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OneWeb files for bankruptcy
OneWeb, a high-profile startup that raised billions to build a global network of satellites for internet access, has filed for bankruptcy protection. The London-based company, which counts SoftBank as a key backer, cited the coronavirus pandemic as a central factor of its inability to close a much-needed financing round.

Big Asian Firms Are Selling Some of Their Venture Capital Investments
Big Asian corporations that invested in startups are looking to sell their stakes in the secondary market as they retreat from the market to hoard cash in the current slowdown. The Financial Times said one company was offering to sell its shares of Gojek, the food delivery and ride hailing app that is Indonesia's most valuable startup. Another firm had offered shares of Didi Chuxing, China's giant ride hailing app. The report didn't identify which companies had sold their stakes.

Ride hailing, a cash burning business even before the global slowdown caused by the Covid-19 pandemic, has been especially hard hit in recent weeks. While China's economy is showing some signs of recovery, it's unclear what the short-term outlook will be. Firms may also be trying to cash out in the secondary market because the chances of an initial public offering anytime soon are fast approaching zero.

Snap Is Well Positioned to Weather Downturn, Spiegel Says
Snap CEO Evan Spiegel recently assured employees that the company is well-positioned to weather the impact on its business from the coronavirus pandemic, which has caused a significant pullback in ad spending globally, according to people who heard the remarks. At a virtual all-hands meeting for employees last Friday, Spiegel said Snap had a more diverse advertiser base than its rival Twitter, which had warned investors earlier in the week that revenue would fall. He also reminded employees that Snap had $2.1 billion in cash and investments at the end of December, thanks in part to a $1.26 billion debt offering last year.

When asked by one employee whether Snap would give cash stipends to employees, as Facebook did recently, Spiegel said Snap would prioritize the "people who need it." With all Snap employees working from home, he said the company redirected its food budget to fund meals for local schools in Los Angeles, where Snap is headquartered. All of Snap's contractor workers will continue to be paid while they're not able to work due to the crisis, he said.

Snap stock has fallen 31% since mid-February, more than the overall market, reflecting concerns about how ad-dependent firms will be affected. On Monday, Snap shares were down 2.7% even as the overall market rallied.

Software Maker KeepTruckin Lays Off 18% of Staff
KeepTruckin, a well-funded maker of freight software, laid off 349 employees, 18% of its staff, according to an email viewed by The Information. KeepTruckin, which has raised more than $200 million from the likes of GV, IVP and Scale Venture Partners, sells compliance software and truck dashcams that helps freight carriers monitor their fleets. CEO Shoaib Makani wrote in the email that the company is likely to lose customers and see reduced revenue as fewer trucks hit the road.

He wrote that all employees making more than $50,000 aa year would need to take 10% pay cuts and the company's wouldn't pay out bonuses this year. "We considered all options, but unfortunately this was the only way we could ensure ensure viability of KeepTruckin during these uncertain times," he wrote.

Makani didn't immediately respond to a request for comment. The freight-industry news site Freightwaves first reported the layoffs.

Apple Buys Dark Sky Weather App
Apple has acquired Dark Sky, maker of a popular mobile weather app, and is shutting down the Android version of the software. Dark Sky, which is currently the most popular weather app for iOS in Apple's App Store, revealed the news in a blog post on Tuesday. While the deal was likely a small one—Dark Sky didn't announce the financial terms—Apple's willingness to acquire it suggests the growing regulatory scrutiny of big tech companies hasn't completely deterred acquisitions by them.

However, the decision to eliminate the Android version of Dark Sky, along with a planned shutdown of an application programming interface that allowed other software to access Dark Sky weather data, could be of interest to regulators. Both moves seem to be eliminating consumer choices. There are plenty of weather apps, including one from Apple that is built into iOS, but Dark Sky attracted a following with an elegant interface and weather updates tailored to users' locations. The company takes the old-fashioned approach of charging $3.99 for the app without badgering users with come-ons to make in-app purchases.

Disney To Furlough Employees
Disney is taking more cost cutting measures. A few days after it announced its executives were taking a temporary paycut, it announced it was going to be furloughing some employees. The announcement didn't specify which sections of the company would be affected or how many beyond saying it would be for "employees whose jobs aren't necessary at this time."

Reading between the lines here though this is obviously going to affect hourly employees who work at its shuttered theme parks. But it will be instructive to see which other sections of the company it hits. Production is stopped across its movies and TV shows as is publicity. Then there's the advertising division, which has seen major headwinds, especially at ESPN while all sporting events are put on hold. Disney is promising to pay benefits while employees are furloughed and says they will remain employees throughout this period. As significant as this decision may be, it could only be the beginning of the belt tightening Disney will undergo as this crisis continues.

Venture Capital-Backed Startups to Be Eligible for Stimulus Loans
Amid widespread confusion over whether venture capital-backed startups will be eligible for loans administered by the Small Business Administration as part of the coronavirus stimulus package, House Minority Leader Kevin McCarthy offered some clarification Thursday. He told Axios that he spoke to Treasury Secretary Steven Mnuchin about the startup issue and said that "this is going to be solved," with new guidance being released within a day or two. He said if a small business isn't controlled by a single outside shareholder, it would be eligible for the program, which still leaves out private equity-owned businesses, Axios points out.

If McCarthy is correct, it shows that venture-backed companies have many supporters in Washington and scores of letters and phone calls to the Treasury Department and the SBA from various groups and lawmakers had the intended effect. Part of the $2 trillion stimulus plan passed last week is the Paycheck Protection Program, which provides forgivable loans of up to $10 million for companies with fewer than 500 employees. But SBA's current "affiliation rules" would make it so business with venture capitalists among their shareholders would be counted out.

Carmakers Show Big Sales Decline; Tesla Surprises
The automotive sector disclosed March sales figures reflecting the impact of coronavirus quarantines and, as expected, they're awful.

The most valuable automaker Toyota said sales decreased 35% in March from the same month last year, though hybrids were up 9%, according to CNET. Hyundai, Acura, Buick, Honda, Mitsubishi, Subaru were among the hardest hit brands, with March vehicle sales falling between 34% to 52%. For those watching the electric car field, Porsche said it was able to sell 221 Taycans, its first-ever electric vehicle whose retail price starts at $103,000.

The top electric carmaker, Tesla, whose CEO Elon Musk downplayed the global reaction to the Covid-19 virus, surprised analysts by delivering 88,400 vehicles in the first quarter of the year, up from 63,000 a year earlier. That doesn't mean March in particular was a good month: the company, like most other automakers, eventually shut down car production in its main facility in the San Francisco Bay Area. And Tesla delivered over 14,000 fewer cars to customers than it produced in the quarter, meaning the automaker increased its inventory of vehicles it is holding onto, according to Bloomberg.

The quarterly disclosure by Tesla sent its stock up 16% after hours. The share price of Tesla, which is the No. 2 automaker by market capitalization, has dropped by about half after peaking in mid-February, similar to the drop experienced by other carmakers.

Phantom AI raises $22 million to develop ADAS products
Phantom AI announced its Series A funding, led by Celeres Investments and joined by Ford Motor Company and KT. Existing investors Millennium Technology Value Partners and DSC Investment also participate in the round. This funding will help the company democratize the use of advanced driver-assistance systems (ADAS) to reduce accidents, save lives and make driving more enjoyable, while delivering tomorrow's self-driving technology.
*(*Doosan & Chambiz visited Phantom AI on September 20, 2017 & February 6, 2018.)*

T-Mobile and Sprint Close $26 billion Merger, Much to SoftBank's Relief
T-Mobile and Sprint officially completed their $26 billion merger, bringing an end to a two-year regulatory fight over the combination of the third and fourth largest wireless carriers in the U.S.

The closing is a huge relief to SoftBank which was the controlling shareholder in Sprint, the fourth-place competitor. The merger means SoftBank will shift Sprint's $30 billion pile of debt off its balance sheet. The deal had run into significant opposition from state antitrust regulators who tried and failed to block it in federal court. The companies argued that the combination would create a stronger firm that could compete head to head with AT&T and Verizon while aggressively developing 5G technology.

Biotech startup CellFE raises $4.8M seed funding to develop microfluidics based device that delivers gene-editing molecules to human cells. CellFE, a San Francisco Bay Area-based biotech startup developing intracellular delivery platform to enable engineering of life-saving therapies, has closed $4.8 million Series Seed round of financing to fuel the progress already underway towards developing CellFE's innovative solution to enable the engineering of the next generation cell therapies. The round was co-led by Dynamk Capital and Cota Capital co-led, with participation from Embark Ventures, Elm Ventures and McEwan Lane Family Trust. In conjunction with the funding, CellFE also announced that Dr. Gustavo Mahler, Venture Partner, Dynamk Capital and Cota Capital's Founder and Managing Partner Bobby Yazdani will be joining its board of directors. The additional investors joining this round reflects the continued interest in the rapidly growing cell therapy sector.

Founded in 2018, CellFE is an early-stage startup company focused on the application of microfluidics in the process of delivering gene-editing molecules into human cells. CellFE's executive team is composed of members who bring strong expertise in the theoretical and practical aspects of the technology, as well as experience in leadership and business operations. CellFE's research and development efforts are led by world-class scientists who share a passion for engineering life-saving therapies.

EdTech startup Preply raises $10M in funding to grow its online language learning platform
As life goes virtual for people all over the world, teachers and students globally have flocked to online language learning. Enter Preply, an edtech startup building a global human-to-human online tutoring marketplace with locations in Kyiv and Berlin. The company witnessed a record number of daily hours booked on the platform this week. The number of tutors registering on Preply has rocketed in regions such as the U.S., U.K., Germany, France, Italy and Spain. Over the past seven days, some countries have seen the number of tutor registrations triple, compared to the same period in February, and the number of hours students are booking on the platform has doubled in many parts of the globe. Today (March 30, 2020), the Kyiv, Ukraine-based Preply announced it has raised additional $10 million of funding to grow its network of 10,000 verified tutors teaching 50 languages to tens of thousands of students in 190 countries worldwide. The round, which doubles the total raised in the previous rounds, was led by London-based Hoxton Ventures, with participation from European investors Point Nine Capital, All Iron Ventures, The Family, EduCapital, and Diligent Capital. A number of individual angel investors also participated.

Founded in 2013 by the Ukrainian-based team of Kirill Bigai (CEO), Serge Lukyanov (Head of Design) and Dmytro Voloshyn (CTO), Preply now employs 125 staff of 25 nationalities in Kyiv and Barcelona with revenues having grown tenfold in the last three years. Preply's pioneering innovation was to use machine-learning to increase the efficiency of pairing tutors with learners, wherever they are in the world, making smarter connections and cracking the code of effective language learning.

VR workplace training startup Strivr lands $30 million Series B

Virtual reality has been two years away from mainstream adoption for the past six years. In that time, huge companies have made big VR bets only to walk away, countless VR startups have faded or flared out and investment has slowed significantly. Building an attractive VR product for large enterprises to train employees remotely has remained one of the few major areas of opportunity, one that has been largely dominated by Strivr, which just locked down new funding bringing their total funding to $51 million.

The VR training startup has closed a $30 million Series B round led by Georgian Partners, a Canadian firm that hasn't been very active in the AR/VR space. CEO Derek Belch says the company ended up pitching a few dozen firms in this raise, and that while the feedback was "overwhelmingly positive," there were certainly some skeptics.

Palo Alto Networks to acquire CloudGenix for $420M

Palo Alto Networks announced today (March 31, 2020) that it has an agreement in place to acquire CloudGenix for $420 million. CloudGenix delivers a software-defined wide area network (SD-WAN) that helps customers stay secure by setting policies to enforce compliance with company security protocols across distributed locations. This is especially useful for companies with a lot of branch offices or a generally distributed workforce, something just about everyone is dealing with at the moment as we find millions suddenly working from home.

Nikesh Arora, chairman and CEO at Palo Alto Networks, says that this acquisition should contribute to Palo Alto's "secure access service edge," or SASE solutions, as it is known in industry parlance.

Mobility services infrastructure company Via closes Series E round; valued at $2.25B

Via, a company that provides digital infrastructure to power public mobility in cities around the world (earlier post), has raised a Series E financing led by EXOR. The financing values the company at $2.25 billion and will enable Via to advance its vision of efficient, accessible, and equitable public mobility. Leading Via's Series E financing, EXOR will invest $200 million in the company, and Noam Ohana—head of EXOR Seeds, the early stage investment arm of EXOR—will join Via's Board of Directors. New investors Shell, Macquarie Capital, and Mori Building also participated in the round, as did existing investors Pitango, 83North, Hearst Ventures, Ervington Investments, Planven Ventures, Broadscale Group, and RiverPark Ventures.

Via's technology powers the next generation of public transportation, helping cities move beyond a system of rigid routes and schedules to a fully dynamic network. Via's algorithm efficiently combines, in real time, multiple passengers or packages headed in the same direction, significantly reducing urban congestion and emissions while providing a high quality and lower cost mobility service.

Axonius raises $58M for cybersecurity

New York-based Axonius, a 3-year-old cybersecurity asset management startup, announced it has closed on $58 million in Series C funding. Lightspeed Venture Partners led the round, which brings the company's total funding to $95 million.

Orion Labs secures $29M

Orion Labs, which provides communication tools for deskless and frontline workers, has raised $29 million in a Series B round led by Dell Technologies Capital. The San Francisco-based company also named a new CEO, Gregory Taylor, who has previously held executive roles at several growth-stage tech companies.

Allset fills up with $8.25M for meal preordering
Los Angeles-based Allset, a food preordering service for people looking for a quick bite, announced it has raised $8.25 million in a Series B funding round led by EBRD. Amid the coronavirus epidemic, the company has seen rapid shifts in neighborhood demand patterns, as well as surging interest in contactless pickup options.

Dining and takeout food tech startup Allset raises $8.25M in Series B funding even as coronavirus ravages the restaurant industry
With many businesses grappling with coronavirus pandemic, the impact of the deadly virus is more felt in the restaurant industry, with millions of restaurant workers laid off across the United States. However, in the midst of pandemic, one foodtech startup is still thriving. Allset is a platform that allows diners to pre-order and pre-pay meals to save them time normally spent waiting around.

Co-founded by Ukraine-born Stas Matviyenko, the San Francisco, California-startup announced that it has raised $8.25 million in EBRD-led the Series B round, with participation from existing investors Andreessen Horowitz and Greycroft, amongst others. The new round brings the Allset's total funding to $16.6 million.

Olive raises $51M for health care AI
Olive, a startup working on automating administrative processes so hospital employees can focus more on patient care, has just raised $51 million in a new funding round led by General Catalyst. The Columbus, Ohio-based company has been developing an AI workforce of interconnected bots that work to automate health care's most redundant, data-heavy tasks.

Insight Partners closes $9.5B software growth fund
Growth investor Insight Partners announced the final close of a $9.5 billion flagship fund, its largest to date. The fund, Insight Partners XI, will invest globally, focusing on investments of $10 million to $300 million in high-potential growth-stage software companies.

SteadyMD secures $6M for telehealth
St. Louis-based telehealth startup SteadyMD has raised $6 million in a Series A round led by Pelion Venture Partners. The company matches patients with doctors who practice primary care, pediatrics and functional medicine. Patients can talk to their doctors over the phone, video or text.

Seattle machine learning startup OctoML raises $15M from Amplify and Madrona
OctoML is charging ahead with its machine learning deployment software and on Friday announced a $15 million investment round to help support growth. The Seattle startup spun out of the University of Washington this past July, when it raised a $3.9 million seed round. Founded by a group of computer science experts, the company aims to help companies deploy machine learning models on various hardware configurations.

OctoML is led by the creators of Apache TVM, an open source "deep learning compiler stack" that started as a research project at the UW's Paul G. Allen School of Computer Science & Engineering a few years ago. It has attracted a thriving community of users including tech giants such as Amazon and Facebook that want to optimize and automate their deep learning models for IoT/edge or cloud deployment on an increasing number of platforms such as phones, cars, health devices, and other use cases.

Amid Downturn, Silicon Valley's Balance of Power Shifts From Startups to VCs

By Kate Clark

For years, entrepreneurs have called the shots in Silicon Valley's startup ecosystem as an abundance of capital chased a limited supply of good ideas.

But in a matter of weeks, as businesses everywhere lurch to a halt due to the coronavirus pandemic, the pendulum has swung decidedly back toward venture capitalists. These investors say cash-hungry startups are now coming to them for investments on more favorable terms, offering more equity for less money than in the past.

"If you need to raise money, you're kind of screwed," said Mitchell Green, a founding partner of Lead Edge Capital, a growth equity firm with investments in Uber and Spotify. "Over the last decade, companies have had the upper hand because there's so much money. Now, if you are forced to raise capital, [investors] will have the upper hand and be able to get good prices."

In one recent example, Lime, the once-hot operator of electric scooters, is trying to raise an emergency round of capital at a valuation of $400 million, an 80% discount from its last round, The Information reported last week. The drop in valuation means investors can buy more for less, a prospect that has many funds preparing to accelerate the pace of their investing. Lime is one of the first "unicorns"—startups worth more than $1 billion—to see its valuation slashed due to the fallout from Covid-19. It certainly won't be the last.

Venture capital itself won't be immune from the economic turmoil. Some startup investors are reneging on deals, or taking much longer to make decisions about potential financings to preserve capital.

The best-positioned firms are likely to be the more established ones with long track records of backing entrepreneurs. Firms that have recently raised substantial funds from university endowments, pension funds and other institutional limited partners are in a much better place than those that have to refill their investing coffers now.

Some well-known VCs have begun talking about the current moment as something like an integrity test for startup investors and a reckoning for the dilettante investors that veterans of Sand Hill Road—the Silicon Valley street that is home to many VC firms—often grumble about.

"Reputations are built in hard times, not the easy times," Bill Gurley, a general partner at Benchmark Capital, tweeted recently. "If you shake a hand, sign your name—stand strong, or your word is no good. Otherwise you are a transient that only wanted the easy take. And you should move on."

Valuation Haircuts

While it's too soon to tally the damage to startups, many are likely to see steep drops in their valuations—assuming they don't shut down altogether—as private asset values tend to reflect a big drop in public market values.

"There is $1.35 trillion of value locked up in unicorns globally," said Wouter Witvoet, founder and CEO of Secfi, a financial advisory business catering to startup employees. "You will see a drop in valuations of about $350 billion if the private markets follow the public markets."

Total VC investment falls during economic downturns too, because funds behave more cautiously and conserve cash for their portfolio companies. From 2007 to 2009, for example, total U.S. VC investments dropped 28%.

If there is a similar economic decline this year, VC investment could drop by as much as $39 billion in 2020 from last year, when total capital invested in startups hit $136 billion, according to financial data firm PitchBook. As venture investments shrink, so will startup valuations.

The result for VCs sitting on piles of cash is cheaper stakes in startups. In its most extreme form, the hunt for value involves investors—derisively referred to as "vulture capitalists"—who focus on finding steeply discounted deals for distressed companies. Rarely does anyone admit to being a vulture capitalist.

"The vultures do come out," said Neil Sequeira, co-founder and managing partner of Defy Partners, a Series A venture firm, "but they aren't usually folks like us who rely on our reputation."

"What makes you a vulture is preying on the weak or the near-dead—that's what a vulture does," said Scott Lenet, founder of Touchdown Ventures, which helps corporations set up VC arms. "The question is, are you taking advantage of someone who can't help themselves? That's what makes it wrong."

Vultures or not, venture capitalists will take advantage of the current environment to increase stakes in their best companies and to make new investments in hot companies that would, in normal circumstances, ask for capital at a much higher price.

And they won't always get off scot free. Some investors are already feeling the burn of a downturn. In addition to advising their companies to conduct mass layoffs, they may have to reinvest in companies at pre-money valuations so staggeringly low their existing shares lose significant value. These "cram down" financings, a type of recapitalization, become more common in a recession.

Collapsing Deals

For startups, a grim sign of how the investing landscape is shifting is the growing number of deals that are blowing up.

One artificial intelligence and machine learning startup had recently lined up a $10 million investment from a New York–based growth equity fund backed by Chinese limited partners. But once the virus hit, they backed out, according to financial documents shared with The Information on the condition that the startup wouldn't be named. The company furloughed 40% of its staff and is hoping to secure a financial lifeline from earlier investors, according to the documents.

Maanav Patel—founder of Glyde, a recently launched tool for ordering and paying for food at restaurants—said two high-net-worth individuals in New York City recently committed $75,000 each to his pre-seed financing but dropped out of the round in early March, citing recent market changes. "That created a domino effect, and the two other investors that were going to participate in the round also backed out after that," Patel said.

Michael Jones, CEO of the venture fund and startup studio Science Inc., said three startups recently approached his fund for capital after angel investors backed out of their round. Similarly, Sequeira said an investor he wouldn't name reneged on a financing deal for one of his companies after the investor had already issued a term sheet. And a managing director of a $400 million early-stage fund, who asked not to be identified, said two companies he passed on investing in earlier have returned with a new pitch at a major discount.

"From my vantage point today, the people that I have seen back off and flake have been angel investors who aren't as liquid as they thought they were," said Katie Jacobs Stanton, founding partner of seed venture firm Moxxie Ventures.

Some startups still have VCs banging on their doors. Earlier this week, Notion, which develops software tools for

workplace collaboration, raised a $50 million round at a $2 billion valuation, a huge increase from an $800 million valuation earlier in the year.

Meanwhile, Oh My Green, which delivers meals to offices around the U.S., is in negotiations with its investors to close an emergency funding at a flat valuation as it adjusts its business model to deliver meals to employees at their homes instead of their offices. CEO Michael Heinrich said he had let go 70% of the company's 600 employees through layoffs and furloughs as a result of the economic disruption caused by Covid-19.

"Our investors are incredibly supportive of what we're doing," said Heinrich, whose investors include Alumni Ventures Group, Fuel Capital and Astanor Ventures. "Nobody could have prepared for a pandemic."

While flat rounds dilute founders and earlier investors, they do so to a lesser extent than down rounds and are a cause for celebration in the current environment. "If you're getting a flat round and you can keep the dilution minimal, you should take that as a victory," Sequeira of Defy Partners said.

Slow Money

VC investing could see a shakeout of its own, depending how long a recession lasts. Many investors in the sector would welcome a culling of the herd after years of new money sloshing around Silicon Valley.

To help its portfolio companies avoid disreputable investors during the turbulence ahead, the venture firm Tribe Capital recently sent an email to its founders with an analysis of historical investment data intended to highlight the funds that behaved poorly during the 2008 financial crisis.

The analysis, prepared by Arjun Sethi, Ted Maidenberg, Jonathan Hsu and other members of Tribe's investment team, identified Sequoia Capital, Accel and New Enterprise Associates as "slow money" firms that developed a reputation for standing by their companies.

Among the investors that can't be trusted in a bear market are corporate investors, private equity firms and hedge funds—nontraditional VC investors that have become increasingly active in private tech investing, wrote the investors at Tribe, which has stakes in equity management tool Carta and email service Front. Tribe included GV, Tencent Holdings, Salesforce Ventures, Deerfield, Tiger Global, IDG Capital and Silver Lake among the investors that companies couldn't rely on in rough times.

"Fast money can come in quickly, sometimes opportunistically or for transactional reasons, and also trade out quickly," they wrote. "These 'fast' money firms are not in the business of venture capital. They aren't interested in helping with company building in the long run. They are what is commonly referred to as 'fair-weather friends.'"

GV, however, is ramping up the pace of its investments, said one person familiar with the matter. A spokesperson for Salesforce Ventures said the firm is actively investing in new and existing portfolio companies. Tiger Global declined to comment. Tencent, Deerfield, IDG Capital and Silver Lake didn't respond to a request for comment.

None of these firms saw a pandemic coming, but many have for years been expecting and preparing for another downturn.

"There had to be a reset," said Sequeira. "A bull market for 10 years and that much capital in the market actually isn't healthy. A higher bar leads to better companies."

The Takeaway

- Startup valuations are dropping as the coronavirus hits the economy

- VC firms stand to gain more equity at lower prices in startups
- Some investors are delaying, reneging on financings

Venture capital isn't escaping the downward spiral of the global economy

Today we're looking at what venture capitalists got up to in the first quarter of the year and how they are really responding to the current global crisis.

It's easy to find mixed signals on Twitter, with some VCs noting that they have slowed their investing cadence or tightened criteria as the markets shed value. Others claim to be as active as before. Founders are reporting new, higher standards that private capital deals now appear to require. TechCrunch compiled a number of reports from entrepreneurs which described an either slowed, more conservative or utterly frozen venture capital scene.

It seems very likely, then, that the United States' venture capital results for Q1 will be somewhat weak. The full impact of the COVID-19 pandemic, however, may show up more acutely in Q2 2020. Why? Because venture data is famously — and annoyingly — laggy. Rounds are announced weeks or months after they are completed, and the timing of their announcements is impacted by news cycles.

So what we see in Q1 2020 venture data will contain deals that took place in the latter days of 2019; Q2 2020 data, in contrast, will feature mostly 2020 deals and will include a reporting period in which a lot of later Q1 deals would have been completed. This does not mean that there's no use in looking at Q1 results — we're looking for early signals, not complete answers in the data.

So let's dig up what information we can on our own, mix in some data from other reports and see what the tea leaves are saying about Q1 venture results so far.

Down and to the right?
We'll start today with a few looks at monthly, reported, equity-only venture capital data from the U.S. We'll proceed on a monthly basis, comparing this year's known results with last year's more complete results; venture rounds are added to private company databases over time, so as time passes, those repositories become more complete. But a big enough gap could indicate a slowdown, if we do find one.

Via Crunchbase, here's a look at the year so far:

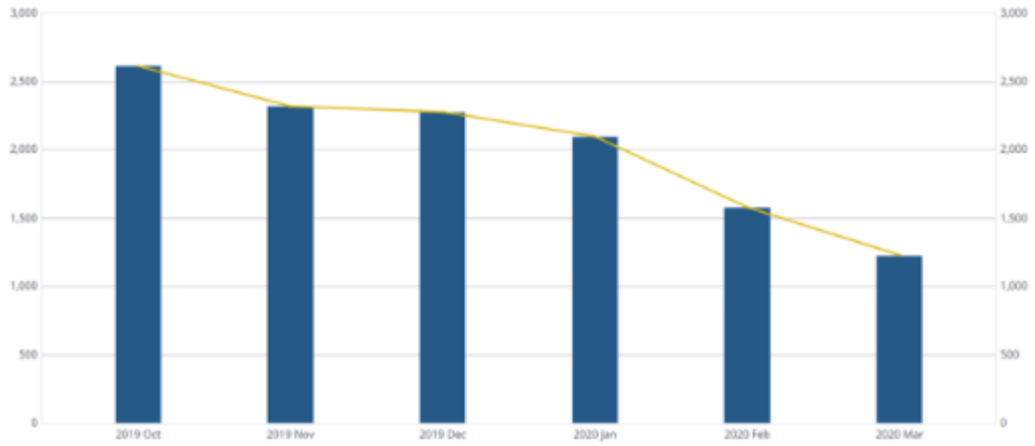
- U.S. equity-only private rounds in January 2020: 712, $13.7 billion (1,103 rounds and $17.7 billion in 2019)
- U.S. equity-only private rounds in February 2020: 519, $11.7 billion (811 rounds, $13.1 billion in 2019)
- U.S. equity-only private rounds in March 2020: 472, $11.2 billion (997, $9.9 billion in 2019)

We can see clear declines in reported private deal volume in the U.S., with a general downturn in invested dollars, at least according to Crunchbase data as of today. The falling round volume appears steep enough to discount reporting lag as the only reason for the decline; deal volume has fallen in the United States in 2020 not only compared to 2019, but also on a sequential-monthly basis.

This matches what we expected, but it is nice to have data back up our gut.

U.S. vs The World
What's going on in the United States appears to mirror what we're seeing around the world.

Indeed, the U.S. data's direction matches Pitchbook data that Axios's Dan Primack published earlier in the month, showing a decline in global venture capital rounds:



What's stunning about this chart is that the timeframe Primack selected shows roughly 50% decline from October to March. This chart is from March 26th, mind, so the final month is short about a week, but it seems unlikely that the final few days of the month will close the gap to even February's totals.

Adding to our chorus of downward arrows, a March 25th piece in the WSJ reported that, per CB Insights, seed-stage capital has "has declined by about 22% globally since January" and that "total private-market funding for startups at $67 billion in the first quarter," off $10 billion from its year-ago totals. Once again the data paints a negative picture of the current venture market.

So what?
The Q1 data is not great. And it's hard to imagine that Q2's results are going to look much better, unless the U.S. economy posts a shocking recovery in the period. Given that domestic states and cities are adding time to their lockdowns this week, in a bid to prevent further infections of COVID-19, the economy is likely to continue to descend in the quarter. Rebuilding is looking like a Q3 task.

It is not clear that VC totals will snap back as the economy begins to mend; it could be quarters until private investors are once again as bullish as they were in the unicorn era (if we match prior heights at all in the next decade).

This is a correction, a downturn, a retrenchment. It may not feel like it yet, but the same crisis that we can see in global economic data is being matched in private investment, and it's going to cause a lot of pain.

Leading VCs discuss how COVID-19 has impacted the world of digital health

By Arman Tabatabai

In December 2019, Extra Crunch spoke to a group of investors leading the charge in health tech to discuss where they saw the most opportunity in the space leading into 2020.

At the time, respondents highlighted startups in digital therapeutics, telehealth and mental health that were improving medical practitioner efficiency or streamlining the distribution of care, amongst a variety of other digital health markets that were garnering the most attention.

In the months since, the COVID-19 crisis has debilitated national healthcare systems and the global economy. Weaknesses in healthcare systems have become clearer than ever, while startups and capital providers have struggled to operate while wide swaths of the market effectively shut down.

Given significant volatility and the rapid changes seen in the worlds of healthcare, venture and startups broadly, we wanted to understand which inefficiencies might have been brought to light, what new opportunities might exist for founders looking to reduce friction in healthcare systems, how digital health startups have been impacted and how health tech investing as a whole has changed.

We asked several of the VCs who participated in our last digital health survey to update us on how COVID-19 is impacting digital health startups and broader healthcare systems around the world:

- Annie Case, Kleiner Perkins
- Kristin Baker Spohn, CRV
- Deena Shakir, Lux Capital
- Jennifer Hartt, Ben Franklin Technology Partners
- John Prendergass, Ben Franklin Technology Partners
- Bill Liao, SOSV

Annie Case, Kleiner Perkins
Our current unprecedented global crisis has put a spotlight on digital health. In the last few weeks alone, we have seen what feels like a decade's worth of societal and regulatory changes that require digital health companies to step up and embrace new challenges and opportunities.

As we do our part by staying home, it's unsurprising that solutions capable of serving a large audience remotely are getting more attention. To that end, there are three areas of digital health that are experiencing particularly significant changes, both in terms of investment and adoption:

Telemedicine is the most obvious example of COVID-19 remaking business as usual. While consumers have long said they would be willing to try telehealth services, as of last year less than 10% had actually received care over video (source).

"Shelter-in-place" paired with regulatory changes allowing Medicare reimbursement for virtual visits (among others) will drive a monumental surge in first-time users of telemedicine. I am optimistic that this will be the catalyst for telemedicine to become the new normal first-line of defense for patients seeking non-emergency medical care.

Diagnostic testing has also become a global conversation in the wake of our shortage of COVID-19 tests and related supplies. While all efforts over the coming months should focus around treatment and combating the spread of the

virus, I believe more attention and more funding will be put towards getting ahead of — and being able to respond more quickly to — whatever the "next" COVID-19 may turn out to be (though hopefully this won't be necessary for a very long time!).

I expect innovation in this space to range from the tests themselves to the remote-monitoring capabilities that would enable us to detect and respond to future abnormalities before they reach epidemic levels.

Mental and physical health are top of mind as we adjust to staying home. Companies like Modern Health are seeing a surge in interest from employers looking to provide mental health support to their employees through this difficult period, and employees have been doubling their use of the platform. Modern Health offers a global network of therapists and coaches who deliver their services 100% remotely, so their model is ideally suited to the new remote-work reality many companies are now facing for the first time. They've even opened up a free community site to provide mental health services to anyone in need of support.

Companies like Future are providing similar services when it comes to physical health. Rather than depending on the gym visits or in-person training sessions that are now inaccessible, Future offers personal training plans designed by professional coaches, delivered remotely and with no equipment required.

These are just two examples of the growing number of digital health companies that can deliver traditionally in-person experiences digitally and are thus uniquely positioned to help people cope and stay strong through this period of stress and uncertainty.

While I can't begin to put into words the harm that this terrible pandemic will cause, my hope is that one small silver lining will be that this period inspires many new founders to make improving healthcare their life's work. If this sounds like you, I would love to hear from you.

Kristin Baker Spohn, CRV
How has COVID-19 impacted the digital health investing landscape?
The global pandemic we are living through is unprecedented in our lifetime and is generating significant shifts throughout everyday life, the economy and the digital health landscape. The response to COVID-19 is impacting every digital health company — creating or accelerating opportunities for some and stalling the commercial engine for others. In my discussions with provider systems, the focus of resources has rapidly shifted towards a world of COVID-19 and everything else.

COVID-19 is driving opportunities, notably the rapid adoption of telehealth/virtual care by clinicians and patients, clinical trials in the cloud, as well as renewed focus on rapid point-of-care diagnostics. With virtual care, we're seeing a decade of acceleration happening in a matter of weeks.

Up until this point, there has been high-activation energy to conduct a first "eVisit" because the alternative (in-person care) was so well-established and largely available. In this environment, being able to conduct a remote visit and triage is critical when it comes to infectious disease.

While it's important for organizations to move quickly, it's also incredibly important to protect clinicians and patients, as we are already seeing more fraud and security breaches. It's crucial for companies to maintain rigor while moving quickly. For example, companies like Wheel, a network of telehealth clinicians, take the quality of the network, training and regulatory compliance very seriously to protect clinicians and patients alike.

When it comes to challenges, the healthcare industry is currently being forced to separate budget and attention into "COVID" and "non-COVID" buckets. Anything not in the "COVID" bucket will be deprioritized right now, and likely for the next 12-18 months. Provider sales have been largely an in-person activity, and today, people are being

blocked at the doors of healthcare facilities for safety reasons, and the industry will need to adapt and change to respond.

Looking ahead, I think we'll also see rapid adoption of cloud and collaboration tools, which are more pervasive in other industries. Whereas collaboration in hospitals, pharma companies, R&D organizations, etc. used to take place in-person, the work will now need to be done remotely. These tools will now be needed for healthcare professionals who can't interact with each other.

A great example is a company like a Viz.ai, which enables mobile-first workflow coordination for stroke care in a secure way. When clinicians are all on staff, they need to be able to do their work across departments. Take specialist consults, for example. Video-based specialist consults in the cloud, with a product like Sitka, will be incredibly valuable for hospitals without specialists on staff.

Finally, any elective programs, such as surgeries and treatments, will be deprioritized. Cash pay and personal discretionary spending will also lessen in an economic downturn.

How has COVID-19 impacted digital health startups operationally?
Many people are feeling helpless right now, but that's not the case for people at many digital health companies. The ones I've spoken to are feeling energized and privileged to be in a position to take action and support the response. The key thing to remember is that we have clinicians and healthcare workers on the front line, and anything we can do to support them, such as tools to improve efficiency and facilitate better triage, is important. I've seen that this is very motivating for digital health employees and companies.

Has COVID-19 significantly changed sentiment around healthcare and the adoption of digital health tools?
We're still in the early days of seeing the impact of COVID-19, but where there is currently an adoption of digital tools to collaborate or deliver better care, this change will be accelerated. We'll also see a bifurcation of digital health companies that empower clinicians and enable care, and those that are just nice-to-haves.

How can digital health companies best respond to the events around COVID-19?
I've been heartened to see how fast companies have moved and sharpened focus. Wheel, for example, is powering the COVID triage and training for virtual care clinicians across telehealth companies, and it has been rapidly deployed.

With a rationing of diagnostics, patients need a doctor to get tested, and those protocols are changing daily as new data and information emerges. And, when more tests and treatments are available, clinicians will be able to diagnose and prescribe treatment remotely and at scale.

Any other thoughts you want to share with TechCrunch readers?
The key thing to remember here is that clinicians and first responders are on the front line and everything we are doing from sheltering in place to donating masks and working hard to deploy solutions are in support of ensuring they can provide patient care. They are also the most at-risk for infection, and at a certain point, we'll have quarantined clinicians, which will further reduce capacity, so enabling them to deliver patient care virtually (for those that are contagious but have mild symptoms) will be even more critical than it is today.

Deena Shakir, Lux Capital
Having spent the better part of the last decade working on/with and now investing in digital health products and companies, I can say with confidence that the COVID-19 pandemic is emerging as a watershed moment for the sector.

Necessity is said to be the mother of innovation, and with health systems globally stretched beyond capacity, technologies that may have otherwise taken years to achieve product market fit may now be quickly adopted as

more "necessary" than "nice to have." Rather than indulging in what has become a politicized trade-off between giving into the virus and giving up the economy, I'm hopeful at the prospect of breakthrough technologies catalyzed by an emergent need to not only help us get through this crisis, but to contribute toward a healthier world when we're past it.

As healthcare workers are forced to engineer face masks out of disposable shoe covers and protective gowns out of garbage bags, so too are hospital administrators desperately seeking technological solutions to mitigate very real and immediate challenges — from scarcity of staff to contagion containment to remote monitoring of chronically ill patients.

At Lux, we're seeing our portfolio companies rise to the challenge in myriad ways — democratizing access to virtual clinical trials, increasing systemic capacity across healthcare facilities, applying sophisticated AI to discover treatments against the virus and more.

Science 37, already the industry leader in decentralized clinical trials, is making the promise of virtual trials a reality today. Elektra Labs, which is building a platform to review and dispense connected technologies remotely, is ensuring that speed does not come at the expense of security, ethics and trust.

Shapeways, the largest 3D-printing platform in the world, is printing masks and medical supplies to quickly support demand from health systems around the country. Recursion Pharmaceuticals is using their unbiased, morphological, AI-enabled platform to screen thousands of compounds and discover signals of efficacy against coronavirus. Avail is minimizing the number of people who have to be physically present in hospital operating rooms, enabling the necessary experts to collaborate virtually in real time.

Digital health companies are by no means immune to the very real and very painful operational and economic challenges that come with company building in the midst of a pandemic and financial crisis. But despite the headwinds, a number of early-stage companies in our pipeline have also seen much quicker adoption, a smoother regulatory path (decades of reform compressed into weeks) and more inbound interest than they can scale.

We're seeing breakthrough technologies taking on everything from telehealth to remote-monitoring platforms to triage and intake tools to documentation and productivity software to wearable and sensor solutions. I am optimistic that these iconoclastic innovators can take on the challenge of this pandemic to not only enable healthcare workers to save more lives now, but also to help shape a perhaps forever-changed healthcare industry in years to come.

Jennifer Hartt & John Prendergass, Ben Franklin Technology Partners
How has COVID-19 impacted the digital health investing landscape?
Investors are monitoring rapid changes in priorities to assess how best to support their portfolios. Many will still look at pipeline for new investment, but through the new lens of pandemic response and containment.
We expect both public and private funds to flow into the most acute need areas. Investors are asking their portfolios to communicate risk and opportunity analyses and to buckle down and pivot, wherever applicable. The analogy to a war-time like response is appropriate.

Has COVID-19 significantly changed sentiment around healthcare and the adoption of digital health tools?
COVID-19 will rapidly push for increased information sharing and resource sharing across both hospital systems and across state lines. Digital health and telemedicine tools will be more rapidly adopted under pressing need. Those adoptions will benefit us permanently, even once we get past the peak crisis of the pandemic at hand.

How can digital health companies best respond to the events around COVID-19?

Digital health companies need to create road maps to implementation that rely on far fewer in-hospital meetings and demos and integration testing. They can position themselves for rapid response and remote monitoring wherever applicable.

Many companies have tools that will be deprioritized. Those companies will need to buckle down and plan for a hit to revenue. Tools relevant to more elective surgeries, well-visits and preventive care will likely take a hit.

Bill Liao, SOSV
So right now in the health space I have several companies whose funding rounds have been disrupted.
The general advice from other board members who remember the last financial crisis is for companies to conserve cash.

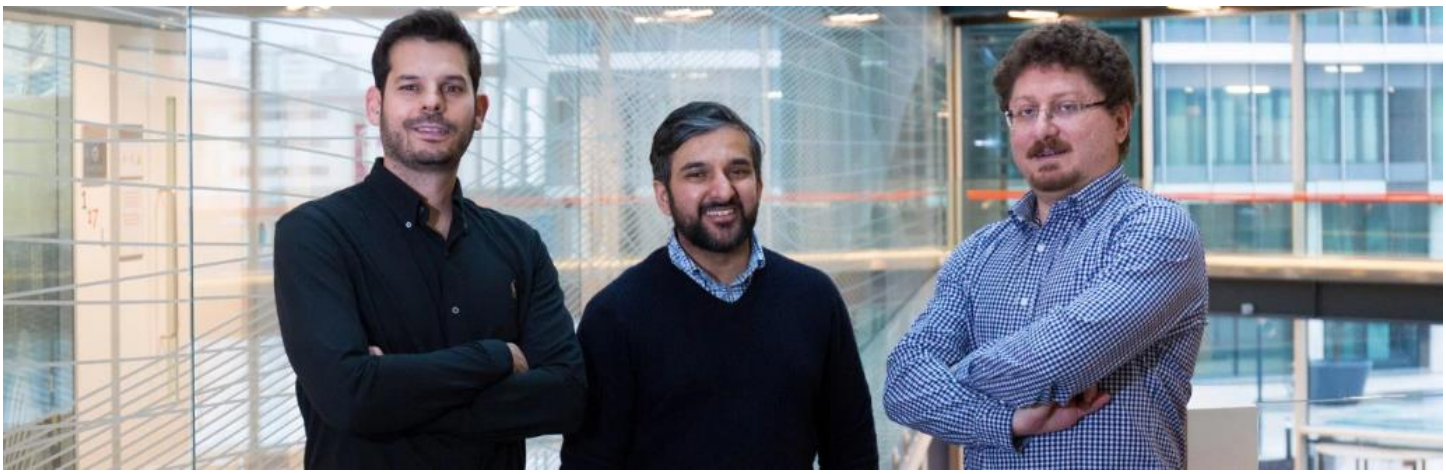
Others suggest that companies focus on social and influencer online marketing campaigns that are cheaper than traditional marketing and more suitable for remote work.

Several companies are going with three-day work weeks and arranging things to be delivered to their people at home, such as healthcare products and groceries.

Lots of payments are being deferred. This is definitely not business as usual.

We are supporting our portfolio companies any way we can in these trying times.

Addionics, a startup creating 'next-gen' batteries for electric cars and more, raises $6M

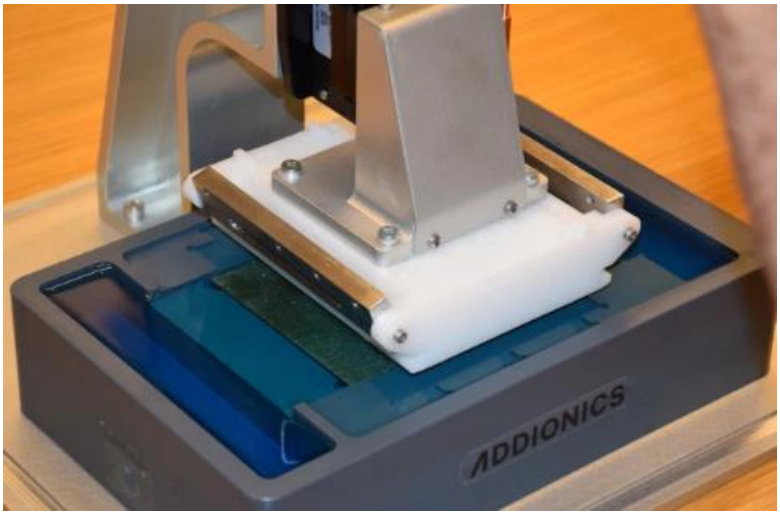


By Steve O'Hear

Addionics, *(* Chambiz DF 13 April 2019)* an Israeli/U.K. startup that is developed next-generation rechargeable batteries for electric vehicles and other applications, has raised $6 million in funding. The round is led by Next Gear Ventures, and includes a $2.5 million grant as part of the European Union's Horizon2020 innovation competition.

Founded by former Imperial College London academics, Addionics has created what it claims are improved rechargeable batteries through a redesign of chargeable battery architecture. It has developed a "patent-protected" and scalable 3D metal fabrication method that are said to enhance car battery performance, increase mileage and safety, and reduce cost and charging time.

Specifically, this new so-called "smart 3D structure" minimises internal resistance and improves the "mechanical longevity, thermal stability and other fundamental limitations and degradation factors" in standard batteries, says Addionics.



It also says its approach is different to other companies that are trying to improve batteries, which tend to focus on chemistry rather than on physics. Addionics' chemistry agnostic approach means that it can still benefit from advances in chemistry, while bringing something additional to the table.

Addionics CTO Dr. Vladimir Yufit explains in a statement: "We are agnostic to the battery chemistry. Therefore, we can take existing or future batteries and enhance their performance by our smart 3D components. No matter what chemistry technology will win the electrification race, we will improve it even more."

Or to put it more colourfully, Yufit says Addionics is "betting on the race, and not on the horse."

To that end, the company is initially targeting the automotive market but also sees its technology finding a home in other products such as consumer electronics, medical devices, grid energy storage, drones, and more.

In terms of commercial traction, it's still early days. However, Addionics says it is currently working with an unnamed tier-1 American automotive company on a proof-of-concept design and testing Addionics cells in vehicles.

Dr. Moshiel Biton, Addionics CEO, says that the goal is to have 3-4 major collaborations with "world-leading OEMs" over the next year.

Facebook Strikes Deal for AR Displays, Squeezing Out Apple

By Alex Heath and Amir Efrati

Facebook has struck a deal to buy all of the augmented reality displays made by British firm Plessey, as the social network looks to build AR glasses capable of overlaying virtual objects onto the real world. The deal could give Facebook an edge over Apple, which recently looked at buying Plessey, one of the few makers of AR displays, according to two people familiar with the matter.

Instead, Plessey will license its technology to Facebook and dedicate its U.K.-based factory to supplying Facebook over several years, both companies confirmed. Facebook could have tried to buy Plessey to gain access to its AR displays, but that would likely have brought intense regulatory scrutiny. Striking an exclusive supply deal speeds up the work and gives Facebook the benefits of an acquisition without a lengthy regulatory review.

An Apple spokesperson declined to comment and Plessey execs didn't return requests for comment on the Apple talks.

Facebook's deal with Plessey illustrates how tech giants are racing to secure the building blocks needed for AR headwear—technology experts believe could be as transformational as the introduction of PCs and smartphones. Facebook CEO Mark Zuckerberg recently predicted that "we will get breakthrough AR glasses that will redefine our relationship with technology" in the 2020s.

To create such a device, Facebook has teams building its own operating system, apps, silicon chips, and tech capable of deciphering human thoughts. It also continues to invest in VR headset maker Oculus, which it acquired for roughly $2 billion in 2014.

In a statement, Facebook said it wants to build "a glasses form factor that lets devices melt away so we can be more present with our friends, families, and surroundings."

"This will take years, so across AR/VR we're continuing to invest in extensive research on this deep tech stack and components such as small-scale displays," the company said.

The AR devices that have been released so far from the likes of Magic Leap and Microsoft are clunky, expensive headsets with extremely limited graphics capabilities that haven't sold well.

Display technology represents one of the key hurdles for tech giants developing AR hardware. To be good enough for everyday use, AR glasses need to have optics that can accommodate wide ranges of light, show the real world with clarity and last all day without losing power or overheating.

"There is no publicly available known display system that meets those requirements," Michael Abrash, Facebook's head of AR and VR research, told The Information in an interview late last year.

But Plessey claims it has developed microLED displays that provide rich colors and contrast while consuming less power than other screens. Even if the displays aren't ready for mass use, the industry is a narrow field with few players, which is why Facebook wanted to lock up supply early.

Plessey formed roughly a decade ago to build display tech for customers including General Electric. In 2017, it focused its business entirely on creating microLEDs for wearables and AR or VR devices at its U.K. factory.

'Tequila' powered biofuels more efficient than corn or sugar

Sourced by University of Sydney

The agave plant used to make tequila could be established in semi-arid Australia as an environmentally friendly solution to Australia's transport fuel shortage, a team of researchers at the University of Sydney, University of Exeter and University of Adelaide has found.

The efficient, low-water process could also help produce ethanol for hand sanitiser, which is in high demand during the COVID-19 pandemic.

In an article published this week in the Journal of Cleaner Production, University of Sydney agronomist Associate Professor Daniel Tan with international and Australian colleagues have analysed the potential to produce bioethanol (biofuel) from the agave plant, a high-sugar succulent widely grown in Mexico to make the alcoholic drink tequila.

The agave plant is now being grown as a biofuel source on the Atherton Tablelands in Far North Queensland by MSF Sugar, and it promises some significant advantages over existing sources of bioethanol such as sugarcane and corn, Associate Professor Tan said.

"Agave is an environmentally friendly crop that we can grow to produce ethanol-based fuels and healthcare products," said Associate Professor Tan from the Sydney Institute of Agriculture.

"It can grow in semi-arid areas without irrigation; and it does not compete with food crops or put demands on limited water and fertiliser supplies. Agave is heat and drought tolerant and can survive Australia's hot summers."

Associate Professor Tan assembled the research team and led its economic analysis.

Lead author Dr. Xiaoyu Yan from the University of Exeter, who led the lifecycle assessment, said: "Our analysis highlights the possibilities for bioethanol production from agave grown in semi-arid Australia, causing minimum pressure on food production and water resources.

"The results suggest that bioethanol derived from agave is superior to that from corn and sugarcane in terms of water consumption and quality, greenhouse gas emissions, as well as ethanol output."

This study used chemical analyses of agave from a pilot agave farm in Kalamia Estate, Queensland (near Ayr) undertaken by Dr. Kendall Corbin for her University of Adelaide Ph.D., supervised by Professor Rachel Burton.

"It is fabulous that the results of my chemical analysis can be used in both an economic and environmental footprint study and have real-world applications", Dr. Corbin said.

"The economic analysis suggests that a first generation of bioethanol production from agave is currently not commercially viable without government support, given the recent collapse in the world oil price," Associate Professor Tan said. "However, this may change with the emerging demand for new ethanol-based healthcare products, such as hand sanitisers."

"This is the first comprehensive lifecycle assessment and economic analysis of bioethanol produced from a five-year agave field experiment in north Queensland. Our analysis shows a bioethanol yield of 7414 litres a hectare each year is achievable with five-year-old agave plants."

The study found that sugarcane yields 9900 litres a hectare each year. However, agave outperforms sugarcane on a range of measures, including freshwater eutrophication, marine ecotoxicity and—crucially—water consumption.

Agave uses 69 percent less water than sugarcane and 46 percent less water than corn for the same yield. For US corn ethanol, the yield was lower than agave, at 3800 litres a hectare a year.

"This shows agave is an economic and environmental winner for biofuel production in the years to come," Associate Professor Tan said.

More information: Xiaoyu Yan et al, Agave: A promising feedstock for biofuels in the water-energy-food-environment (WEFE) nexus, *Journal of Cleaner Production* (2020). DOI: 10.1016/j.jclepro.2020.121283
Journal information: Journal of Cleaner Production

11 big things: Hard feelings at SoftBank in $41B spat

By Kevin Dowd

The coronavirus pandemic continued its deadly spread this week. Parts of China are beginning to bounce back from the initial scourge, but for the rest of the world, the fear and danger of the disease is still building. In some places, it's just beginning.

Yet the financial world spins on. This week was actually a good one for much of Wall Street, as stocks bounced back into bull territory on hopes that a $2 trillion stimulus package will be able to offset the damage of mass shutdowns and stratospheric unemployment.

SoftBank won't see much direct benefit from the stimulus. But the tech conglomerate that shook up Silicon Valley in recent years still saw its share price spike by more than 45% this week, thanks in part to a new plan to sell up to $41 billion in assets—and in spite of a very public disagreement with one of Wall Street's credit watchdogs.

Even amid a global pestilence, SoftBank always keeps things interesting. That's one of 11 things you need to know from the past week:

1. SoftBank's surge
After seeing SoftBank's stock plunge more than 50% in one four-week stretch, Masayoshi Son and his lieutenants are scrambling for a solution.

They held preliminary talks about a potential take-private transaction with Elliott Management and Mubadala, the Financial Times reported this week, but ultimately decided such a deal would be too complicated. Instead, SoftBank is resorting to a massive buyback plan, it announced Monday, which it plans to fund by selling as much as 4.5 trillion yen (about $41 billion) in assets.

The obvious aim was to boost its stock price. Mission accomplished. SoftBank shares jumped nearly 46% over the course of the week, and that's before the buybacks have even begun.

Another stated goal of SoftBank's move was to enhance its credit rating, which Moody's—the company SoftBank paid to assess such things—considered below investment grade. On that front, success was a bit more elusive.

Instead, on Wednesday, Moody's downgraded SoftBank's credit a further two notches, citing the "unexpected size and apparent urgency" of the company's planned divestitures and buybacks. SoftBank didn't take too kindly to that. The same day, it dropped Moody's, arguing there was "no rationale" for the downgrade and that it would cause "substantial misunderstanding" among investors.

SoftBank also helpfully noted that S&P Global Ratings, one of the biggest rivals of Moody's, believed the buyback plan would "reduce downward pressure on credit quality."

Whether Moody's is right or wrong, the feud highlights the inherent conflicts of the credit-ratings industry. Ostensibly, companies like Moody's and S&P provide their ratings to aid investors. But Moody's and S&P are also for-profit entities trying to win business from the companies they are rating. Plenty of people smarter than me made the same point in the wake of the last financial crisis, when flawed ratings on debt securities played a key role in cratering the global economy. This latest tiff shows that this misalignment of incentives remains in place.

SoftBank's recent stock-price struggles continued a run of bad news that dates back to its disastrous attempt at taking WeWork public, one that includes previous layoffs at a host of portfolio companies. That trend also rolled on this week.

Real estate startup Compass, which was valued at $6.4 billion in a SoftBank-backed round last July, according to PitchBook data, laid off 15% of its workers on Monday, The Real Deal reported. The real estate industry is one of many already reeling from a pandemic slowdown.

Satellite internet startup OneWeb, meanwhile, is on the brink of bankruptcy, according to the Financial Times, after negotiations to raise as much as $2 billion in new funding from SoftBank fell apart amid the coronavirus outbreak. More than 500 jobs are reportedly at risk.

And what of WeWork? Here's a selection of headlines from the past few days:

- "WeWork to miss 2020 targets because of coronavirus," writes The Real Deal.
- "WeWork mounts charm offensive as bondholders run for the exits," says Forbes.
- "WeWork offers employees $100 a day bonus to work in its locations. But should they?" asks Inc.com.

So, yeah. Not great.

SoftBank's massive stake in Alibaba is reported to be among the main assets it aims to unload, so the $41 billion plan may not include huge changes to its startup portfolio. But with a second Vision Fund already on hold and SoftBank's preferred strategy of growth-at-all-costs looking more and more like a thing of the past, it's worth wondering if huge changes are to come.

2. Travel troubles
Travel startups have also been clobbered by coronavirus fallout, with job losses popping up across the industry. Corporate travel startup TripActions, last valued at $4 billion, according to PitchBook data, is reportedly laying off hundreds, while other names such as Vacasa, Zeus Living, Sonder and Lola.com are also believed to have furloughed and laid off workers in recent days. Job cuts were also reported at several private companies in other sectors, including names with $1 billion-plus valuations like Getaround and Endeavor.

3. Lime aid
Lime raised more than $750 million in total VC during 2018 and 2019, reaching a $2.4 billion valuation last July, according to PitchBook data. But the scooter and bike rental startup is now running out of cash, according to The Information, and is planning to raise new funding in a round that could reduce its valuation to as little as $400 million. Meanwhile, reports emerged that another scooter unicorn, Bird, is laying off some 30% of its staff.

4. An Instacart revolt
On Friday, a group representing Instacart's in-store shoppers published an open letter accusing Instacart of "turning this pandemic into a PR campaign" while failing to provide "essential protections to Shoppers on the front lines." The shoppers threatened to walk off the job Monday unless Instacart meets certain conditions, including improved safety equipment and additional hazard pay. It's a harsh reminder of how COVID-19 has put some gig workers in precarious positions.

5. Bankruptcy murmurs
Bad news also surfaced recently from a pair of high-profile companies with private equity backing. Luxury retail icon Neiman Marcus and circus operator Cirque du Soleil are both considering bankruptcy filings, according to reports this week—a sign of the wide swathe of businesses being hit by coronavirus-related closures and consumer spending reductions.

6. Housing help
A few rays of positivity shined through on a generally gloomy week for the private markets. One came from Airbnb, which pledged to waive fees and encouraged its hosts to offer free housing for healthcare workers battling the coronavirus outbreak, with hopes of aiding as many as 100,000 people. It remains to be seen whether the current chaos will change Airbnb's previously announced plans to go public in 2020.

7. Thoma Bravo two-step
Thoma Bravo completed one multibillion-dollar deal this week, finalizing a $2 billion purchase of Instructure, a creator of edtech software that's behind the popular Canvas and Bridge platforms. But another major deal will have to wait, as PE Hub reported this week that market conditions have caused Thoma Bravo to delay a planned sale of healthcare security specialist Imprivata that could have fetched another $2 billion.

8. Brex buys
It was a rare bit of normal Silicon Valley news amid a maelstrom of the malefic: Red-hot fintech startup Brex, last valued at $2.6 billion, according to PitchBook data, made three acquisitions this week, snapping up Compose Labs, Landria and Neji. All three smaller startups will add something different to Brex's current suite of corporate finance offerings, ranging from data protection to video tech to software management.

9. Let it go
OfferUp and Letgo both attained unicorn status by creating peer-to-peer platforms where customers could buy and sell stuff of every sort. Now, they're set to combine, as OfferUp agreed this week to acquire Letgo in a bit of marketplace consolidation. Letgo's current majority investor, OLX Group, will also lead a $120 million investment in the newly merged business.

10. Occidental's acquiescence
With oil prices and its own stock in freefall, Occidental Petroleum reportedly gave in this week to a series of demands from activist investor Carl Icahn, including a trio of new board members and slashed pay for Occidental executives. The rocky relationship between Icahn and Occidental dates back to last year, when Icahn argued that Occidental had severely overpaid in a $38 billion takeover of Anadarko Petroleum. In recent months, the markets seem to agree.

11. Taxis take off
At least we can still dream about flying taxis. Lilium, a German startup building electric, autonomous, on-demand air taxis, raised more than $240 million in new funding this week from backers including Tencent and Atomico. Lilium announced last October it had completed its first phase of flight testing with a sleek video offering a glimpse of its aircraft in action.

Perception-action loops for drones develop with Microsoft simulation approach

Sensing technologies have improved steadily, but the ability of robots to make decisions in real time based on what they perceive still has a long way to go to equal or surpass human capabilities. Researchers from Microsoft Corp., Carnegie Mellon University, and Oregon State University have been collaborating to improve perception-action loops.

As members of Team Explorer, they are participating in the Defense Advanced Research Projects Agency's Subterranean (DARPA SubT) Challenge. The competition is designed to develop technologies that could aid first responders in hazardous environments. Team Explorer won first place in the Tunnel Circuit in September 2019 and second place in the February 2020 Urban Circuit.

In a blog post, the research team explained how it has created machine learning systems to enable robots or drones to make decisions based on camera data. It includes Rogerio Bonatti, a Ph.D. student at Carnegie Mellon University (CMU), and Sebastian Scherer, an associate research professor at CMU. The team also includes Ratnesh Madaan, research software development engineer for business AI; Vibhav Vineet, a senior researcher; and Ashish Kapoor, partner research manager at Microsoft.

"The [perception-action loop] system is trained via simulations and learns to independently navigate challenging environments and conditions in real world, including unseen situations," the researchers wrote. "We wanted to push current technology to get closer to a human's ability to interpret environmental cues, adapt to difficult conditions, and operate autonomously."

Building a drone racing model

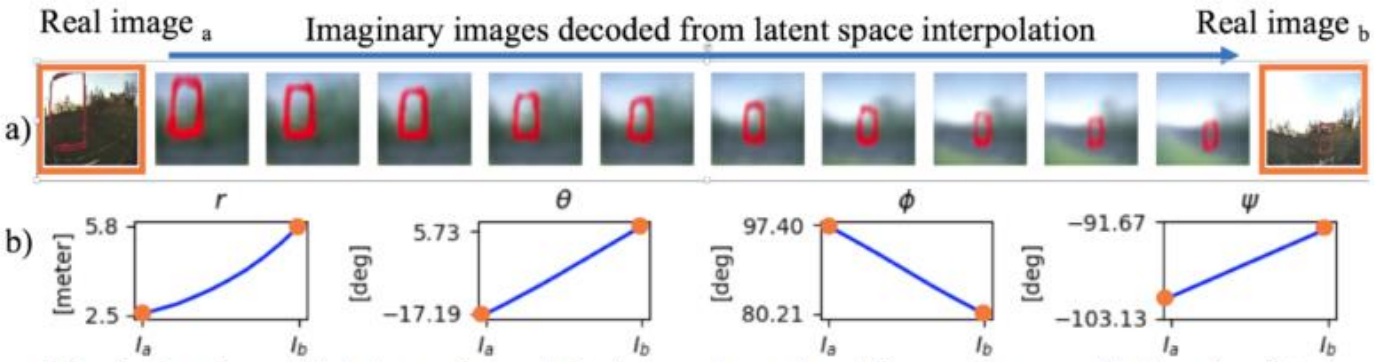
"In first-person view (FPV) drone racing, expert pilots can plan and control a quadrotor with high agility using a noisy monocular camera feed, without compromising safety," said the researchers. "We attempted to mimic this ability with our framework, and tested it with an autonomous drone on a racing task."

The team trained a neural network with data from an RGB camera and mapped visual information directly to control actions. It broke the task into two parts — building a simulation and taking control actions.

The models had to account for variances in between the simulation and the real world, such as differences in lighting. The researchers used Microsoft's AirSim simulator and a Cross-Modal Variational Auto Encoder (CM-VAE) framework and combined raw unlabeled data with the relative poses of gates in the drone's coordinate frame.

"The system naturally incorporated both labeled and unlabeled data modalities into the training process of the latent variable," they said. "Imitation learning was then used to train a deep control policy that mapped latent variables into velocity commands for the quadrotor."

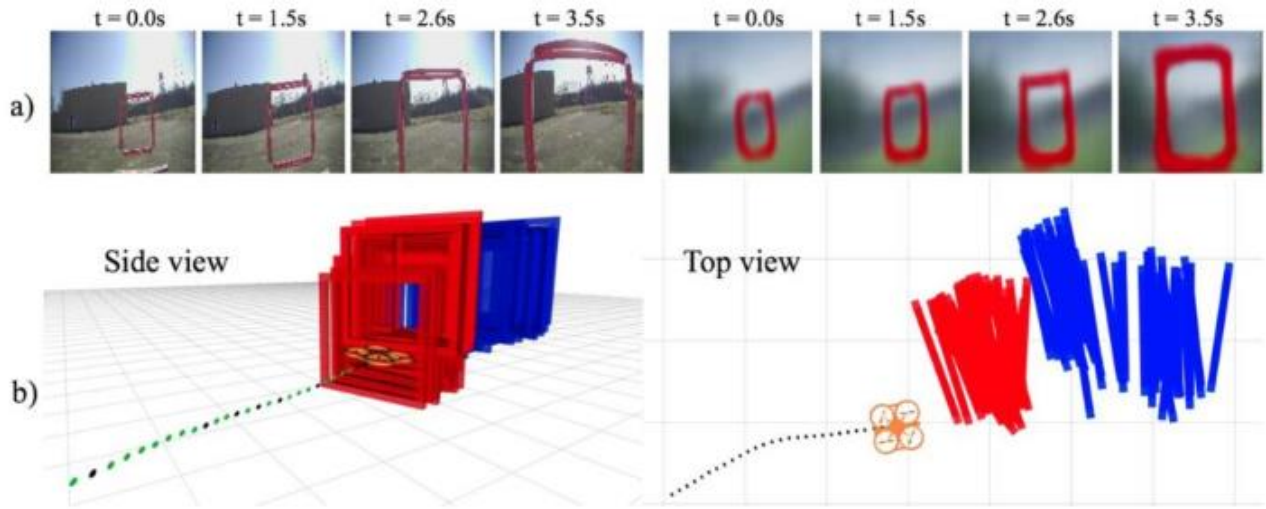
By abstracting video frames to a lower-dimensional representation, the team was able to train a deep control policy with imitation learning while still providing enough information for the drone to navigate through obstacles.



Visualization of smooth latent space interpolation between two real-world images. The ground truth and predicted distances between the camera and gate for Images A and B were 2 and 6m and 2.5 and 5.8m, respectively. Source: Microsoft

Testing the perception-action loop

The researchers tested their perception-action loop system on a drone racing track with different courses. While they reported that the "performance of standard architectures dropped significantly," their CM-VAE was able to approximate gate distances based purely on simulated data.



In a three-second flight segment, a) the CM-VAE decodes images and b) the time history f gate center poses decoded from the CM-VAE (red) and regression (blue). The regression representation is affected by higher offset and noise. Source: Microsoft

The control framework even worked indoors, with stripes painted on the floor matching the gate color, and in snow. "Despite the intense visual distractions from background conditions, the drone was still able to complete the courses by employing our cross-modal perception module," the team wrote.

"By separating the perception-action loop into two modules and incorporating multiple data modalities into the perception training phase, we can avoid overfitting our networks to non-relevant characteristics of the incoming data," it added. The combination of abstracted sensor data and simulation-trained models could lead to better performance.

However, the researchers found that "an unexpected result we came across during our experiments is that combining unlabeled real-world data with the labeled simulated data for training the representation models did not increase overall performance. Using simulation-only data worked better. We suspect that this drop in performance occurs because only simulated data was used in the control learning phase with imitation learning."

Using unlabeled data

A recent trend in artificial intelligence and robotics development is to limit or tighten the data sets needed to train autonomous systems. Microsoft's work with Team Explorer is an example of how separating the perception from control policies can lead to more robust perception-action loops.

The researchers at Microsoft, CMU, and Oregon State concluded that combining multiple data streams in the CM-VAE led to better generalization and recognition of objects, but more work remains to be done on using adversarial techniques to bring simulated data closer to real images.

The use of unlabeled data and simulation could have multiple applications for autonomous systems, noted the team. They include detecting people's faces for search-and-rescue operations, drone inspections, and robotic piece picking.

The sector employs about 250,000 people in the U.S., according to the Semiconductor Industry Association, one of the top trade groups for the industry. Roughly half of all production plants operated by American chip manufacturers are located in the U.S.

By James Morra

The U.S. semiconductor industry is lobbying federal and state governments to have chip production plants labeled as essential businesses that are allowed to operate despite lockdowns to contain the spread of the novel coronavirus. The Semiconductor Industry Association (SIA), a top trade group representing the sector, is trying to lift its chances for exemptions to orders in states around the U.S. to close nonessential businesses.

The group, which represents U.S. chip manufacturers from Intel and Texas Instruments to Micron Technology and Globalfoundries, has argued that their output is essential for the livelihood of the U.S. economy. It is urging the Department of Homeland Security to roll out recommendations to keep fabs open during the worsening outbreak. The efforts are colliding with orders around the U.S. to limit the movement of people and infections.

John Neuffer, SIA president and chief executive, argued in a blog post that chips are critical to infrastructure, ranging from telecommunications networks to power grids. They also underpin broad swathes of the American economy, including healthcare and manufacturing. Chips are also critical parts used in personal computers and cloud data centers, which are both key to businesses increasingly telling people to work remotely.

Devi Keller, who leads the trade group's global policy efforts, said in a statement that due to "the highly integrated and global nature of the semiconductor supply chain, shortages created by operating restrictions in one region cannot be readily made up by production in other regions." She said the shortages could lead to delays in the supply chain, hitting electronics production. U.S.-based companies control 45% global market share in chips.

U.S.-based chip makers have not complained about production constraints due to the virus. Micron CEO Sanjay Mehrotra said last week that the fallout has not seriously hurt its manufacturing operations to date. He said the company plans to obey government orders, adding that it was forced to shut down production plants in Southeast Asia for a short time due to a sudden lockdown. The fabs have since restarted limited production.

Mehrotra warned that tougher government orders could result in temporary or prolonged shutdowns at its other fabs. Micron is also preparing for supply shortages and logistics issues that could hamper its ability to maintain production. It is stockpiling more of the raw materials used to manufacture chips and stashing more at fabs to reduce logistics delays, he said. The company is also expanding testing and assembly lines at its fabs.

Intel, the world's largest vendor of chips used in cloud servers and data centers, is also maintaining production while safeguarding the health and safety of its employees. The Santa Clara, California-based company's chief executive, Robert Swan, recently said in a letter to customers that it has been business as usual for its production line and factory operations. Intel operates fabs in California, Arizona, Oregon and other U.S. locations.

Micron, which sells DRAM and NAND memory used in smartphones and data centers, has also taken precautions to impede the virus's transmission on its production lines. Micron, the world's No. 3 memory chip manufacturer, has started to alternate shifts and separate employees from each other to suppress the spread of the deadly sickness. Micron oversees 13 production plants around the world, including in Utah and Idaho.

The crisis is also leading to uncertainty for other players in the semiconductor market. Applied Materials, the world's

largest seller of chip manufacturing equipment, warned that business could be harmed by the global spread of the coronavirus. The company on Monday said that shutdowns aimed at blocking the outbreak are resulting in "major disruptions in the supply chain and logistics operations that support the chip industry."

New York, the current epicenter of the virus in the U.S., has granted requests from chip manufacturers to stay open as more of the country shuts down due to the outbreak. The SIA said that these production plants are among the cleanest places in the world, with workers entering and exiting the factory floor through airlocks while wearing coveralls, boots, hoods, face masks, and gloves to protect the silicon chips from contamination.

The semiconductor industry employs roughly 250,000 people in the U.S., according to the SIA. Around half of all production plants operated by American chip manufacturers are located in the U.S. The SIA said that 19 states are home to major fabs.

Sourced by Financier Worldwide

A close affinity with environmental, social and governance (ESG) issues has rapidly become a core component of the M&A process in recent years. Indeed, ethical oversight can be the difference between a transaction's success or failure.

Evidencing the rapid uptick in ESG-influenced M&A is the Herbert Smith Freehills report 'M&A in 2020: the new normal', which reveals that 83 percent of M&A practitioners believe that ESG will become increasingly critical to M&A decision making in the next 12 to 24 months, while 1250 chief executives rated environmental risks as the biggest threat to business growth.

Also highlighting the value of integrating ESG into the M&A process is a 2017 report by Sustainalytics 'ESG compatibility: a hidden success factor in M&A transactions', which found that, within a sample of 231 M&As, ESG compatible deals outperformed ESG incompatible deals by an average of 21 percent on a five-year cumulative return basis. Furthermore, to date, there have been over 1400 signatories to the UN Principles for Responsible Investment – a formal declaration committing firms to incorporate ESG issues into their investment analysis.

Boiled down, ESG issues can encompass: (i) environment – waste management, hazardous materials, pollution, water use, energy use, global warming, emissions to air, resource use, biodiversity and land contamination; (ii) workplace – talent attraction and retention, employee development, employee welfare, equality and diversity, and occupational health and safety; (iii) community – community impact, local economic development, human rights and community investment; (iv) marketplace – responsible marketing, responsible products and sustainability within the supply chain; and (v) governance – governance of sustainability issues, board level responsibility, anti-bribery and corruption, business ethics and conduct, and grievance procedures.

"A firm's ESG profile can have a significant impact on its operating performance and financing cost, so companies are now placing a much greater emphasis on managing the ESG risks involved in their investment," says Dr Zhenyi Huang, a research fellow at Cass Business School. "In the context of M&A, the ESG compatibility of acquirers and targets is an increasingly important factor throughout the whole deal process, from the early stage of target selection to the due diligence process, then the integration of the ESG standard of the combined business in the post-deal stage."

In the view of Melissa Sawyer, a partner at Sullivan & Cromwell, ESG issues, while historically a secondary concern, are becoming an increasingly important consideration for both targets and acquirers. "A company without a clear ESG agenda may be a less attractive partner," she suggests. "Moreover, if a management team has a limited or superficial strategy for handling ESG matters, a buyer may conclude that the team is not adequately managing the company's long-term risk profile.

"In the context of M&A, the ESG compatibility of acquirers and targets is an increasingly important factor throughout the whole deal process."

"For example, a buyer may ascribe a discount to a natural resources company that is not investing in environmental best practices today on the theory that it is carrying a significant contingent liability for environmental remediation

in the future," she continues. "In addition, because ESG encompasses human capital issues, inadequate ESG planning may be an indicator of potential risk of labour unrest and inadequate global talent development."

Despite the lack of a clear ESG agenda at many companies, for Tim Clare, director of transactions and ESG advisory at Anthesis, the high-profile nature of many ESG issues means that the perception of what might be a material risk is broadening among the dealmaking community. "There is only a minority, albeit growing, of firms that are yet sophisticated enough in their ESG systems and frameworks to undertake a broad ESG due diligence assessment on every deal," he says.

An evolving process, the ways in which M&A practitioners are taking ESG factors into account when considering potential investments is becoming increasingly influential in the drive toward generating growth and delivering stakeholder value.

Challenges

Among the biggest challenges facing dealmakers when integrating ESG into the M&A process is fully understanding and assessing the materiality of relevant ESG factors. Materiality is often specific to the target company, its supply chains, its industry sector, as well as the countries and sub-national regions in which it and its supply chains operate.

"A sense of the importance of ESG issues may not be shared between deal teams," contends Mr Clare. "That lack of appreciation may also be shared or mirrored by other advisers, such as the corporate finance, banking and legal teams. Currently, there are no standard disclosure requirements, so there may be a lack of disclosure by vendors. In a similar vein, auction processes especially, where the number of questions that can be asked is strictly managed, can see ESG losing out."

Additional challenges include adhering to a transaction's timescales, especially if ESG has been commissioned late in the process, as well as keeping to a budget, especially important in a competitive M&A process. "The key action is ensuring that an ESG scoping assessment – as recommended in nearly all the guidance – is undertaken very early in the investment analysis in order to identify what might be material ESG issues," suggests Mr Clare. "ESG is very broad and often it is not possible to evaluate the issues if the time allowed is too short."

Also significant is the impact of ESG oversight on a company's reporting function. "ESG reporting is shown to be largely motivated by relevance to investment performance, stakeholder demand, product strategy and ethical considerations," notes Dr Huang. "A problem with the use of ESG information is the lack of reporting standards, which is the challenge that regulators and policymakers still need to work on. Meanwhile, the cost of gathering and analysing ESG information presents a challenge for many firms. For stakeholders, a lot of times they may find the ESG information disclosed by firms to be too general; in particular there tends to be a lack of quantifiable information that is useful and comparable over time."

Strategies

There are strategies in the M&A toolkit that investors and dealmakers can deploy to factor relevant and material ESG issues into their decision making and ultimately scope and execute a transaction.

"Due diligence remains the primary avenue for acquirers to assess the ESG health of a business and the associated risks and opportunities of an investment," says Tyler Drayton, an associate at Sullivan & Cromwell. "However, evaluating ESG issues during diligence can be challenging, as the cultural elements that acquirers are seeking to assess are often elusive and undocumented. That said, the tenor of casual and unstructured interactions with management and employees during a deal process can still provide a strong indication of a company's corporate culture and priorities.

"Companies should also remain cognisant of the risks and opportunities associated with integrating two companies with disparate approaches to managing ESG issues," he continues. "On the one hand, the acquisition of a company

with a nascent ESG programme could expose the acquirer to potentially unknown ESG risks or erode the long-term financial performance of the combined business. On the other hand, the acquisition of a company with a vigorous sustainability programme can act as a springboard for an acquirer to incubate those same strategies into its own business."

According to Stephen Pike, a partner at Gowling WLG, a target's ESG posture could be a key factor in whether to abandon or proceed with a transaction. "Negative screening, for example, could involve declining to pursue an acquisition because the target's business activities or the poor management of ESG factors would pose a risk profile that would be unacceptable to the buyer. On the other hand, positive screening in target selection might seek a target that outperforms its competitors on relevant and material ESG factors, such as carbon footprint, water use and reuse, fully recyclable packaging and workforce diversity."

Furthermore, these strategies allow companies to incorporate ESG due diligence in areas such as climate change and greenhouse gas emissions in the environmental dimension, followed by human rights and labour standards in the social dimension. "Investing in firms with a good ESG performance can help with the post-deal financial returns as well," observes Dr Huang. "Also, many institutional investors are now actively avoiding assets with poor ESG standard, especially in the 'sin industries', such as tobacco, arms, gambling and alcohol businesses."

ESG and deal value

While it is beyond doubt that M&A transactions benefit significantly from the effective integration of ESG factors, it should be noted that there is no hard data that definitively links ESG oversight and value creation.

"The question as to the value of ESG is routinely asked but the data is not really there yet to directly link specific ESG actions to overall value," says Mr Clare. "Dealmakers will talk about specific bottom line cost savings, risk avoidance and focus in on hard-to-value improvements, which cannot always be connected to the bottom line, and then, ultimately, value. But it is widely accepted that well-run businesses from an ESG perspective are in high demand and transact more smoothly."

In an attempt to definitively link ESG oversight and deal value, academic researchers have investigated the impact of acquirer and target ESG compatibility using large samples of completed M&A transactions. "It has been shown that a fit of ESG between the firms involved in a deal to a significant extent reflects the similarity in their corporate culture," says Dr Huang. "Those firms tend to face lower frictions in their deal negotiation and integration stage. As such, they are more likely to close a deal with success, and to create higher synergy values which result in superior long-run operating performance. Thus, from the mega data of empirical studies, researchers find that the compatibility of firms' ESG contributes positively to deal success."

Future ESG value

Across the M&A spectrum, investors and dealmakers are increasingly factoring ESG considerations into their investment decisions, with ESG essentially a proxy for a company's long-term health and financial performance. Testifying to this uptick is BlackRock, which recently announced that all of its active investment teams consider ESG factors a core component of their investment process.

"The driver of this increased focus on ESG factors is the accelerating momentum of corporate governance moving beyond a shareholder primacy focus to a stakeholder and 'corporate purpose' focus," suggests Mr Pike. "ESG factors will therefore take up more of the board's attention and have a stronger impact on the long-term performance and value of a corporation."

That being so, companies are proactively addressing ESG issues as part of their business model. "We anticipate that demands for companies to increase their focus on ESG issues will continue to intensify in their frequency and volume," says Ms Sawyer. "How companies respond to these calls will ultimately contribute to their perceived value and risk in the context of M&A transactions.

“Over the next five years, we expect to see a rationalisation of approaches to ESG-related disclosures,” she continues. “The market will converge on a set of disclosure standards, which may well vary by industry and jurisdiction. With more consistent disclosure practices will come more useful data.” In other words, in future, it will become that much easier to measure which ESG practices correlate with better performance.

“With that kind of data in hand, it will in turn be easier for investors to direct investments to companies that outperform from both ESG and other perspectives,” adds Mr Drayton. “Once investors are able to target investments in this manner, we expect to see more companies optimising their approach to ESG in a cycle that will continue to refine itself and be extended to new sectors and types of businesses over time.”

China's Venture Capitalists Start Making Deals, Amid Signs of Recovery

By Yunan Zhang

A global epidemic that's forcing billions of people to work and study from home, or wear masks whenever they go out, might not seem like the ideal time to sell cosmetics. But in China, Perfect Diary, a four-year-old online makeup retailer selling items like brightly hued lip gloss and eyeliner, has been thriving. Perfect Diary's sales grew 250% in both January and February compared to sales a year ago, according to people who have direct knowledge of the company's performance.

ZhenFund CEO Anna Fang. Photo by Bloomberg

No wonder, then, that earlier this month, Tiger Global Management led Chinese private equity firms Hopu Management Investments and Boyu Capital in a $100 million investment in the startup. The fundraising valued the company at $2 billion, doubling its previous valuation from last September when it most recently raised money, according to people with direct knowledge of the deal.

The deal shows how investors are betting that the world's second-biggest economy will bounce back from the coronavirus-triggered shutdown of the past couple of months. On Wednesday, China reported that its manufacturing activity unexpectedly expanded in March after having collapsed in February.

"Deals have been getting done this year," said Anna Fang, founding partner and CEO of ZhenFund, an early stage investor in China. ZhenFund was an early investor in Perfect Diary, but didn't take part in this round. In March, her firm completed a few deals after meeting with entrepreneurs online.

Discussion about the investment in Perfect Diary, which hasn't been previously reported, began late last year, before the outbreak of Covid-19. Investors' agreement to double the value of the startup despite the epidemic underscores their faith in the resilience of China's middle class.

Consumer Brand Bets

Investors are putting money in other consumer brands in China. Online grocery delivery startup Dingdong Meicai, which is backed by Sequoia Capital, in March raised $400 million at a valuation of more than $1.5 billion, according to people briefed on the deal by the company. The startup, also known as Dingdong Fresh, said the total volume of transactions in February reached $169 million as it expanded to six cities from just one last year, when annual sales were $705 million. The deal hasn't been previously reported.

Heytea, one of China's largest tea chains, is closing a new round of financing, valuing the company at $2.3 billion, nearly double its previous valuation of $1.3 billion in 2019, according to tech media company 36Kr. The epidemic has badly affected business at Heytea's 400 shops. But the chain is recovering as more and more shopping malls return to regular opening hours. In recent weeks, Heytea sales have already bounced back to about 70% of their normal volume, according to an investor in the company.

Education is another hot theme. With schools closed, online education has taken off as parents seek ways to teach their children. Online education startup Yuanfudao, whose name means "ape tutoring" in Chinese, said March 31 that it had completed a new financing round led by Hillhouse Capital and Tencent valuing it at $7.5 billion. Tencent previously invested in Yuanfudao in late 2018, when it was valued at $3 billion, The Information reported.

"Everybody really went into seclusion during 45 days, and now activity is resuming. Our team in China is back to work," said Denis Barrier, CEO and co-founder of Cathay Innovation, a venture capital firm that invests in Europe, Africa and Asia. He said his firm was currently looking at investing in a startup in the field of automation for retail stores, and in another in cloud computing.

To be sure, some of the deals getting done now were already in the pipeline before the government extended the Chinese Lunar New Year national holiday in January, ordering businesses and schools to remain closed until February to contain the spread of the disease. And smaller or weaker startups that need to raise cash will have a harder time than before. Even larger startups are facing difficulties. Ride-hailing app Didi Chuxing, for instance, saw demand for its services fall when most workers stayed home.

But there's still a lot of money in China-focused investment funds, which raised record amounts of cash last year. "The leading funds raised huge sums of money in 2019; they raised billions," Barrier said. "There is enough money to get leading deals done."

Hot Companies

Investors said that in the current climate of uncertainty, they were more comfortable betting on the companies that are leading their industries. They said they expected to see more consolidation of companies within the market. Companies with strong growth and cash flow will draw more investment, and that will help them hire and retain top talent.

Perfect Diary fits that mold. It was founded in 2016 by Huang Jinfeng, a Harvard Business School graduate and former McKinsey consultant who previously worked at Procter & Gamble. The fast-growing startup is part of a trend of Chinese consumer brands looking to displace traditional retailers and foreign brands. They're similar to U.S. startups like Glossier, which promotes itself on Instagram. Perfect Diary, which is owned by Guangzhou-based Yatsen, relies on China's social networks, like Tencent's WeChat or ByteDance's short-video app Douyin, to promote its products.

The total volume of transactions on the platform, including sales and returns, grew to 3.8 billion yuan ($535 million) in 2019, up from 800 million yuan in 2018. The company's executives told investors that the goal is to reach at least 6 billion yuan by the end of this year.

The online retailer is expanding offline, too, in a manner similar to American companies such as eyeglass maker Warby Parker in the U.S. The company opened 49 physical stores last year and said it plans to open 150 more by the end of this year. The cosmetics company is also trying to expand beyond its existing product line and brand. It has launched a new skincare brand called Abby's Choice on Alibaba's Tmall earlier this year. Investors say they are betting on the company's potential to become the next Estée Lauder, which counts China as one of its key markets.

The Takeaway

As China's economy shows signs of recovering from the pandemic-triggered shutdown, private tech firms are raising money. The well-positioned firms, such as fast-growing cosmetics firm Perfect Diary, are even showing big increases in valuation.

"The future starts here" – four cases of industrial AR in automotive manufacturing

By James Blackman

The hottest new digital tech in the automotive space is not the electrification or automation of vehicles. It is not, actually, sensors or analytics in production facilities. Instead, it is augmented reality (AR), brought to life on voice-operated wearable computers, and sold as connected worker solutions.

In terms of digital pyrotechnics, augmented reality is delivering industrial change at the sharp end of manufacturing, now – on the production line, and on the bottom line. Automotive manufacturers are using industrial AR solutions for remote maintenance and fleet management, in particular.

Just ask US firm RealWear, which makes so-called "smart glasses for industry" – in a hard-wearing, voice-operated, Android-based, head-worn computer called the HMT-1, along with software for the experience. It has a bunch of testimonials lined up to tell the tale, from the likes of Groupe PSA, Toyota, and Volkswagen.

These are summarised below, along with its work with Renault Trucks. RealWear says its HMT-1 device is simple to set-up, easy use, and comfortable to wear. The company has a bunch of partners making software applications for its hardware, as it is deployed in a range of use cases.

But, actually, the automotive cases, presented below, are of a type: each is about remote work and guidance, between the shop floor – whether on the production line in factories or the garage in dealerships – and resident experts, armed with visual guides, commentaries, and years of experience.

A quick word from Renault Trucks before we get started – just because it zooms-out, and neatly captures the blue-sky vision. "The possibilities to transform the way we work with this technology are far-reaching, from hands-free inspections and voice activated report writing, to creating live step by step instructions," it says. "The future starts here."

Groupe PSA
Factory workers for Groupe PSA have logged more than 10,000 hours on AR headsets in the last two years. The French firm – which owns Peugeot, Citroën, DS Automobiles, OPEL, and Vauxhall – has made RealWear's HMT-1 headset available in 80 per cent of its factories to date, with plans to expand in the future.

Adoption has been swift, says RealWear. The HMT-1 head-gear, which clips into a hard hat and works well in noisy environments, has been adopted by technicians in factories in France, Spain, Portugal, Germany, Slovakia, Russia, Morocco, India, Argentina, and Brazil.

They are using the HMT-1 with remote visual guidance (VRG) software from HPE to conduct real-time two-way video conference calls with remote experts at other factories. Groupe PSA has been able to simplify assembly processes, reduce downtime, and improve the mission-critical tasks, says RealWear.

Guillaume Calfati, who leads "digital experiences and creative excellence" at Groupe PSA, comments: "Our fleet of HMTs was seamlessly integrated within our existing processes and passed all safety compliant requirements without question. We will continue to expand our HMT-empowered team with big plans ahead."

Renault Trucks
Renault Trucks is using AR to guide dealerships in the UK to speed up after-sales service for fleet customers. More rapid repair times mean more trucks on the road, and fewer in the garage.

Renault Trucks' solution, called Optiview, combines the HMT-1 head-gear with software from Canadian industrial AR solution provider Librestream. Technicians at fleet dealerships can contact technicians at head office for real-time guidance with a few simple voice commands.

The solution also supports two-way sharing of documents, images, and videos, as well as noise capture to help with visual inspection. Renault Truck says the initiative marks "a new era" for the firm, "where wearable AR and voice commands become the norm in our workshops and out in the field".

Derek Leech, the company's service market and retail development director in the UK, said: "The headset is the ideal wearable choice for technicians, giving them the support of the technical team right when they need it to speed up diagnosis and repair on complex issues. This technology will improve the efficiency of our dealer network and our customer service, resolving issues more swiftly."

Toyota
In Germany, Toyota has achieved a 20 per cent saving on field service costs by using AR based connected worker solutions from RealWear and German AR software firm Essert Digital. "With AR support, we can better decide when a field service is really necessary," says Toyota.

Achim Koch, product quality manager at the company, comments: "This increases the availability of the experts, improves the support of our dealers and increases customer satisfaction. The goal in the first year is to reduce 20 per cent of field service through the augmented support software. Each of these missions costs us about 1000 euros, as soon as a significant sum comes together."

Toyota has identified additional use cases, as well, says RealWear. It is planning pilot projects in its European production plants, for maintenance, repair, and operations, as well as in its warranty processing division.

Volkswagen Group
In the UK, Volkswagen Group has combined AR hardware and software from RealWear and Atheer, to deploy a 'remote expert live support' (RELS) system to connect technicians at Volkswagen retail dealerships to experts at its head-office in Milton Keynes. "They become connected workers in an instant," says the US firm.

The Atheer software gives access to technical information, rendered on the RealWear headset. Dealerships can get real-time guidance from remote experts when they run into problems, access critical doc, and get refresher courses to 'gen-up' on new components, systems and models.

The point is the car industry is modernising fast, with roll out of electric vehicles – and autonomous electric vehicles down the line. Volkswagen expects to have 22 million electric vehicles on the road during the next decade, and 70 new models.

The company is already enhancing the layout of its service bays in the UK, and investing in new skills training programmes for sales experts and technicians. To an extent, today's expertise will be yesterday's know-how, and staff will need to retrain. Industrial AR systems provide a smart facility for that education process.

Metin Tahsin, technical support manager for Volkswagen UK, said: "RELS enables our technical service centre to support Volkswagen's innovative new vehicles with industry-leading customer service, reliability and safety. We have seen the power of AR and believe it will be a major driver to transform the way we service and maintain the millions of new Volkswagen vehicles that will hit in the road the next few years. And we value Atheer's partnership and the power of the Atheer platform in making this a reality."

MixComm Announces Breakthrough 5G 28GHz Beamforming "SUMMIT 2629TM" Front End IC on GLOBALFOUNDRIES Enhanced 45RFSOI Solution

Sourced by MixComm

MixComm announced its first production device, the SUMMIT 2629. The New Jersey-based start-up's technology is based upon breakthroughs developed at Columbia University CoSMIC lab led by Dr. Harish Krishnaswamy. The SUMMIT 2629 integrates novel power amplifiers, low noise amplifiers, T/R switching, beamformers, calibration, gain control, beam table memory, temperature and power telemetry, and high-speed SPI control for a front-end module with optimal partitioning for 5G infrastructure. The device is fabricated on GLOBALFOUNDRIES® (GF®) 45RFSOI which has inherent advantages over other semiconductor technologies for infrastructure applications. The SUMMIT 2629 operates from 26.5-29.5GHz and is the first of a family of MixComm mmWave devices.

MixComm SUMMIT 2629 Product Highlights:

- Industry leading efficiency more than 2X better than existing solutions
- Four-element Dual-pol. TX/RX with Independent Polarization Beam Directions
- High-Power, High-Efficiency SOI CMOS Power Amplifiers
- State-of-the-art Low-Noise Amplifiers and Low-Loss T/R Switching
- Ultra-low Transmit and Receive-Mode Power Consumption
- 6-bit full-3600 Phase Shifting and 0.5dB-step 16dB-range Variable Gain in Each Path
- Fully calibrated for Gain/Phase Matching Across ICs
- Extensive On-chip Temperature and Power Sensing
- On-chip Gain Control for Temperature Compensation
- High-Speed SPI with Large On-Chip Beam Table Storage
- Wafer-Level Chip-Scale Package (WLCSP) compatible with low-cost PCB manufacturing
- Support for Large-Scale Arrays through Multiple Chip-Addressing Modes

"Over the next couple of years, we will start to see the true proliferation of mmWave 5G, but for this to be successful, a leap forward is required in the hardware technology. The SUMMIT 2629 provides this leap forward in the 28GHz band," said Dr. Harish Krishnaswamy, MixComm Co-Founder and CTO, adding, "Over the next several quarters, MixComm will be announcing several more products which will continue to march forward in performance, features and cost."

SUMMIT 2629 has been designed to address the critical challenges that currently constrain 5G mmWave success, by

1. Extending range to decrease carrier cost and improve customer satisfaction,
2. Reducing thermal and electrical power consumption budgets, and
3. Optimizing antenna arrays to reduce module cost.

These benefits make the MixComm solution ideal for 5G infrastructure ranging from gNodeB base stations and repeaters to customer premise equipment. The flexible architecture and ultra-low power operation will also enable 5G hotspots and other user equipment demanding long battery life and sleek form factors.

The MixComm team has worked with RFSOI process technologies for more than a decade. This experience is a key reason MixComm chose to work closely with the RFSOI leader, GF. 45RFSOI is a 45nm, partially-depleted SOI technology co-developed with Defense Advanced Research Projects Agency (DARPA) to accelerate mmWave innovation and enable commercially-viable applications. It is in high volume production at multiple GF fabs since 2008. RF-centric enhancements in device and technology features to this baseline platform, such as thick copper and

dielectric back-end-of-line features along with GF's design enablement delivers world-class performance in LNAs, switches and power amplifiers to its clients. These features make GF's 45RFSOI the ideal solution to handle the demanding performance and integration requirements of 5G mmWave applications.

"Working together, GLOBALFOUNDRIES and MixComm are partnering to push the envelope on integrated RF front-end innovation and accelerate the path to a 5G-connected world," said Bami Bastani, senior vice president and general manager of Mobile and Wireless Infrastructure at GLOBALFOUNDRIES. "Built on GLOBALFOUNDRIES' industry-leading 45RFSOI technology, MixComm's SUMMIT 2629 delivers an RF/mmWave solution that is positioned to support emerging 5G cellular communications infrastructure."

"No other company has as much mmWave and RFSOI design and product experience as MixComm," said Mike Noonen, MixComm CEO. "SUMMIT's breakthrough performance and features are a result of that head-start and our deep partnership with GLOBALFOUNDRIES."

The SUMMIT 2629 will be available for sample in Q2, 2020.

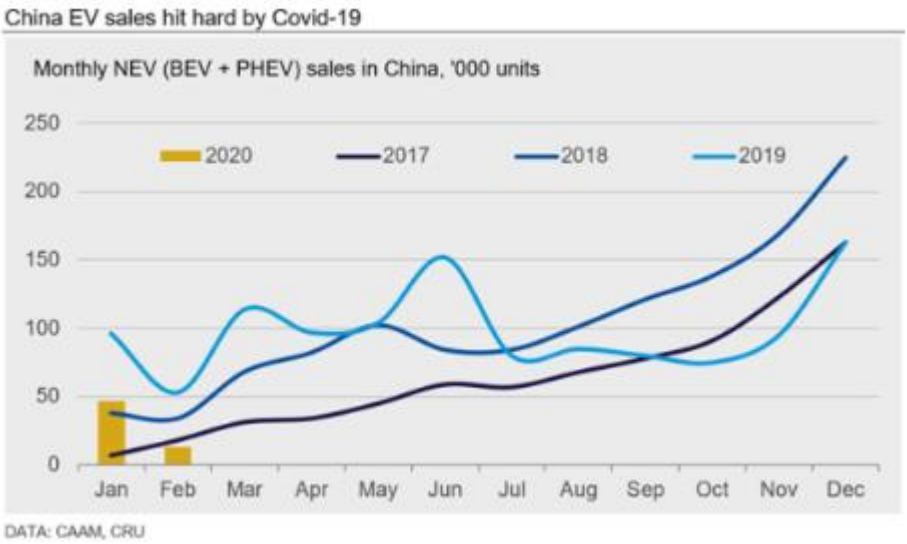
About MixComm Inc.

MixComm, based in Chatham, N.J., is a fabless semiconductor company developing transformative solutions for emerging wireless applications and markets. MixComm was co-founded in 2017 by Dr. Harish Krishnaswamy of Columbia University's Engineering School and Frank Lane, formerly Senior Director at Flarion Technologies and Vice-President of Technology for Qualcomm. The company's technology is based on breakthroughs from Dr. Krishnaswamy's CoSMIC lab at Columbia University and is funded by Kairos Ventures. The founding team has a proven track record in RFIC research and development and in commercializing cutting-edge RF silicon at both startup and large semiconductor companies. This company participated in Doosan & Chambiz Forum presenting their startup pitch deck.

Chinese EV sales hit hard by COVID-19 outbreak, but only for short-term

The COVID-19 has hit the Chinese EV sector hard; CRU, a provider of business intelligence on the global metals, mining and fertilizer industries, believes that weak sales will last at least until early Q2 2020. Nonetheless, it continues to forecast Chinese EV sales growth in 2020 over 2019's total.

EV sales in China dropped 75.2% y/y in February, with a decline of 79.1% for the whole Chinese auto industry.



CRU expects the Chinese EV market will remain becalmed until at least April. Despite the steady decline of case numbers in China, many consumers continue to be wary of visiting dealerships.

Despite the disruptions to Q1 2020, CRU expect EV sales to grow slightly this year for the following reasons:

- **Supportive government policies.** President Xi mentioned the need for incentives targeting the automotive industry during the meeting of the Chinese Politburo Standing Committee in February. The Ministry of Commerce and several local governments have also announced positive policies, with more likely to come this year. There is debate among decision makers about whether EV subsidy policies should remain at current levels or fall as was previously scheduled.

- **Pent-up demand.** Demand for electric vehicles is likely to emerge later this year once the COVID-19 outbreak has passed. Much of the sales lost in Q1 can be made up for later in the year. Automotive sales in January and February are typically low anyway and combined they generally account for less than one eighth of sales.

- **Major new EV models will be released in H2 2020.** Moreover, Tesla will continue to ramp up production at its Shanghai factory through the year. Despite the supply chain issues surrounding the Autopilot system in Model 3 deliveries in China, CRU still believes the vehicle will be highly popular with Chinese consumers and the sales could go beyond 100,000 in China this year.

CRU's base case view is that COVID-19 will have only a relatively short-term impact on the Chinese EV sector, and that total sales in China can grow slightly this year.

By Lou Frenzel

Battery technology has lagged all other electrical and electronic developments for decades. Some have actually said we're not much further along from the development of the long-lived lead-acid battery that's been around since its invention in 1859. The reason for its long life is that very few new batteries have been able to deliver that kind of power in a reasonably sized package.

The biggest recent development was the lithium-ion battery with its excellent power per size-weight rating, which has gradually been replacing many others in portable gear like smartphones. It's also slated to be the prime power source in our future vehicles, the EVs, and self-drivers. But now with this recent announcement, that could change.

At their press conference last week, the Battery Advanced Development Inc. announced its breakthrough battery technology. The new battery uses an unusual combination of chemicals for the electrodes and the electrolyte, an elixir they would not divulge. Unlike some of the new batteries that require special rare chemicals, this battery uses a stew of ingredients that are all readily available from existing resources.

With patents pending, the company is working toward producing a signature product. Now that the chemistry is out of the way, the next step is the engineering and manufacturing to mass-produce some versions of the product profitably.

A Peek at the New Battery

The company hasn't decided on a physical form factor yet, but apparently it will be possible to produce standard sizes like D, C, AA, and AAA cells. And it doesn't have to be as large as the typical car battery.

At the press conference, they showed a prototype about the size of a deck of cards. It has impressive specifications. The nominal output voltage is 13 V, which kind of makes one wonder what chemical cocktail they're using. Cell voltage is 4.3 V and three are required to make the 13-V battery.

But that's not the real eye-opener. This battery can supply as much current as a car battery. One of the demos at the press conference involved starting a car with just the new miniature battery. Like having an ordinary DieHard or Interstate battery in your shirt pocket. Impressive. Maybe unbelievable is a better word to describe it.

The Good News and the Bad News

This new battery really is a major development. It will change some things, but not others. In my assessment, there will be some positive outcomes but with some conditions. For starters, this is a primary battery—not a secondary battery—so it's not rechargeable. When they're used up, you need to get a new one. You will have to replace them probably at high cost, initially at least.

Instead of recharging your electric vehicle overnight, you simply open the car hood and replace the batteries like you would change the AA cells in flashlight. This is good news for the battery company, as a constant supply will be needed. Time to buy stock in Battery Advanced Development?

At the press conference, the CEO introduced the company's development team, literally three heavily bearded guys working for a couple of years in an uninsulated cinderblock building in Oklahoma. All three were close college buds, two chemists and one EE. No names were given. They are part of a subsidiary research organization called Advanced Science Systems. I wanted to ask how they arrived at the chemical combination that produced the breakthrough, but they took no questions.

The other bad news is that a whole boatload of dead batteries will need to be disposed. There was no discussion of this; maybe an environmental crisis in the making.

But look on the positive side. Batteries like this will make electric vehicles practical at last. And perhaps, they will lead to applications like replacing solar-powered homes with battery power. Or minimizing the need for wind power. Based upon a good battery life, you could run your whole home from a few of these batteries and some inverters. You just have to keep a stock of these replacement batteries on hand as they will eventually fail.

Imagine yourself on a driving trip in Nebraska. While driving on I80 near Cheyenne, Wyo., your EV dies. You get out your spare battery and replace it. It's not as big or heavy as your spare tire. Your EV requires the near 800-V level to run the motor and other things. Be careful as you plug in that new hot 800-V dc supply.

What Do You Think?
Yes, this is a significant battery breakthrough, but with reservations. Are the downsides less than the upsides? And forget about charging, it's not an option. Keep a spare battery in your EV at all times. Thankfully it will be small. While other EV users will be waiting in line at the only charging station in Nebraska, you will be hours ahead on your way to Wyoming.

The founders of the company and its subsidiary concluded the press conference with a summary of the VC interest. Will a one-million-square-foot battery factory in the desert of Utah become a reality? Is it time to invest or not? If you were a VC, would you?

Look for our follow-up articles as we are closely tracking the progress of this development. If we can get a representative battery, we will run some tests to see where this bizarre new battery fits into the battery spectrum. Stay tuned.

Fig.1 Example use case for printed electrochromics: a shock detector smart label with an interactive printed interface.

Expanding Need for Simple Electronic Display Functionality

Rapid advances in the miniaturization and reduction of costs in computing, electronic sensing, and communications have allowed the integration of "smart" electronic functionality into almost everything. "Intelligence" is now embedded into a wide range of everyday objects, and spread throughout our working and living environments. Much of this intelligence, data collection and transfer is hidden from the human senses, requiring little or no human involvement. But as the number of human daily touch points and interactions with smart devices grows, so too does the importance of user experience design and the role of displays.

Conventional electronic displays cannot be economically and sustainably applied into all smart objects and environments and can often times be functionality overkill for the simple display requirements of many everyday objects. Also, user experiences built around the need for extensive use of separate reading devices, e.g. RFID or Bluetooth readers in smart phones, can be increasingly challenging especially with the high number of distractions and strong competition for attention on mobile screens. Further with a doubling of screen time over the past four years among certain user demographics, there is also a growing sense of screen fatigue leading to people "detoxing" from light emitting screens while still valuing user interfaces that are useful yet unobtrusive.

> "As technology becomes ubiquitous, it also becomes invisible."
> - Kevin Kelly, Wired magazine Founding Executive Editor

When technology becomes ubiquitous, it needs to seamlessly blend into the product and our surroundings. The user experience should be effortless. As the "computing" or intelligence blends into smart objects and environments, also the displays need to become more practical: i) eliminating the need for recharging or replacing of batteries, ii) eliminating the amount of effort to access information, and iii) be inexpensive for intended purpose.

Printed Electrochromics Brings Everyday Printable Objects and Surfaces to Life

Electrochromic devices (ECD) are electrochemical cells where color changes occur upon electrochemical reactions of two or more redox active electrochromic materials electrically connected by an external circuit and physically separated by an ionic conducting layer (electrolyte layer). Electrochromic materials and devices can be controlled to change their color and opacity by the application of electrical stimuli. ECDs are a non-light emitting reflective

technology. Materials for ECD manufacture can be taken into the form of printable inks and the manufacturing processes made compatible with standard graphic printing and converting processes. The resulting device can be made thin, flexible, transparent, robust, and ultra low-power. As ECDs can be produced into a wide range of different shapes and sizes, they offer a wide range of advantages for product design and integration.

Fig.2 Electrochromic devices can be printed in sheet-to-sheet or roll-to-roll. Ynvisible Production R2R line in Linköping, Sweden.

R&D toward printed electrochromics began in the 1990s. In recent years, with strong advances in printed electronic and hybrid electronic systems, developments of ECDs have made strong technical progress into mass-manufacturability. Electrochromic displays and visual indicators are now entering markets that are considered "blue ocean" from the perspective of the electronic display industry. In these market spaces conventional printed products and surfaces now meet electronics. The over 800 billion USD per year printing industry, and particularly the industrial printing sub-sector, are welcoming printed electronic systems with high level of interest.

Things Alive

Today Ynvisible Interactive Inc. ("Ynvisible") is leading the charge to bring printed electrochromics into market. Ynvisible was established with the vision to bring everyday objects and surfaces to life benefitting people in a smart and connected world. The company's mission is to provide practical human interfaces to smart everyday objects and ambient intelligence.

After early explorations into different chromogenic systems the company focused on developing electrochromics into a mass producible, ultra-low power consuming visual interface technology. The company now develops and commercializes different printed electrochromic systems on film materials. By combining other printed electronic components and microelectronics into the electrochromic system, the company designs and produces interactive graphic solutions for everyday smart objects and surfaces.

Ynvisible aims to be the leading supplier of design tools, inks and quality control systems for the design and production of interactive printed graphics based on printed electrochromics and other printed electronics technologies. The company is building its technology and products platform under the ynvisible™ brand (ynvisible is a registered trademark in certain countries and territories).

Fig. 3 Electrochromic displays on a temperature label provide clear visual indication and are easy to implement - user friendly and available in high volumes.

Ynvisible's primary focus is on applications in retail and logistics (where ECDs are printed onto RFID tags and RF-based smart labels), premium consumer brand products, and healthcare and wellness (in particular medical and diagnostic devices). Today the company offers a full services package to help product developers and designers get started with printed electrochromics. Ynvisible's design, prototyping, customer training and sheet-to-sheet production services are based in Almada, Portugal. The company's inks development and R&D services are based in Freiburg, Germany. In Linköping, Sweden the company operates a roll-to-roll production facility with extensive printing, converting, and quality control system capabilities. In addition to high volume ECD printing, the high capacity production line is utilized for printing of other printed electronic components and systems. Ynvisible sells printed electronics production upscaling services to other product owning companies.

Ynvisible Interactive Inc. is a publicly traded company, listed in the Toronto Stock Exchange Venture list [TSXV:YNV], the OTC Markets [OTCQB:YNVYF] and the Frankfurt Stock Exchange [FRA:1XNA]

Getting Started With Printed Electrochromics
To learn more about Printed Electrochromics, Ynvisible is hosting a free webinar on Apr 2, 2020 12:00-1:00 PM in Eastern Time (US and Canada). The one hour webinar includes speakers from the Georgia Institute of Technology, NXN-IP and the University of Lapland. To register see: https://www.ynvisible.com/events

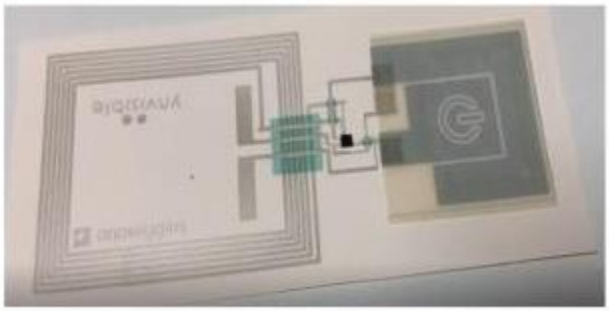


Fig.4 Printed paper label with printed NFC antenna and printed electrochromic display on the same substrate. A collaboration between Arjowiggins and Ynvisible.

Start-Ups Are Pummeled in the 'Great Unwinding'

Dozens have laid off thousands, slashed costs and changed their businesses to try to survive the pandemic. All that may not work.

By Erin Griffith

After a crush of travel cancellations in March, WanderJaunt, a short-term home rental start-up in San Francisco, laid off 56 of its 240 employees last week.

Demand for services from Wonderschool, a start-up that helps people find day care and preschool providers, dropped by half, leading it to cut most of its 60-person staff.

And at ClassPass, which offers a membership program for fitness classes, over 95 percent of revenue evaporated in just 10 days as studios and gyms around the world shut down. To survive, the start-up slashed spending, froze hiring and rushed to build a video streaming service for virtual workouts.

"This is the great unwinding," said Martin Pichinson, head of Sherwood Partners, a Silicon Valley advisory firm that restructures failed start-ups. In recent weeks, he said, his firm has fielded a "firestorm" of calls — a volume three or four times the highest he had ever seen.

Start-ups have always been risky, designed to grow fast or die, but the coronavirus pandemic is turbocharging Silicon Valley's natural selection and causing a shake-up so sudden it has defied comparison. In just a few weeks, more than 50 start-ups have cut or furloughed roughly 6,000 employees, according to a tally by The New York Times. Plans for initial public offerings are on hold. And funding is drying up for many young tech companies.

The fallout is hitting the highest-profile start-ups as well as the smaller ones trying to disrupt them. Airbnb, the home rental start-up valued at $31 billion, has stopped hiring and has suspended $800 million of marketing. Bird, an electric scooter start-up, laid off 30 percent of its staff last week, while Everlane, an apparel company, cut or furloughed hundreds of workers.

The real estate start-ups Knotel and Convene have laid off or furloughed half of their workers. The hiring site ZipRecruiter cut around 40 percent of its staff. OneWeb, a satellite start-up that had raised $3 billion in venture funding from investors including SoftBank, the Japanese conglomerate, filed for bankruptcy on Friday and plans to sell itself. And travel start-ups — Vacasa, Sonder, Inspirato, Zeus Living and TripActions, among others — have been some of the hardest hit.

Daniel Zhao, a senior economist at Glassdoor, a workplace review and job listings site, said the situation facing start-ups now was worse than in downturns like the dot-com bust in the early 2000s and the financial crisis of 2008.

"The coronavirus outbreak is economically akin to a major hurricane occurring in every state around the country for weeks on end," he said.

The numbers are stark. In March, job listings at the 30 most valuable start-ups in the United States dropped 19 percent, or an average of 21 jobs each, according to Thinknum Alternative Data, a research company. Start-up funding in the first three months of 2020 was also on a pace for its second-steepest quarterly decline in 10 years, said CB Insights, which tracks start-ups.

Start-ups in some areas — telemedicine, food delivery, online learning, remote work, gaming — are thriving amid the quarantines. And there were signs that the boom times were shaky even before the coronavirus brought wide swaths of the U.S. economy to a halt.

But the pain is now deeper and most likely just beginning, especially as investors, already bruised by a string of disappointing I.P.O.s last year, become even more cautious. On March 5, Sequoia Capital, a top venture capital firm in Silicon Valley, issued a warning to start-ups, calling Covid-19 "the black swan of 2020."

Bill Gurley, an investor at the venture capital firm Benchmark, said that over the past 10 years of the start-up boom, investors had taken on more and more risk. That has changed, leaving many of the riskiest start-ups exposed.

"'Risk on' happens slowly," he said. "'Risk off' happens overnight."

Let Go With Little Warning

For start-up workers, the past few weeks have been sobering. Many had bought into the tech industry's change-the-world ideals, had few boundaries between their work and personal lives and hoped for big payouts if their start-ups went public. Now they were being laid off over video calls.

At Bird, the Los Angeles scooter start-up, which had once been valued at as much as $2.5 billion, hundreds of employees were invited to a video conference call on Friday morning with just an hour's notice. On the call, the voice of an unidentified executive explained that their jobs had been eliminated. A slide outlined the terms: a month of severance pay, three months of medical benefits and one year to exercise their stock options.

The workers were asked to mail in their laptops, said Jenny Alvauaje, a Bird data analyst who was on the call. Some workers missed the call but learned they had been laid off when they lost access to internal systems shortly after, she said.

In a statement that called the layoffs "a difficult decision," a Bird spokeswoman added, "We purposefully and intentionally did not have any video on to protect privacy as we delivered the news live to individuals."

The end was equally abrupt for Nik Buenning, 40, a data scientist at Panoramic, a marketing software start-up in Los Angeles. He was just settling into his work-from-home setup on March 23 when a companywide email said to expect a call from human resources.

Right away, he said, "people started sending Slack messages like, 'I'm out.' 'I'm out.' 'I'm out.'" An hour later, he was out, too.

Mr. Buenning signed up for Upstream, a new networking app that unveiled itself earlier than planned to cater to tech workers affected by coronavirus layoffs. Sites like Silver Lining are also helping people connect with companies that are still hiring.

Many start-up workers have added their names to Google spreadsheets, which recruiters share in weekly newsletters like Layoff List, created by a recruiting company called Drafted. Hiring managers, venture capitalists and start-up advisers read the newsletter, said Vinayak Ranade, chief executive of Drafted.

Some laid-off workers said they might flee to the safety of the largest tech companies, which are sitting on piles of cash and benefiting from increased use in the quarantines.

When Kenyon Brown, 24, a product manager, left his job early this year at Mariana Tek, a software company in Washington, he had eight or nine promising job leads at start-ups. Those quickly evaporated as the virus spread. He

said he was now more open to big tech companies since they were still hiring. The situation "has definitely forced me to think about my short-term career in another light," he said.

Survival Mode

The start-up survival guide reads something like this: Cut spending, lower prices on products, renegotiate fixed costs for things like leases and ask the government for assistance for the fitness studios, home rental operators or gig workers they rely on.

Some entrepreneurs said they viewed the coronavirus as a moment to rally around their company's mission, citing the "wartime C.E.O." idea popularized among start-ups by the venture capitalist Ben Horowitz. It states that executives facing an "imminent existential threat" do whatever it takes to win.

"There are no distractions now," said Michael Chen, 30, chief executive of WanderJaunt, the short-term home rental start-up.

Mr. Chen's four-year-old company, which had raised $27 million in funding, has slashed its prices; a house that rented for $700 a night now goes for $100, for instance. And it has switched its focus from vacation travelers to those displaced by the virus, like stranded college students, people seeking a separate work space or medical workers isolating themselves from family.

At Sonder, a travel start-up in San Francisco that laid off 282 people and furloughed 135 of its 1,254 workers last week, the speed of decision-making has increased from a few days to a matter of hours.

"In many ways it's energizing, but it's also quite chaotic," said Francis Davidson, chief executive of Sonder, which raised $345 million in funding and was valued at $1.1 billion. He said his investors had advised him to cut fast and deep to allow employees to hit the job market before things got worse and to avoid multiple rounds of layoffs.

"People that are looking for a really coddled environment should not be in start-up land," he said. "You need to have thick skin and a high adversity quotient."

'A Time of Weeding Out'

Many venture capital firms are flush with cash from record-breaking hauls in recent years. But they may not decide to use the money to keep struggling start-ups alive.

"There's no doubt that this will be a time of weeding out of start-ups that can't survive," said Mike Jones, an investor at the venture capital firm Science.

One venture capital firm in San Francisco, Alpha Bridge Ventures, said it was too small to pour more money into its start-up investments. The firm has made a promise to the founders it has backed: If their companies fail because of the coronavirus, it will give them $25,000 for their next company.

"We can at least take one burden off their shoulders," said Jake Chapman, an investor at Alpha Bridge, adding that two or three of the firm's 21 investments are at risk of failing.

In lieu of networking events and lavish retreats, venture firms are now dispensing advice in blog posts, on Twitter and at virtual panels over Zoom. At a March start-ups event, Alexis Ohanian, an investor at Initialized Capital in San Francisco, encouraged founders to adapt to the new reality.

"If what you're doing now is just not a viable solution in this new world and in a different economy," he said, "then find something that is."

Nokia: 5G can't be done properly without cloud computing

Nokia exec: 'You cannot do 5G properly without taking advantage of cloud computing technologies"
To demonstrate just how varied Nokia's approach to 5G is, the Finnish company's Global Head of Mobile Networks Marketing Sandro Tavares explained to RCR Wireless News that its 20 global 5G contracts that have gone live span all different spectrum zones and all different technologies, including macro cells, massive MIMO, small cells and more.

"We right now are counting 69 deals on 5G, globally," said Sandro, adding that it's important to remember that 5G is more than just radio, evident in the fact that 60% of those deals are end-to-end solutions, and therefore, cover a lot more than just radio systems.

"Especially as you move further towards 5G standalone (SA), and even on NSA, the capabilities across the network are extremely important — transport, the mobile core, all of that is important," he continued.

With the introduction to 5G SA to the conversation, Sandro provided some insight into 5G's next biggest chapter.

"The expectation is that 5G SA will start to reach maturity throughout this year," he offered. "By the end of this year, we should start to see initial deployments, and it should reach mainstream sometime next year."

He also stated that the high interest in SA from the enterprise and industry side of things — to power low-latency applications — will likely speed up its deployment and adoption.

"A lot of these innovative use cases that we talk about with 5G are enabled by SA, especially when you're talking about ultra-low latency applications, like IoT," he said.

One thing that Sandro really wanted to get across is how critical cloud computing is to 5G's success, stressing that 5G cannot be "done properly" without taking advantage of cloud computing.

"Cloud computing technologies play a significant role in enabling 5G," he continued, "even if we take a more conservative approach, and deploy the 5G radio access in a 'classic' way, with the classic approach of hardware that is built for the purpose for the radio access, the core is going to the cloud regardless."

He added that once we get to 5G SA and the requirements for low latency become "more pervasive and more present," the networks and cloud infrastructure are going to evolve to amore distributed approach.

"You're building smaller, and in some cases, very small, data centers closer to the edge of the network so you can host the infrastructure and the applications that they're going to be delivering," he explained further.

In addition, the applications — whether consumer or industrial — on 5G networks will also be running on the cloud, either the public cloud or private clouds built by operators. But the cloud, nonetheless.

Finally, he said that even for the radio access, there is a lot of movement towards virtualizing the RAN, which, Sandro points out is basically utilizing cloud computing technology to run the baseband processing for the base stations.

"That is something that some of our customers are already doing and still others will do," he concluded, "and it's an extremely valid option for the optimization for the capacity of the RAN."

What's the future hold for unlicensed use of the 6 GHz band?

By Sean Kinney

FCC scheduled to vote April 23 on new rules for unlicensed use of 6 GHz
After taking fairly extensive public comment, the U.S. Federal Communications Commission at its April 23 open meeting will consider new rules that would open 1200 megahertz of the 6 GHz band for unlicensed operations. FCC Chairman Ajit Pai this week said he was "circulating draft rules" designed to allow unlicensed devices to share the spectrum with incumbent licensed users based on rules "that are crafted to protect those licensed services and to enable both unlicensed and licensed operations to thrive throughout the band.

Pai noted consumer use of Wi-Fi as well as projected increases in the use of Wi-Fi for mobile data offload in detailing his support for the move. "To accommodate that increase in Wi-Fi demand, the FCC is aiming to increase the supply of Wi-Fi spectrum with our boldest initiative yet: making the entire 6 GHz band available for unlicensed use," he said in a statement. "By doing this, we would effectively increase the amount of spectrum available for Wi-Fi almost by a factor of five. This would be a huge benefit to consumers and innovators across the nation."
As currently contemplated, 850 megahertz would go toward standard-power unlicensed use, and low-power, indoor unlicensed operation would be across all 1200 megahertz. According to Pai's statement, "An automated frequency coordination system would prevent standard power access points from operating where they could cause interference to incumbent services."

Here's a variety of comments from a number of stakeholders across the telecom industry:
Mark Racek, Senior Director, Regulatory Policy at Ericsson, said in a statement**, "**Mid-band spectrum is critical for the U.S. to lead in the development of a robust 5G ecosystem. Other countries are far ahead of the U.S. in identifying and assigning licensed mid-band spectrum. Licensed spectrum in the upper 6 GHz band is necessary to ensure U.S. 5G leadership by facilitating new wireless applications and services beneficial to consumers and businesses. At the same time, Ericsson recognizes the need for a mix of both licensed and unlicensed spectrum and, therefore, urges the FCC to move ahead with opening the lower 6 GHz range for unlicensed use if incumbent users can be assured of protection from interference, and we request the FCC to seek additional comment on licensed use of spectrum in the 6 GHz band."

From trade association CTIA's EVP Brad Gillen: "We support the FCC's efforts to make the lower half of the 6 GHz band available for unlicensed use and will continue to work closely with the commission to ensure rigorous protections for licensed services already existing in the band. While the FCC has done a remarkable job freeing up critical licensed spectrum for 5G, the United States faces a growing mid-band deficit. It is essential that the FCC and the administration develop a roadmap to close this deficit before moving forward with plans to give away the full 1200 MHz in the 6 GHz band and further limit our few remaining options."

Intel EVP and GM of the Client Computing Group Gregory Bryant said in a statement, "Intel commends the FCC for opening the 6 GHz spectrum band for unlicensed operation, which will significantly improve Wi-Fi for all Americans. We deeply appreciate the efforts of FCC staff who have worked tirelessly assessing the complexities associated with the 6 GHz band, and eagerly await the FCC addressing this important topic at its April 23rd meeting."

Derek Peterson, CTO of Boingo Wireless, said, "The expansion of Wi-Fi into the 6 GHz band provides exciting new real estate that lays the foundation for continued wireless innovation. The significant swath of contiguous spectrum is well suited to facilitate Wi-Fi's skyrocketing growth, and will enable Boingo to maximize the benefits of neutral host Wi-Fi 6 deployments at major airports, stadiums, military bases and multifamily communities."

CommScope CTO Morgan Kurk said, "Along with initiatives such as CBRS and C-Band, the Commission's actions are providing the essential mid-band spectrum (licensed, unlicensed, and shared) that enable the U.S. to lead the transition into the 5G era. The wireless industry needs more spectrum to enable wider channel bandwidths which in turn will usher in the multi-gigabit age. This decisive move by the FCC will give Wi-Fi and other unlicensed services the capacity and capability to drive new and innovative applications. The current COVID-19 situation vividly illustrates how a high-bandwidth, high-reliability, highly accessible network is as critical as electricity to survive and thrive in society."

Qualcomm CEO Steve Mollenkopf said in a statement, "Qualcomm fully supports the FCC's plan to allocate the 6 GHz band for advanced unlicensed operations at its April 23rd meeting. We applaud FCC Chairman Pai and his fellow FCC Commissioners for this initiative, which will provide American consumers with better, faster broadband for so many uses, including telemedicine, remote learning and working, fully immersive augmented and virtual reality, & the Internet of Things. In February, we demonstrated a full suite of Wi Fi 6E products ready to start using this large new swath of spectrum. We are also optimizing other exciting new technologies for this large swath of spectrum, including the next version of 5G and next generation Wi-Fi. Today's announcement is another important step taken by the FCC to ensuring American leadership in the key 21st Century enabling technologies."

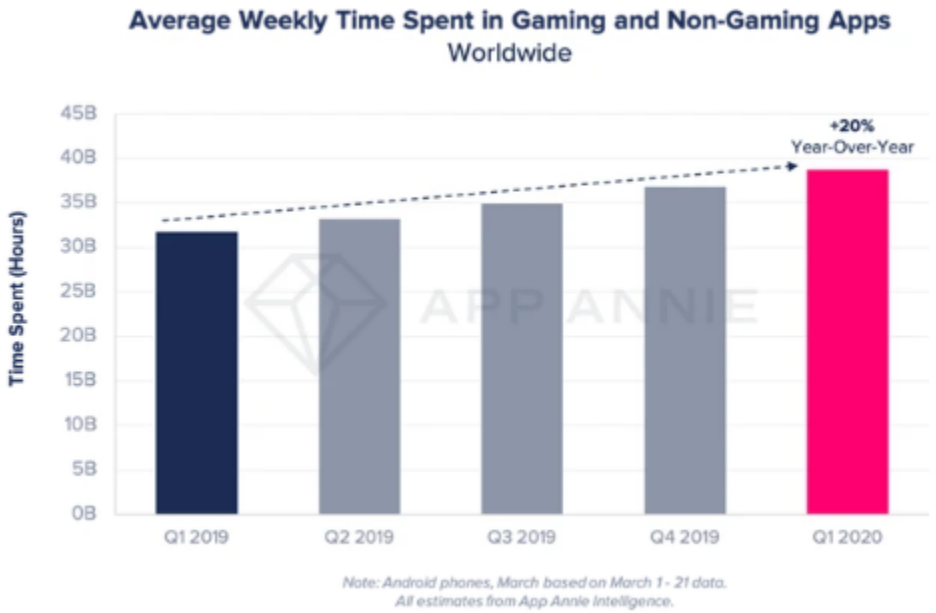
To get an idea of some of the objections to how the FCC is approaching 6 GHz, read the following:

- Tech, Wi-Fi companies back broader unlicensed use at 6 GHz; public safety and utilities balk
- Tech giants shred NAB research on unlicensed use of 6 GHz as 'wildly inaccurate'

Consumers spent record $23.4 billion on apps in Q1 2020, thanks to being stuck indoors

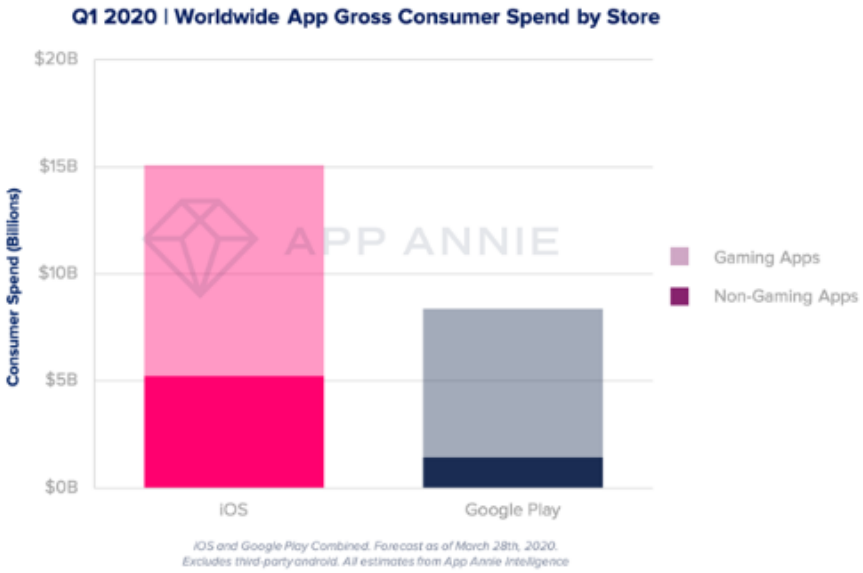
By Sarah Perez

Time spent in mobile apps has been surging, as people stuck at home due to the coronavirus outbreak have been turning to apps to do their shopping, manage their finances, find new exercises, work from home and stay entertained. According to new data from App Annie, released today, Q1 2020 was the largest-ever quarter in terms of consumer spend on apps. In addition, the average weekly time spent in apps and games worldwide was up 20% year-over-year in the quarter, based on an analysis of Android devices.



This has translated to a record increase in consumer spending on the app stores.

In Q1 2020, consumers worldwide spent over $23.4 billion through the app stores — the largest-ever quarter, App Annie said. iOS accounted for $15 billion of that figure and Google Play was $8.3 billion. Both of these figures were an increase of 5% year-over-year on their respective platforms. Non-gaming apps accounted for 35% of consumer spend on iOS and 15% on Google Play. Meanwhile, consumers spent over $16.7 billion on games in the quarter.



The U.S. and China were the largest contributors to consumer spend on iOS, and the U.S., Japan and South Korea were the largest on Google Play.

Android users spent the most on Games, Social and Entertainment apps, thanks especially to Disney+ and Twitch.

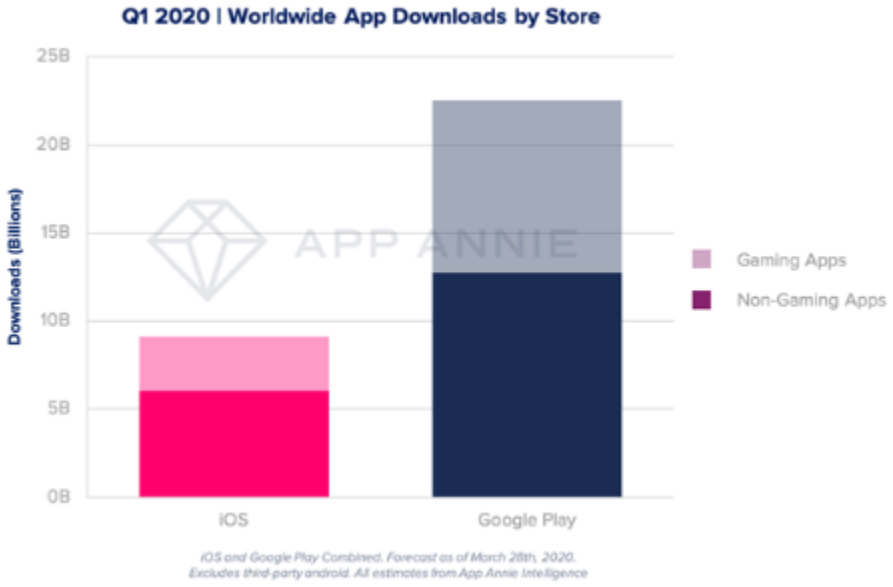
Meanwhile, iOS users spent the most on Games, Entertainment and Photo and Video apps, with TikTok notably breaking into the top five by consumer spend on iOS in the quarter, at No. 3 behind Tinder and YouTube.

Top Apps Worldwide
iOS App Store & Google Play, Q1 2020F

Rank	Downloads	Rank Change vs. Q4 2019	Consumer Spend	Rank Change vs. Q4 2019	Monthly Active Users	Rank Change vs. Q4 2019
1	TikTok	-	Tinder	-	Facebook	▲ 1
2	WhatsApp Messenger	▲ 1	YouTube	▲ 3	WhatsApp Messenger	▼ -1
3	Facebook	▼ -1	TikTok	▲ 5	Facebook Messenger	-
4	Instagram	▲ 1	Netflix	▼ -1	WeChat	-
5	Facebook Messenger	▼ -1	iQIYI	▼ -1	Instagram	-
6	Likee	-	Tencent Video	▼ -4	TikTok	-
7	Snapchat	▲ 1	Disney+	▲ 4	Alipay	-
8	SHAREit	▼ -1	Google One	▲ 1	Kwai(快手)	▲ 6
9	Netflix	▲ 1	Pandora Music	▼ -3	Pinduoduo	▲ 2
10	Spotify	▼ -1	LINE Manga	-	Taobao	▼ -2

Note: Downloads and consumer spend based on combined iOS App Store and Google Play as of March 28th. MAU based on iPhone and Android phone combined, last full month of data(Feb 2020). All estimates from App Annie Intelligence.

31 billion apps installed in Q1 2020
There were also 31 billion new app downloads in Q1 2020, up 15% from the fourth quarter of 2019. That's notable, given that the fourth quarter usually sees a big boost in app installs from holiday sales of new phones, and Q1 managed to top that.



On Google Play, downloads were up 5% year-over-year to 22.5 billion, while iOS downloads were up 15% year-over-year to over 9 billion.

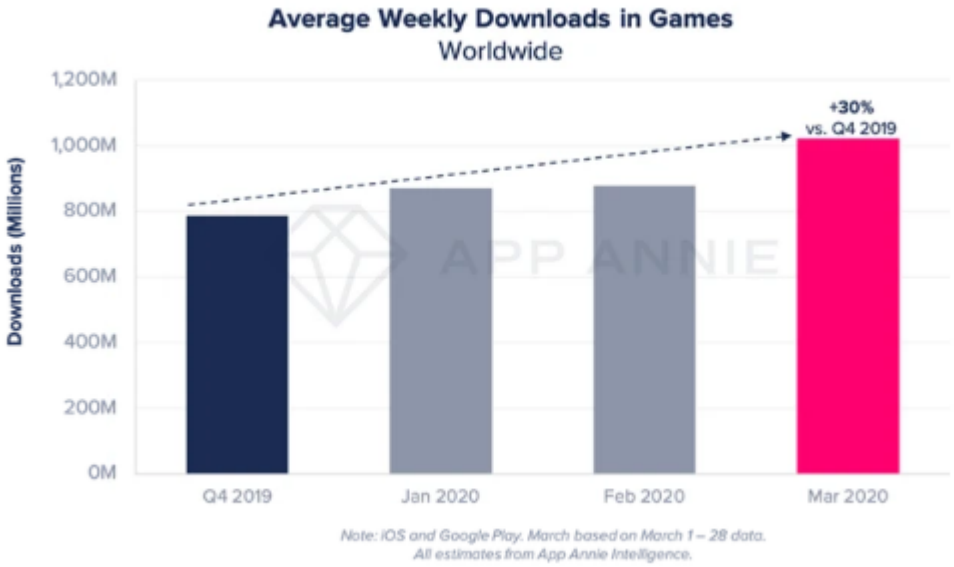
Non-gaming apps on Google Play accounted for a majority (55%) of downloads, and on iOS, they were 65% of downloads — an indication that people were looking for a variety of mobile apps to manage their newly stay-at-home and work-from-home lives, not just distractions.

The largest markets for Google Play downloads were India and Brazil, owing to their sizable populations and preference for lower-cost, Android devices. On iOS, China and the U.S. were the two largest markets by downloads and the main drivers of download growth for the quarter.

Mobile Games, Tools and Entertainment were the largest categories for Google Play downloads while Games, Photo and Video, and Entertainment were the largest categories on iOS.

On both platforms, Games drove the most growth.

In Q1 2020, mobile game downloads grew 20% year-over-year to reach over 13 billion in the quarter. They were also up 30+% on a quarterly basis.



On Google Play, game downloads were up 25% to nearly 10 billion, year-over-year, and on iOS they were up 25% to top 3 billion in Q1.

Users downloaded Puzzle, Simulation, Action and Arcade games in the quarter, but spent the most on Role Play, Action and Strategy games, as is typical.

Top Games Worldwide
iOS App Store & Google Play, Q1 2020F

Rank	Downloads	Rank Change vs. Q4 2019	Consumer Spend	Rank Change vs. Q4 2019	Monthly Active Users	Rank Change vs. Q4 2019
1	Brain Out	6	Game For Peace	2	PUBG MOBILE	-
2	Hunter Assassin	▲ 12	Honour of Kings	▼ -1	Candy Crush Saga	▲ 1
3	Woodturning	↑	Monster Strike	▼ -1	Honour of Kings	▲ 1
4	Johnny Trigger	▲ 68	AFK Arena	▲ 34	Game For Peace	▲ 3
5	PUBG MOBILE	▼ -2	Candy Crush Saga	▼ -1	Call of Duty: Mobile	▼ -3
6	Free Fire	-	Lineage 2	▲ 31	Anipop	-
7	WormsZone.io	↑	Fate/Grand Order	▼ -2	Subway Surfers	▲ 2
8	Subway Surfers	▼ -3	Gardenscapes - New Acres	▲ 5	Clash of Clans	-
9	Draw Climber	↑	PUBG MOBILE	▲ 2	Pokémon GO	▼ -4
10	Rescue Cut	-	Rise of Kingdoms	▲ 6	Minecraft: Pocket Edition	▲ 3

Note: Downloads and consumer spend based on combined iOS App Store and Google Play as of March 28th. MAU based on iPhone and Android phone combined, last full month of data (Feb 2020). All estimates from App Annie Intelligence.

Other categories seeing strong downloads across both platforms included Heath & Fitness, Education and Business. Health & Fitness was up 40% on Google Play and 30% on iOS, quarter-over-quarter. Education was up 35% on Google Play and 40% on iOS. And Business was up was up 30% on Google Play and 35% on iOS.

Facebook, Instagram, WhatsApp Leaders Shift Focus During Crisis

By Alex Heath

Will Cathcart, who runs WhatsApp, is doing whatever he can to keep the Facebook messaging service from crashing under a crush of users. Fidji Simo, who runs Facebook's main app, plans to give small businesses a way to fundraise through the site. And Vishal Shah, a top executive at Instagram, is making live broadcasting more appealing on the photo-sharing app.

Like most leaders in the tech industry, the people who run Facebook's highest-profile products have seen their jobs turned upside down over the last few weeks, as the coronavirus pandemic has forced them to ditch plans that now seem irrelevant while turning to other matters that are suddenly immediate necessities. In interviews with The Information, Cathcart, Simo and Shah talked about how their priorities have shifted in the past few weeks. They were less clear about how the economic fallout from the pandemic would hurt Facebook's advertising business, though it almost certainly will.

For Simo, the choices were clear. With many businesses struggling due to the current lockdown, Facebook on Thursday announced that it will permit businesses to use the Facebook crowdfunding feature, which it had previously restricted to nonprofits and individual accounts. Businesses will also now be able to sell gift cards directly to Facebook users in the U.S. for the first time. (Sibling app Instagram is working on a similar offering.)

Other product tweaks will allow businesses on Facebook to more easily show customers if they've changed their offerings due to the pandemic—for example, restaurants shifting to only providing food pickup and delivery.

Before the outbreak turned into a full-blown crisis, one of the newer features Simo's team had been focusing on was enhancements to Marketplace, Facebook's Craigslist-like service for buying and selling items locally. But with public health officials widely ordering people to stay at home, it seemed unlikely that many people would want to meet up with strangers to swap goods. The same thinking applied to Facebook's Events product for organizing real-world gatherings. Simo put those products on the back burner.

"There's no doubt that this product is less relevant right now than [in] the past," she said of Marketplace, noting that the Events team was now focusing on facilitating virtual gatherings rather than physical ones.

Facebook Live's Resurgence

At the same time, other uses of Facebook have begun to take off on their own. Facebook Live, a livestreaming capability, is having a resurgence. Facebook launched it several years ago with a program that paid media companies to use the feature. But it hadn't developed a wide audience—until now.

In recent weeks, celebrities, musicians and companies have begun using it to communicate. Pope Francis held mass on it, and the Cincinnati Zoo gave virtual tours on it. People have used Facebook Live to broadcast their weddings. In the U.S., the number of people watching live videos monthly on Facebook's main app increased 50% in March compared to February, according to Simo.

Facebook has looked for other ways to give livestreaming a boost. Last Friday, Facebook held a free live-viewing party of "Legally Blonde" on the site after striking a deal with MGM, the studio behind the movie. Simo says Facebook is talking to other movie studios about similar agreements. Separately, the company also accelerated the rollout of a tipping feature for livestreamers, which it had previously limited to gamers, shipping it last week instead of later this year as originally planned.

“We’ve been very much looking at what people are doing on Facebook and what their needs are at this moment in time,” Simo said.

Similarly, views of live videos on Instagram increased 70% week over week in the second and third weeks of March, Vishal Shah, the app’s vice president of product, said. His team is working on making livestreams—replays of which currently disappear 24 hours after they’re posted—easier to save for watching later on IGTV, the app’s hub for longer videos.

Instagram’s Live Video Plans

Instagram is also developing the ability to show live video on the web, rather than just in the app. That would broaden the reach of the broadcasts. Instagram also plans to extend the amount of time people can go live beyond its current limit of one hour.

Recently the Instagram account has been publicizing weekly schedules of live broadcasts from top accounts on the app. Instagram hopes to add a scheduling feature that ensures people get updates from accounts they follow when a broadcast is about to go live.

“We’re investing in this so much just because we’re just seeing a ton of growth,” Shah said.

Even though Facebook and Instagram are seeing their traffic skyrocket, the company’s revenue is likely to suffer as many businesses pull back on their spending on ads. Another social media company, Twitter, withdrew its first-quarter financial forecasts last month because of the turmoil in the ad business. The Interactive Advertising Bureau estimates that digital ad spending will drop 33% between March and June.

“Everyone’s business is impacted right now, and advertising will be no exception,” Simo said. “We don’t know by how much.”

WhatsApp’s Usage Spike

For WhatsApp, Facebook has even fewer opportunities to make money from a recent surge in usage. That’s because, unlike Facebook and Instagram, WhatsApp doesn’t yet sell advertising on the messaging service. It generates some revenue through a business chat product, but it has begun giving free access to that technology to governments and humanitarian organizations to help them communicate with the public during the crisis.

When asked if WhatsApp felt pressure to make money, Cathcart, who leads the app, said, “I think our focus is, how do we have our services be useful for people?”

During the second week of March, WhatsApp was already seeing huge spikes in usage in parts of the world, such as Italy and Iran, that went into lockdown to combat the spread of the coronavirus. The team behind the messaging app worried that if usage grew elsewhere at the same rate, WhatsApp would buckle under the strain.

In early March, Cathcart made the decision to increase WhatsApp’s server capacity 80%, which it was able to do quickly through Facebook’s global infrastructure. “The number one thing is having the service be up and running and reliable for people,” Cathcart said.

Video calling in Italy and Spain, two countries hit hard by the virus outbreak, has doubled in recent weeks, for example. In response, WhatsApp is working to expand the number of people it supports in a group video call from four to eight. In India, where people widely use WhatsApp, Cathcart’s team limited the length of ephemeral video

posts to 15 seconds instead of 30, a move they and other internet services made to ease the strains on the country's internet speeds.

WhatsApp has been criticized as a hotbed of misinformation about the coronavirus—including everything from false cures to inaccurate information about how it spreads—through the app's message forwarding feature, which functions like a modern equivalent of chain emails. Because the app encrypts messages sent by its 2 billion users, it can't read what people are saying to each other, which severely limits its ability to monitor speech.

Still, the app recently partnered with the International Fact-Checking Network, a consortium of global fact-checkers organized by the Poynter Institute for Media Studies, to let users in some countries forward messages to review for accuracy. And Cathcart said WhatsApp is working on a feature that will let people quickly search the contents of a message on the web. That would let users tap a chain message containing a report that would link to a Google search—another way to give people options to corroborate what they read.

Cathchart acknowledged that the spikes in usage WhatsApp is seeing now are unlikely to last. "I certainly hope some of the usage goes away," he said.

The Takeaway

Leaders from Facebook, Instagram and WhatsApp are reshuffling priorities for the apps due to the coronavirus pandemic. A renewed area of focus is the livestreaming video capabilities of both Facebook and Instagram, as people around the world sheltering at home are connecting with these features. And the Facebook app is adding more options to support businesses under financial duress, like the ability to fundraise and sell gift cards.

By Gary Burnison @ CEO of Korn Ferry

No one thinks much about a certain leadership quality — until the you-know-what hits the fan.

The quality I'm referring to is crisis management.

Thankfully, true crises are relatively rare occurrences. They are the black swans of **leadership**.
We've done nearly 70 million assessments of executives, so we know what makes a great leader — the best-in-class who are among the top 20%. Our research shows that three of the four qualities of a great business leader are largely intuitive: (1) sets vision and strategy; (2) drives growth; and (3) displays financial acumen.
The fourth is managing crises. It's underappreciated, overlooked, and often not even one of the top requirements — until a crisis hits.

This is one of those times. A month ago, when the stock market was making all-time highs, only the rare few could have predicted universities would close, companies would tell employees to work from home en masse, and the NBA season would abruptly be suspended, followed by museums, cathedrals, and Broadway.

While it's natural in uncertain times for people to turn to the leader for definitive answers, sometimes the authentic answer is "I don't know right now" — quickly followed by, "And here's what we are going to do." In a crisis such as today, leaders need a Plan B — and a Plan C and Plan D as well.

Leaders always deal with ambiguity. It's timeless and comes with the job. During crises, ambiguity becomes exponential. As fear becomes contagious across organizations, leaders must manage their own responses to ambiguity.

How do they do that? By following our six steps of leadership:

1. Anticipate– predicting what lies ahead
2. Navigate– course correcting in real time
3. Communicate– continually
4. Listen– to what you don't want to hear
5. Learn– learning from experience to apply in the future
6. Lead– improve yourself to elevate others

Let me provide some color commentary on what leaders can do to put crisis management in action.

Start at the Bottom of Maslow's Hierarchy: In a crisis, you first need to meet people where they are. Their most basic needs must be met and they need to feel safe. Naturally, no one is interested in talking about the company's strategic plan when they're out buying hand sanitizer and toilet paper. Once their essential needs are addressed, then the focus can shift to alignment, common purpose, elevating others, and even opportunities for growth.

> By running the "unknown" of the current crisis against the "known" of previous ones, leaders gain perspective, identify patterns, connect the dots, and determine appropriate and timely responses.

Earthquakes and Aftershocks: In Los Angeles, where our firm is based, we're accustomed to earthquakes and know that when one occurs, aftershocks are coming. Other crises also demand that you have to anticipate the consequences of the initial shock. Too often, people don't consider all the possibilities. Anticipation becomes a Monte Carlo simulation in action.

For example: *what if travel bans expand, commerce slows, or a liquidity crisis develops, etc.? What is the impact on all aspects of my business? What are the implications for employees, customers, and investors?* Strategy is making a bet, and the skill of anticipating improves one's odds.

Urgent vs. Important: Day to day, leaders face a multitude of issues, both urgent and important. I've found that many leaders have difficulty distinguishing between the two. When a crisis hits, though, everything blurs as events and their implications constantly change. What's important often becomes urgent, and what's urgent becomes critical. Leaders must delegate the urgent by empowering others to lead around a common purpose.

Leave No One Behind: In a crisis, leaders must connect with, motivate, and inspire others, and show genuine compassion. In the military, for example, leaders put the safety and well-being of others before themselves. I've met a number of military leaders who led during periods of conflict and voluntarily told me, "I've never lost a soldier." This reveals a deep mindset of humility and accountability, rather than hubris and bravado.

Know What to Do When You Don't Know What to Do: There's nothing like a crisis or a complex problem to accelerate learning. This is learning agility to the "Nth" degree — applying past lessons to new and unfamiliar situations. It really is knowing what to do when you don't know what to do.
Amid uncertainty, leaders need to be hyper-focused on past experiences and synthesize and apply them to real-time, fluid conditions. Clarity comes from finding a close comparison. Is it like the Great Recession? The 1987 stock market crash? The outbreaks of SARS or MERS?

By running the "unknown" of the current crisis against the "known" of previous ones, leaders gain perspective, identify patterns, connect the dots, and determine appropriate and timely responses. The eventual recovery may be a V or a U or some other alphabet letter, but there will be a new normal — thanks, ultimately, to the scientists, innovators, and dreamers.

The natural inclination in a crisis may be to go into command-and-control mode. That's not leadership. Leadership is creating a "bottom-up" culture of world-class observers to accurately perceive today in order to predict tomorrow.

Gary Burnison is the CEO of management consulting and recruiting firm Korn Ferry.

By Monica Nickelsburg

At least 30 of the fulfillment centers that power Amazon's e-commerce business have outbreaks of COVID-19, according to local news reports and employee accounts. The mounting cases are sparking walkouts, frustration, and an unprecedented challenge for a tech company that finds itself at the center of the coronavirus pandemic.

Amazon says it is going to great lengths to protect employees on the front lines, but current and former workers who spoke with GeekWire for this story say its statements don't always match the experience on the warehouse floor. Employee concerns bubbled over in the form of walkouts at fulfillment centers in New York, Chicago, and Detroit this week, with workers demanding Amazon shut down facilities with confirmed cases for thorough cleaning.

The outbreaks and employee unrest come at a time when Amazon desperately needs all hands on deck. The company has been fielding a massive surge in orders in the weeks since the virus gained a foothold in the country. Many shipments are delayed, and consumers across the U.S. are unable to order groceries through the Amazon Fresh service.

Amazon executives are now navigating the responsibility of supplying thousands of Americans under isolation orders with items they need, mitigating virus outbreaks across their facilities, and keeping a worldwide delivery and logistics engine humming during a pandemic.

Meanwhile, workers in Amazon warehouses are facing difficult decisions and trade-offs of their own.

Inside Amazon warehouses

Frank Eliason works at an Amazon fulfillment center in New Jersey where two of his co-workers have tested positive for COVID-19. The 47-year-old is considered at-risk for the disease because he has diabetes. He also has two daughters at home who he worries about infecting.

"Employees are scared," he said. "I am scared. I do not want to bring this to my family. This is an unprecedented event. There is no playbook for employees or companies."

Amazon would not say how many warehouses have COVID-19 cases, but local news reports and a running list tracked in a private employee Facebook group indicate at least 30 of Amazon's 175 fulfillment centers are affected. Workers at several Amazon warehouses are organizing walkouts to demand that the company temporarily close facilities for cleaning. It's a position backed by Amazon Employees for Climate Justice, an activism group created by mostly white-collar workers at the company's Seattle headquarters.

"To be honest, every facility that has positive cases in them need to be shut down and cleaned inside and out," said one Oklahoma City worker who asked not to be identified because he is concerned about retaliation from Amazon.

Amazon employees at a fulfillment center in Staten Island made the same demand when they walked off the job on Monday. Amazon fired the organizer of the demonstration, Christian Smalls, claiming he put his colleagues at risk by breaking quarantine.

Update: Notes from an internal Amazon meeting leaked to Vice News provide an unflattering glimpse into the company's PR strategy toward Smalls. Amazon General Counsel David Zapolsky called the employee "not smart or articulate" and sought to make him the face of the labor movement in New York facility, according to the report.

The New York protest was one of several around the country organized by increasingly uneasy Amazon warehouse workers.

"I am sitting here right now trying to decide if today is the day I will get sick," Eliason said. "Do I really want to go in? It is a question I ponder each day."

Eliason said he supports Amazon's decision to fire Smalls, "assuming the employee who was fired was asked to quarantine with pay. I worry each day of people coming in knowingly or unknowingly are sick."

Amazon consults with public health officials and medical experts when deciding whether to shut down a contaminated warehouse, according to spokesperson Timothy Carter.

"Our process also evaluates where the employee was in the building, for how long, how much time has passed since they were onsite, and who they interacted with, among other items," he said in a statement. "If someone hasn't been at the building for quite some time, they were onsite only briefly, or the area they were in was already deep cleaned several times as a regular course of business, we may not need to close."

Amazon's new protocol

Amazon has made more than 150 "significant process changes" in response to the COVID-19 outbreak, according to a blog post by worldwide operations CEO Dave Clark.

On Sunday, Amazon started screening employee temperatures at warehouses in New York and the Seattle area, sending anyone who registers above 100.4 degrees home. Clark said Amazon will roll out temperature screening across its facilities, including Whole Foods stores, next week.

Amazon expanded its sick policies, providing two weeks paid time off for employees who test positive for COVID-19 or are asked to quarantine due to exposure. The company is also offering unlimited unpaid time off to all employees.

Inside an Amazon Prime Now delivery hub in Seattle.

Clark said that disinfectant wipes and hand sanitizer are readily available in all fulfillment centers, though some workers say they do not have access to those supplies.

"They're not supplying us with the proper PPE or cleaning products to ensure that our areas are cleaned after every shift," said the Oklahoma City worker who asked to remain anonymous. "I have been bringing my own Lysol to ensure my area is cleaned. We were told each department and station would have their own products to clean. Nothing has shown up."

There is a global shortage of personal protective gear (PPE) that even Amazon's vast supply chain has struggled to fill. Amazon ordered millions of masks for fulfillment center employees weeks ago and those supplies are starting to arrive, according to Clark. Any N-95 masks that are critical for healthcare workers will be donated or sold to medical providers at cost. Amazon is requiring warehouse workers to maintain a distance of at least six feet from one another and has canceled daily stand-up meetings which bring employees into close proximity with each other.

It's difficult to conceptualize the sheer size of an Amazon fulfillment center, which can range from 400,000 to 1 million square feet. A typical Amazon warehouse is comparable to 10 football fields lined up.

"Cleaning and sanitizing of an entire warehouse (let alone multiple warehouses) seems incredibly daunting," said Scott Meschke, a microbiologist specializing in pathogens at the University of Washington's occupational health sciences department, in an email.

The Centers for Disease Control do not have specific cleaning guidelines for warehouses, but recommend other facilities close off areas visited by infected people, ventilate, and "wait 24 hours or as long as practical before beginning cleaning and disinfection."

"A potential problem with shutting a facility for cleaning is that in the absence of a more holistic plan to control spread, the likelihood is that contamination may be reintroduced by infected workers," Meschke said.

A lifeline in isolation

Washington, California, New York, and other jurisdictions across the country have implemented mandatory isolation orders, compelling thousands of consumers to turn to online shopping when they might've otherwise visited a store.

Last month, Amazon announced plans to hire 100,000 new warehouse workers to cover for sick employees and respond to the surge in orders from customers practicing social distancing. Clark said Thursday that the company has already hired 80,000.

Analysts at Jefferies conducted two surveys of about 630 U.S. adults on March 10 and March 27 that show how the pandemic is influencing demand for Amazon's products and delivery horsepower. Amazon was the only online retailer that saw consumers increasing their spending, according to the surveys. The percentage of consumers who said they are spending more on Amazon jumped from 14 percent to 34 percent. Consumers are spending less on other sites, like eBay, Chewy, and Etsy, according to the analysis.

Though the shift to online shopping is nothing new, its acceleration due to the pandemic has been disastrous for brick-and-mortar retail. Nordstrom, Macy's, Kohl's and others are shuttering stores and furloughing employees as traditional shopping grinds to a halt. The broad social distancing orders driving this trend are temporary, but the shift to online shopping may not be.

"This is not simply predicated on a one-time bump in the first and second quarter as consumers have been forced to stay home … we believe the current backdrop provides for incremental comfort and awareness of purchasing basic goods at home, which will have [a] lasting impact," write analysts at William Blair.

Inside an Amazon fulfillment center in Washington.

But the surge in demand may not be the financial buoy for Amazon that it appears to be at first glance. Amazon is spending more than $350 million on its response to the pandemic, according to Clark.

"We expect to go well beyond our initial $350 million investment in additional pay, and we will do so happily," he said.

Amazon increased its minimum warehouse wages by $2 to $17 per hour last month and fulfillment centers temporarily stopped accepting shipments of non-essential items so that the company can restock household goods and medical supplies.

“This could be a headwind for Amazon, partially offset by greater-than-expected demand in grocery items and other staples, including health-related items,” wrote Mark Mahaney, an analyst with RBC Capital Markets. That firm lowered its revenue estimates for Amazon this year due to the impact of the coronavirus.

Still, Mahaney believes “Amazon is better positioned than most other names in our coverage universe to weather this macro uncertainty given the diversity of its business.”

The sprawling Amazon empire includes its lucrative cloud arm, growing advertising business, and grocery store chain.

Amazon’s relative resilience could reshape the e-commerce landscape when the coronavirus threat passes. Millions of Americans are reporting job losses at a time when Amazon is hiring. Retail stores are shutting down at a time when Amazon’s demand is surging. Though the tech giant is not immune to economic turmoil, it could come out of the crisis in a more dominant position than before.

Sourced by TechXplore

Demonstration of a renewable energy storage system. Photos of the researchers' demonstration of a renewable energy storage system based on a DZMB pack (in the middle of the photo) integrated with solar photovoltaic (PV) modules and a wind-driven generator through a controller. The controller was also connected to a light-emitting diode (LED) panel, serving as the electrical load.

The global demand for rechargeable batteries has grown exponentially over the past decade or so, as they are needed to power the increasing numbers of portable electronic devices such as smart phones, laptops, tablets, smart watches and fitness trackers. To work most efficiently, rechargeable batteries should have a high energy density, yet they should also be safe, stable and environmentally friendly.

While lithium-ion batteries (LIBs) are now some of the most widespread rechargeable energy storage systems, they contain organic electrolytes that are highly volatile, which significantly reduces their safety. In recent years, researchers have thus been trying to identify new battery compositions that do not contain flammable and unstable electrolytes.

Among the most promising alternatives to LIBs are batteries based on non-flammable and low-cost water-based electrolytes, such as lead-acid and zinc-manganese batteries. These batteries have numerous advantages, including greater safety and low production costs. So far, however, their performance, working voltage and rechargeability have been somewhat limited compared to those of lithium-based solutions.

Researchers at the Key Laboratory of Advanced Ceramics and Machining Technology, the Tianjin Key Laboratory of Composite and Functional Materials and Tianjin University in China have recently introduced a new design strategy that could enhance the performance of zinc-manganese dioxide (Zn–MnO_2) batteries. The approach they developed, presented in a paper published in Nature Energy, entails decoupling electrolytes inside the battery to enable an optimal redox chemistry in both Zn and MnO_2 electrodes.

"Our paper occurred unintentionally when we assembled an alkaline Zn–MnO_2 battery with freshly electrodeposited MnO_2, which has some residual H_2SO_4 (from the electrodeposition bath) on the MnO_2 surface," Prof. Cheng Zhong, one of the researchers who carried out the study, told TechXplore. "The assembled battery exhibited extra higher discharge voltage than conventional Zn–MnO_2 batteries, which encouraged us to strip things down to basics, laying the foundations for our study."

Prof. Zhong and his colleagues found that their strategy for decoupling electrolytes led to better performing Zn-MnO2 batteries with an open-circuit voltage of 2.83 V. This is a highly promising result, considering that more conventional Zn-MnO2 batteries typically have a voltage of 1.5V.

The capacity of the battery fabricated using their electrolyte-decoupling strategy, dubbed DZBM, faded by just 2% after it was continuously used and recharged for 200 hours. In addition, the battery retained 100% of its capacity at a variety of discharge current densities. Remarkably, the researchers demonstrated that batteries created using their method can also be integrated with wind and photovoltaic hybrid power systems, which further increases their sustainability.

"The electrolyte-decoupling strategy aims at simultaneously enabling the optimal redox chemistry of both the Zn and MnO2 electrodes," Prof. Zhong explained. The working conditions of the MnO2 cathode and Zn anode were decoupled to enable both acidic MnO2 and alkaline Zn redox reactions in a single cell. The resulting DZMB battery has a much higher working voltage and prolonged cycling life than traditional alkaline Zn-MnO2 batteries."

In the future, the new design strategy introduced by Prof. Zhong and his colleagues could be used to produce new Zn-MnO2 batteries that are low-cost and safe, but that also have exceptionally high open-circuit voltages and a prolonged cycling life. Notably, the same strategy could also be used to enhance the performance of other zinc-based aqueous batteries, including those with Zn-Cu and Zn-Ag compositions.

"Since the cost and performance of state-of-art ion-selective membranes are still unsatisfactory, our future researches will focus on the studies of decoupling designs without using the membranes," Prof. Zhong said.

More information: *Cheng Zhong et al. Decoupling electrolytes towards stable and high-energy rechargeable aqueous zinc–manganese dioxide batteries, Nature Energy (2020). DOI: 10.1038/s41560-020-0584-y*

Journal information: *Nature Energy*

Pandemic puts the brakes on micromobility

By Megan Rose Dickey

As of this writing, nearly a million people globally have been infected with the novel coronavirus and 50,322 have died. Healthcare systems are overwhelmed, consumers and profiteers are hoarding supplies and some service workers have launched strikes while many others have been let go. In the world of micromobility, we've seen Bird lay off hundreds of employees and Lime is reportedly gearing up for layoffs of its own.

Ride Report creates software that enables cities to better work with micromobility operators and has a bird's-eye view on the industry. In a conversation with TechCrunch, CEO William Henderson outlined some of the trends that have emerged and what we can expect for micromobility operators amid the pandemic — and once it's over.

"All of this came at a really hard time for micromobility," he tells TechCrunch. "It couldn't really have occurred at a worse time in some ways."

That's because there was already a lot of pressure on startups in the space to reach profitability on an accelerated timeline, Henderson says. While winter is notoriously known as a rough time, the environment in this pandemic is "micromobility winter on steroids."

Over the last month, companies have paused operations in cities and started laying off people. Operators Bird and Lime, for example, paused operations across the board last month.

"Operators were already in a place where they needed to get to operational efficiency and profitability and now they're really having to double down," Henderson says. "And I think it's pretty likely that some operators are not going to make it or they'll be consolidating."

Industry consolidation has been going on for some time now, but it's likely it will accelerate, Henderson says. Some cities may lose micromobility services altogether unless they can focus more on their regulatory efficiencies.

"So, how can they get what they need in terms of control but not at the cost of losing these services altogether," Henderson says. "Our own mission is more important than ever. We're sort of all-hands-on-deck because the only way that cities are going to be able to do what they need to do in terms of regulation, and do it efficiently enough to keep micromobility alive, is to do it via an efficient API-driven platform."

That's why Ride Report has been working to get those APIs online. It'll make the difference between cities having micromobility or not over the next few months, Henderson says.

On a brighter note, Henderson says biking is surging. In March, Citi Bike reported demand had increased 67% between March 1 and March 11 compared to the same period in 2019. Henderson says there are similar surges in Wuhan, China and Beijing.

"And then people are moving to longer trips because they're basically avoiding or substituting what would have been a trip on mass transit with bike share," Henderson says. "And then, of course, that's happening even as in other cities, micromobility is completely shutting down. So it's a really interesting set of countervailing trends. I think what it points to is biking is a really efficient and resilient form of transportation. So, to me, it emphasizes the long-term need for micromobility."

If this pandemic had hit two years from now, Henderson envisions a much different response from cities and operators. He says he thinks cities would have created regulatory playbooks around how micromobility can play a critical role during disasters.

That's the stance San Francisco-based Spin has taken. The company has chosen to keep operating during the pandemic because it sees its vehicles as providing support to the public transportation system as people take essential trips to places like a grocery store or pharmacy. Meanwhile, some companies have opted to pause operations citing concerns about the spread of the virus.

"You have different operators doing different things for different reasons," Henderson says. "And then you have different cities, as well, encouraging or demanding different things."

A few things may be going on. With docked systems, there is less labor required because workers don't need to go out to reposition and recharge the vehicles in the way they do with scooters, Henderson says. Another is that these companies are operating on venture capital and may not have had a lot of runway when the pandemic hit. Now, they're going into cash-conservation mode, he says.

"So, whether it's good or bad for the city and good or bad for citizens, they just can't afford to operate at a huge loss," Henderson says. "And because people are overall taking fewer trips right now, it might be even harder for them to hit profitability in a lot of these markets than it was before."

Meanwhile, some operators are quickly adapting and trying to provide riders with peace of mind. Wheels, for example, has begun deploying bikes with self-cleaning brake levers and handlebars. In Stockholm, Voi has begun including gloves on its vehicles to help protect riders.

It's worth noting that there's not a huge risk of contracting COVID-19 from shared micromobility vehicles, according to Dr. Richard Malley, a senior physician in the division of infectious diseases at Boston Children's Hospital. There is a potential risk in that riders are using vehicles that have been potentially used by a number of other people, he tells TechCrunch, "but in my mind, that risk is very low, but it's not quantifiable per se."

He added, "the likelihood that you're going to have a sufficient amount of virus that survives for a prolonged period of time and you will then touch that and expose yourself seems to me to not be the highest risk. You also have to ask yourself how long is not just the viral RNA present on the handlebar, but is there enough variants to actually then if you touch your nose or hand or eyes is the density high enough to actually cause an infection."

Still, riders should practice good hygiene and wash their hands thoroughly after rides, either with soap and water or with sanitizer that has at least 60% alcohol content. That's what is most important, he says.

This is all to say that for the companies that can afford to operate with lower revenues, it's worth doing. That's because the likelihood of spreading the virus through ongoing operations is low. For the companies that are still operating, some are exploring different business models, such as moving from a per-trip rental per minute to weekly or monthly rentals.

"I know Pony is doing that in France and we saw Bird doing that last year, and I wouldn't be surprised to see some of the operators buy more into that type of model," says Henderson, "particularly if this becomes a prolonged affair."

GM and Honda are co-developing two new electric vehicles due to arrive in 2024

By Kristen Korosec

GM and Honda will jointly develop two new electric vehicles slated for 2024, the latest move by the two automakers to deepen their existing partnership.

Under the plan, the automakers will focus on their respective areas of expertise. Honda will design the exterior and interiors of the new electric vehicles; GM will contribute its new electric vehicle architecture and Ultium batteries. This new architecture, which GM unveiled last month to showcase its own EV plans, is capable of 19 different battery and drive-unit configurations. The architecture includes large-format pouch battery cells manufactured as part of a joint venture between LG Chem and GM.

The vehicles, which will have a Honda nameplate, will incorporate GM's OnStar safety and security services. GM's hands-free advanced driver assistance technology, known as Super Cruise, will also be available in the new vehicles.

The vehicles will be produced at GM plants in North America. Sales are expected to begin in the 2024 model year in Honda's U.S. and Canadian markets.

The aim is to pull the strengths of both companies to unlock economies of scale around electric vehicles, according to Rick Schostek, executive vice president of American Honda Motor Co., who added that the two companies are already in discussions about further extending the partnership.

The companies have a long history of working together, including sharing vehicles as far back as the late 1990s when Isuzu was part of GM. The bulk of the joint projects have centered on hydrogen fuel cell tech, batteries and more recently, autonomous vehicles.

GM and Honda formed a strategic alliance in July 2013 to develop hydrogen fuel cell technology, a partnership that has produced some 1,200 patents. The automakers formed a joint venture in 2017 called Fuel Cell System Manufacturing LLC to produce hydrogen fuel cell systems. FCSM is installing the production equipment for their first high-volume fuel cell manufacturing facility in Brownstown, Michigan with production expected to begin this year, according to GM.

The companies announced in 2018 an agreement for Honda to use battery cells and modules from GM in electric vehicles built for the North American market.

GM acquired Cruise in 2016; Honda later committed $2.75 billion as part of an exclusive agreement with GM and its self-driving technology subsidiary Cruise to develop and produce a new kind of autonomous vehicle. Cruise Origin, an electric, self-driving and shared vehicle and the first product of that arrangement, was revealed January 21.

Global edge computing initiative aims to accelerate adoption for 'everyone'

By Catherine Sbeglia

MobiledgeX CEO: 'Seamster is meant to help everybody in the world be successful when it comes to edge computing'

Seamster, the global edge computing initiative dedicated to enterprise use case exploration and adoption, launched this week during a virtual event with support from members from across the expanding edge ecosystem. The initiative is focused on fast-tracking global edge computing and 5G deployments and unraveling the prohibitive unknowns about the edge through a collaboration.

The virtual panel, comprised of speakers from Accedian, Dell EMC, MobiledgeX, VMware, Worldwide Technology (WWT) and others, explored critical edge considerations, such as who will benefit from edge computing capabilities, the opportunities that it brings to different verticals, as well as what makes this the right time for edge computing technologies.

According to Joe Wojtal, CTO, Global Service Provider at WWT, a critical element of edge computing is understanding the business outcome a particular customer is trying to achieve. The primary reason behind this is in evident in data that shared by TOPIO Networks showed during the event, which revealed that what drives the need for edge computing varies considerably from vertical to vertical.

"This is just not a technology discussion," Wojtal said, "it's understanding how, within that business vertical, to make it work."

As the panel moderator Senza Fili Founder and President Monica Paolini pointed out, edge computing technologies aren't new. So why establish a global edge computing initiative now? What has changed?

From VMware's Gabriele Di Piazza, VP, solutions & marketing, Telco & Edge Cloud BU, there are three main factors that contribute to this being the right time for edge.

First, he stated that it is a result of the new types of applications that are emerging right now in different industries.

"The new demands for these new types of application is starting to happen right now," he said. "Second aspect is you can only automate when you actually have enough penetration for cloud […] so edge means that you need to operate applications in a specific location. We see the decentralization of these applications […] and this is happening right now."

And finally, of course, there is the adoption of 5G technologies, which are "just around the corner."

Wojtal jumped in to add that in general, enterprise customers are going through some "major digital transformation initiatives."

"So that's requiring a whole bunch of new computing and application paradigms that are going to drive the consumption of technology," he said. "Now is the time that is the unique convergence of the digital transformation needs that they have, the technology capabilities, as well as the virtualization that the cloud providers have gone through over the last several years."

Eric Braun, chief commercial officer for MobiledgeX, provided his perspective as it pertains to the consumer side of things, saying, "The applications, the devices connected to cellular, the desired experiences are emerging [...] Everything is sort of catching up on that side."

Kevin Schatzkamer, VP of service provider solutions at Dell EMC, also commented that about 75% data going forward is generated outside of the data center to support the emerging need to relocate the processing of data and move resources closer to where data is generated.

In his opening remarks, Jason Hoffman, president & CEO at MobiledgeX, expressed the importance of taking an "ecosystem approach" to the development and rollout of edge computing technologies, saying enterprises need help figuring out where they're going to fit in "in this new world."

"That is exactly the idea behind Seamster," he said, "to help everybody in the world be successful when it comes to edge."

** To watch the entire virtual launch, click here.*

Private equity fundraising totals sure to tumble due to the coronavirus

By Adam Lewis

Private equity fundraising in the US surged over the past decade, with annual figures climbing from less than $60 billion in 2010 to a record $301 billion in 2019.

But now that the coronavirus outbreak has reduced travel, dealmaking has slowed, and limited partners have begun to worry about the economy, the fundraising market could be in line for its first serious decline since the last financial crisis.

"Though we remain hopeful that fundraising will not suffer as much as it did after the last crisis, the prudent assumption is the macro-environment for fundraising will suffer significantly and fundraising levels could remain depressed for an extended period," Eaton Partners partner Jeff Eaton said in an email.

Considering the relatively slow pace of the fundraising process, it's unlikely the recent upheaval will have much of an impact on Q1 numbers. Eventually, though, effects will be felt.

"We expect this to be a difficult time for most firms fundraising, though the impact may not be seen in the data until the second and third quarters," PitchBook analyst Wylie Fernyhough wrote in an analyst note on the effects of COVID-19 on the PE market. "LPs that had already completed much of their due diligence checklist and mapped out new commitments are likely to follow through."

Even before the coronavirus outbreak, the cyclical nature of buyout fundraising meant this year's totals were expected to fall below last year's, according to the 2020 PitchBook Private Equity Outlook. Many major private equity firms raised massive sums in 2019, including names such as Blackstone, Vista Equity Partners and Leonard Green & Partners, likely taking them off the market for a year or two. Blackstone topped everyone by pulling in $26 billion, the largest private equity fund ever.

No firms were expected to top or even approach that figure in 2020, even before most of the country locked down. Platinum Equity announced in January the closing of this year's largest fund to date, a $10 billion effort that topped a $6.5 billion predecessor. But otherwise, there haven't been any additional 11-figure vehicles so far in the US.

Platinum Equity partner Mark Barnhill said the timing was perfect for the firm, which had already finished investing its previous flagship effort. "Sometimes it's better to be lucky than good," he said.

While large investors such as Platinum could come through a slowdown unscathed, smaller middle-market firms might not be so lucky. The new market reality will make gathering capital tough for less-established investors without deep pockets and long track records of success.

"Fresh fundraising for middle-market GPs will prove difficult as most LPs are pushing these decisions out several months," Fernyhough wrote. "For first-time funds and nascent managers without an established LP base expecting to begin the fundraising process in today's environment, we expect it will prove to be a nearly impossible task."

On the other side of the relationship, institutional investors such as pension funds or endowments have their own set of problems. For one, they've likely been most concerned about the likely dip in valuation of portfolio companies and the next time they will be asked to draw down capital. Some might even be recalculating their entire investment strategy, Barnhill said.

"LPs are rethinking where's the best place to put my money right now," he said. "I think you're going to see a lot more push into distressed assets because there's a sense there's a lot more opportunity there."

To make matters more difficult for private equity firms, they'll have to convince limited partners that they would perform well in a distressed environment. And that's no easy task, unless a firm has a history of getting companies through difficult times. For Barnhill and Platinum, that's not as big of a problem.

"I could find a story about our operational capabilities and our track record that would make it more likely that we'd be able to convince investors to re-up," Barnhill said. "But I'm happy I don't have to go out and tell that story right now. Because you still have to deal with that slowdown in the market and everybody's reluctant."

"If they are still in leveraged buyouts, they are going to be looking at managers with an established track record and, No. 2, be able to work in crisis environment, in a downturn environment," he added.

There is a huge silver lining for private equity. If stock prices continue to plunge or remain depressed, firms will have the chance to shop for bargains after years of skyrocketing multiples. And with the Federal Reserve dropping interest rates to near zero earlier this month, they could potentially borrow money at historically cheap rates—or simply tap into the record levels of dry powder (roughly $1.5 trillion total) already on hand. In other words, the chance for substantial returns should retain at least some LP interest.

But even that could come with its own risks, since it is still unclear how long it will be before the market could rally or whether private equity firms can secure financing in a volatile environment. In some cases, general partners may have to devote more equity to a deal than in a typical leveraged buyout. But firms that recently closed funds, including Platinum, can still afford it.

Barnhill said, "I have a $10 billion war chest now that puts us in a very unique position relative to these opportunities."