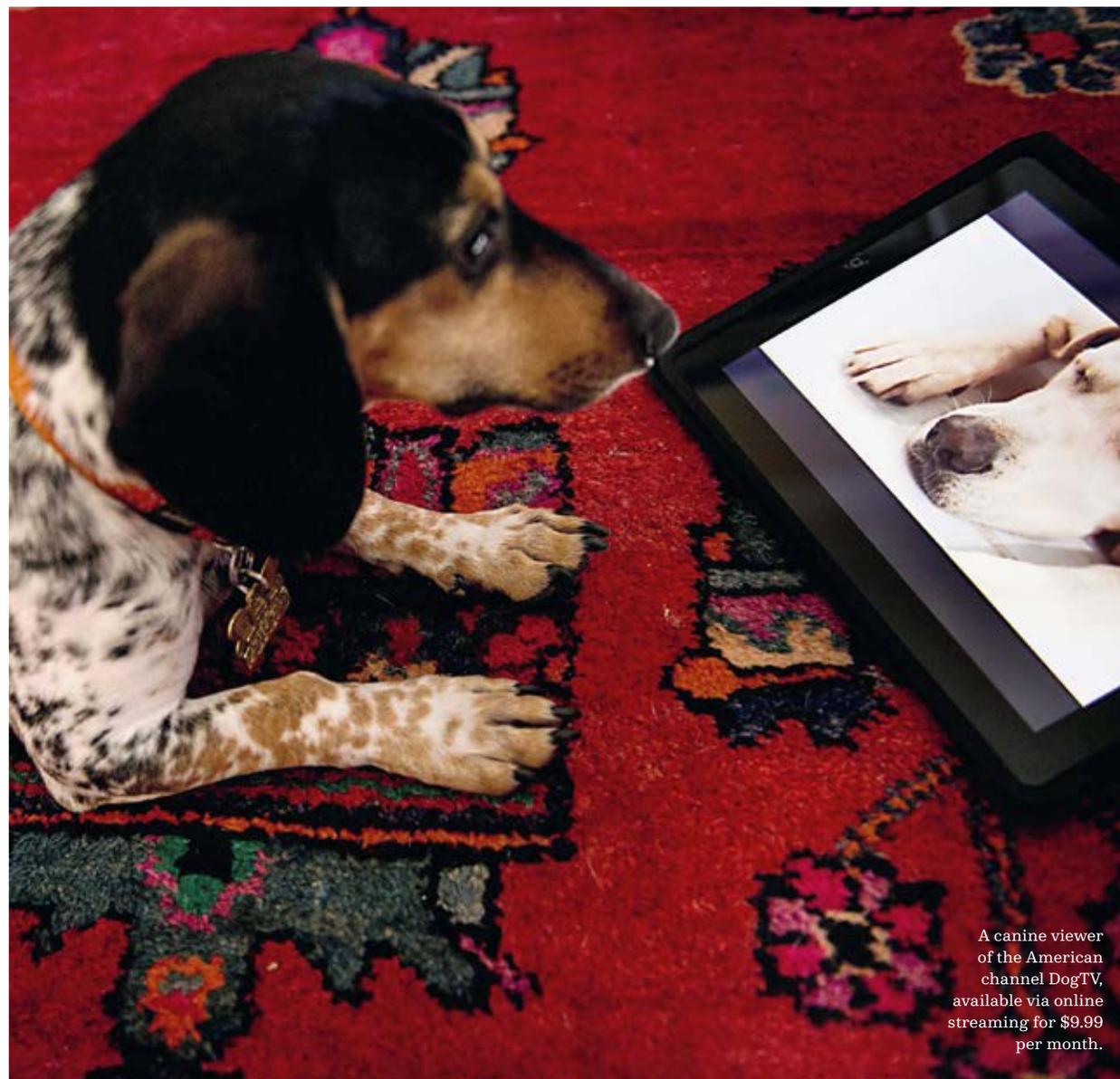
The total global expenditure on the purchase of pet food by their owners. In Europe, it reached 20.5 billion euros in 2017.

+27%

The increase in spending on pets in 2017 in China, to a total of \$27 billion.

68%

The percentage of households in the United States that have a pet, compared to 56% thirty years ago. In Europe, 80 million households have a pet.



A canine viewer of the American channel DogTV, available via online streaming for \$9.99 per month.

AN APP TO TALK TO YOUR DOG

But the services industry has seen the strongest growth in the last few years. "There are now services that will watch, walk or groom your dog or cat at home," said May. Most of these services use an app, such as Wag or DogVacay, and services can be ordered in just a few clicks.

The most devoted owners can even put their pet up in a luxury hotel while they go on their own

holidays, send it to a fitness or yoga class, or pay for a massage with aromatherapy oils. The SpotOn app can call a taxi that is equipped to carry pets. Some even have seatbelts for dogs and cats.

There are also several online services to check up on your dog or cat from afar, feed it via an automatic distribution system, and even interact with it on Skype.

DogTV, a California-based company, offers a television programme for dogs that owners can leave on when they're not home. Finding Rover can find a lost dog, thanks to a facial recognition algorithm.

Apps encouraging romantic or friendly matchmaking between dog or cat lovers are also booming. Last year, Nestlé acquired French platform Wamiz, where pet owners can interact online.

PUT A STENT IN YOUR CAT

"Not long ago, when your pet was sick or ageing, you would put it to sleep and cremate it," said pet expert, Philip Cooper. "Now, there is a wide range of complex interventions and palliative care available." Cooper was offered a chemotherapy treatment priced at \$15,000 when his dog got cancer. Putting in stents, open-skull surgeries and transplants have also become common.

This evolution has been encouraged by increasingly powerful diagnostic tools, such as MRIs and ultrasounds, as well as health insurance products for pets. For deceased pets, many vet clinics now offer funeral services and provide grief counselling, all paid by the hour.

Less dramatic but just as profitable, tools to monitor pet health are also on the market. Example: Toletta, a smart litter that can calculate a cat's weight and urine volume every day, so owners can monitor for urinary infections or obesity.

Eager to capitalise on this market, "Mars acquired several veterinary hospital chains, including VCA in the US, Linnaeus in the UK and Anicura in central and northern Europe," said Jared Koertner, industry specialist. Investment fund JAB is expected to acquire a majority stake in another brand called Compassion-First Pet Hospitals. Walmart will also open pet clinics in its stores.

ISTOCK



Veterinary hospitals, as well as related services, are multiplying.



ISTOCK

IN CHINA, DOGS ARE NO LONGER EATEN

Emerging countries have only recently began to appreciate pets. "This phenomenon is particularly striking in China, India, Russia and Latin America, regions where the economy is doing quite well and there's an emerging middle class and a large population," said Cooper. In 2018, Nestlé's Purina brand recorded double-digit growth in emerging countries. In Mexico alone, it generated more than 1 billion Swiss francs.

Until recently seen as an exorbitant luxury in countries where some of the population did not have enough to eat, pets are now seen as a symbol of prestige. In 2017, residents of China spent an average of 5,016 yuan per household for their pets, which is double the minimum wage in the country, according to the platform Goumin.

China is particularly fond of small breeds, such as pomeranians and Japanese shibas, as well as giant breeds such as Tibetan mastiffs. In Russia, cats are very popular.

Walking on the moon once again

After years of being forgotten, exploring the moon is back in the spotlight. While there is much talk about China's plans, many other countries have their own projects and the United States is leading the pack.

BY BERTRAND BEAUTÉ

One small step for mankind, but a big step for China. On 3 January 2019, the Chang'e 4 probe lander touched down on the far side of the moon. This is a first, which brings to mind other space accomplishments. Abandoned for decades, moon land-

ings are of interest again, exactly 50 years after Neil Armstrong set foot on the moon in 1969.

In addition to China, both Japan and India recently completed a lunar orbit and are now planning a moon landing. In Europe, the

European Space Agency (ESA) and ArianeGroup (a subsidiary of Airbus and Safran) signed a study contract in January 2019, with the goal of launching a mission to the moon by 2025. But as always, Uncle Sam is the most ambitious of all (see inset on p. 57). NASA plans to send

astronauts to the moon again soon. "The United States will return to the moon, and we're going to do it sooner than you think!" tweeted Jim Bridenstine, head of NASA, in November 2018.

With 12 astronauts having already set foot on the moon between 1969 and 1972 and more than a hundred missions to space completed, why is there such renewed interest in the moon? "Scientific research isn't the primary goal of these missions,"

said Francis Rocard, director of the solar system exploration programme at CNES, the French Space Agency in Paris. According to experts, the quest for prestige and hegemonic concerns have been and still are a primary motivation for many countries, including China. In other contexts, particularly for the United States, there are economic goals in mind.

As the first country to land on the moon in the 21st century, China chose the Earth satellite as its first entry into space exploration. "Both China and India believe that space technology is key to their national pride," said Isabelle Sourbès-Vergier, a specialist who studies space policies at the Centre Alexandre Koyré in Paris. "China believes that all great nations have access to space. So it created an ambitious exploration programme. But China can't start complex missions right away, simply because it doesn't have enough experience."

Following Chang'e 4's successful landing, the Chinese probe will take a sample of the moon in 2019 and then return to Earth. This has already been done by other countries. "The scientific results gained from

Chinese expeditions are small, even non-existent. China is just repeating what the Soviets and Americans did in the 1960s and 1970s," said Rocard. "But the country is moving fast, and their schedule is on target. They want to access deep space and the moon is an excellent stepping stone to get there." The Chinese programme is planning for manned missions to the moon by 2030.

So what is the United States up to? "For the Americans, the challenge is completely different," said Rocard. "They've known how to get to the moon for decades." So why go back? "With the end of the International Space Station (ISS) planned for 2024, NASA really needs a new project," said the astrophysicist. "It is doing everything it can to make sure the US space industry doesn't crumble, since it is a huge sector in ▶



"NASA is doing everything it can to make sure the US space industry doesn't crumble, since it is a huge sector in the United States"

Francis Rocard, director of the solar system exploration programme at CNES

COMPANIES TO WATCH

For investors, the relaunch of the US space programme could be an opportunity. According to an October 2017 study, Bank of America predicted that the overall value of the space industry will soar from \$329 billion in 2016 to \$2,700 billion in 2045. Many companies will benefit, including some well-known industry giants such as Northrop Grumman, Boeing, Lockheed Martin, Raytheon, Thales and Airbus. But lesser-known companies will also play a role, such as Moog, which develops aerospace control systems, and United Technologies, which designs space suits for NASA, among other things. Investors can also consider exchange-traded funds (ETF), such as the iShares US Aerospace & Defense ETF (ITA).

A NEW COLD WAR?

During the Cold War, the United States was focused on satellites and rockets from the USSR. It was quite mutual. But recently, a new rivalry has appeared in the space industry: Beijing versus Washington, as if China had replaced the USSR. But it would be wrong to think that China has the same kind of power. "Hypernationalism justifies aerospace spending. The United States is essentially saying: 'Watch out! China is catching up, we must speed things along'. And Xi Jinping's regime has every reason to let people believe that China will outpace the US.

"Clearly, the US is exaggerating the idea that China is its main competition in order to finance space projects," said Isabelle Sourbès-Verger, a specialist who studies space policies at the Centre Alexandre Koyré in Paris. "But in reality, while these two countries are playing the same sport, they're not in the same league. China cannot outpace the United States." As proof, have a look at the numbers. The OECD estimated China's secretive civilian and military space budget at \$8.4 billion in 2017. That's quite far from the \$48 billion spent yearly by the United States.

Compared to these two giants, other countries are falling behind. With a budget of \$2 billion for its civilian component, the Russian programme is barely hanging on. "Everyone's waiting for Russia's space sector to either crumble or take off again, but it's just stagnant," said Sourbès-Verger. With no national pride to contend with, Europe lacks strategy and will most likely support the US programme. India, on the other hand, is focused primarily on useful space – that is, on satellites – with a yearly budget estimated at \$1.9 billion.



Takeoff of the Chang'e 4 lunar spacecraft at the Xichang Satellite Launch Center (southwest China) on 7 December 2018.

JIANG HONGJING / AFP

the United States that creates revenue for companies and thousands of jobs. The space industry lobbyists are pushing very hard to keep it alive."

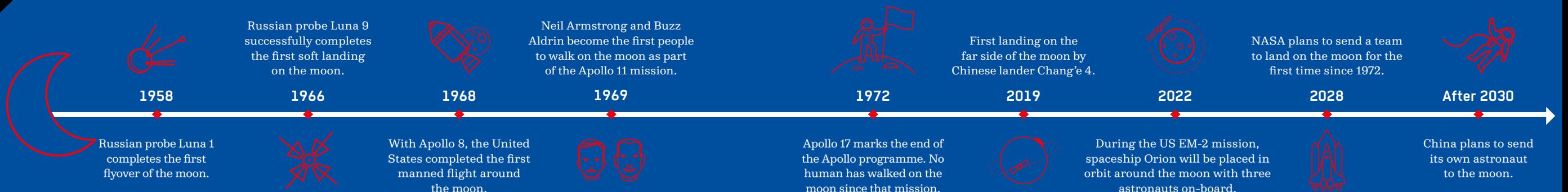
The United States has stated that it wants to send an astronaut to Mars, but such a voyage is exorbitantly expensive and isn't even technologically possible at the moment. So NASA has to take a different direction for now: "During the Obama administration in 2015, the US decided to launch a return mission to the moon, with the questionable argument of using it to prepare for a voyage to Mars," recalled Sourbès-Verger. In reality, NASA built a moon orbit space station, dubbed the Lunar Orbital Platform-Gateway (LOPG) which could eventually serve as a refuelling station for shuttles heading to Mars. The process has already begun, and the first modules are scheduled to launch starting in 2022. A manned mission in lunar orbit is also planned for 2023.

To build shuttles, landers and necessary equipment, NASA will call on the private sector in order to keep its own Research & Development costs down. "We want multiple suppliers to compete for the work," said Bridenstine, director of NASA. In January 2016, the agency signed a

contract that could reach \$14 billion with Space X, Boeing, Orbital ATK and Sierra Nevada to deliver supplies to the International Space Station (ISS). For its mission to the moon, NASA announced in November 2018 that it had selected nine companies (Astrobotic, Deep Space Systems, Draper, Firefly, Intuitive Machines, Lockheed Martin, Masten Space Systems, Moon Express and Orbit Beyond). These companies could share up to \$2.6 billion over 10 years to develop the necessary equipment.

To make the LOPG a refuelling station on the way to Mars, some companies are already considering using the moon's natural resources. Shackleton Energy, for example, is developing a project to extract and refine the moon's polar ice to convert into fuel. "Many NASA researchers are wondering if it is even possible," said Rocard. "Personally, I don't really believe it. Exploiting moon ice seems a very complex endeavour, since it's at the bottom of a very deep crater at -200°C. It would be more feasible to take water from the surface of hydrated asteroids." Whatever the solution will be, mining operations on the moon and its asteroids will open new economic possibilities in space and are already inciting dreams of interstellar voyages. ▲

Important dates in space exploration



Lululemon, the amazing power of yoga

Twenty years after its creation, the Canadian technical athletic apparel brand continues its irrepressible growth. After conquering North America, it has now set its sights on Europe and Asia. We revisit its story.

ANGÉLIQUE MOUNIER-KUHN

Who would have imagined that when the yoga clothing specialist Lululemon Athletica arrived on the stock market back in 2007, its shares would be so popular among investors? Now a member of the NASDAQ-100, the company has seen its value increase tenfold since its initial public offering. Its capitalisation is now close to \$20 billion. Better still, while American stocks staggered in 2018, Lululemon's share price soared by 55%, a rare ray of sunshine in a disrupted retail sector. With a 20% increase since the beginning of the year, the stock seems to be challenging the laws of market gravity. The overwhelming majority of analysts in the Thomson Reuters consensus still recommend it for purchase, despite some reservations (see Analyst's Advice on p. 63).

It attracted its customers by organising yoga and fitness classes in its own retail outlets

Lululemon Athletica's success story combines all the ingredients of the entrepreneurial sagas often analysed by business school students. The company was founded in 1998 in Vancouver, Canada's cool and trendy equivalent to San Francisco. Its founder, Chip Wilson, was a competitive swimmer who made a name for himself selling clothing for snowboarding fans. The young entrepreneur launched his Boogie Pants, a pair of black trousers that was both tight and comfortable, in a bid to

appeal to women who practised yoga, which, at the time, was a niche sport overlooked by major equipment manufacturers.

"Ever since the first wave of peaceful protests that gave it a boost in the 1970s, yoga maintained a somewhat uncool, hippie image. People practised yoga in baggy trousers, which may have been practical but were also very ugly," says Stephane Bonvin, a fashion consultant and the co-founder of the Yogartamis

centre in Geneva. The enterprising genius of Chip Wilson is evidenced by his creation of the brand just as a second yoga wave was about to take over the entire planet, instigated by a flock of trendy celebrities.

The small shop in Vancouver, which transformed into a yoga studio in the evening, sold technical clothing with subtle stitching, gradually being offered in a range of pastel colours. This sober design was how Lululemon stood out from the tradi-

tional loud styles of Nike, Adidas and Reebok, allowing it to impose high prices without getting any pushback.

Similarly, the Canadian company avoided buying into the standard marketing techniques of sports brands. It used neither fashion muses nor famous athletes to make itself known. Instead, the brand adopted an astute marketing strategy that promoted rarity and relied on a vertical system. It attracted its customers by organising yoga and fitness classes in its

own retail outlets or nearby buildings. Everything was aimed at turning one-off subscribers into unconditional followers. The unassuming logo, a kind of stylised, fluid omega sign, was designed as a sort of tribal mark to show belonging to the exclusive "Lululemoners community". >



ERNESTO DISTEFANO / AFP

A Lululemon yoga class at Vancouver's Stanley Park (October 27, 2018).

IN FIGURES

426

The number of Lululemon retail outlets in the world.

\$4 BN

The expected revenue in 2020, compared to 2.65 billion in 2017.

13,400

The number of employees worldwide in January 2018.

1998

The year the company was founded.

When Chip Wilson's company went public on the NASDAQ stock market less than 10 years after its creation, it posted \$150 million in net earnings and had already opened 59 shops in Canada and the United States. But it was only in the early stages of its explosive rise – a new tidal wave was about to hit the fashion market. A combination of streetwear and sportswear, "athleisure" (a contraction of the words "athletics" and "leisure"), arose at the turn of the decade. This category of clothing, originally designed for the gym, is now also suitable for the office, recreation or even a private viewing of an art exhibition, so it closely takes its cues from the luxury goods industry. The *Wall Street Journal* nicknamed this new style the "wear anywhere" apparel.

These fast-fashion pieces began causing trouble for luxury fashion houses thanks to the fact that every brand had turned to this new trend of chic jogging bottoms and trainers. But with its carefully designed cuts and top-quality materials, the Canadian brand was already several

steps ahead. "Lululemon created an outfit to suit a new lifestyle that was emerging," explains Bonvin. "When athleisure became mainstream, the brand didn't need to fight the competition. It was a pioneer, so it was already on the market," adds Florence Allday, an analyst at Euromonitor International. According to the market research provider, growth in global athleisure clothing sales further rose to 8.1% between 2017 and 2018.

Lululemon has diversified its income sources by offering men's products, which will soon represent a quarter of its sales

The enthusiasm of Lululemon's shareholders is down to the company's ability to ride this trend to an

Lululemon's Athletica Store on New York's 5th Avenue has become a fashion mecca.



RICHARD B. LEVINE / KEystone



An artistic installation featuring Lululemon yoga pants, at the Museum of Modern Art in New York (January 28, 2018).

2019 MOMA, N.Y.

ANALYST'S ADVICE

"STRONG INTERNATIONAL POTENTIAL"

Could this be the first wobble in the almost unanimous opinion that has prevailed until now? On 19 February, Simeon Siegel, an analyst at Nomura Instinet, demoted the Lululemon stock to "neutral", with a price target of \$157: "We believe it is still one of the best options in the retail sector, but we think this is already reflected in its current price." Since its one-year low, the share price has increased by nearly 94%. "In the longer term, there is every indication that management will achieve its target of \$4 billion in revenue," says Siegel. He explains that the company still has strong international growth potential, but its prospects in the North American market are more limited.

increase in sales, despite the considerable reshuffle in its management – not to mention Chip Wilson's provocative and angry outbursts. No stranger to controversy, he has not held a position in the company since 2015 but remains the largest individual shareholder and regularly criticises Lululemon's strategy.

While developing its online retail business (accounting for almost a quarter of its sales), the company turned its sights on Australia, Europe and now Asia. It has 426 retail outlets worldwide and continues to open a dozen new stores per quarter. The Zurich shop, which opened in 2016, is one of 11 locations in Europe to date. In New York, the flagship store on Fifth Avenue is expected to double in size this year. Lululemon has also diver-

sified its income sources by offering men's products, which will soon represent a quarter of its sales. The ultimate recognition came at an exhibition in which the Museum of Modern Art in New York selected the original Boogie Pants as one of the 111 garments and accessories that have had the greatest impact over the last century.

In total, the brand's revenue for 2018 is expected to reach nearly \$3.2 billion, bringing it even closer to the goal it sets out with each of its results publications: to surpass the 4 billion mark in 2020. The Lululemon success story has a bright future ahead of it. Unless, of course, athleisure shows signs of running out of steam, or the competition steps into the breach and ultimately ends up overshadowing it. ▽

“TOKENISED SECURITIES ARE NOW POSSIBLE UNDER SWISS LAW”

The issuing of tokenised securities is becoming a tangible reality. This game-changing new rule will benefit both startups and investors. Jacques Iffland, a lawyer at Lenz & Staehelin, explains.

Distributed ledger technology, or DLT, is branching out from cryptocurrencies and ICOs. DLT is well on its way to fundamentally reshaping the infrastructure of capital markets, making them more accessible to startups and SMEs. Jacques Iffland, a lawyer who specialises in capital markets at Lenz & Staehelin, which co-founded CMTA (see inset, opposite), enlightens us about these ground-breaking changes.

How can distributed ledger technology facilitate company financing?

These days, only large companies can trade on stock markets. Startups and SMEs don't have access to them. Distributed ledger technology can simplify the infrastructure of capital markets and thus reduce the cost of issuing securities. In essence, DLT lets organisations work around certain logistical constraints, such as going through central securities depositories.

Wasn't that supposed to be the case with ICOs?

With an ICO – as it's generally defined – different types of instru-

ments can be issued with each transaction. There are no standards. And that's a problem for institutional investors. They not only have to look at the issuer and its business model, but also the exact rights associated with the instrument. The effort required to wade through that analysis is often disproportionate.

It would be a whole new situation if, instead of being tailor-made for each transaction, the rights lined up with those granted with traditional instruments traded on capital markets, such as equity and debt instruments. Institutional investors know those inside out. Issuers can reach institutional investors by using distributed ledger technology to issue traditional instruments, which is not theoretically the case with an ICO.

So, traditional instruments traded on capital markets, like shares and equities, can be issued in token form?

Yes, and the issue was debated for some time. Swiss legislation had clearly not planned to allow for tokenisation. But the legal landscape

has cleared up since then. Professor Hans Caspar von der Crone from the University of Zurich, one of the most renowned experts in Swiss corporate and commercial law, confirmed that Swiss companies can already tokenise shares under Swiss law. And that statement formed the basis used by the CMTA to design its blueprint for tokenisation. Mt Pelerin used this blueprint to be the first company to tokenise its shares in late 2018.

OBJECTIVES OF THE CMTA

The Capital Markets and Technology Association [CMTA] aims to develop initiatives to facilitate the use of distributed ledger technology on capital markets, create standards, and, in doing so, make things more comfortable for investors. This non-profit was set up in 2018 by Swissquote in partnership with Lenz & Staehelin and Temenos AG, and with the support of the École Polytechnique Fédérale de Lausanne (EPFL).

THE FUTURE OF FINTECH IN THE SPOTLIGHT AT EPFL

Founded in 2018, the CMTA will hold its first public conference on 6 June 2019 in partnership with the EPFL's Center for Digital Trust (C4DT). The event will take place at the SwissTech Convention Center in Lausanne, focusing on the outlook for DLT on capital markets.

Find out more at cmta.ch

Isn't it because they're more complex than a traditional ICO that tokenised debt and equity securities took so long to emerge?

The transactions are no more complex, at least not in Switzerland. The authorities generally call for further details on ICOs, to make sure that the tokens issued do not qualify as deposits, which would require authorisation. These issues are irrelevant to the issuance of tokenised securities because the legal framework is clear.

Of course, a public offering of securities may involve the publication of a prospectus, i.e. a document for which its authors are legally liable. The importance of the prospectus should not be under-estimated, but nor should it be overblown. There's nothing surprising about asking a company that is raising large sums of money to provide information about its business, financial position and intended use of the funds. The rampant lack of credibility on the ICO market is mainly because issuers did not release adequate information. A well-defined legal framework that clearly determines responsibilities is in fact a positive development for investors.



Several private banks are members of the CMTA. Why are these institutions interested in tokenised securities?

Investing in innovation and unlisted companies is a big draw for private banks. In today's low-rate environment, the need to find higher-yielding investments is increasingly urgent. Hunting down the next unicorn is an attractive prospect for private banking clients. But investing in an unlisted company is currently so complex that it can be incompatible with some management strategies. Tokenisation can simplify all that by facilitating trading in equity and debt securities.

No stock exchange currently lists tokenised securities. How

will the liquidity of these instruments develop?

A stock exchange, in the legal sense of the term, is not required for a secondary market to develop for tokenised securities. Swiss law now lets banks create their own trading platforms and develop an equity or debt securities market. The securities traded on these platforms are not listed but simply admitted to trading. That's a key distinction. Listing means substantially higher requirements for issuers. So these platforms offer a useful alternative to stock exchanges, including for tokenised securities. ▽



JACQUES IFFLAND
LAWYER
LENZ & STAEHELIN

DON'T FORGET EQUITIES!

While interest rates in Swiss francs are at their lowest, equity markets are still appealing to investors.

Interest rates in Swiss francs are virtually zero. This has been the situation in Switzerland for several years now. In this economic environment, it is still possible for investors to build profitable portfolios, for example by selectively investing in equities. We get some expert advice from Jürg Schwab, head of trading at Swissquote.

Why is now a good time to invest in equities?

One of the best reasons is the level of interest rates in Swiss francs, which is close to zero because of the SNB's policies. This situation is likely to continue for some time. Keeping lots of money in a savings account isn't the best option in this context, especially considering inflation. Conversely, investing in equities can lead to attractive returns. There are currently excellent medium-term investment opportunities with a moderate risk.

What criteria should be taken into account for this type of investment?

First, we recommend choosing equities with a low or average volatility. It's better to focus on solid companies that sell quality products and have

loyal customers. This could mean companies in pharma, finance, or the auto industry, for example. Furthermore, I suggest looking at the return. Many companies pay a high dividend, with a return higher than 2.5%.

What about tech companies?

It's a very interesting sector that appeals to many of our clients. But don't forget that many companies in this industry are already valued very highly, since the market has already anticipated their future growth.

Which currencies should we invest in?

For Swiss investors, equities in Swiss francs are the safest bet, as there is no exchange risk. Nonetheless it's also good to diversify your portfolio with some equities in euros and dollars, which can also increase the potential return of your portfolio.

Is there a particular way in which we should invest?

How to invest is a very personal question. But let's say it's better to have a strategy – ideally it is good to build a well-diversified portfolio. The standard approach is to first determine your

investment universe. Then, some investors do what we call stock picking: they watch for a particular stock to drop and then buy at the most opportune moment. Others go step-by-step, investing at regular intervals – every month, for example – in stocks they have chosen in advance. In this way they reduce the risk of systematically buying too high.

Whatever method you choose, it is better to continue investing during periods of economic uncertainty. This approach often proves to be profitable: investors can benefit from stock market lows to seize opportunities.

What about profit-taking?

It's important to periodically take profits. We can go step-by-step here too. When a security is performing extremely well and the company's future is still promising, selling half of the position is often a good option. ▲



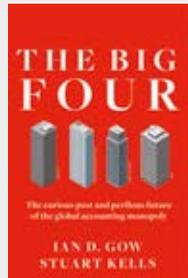
JÜRIG SCHWAB
HEAD OF TRADING
SWISSQUOTE

WE GOT HIGH!

The Swiss Derivative Awards has just named our "Cannabis" certificate as **Best Equity Product**. Investing in cannabis has been formally declared a great idea!

[swissquote.com/cannabis](https://www.swissquote.com/cannabis)

TO READ, TO DOWNLOAD

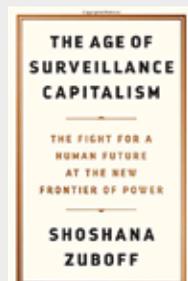


CHF 40.-

THE BIG FOUR THE CURIOUS PAST AND PERILOUS FUTURE OF THE GLOBAL ACCOUNTING MONOPOLY

By Ian D. Gow and Stuart Kells
(La Trobe University Press, 2018)

With more employees than the Russian army has soldiers, the “Big Four” (Deloitte, PricewaterhouseCoopers, Ernst & Young and KPMG) are bastions of the global economic system. This book by Ian D. Gow, professor at the University of Melbourne, and Stuart Kells, author of a landmark study on publishing house Penguin Books, brilliantly tells the fascinating story of the Big Four’s rise to status amidst fierce struggles, triumphs and defeats. It is a must-read for those interested in the past and future of the financial auditing sector.



CHF 20.-

THE AGE OF SURVEILLANCE CAPITALISM THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER

By Shoshana Zuboff
(PublicAffairs, 2019)

According to American researcher Shoshana Zuboff, inventor of the “surveillance capitalism” concept, the centralisation and constant collection of personal data has made the prediction – and the control – of human behaviour a profitable activity. In this detailed and well-argued book, she describes how the emergence of this “Big Other” is a threat to democracy and freedom.



App Store
Google Play
Free

FOCUS KLAR FIREFOX THE DEFENDER

Developed by Mozilla, this app is simply a version of Firefox designed to respect personal data and equipped with an arsenal of tools to fight against tracking. Advertising trackers, statistical cookies and other social network spy buttons are automatically blocked, and users can erase all of their history with a single tap of the finger. As a bonus, free from these many invasive connections, browsing is often faster!



Google Play
Free

REMOTE FINGERPRINT UNLOCK AN ALTERNATIVE TO PASSWORDS

Entering a password to unlock your PC screen can be tedious, especially when you have to do it several times a day. So, why not do it by simply opening the camera of your Android smartphone with a gentle touch of the finger? This is what Remote Fingerprint Unlock offers. It is a free and very easy-to-use app. Warning: it only works with Windows.



App Store
Google Play
Free

RADIO GARDEN 1,001 RADIO STATIONS IN THE PALM OF YOUR HAND

Making the radio available on the internet is nothing new and had already introduced billions to a certain Mark Cuban in 1999, just before the burst of the internet bubble. Twenty years later, Radio Garden is offering something a little different: access to thousands of stations around the world, simply by choosing broadcast points around the world. This refreshing and fun app will help you to clear your mind and discover new horizons.



Google Play
CHF 1.-

BOUNCER LESS INTRUSIVE APPS

Setting permissions for smartphones is rather black and white, and lacks nuance – for example, sharing a single photo with an app without giving it permanent access to your entire library. Bouncer addresses this, granting temporary or one-time access for occasional uses. Any authorisation granted is revoked once the task is complete.



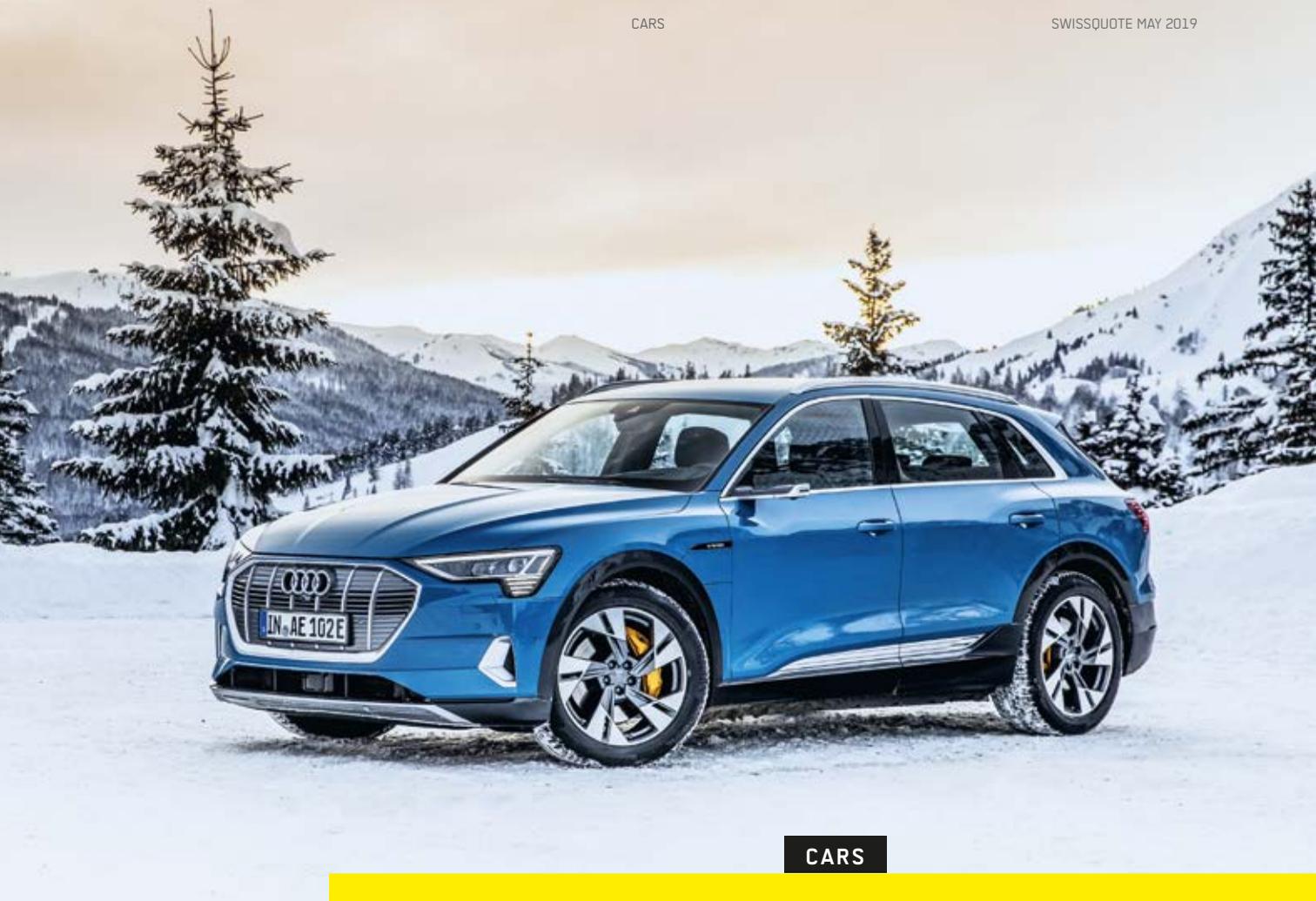
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LEADING
HOTELS®



CARS

E-tron, the Audi all about watts

BY RAPHAËL LEUBA

The Ingolstadt manufacturer's first electric vehicle boasts effortless style, which makes its features all the more spectacular. Our tester was head over heels.

Electric vehicles aren't all over the roads yet, but they have outgrown their reputation of glorified bumper cars at a carnival. Instead, electric vehicles are adventurous, supercharged influencers such as the e-tron 55 quattro. Available at the AMAG dealership in Bienne for a test run, the Audi electric crossover was the star of the showroom. It looks like a mix of the Q5 and the Q8, proof that Audi is impervious to the stylistic exuberance of BMW (i3) and Tesla (X). The long 4.9 m silhouette rests on a spe-

cific platform, with a flat central lithium-ion battery and two electric engines on the axles. The only clear give-aways that this is not a combustion engine are the grille, slightly tilted open to increase aerodynamics (Cx 0.27), and the connection flap moulded into the front left flank.

As for the interior, Audi aficionados will feel right at home. Like the Q8, the digital "Virtual Cockpit" is accompanied by two OLED touchscreens in the centre console.

These include most, if not all, navigation commands, including temperature and driving modes. Your smartphone has a dedicated location and can be induction-charged. All that's left to do is set the ionising temperature, trust the backup cameras and slide your thumb across the gear selector to D...

In Latin, "audi" means "listen!" We did, and the car runs almost silently – the only sound was a soft hissing noise during acceleration and braking. The double-glazed windows, air suspension and quality assembly all work together to create a profoundly quiet environment. The e-tron continues to pleasantly surprise the senses with haptic feedback screens, automatic steering – if you happen to let go of the steering wheel – and a smoothness found only in electric motors.

But most importantly, the e-tron handles with surprising ease, feeling almost weightless. The lowest possible centre of gravity makes this four-wheel drive vehicle very easy to manoeuvre despite its weight of 2,490 kilos empty, as it is perfectly balanced on the two axles. With 300 kW (408 hp) under the hood, passing other cars is easy. The supercharged torque (664 Nm), available instantly, can smooth out every bump in the road and easily ascend even the steepest gradients with no effort. It is also possible to tow 1,800 kilos. And when going downhill, the motors switch to generators, recouping up to 70% of the electric input, which Audi claims is a record. Managing the intensity of the energy recovery with the paddle shifters on the steering wheel becomes second nature as you continue to drive. Light pressure on the brake pedal also activates the "brake motor" which encourages proactive driving.

The disc brakes only kick in during hard braking, slowing the kinetic energy with heat. The 417 km

advertised range therefore includes regular energy recovery.

Some test runs in ruts and spring snow put the all-wheel-drive to the test

Priced at 12,200 Swiss francs higher than the Audi, the imposing Tesla X, with a 100 kWh battery, offers more than 100 kilometres of range, which is quite significant. That said, with 95 kWh, the e-tron already allows for a few solid

sets of sporty driving and several minutes of heated seats before the battery runs dry in the middle of a remote valley. And while the actual range starts to run short after more than 300 km (consumption of 23.7 kWh/100 km in WLTP cycle increases to about 28 kWh/100 km on hilly terrain), the Audi has yet another card to play: its ability to take shortcuts thanks to off-road mode that raises the body off the ground by a few centimetres. Some test runs in ruts and spring snow put the all-wheel-drive to the test: while there is no mechanical link between the axles, the e-tron can escape a tricky situation thanks to its precise electronic connections. It is proof that today's electric vehicles can make sparks fly on any terrain, in any form. ▲



ENGINE:

INDUCTION, 95 KWH BATTERY

HORSEPOWER:

300 KW (408 HP) IN BOOST MODE

ACCELERATION:

0 TO 100 KM/H – 5.7 SEC.

PRICE:

STARTING AT CHF 89,900

THE ALTERNATIVE



JAGUAR I-PACE, THE 2019 CAR OF THE YEAR

For its first foray into electric vehicles, Jaguar designed a refined hatchback touring car with quality safety features (AWD) and performance. Its two engines generate 294 kW (400 hp) and 696 Nm. This is more than enough to rocket the 2.2 tonne I-PACE from 0 to 100 km/h in 4.8 seconds. With a WLTP consumption of 22 kWh/100 km (2.4 L petrol equivalent), its range exceeds 400 km.

Price: starting at CHF 82,800

TRAVEL

A walk on the surreal side in Dalí's favourite region

While the surrounding coastline has been largely taken over by mass tourism, the fishing village of Cadaqués, a very special destination for the painter Salvador Dalí, has retained its pictorial charm. Follow in the footsteps of the master.

BY SALOMÉ KINER

“This land is my inspiration. I am one with the sky, the sea, and the rocks, forever bound to Portlligat where all my raw truths and my roots took shape. I am at home only in this place. Everywhere else is just a place to rest.” Dalí says it all. It was the small fishing village of Portlligat, a stone's throw from Cadaqués, that fed the creativity of this iconic surrealist.

But it is not an easy village to reach. From the plain of Figueres, 140 km north of Barcelona, there is only one road to the village of Cadaqués, with just 2,600 inhabitants. It is a place where you can easily imagine Don Quixote chasing after his imaginary foes. The arid, winding road to the village is lined with caper bushes and olive trees. At certain points, you can catch a glimpse of a bright blue eye staring up at you from below: the Mediterranean Sea and its waves breaking on the jagged rocks. But it is only by starting at the bottom of this series of hairpin bends that you will see the whitewashed houses stand out against the red mountain.

Before the road was built in 1930, Cadaqués was completely cut off from the rest of the world, making it inaccessible. For a long time, its unique location made it a haven for pirates and privateers who would seek shelter there after coming under attack from ships. In 1543, hungry for revenge, the fearsome Turkish pirate Barbarossa (a.k.a. Redbeard) set fire to Santa Maria church. It was rebuilt by fishermen to once again reign over the village, and its altarpiece is still one of the most beautiful in Catalonia today. ▶



It can be reached by strolling through the steep, narrow streets of Cadaqués, along which your nose will succumb to the sweet smell of bougainvillea, your wallet will fall victim to local craft shops and your eyes will be mesmerised by the whitewashed houses and their blue shutters.

The painter of melting watches avidly protected his little corner of heaven

While the Costa Brava has surrendered to the siren song of major urban tourism projects, Cadaqués has remained miraculously untouched. Its architecture, born of Gothic inspiration and maritime practicality, is a scene that Dalí spent his whole life painting. Nestled together, the little houses with their ochre roofs, shaded terraces and pointed chimney pots, tumble down the hill to the waterfront. This popular esplanade, lined with bars, restaurants and terraces, comes alive after the traditional siesta and remains astir until late into the night.

As is the case with all places synonymous with good living, Cadaqués holds many culinary delights. Visitors can start the day at the Mallorquina bakery with Taps Dolços fresh out of the oven. These spongy cakes, soaked in syrup and sprinkled with icing sugar, melt in your mouth like a fluffy cloud. At lunchtime, why not eat at Es Baluard overlooking the bay with a view of the port and sailing boats. This family-owned restaurant, which opened in 1967, offers the catch of the day served up on small tasting dishes. It also has a particular talent for anchovies.

In the evening, enjoy an aperitif at the Blau Bar, where the tables are arranged in a circle around a hundred-year-old tree. For dinner, foodies will find what they are looking for in the historic centre. Compartir, the latest creation of three former



GETTING THERE

Return flights to Barcelona from Zurich start at 200 Swiss francs per person, and 80 Swiss francs from Geneva. From Barcelona, take the train to Figueras (1 hour 58 minutes), then bus 12 to Cadaqués (1 hour). Alternatively, rent a car in Barcelona.



PLACES TO STAY

L'Horta d'en Rahola This family hotel has seven immaculate rooms, a swimming pool and a garden, perfect for a typical Mediterranean experience.

Starting at 150 Swiss francs per night for two people.
hortacadaques.com

Salvador Dalí's house in Portlligat, today a museum.

JEAN-PIERRE DALBÈRA

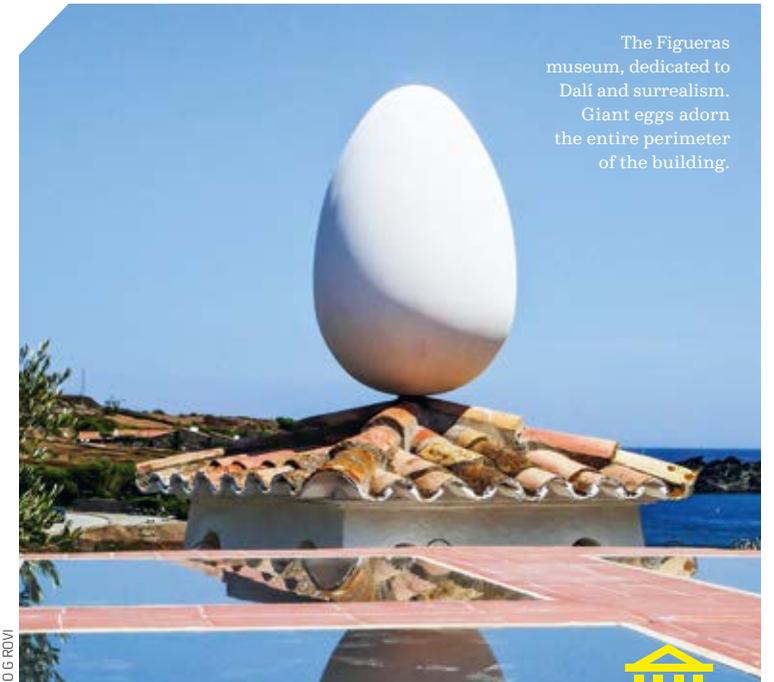


elBulli chefs, revisits the convivial concept of tapas and welcomes its customers in a tree-filled courtyard. When the sun is out, take a walk to the Chiringuito de la Mei luxury beach bar and enjoy your dinner with your feet in the water while watching the truly magnificent sunset. In Cadaqués, city of light, colours are reinvented every night and offer up a spectacular natural show.

The island atmosphere of Cadaqués owes a lot to its environment. The Cap de Creus Natural Park is the largest protected area in Catalonia. This rocky area is the easternmost point of the Iberian Peninsula. Its sharp hilly terrain is shaped by the tramontana wind which constantly creates the extraordinary forms that Dalí treasured. Like all geographic extremities, you feel like you've arrived at the end of the world. Leave your vehicle at the foot of the lighthouse and continue along the GR92 coastal path by foot. Take what you need and head down the path, between the brambles and prickly pears, which leads to a remarkably beautiful cove. Gaze upon the snow-topped peaks of Mount Canigou standing out against the sea on the horizon, let yourself be lulled by the cicadas singing in the scrub, and soak up the shimmering rays of sunlight bouncing off the crystal-clear waters.

From "The Great Masturbator" (1929) and "The Spectre of Sex Appeal" (1934) to "Othello Dreaming Venice" (1982), so many of Dalí's paintings were directly inspired by the rocks at Cap de Creus. The painter of melting watches avidly protected his little corner of heaven. It is thanks to his undying love for this small Catalan town that it has been preserved from tumultuous real-estate programmes. Since Dalí's death in 1989, almost nothing has changed. It is as if he had used the last strokes of his brush to draw an aura of immutable protection around this small marina. ◀

The Figueras museum, dedicated to Dalí and surrealism. Giant eggs adorn the entire perimeter of the building.



ALBERTO G. ROVI

THREE UNMISSABLE MUSEUMS



1. THE PORTLLIGAT MUSEUM-HOUSE

In 1930, Dalí bought his first fisherman's hut in the cove of Portlligat next to Cadaqués. This estate would expand over time with other small houses, an olive grove and a sculpture garden. André Breton, Marcel Duchamp, René Magritte and Luis Buñuel came to stay in this disorientating, labyrinthine building, a true reflection of the artist and the streets of the village.

Among its unusual features are a stuffed bear guarding the entrance, a hatched egg overlooking the terrace and a giant Christ made of litter collected from the beach. There is also a projection room which offers a fascinating documentary on the site's history. A word of warning: the museum is very popular, so visits are to be reserved in advance.

2. THE GALA DALÍ CASTLE MUSEUM-HOUSE

Dalí was madly in love with

his wife, Gala, and promised her a palace. He fulfilled this promise in 1969 when he bought the castle of Púbol. The medieval house was run down and its garden a wasteland, but the couple was seduced by the romantic ruin. Dalí led the residence's restoration and decorated it with frescoes and personal sculptures. Respectful of his wife's rest, he only visited upon Gala's handwritten invitation. When she died in 1982, her remains were transported by Cadillac to the castle, where she is interred. The museum-house opened to the public in 1996.

3. THE FIGUERES THEATRE

From drawings, sculptures, and paintings, to jewellery and personal belongings, more than 1,500 Dalí pieces can be seen in this museum, built by the artist himself on the site of the former municipal theatre.

Access and opening hours
salvador-dali.org/en/museums/

View on the creek of the Cap de Creus Natural Park.



ALBERTO G. ROVI

BOUTIQUE



TRAINERS OF THE FUTURE

Thirty years after the release of Back to the Future Part II, the American equipment manufacturer Nike launches the trainer version of its famous self-lacing shoes, the Adapt BB. Cables can be used to adjust the tightness around the feet, through buttons located on the soles. And, even better, the system can be controlled via a smartphone application.

nike.com
\$350



TIME FOR EROTICISM

Unafraid to defy convention, Ulysse Nardin has created a series of watches in collaboration with Milo Manara, the famous Italian author of erotic comic books. Presented in polished stainless steel and rose gold, the 10 limited edition Classico models feature the underwater romantic adventures of a mermaid and an Earthwoman on the dial. Each reproduction of the original paintings is numbered and signed.

ulysses-nardin.com
CHF 26,900.-



BREATHTAKING SOUND

With its soft glow, the LSPX-S2 at first appears to be a kind of futuristic candle. However, and quite importantly, it can fill a room with sound. With a battery life of eight hours, the new Sony glass speakers project music at 360 degrees. Compatible with both Bluetooth and Wi-Fi, the system can also connect to Spotify with the mere press of a dedicated button.

sony.com
CHF 699.-



A CLEAN, FULLY-CHARGED SMARTPHONE

Don't be fooled by its design – far from holding flowers, this Lexon vase acts as a wireless charging station for smartphones. Designed by the duo of Italian designers Manuela Simonelli and Andrea Quaglio, the 17.5-centimetre high container has another secret advantage: integrated LED UV technology that cleans smartphones of bacteria!

lexon-design.com
CHF 89.95

IN GOOD SHEETS

To ensure you can sleep with peace of mind, Pfister has created a collection of sustainable bed linen, signed by the Swiss designer Alfredo Häberli. The Seebach line is entirely biodegradable, from the organic cotton fabric to the pigments, including the threads, the label and even the buttons of vegetable ivory, which can be reintroduced into the natural cycle without leaving any waste materials.

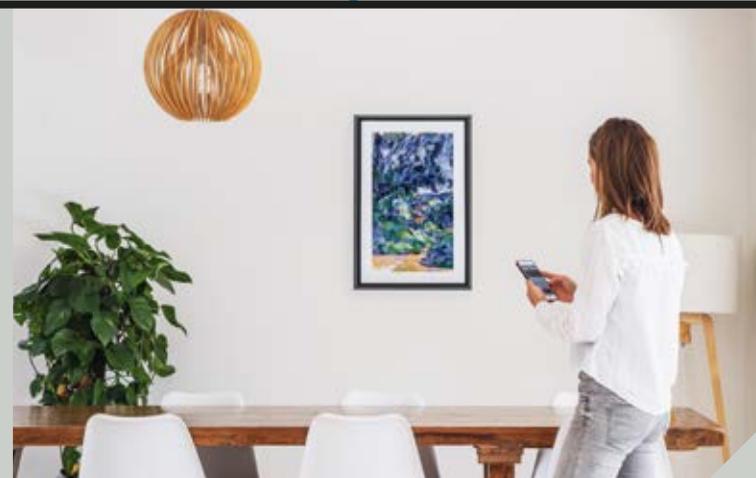
pfister.ch
From CHF 24.95 (pillowcase)



ART À LA CARTE

Meural, a start-up based in New York, is reinventing the art of interior design with the digital Canvas system. To change the painting on display, you won't need a hammer and nails – just swipe the image. With Wi-Fi connectivity, the frame contains an 8 GB hard drive on which you can save a playlist of works pre-selected from the label's application or website.

meural.com
From CHF 649.-



THE GREEN RECORD PLAYER

In keeping with the philosophy of the American label House of Marley, the Stir It Up record player is produced using eco-friendly materials. Its base is composed of a natural bamboo upper panel and a fabric-covered MDF support made from hemp, organic cotton and recycled plastic bottles. Its platter mat is composed of recycled silicone, and the turntable is made from recycled aluminium.

thehouseofmarley.com
CHF 269.90



BOUTIQUE

GEEK

FIDO UNDER SURVEILLANCE

Invoxia's GPS Pet Tracker is a small tag that fits on a dog's or cat's collar. It can be used to find pets at all times via an app. Owners can receive a notification when their furry friend goes beyond a predetermined area. As a bonus, the app can detect time spent running or walking, and it even monitors sleep quality.

invoxia.com
CHF 149.-



SECURE CRYPTOCURRENCIES

French company Ledger is launching the Ledger Nano X, successor to the famous Ledger Nano S, of which more than one million copies have been sold around the world. Ledger's offline cryptocurrency storage solution, renowned for its reliability, has made the company a leading player on the market. The Nano X inherits the design of its predecessor but stands out with its more intuitive, easy-to-use interface. Another notable new feature: users can manage their cryptocurrencies via their smartphone using Bluetooth. Ledger has announced it will be available from April.

ledger.com
CHF 140.-



POWER GAMING

Want to play high-resolution games on your PC? Corsair has a high-end turnkey solution for you. It is compact - less bulky than a traditional mini tower. The design, quality and performance are all top notch. The One i160 model is equipped with the Nvidia GeForce RTX 2080 Ti graphics card, the most powerful on the market. The cooling fans are very discreet, even while playing, which is rare for this type of machine. This abundance of power comes at a price: more than 4,000 Swiss francs, monitor not included.

corsair.com
CHF 4,299.-



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TRIED AND TESTED

PAY UP TO BREAK EVERYTHING

BY MARTIN LONGET

Swissquote Magazine tested Switzerland's only Rage Room: a room where visitors can go crazy destroying everything around them with bats and hammers. We give you a look inside.

Shards of glass fly in all directions as I methodically swing my baseball bat. "Go on, give it all you've got!" my friends encouraged, unrecognisable in their blue jumpsuits, faces hidden under protective masks and ski goggles. Bottles, glasses, plates and other dishes, completely destroyed, fall into a thousand pieces, joining the giant pile of debris left by previous visitors.

This scene of pure demolition is the Rage Room, a room furnished specifically for breaking things at the EVADE Escape Game's Lausanne location. The concept? A place for people to destroy all sorts of objects, including bottles, furniture and electrical appliances in a half-padded room whose battered walls bear witness to the violent destruction that occurred within.

For the destruction itself, a variety of tools are available: a baseball bat, of course, but also a large mallet, hammers and a few big iron bars. We opted for the "Super Rage" package priced at

50 Swiss francs, so we received a small box containing mostly dishes and bottles, as well as an electronic device. We could also pick from the immense pile of leftover debris, which included computer monitors and pieces of furniture. Everything would eventually be sorted and recycled, the company assured.

My pent-up rage dissipated quite nicely, and I particularly liked the heavy mallet

I must say that destroying things was quite satisfying, especially after spending an hour stuck in traffic on the way there. My pent-up rage dissipated quite nicely, and I particularly liked the heavy mallet, because it left no items intact and using it required a large

amount of negative energy. Some objects were almost impossible to smash, like the dead printer. Even after hitting it multiple times with the mallet, it was still too solid. Sadly the branding was destroyed, so there's no way of congratulating whichever manufacturer created such a hardy machine... If you decide to try it out, I suggest the baseball bat, which is light and easy to handle, perfect for bashing bottles and shattering dishes.

After a few minutes of intense smashing, there was no more material left for us to destroy. We paid an extra 30 Swiss francs for a second box that was decimated just as quickly.

We left the session exhausted and dripping with sweat, but frankly speaking the quantity and variety of materials to smash was a bit lacking... Pro tip: bring your own box of things to destroy. It will cost 10 francs more, but you won't run out of material, and you'll gain the satisfaction of destroying your own items... or maybe your ex's. ▽

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 **Swissquote**

TO BREAK THE RULES,
YOU MUST FIRST MASTER
THEM.

CELESTINE

by AUDEMARS PIGUET



AUDEMARS PIGUET

Le Brassus

AUDEMARS PIGUET BOUTIQUES
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