



MARKET GPS

EQUITY PERSPECTIVES

APRIL 2021

Featuring the latest quarterly insights from our investment teams:

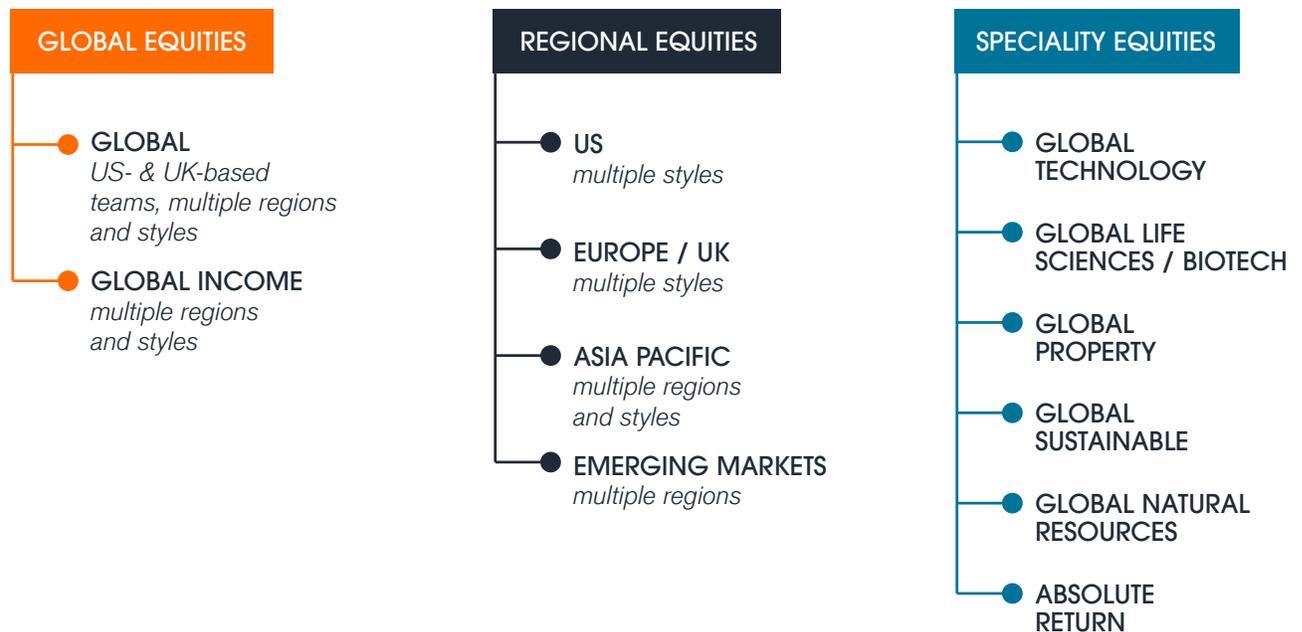
- ▶ Powerful factors coalescing for a rebound in U.S. travel and leisure
- ▶ Health care's innovation shifts into high gear
- ▶ Technology: solutions for a sustainable future in transport
- ▶ Emerging market equities: China's "smart" opportunity

OUR EQUITY CAPABILITIES

Janus Henderson provides an active approach to equity investing. The equities platform is shaped by the belief that fundamental research is the foundation for delivering long-term, market-leading risk-adjusted returns. Independent thought and unique viewpoints are central to this approach and result in portfolios that are meaningfully different to an index. Each team expresses their individual, high-conviction ideas through processes that have evolved to suit their specific areas of the market and within robust risk control frameworks.

While operating with independence, the equities teams benefit from collaboration and shared research that provide a source of portfolio ideas. The culture encourages intellectual challenge and stimulating debate to test – and ultimately strengthen – investment thinking. The success of ideas is measured by overall client outcomes with the aim to deliver consistent, long-term risk-adjusted excess returns over benchmarks and peers regardless of the investment landscape. This effort is supported by award-winning, proprietary portfolio construction technology and a cultural emphasis on the client promise.

The equity teams, led by Co-Heads of Equities Alex Crooke and George Maris, include 167 investment professionals, responsible for US\$219.4bn in assets under management¹. The teams include those with a global perspective, those with a regional focus – US, Europe, Asia Pacific and Emerging Markets – and those invested in specialist sectors. A range of growth, value and absolute return styles are employed.



¹ Source: Janus Henderson, as at 31 December 2020.

POWERFUL FACTORS COALESCING FOR A REBOUND IN U.S. TRAVEL AND LEISURE



Jeremiah Buckley



David Chung

Portfolio Manager Jeremiah Buckley and Assistant Portfolio Manager David Chung discuss the strong recovery potential for travel and leisure industries as COVID restrictions ease.

Key takeaways

- » Travel and leisure industries have been hampered by social restrictions, perhaps more than any other segment of the economy, during the COVID pandemic.
- » However, a confluence of factors – broader rollout of vaccines, significant pent-up demand, robust consumer savings and extensive monetary and fiscal stimulus – are beginning to foster green shoots of activity.
- » Although it is impossible to forecast the exact timing, looking to the second half of 2021 and beyond, select stocks within these industries may benefit as the U.S. economy reopens and pent-up demand is unlocked.

Travel and leisure have perhaps been the two industries most severely impacted by social restrictions brought on by the COVID pandemic. However, there are powerful factors coalescing that point to a strong economic rebound in the U.S. in 2021: the broader rollout of vaccines, significant pent-up demand, strong consumer balance sheets and extensive monetary and fiscal stimulus. These forces are beginning to foster green shoots of activity – particularly in these beleaguered areas – and could lead to a considerable rebound once the economy can fully reopen.

A health solution to the pandemic is driving optimism

Vaccination rollouts have led to a marked drop in the number of COVID cases and hospitalizations, fueling optimism for a full reopening of the economy. At the time of writing, nearly 100 million vaccine shots had been administered in the U.S. and nearly 20% of the population had received at least one dose.¹ Some states have begun to lift social restrictions and mask mandates (e.g., Texas, South Dakota, Montana, Mississippi and Iowa), citing the drop in infections and increased vaccinations. In other states, restrictions are being eased, such as allowing increased capacity for social gatherings in restaurants, theaters, casinos and sports and entertainment venues, foreshadowing a full reopening of the economy. However, significant concerns remain around highly contagious variants of the virus and past instances where the easing of restrictions has led to spikes in cases.

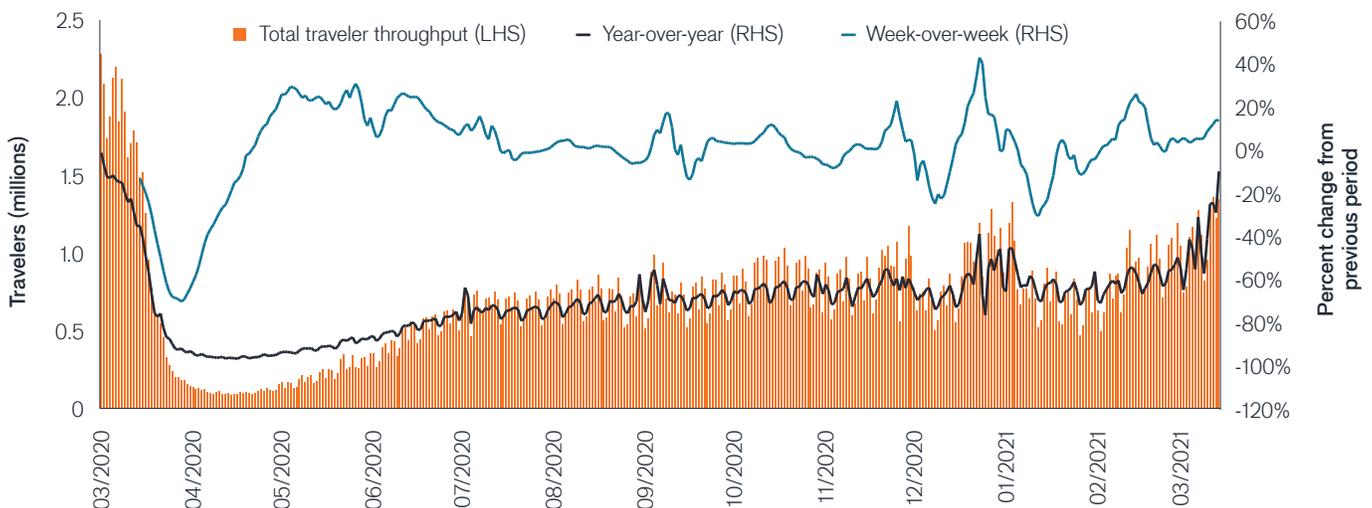
Unlocking pent-up demand

Consequently, we are starting to see green shoots of activity in travel – particularly within leisure – and indications of significant pent-up demand that will be released as restrictions ease and markets reopen to tourism. Many consumers were forced to skip vacations entirely in 2020 and are now anxious to travel in the very near future: 34% of Americans plan to travel out of town this spring and another 35% plan to do so this summer², while 76% are planning destination wish lists for future travel.³

Although still significantly below pre-pandemic levels, total traveler throughput at U.S. airports has increased to the highest levels since the pandemic began as shown in Figure 1.

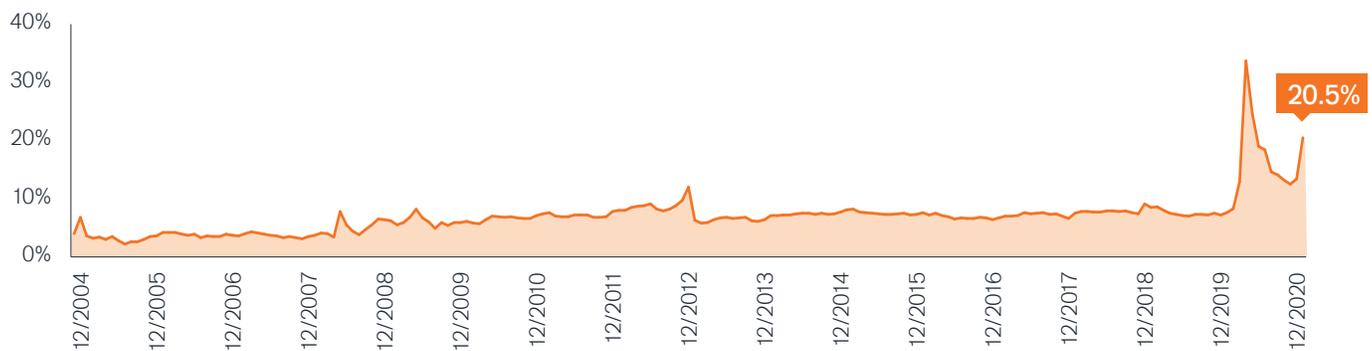
A major hotel chain expects essentially all rooms within their network to be reopened by mid-2021, and occupancy over the Presidents' Day holiday in February 2021 was the highest for a long weekend since the beginning of the pandemic. While leisure travel and bookings within driving distance continue to significantly outpace business and longer-distance travel, there are expectations that business and group demand (trade conferences, for example) will recover in the second half of 2021 and into 2022, as some companies view this travel and these events as essential to their businesses. That said, the majority of hotel reservations are still being made within a week of travel and international trips remain heavily restricted. This lack of visibility limits trend forecasts going forward but does suggest that companies more exposed to regional travel could benefit initially, and potentially grow market share during this period.

Figure 1: Total traveler throughput



Source: TSA.gov, as of 14 March 2021.

Figure 2: Personal saving rate



Source: U.S. Bureau of Economic Analysis, Personal Saving Rate [PSAVERT], retrieved from FRED, Federal Reserve Bank of St. Louis, as of 03 March 2021.

The re-emergence of travel demand also has the potential to positively impact industries outside of obvious beneficiaries like airlines and hotels. In March, a major U.S. ride-share provider reported its highest week of rides and year-over-year growth in ride-share volume for the first time since the pandemic began. At the same time, while electronic payment networks have seen cross-border volumes significantly hurt by international travel restrictions, the pandemic has accelerated the adoption of e-payments, and these companies may be poised to benefit from an uptick in travel transactions once restrictions are lifted.

Healthy consumer balance sheets can provide fuel

Although millions still remain unemployed and affected by the fallout from the virus, in general, the U.S. consumer appears to be in a healthy position to help drive a recovery, bolstered by surplus savings (Figure 2) and asset growth from both the stock market recovery and strong home values. Year-over-year, the personal saving rate in the U.S.

has nearly tripled to 20.5% as of January 2021 versus 7.6% as of January 2020, driven by a tremendous amount of fiscal stimulus with the likelihood to go even higher with an additional US\$1.9 trillion of stimulus recently passed. Personal saving as of January 2021 amounted to US\$3.9 trillion, up from US\$2.3 trillion in December, in large part due to the Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act, which was passed in late December.

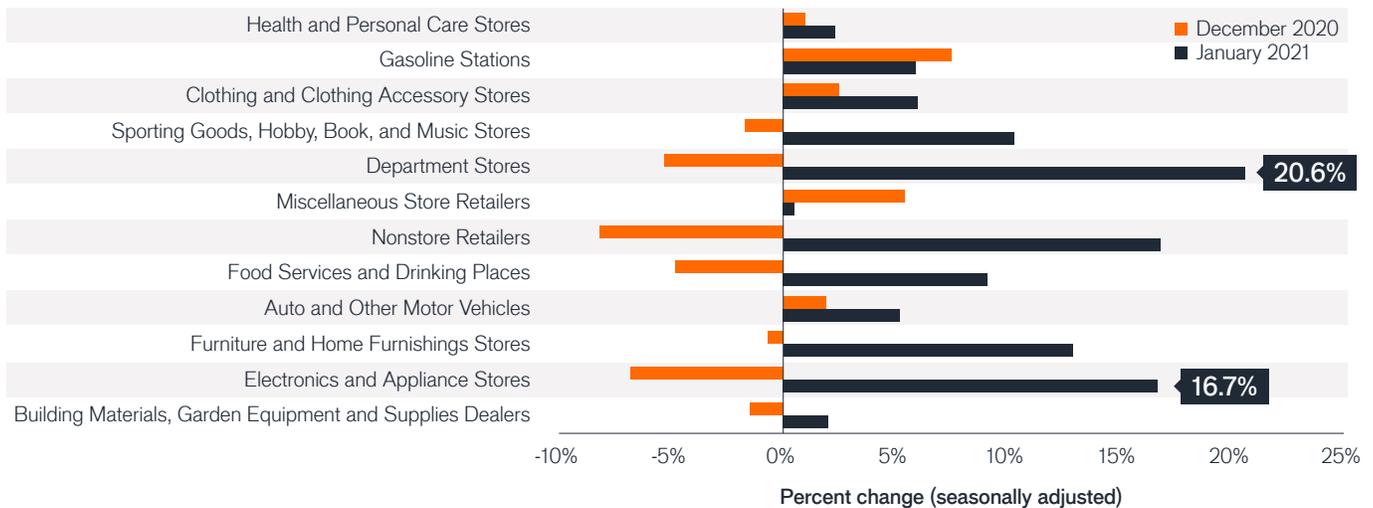
Consumers can decide to spend savings on goods and services or use them in other ways, such as paying down debt or making investments. Ultimately, these decisions will play a significant role in the trajectory of the economic recovery, and early indications show that consumers' propensity to save during 2020 is beginning to ease. Retail sales are picking up, as depicted in Figure 3 – advance retail sales for January grew 7.6%, with a larger percentage of spending being directed to discretionary categories. While preliminary data for February was weaker in comparison, sales remain elevated versus 2020 and we expect consumer spending to trend higher as the recovery continues.

Figure 3: Advance retail sales (retail and food services)



Source: U.S. Census Bureau, Advance Retail Sales: Retail and Food Services, Total [MARTSMPCSM44X72USS], retrieved from FRED, Federal Reserve Bank of St. Louis, as of 16 March 2021.

Figure 4: Advance monthly sales for retail and food services by kind of business



Source: U.S. Census Bureau, Advance Monthly Sales for Retail and Food Services by Kind of Business, Percent Change, Seasonally Adjusted retrieved from FRED, Federal Reserve Bank of St. Louis, as of 16 March 2021.

For instance, in January, retail sales at Electronics and Appliance Stores as well as Department Stores increased by 16.7% and 20.6%, respectively (Figure 4). If this trend continues, the amount of cash in savings could spur significant growth, as personal consumption represents over two-thirds of U.S. gross domestic product (GDP).

Growth drivers in the short and long term

Throughout the pandemic, we have seen investment themes related to widespread digitization galvanized. We think that a broad economic recovery can only serve to bolster these long-term trends. These include the shift to e-commerce, increased adoption of digital payments, a transition to the cloud and Software as a Service for remote work, schooling and entertainment and increased health care innovation across pharmaceuticals, medical devices, patient personalization and diagnostics capabilities.

While we have seen a recent uptick in inflation expectations and interest rates, we also continue to believe that the backdrop for equities in general remains positive, helped by ongoing fiscal stimulus and accommodative monetary policy. This backdrop combined with an improving health situation, significant pent-up demand and a strong consumer creates growth potential for certain companies in the leisure and travel industries.

That said, it remains extremely important to be selective when analyzing these industries, as some stocks' valuations are higher than pre-pandemic levels despite materially worse balance sheets. In some cases, companies have also diluted shareholders by issuing additional equity. Businesses, particularly in the travel and leisure industries, that can benefit from a recovery and have strong balance sheets could be well placed for a rebound as the economy reopens and returns to health.

¹ Centers for Disease Control and Prevention, 10 March 2021.

² Survey conducted online within the United States by The Harris Poll on behalf of Ad Age during 23-25 February 2021, among 2,032 U.S. adults ages 18 and older.

³ American Express Travel: 2021 Global Travel Trends Report.

Glossary

Fiscal policy/stimulus: Government policy relating to setting tax rates and spending levels. It is separate from monetary policy, which is typically set by a central bank. Fiscal expansion (or 'stimulus') refers to an increase in government spending and/or a reduction in taxes. Fiscal austerity refers to raising taxes and/or cutting spending in an attempt to reduce government debt.

Monetary policy/stimulus: The policies of a central bank, aimed at influencing the level of inflation and growth in an economy. It includes controlling interest rates and the supply of money. Monetary stimulus refers to a central bank increasing the supply of money and lowering borrowing costs. Monetary tightening refers to central bank activity aimed at curbing inflation and slowing down growth in the economy by raising interest rates and reducing the supply of money. See also fiscal policy.

HEALTH CARE'S INNOVATION SHIFTS INTO HIGH GEAR



Andy Acker

Portfolio Manager Andy Acker explores the unprecedented number of medical breakthroughs occurring in health care and what it means for the sector.

Key takeaways

- » Biopharma companies developed vaccines for COVID-19 in record time. But as the pandemic's end comes into sight, we believe health care's achievements are only getting started.
- » An ever-improving understanding of the biology of disease, advanced analytics and capital investment are leading to a surge of new drug approvals and boosting revenues.
- » This momentum could accelerate as the sector increasingly targets unmet medical needs in areas such as cancer, autoimmune disease and diabetes, and attracts investor capital.

For much of the past year, efforts by biopharma companies to rein in the COVID-19 pandemic have dominated the news coming out of the health care sector. The industry's response – developing vaccines and treatments for the novel coronavirus in less than a year – is one for the record books.

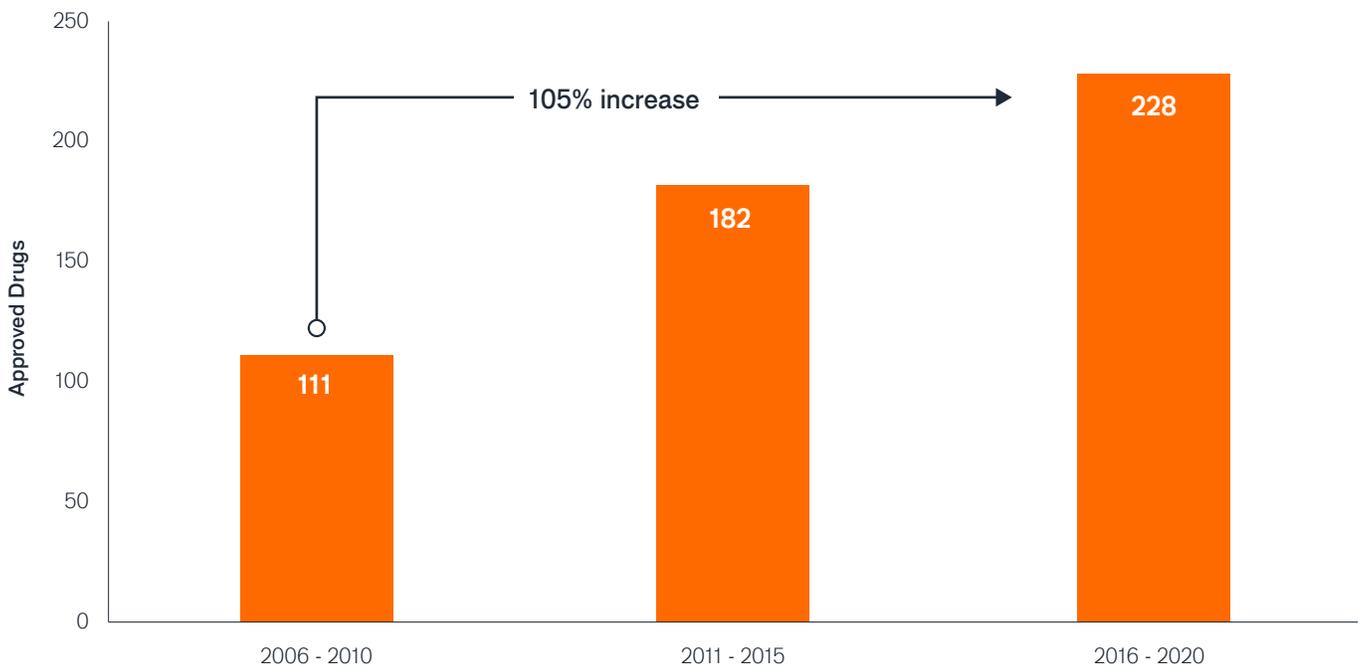
But as the end of the pandemic comes into sight, we believe health care's achievements are only getting started. Last year, the U.S. Food and Drug Administration (FDA) approved 52 novel drugs, excluding medicines for COVID-19. That sum is not far from the 2018 record of 59 and occurred despite lockdown measures that closed labs and slowed drug-manufacturing site inspections.¹ At the same time, some of the first COVID-19 vaccines to be granted emergency use authorization were based on advance drug modalities that previously had never moved beyond the research lab.

In short, while the COVID-19 pandemic brought some parts of the global economy to a standstill, health care's innovation engine was shifting into high gear. Looking ahead, we believe this momentum – rooted in accelerating innovation and supported by financial markets – could fuel growth in the sector for years to come.

Health care innovation ramps up

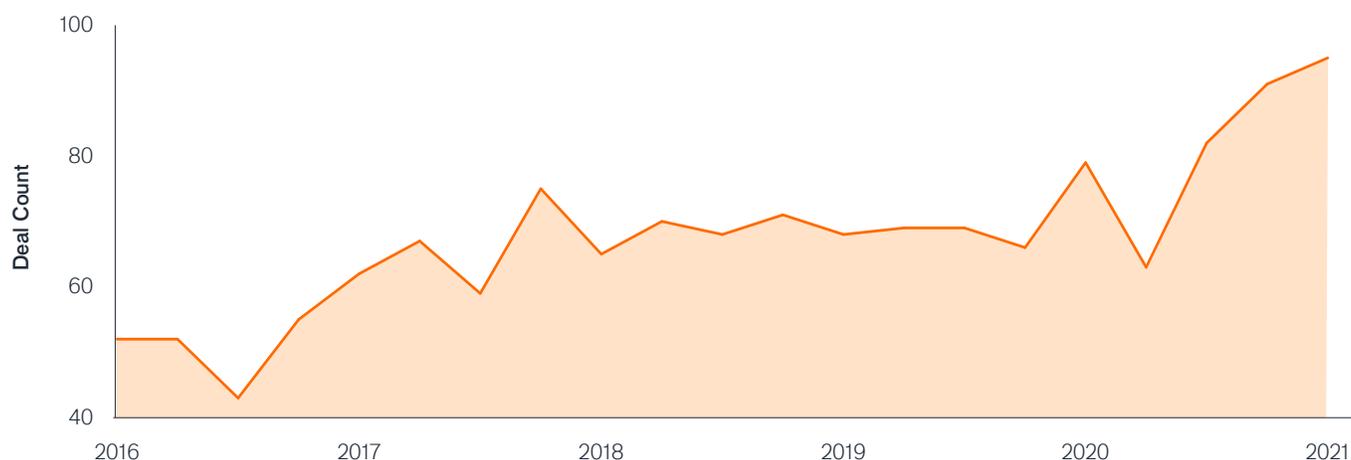
In 2020, ultra-low interest rates and COVID-related research drove investor enthusiasm for health care, allowing the industry to raise record levels of capital. A total of US\$51 billion in venture capital was invested in health care last year.² In biotech specifically, 84 firms made initial public offerings (IPOs), an increase of 65% from 2019. These companies raised more than US\$15 billion – about three times as much as the prior year – and saw their stocks climb by an average of 89% year to date.³ IPOs have continued at a swift pace so far in 2021, and the funding boom is expected to spur further innovation: 64% of biotech chief financial officers say they plan to increase research and development (R&D) spending in 2021.⁴

Figure 1: FDA novel drug approvals



Source: U.S. Food and Drug Administration, data as of 31 December 2020.

Figure 2: Deal boom – mergers and acquisitions in biotech



Source: Bloomberg, data are for deals announced or completed from 1 January 2016 through 11 March 2021.

Even large-cap pharmaceutical companies have been ramping up their investments in novel therapeutics. Flush with cash but facing patent expirations, big pharma has been rapidly buying innovation through the acquisition of small- and mid-size biotechs, as highlighted in Figure 2. In December, for example, AstraZeneca announced it would spend US\$39 billion to purchase Alexion Pharmaceuticals, a longtime biotech stalwart that will help AstraZeneca expand into the treatment of rare diseases.

Research also shows that R&D productivity within the pharmaceutical industry has been improving. During preclinical research, companies now increasingly validate drug targets genetically and use biomarkers to identify appropriate patient pools, both of which have helped to reduce attrition rates in later-stage studies. More and more, pharma companies are targeting genetically identified rare diseases and employing new mechanisms of action and novel treatment modalities, raising the odds of drug approval.⁵

Consider the case of spinal muscular atrophy (SMA). SMA is a hereditary neuromuscular disease that impairs an infant's ability to sit, walk and breathe, often leading to death within the first two years of life. In late 2016, the FDA approved the first SMA therapy, Spinraza, an antisense-based drug that helps the body produce a protein critical for the functioning of motor neurons that is lacking in SMA patients. Then in 2019, regulators approved a gene therapy for SMA, Zolgensma, and in 2020, an oral small-molecule medicine, Evrysdi. Thus, within a matter of years, a genetic condition which previously had no available treatment gained three new medicines, each with a different mode of action.

Advances and breakthroughs

Advances are being made across a multitude of disease categories, with cancer screening among the most exciting. Early detection of cancer can drastically improve survival rates for patients. Blood-based tests in clinical trials aim to look for fragments of DNA and RNA released by tumors into the bloodstream, even before cancer symptoms are present. Preliminary data have been promising – so much so that two multibillion-dollar acquisitions of companies at the forefront of this science were announced in 2020.

Last year brought other medical breakthroughs. For example, after decades of research, scientists seem to have finally managed to target a cancer-causing mutation known as KRAS^{G12C}, which is common in lung, colorectal and pancreatic cancers. The mutation has been notoriously difficult to address, but recently a new cohort of precision oncology drugs delivered positive late-stage trial data, with important implications. Lung cancer, for one, is among the most common types of cancer, with more than 228,000 Americans diagnosed each year. For those in advanced stages, survival rates remain extremely low with current therapies.⁶

The area of autoimmune disease also saw positive news. Myasthenia gravis is a condition in which a buildup of certain antibodies leads to attacks on nerves and muscles. In 2020, a drug candidate showed efficacy in targeting the neonatal Fc receptor responsible for regulating those antibodies. If confirmed by later-stage studies, this drug could pave the way to a broad class of promising new therapies for multiple autoimmune diseases.

Finally, significant and exciting progress continues to be made in cell and gene therapies. As of early 2020, the FDA had received more than 900 investigational new drug applications for gene therapies in clinical studies.⁷ Next-generation cell therapies are now being developed that will allow researchers to mass produce cancer-fighting immune cells, lowering the cost and time required to deliver these highly efficacious medicines.

Innovation leads to sales growth

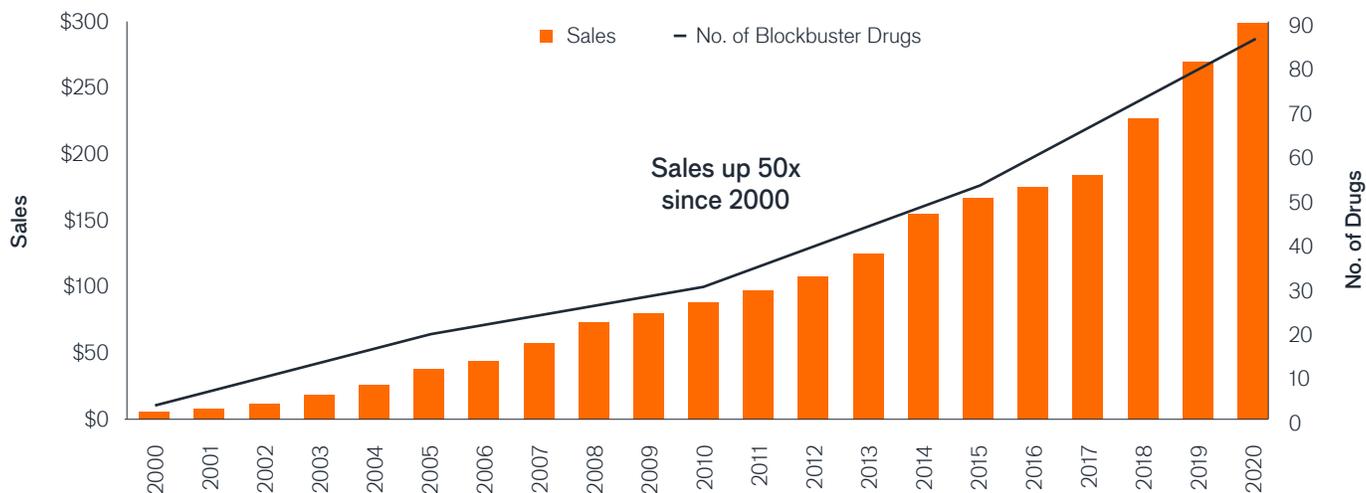
The surge in medical innovation is having a commensurate impact on biopharma revenues. Last year, sales of biotech blockbuster drugs neared US\$300 billion, about 50 times the amount from two decades ago as shown in Figure 3. Rising global demand for health care is helping drive the growth. At the same time, more drugs are now targeting patients with high, unmet medical needs. Tepezza, for example, was approved by the FDA in January 2020 as the first treatment for thyroid eye disease, a condition in which eye muscles and fatty tissue behind the eye become inflamed. With the potential to spare patients the need for multiple invasive surgeries, the drug was rapidly adopted. Last year, sales hit US\$820 million, crushing consensus expectations of US\$27 million and representing one of the best rare disease launches in history.⁸ Even more remarkable, the explosive growth occurred during the pandemic, when regular medical care was often limited or delayed.

Other launches have experienced COVID-related disruptions, which could set these products up for a recovery in 2021. For example, MiSight, a soft contact lens approved by the FDA in November 2019, slows the progression of myopia (nearsightedness) in children ages 8 to 12. However, during the pandemic, optometrist visits dried up, resulting in disappointing sales. Today, roughly 15% of clinicians in the U.S. have received training for MiSight, thanks to the implementation of remote training programs. As office visits resume, demand could accelerate: Roughly 30% of the global population suffers from myopia, a number that is expected to swell to 50% by 2050.⁹

The next chapter: the internet of health care

As MiSight highlights, innovation is taking place throughout the health care sector. In medical devices, we are witnessing an unprecedented convergence of scientific and technological advances that could have life-changing potential for patients. In late 2019, pharmaceutical giant Eli Lilly announced it was partnering with Dexcom, a maker of continuous glucose monitors. CGMs are small sensors worn by diabetics that continuously measure blood sugar levels. Connected to an insulin pump, the CGM can automatically deliver insulin to patients when needed (no finger stick tests required). It also sends data to a wireless device, such as a smartphone. Eli Lilly and Dexcom's partnership is intended to amass that data and, with the aid of machine learning, discover patterns across thousands of patients that could lead to better treatment plans for diabetics.

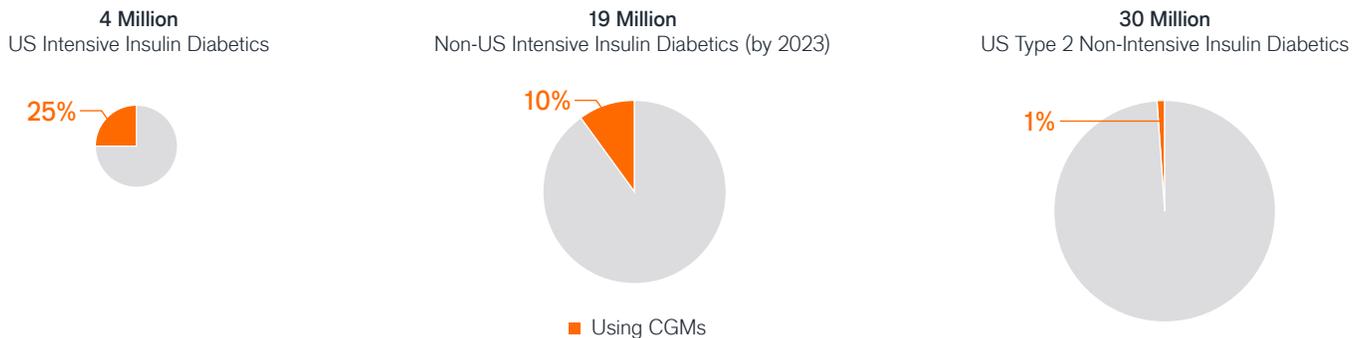
Figure 3: Blockbuster drug sales (US\$ billions)



Source: Janus Henderson, ISI Research. Data as of 31 December 2020. Blockbuster drug = >\$1 billion (USD) in sales.

Figure 4: Room to grow

Continuous glucose monitors (CGMs) have penetrated only a small percentage of the sizable diabetes market, creating opportunity for sales growth.



Source: Dexcom. Data reflect total number of diabetics by geography and type as of 31 December 2020, unless otherwise noted.

We expect this type of “connected” health care to gain momentum, particularly following COVID-19. The pandemic underscored the importance of managing comorbidities, as well as the need for remote care options. In the U.S., some 4 million people have been diagnosed with type 1 diabetes or type 2 intensive diabetes, with only about 40% of the former and 15% of the latter using CGMs. As shown in Figure 4, another 30 million people have non-intensive type 2 diabetes, of which roughly 1% use a CGM. As health care providers increasingly understand the potential long-term benefits of the technology, we believe reimbursement rates will improve and usage could soar.

Balancing risk with opportunity

Enthusiasm for the rollout of COVID-19 vaccines and medical breakthroughs have sent stocks of some health care companies soaring, particularly those of preclinical or early-phase small-cap biotech firms. We believe caution is

warranted in many cases where the science is still unproven and revenues are nonexistent. Industry research shows that 90% of drug candidates fail to move beyond clinical trials. Furthermore, in our experience, Wall Street analysts tend to under- or overestimate a new drug’s commercial potential 90% of the time. With that in mind, we believe investors need to be selective, balancing valuation with downside risks.

However, we also see a burgeoning opportunity set. Relative to the broad equity market, the health care sector trades at a discount, with a forward price-to-earnings (P/E) ratio of 16.3 compared to 22.9 for the S&P 500® Index¹⁰. Stocks of profitable biotech companies are even cheaper, with an average forward P/E of 11.1.¹¹ In addition, in 2020, 100 companies were added to the Nasdaq Biotechnology Index, which requires firms to have a minimum market capitalization of US\$200 million. In short, the industry is expanding rapidly and, in our view, could still have significant room to grow in the months and years ahead.

¹ U.S. Food and Drug Administration, data as of 31 December 2020.

² “Health Care Investments and Exits,” Annual Report 2021, Silicon Valley Bank.

³ Jefferies, as of 5 January 2021.

⁴ “The Biotech IPO Boom,” BDO Biotech Brief Winter 2021, February 2021.

⁵ “The endless frontier? The recent increase of R&D productivity in pharmaceuticals,” The Journal of Translational Medicine, 2020.

⁶ Cancer.net, as of May 2020.

⁷ U.S. Food and Drug Administration, as of 28 January 2020.

<https://www.fda.gov/news-events/press-announcements/fda-continues-strong-support-innovation-development-gene-therapy-products>

⁸ Janus Henderson, company reports. Data as of 31 December 2020.

⁹ Janus Henderson, company reports. Data as of 31 December 2020.

¹⁰ Bloomberg, data are based on forward, 12-month estimated earnings for the S&P 500 Health Care sector and the S&P 500 Index as of 15 March 2021.

The S&P 500 Health Care sector comprises those companies included in the S&P 500 that are classified as members of the GICS® health care sector.

¹¹ Bloomberg, data are for GICS-classified biotechnology stocks as of 15 March 2021.

Glossary

Price-to-earnings (P/E) ratio: A popular ratio used to value a company’s shares. It is calculated by dividing the current share price by its earnings per share. In general, a high P/E ratio indicates that investors expect strong earnings growth in the future, although a (temporary) collapse in earnings can also lead to a high P/E ratio.

TECHNOLOGY: SOLUTIONS FOR A SUSTAINABLE FUTURE IN TRANSPORT



Alison Porter



Graeme Clark



Richard Clode

Technology portfolio managers Alison Porter, Graeme Clark and Richard Clode highlight how technology companies are providing solutions for a future of sustainable transport.

Key takeaways

- » Technology is the science of solving problems and its innovation is already having a positive impact on the transportation crisis.
- » Tech is providing sustainable transport solutions across zero emission vehicles, Advanced Driver Assistance Systems (ADAS), Transportation as a Service (TaaS) and autonomous driving.
- » While myriad investment opportunities exist within sustainable transportation, thorough analysis and deep understanding of franchises and solutions are required.

When we think about the megatrends that provide a rising tide to the global challenges that we face, the transport revolution is crucial. The International Energy Agency (IEA) estimated that transport generates almost a quarter of global emissions, with cars and trucks contributing 75% of that. As a result, some 92% of the world's population live in places with air pollution levels exceeding World Health Organization (WHO) limits.

Many facets to transport sustainability

A key driver is urbanisation – around 64% of all travel occurs in cities¹ and while occupying only 3% of global land mass, cities generate over 70% of global greenhouse gas emissions². A significant portion of those emissions are due to inefficiency, with 30%-40% of traffic in cities looking for a parking spot responsible for 40% of fuel consumption^{3,4}. Not only must we contend with a growing global population, but it is estimated that 70% of people could live in cities by 2050 compared to 55% in 2018. More efficient, lower emission modes of transportation are required.

An ageing population and accompanying accidents is a wider challenge that is more acute in cities, with populations made up of a rising percentage of over 65-year-olds. Drivers over the age of 75 are almost two-and-a-half times more likely to suffer a fatal road accident⁵. At the other end of the age divide, the percentage of teenagers with a driving licence is also falling precipitously⁶. In both these demographics, new transport solutions are key.

More widely, access to quality and affordable transportation is a key driver of reducing poverty and inequality. With over a million road deaths globally a year, according to the WHO, a high multiple of that in terms of injuries and even more in terms of road crimes, it is clear that new transportation solutions are required to transport people more safely, affordably and efficiently.

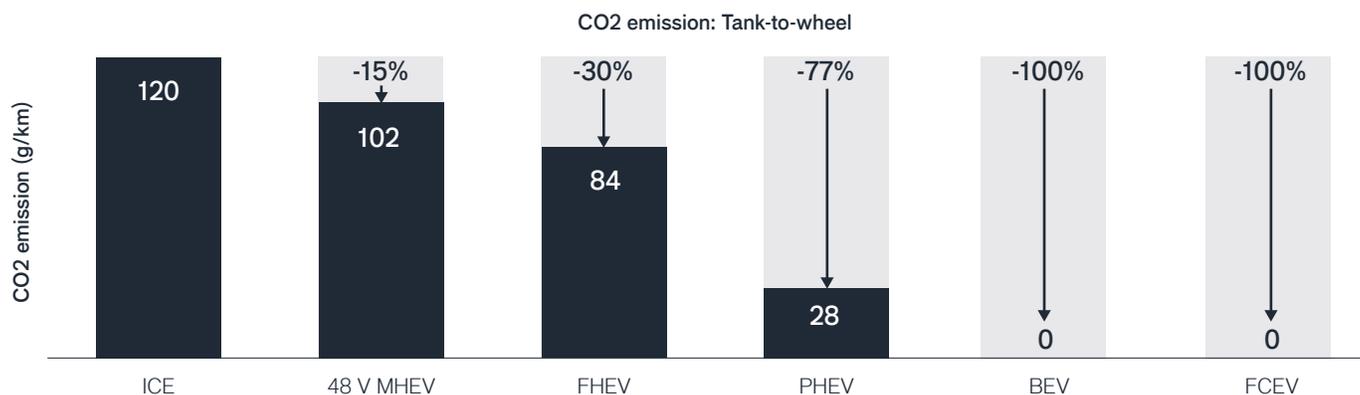
Importantly, we must think about the sustainability of transportation in the widest possible sense of the word – sustainability of the planet, the creation of sustainable cities and the sustaining of life and its quality.

Technology is a problem solver

Technology is the science of solving problems, and its innovation is already having a positive impact on the transportation crisis. Thankfully, the starting point is a situation that is so inefficient there is huge room for improvement. The incumbent model is personally-owned cars; expensive assets that are often financed yet spend 95% of the time unoccupied, and when occupied, only with an average of 1.7 passengers.^{7,8} And when driven, vehicles are reliant on internal combustion engines (ICE) powered by fossil fuels, while denigrating the urban landscape. For example, a significant portion of land in Los Angeles is car-related tarmac/concrete, including streets, pavements and parking.

“Technology is providing wide-ranging sustainable solutions – across zero-emission vehicles, Advanced Driver Assistance Systems (ADAS), Transportation as a Service (TaaS) and autonomous (self-driving).”

Figure 1: Carbon dioxide emission by degree of electrification



Source: Infineon Technologies, automotive division call 5 October 2020; The International Council on Clean Transportation (ICCT), May 2020. ICE = Internal Combustion Engine; 48 V MHEV = 48V Mild Hybrid Electric Vehicle; FHEV = Hybrid Electric Vehicle; PHEV = Plug-in Hybrid Electric Vehicle; BEV = Battery Electric Vehicle; FCEV = Fuel Cell Electric Vehicle.

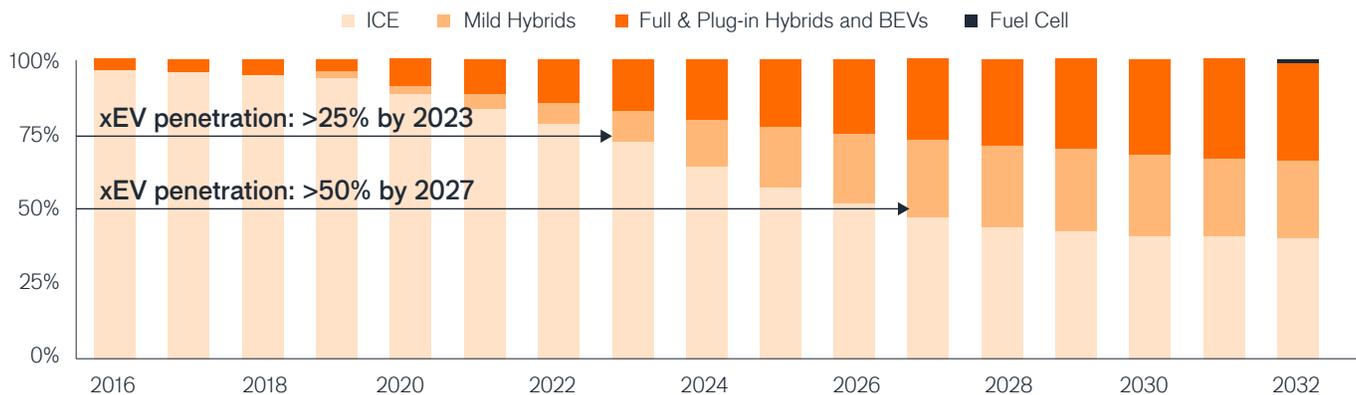
Figure 1 compares Tank-To-Wheel (TTW) (the use of fuel in a vehicle) and carbon dioxide (CO₂) emissions during driving for internal combustion engines versus various types of electric vehicles (EV). It shows the clear benefits of EV.

Accelerating EV adoption

2020 saw a dramatic inflection in electric vehicle adoption, notably in Europe, with 137% growth⁹, surpassing the incumbent largest market of China in volume on some estimates. Government-set green targets backed by generous subsidies were further boosted in countries such as China, France and Germany as COVID fiscal stimulus packages were

issued to boost post-lockdown economies. This has accelerated the trajectory towards price parity with ICE cars. A greater selection of models from well-known brands increasingly in the mid-cost range, and superior charging infrastructure have all combined to accelerate EV adoption during the COVID crisis. However, penetration remains low at less than 5% in China and Europe, with the US a laggard at less than 3%. According to IHS Markit forecasts, there will be a significant inflection to 25% global EV penetration by 2023 and over 50% by 2027 (see Figure 2). The rumoured entry of Apple into the market is likely to accelerate this trend, while companies such as sustainable transport start-up Rivian is helping Amazon deploy a fully-electric commercial fleet.

Figure 2: EV penetration – car production by fuel type



Source: Infineon Technologies, automotive division call presentation 5 October 2020. Based on or includes content supplied by IHS Markit, Automotive Group. Alternative propulsion forecast, July 2020.

Moving forward with ADAS and autonomous technology

As Advanced Driver Assistance Systems (ADAS) continue to become more sophisticated, they are beginning to cascade down to the mass market and are increasingly mandated by safety standards. Emergency braking, automated lane changing, more sophisticated cruise control and automated parking are becoming more prevalent. Forecasts predict a significant inflection in ADAS adoption through the next decade with more simple level 1 ADAS having achieved 40% penetration in 2020 but more advanced level 2 ADAS only achieving 7% and level 3 (pre-autonomous) 0%. Forecasts however suggest combined adoption will rise to 87% by 2030 (Figure 3).

While the practical challenges of autonomous driving have now been better acknowledged, real progress has been made with Alphabet subsidiary Waymo commercialising fully driverless taxis in Phoenix. We have also seen Motional, the joint venture between Hyundai and tech auto supplier Aptiv, powering autonomous rides for Uber rival Lyft in Las Vegas. Autonomous technology looks to be a longer-term trend and is likely to be geofenced or reserved for commercial fleet/delivery uses for the foreseeable future. This is despite the best efforts of Tesla to take their autopilot functionality to the truly autonomous level.

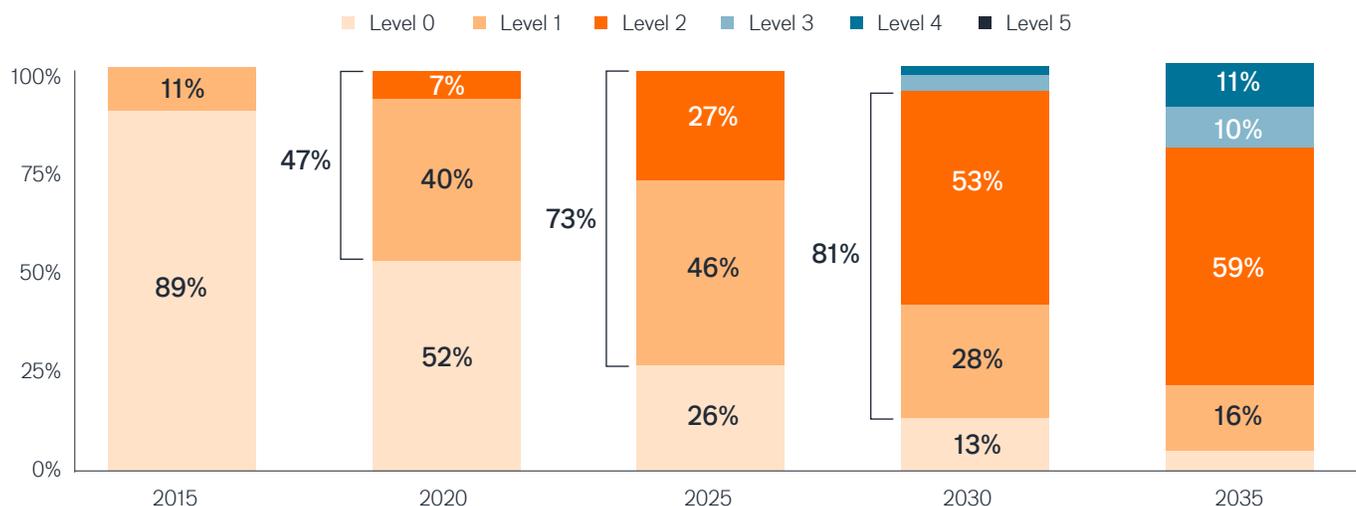
The autonomous technology push also has important longer-term implications for ride hailing. It will be a key driver in reducing the cost to parity with owning a car,

which would unlock a much larger Transport as a Service (TaaS) addressable market, especially given 46% of all US vehicle rides are less than three miles in distance¹⁰. Waymo, Motional/Lyft and Aurora/Uber are all working towards that goal. In the interim, ride hailing is already impacting the propensity for younger people to learn to drive. Despite the perceived ubiquity of Uber when it became a publicly listed company in 2019, the company talked about only 1% penetration of their addressable market. Uber has since committed to being a zero-emission platform in the US, Canada and Europe by 2030 and as early as 2025 in London.

Investment considerations

The technology sector provides myriad opportunities to take advantage of these powerful long-term trends within sustainable transportation. Rather than attempt to identify which will be the dominant electric vehicle company, it may be better to consider suppliers of key technologies that are agnostic to who wins EV leadership, such as those companies specialising in electrification and ADAS platforms, ride hailing and computer vision necessary for more advanced ADAS and ultimately autonomous driving. While these stocks have generally benefited from the secular trend towards sustainable transportation, conviction to invest in each L2 company requires thorough analysis and debate, a deep understanding of their franchises and an appreciation of the solutions they can provide to solve global challenges.

Figure 3: Car production by degree of automation



Source: Infineon Technologies, automotive division call presentation 5 October 2020; Strategy Analytics: Matrix Live, December 2019. L2 includes L2 and L2+. Level 0 – no automation; Level 1 – driver assistance; Level 2 – partial automation; Level 3 – conditional automation; Level 4 – high automation; Level 5 – fully autonomous. See Glossary for more details.

¹ Arthur D Little: The Future of Urban Mobility.

² World Economic Forum, Davos 2020: Climate emergency: how our cities can inspire change.

^{3,4} DC Shoup, Cruising for parking, 2006; Casualty Actuarial Society.

⁵ Japan National Police Agency, June 2019.

⁶ Sivak, M; US data.

^{7,8} US National Household Travel Survey, 2017.

⁹ EV-volumes.com, January 2021.

¹⁰ US National Household Travel Survey, 2017.

Glossary

Advanced Driver Assistance Systems (ADAS): electronic systems in a vehicle that use advanced technologies to assist the driver. ADAS uses sensors in the vehicle such as radar and cameras to perceive the world around it, and then either provides information to the driver or takes automatic action based on what it perceives.

Fiscal policy/stimulus: Government policy relating to setting tax rates and spending levels. It is separate from monetary policy, which is typically set by a central bank. Fiscal expansion (or 'stimulus') refers to an increase in government spending and/or a reduction in taxes. Fiscal austerity refers to raising taxes and/or cutting spending in an attempt to reduce government debt.

Geofencing: a feature in a software programme that uses the global positioning system (GPS) or radio frequency identification (RFID) to define geographical boundaries.

Levels of automated driving: as defined by the Society of Automotive Engineers (SAE). Level 0 – no automation; Level 1 - driver assistance (automated systems start to take control of the vehicle in specific situations); Level 2 - partial automation (more complex functions that pair steering with acceleration and braking, thanks to a greater awareness of surroundings); Level 3 - conditional automation (driver fully disengaged from driving, limited to specific situations); Level 4: high automation (fully capable of monitoring the driving environment and handling all driving functions for routine routes and conditions); Level 5 - full automation, no driver required behind the wheel.

Monetary policy/stimulus: The policies of a central bank, aimed at influencing the level of inflation and growth in an economy. It includes controlling interest rates and the supply of money. Monetary stimulus refers to a central bank increasing the supply of money and lowering borrowing costs. Monetary tightening refers to central bank activity aimed at curbing inflation and slowing down growth in the economy by raising interest rates and reducing the supply of money. See also fiscal policy.

Transportation as a Service (TaaS): TaaS is being driven by four macro trends: autonomous vehicles; electrified vehicles; connectivity; and the sharing economy. It involves a shift away from ownership of the mode of transport towards mobility solutions that are consumed as a service.

EMERGING MARKET EQUITIES: CHINA'S "SMART" OPPORTUNITY



Matt Culley



Daniel Graña

Emerging markets Portfolio Manager Daniel Graña and Assistant Portfolio Manager Matt Culley explain why China is well positioned to lead in electric vehicle manufacturing.

Key takeaways

- » Software and data will be at the center of the next generation of vehicles.
- » With propulsion commoditized by electric engines, China's low-cost manufacturing base will make the country competitive in the global marketplace.
- » China's government would champion the domestic EV industry as it furthers the goals of value-added technologies and decarbonization.

“When the winds of change blow, some people build walls and others build windmills .”

CHINESE PROVERB

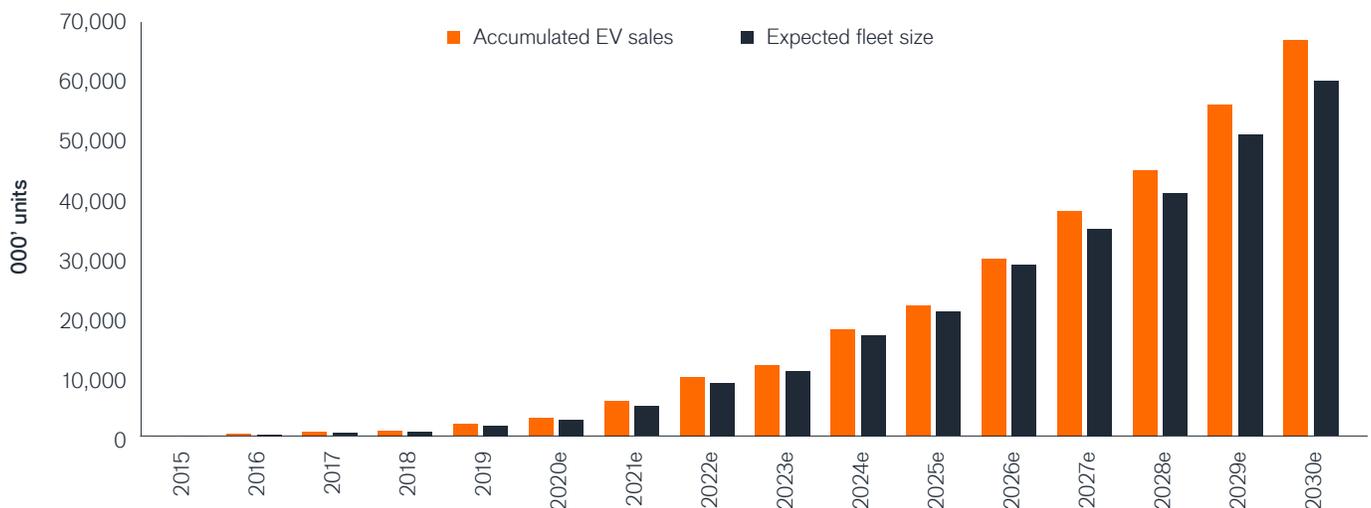
Most prior seismic shifts in technology over the past 50 years have been precipitated by the commoditization of what were uniquely hardware-oriented products toward software-oriented solutions. The pace of change during these shifts feels glacial, then sudden. Their potential feats trivial, then limitless. Incumbents fight the imminent change until that tipping point where it becomes apparent, then rush to catch up. The future is always obvious in hindsight.

Electric vehicles (EV) are the future. “Electric,” however, is just an enabling technology and can be seen as commoditizing the hardware cost of transport. We believe the winners in the EV revolution will be “smart” and defined by software in much the same way we have seen in prior historical analogues. China has the opportunity to be a leader in not only the design and production of the next generation of vehicles, but also to leverage the power of software and big data to reimagine the entire automobile industry.

Hardware was king because it was expensive, software was a necessary accessory

To better understand this perspective, we just need to look at two of the prior seismic shifts in technology – the invention of the personal computer and the smartphone. The incumbents in the 1970s during the rise of the PC were premier electronics engineering companies such as Digital and Hewlett Packard. Similarly, telecommunications equipment vendors including Motorola and Nokia dominated the handset industry in the early 2000s. Today the automotive original equipment manufacturers (OEM) are the premier mechanical engineering companies. What made these companies special was their relentless innovation to solve distinctly physical problems. The winners in the race to reduce hardware costs historically won the marginal profit pool. Years ago, and similarly, the Digital Equipment PDP-11/70 minicomputer could be configured with up to a “full meg” of RAM. The cost of that memory board was about a million dollars, so memory-intensive software was simply not an option. The value they brought was in the hardware.

Figure 1: Total estimated EV fleet size



Source: CAAM, CEIC, Morgan Stanley Research. e = Morgan Stanley Research estimates.

During these shifts, however, we see software completely redefine what the hardware can do. When the cost-per-bit of compute power fell far enough, it gave way to the rise of Microsoft's Windows. When the same happened with bandwidth, we saw the rise of Apple's iPhone. In much the same vein, we believe EVs are not special because they are electric, but because of what electric can enable.

Mentality of incrementality vs. exponentiality

It was the culture of incrementality that made these companies great. Automotive engineering focuses on a traditional hardware-centric approach. The OEMs take their starting point, "A," as a given, and work forward to "B." There are physical limitations on the power that can be extracted from combusting gasoline inside a cylinder and small changes to the engineering of these components could yield improvements in fuel efficiency over competitors. Their cultures have been built on constant innovation at the edge of these physical limitations. As recently as five years ago almost every automotive company in the world was dismissive of electric as too costly versus the present internal combustion engines. They poured billions of dollars into diesel, turbochargers and hybrid solutions to meet increasingly stringent fuel-efficiency requirements.

Technology, however, deals in exponents. Software companies architect their cultures from a solutions-oriented mindset. They begin with the vision of the end goal, "Z," work backward to the present, "A," and assume the hardware cost convergence as a given. With the exponential improvement in battery costs, these two do not meet in the middle. When it becomes

apparent that the hardware has been sufficiently commoditized, the incumbents find themselves caught out along that continuum, say at "D" or "E" where the software companies find themselves somewhere closer to the end goal, say "S" or "T."

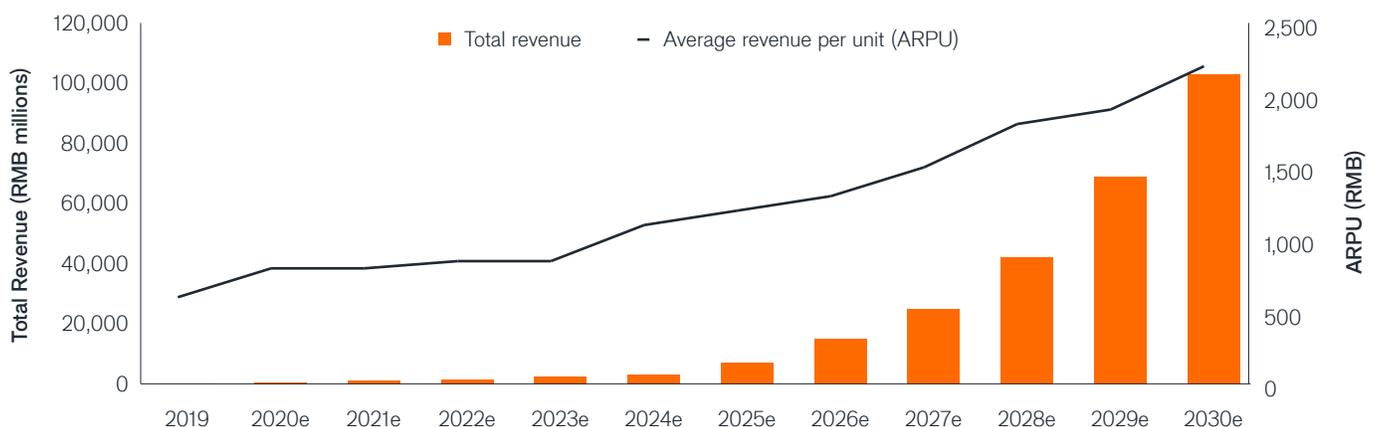
China wins in manufacturing

One of the most important results from an emerging markets perspective stemming from these seismic shifts was the geographic move in manufacturing from West to East. As software began to define the value add of the personal computer, both assembly and component manufacturing shifted to Asia, primarily China. Automotive production has historically come from developed markets given the national importance of industry employment, union presence and intellectual property in manufacturing. However, the number of moving parts within the engine in an EV shrinks by orders of magnitude, from 2,000 to just 20. What was once a marvel of engineering is quickly becoming obsolete. Put simply, it is much easier to build an electric car than an internal combustion one. It is perhaps for this reason that we see so many EV start-ups coming out of China. China has the unique capability of being able to leverage their low-cost manufacturing base and support innovative start-ups to focus on a software architecture from the outset.

A software defined experience

Perhaps the most important aspects of EVs are that they offer a better value proposition to the end user. The Chinese start-ups like Nio, Xpeng, and Lixiang have designed their vehicles with a unified software architecture that is capable of being dynamically updated over-the-air

Figure 2: Expected revenue contribution from software services



Source: CAAM, CEIC, Morgan Stanley Research. e = Morgan Stanley Research estimates.

down to the firmware and component level. As noted by a predominant executive of a major legacy automotive manufacturer, “mechanical engineering has a cycle time of two to five years. Now when it comes to software, we are talking two years to two weeks.” Incumbents’ products are built upon hundreds of outsourced vendors using broadly incompatible software code. By developing a unified software stack these innovators can continually improve the vehicle after the initial sale. This fundamental shift has the potential to turn industry economics upside down and slow the natural depreciation of their vehicles. Consumers now have access to the most modern technology for longer and are embracing “smart” electric vehicles much faster than expected.

Diminishing returns vs. accelerating returns to scale

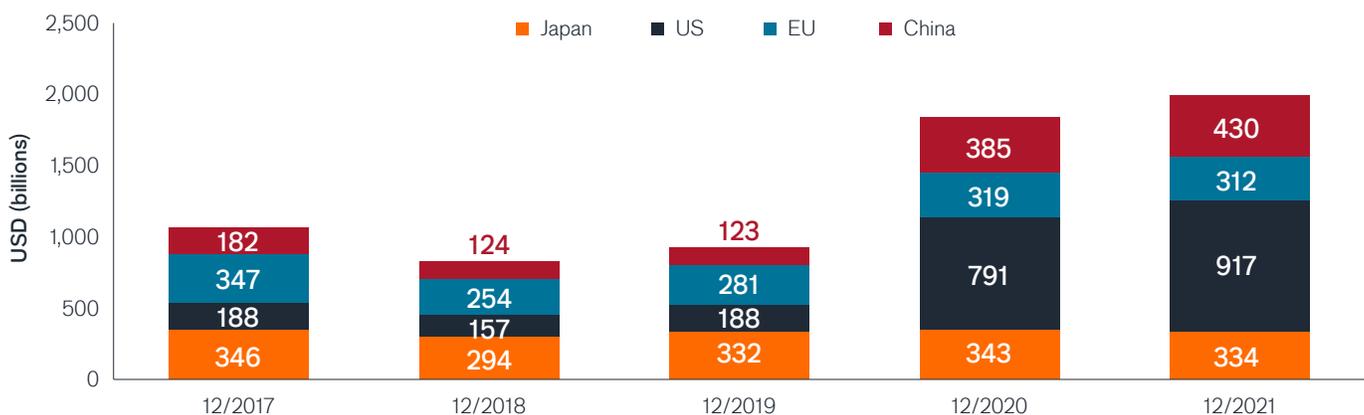
Perhaps one of the most important changes is the fundamental shift in the driver of long-term returns. Traditional OEM business models are predicated on selling volumes of cars through their dealer network. Given differentiation has fundamentally been hardware oriented, as manufacturers exhaust the limits of any one model, they have expanded their vehicle lineup. This has led to the development of lower margin products in order to maintain manufacturing efficiency, economies of scale and to hit regulatory requirements. Bypassing the legacy dealerships, Chinese manufacturers have adopted a similar strategy to Tesla of selling direct to consumer. With software at the center of the consumer experience, data emerges as the key. Start-ups in China are collecting more data every day and improving their products at an accelerating rate, requiring fewer models and less hardware investment. They have built their business

from the standpoint of engagement to build the flywheel around data. It is no surprise that the three current listed manufacturers are all backed by the Chinese Internet giants. Nio is backed by Tencent, Xpeng is backed by Alibaba, and Lixiang is backed by Bytedance, owner of TikTok and its Chinese counterpart Douyin. As they shifted their mindset from units and price to minutes of time spent and miles driven, it fundamentally opens different avenues for monetizing the vehicle-based on software, which is their core competency. What differentiates this from traditional industry is that businesses built upon data see their competitive advantage grow exponentially, rather than decay. Outside of Tesla, no other major automaker has architected their business models this way.

China leapfrogs to prosperity

This would not be the first time that China has capitalized on innovation to bypass iterations of a particular trend. China has been a first-mover in 5G and wireless technology instead of deploying a broader wireline network. They were an early adopter of digital payments, skipping the credit and debit card trends that thrived in the West. E-commerce proliferated to globally leading penetration ahead of a more formalized offline retail trade. Importantly, the central government appears to back rapid advancement of the industry as it aligns with its goals of dominating select advanced technologies and – with the accompanying transition to electric propulsion – achieving carbon neutrality by 2060. By providing an accommodative home market, Chinese manufacturers will be able compound these natural data scale advantages and export globally. China has the unique opportunity to win on both the manufacturing and technology fronts and surpass the Western incumbents who have dominated the industry for the last century.

Figure 3: Auto market cap by country



Source: Refinitiv, Morgan Stanley Research.

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