

# Mobility



We invest in great entrepreneurs  
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## Smart city: what's in a name?

Paris drawn by Le Corbusier (1920) was very efficient, but car-first...



...while contemporary visions of the Smart City revolve around sharing



- What do these two cities have in common?
  - They solve for **density** and **optimisation of space**

## Contrary to popular belief, there is early evidence that COVID won't drive people to the countryside but rather accelerate mega-city issues...

### URBANISATION IS A LONG TERM TREND ACCELERATED BY TECHNOLOGY...

- Despite much being written about Gen X moving outside of cities, **cities – and megacities – are still growing and need to be adapted**
- Today the world has 34 megacities (10m+ inhabitants); they will be **48 in 2035**
- Lower transaction costs (cheaper travel, better technology) have participated in the **construction of “hubs” and megacities**
  - Dense urban areas are especially good at **generating new and unconventional ideas**
  - Inventors moving into clusters substantially **increase patents and citations**
  - Local hubs that generate new technology hold disproportionate shares of employment in those technologies, especially for **high skilled workers**

### ... AND CITIES NEED TO CHANGE...

(↑ ↓ → arrows show pandemic impact)

#### Traffic congestion

- ↓ COVID has accelerated **public policies** aimed at reducing congestion (charging, traffic and parking restrictions)
- ↑ Continued investments in **home delivery** have increased traffic
- While still below pre-pandemic levels, **traffic is going back up**: in 2021, Londoners saved one hour compared to the 149 hours they lost pre-pandemic. A lot of the impact is due to people losing their jobs rather than moving outside of the city

#### Maintenance & fleet costs

- ↑ **Supply chain disruptions** have impacted bikes and e-bikes, as well car parts
- ↑ **Used-vehicle prices decreased**, impacting the revenues of car rental companies and prompting cost reduction initiatives

#### Rent tension

- ↑ Rent prices in major cities are seeing **“post-pandemic” catch-ups**, with prices increasing up to 40% at renewal
- ↑ In **major hubs like New York**, **rents have gone up 70%**, even higher than pre-pandemic levels

#### Pollution

- **Net zero emission targets** require a significant shift to public transportation and trends
- ↑ **Digital services are heavy polluters**









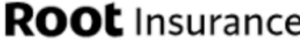





#### Infrastructure & road sharing costs

- Most housing continues to be built on **poorly connected developments** with few facilities
- **Cars take a huge amount of space**: there are an estimated billion parking spots in the US — four for every car
- ↑ **Infrastructure spending** is needed to upgrade aging subways and trains
- ↑ **Cargo bikes** require larger bike lanes

### ... AS EVIDENCE SUGGESTS COVID WILL NOT CHANGE MACRO TRENDS

- **US firms surveyed in June 2020 predicted zero change in future demand for office space** – rather than the large drops some might expect
- **COVID-19 could strengthen, rather than weaken, the tendency to big cities growth**. A consequent shift within the economic geography of big cities, with suburbs benefiting at the expense of city centres, is quite plausible
  - For example, falling transaction costs help to facilitate the concentration of ‘front office’ activities in city centres while ‘back office’ activities move to the suburbs. In addition, they facilitate functional specialisation – explaining why headquarters are increasingly concentrated in bigger cities, while smaller cities specialise in production
- **Car ownership is still alive and well**: the six bestselling cars in the US are all big vehicles such as SUVs and pick-ups even as low-emissions alternatives are readily available

## ... so it is no wonder most mobility innovations focus on the increased efficiency of mobility and road-sharing

TREND	Data for Mobility	Next-gen Car Ownership	Mobility Services	InsurTech	Urban and e-mobility	Electric Vehicles / Hydrogen
PROBLEM SOLVED	Route optimization & maintenance costs	Traffic congestion	Pollution & Recycling	Road Sharing	Traffic congestion	Pollution & Recycling
KEY FACTS	<ul style="list-style-type: none"> <li>Fleet management and risk management through AI tracking the usage of shared mobility services in the cities</li> <li>MaaS / mobility data provider often cloud based technology</li> </ul>	<ul style="list-style-type: none"> <li>Car-as-a-Service :simplify customer journey from the repetitive and time-consuming constraints of traditional vehicle-rental</li> <li>Car delivery models: new sales models and new management of used cars</li> </ul>	<ul style="list-style-type: none"> <li>Trusted networks of repair shops, spare parts</li> <li>Economic gains on claims</li> <li>Ancillary operational services</li> </ul>	<ul style="list-style-type: none"> <li>New monetization model : community bike and e-bike insurance</li> <li>Enhanced claims management</li> </ul>	<ul style="list-style-type: none"> <li>Fleet Sharing : multi-modal micro-mobility solutions are more mature</li> <li>Ride Hailing to connect passengers with car drivers in urban areas</li> <li>On demand platforms offering food delivery directly to consumer</li> </ul>	<ul style="list-style-type: none"> <li>Demand for electric car charging stations is soaring (CAGR of 47%)</li> <li>Asset heavy vehicle to infrastructure solutions</li> <li>Hydrogen charging stations with innovative fuel cell systems from green hydrogen from renewable energy sources (e.g : Grove)</li> </ul>
SAMPLE START-UPS	  	 	 	 	 	  
AVP THOUGHTS	<ul style="list-style-type: none"> <li>Telematics and AI enable to better secure people and assets</li> <li>Adoption and scaling still slow</li> <li>Business model challenges for most MaaS player, mostly project-based with a regional focus</li> </ul>	<ul style="list-style-type: none"> <li>More sustainable and tech-driven initiatives, groundswell of rental vs. ownership</li> <li>More transparent pricing, better customer (sellers &amp; buyers) knowledge by leveraging data</li> </ul>	<ul style="list-style-type: none"> <li>New economy born on top of new models, which increasingly outsource part of the value-chain and operations: logistics, 'valeting', cleaning, charging, etc.</li> <li>Supply-driven business model, currently capping the growth (lack of gig workers)</li> </ul>	<ul style="list-style-type: none"> <li>Pay-per-use penetration increasing, more players integrating part of the value chain</li> <li>Coverage of all new mobility devices : (e-scooters, e-bikes)</li> </ul>	<ul style="list-style-type: none"> <li>Unprofitable business model due to fierce competition and high leasing cost</li> <li>Need to rethink cities and outdoor spaces in collaboration with local authorities</li> <li>Question of sustainable energy infrastructures</li> </ul>	<ul style="list-style-type: none"> <li>Lots of regional / country specificities, difficult to scale internationally</li> <li>Need to have a unified battery protocol and global network of easy-to-use output chargers</li> </ul>

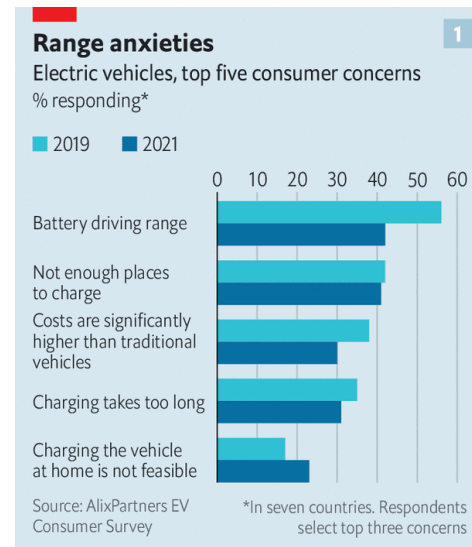


## Venture Capital money flows first to Consumer and SaaS models rather than enabling hardware infrastructure

Infrastructure and hardware are essential to mobility...

### Charging infrastructure

- The 6m pioneers who opt for EVs in 2021 will still represent only 8% of all car purchasers.
- That figure will need to increase to around two-thirds by 2030 and 100% by 2050 in order to meet net-zero goals
- The current number of public chargers—1.3m—cannot begin to satisfy demand.
- By 2030, 40m charging points will be needed, requiring an annual investment of \$90bn a year
- Only 16% of required charging stations will be achieved by 2030



The Economist

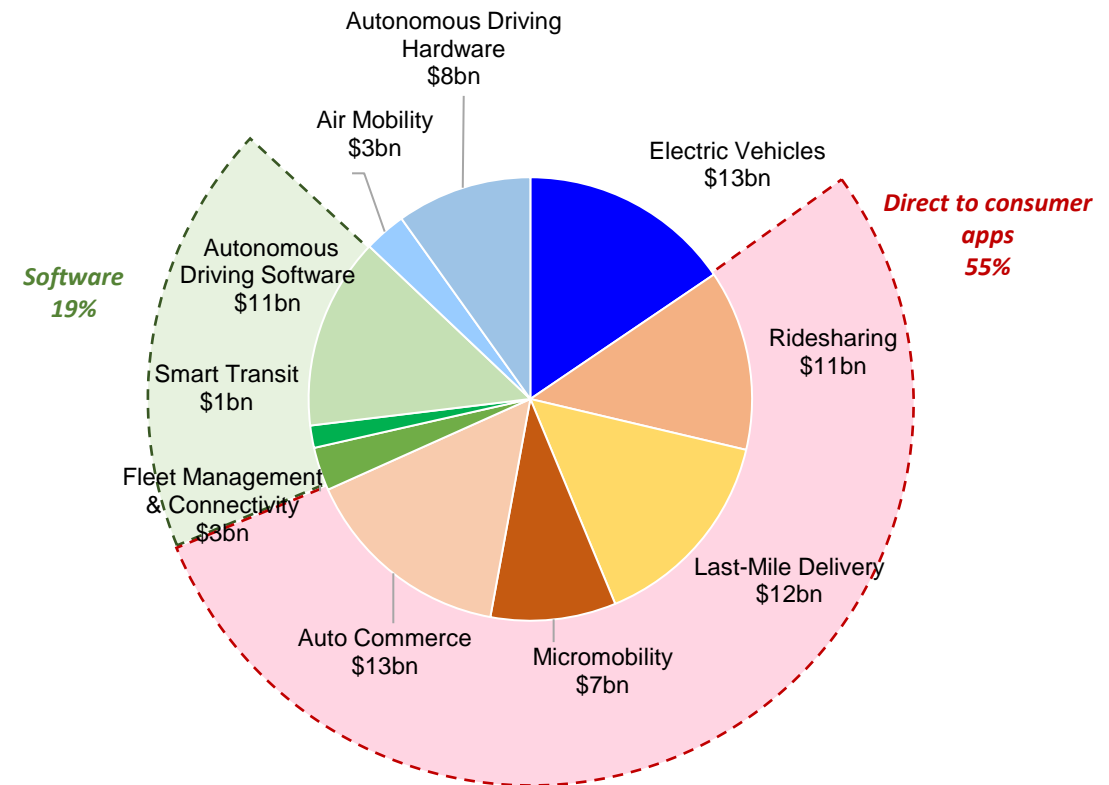
### Smart city infrastructure

- In general, VC investment in startups building semiconductor and infrastructure/broadband companies has been limited given the relatively high capital requirements
- However, existing infrastructures are sine qua non conditions to VC investments (4/5G networks have opened ride sharing, drones, autonomous vehicles and video manufacturing)
- Private investment in infrastructure projects has been stagnant for seven years running. However, while some other sectors of the economy were significantly affected by the COVID-19 pandemic, private investment in infrastructure projects remained resilient to pandemic shocks
- Public intervention (such as the US' new infrastructure bill) could unlock new VC investments, such as adding-value to chip-making processes (like cybersecurity) as they're being re-shipped home – AVP has recently met with Profian, a company pioneering this space

... yet VCs have historically been more active in Consumer or software models

- Investors have spent nearly \$82bn on mobility technologies in Q1 2021, but most VC investment went to Direct to Consumer app models or Software-as-a-Service / Software
- Public markets & SPACs financed more hardware models such as EVs

### Q1 2021 VC deals in mobility by sector (Worldwide)



## Despite this, Venture Capital investments in the mobility sector keep growing at unprecedented volumes...

New funds have participated in transforming rounds...

### Main New VC funds investing in mobility

VC	Country	Amount (in €m)	Date	Notorious Investments
<b>FONTINALIS</b> PARTNERS	US	104	Aug-21	Skyrise*, Coros*, Ouster*, Gatik*, Humatics*, Loop
<b>SoftBank</b> Group	JPN	30,000	Oct-19	Tier Mobility*, Uber*, Didi*, Fair*, Ola*, Grab*, Kuidi Dache*
<b>MANIV</b> MOBILITY	IS	100	Jul-19	Zoomo*, Autofleet*, Bipi*, Fenix*, Blissway
<b>tandem</b>	US	100	Jan-15	May Mobility*, Xstream Trucking*

### Key 2021 deals

**nuro**

Series D  
Tiger  
\$600m

**Bolt**

Series D  
Sequoia  
\$713m

**FLIXBUS**

Series G  
Canyon Partners  
\$650m

**Flink**

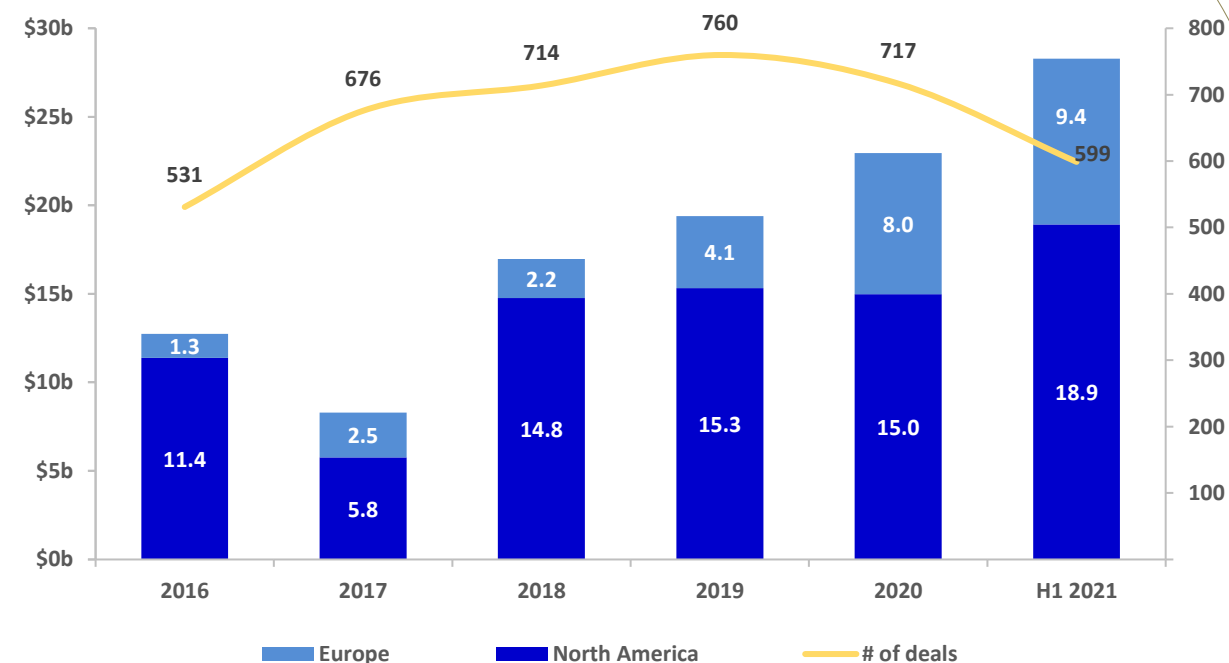
Series B  
DoorDash  
\$600m

**GORILLAS**

Series C  
Delivery Hero  
\$950m

... and overall investments are increasing

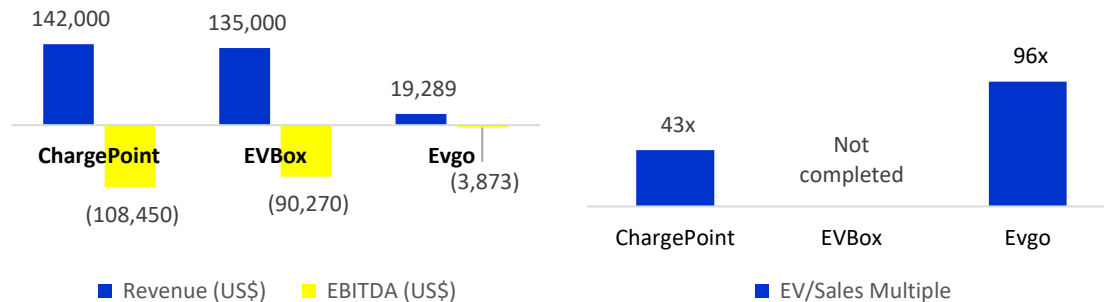
### Europe & North America VC investments - Mobility



## ...while SPACs and Corporates have come to the rescue of capital intensive-models, driven partly by regulation tailwinds...

### SPACs have financed low-revenue, capital intensive models...





- Specialist charging firms found SPACs a good way to raise capital for their ambitions: while none of them are profitable and revenues are tiny, they are highly valued by the markets. They will however need to find profitable business models as subsidies fade



- Investors are also investing in other hardware, such as Air Taxis, through SPACs. Investors have earmarked a record \$4.3bn to electric air taxi start-ups in 2021, despite most start-ups not yet having a flying prototype able to carry passengers. Lilium (US), Archer (US) and Vertical Aerospace (US) all listed through SPACs this year

### ...while subsidies and public pressure have prompted corporates to invest

#### Main Corporate VC funds

Companies	Country	Latest fundraising amount (in €m)	Date	Notorious Investments
 BMW i VENTURES	DE	300	Jul-21	AutoBrains*, Zum*, Nauto*, Kodiak Robotics
 TOYOTA VENTURES	US	300	Jul-21	Universal Hydrogen*, Burro*, Realtime Robotics*, Bipi*
 SAMSUNG	KR	300	Sep-17	Almotive*, Renovo*, Quanergy*, Graphcore
 gm VENTURES	US	-	Jul-10	Oculii*, Yoshi*, Envisics*, Proterra*, Nauto*

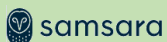





#### Main Corporate initiatives

- Vertical integration:** Tesla has not revealed what it has spent on its “Supercharger” network, which now numbers 30,000 points worldwide, but it is likely to have been several billion dollars. Other car firms are following, up to a point: BMW, Ford, Hyundai and Mercedes-Benz are partners with VW in Ionity, and VW’s Electrify America has 2,200 fast chargers in the US
- Oil companies:** Shell acquired ubitricity, a leading European on-street charging firm, and plans to roll out 500,000 charging points around the world by 2025, both kerbside and fast charging. BP and Total have also been busy buying charging firms.
- Utilities:** Wallbox, part-owned by Spain’s Iberdrola, sells chargers for homes and workplaces. The Electric Highway Coalition, made up of 17 American power companies including Dominion Energy and Duke Energy, plans to install fast charging along intercity routes.

## ...explaining intense deal flow activity in the sector in 2021, both from an investment and exit standpoint

### Top 2021 Mobility Rounds

#### Main Mobility startups funding rounds (\$m, 2021, Europe / US)

Company		Lead	Amount (in \$m)	Valuation	Date	Description
 nuro	US	Tiger Global	517	7,420	Nov-21	Fully autonomous delivery fleet
 samsara	US	A16Z	IPO	\$11.5bn <sup>1</sup>	Sep-21	Cloud platform for fleets
 LILIAM	DE	Tencent	381 (PIPE)	2,210	Sep-21	Electric vertical take-off jet
 Bolt	ES	Sequoia	600	4,000	Aug-21	On-demand transportation
 CAZOO	UK	D1 Capital	686	6,000	Aug-21	Car marketplace
 Aurora	US	Uber	841 (PIPE)	10,930	Jul-21	Self-driving delivering technology
 FLIXBUS	DE	Canyon	534	2,470	Jun-21	Bus transportation services
 QUANERGY	US	Rising Tide	33 (PIPE)	1,980	Jun-21	AI-powered LiDAR platform
 zipline	US	Temasek	207	2,280	Jun-21	Automated drone delivery service
 BlaBlaCar	FR	Accel	97	1,430	Apr-21	Carpooling application
 deliveroo	US	Temasek	207	2,280	Jun-21	Automated drone delivery service
 Flink	DE	DoorDash	600	2,100	Sep-21	Grocery delivery platform
 GORILLAS	DE	Delivery Hero	950	2,050	Sep-21	Grocery delivery platform
 TIER	DE	SoftBank	200	1,720	Oct-21	On-demand mobility services

Private Investment in Public Equity deals





















IPO

1. Expected as per press articles

Source: Pitchbook, Dealroom, Crunchbase, AVP analysis

### Top 2021 M&A deals and Corporate activity

#### Mobility M&A sample (\$m, 2020-2021, Europe/US)

Target		Acquirer		Deal Size	Total Raised	Date	Description
 <b>SAFERIDE</b> <small>Vehicle Insights. AI Driven.</small>	IS	 <b>Traffilog</b>	IS	n/a	-	Nov-21	AI solutions reducing operating and maintenance costs for fleets
<b>Uber</b>	US	<b>Yandex</b>	RU	1,000	24,680	Sep-21	Ride hailing and car-sharing
 <b>has-to-be eMobility</b>	AT	 <b>chargepoint</b>	US	250	Seed	Jul-21	E-mobility software infrastructure
 <b>veoneer</b>	SE	 <b>Qualcomm ventures</b>	US	4,500	IPO	Jul-21	Safety electronics and software
 <b>GRUBHUB</b>	US	 <b>JUST EAT</b>	ND	4,780	329	Jun-21	Online takeout food platform
 <b>ROADSTER</b>	US	 <b>CDK Global</b>	US	364	28	Jun-21	Automotive e-commerce platform
 <b>ASTM</b>	IT	 <b>ARDIAN</b>	FR	1,710	47	May-21	Motorway industrial company
 <b>PRODIGY</b> <small>Car Selling Marketplace</small>	US	 <b>Upstart</b>	US	75	19	Apr-21	Car selling marketplace
 <b>cellcentric</b>	DE	 <b>Hyundai</b>	SE	600	-	Mar-21	Hydrogen fuel cell manufacturer
 <b>ROLEC</b>	UK	 <b>SDIPTech</b>	SE	1,090	-	Feb-21	EV Outdoor charging points
 <b>WAVE</b>	US	 <b>IDEANOMICS</b>	US	41	12	Feb-20	Wireless electric vehicle charger

#### Mobility startups & Corporate partnerships

Corporate	Startup	Country	Date	Contract	Description
 <b>General Motors</b>	 <b>Al momento</b>	China	Sep-21	AI algorithm shared	AI for autonomous driving
 	 <b>ARGO AI</b>	US	May-21	Lidar technology shared	Fully integrated self-driving system
	 <b>Uber</b>	US	Jun-19	Self driving integration	Ridesharing platform
 	 <b>northvolt</b>	SE	Aug-21	Sustainable battery cells	Lithium-ion batteries manufacturer



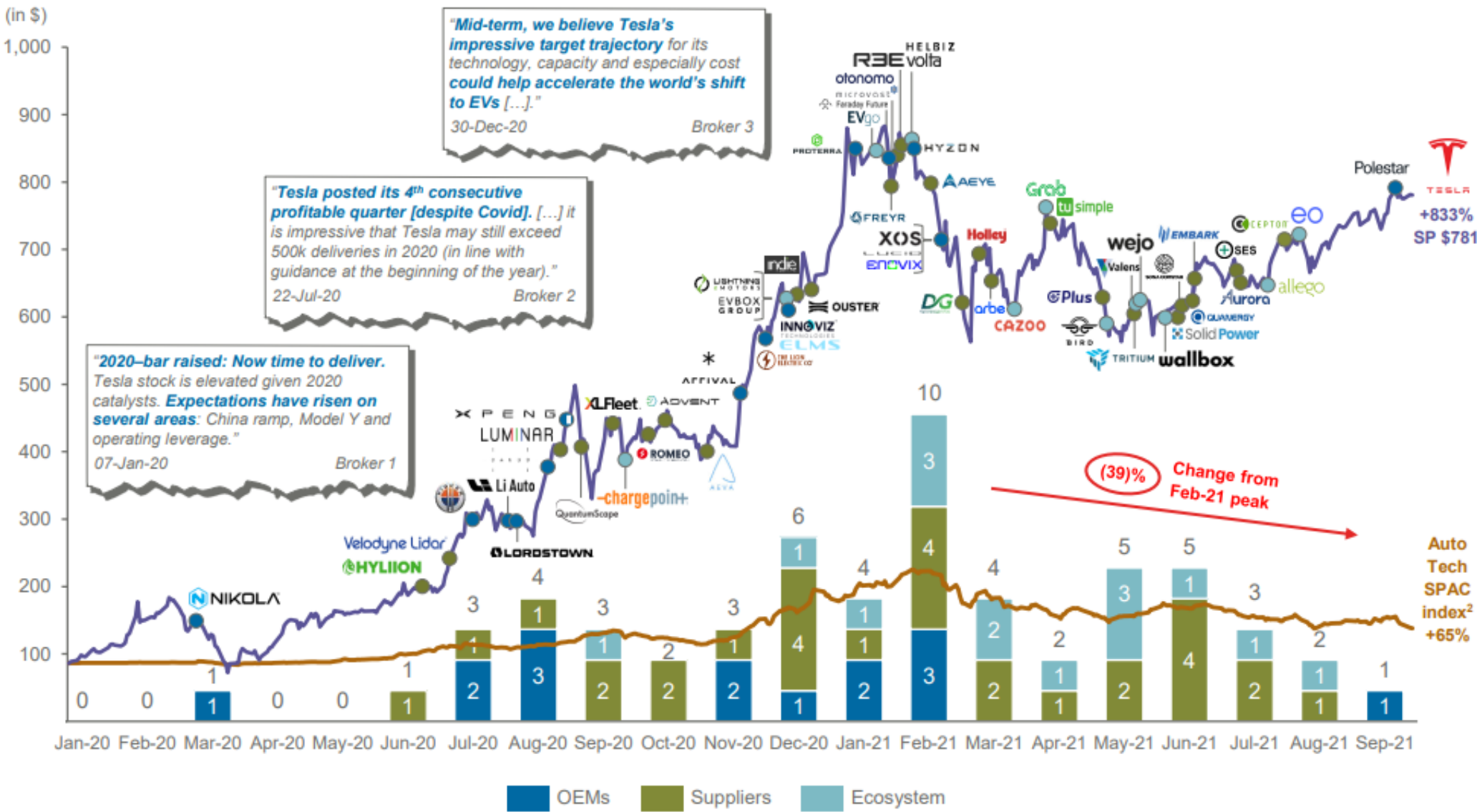
# Appendices



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# SPACS are a preferred way for mobility companies to cater to their significant cash flow needs

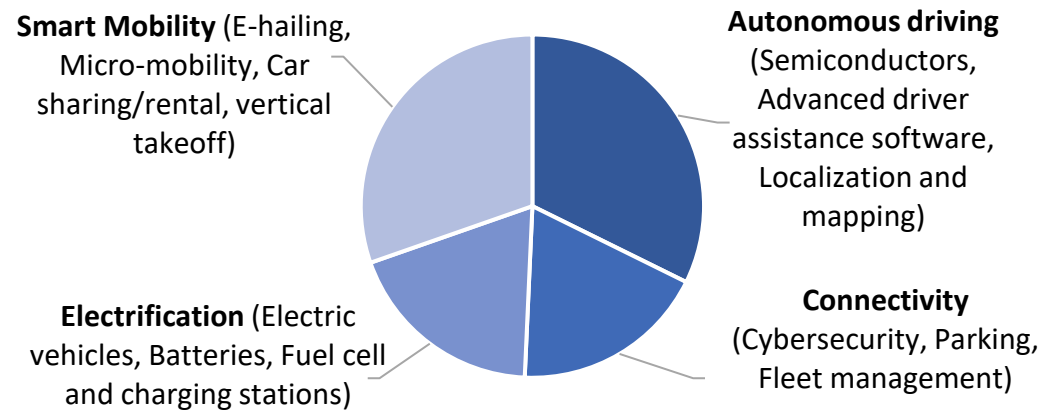
Tesla's share price performance and number of Auto Tech equity deals over time<sup>1</sup>



Source: JP Morgan Automotive update October 15, 2021

## A wave of innovations has unlocked value in mobility, driving investments in the space

### Four trends have driven the recent spike in investment



- **Autonomous Driving:** Comprehensive AI algorithms with advanced driver assistance systems (ADAS) minimizing human negligence and errors. Combining AI with smart sensors have further enabled the reliability of these systems
- **IoT connectivity:** Easy tracking of vehicular data for various use cases such as insurance, driver safety, predictive maintenance, and fleet management
- **Mobility as a Service:** Integration of various modes of transportation into a single mobility service
- **Electric Mobility:** Providing efficient batteries and charging infrastructure. EV of all sizes will streamline the logistics sector and reduce harmful emissions

### China and the US continue to lead mega rounds

Asia and North America have been the main drivers of the worldwide deal value, with mega-rounds from companies like Waymo, Gojek, WeltMeister or Didi Chuxing

The pandemic has catalyzed some existing trends, including the shift to flexible and remote working, changes to the way people travel, as well as innovations in last mile delivery offerings and individual micro-mobility solutions

	Total disclosed investment amount since 2010, \$ billion	Total number of companies
United States	84.5	471
China	50.6	154
United Kingdom	34.1	51
Israel	18.5	43
European Union	10.7	227

Source: CapitalIQ; Pitchbook; Cipher; McKinsey analysis

- **Top funds such as SoftBank are heavily invested** (more than \$30billion in automotive ACES focusing on autonomous driving and e-hailing in Softbank's case)
- High potential for mobility funding in Europe – large rounds of \$100m+ have been achieved, a lot of them in Germany due to the country's large automotive heritage

## Zoom on the Swiss 'Mobility' space

Switzerland has +100 startups in the Mobility space, covering all the use cases from electric vehicle to autonomous devices



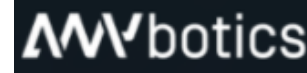
HQ Zurich  
Year founded 2019  
# FTEs 220  
Amount raised  
\$56.7M  
Investors EDB  
Investments

### Overview:

- Provider of a cloud-based technology platform for inspection of assets and technical infrastructure
- Uses AI and data from sensors to inspect mobility infrastructures like roads, bridges, and transportation assets

### Traction and latest news:

- Has raised €52m in its first round of equity funding led by a Swiss family office (unknown) in April 2020
- Currently looking to raise a \$50-100m Series C (discussion with our Growth Fund)



HQ Zurich  
Year founded 2016  
# FTEs 80  
Amount raised  
\$22.3M  
Investors Swisscom  
Ventures, ACE and Co

### Overview:

- Develops highly mobile legged robots operating in challenging environments (industrial plant inspections, unstructured environments)
- Increase productivity and safety through the inspection and maintenance

### Traction and latest news:

- The company raised CHF 20 million of Series A venture funding to accelerate the commercialization of the company's autonomous robots for industrial inspection applications



HQ Zurich  
Year founded 2017  
# FTEs 24  
Amount raised  
\$20m  
Investor  
Denso, Innovest  
Global

### Overview:

- Develops a micro-mobility service platform to provide high performance eBike via its application, replacing a car, rideshare and public transit
- Supports cities in their goals towards a sustainable, urban environment
- Faster speed and longer journey average makes it one of the few suburban micro mobility services that works on a long-term base

### Traction and latest news:

- The company was in talks to receive Series B venture funding from undisclosed investors. Subsequently, the deal was cancelled



HQ Bern  
Year founded 2018  
# FTEs 500  
Amount raised  
\$73.12m  
Investor  
Redalpine Venture  
Partners, Schweizerische  
Mobiliar Genossenschaft,  
Armada Ventures, Ltd.

### Overview:

- Operator of a car subscription platform
- Offers an alternative to vehicle purchasing and leasing by allowing subscribers to select their car online and pay a fixed monthly price that includes all costs except gasoline or charging costs

### Traction and latest news:

- The company raised CHF 15 million of Series C venture funding on March 23, 2021, putting the pre-money valuation at an estimated CHF 69 million
- The funds will be used to advance product development, continue market expansion, and grow the team



AXA Venture Partners

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