Investment Recipes

by AtonRā Partners

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On the Menu

AMBARELLA – BRINGING SIGHT TO COMPUTING

Focusing On Computer Vision

A fast-growing market opportunity

Ambarella is focusing on security and automotive (now 60% of sales), projected to be the fastest-growing end-markets for Computer Vision (CV) chips.

- The installed base of security cameras should grow at 12% CAGR between 2020-2024.
- Autonomous vehicles net addition are expected to grow at 22% CAGR (2019-2023) and reach more than 740k new units a year by 2023.

The leading player within the computer vision (CV) space

Ambarella's computer vision processors bring enhanced performances and higher flexibility to its customers, outperforming competitors such as Intel and Nvidia.

- On a performance-adjusted basis, its chips are up to 5x less power-hungry.
- Based on an open platform, its solutions are easier to embed in client's systems (e.g., surveillance systems, advanced driver-assistance systems, etc.).

A niche market rewarding performances

Performance in data elaboration stands up as the most important competitive factor in the computer vision segment, while pricing is not as key as for many other semiconductor products.

- CV-specific chips sell on average at about 2x standard chips prices.
- Intel's chips – one of Ambarella's biggest competitor – don't perform as well and don't come with the same offering.

Ambarella™

SOURCES:
AtonRâ Partners, Gartner, IHS Markit, Morgan Stanley Research, WSJ

A Well-Defined Market Potential

Autonomous driving requires Computer Vision

Driving assistance systems need cameras to capture the environment surrounding the vehicle. Computer vision helps in analyzing inputs and producing a timely response.

- The serviceable addressable market (SAM) in the automotive segment is expected to growth from $1.5B in 2018 to more than $5bn by 2025.
- Highly automated and fully autonomous cars will use up to nine camera modules, requiring an increase in CV chips deployment.

Surveillance systems' growth pulled by China

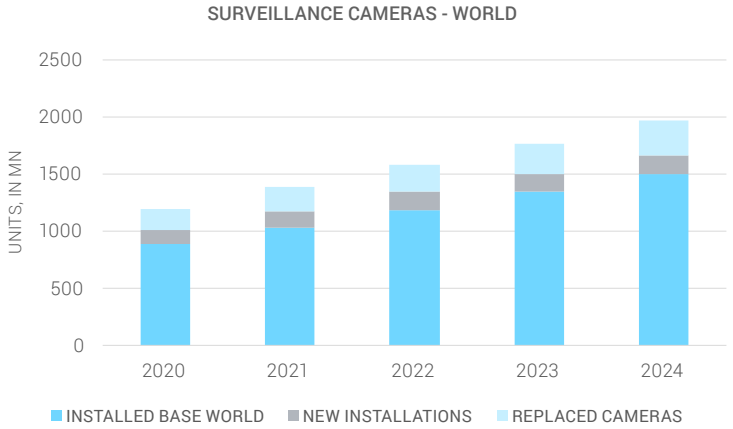
China is the most important surveillance camera market globally. Besides, the two main worldwide cameras and surveillance system players are headquartered there.

- More than 50% of security cameras are installed in China.
- Hikvision and Dahua, with 38% of the global installed base, are the largest security cameras manufacturers.

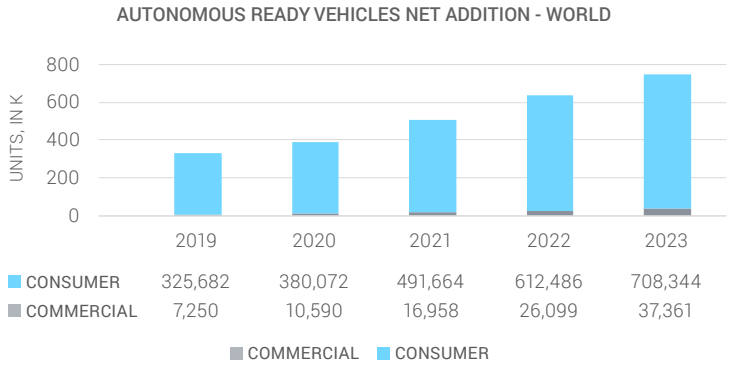
Valuing performance above price

Applications relying on computer vision require real-time data elaboration, and superior chip efficacy, Speed and power consumption are the key variables when choosing one product vs. another. As such, this market is not as commoditized as many others in the Semi's business.

- Ambarella's CV chips range covers almost every application, a clear distinctive advantage vs competitors.
- Ambarella's ASP (average selling prices) range from $10 to around $50, for its high-end CV2 chips.



SOURCE: AtonRâ Partners, IHS, WSJ, Morgan Stanley Research



SOURCE: AtonRâ Partners, Gartner

SOURCES:
AtonRâ Partners, Gartner, IHS Markit, Morgan Stanley Research, WSJ

The Automotive Open Source Solution

Needing alternatives to a closed source ADAS

Mobileye (a subsidiary of Intel) is the leader in advanced driver-assistance systems (ADAS). Its ADAS combines hardware and software – but original equipment manufacturers (OEMs) prefer to deploy proprietary software.

- Mobileye has a 70% market share in ADAS.
- The autonomous vehicle market is very competitive, and OEMs see proprietary software as a competitive edge.

Ambarella as the best open-source ADAS solution

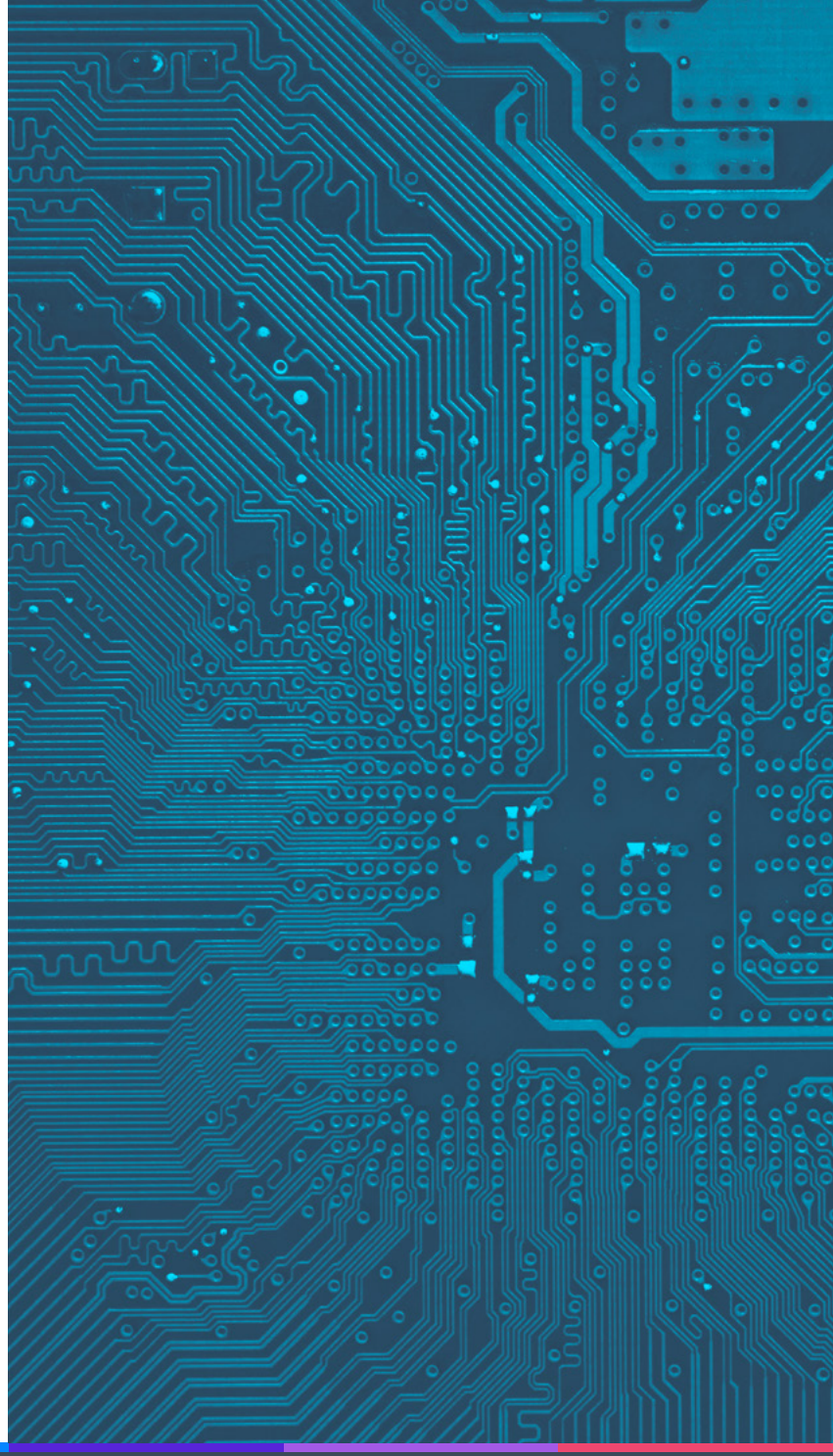
Ambarella offers just the hardware component for ADAS, thus allowing its automotive clients to source other parts (notably software) independently. Compared to other open sources chip providers, Ambarella offers better performances and a broader range of products.

- Nvidia's Xavier and Ambarella's CV2 chips were tested at the CES 2020. They had comparable computational speed, but Ambarella's CV2 had significantly lower battery consumption (6 watts vs. 32 watts for Nvidia's Xavier).

Intel lagging behind

Ambarella's chips perform better than its main competitors, a critical factor for applications that require real-time responses. An "outsourced foundry" approach gives Ambarella the flexibility to pick and choose the best available technology.

- Ambarella's chips are faster because based on a 10nm node, thanks to its foundry agreements with Samsung and TSMC.
- Intel uses a 28nm node and is currently limited by its existing foundries.



Security Cameras

Surveillance cameras need Ambarella's computer vision

Computer vision allows surveillance systems to detect threats in real-time. Chips interpret the frames gathered by cameras and permit software to give a prompt response. Major surveillance systems worldwide are deploying CV systems by exploiting Ambarella's expertise.

- The company announced design wins with 9 of the top 10 global camera makers and expects 5 of them to scale to mass production in the current quarter.

Open source surveillance systems

Ambarella's best in class chips provide an open source opportunity to a market where HiSilicon (owned by Huawei and the main player in surveillance systems) is offering fewer flexible solutions, like what Mobileye does in the automotive space.

- The Chinese leaders in surveillance systems (Hikvision and Dahua) already rely on Ambarella's solutions for 10% of their domestic business.

The Chinese opportunity

The U.S.-China trade war is turning out as a good opportunity for Ambarella. Design wins may arise because of Huawei being blacklisted.

- HiSilicon may be dropped by U.S. hardware producers to respect U.S. sanctions, opening new commercial opportunities for Ambarella, as it happened with Hanwha Techwin.
- Hikvision and Dahua have a significant export business (around 30% of sales) and may face strong headwinds if they rely just on HiSilicon as a supplier.

Catalysts

- **Hikvision and Dahua entity list removal.** Ongoing talks between the U.S. and China may enhance the outlook for Ambarella. Companies placed on the entity list are restricted from accessing certain U.S. technologies.
- **Design wins in the automotive space.** Ambarella is expected to reveal further partnerships with automotive players and OEMs during its upcoming earnings announcement (March the 3rd 2020). The CEO spoke about being close to winning some of them during its latest earnings call.
- **Deployment of the recently announced 3D sensing platform.** Ambarella announced a partnership with Lumentum and ON Semiconductor in January 2020, for the development of intelligent access control systems and smart video security products (e.g., smart doorbells and door locks).

Risks

- **Trade war impact on Chinese surveillance market.** Further restrictions on technology transfer coming from ongoing trade talks would slow down Ambarella's security segment's growth.
- **Complete removal of Huawei restrictions by the U.S.** HiSilicon has been particularly affected by the U.S.-China war and benefited Ambarella. HiSilicon would regain some lost market share.
- **Inventory normalization.** Hikvision and Dahua invested 10MM of additional inventory to anticipate trade war risks. This may push forward the need of supplementary material.

Bottom Line

- Ambarella is a leading player within the computer vision space. With a clear different business model (open-source) vs. its competitors (Intel and Nvidia notably) it has refocused on the automotive and security segments by investing over $350mn in its computer vision platform over the last 5 years.
- Ambarella beats competitors on product performance and offering width rather than on products' cheapness.

Companies mentioned in this article:

Hangzhou Hikvision Digital Technology Co Ltd (002415 CN), Hanwha Corp (000880 KS), Huawei (not listed), Intel (INTC US), Lumentum (LITE US), NVIDIA (NVDA US), ON Semiconductor (ON US), Samsung (005930 KS), TMSC (2330 TT), Zhejiang Dahua Technology Co Ltd (002236 CN)

IS THE 'GLOBAL SUPPLY CHAIN' PATIENT SICK?

The Impact Of The Coronavirus Is Unlikely To Last

When the Chinese factories sneeze, the global economy catches a cold

Chinese factories struggled to restart their activities after the Lunar New Year as the coronavirus ("COVID-19") forced workers to stay at home. Given China's role in the global supply chain, a worldwide domino effect was feared.

- According to the World Bank, China accounts for 28% of the global net output of the manufacturing sector.
- It has been the largest trading nation in the world since 2013.
- China today represents 19% of worldwide GDP (approx. 3.5% in 1999).

A leading position in the global supply chain that is no coincidence

It took China over 40 years to become the factory of the world, thanks to economic reforms, a quasi-unlimited and cheap supply of labor, the creation of highly-incentivized industrial zones, and investments into its transportation network.

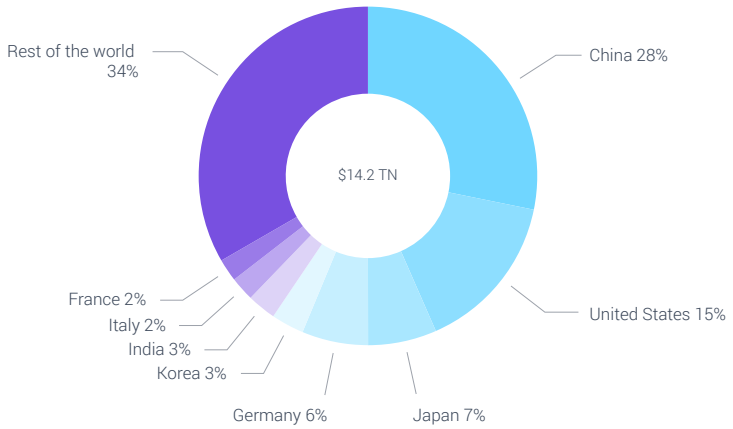
- Seven of the top-10 world container ports are based in China.
- The railway network is already the second-largest worldwide and will hit 175'000km of tracks by 2025 (from 131'000km in 2018).

A virus won't harm China's leadership in the global supply chain

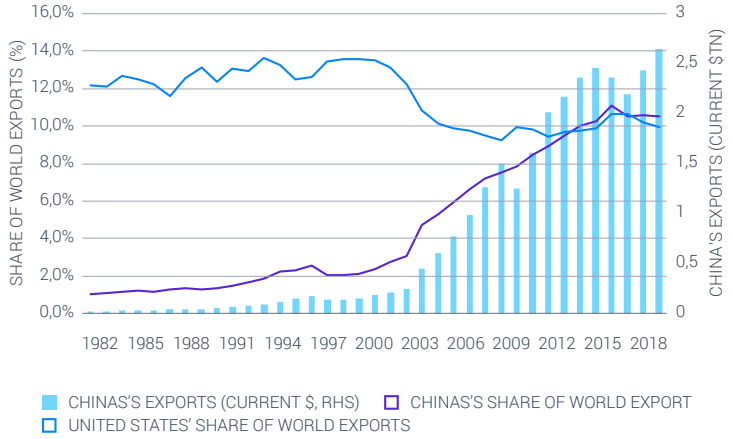
COVID-19 will not significantly alter China's role in the supply chain. China remains the only country capable of manufacturing goods in large volumes, at fair prices, and providing an efficient logistics network with a global reach.

- At most, multinationals could review their business continuity plans and negotiate new clauses with Chinese producers to secure supply of goods.

MANUFACTURING, VALUE ADDED (BY COUNTRY)



THE GROWING IMPORTANCE OF CHINESE EXPORTS



SOURCES:
Data from World Bank and OECD as of February 2020, World Shipping Council, Ministry of Transport of the People's Republic of China

Economics Of A Quarantine

The financial impact of past epidemics

Pandemics are not necessary the first black swan event that comes to the mind of market strategists. It will take time to assess the total economic impact of COVID-19, even more since the virus spreads around the world. Comparison to recent epidemics is not easy, as they had lesser economic consequences.

- SARS outbreak is often used as a benchmark, and it did cost about 0.5-1.0 percentage point of GDP growth to China in 2003.
- MERS and Ebola occurred in less economically-important regions.

The importance of the inventory levels

A V-shaped economic recovery requires store shelves to remain full. Indeed, inventories were built ahead of the Lunar New Year festivities, creating a buffer for multinationals to look for alternative suppliers or temporarily relocate production.

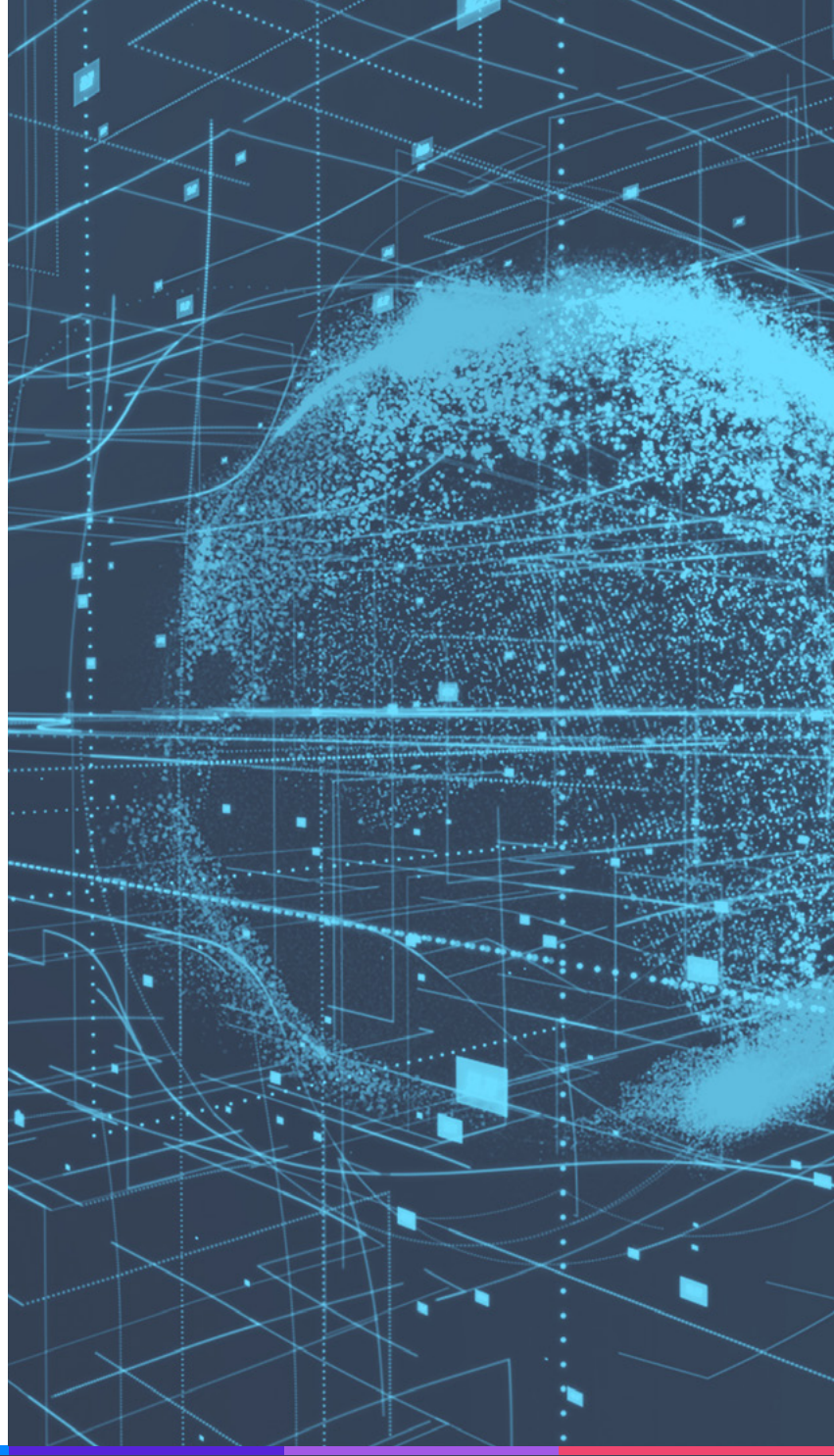
- According to Wells Fargo, U.S. retailers' inventories are enough to meet demand until at least mid-April.
- Products manufactured with a just-in-time process and a complex supply chain, e.g., automobiles, are the most at risk.

COVID-19 impact is not limited to the production of goods

As organizations activated their business continuity plans, the outbreak turned into one of the most significant work-from-home programs in the world. The e-commerce share of retail sales is set to benefit from people forced to stay at home.

- China is already a leader for e-commerce (approx. 35% of retail sales).
- Chinese consumers spend nearly 5 hours per day on their mobile devices.

SOURCES:
Wells Fargo, CNBC



China Will Remain The Factory Of The World – For Now

Part of a long-term plan, Made in China 2025

The time when China was mainly producing goods with little value added is over. The country is implementing a multi-year strategy to become a technology-intensive powerhouse. Following COVID-19, China could double down its efforts to implement this plan and promote domestic innovation in IT, green energy, healthcare, etc.

- The production of lower added value products shifted to Southeast Asia, a region where China is extending its economic and political influence.

An army of robots

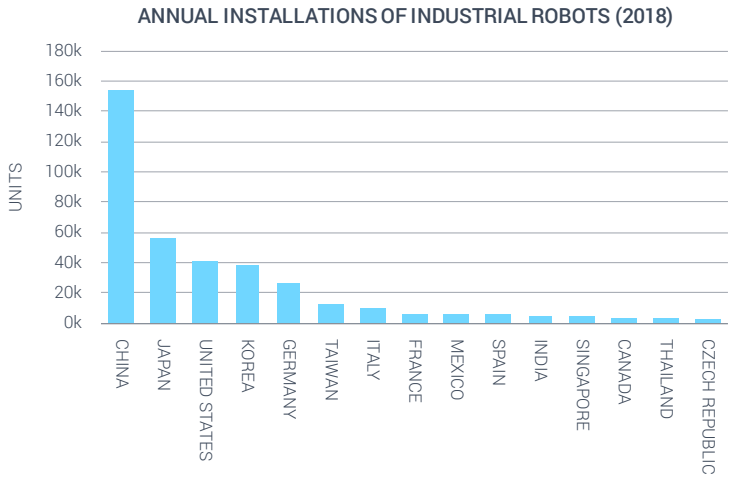
As wages are on the rise and the population is aging, Chinese factories are investing massively in robots. Moreover, China is encouraging the development of its robot industry through subsidies attracting foreign investments. The Coronavirus situation could accelerate this trend as Chinese factories must be able to provide a minimal supply, in all types of situations.

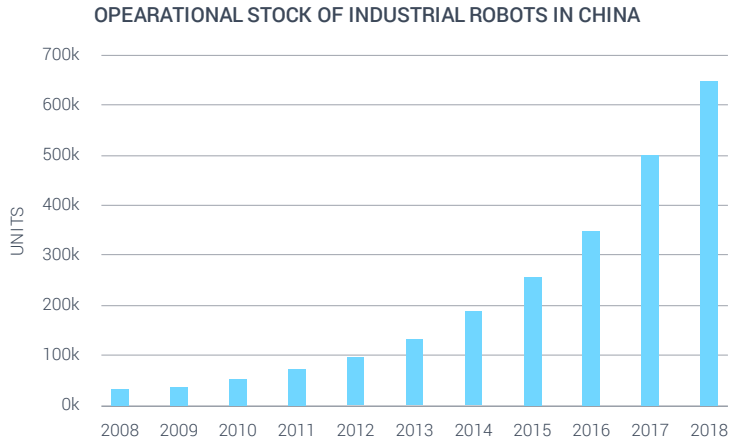
- China is the largest importer of industrial robots.
- ABB will open in 2021, a new robotic manufacturing and research facility in Shanghai.

Potential risk from 3D printing

China will maintain its dominant position in the global supply chain as long as 3D printing remains in the developmental stage. The current outbreak could increase R&D spending and investments in this field, threatening China's dominant position.

- By producing components and goods locally, 3D printing could reduce global trades – and the world dependency on China.
- According to ING, 50% of manufactured goods could be 3D-printed by 2060.





SOURCES:
International Federation of Robotics – World Robotics 2019, ING

Catalysts

- **New Silk road.** To facilitate global trade and develop infrastructure, China is lending up to $8tn over >30 years to 68 countries, mainly in Central Asia, the Middle East, and Europe.
- **Made in China 2025.** China is implementing a strategic plan to move higher the technology ladder. The country aims to compete directly with developed countries in the manufacturing process.
- **High human capital.** Over the past few years, China has moved above developed countries in education. This young and educated population is entering the workforce and will increase innovation while preserving the competitive advantage on the supply chain.

Risks

- **Protectionism.** Protectionism is globally on the rise. A significant increase in tariffs could have an impact on global trade – until the participants adapt to the new situation.
- **Seasonality of a virus.** There are ongoing studies about the seasonality of COVID-19. If China was going to suffer a global shutdown every year due to a pandemic, major importers will have to look for alternative upstream suppliers located in other countries.
- **Third industrial revolution.** In the long-run, increased automation and 3D printing have the potential to relocate the global supply chain closer to the final consumers.

Bottom Line

- Chinese factories and the global supply chain have been in the headlines since the beginning of the COVID-19 epidemics. We believe that the virus outbreak will not have a lasting impact on the production capacity of the country.
- China has emerged as a key player in the global supply chain and will maintain this position in the coming years.

Companies mentioned in this article:

ABB (ABB SW)

EQUIPPING TOMORROW VEHICLES

LiDAR: A Military Technology In Your Hand

When tech maturity translates into lower costs…and increased adoption

Light Detection And Ranging (LiDAR) technology is reaching maturity after having been considered an experimental, expensive and high-end technology. Like radar, LiDAR was initially developed for military uses, but it is now getting used in civil applications.

- Costs are dropping significantly, with cheapest LiDARs now priced at $100.
- This unlocks new fields of use for LiDAR technologies.

Not only equipping tomorrow vehicles

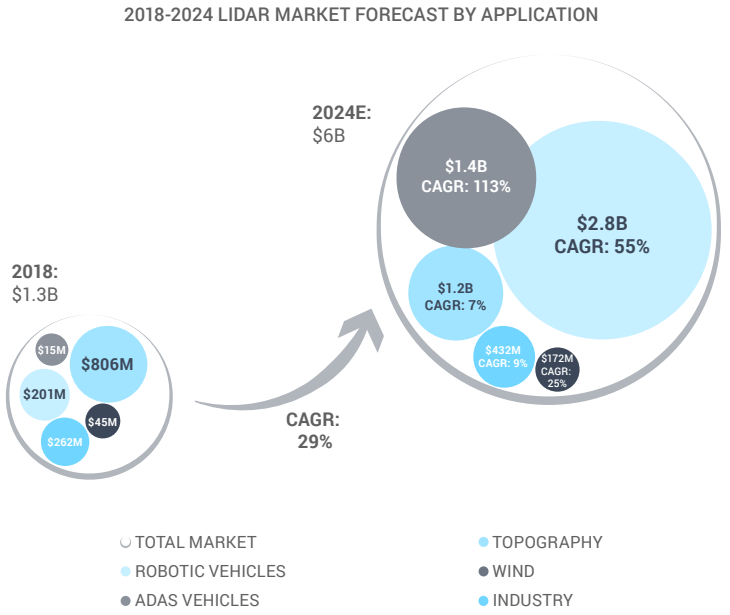
Automotive suppliers are developing low-cost LiDAR solutions for cars. Other industries such as windmills operators use it for optimizing turbine positioning. Inventory management systems use of this technology for counting objects on a shelf or move them with high accuracy.

- Warehouse management, a $20bn market could be disrupted by LiDAR.
- Non-military air and land vehicles deploy LiDAR to understand and navigate their surroundings.

The sweet spot in a fast-growing market

In our latest issue we wrote about 3D optical sensing, the largest booming technology in the sensors market. Looking further down the value chain, LiDAR have the highest growth potential as the inflection point nears.

- The LiDAR market is expected to be worth $6.3bn by 2024, with 29% CAGR.
- The automotive and robotic vehicles sectors are the most important, with CAGR of 60% and 58% respectively.



Source: lidar for automotive and industrial applications 2019 report, yole developpement, march 2019

SOURCES:
Yole, Reuters

Multiple High Tech Components

Simple though complex device

LiDAR devices are made up of three key elements, all of which are high-end parts of sophisticated technologies: laser, optics with scanner, and photodetector with receiver electronics.

- It uses visible infrared (IR) and ultraviolet (UV) light that scans a surface. The reflected signal is then read by a sensor and the scene (picture) is reconstructed.
- It can sense all sorts of materials, including metallic and non-metallic objects, minerals, water such as rain or cloud, wind, and chemical compounds.
- The resolution can be extremely high, up to 30cm2 from a distance of 1km.

Reaching maturity to satisfy the most demanding market

Automakers are known to be very demanding customers: component suppliers have been pushed to improve their LiDAR systems across the board.

- Lasers are changing from Edge Emitting Lasers, prone to diffraction and less precise, to Vertical Cavity Surface Emitting Lasers, which increase accuracy.
- The more advanced MEMS are replacing optical scanners.
- Standard detectors are substituted by the more precise, and less prone to error, single-photon avalanche diode.

Getting as cheap as possible

The debate around LiDAR revolves around cost-benefit metrics with detractors saying that it costs too much. But the cost is never a long-term issue in technology, as the higher the volumes and the lower the prices. This happens now for LiDAR.

- Velodyne has launched a $100 LiDAR at CES last January.
- Drone manufacturer DJI is selling its LiDAR, Livox, starting at $599.
- Intel's LiDAR is available from $349.

SOURCES:
IHS, McKinsey «Automotive software and electronics 2030» , Business Insider Digital Health Intelligence

Who's In The Game

A fragmented market landscape but Waymo might eventually win the race

The LiDAR market gets more and more crowded as the technology is moving from its experimental phase to being industrialized.

- Google's Waymo might win the race as it has the best technology at the best price.
- Velodyne, Bosch, Denso, and Valeo are some other players in the automotive market, which is expected to be a $2bn market opportunity by 2023.
- Pure players, like Velodyne, Quanergy, and Robosense, have a range of products servicing other markets, like Robotic vehicles.

The largest opportunity lies in custom robots

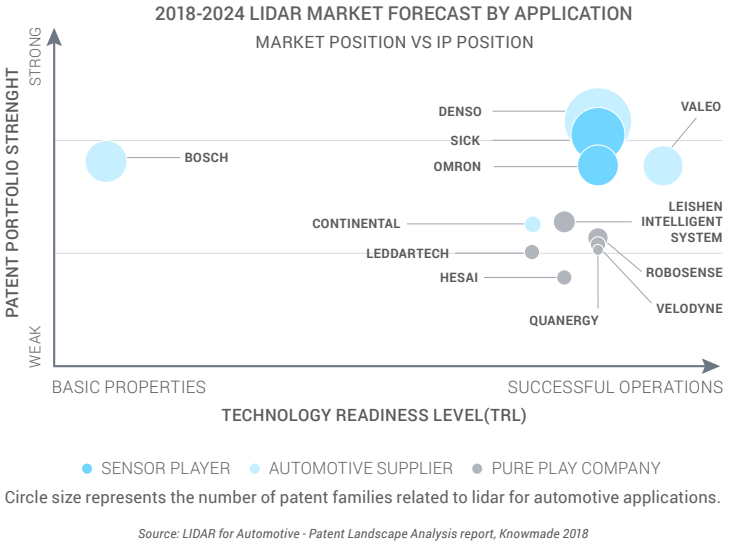
As the technology matures, a plethora of LiDAR markets develop, opening new opportunities.

- Custom robots for warehouse management notably is a market that can greatly benefit from LiDAR technology. This market alone is worth $3-4bn.
- Topography represents a $1.2bn opportunity, where LiDAR attracts interest from oil & gas players.

Competition is tough, very tough

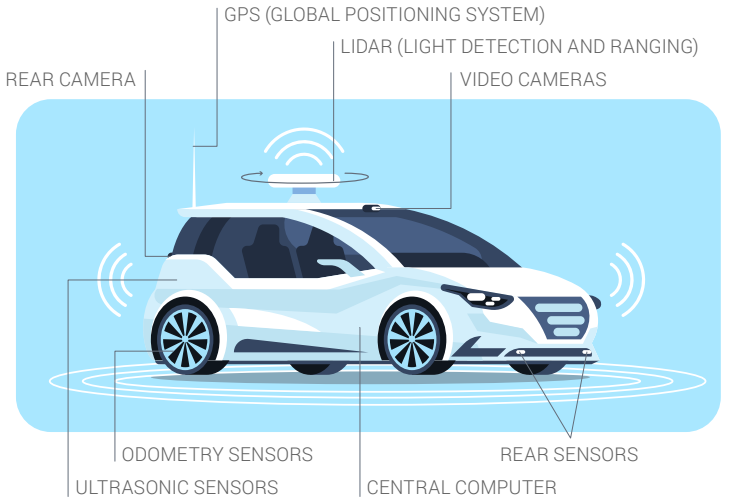
LiDAR is not the only technology able to sense the surrounding. Radar, GPS, Camera, Ultrasound talking to an AI chip can offer the same degree or even more details than LiDAR and are currently still cheaper.

- The industry leader Velodyne sells its top-end product at $75k. Intel's Mobileye solutions sells at $1k. For cars, low-end LiDARs are the key for their adoption.
- None of them though is reliable as LiDAR in all conditions, such as in bad weather or in dark conditions.



Circle size represents the number of patent families related to lidar for automotive applications.

Source: LIDAR for Automotive - Patent Landscape Analysis report, Knowmade 2018



SOURCES:
IHS, McKinsey «Automotive software and electronics 2030» , Business Insider Digital Health Intelligence

Catalysts

- **Autonomous vehicle.** Car manufacturers are pushing the development of ADAS (Advanced Driver-Assistance Systems) solutions. LiDAR's are part of the equation that will make AVs a reality.
- **Warehouse automation.** Automation and inventory management will push the adoption of LiDAR technologies, as it adds an extra eye to look after inventories.
- **Artificial intelligence.** AI will use LiDAR input, together with other sensing technologies, to improve the driving experience by making it safer.

Risks

- **Regulation.** Autonomous Vehicles represent the biggest LiDAR opportunity, but regulation may hinder ADAS adoption and thus slowdown the takeoff of LiDAR.
- **Lack of credibility and high prices.** Tens of startups are developing LiDAR, but no big name (including Alphabet's Waymo) has come out with a precise cost-effective solution.
- **Cannibalizing technologies.** The three main components of LiDAR are very complex devices. Their function can be replaced by alternative technologies and the final solution might converge very slowly.

Bottom Line

- LiDAR is reaching maturity after having been considered an expensive and high-end technology. Robotic vehicles for inventory management, together with autonomous vehicles are the key end markets, however low-cost (which started to fall sharply as of late) products are needed for LiDAR to take-off.
- Being the most advanced and precise 3D sensing technology, LiDAR has just started to enter several high growth sectors. The lower the price and the higher the adoption in the next few years. We are closely monitoring the market but Alphabet's Waymo is likely one of the winners in this race.

Companies mentioned in this article:

Alphabet Waymo (GOOG US), Bosch (not listed), Denso (6902:JP), DJI (not listed), Intel (INTC:US), Quanergy (not listed), Robosense (not listed), Valeo (FR:FP), Velodyne (Not listed)

VIRTUAL AND AUGMENTED REALITY IN HEALTHCARE HIT THE ROAD

Transformative Potential In Medicine

Reshaping healthcare

The adoption of Virtual Reality (VR) and Augmented Reality (AR) in medicine is still in the early-innings. Preference for non-invasive procedures and the need to reduce healthcare cost are driving expansion in the medical field.

- The global market of AR and VR is expected to grow by 36% CAGR between 2017 and 2025.
- From 800k users today to 3.4mn by 2025.

The revolution is underway

VR and AR (a.k.a. extended reality or immersive technologies) are already playing a significant role in healthcare, enhancing physicians' ability to carry out safe and precise procedures.

- AccuVein's AR app enables nurses and doctors to locate veins during blood draws and vascular procedures.
- Physicians of leading medical centers are using ImmersiveTouch's solutions for surgical training.

Piquing FDA's interest

U.S. regulatory bodies are realizing the potential of AR and VR in medicine and are taking steps to foster the development and approval of such technologies. Better regulation could help break down barriers to adoption.

- The FDA has recently scheduled a meeting to assess the current challenges of AR and VR in medicine and elaborate better standards to evaluate their approval.

SOURCES:
Virtual and Augmented Reality, GoldmanSachs, Digital Reality in Life Science and Health Care, Deloitte, Hospitals Try Giving Patients a Dose of VR, Vein Finder (image)

BIONICS

Breaking Barriers

A step closer to reimbursement

The FDA and other regulatory agencies around the world plan to accelerate the development of immersive technologies in medical applications. Favorable regulations are the first step to have payers on board and spur broader adoption.

- In the U.S., some clinicians get reimbursed when using VR as a therapy for phobias or stroke rehabilitation.
- Techniker Krankenkasse, the biggest health insurance in Germany, is reimbursing the use of VR to treat anxiety.

Building clinical evidence

VR and AR promise to improve the precision, speed, and safety of medical procedures. To breed confidence in these technologies, companies are building clinical evidence.

- Recent studies found that VR reduces surgical errors by 54% and boosts the surgeon's overall performance by 230%.
- Patients using AccuVein's AR system see a 39% reduction in pain.

Becoming affordable

While the price of AR and VR hardware has plummeted, software prices are still prohibitive. Producing extended-reality apps for medical use quicker and more efficiently will ultimately lower costs.

- VR headsets are now priced around $300 to $400 and can be as cheap as $5 with the Google Cardboard.
- The new version of Microsoft's AR headset, Hololens 2, is priced at $3'500, or 40% less than the previous model.

SOURCES:
Research: How Virtual Reality Can Help Train Surgeons
VR headsets relaxing patients during surgery at St George's
Effect of virtual reality therapy on functional development in children with cerebral palsy

IMAGE SOURCE

IMAGE SOURCE

Giving Surgeons X-Ray Vision

Cost-cutting tech

VR and AR technologies may help the healthcare industry save money by lowering the cost of medical training and improving the quality of procedures.

- Hospitals see annual savings of about $350k when using AccuVein's AR system as it helps reduce the number of sticks required to draw blood.
- A training mannequin could cost up to $250k, compared to the VR headset's price of around $400, plus the cost for related software.

Towards augmented surgery

With VR and AR, surgeons can visualize the entire human anatomy without any invasive intervention. Besides, the technologies enrich surgeons' experience by providing enhanced medical images and hands-free insights about a patient's health.

- Philips has recently launched its AR technology for minimally invasive surgery.
- In 2018, Novarad announced FDA clearance for its OpenSight AR, a system used for preoperative surgical planning.

Surgical robots are blending with AR and VR

As competition intensifies in the robotic surgery space, adopting innovative technologies that bring additional value to the platforms will be a key differentiating factor.

- Last year, Intuitive Surgical received the approval of its AR system, allowing surgeons to see 3D images of patient anatomy during robot-assisted surgeries.

SOURCES:
Virtual and Augmented Reality, GoldmanSachs,
Digital Reality in Life Science and Health Care, Deloitte,
Hospitals Try Giving Patients a Dose of VR

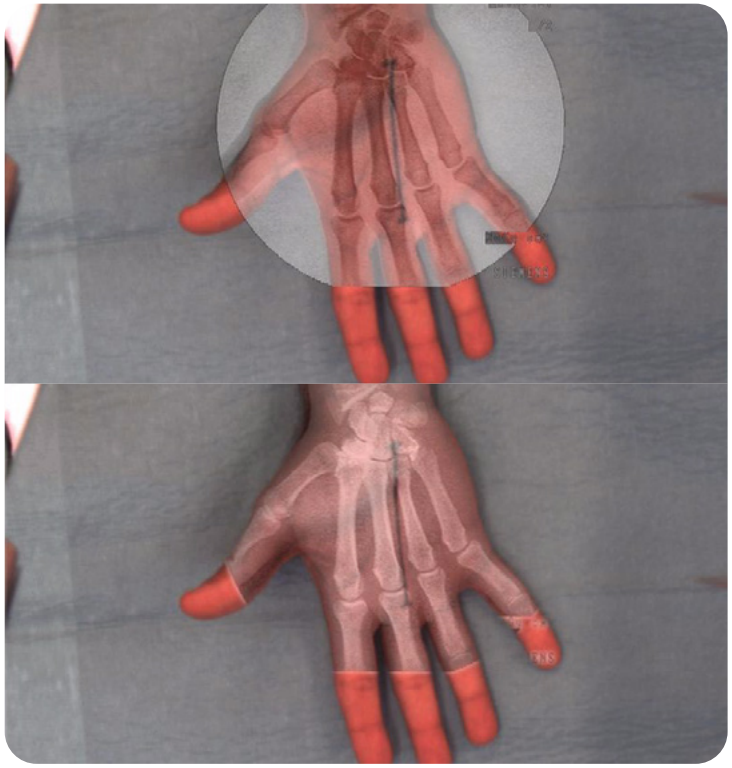


IMAGE SOURCE

IMAGE SOURCE

Catalysts

- **The FDA aims to stimulate the development of AR and VR in medicine.** The FDA will host a public workshop on March 5 to propel the advancement of such technologies.
- **A new FDA program offers a faster way to tap the market.** The Safer Technologies Program speeds up the patient's access to medical devices that prove to be safer than current alternatives. VR and AR devices that meet the requirement will benefit from an expedited approval pathway.
- **5G deployment.** Any network interruption and latency of AR and VR in medical applications could have a significant negative impact on the user experience/performance. 5G deployment grants more stable connections and faster data download and upload.

Risks

- **Lack of clinical evidence.** Clinical evidence is essential to drive adoption and reimbursement. However, studies proving the effectiveness of AR & VR in healthcare are still not significant.
- **Privacy and security issues.** The privacy and safety of AR and VR technologies remain to be adequately addressed, notably in the healthcare sector.
- **Lack of quality apps.** One of the most significant challenges of the sector is the production of high-quality software since patients' outcomes, and users' experience depend on how good the content of the VR/AR app is.

Bottom Line

- We are now closer than ever to see medical applications of VR & AR becoming mainstream. The recent move by the FDA may represent a significant catalyst for medical VR/AR manufacturers.
- Our Bionics certificate is currently not exposed to any extended reality pure player. We believe that the deployment of such devices will play an essential role in the top-line growth of some bionic companies we are already exposed to, most notably in the surgical space, and are closely monitoring the sector.

Companies mentioned in this article:

AccuVein (not listed), Googe (GOOGL US), ImmersiveTouch (not listed), Intuitive Surgical (ISRG US), Microsoft (MSFT US), Novarad (not listed), Philips (PHIA NA)

ALNYLAM – THE SOUND OF SILENCE

The Power To Shut Down Genes

RNA-based drugs: the next generation of therapeutics

DNA and RNA-based gene therapies act before the defective protein is made and look to replace current protein-based drugs.

- Compared to DNA-gene therapy, RNA-gene therapy is less invasive and avoids risk of irreversible damaging changes.
- RNA-based therapies are cheaper and more stable than DNA gene therapies.
- At a low and adjustable dosage, RNA-based drugs allow a more extended period between injections than conventional drugs (i.e., biannual vs. daily/weekly administrations).

A big market for RNA-based medicines

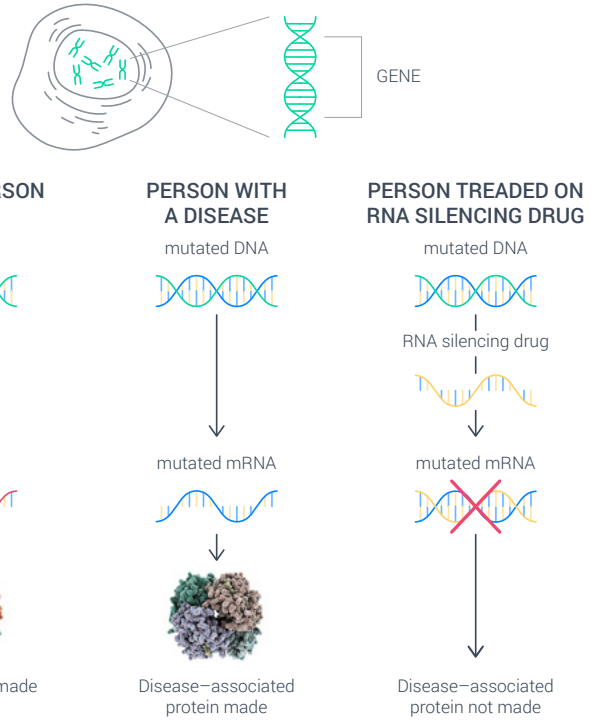
Diseases are caused by overproduction or, on the contrary, by the lack of a protein. According to the type of RNA used, the drug can silence the disease-associated protein (e.g., RNAi) or trigger the production of the missing one (e.g., mRNA).

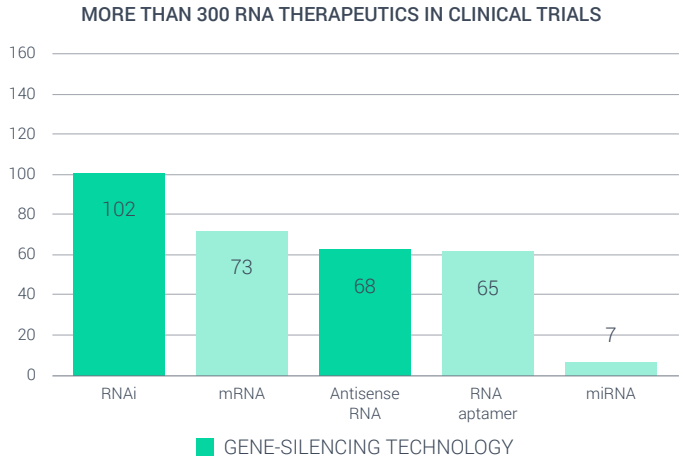
- Given the potential to treat various diseases such as cancers, AIDS and rare diseases, the market could reach $10bn by 2025 (a CAGR of 39%).
- Most RNA-based drugs under development are RNA interference (RNAi).

Alnylam: the pioneer of RNAi technology

With two drugs already approved, Alnylam has demonstrated the effectiveness and safety of its proprietary RNAi platform. By targeting rare diseases, the company benefits from several FDA designations to accelerate and improve its clinical trials.

- Alnylam has significantly increased its probability of success compared to the industry (54.6% from Phase I to end Phase III vs. 5.5%).
- Thanks to its technology platform, Alnylam reduces costs and creates high barriers to entry.





SOURCES:
Coherent Market Insights; Global Data

A Closer Look At The Technology

RNAi put the disease-causing protein under silence

The overproduction of a protein, due to genetic mutations, is the cause of many diseases. Proteins are built according to DNA-based instructions which are carried by an intermediate molecule, called mRNA.

- RNA interference (RNAi) is a process that blocks the translation of mRNA into a protein by cleaving it. RNAi drugs prevent the production of a defective protein.
- So far, RNAi has proven better stability and safety than other silencing drugs such as ASOs (antisense oligonucleotides).

Challenges to overcome before RNAi is widely adopted

RNA can't be delivered "naked" to the cell because enzymes will degrade it. Alnylam was the first to develop an accurate, efficient and safe delivery capsule, lipid nanoparticles (LNPs). After the Onpattro's launch, Alnylam is using GalNac as an alternative to LNPs.

- GalNAc is administered subcutaneously vs. LNPs' intravenously delivery. Patients can self-administer low doses quarterly (or even semi-annually) vs every 3 weeks for LNPs.

A proprietary tech platform targeting rare diseases

After 15 years and $1.5bn of R&D investment, Alnylam was the first company to turn RNA interference technology into a drug. The platform validation demonstrates the company's capabilities to develop drugs with genetically validated candidates, and restored confidence in the efficacy of RNAi.

- In 2018, Onpattro was approved to treat a rare liver disease and just one year later, Givlaari was approved for the treatment of acute liver porphyria.
- Alnylam can easily replicate this technology on various genetic diseases caused by a defective protein, such as Huntington's Disease.

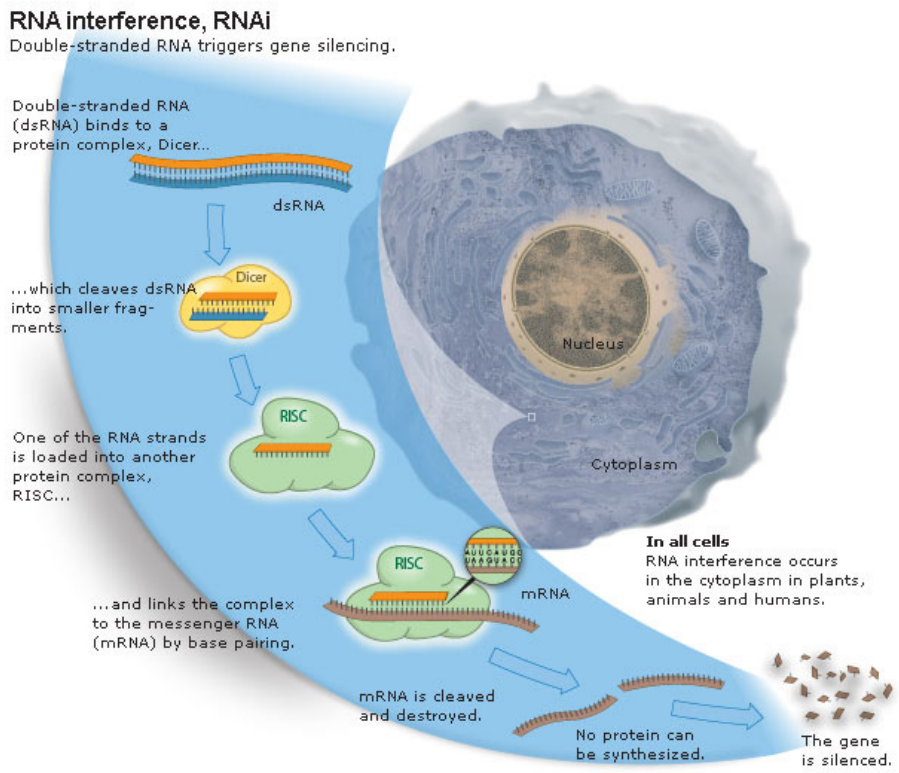


IMAGE SOURCE

SOURCES:
The Nobel Prize in Physiology or Medicine 2006. NobelPrize.org. Nobel Media AB 2020. Sun. 16 Feb 2020

A RNAi Pipeline Full Of Promises

Promising strong franchises: Onpattro and Givlaari

To date, Alnylam has obtained two approvals, Onpattro in 2018 and Givlaari in 2019. The latter received FDA approval three months ahead of the PDUFA date.

- Onpattro had solid FY2019 net revenues of $166.4mn as, due to strong physician recommendation, it is preferred to Tegsedi (Ionis), its main rival.
- The company estimates Onpattro FY2020 net revenues at between $285mn to $315mn, a projected annual growth of about 80%.
- Givlaari peak sales could reach $500mn by 2023.

A rich late-stage pipeline

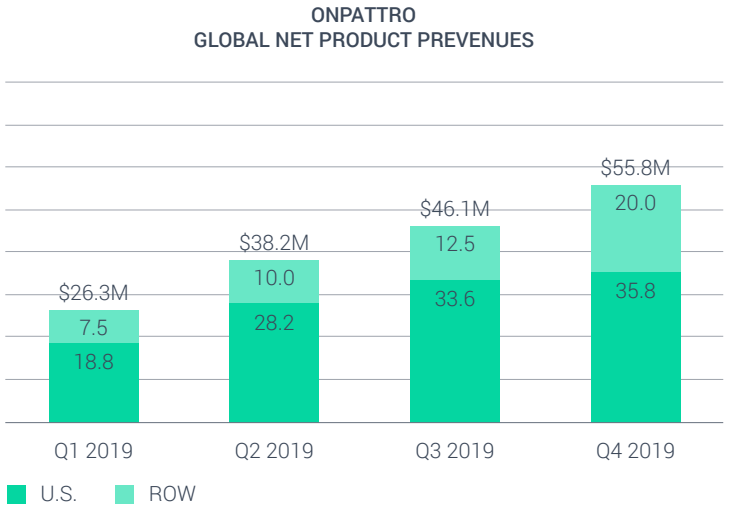
Onpattro is currently being tested for additional applications (wild-type of ATTR and h-ATTR with cardiomyopathy). Also, Lumasiran is one of the most promising late-stage candidates, on Primary Hyperoxaluria Type 1 (ultra-rare kidney disease).

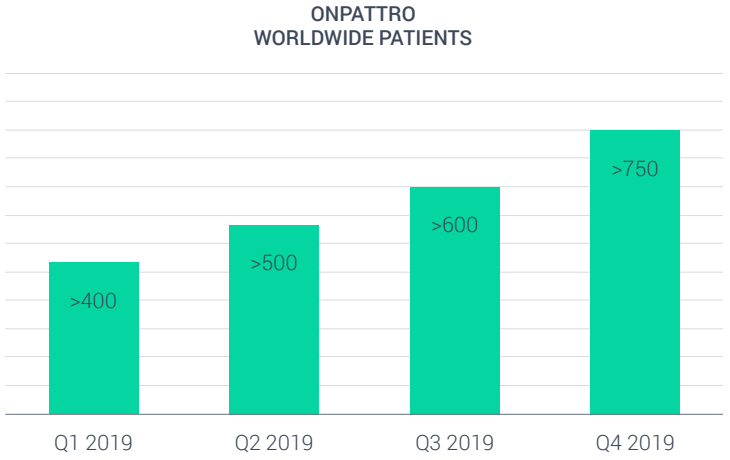
- Additional applications would expand Onpattro's market five-fold (250k patients vs. 50k for the current indication).
- In December 2019, Lumasiran's Phase III study was succesful, opening the way for an approval by the end of 2020.

Strong collaborations

Alnylam has two partnered late-stage programs: Inclisiran on Hypercholesterolemia with Novartis and Fitusiran on Hemophilia A/B with Sanofi. In 2019, Alnylam partnered with Regeneron on CNS and ocular diseases.

- Inclisaran has reported positive Phase III data, supporting a 2020 approval.
- Fitusiran has Phase III data also expected in 2020.
- In 2019, Regeneron entered the partnership with $400mn upfront payment, $400mn equity, and up-to $200mn in milestone payments.





SOURCES:
The Nobel Prize in Physiology or Medicine 2006. NobelPrize.org. Nobel Media AB 2020. Sun. 16 Feb 2020

Catalysts

- **Approvals of Lumasiran and Inclisiran.** The company has two expected approvals in 2H20 for Primary Hyperoxaluria Type 1 and for Hypercholesterolemia.
- **Full data in March 2020.** Full results from the Lumasiran Phase III study will be presented at the OxalEurope International Congress in March, supporting the approval in 2H20.
- **Next-generation of GalNAc delivery.** Lumasiran and Inclisiran, if approved in 2020, will have better patient adherence, less risk on bad infusion reactions and higher durability than already launched drugs.

Risks

- **Safety issues.** Safety issues were raised during the development of Givlaari in 2019. Even if it is already approved by the FDA, any incidents emerging from real-world data would dramatically affect Alnylam.
- **Onpattro's competition.** Ionis/Akcea's TEGSEDI should receive the U.S. approval in early 2020 for hATTR patients with polyneuropathy, following its EU market authorization in 2019. They are also initiating the Phase III study on hATTR patients with cardiomyopathy this year.
- **Lower than expected commercial adoption.** Givlaari was launched at the end of 2019. Expectations are high, due to the success of Onpattro, any disappointment would be a risk to the stock price.

Bottom Line

- RNA-based drugs are attractive due to their numerous advantages over protein-based or DNA-based therapies. We believe that Alnylam (recently added to our Biotech certificate) is well-positioned in this market thanks to its proven RNAi platform and various late-stage compounds.
- We are currently considering adding other biotechnology companies operating in the RNA-based therapies market and, more broadly, in the gene therapy market, to our certificate.

Companies mentioned in this article:

Akcea Therapeutics (AKCA US), Alnylam (ALYN US), Ionis (IONS US)

INSURTECH – RESHAPING THE INSURANCE INDUSTRY

Pioneering Digital Innovation In Insurance

The insurance market is fully embracing technology

The insurance sector is digitizing at the speed of light. AI, Big Data, wearable technology, and data science models have produced a novel subsector of Fintech - Insurtech. These players may operate alone by offering peer-to-peer insurance or cooperate with established insurers by providing them with innovative tech solutions.

- Global Insurtech market is projected to skyrocket from $8.5bn to $26bn over 2020-25, a 25% CAGR, with Europe contributing half of it.

Simplifying the life of insured and insurers

Insurtechs are improving processes in the whole insurance value chain. They simplify customer's journey, provide personalized instantaneous one-click insurance solutions for clients, and supply insurers with AI-powered pricing and claims management.

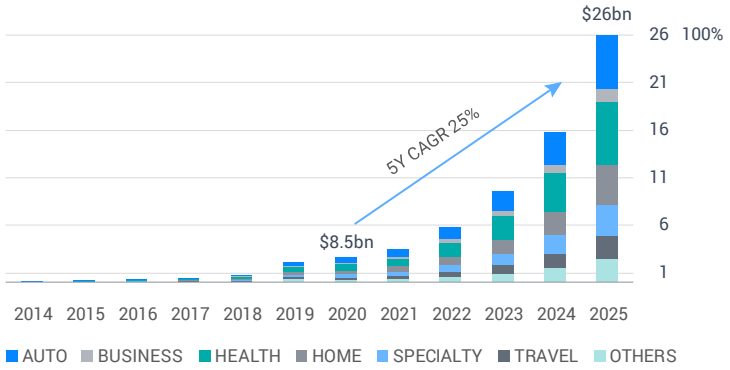
- On-demand insurtechs Trov and BoughtbyMany offer pet insurance, travel protection and more. Moreover, firms such as Lemonade or Hippo offer an insurance quote in 60 seconds.
- With Claimable, insurers may invite their customers' to an intuitive platform with real-time tracking and processing - an API costing only $4 per claim.

Opportunity, not a threat, for traditional Insurance companies

Insurers compete primarily on product differentiation, pricing, and customer service. Technology improves these areas, and Insurtechs create value through tactical partnerships with incumbent players.

- Australian Suncorp has partnered with an Insurtech to provide its Millennial generation customers with instant access to insurance for personal items.

INSURTECH MARKET IS RAPIDLY ACCELERATING



ONE CLICK INSURANCE

IMAGE SOURCE

SOURCES:
Global InsurTech Market Will Grow by Almost USD 15.63 Billion During 2019-2023 | Technavio
Insurtech Boom Will Reshape The Global Insurance Market, Grand View Research, AtonRâ Partners

Adapting To Evolving Customer Needs

Providing increasingly transparent and personalized solutions

Some insurtechs attract customers by offering insurance policies found nowhere else. Others enrich consumers' options about what insurance to choose and where to buy it. More customers choose to be insured given increased transparency and comparability.

- Insurtech BoughtbyMany caters to niche groups who have challenges finding good insurance, e.g., people affected by diabetes or young drivers.
- BusinessComparison.com compares insurance deals and helps to save money and time.

Modernizing transaction processes

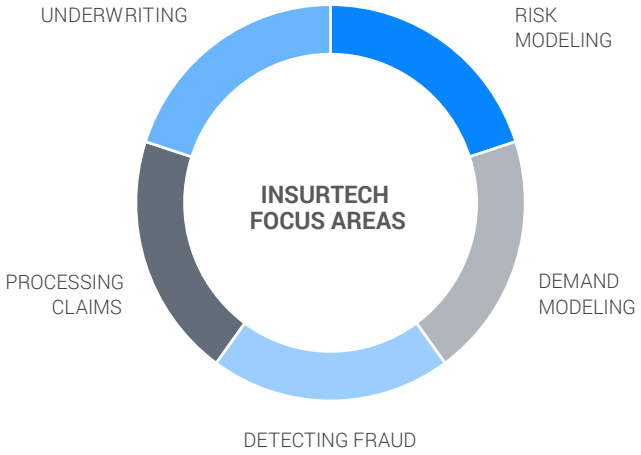
Insurtechs modernize client onboarding, claims management, and billing by relying on technology that speeds up transactions. Furthermore, Big Data and analytics provide real-time pricing and risk-modelling which innovate policy design and improve user experience.

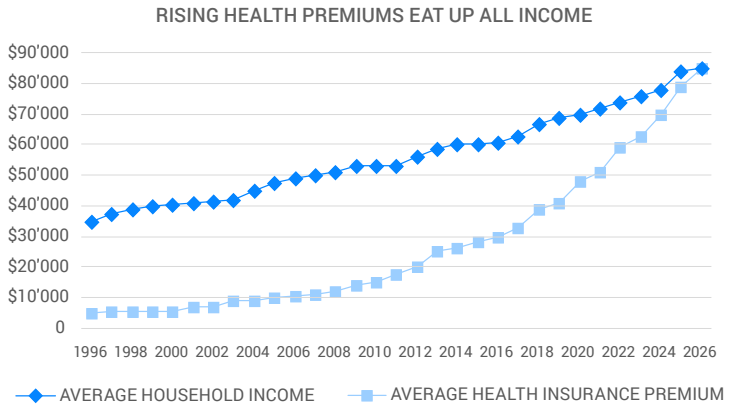
- Using AI and Big Data, Chat-bots may personally guide each customer through the identification process or help process incidents by analyzing live location or photos.
- For insurers, Insurtechs may offer safer storage and faster access to customer records, e.g. by using Blockchain technology.

Solving the problem of unsustainably rising premiums in the U.S.

At the current trend, the cost of U.S. healthcare insurance premiums will reach average household income by 2025 making it difficult for people to stay insured. With innovative models and AI, Insurtechs may adjust premiums on demand which helps reduce processing costs resulting in lower premiums.

- Insurtechs can help capture 55% of the world's population that is still uninsured or may not afford excessive premiums.





**NOTE: Projections for 2003 to 2025 were extrapolations of the 1996 to 2002 average annual increase rates (3.03 percent for incomes and 10.83 percent for insurance premiums) using 2002 data as baseline. information from references 2 and 3*

SOURCES:
Health Care Costs – Part 1, "The Problem"

Enablers and Visionaries

Cleverly addresses new and emerging risks

Unlike traditional insurances, Insurtechs are both quick to embrace and insure new technologies and products. For example, they are now offering drone insurance while simultaneously using them as a tool to analyze risks by surveying the property for structurally weak points.

- Companies such as Slice and Flock can meet highly specialized demand, e.g., ensuring private vehicles used for commercial purposes on a pay-per-ride basis or drones on a pay-per-flight basis, respectively.

Enablers, not disruptors

Insurtechs are focusing on reshaping certain steps of the insurance process and will benefit the most from partnering with traditional players. They are expected to effectively transform the sector rather than disrupt it.

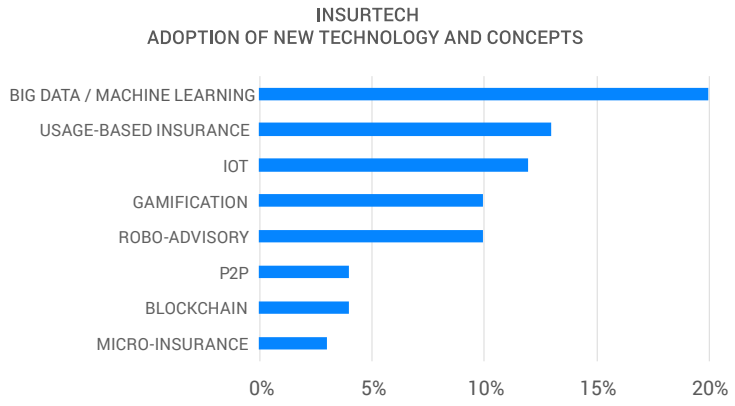
- Most Insurtech solutions such as apps and data science algorithms are available on a standalone basis. However, integrating them in any established insurer's framework will yield more value for both parties, by offering a better service to more customers.

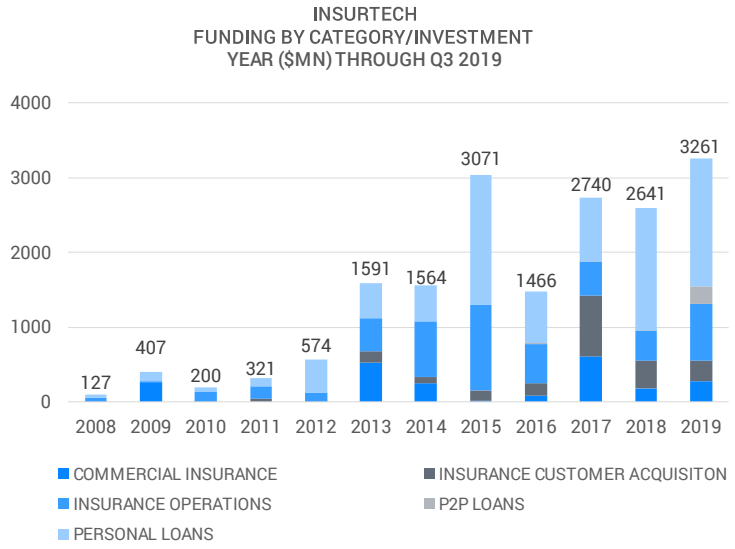
Innovating with Top-down or "Open-Architecture" approach

Innovation is happening through sharing the insurtech architecture openly through partnerships and M&A synergies.

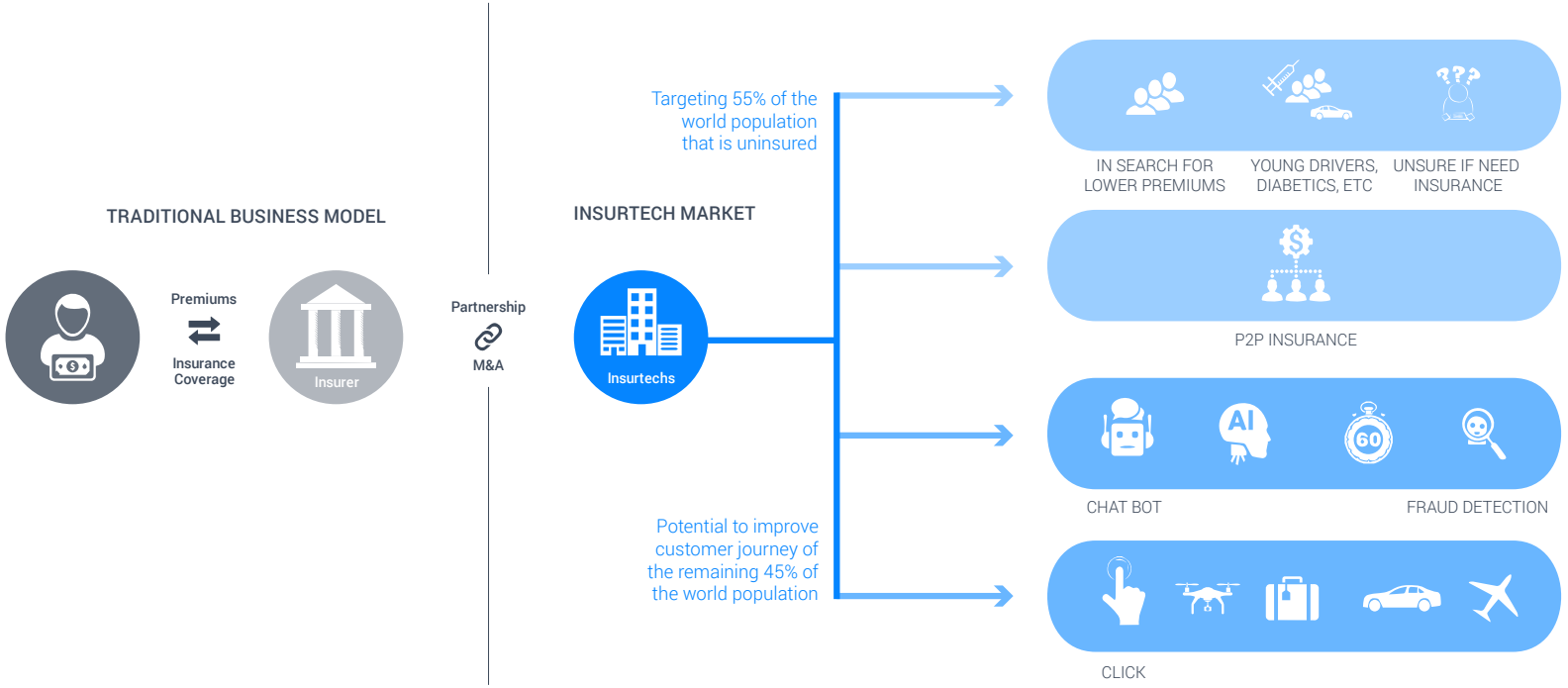
- Accelerating VC investments have cumulatively reached $16bn since 2008 with investments shifting towards more mature startups.
- There are currently over 500 Insurtechs out of 1200 launched in the past decade, who have a proven track record and are now enjoying rising valuations.

SOURCES:
The view from a start-up perspective: Is competition broken? How can it be fixed?
Why Collaboration Is The Future Of InsurTech, McKinsey, KPMG, AtonRâ Partners, Venture Scanner with analysis by Deloitte Center for Financial services





A Missing Link In The Insurance Value Chain



VALUE CREATION FOR INSURERS

- LOWER COST OF CLAIMS
- BLOCKCHAIN / FASTER PROCESSING
- NEW DISTRIBUTION CHANNELS
- NO FRAUDULENT CLAIMS
- CHEAPER CLAIMS MANAGEMENT
- LOWER COST OF SALES

BUSINESS MODEL OF INSURTECHS

- REVENUE FROM API SOLUTIONS
- REVENUE FROM LICENSING
- REVENUE FROM ONE-OFF SELLING
- LARGER CLIENT BASE
- HIGHER RECURRING REVENUE
- OPPORTUNITY FOR M&A

SOURCES:
AtonRâ Partners

Catalysts

- **Lack of competition between insurers.** Rising premiums will leave three options – keep paying, switch to Insurtech or become uninsured.
- **Increased connectivity.** A growing number of sensors would capture more data and provide better analytics. People would choose Insurtechs as they offer personalized solutions and are able to flag risks before they become claims.
- **Blockchain.** A consortium of Allianz, Swiss Re, Zurich, and Aon, is finalizing blockchain-reinsurance solution called B3i. If proven successful, other insurtechs will follow the example by integrating blockchain and improving their operations.

Risks

- **Lack of partnership.** Developing in-house solutions instead of partnering with insurtechs would hurt the insurance sector and slow down innovation.
- **Unsuccessful regulatory reform.** Failure to create a regulatory sandbox allowing insurtechs to test products would prevent them from recovering development costs and obtaining a statistically large sample of useful data.
- **Back to the old ways.** If Insurtechs do not get enough traction with incumbents, they could revert to less profitable and fierce competition.

Bottom Line

- Insurtechs improve the whole insurance value chain by speeding up processes and improving the overall customer journey. The market is expected to triple by 2025 as advanced analytics and real-time pricing offer more personalized insurance solutions at lower costs for both insured and insurers.
- Growing at a 5Y CAGR of 25%, the Insurtech industry represents an attractive investment opportunity. We favor this sector by having a substantial 19% exposure to Insurtech in our Fintech certificate.

Companies mentioned in this article:

BoughtbyMany (not listed), BusinessComparison.com (not listed), Claimable (not listed), Flock (not listed), Slice (not listed), and Trov (not listed)

NIO CHINESE EV SHOOTING STAR

Best-Positioned To Capture China's Ev Boom

Pushing innovation to the next level

NIO is Tesla's Chinese little sister, a small but innovative electric vehicle (EV) manufacturer pioneer in China's premium EV market and integrating next-generation technologies in connectivity, artificial intelligence, autonomous driving and charging.

- The company was first put in the spotlight in 2016 when its first model, the EP9 supercar, became the world's fastest all-electric car.
- All its current models integrate autonomous driving level 2, along with AI digital assistants as well as innovative charging solutions.

Low on cash, high on new concepts

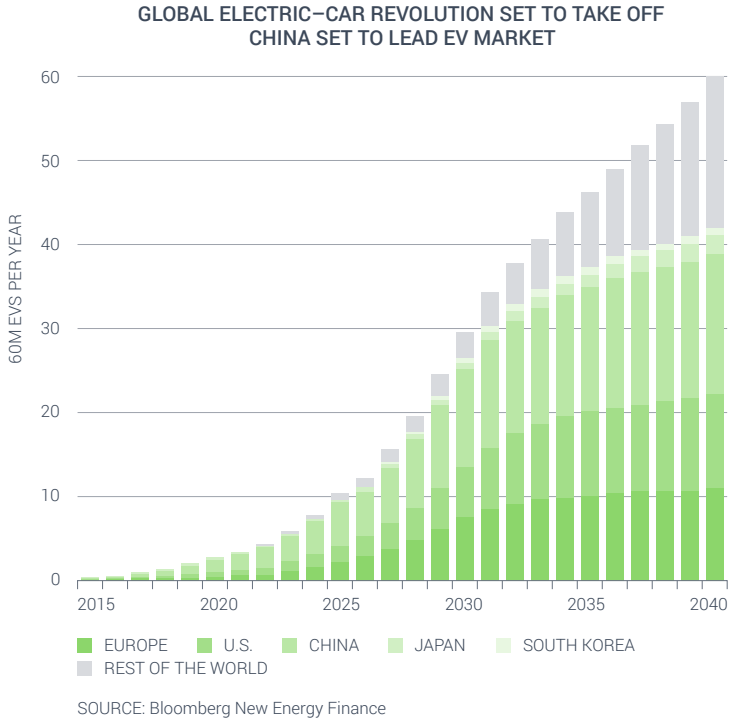
Despite NIO's important cash-burn (currently at ~$400mn per quarter), it can rely on strong support to raise capital and an innovative business model to cut costs.

- The company is backed up by key technology leaders such as Tencent and Baidu, as well as state-owned car manufacturers e.g., JAC and GAC.
- Its online and offline direct-sales model allows NIO to be more cost-efficient and expand sales networks effectively in China.

Born in the right place at the right time

EV is a booming industry, and China is the world's fastest adopter. NIO's current market share is low (~1% of EV), but new models are scheduled to be released over the next 3 years broadening the company's product offer (compact SUVs, Sedans, Minivans, etc.).

- China represents nearly 50% of global EV sales, with >1.2mn EVs sold in 2019.
- EVs are expected to account for 19% (vs.4.7% today) of all new passenger vehicle sales in China by 2025.



SOURCE: Bloomberg New Energy Finance

SOURCES:
NIO EV Sales Almost Hit A New Record In December 2019

The Art Of Innovation

Don't charge your battery pack, swap it

A key differentiating factor is its battery swapping technology, through parking docks where a robot can swap an empty battery with a fully charged one in only 3 minutes.

- Swap stations are compact (approx. 45m2) and designed to be fully automated.
- They use in-house chassis replacement technology based on >300 patents for precise positioning, rapid disassembly, and flexible deployment.

A computer on wheels

NIO is developing its autonomous driving technology equipped with Mobileye (Intel subsidiary) EyeQ4 processors and providing Level 2 automation.

- NIO Pilot, its proprietary Advanced Driving Assistance System (ADAS), provides >20 advanced driving assistance features (automatic lane changers, highway & traffic jam assistance, lane keeping, etc.) and over-the-air software updates.
- NOMI, its AI-powered in-car assistant, enables voice-activated & personalized services (e.g., driver identification & seat position adjustment, speech recognition, etc.).

An innovative manufacturing approach

NIO is leveraging on strategic partnerships, including Chinese state-owned automakers (JAC and GAC), as well as world-leading Tier 1 suppliers.

- Manufacturing agreements are in place with JAC to produce the ES8 (7-seat SUV) & the ES6 (5-seat SUV), and with GAC for the upcoming Hycan model (cheaper 5-seat SUV).
- The ES8 and ES6 each use over 1'700 parts from over 160 suppliers, including Bosh (brake boosters), Continental (air suspension), CATL (battery cells), etc.

IMAGE SOURCE

SOURCES:
NIO Annual Report 2018

Reinvent Strategic Business Models

Cash-intensive but with a solid backbone

NIO's main challenge is its ability to secure enough funding to sustain its growth. Building a carmaker from scratch is no small task and requires substantial financial support before reaching profitability (see Tesla's example).

- NIO averages $400mn of cash burn per quarter from operating activities.
- Technical issues also affected profitability, as 5'000 ES8 were recalled to replace malfunctioning battery packs last year (cause: design issue with a module pressing on a wiring harness & causing short-circuits).

Batteries becoming a recurring revenue stream

Battery swaps are source of recurring revenues. Users either take out monthly/annual subscription or access energy services on a pay-per-use basis.

- Subscription costs $140 per month, $1540 if paid annually, or $26 per charge (cheaper than refueling an internal combustion engine car at current 0.7$/L).
- 125 swapping stations are in operation, and 1'100 planned by year-end.
- The energy package includes access to battery swapping, mobile charging trucks, power express (on-demand pick-up and drop-off charging service).

Revolutionary sales channels

NIO created a network of innovative sales channels such as the NIO Houses (large showrooms >1'000m2), NIO Spaces (~150m2 showrooms), and NIO's mobile app.

- There are currently 22 NIO Houses & 55 NIO Spaces.
- Buyers can pre-order vehicles through the NIO app, find charging stations or arrange for battery swap services.
- This direct-sales model improves margins by removing franchised distribution costs and lowering the number of physical point-of-sales needed.

IMAGE SOURCE

IMAGE SOURCE

SOURCES:
NIO Annual Report 2018

Catalysts

- **EC6 Launch.** The EC6 (a sportier & more compact version of the ES6) should start first delivery in September 2020 and could attract new customers thanks to its new design, improved range (up to 615 km), and attractive price.
- **New Battery.** A new 100kWh battery pack is to be released in 4Q20, enabling existing car owners to upgrade their current battery packs (70kWh or 84 kWh) through a simple battery swap and a one-off payment.
- **New partnerships.** E.g. the upcoming JV with Beijing E-Town capital and the preliminary agreement with Hefei government which are to bring > $1.4bn each, boosting NIO's manufacturing capabilities, price competitiveness, and alleviating financial pressure.

Risks

- **Subsidy Cut.** While Chinese government recently announced its intention to not cut further subsidies on New Energy Vehicles (NEV) for this year, any policy change could harm EV sales in the short term.
- **Raising competition in the premium EV segment.** Several competitors are entering Chinese' high-end EV market, with notably Audi's e-tron, Mercedes' EQC, or BMW's Mini EV intensifying the overall competition.
- **Factories shutdown.** NIO currently relies only on its agreement with JAC to produce its car at its Hefei plant, putting the company under threats of extended factories shutdowns caused by the Corona virus.

Bottom Line

- While still a young, small & cash-intensive EV producer, NIO remains a highly attractive pick featuring technological innovation, attractive design, and strong government support.
- Considering its current risk profile and growth potential, we have integrated NIO as a "good conviction" in our Sustainable Future Certificate.

Companies mentioned in this article:

Audi (NSU GR), Baidu (BIDU US), BMW (BMW GR), Bosh (not listed), CATL (300750 CH), Continental (CON GR), GAC (2238 HK), Intel (INTC US), JAC (600418 CH), Mercedes Benz (DAI GR), NIO (NIO US), Temaesk (not listed), Tencent (700 HK)

CHARTS FOR THOUGHTS

Cybercrime – Rage Against The Machine?

Cybercrime – way more developed than we may feel

As the internet has become ubiquitous, so businesses big and small have to be online – this has exposed them to cyberattacks, and related cost have skyrocketed. Lost in the mass, individuals may not feel the heat until they are directly hit by a cyber attack.

- According to Juniper Research, cybercrime-related protection costs will exceed $2bn globally in 2019.
- Over 50% of businesses do not have the budget to recover from a cyberattack.

It's all about the money

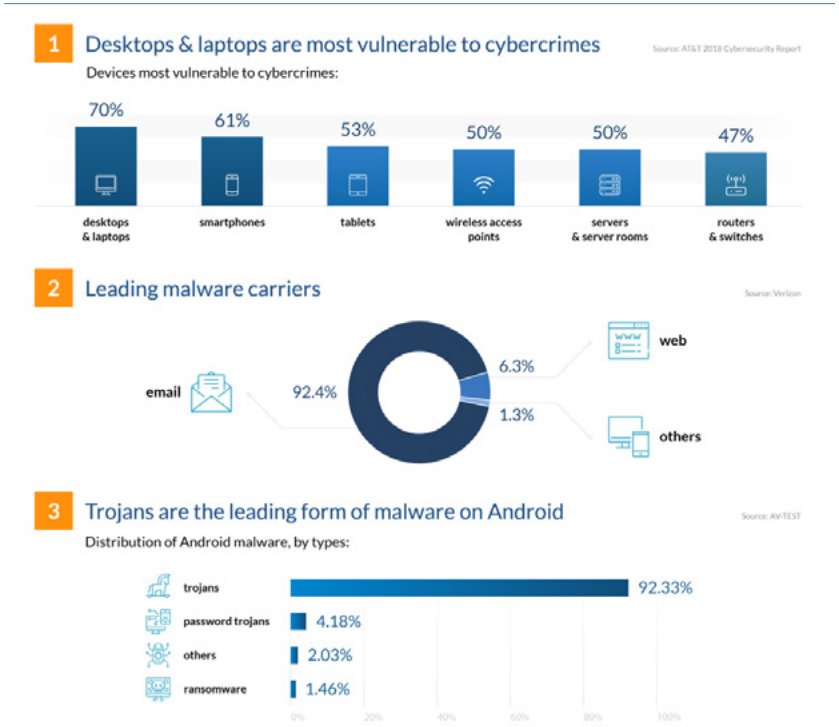
Cybercrime is a very profitable, albeit illegal, activity. As data has become modern days gold, getting (illegal) access to it allows cybercriminals to easily and quickly monetize their efforts.

- According to the 2018 Web of Profit Report (Bromium & Dr. Michael McGuire), $500bn was made from the theft of trade secrets, $160bn from stolen data trading, $1.6bn from crimeware-as-a-service, and $1bn from ransomware.

A chain is as strong as its weakest link – what about the human?

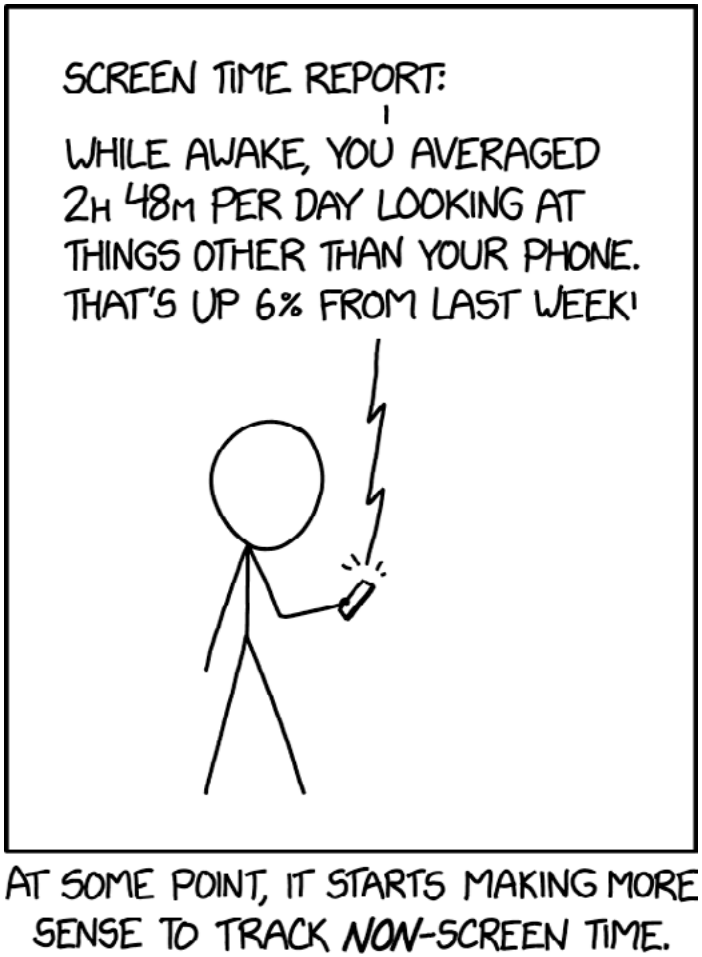
Corporates have been investing heavily to ensure their IT systems are safe, and a sprawling industry has developed to provide tools to protect businesses from cybercrime. But as the few statistics presented here show, the weakest link seems to be the human user.

- End-user devices are considered as the most vulnerable by IT professionals, exactly because of being used by individuals outside of IT-controlled environments.



SOURCES:
51 Important Cybercrime Statistics: 2019 & 2020 Data Analysis & Projections

CASUAL FRIDAY



SOURCE:
https://xkcd.com/2223/

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www.atonra.ch/investment-themes/








HEALTHCARE M&A	SUSTAINABLE FUTURE	BIOTECHNOLOGY	AI AND ROBOTICS	FINTECH	SECURITY AND SPACE	MOBILE PAYMENTS	BIONICS

About AtonRâ Partners

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AtonRâ Partners is a conviction-driven asset manager combining industrial and scientific research with financial analysis. AtonRâ Partners focuses on long-term trends powerful enough to be turned into thematic equity portfolios.

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