Investment Recipes

by AtonRā Partners

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On the Menu

NEURALINK, WHEN SCI-FI BECOMES REALITY

The Ambitious Dream Of Elon Musk

Brain-machine interfaces (BMI), the technology of tomorrow

BMI are neural implants that can read and/or write the human brain. Musk's Neuralink is developing state-of-the-art BMI to connect human brains and computers.

- BMI sense electrical activity of neurons, sending the signal to a computer for processing and resulting in a command to carry out a desired action.
- They are used as cochlear implant for hearing problems, deep-brain stimulation to treat Parkinson's disease or to allow patient with paralysis to control prosthetics.

Treating brain-related conditions and enhancing humans

Neuralink's ambition is to build a safe, wireless and accurate BMI that people can use on their own and over the long-term.

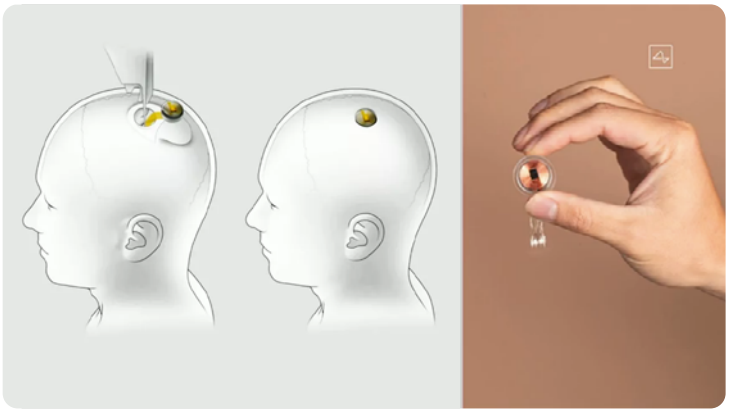
- The short- to mid-term vision is to use the device to treat patients with neurological diseases or paralysis.
- The long-term goal is to create a symbiosis between human brains and artificial intelligence (AI) to enhance human cognition.

A risky technology challenging ethics

The neural implant is not without any risk and specialists worldwide are debating about the feasibility and ethical concerns of such a technology.

- The invasiveness of the device can lead to various safety problems such as infection or implant rejection.
- It faces important ethical considerations about privacy and protection of brain data, social inequalities and the risk of brain-hacking.

NEURALINK



SOURCE:
Elon Musk's Neuralink Shares More About Its Implantable Brain Stimulator
Elon Musk shows Neuralink brain implant working in a pig

Brain-Machine Interfaces (BMI), The Technology Of Tomorrow

Brain-machine interfaces (BMI)

The technology behind Neuralink consists of devices directly linked to the brain and translating neuronal information into commands for external machines or affecting the internal environment of the brain.

- Brain signals are the electrical activity of neurons, produced as they communicate between them to produce our thoughts, movements and consciousness.
- Neural activity can be recorded using non-invasive or invasive methods, depending on the level of signal-accuracy needed.

Actual applications of BMI

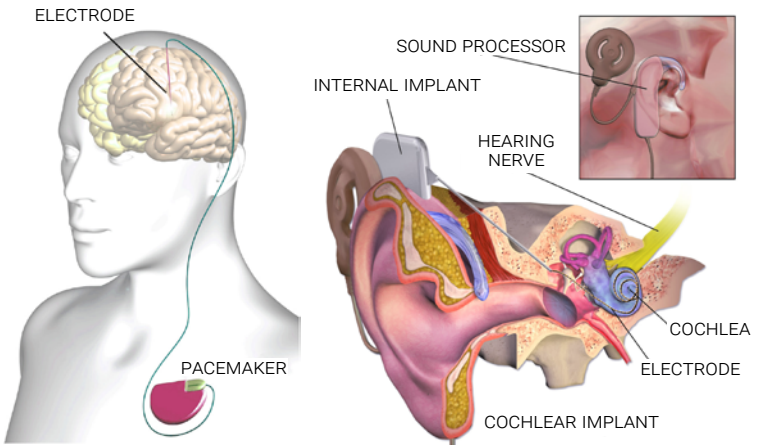
Currently, BMI are limited to a few applications of brain stimulation to treat brain-related conditions but there is strong R&D in the field.

- Deep brain stimulation (DBS) is a device that sends electric pulses to a specific brain region to treat Parkinson's disease.
- Cochlear implants are used to improve hearing capabilities of patient suffering from deafness.

«The Link», the neural implant developed by Musk

Neuralink is developing an invasive implant that can both read and write the brain. A coin-sized chip with more than a thousand flexible electrodes is inserted into the brain using a custom-made robotic system. Each electrode records the electrical signal of only a few neurons and gives precise information about brain activity. These electrodes can also stimulate the surrounding neurons.

- "The Link" is state-of-the-art BMI from an engineering point of view.
- They received FDA designation in July 2020 as a breakthrough device.



SOURCE:
Typical deep brain stimulation setup
Blausen.com: Medical gallery of Blausen Medical 2014

Treating Brain-Related Conditions And Enhancing Humans

Treating people with neurological diseases

In the next 5 to 10 years, the goal of Neuralink is to restore sensorimotor functions for people suffering from neuromuscular disorders, blindness or deafness as well as neurogenerative diseases such as Parkinson or Alzheimer.

- Mental and neurological disorders are projected to increase dramatically due to demographic aging and globalization of unhealthy lifestyles.
- Neurological disorders cost the US nearly $800bn yearly and the costs of dementia and stroke alone are expected to reach $600bn yearly by 2030.

Enhancing human cognition

Over the longer term, Neuralink aims at benefitting healthy people. Musk dreams about enhancing human cognition and to use artificial intelligence (AI) as an extension of the brain.

- According to his vision, it will be possible to store detailed memories and access them whenever we want or communicate via telepathy.

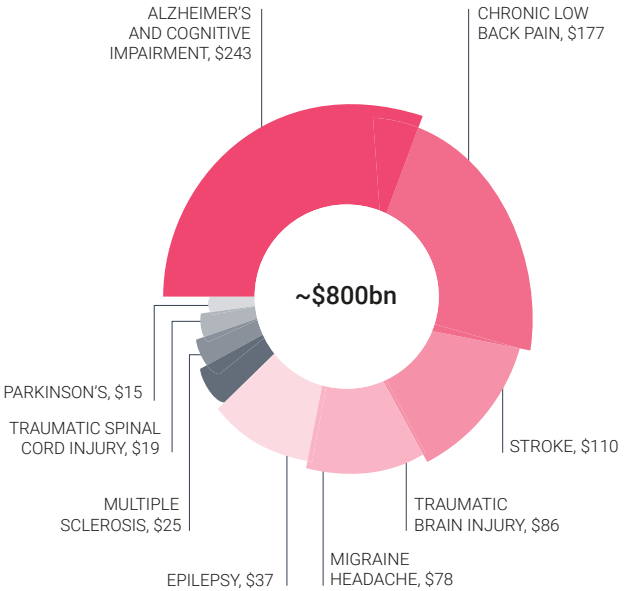
A marketing move that can boost the neuroscience industry

Musk's notoriety attracted worldwide curiosity during the public presentation of Neuralink's new chip in August 2020. This is likely to drive interest for the neuroscience industry in general, especially from investors, wanting to capitalize on its growth potential.

- The BMI market is expected to reach $1.8bn by 2024 with a CAGR of 9.9% growing from $945mn in 2017.
- Funding projects, like the BRAIN initiative in the US to improve our understanding of the nervous system, are gaining support and public awareness.

ANNUAL COSTS OF MAJOR NEUROLOGICAL DISEASES IN THE US

YEARLY ECONOMIC BURDEN OF MAJOR NEUROLOGICAL DISEASES IN BILLIONS OF DOLLARS (2014)



SOURCE:
Brain-Computer Interface Market report, Value Market Research,
Neurological diseases cost the US Nearly $800 billion per year
The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative

A Risky Technology Challenging Ethics

Invasiveness of the implant

Opening the skull and inserting electrodes into the brain faces many safety challenges, notably risks of infection or damaging neural tissue. The implant should also remain functional in the long term without being degraded by the corrosive environment of the brain.

- Competitors like Kernel are developing non-invasive techniques to monitor brain activity, but quality of the recorded signal remains the main hurdle.

My brain, my property

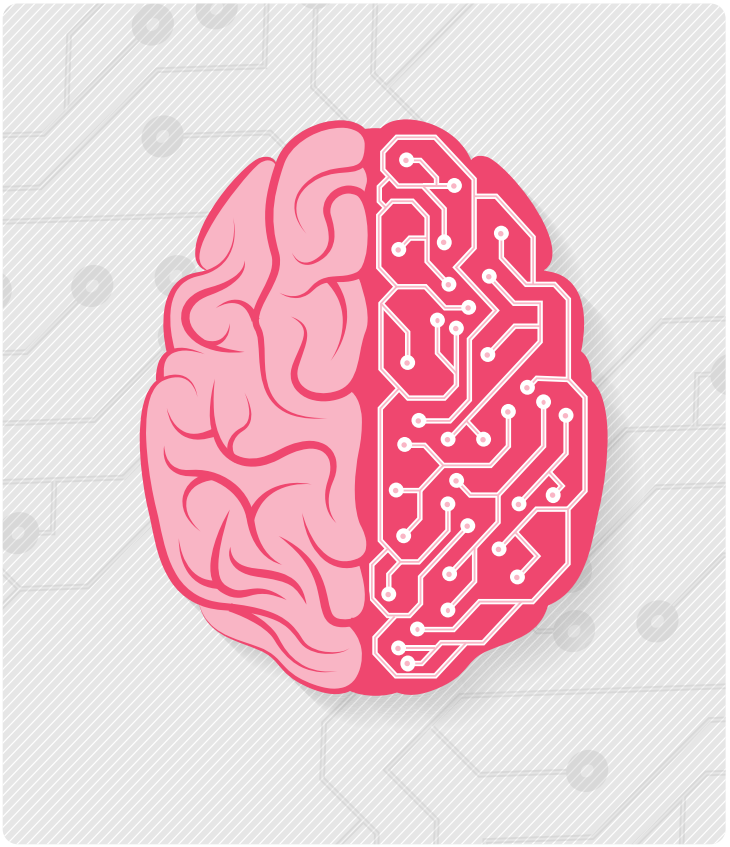
Privacy and protection of personal data is already a sensible subject and with brain data the debate reaches another level. There is risks of brain-hacking with people taking control of other's BMI to steal personal information or, worst, to manipulate the brain and people's behavior.

- Even if the technology to enhance human cognition becomes feasible, there are important ethical issues that need to be considered and could hinder the adoption of new devices.

A risk of increasing social inequalities

Enhancing human capabilities is likely to change societal norms, raise inequalities and generate new forms of discrimination.

- The access to expensive implants is expected to increase the gap between the rich, that would benefit from higher cognition and power, and the poor who would not be able to afford the technology.



Catalysts

- **The first successful implant into a human.** Neuralink's first BMI product is expected to be implanted into a human patient by the end of 2020 in a clinical study and is likely to treat a broad range of brain-related diseases.
- **Rising awareness.** Neuralink and Elon Musk did a great marketing move that hopefully will be a catalyzer boosting the interest of people and investors towards the neuroscience industry.
- **Technological advancements.** There is a need to create smaller, more densely packed electrodes and the miniaturization of electronics continues to reduce the size of implants and include more functionalities.

Risks

- **Invasiveness.** BMI requires surgery to implant electrodes under the scalp. The invasiveness allows a much better quality of the signal but may lead to complications (tissue damaging, infection, stroke, etc.).
- **Lack of understanding about neural processing.** There is a lack of understanding about neural and cognitive processes like memories and consciousness, limiting BMI applications for the moment.
- **Long term goals and ethical issues.** There are more doubts about his long-term goal of creating a human-computer symbiosis. If memory and consciousness mechanisms are revealed, there are important ethical issues that have to be carefully considered.

Bottom Line

- The brain is an actual and very hot topic which showed significant advances in the past decades. Research aims at elucidating the mysteries of the nervous system and promises a high potential of growth in the future. The cognitive enhancement of humans is not for tomorrow, but the use of this technology to treat neurological conditions or paralysis already exists at a preliminary stage and will be improved in the near future.
- Elon Musk is a well-known and visionary entrepreneur, notably founder of Tesla and SpaceX, who has proved wrong many naysayers to his projects, initially considered as "impossible". His start-up, Neuralink, is making noise and has significant potential to treat several neurological diseases within the next 10 years.

Companies mentioned in this article:

Neuralink (not listed), Kernel (not listed)

OUR MICROBIOME TO FIGHT ANTIBIOTICS RESISTANCE

The Spread Of Superbugs

The threat of antibiotics resistance

Antibiotics are drugs administered against bacterial infections (*E Coli*, pneumonia, tuberculosis..). They are an important discovery in medicine, but their misuse or overuse has made them less effective, leading to so called "antibiotics resistance".

- Superbugs are bacteria that have become resistant to antibiotics.
- Today 50% of bacterial infections are caused by superbugs that can be lethal. 2,8mn people in the U.S. are affected by this resistance; 25,000 die each year.

An urgent need for new weapons

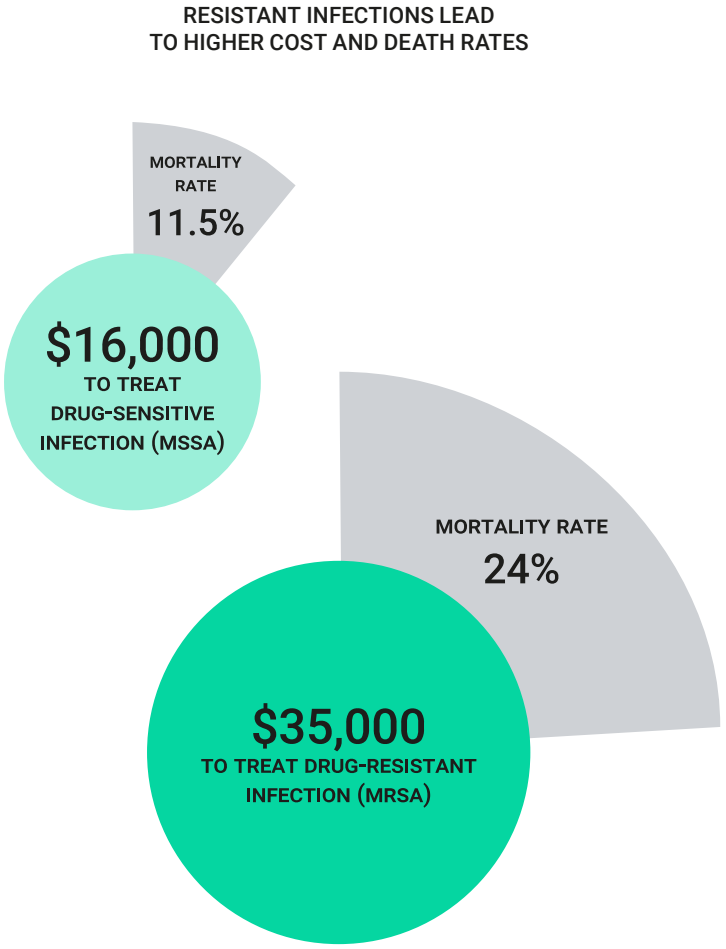
The decline in common antibiotics' efficacy has led to an urgent need for new drugs. However, only three new antibiotics classes for human use were approved since 2000.

- Even innovative classes of antibiotics show resistance after a few years.
- The healthcare industry must be encouraged to return to the field. Increased grants and investments, with more adaptive regulations, are needed.

Boosting our microbiome to fight back

The microbiome's role in several diseases is now undeniable, as we highlighted in our June 20th Investment Recipes issue. The antibiotics resistance could lead to recurrent forms of infections and the use of antibiotics creates an imbalance in the gut ecosystem, known as dysbiosis.

- This dysbiosis and thus vulnerability to harmful germs are generated and maintained by both antibiotics and infections. The restoration of a healthy microbiome could reduce the rate of recurrent bacterial infections.
- Most bacterial infections are contracted in hospital as patients are most vulnerable and despite often being already treated with antibiotics.



SOURCE:
Fillice FA, Nyman JA, Lexau C et al., Excess costs and utilization associated with methicillin resistance for patients with Staphylococcus aureus (MSSA). Infection control and hospital epidemiology 2010

The Threat Of Antibiotics Resistance

Consequences of the use of antibiotics

Globally, 700k deaths are related to antibiotic resistance and expected to reach 10mn by 2050. It also threatens surgical procedures and treatments.

- Every year, 13,000 infections (40%) after prostate biopsy are due to fluoroquinolone resistance. One-third of cystic fibrosis patients die of an infection after a lung transplant.
- Global GDP is expected to be 1.4% and 2-3.5% lower in 2030 and 2050, respectively, if no solution is found.

Mechanisms of resistance based on natural selection

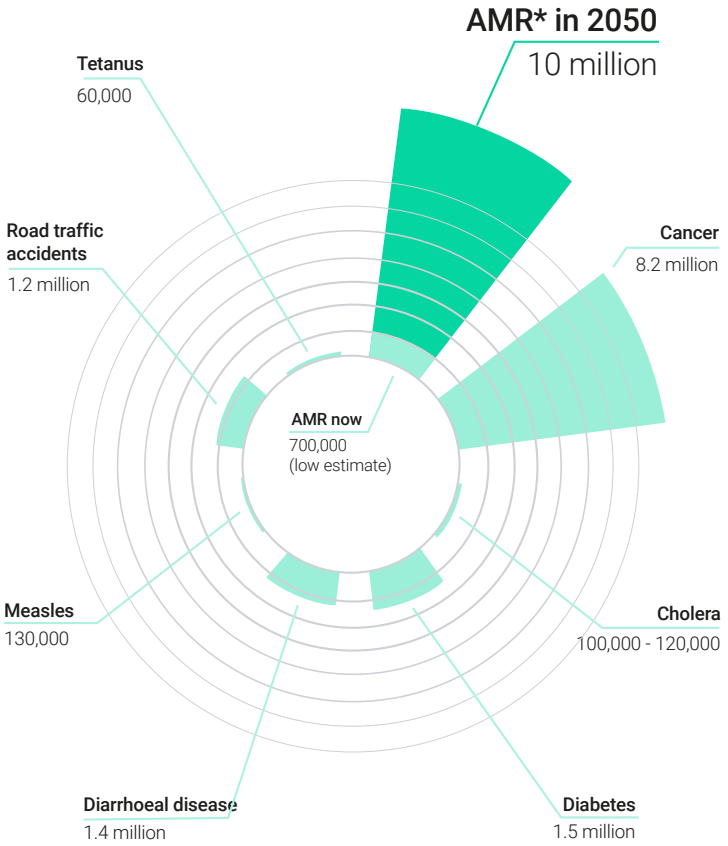
Resistance can result either from a mutation or the acquisition of genes conferring resistance to one or more antibiotics. The strongest bacteria survive and can exchange genes with each other resulting in cross-resistance.

- While the acquisition of resistance by mutation is a rare phenomenon - one in a billion – genes can be exchanged at a very high frequency, one in 100 bacteria.
- Five mechanisms of resistance have been identified: inactivation by specific enzymes, reduction of membrane permeability, pumping-out antibiotics, alteration of metabolic pathways and the modification of the cell structure.

C. Difficile infection (CDI) : an urgent threat

The Centers for Disease Control (CDC) established a list of the most urgent multi-drug resistant infections, which includes CDI. Widespread use of antibiotics in hospitals disrupts the gut microbiome by killing good bacteria. It creates an ideal environment for *C. Difficile*, which causes severe diarrhea, dehydration, and bowel perforation.

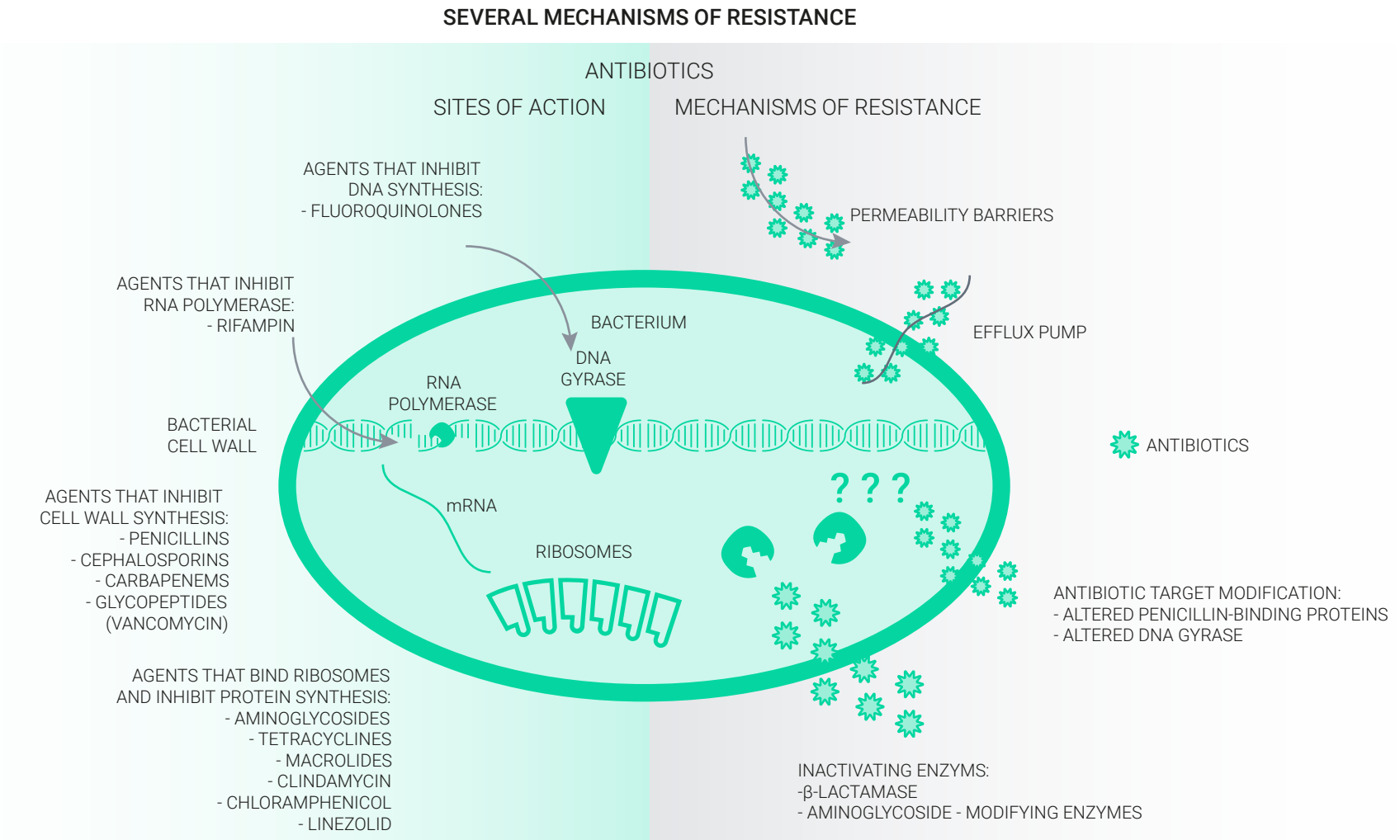
- *Clostridium Difficile* is a bacterium that forms spores (solid biological shells), making it highly resistant to standard disinfection practices.
- This infection affects 500k people and causes 15k deaths in the U.S each year.



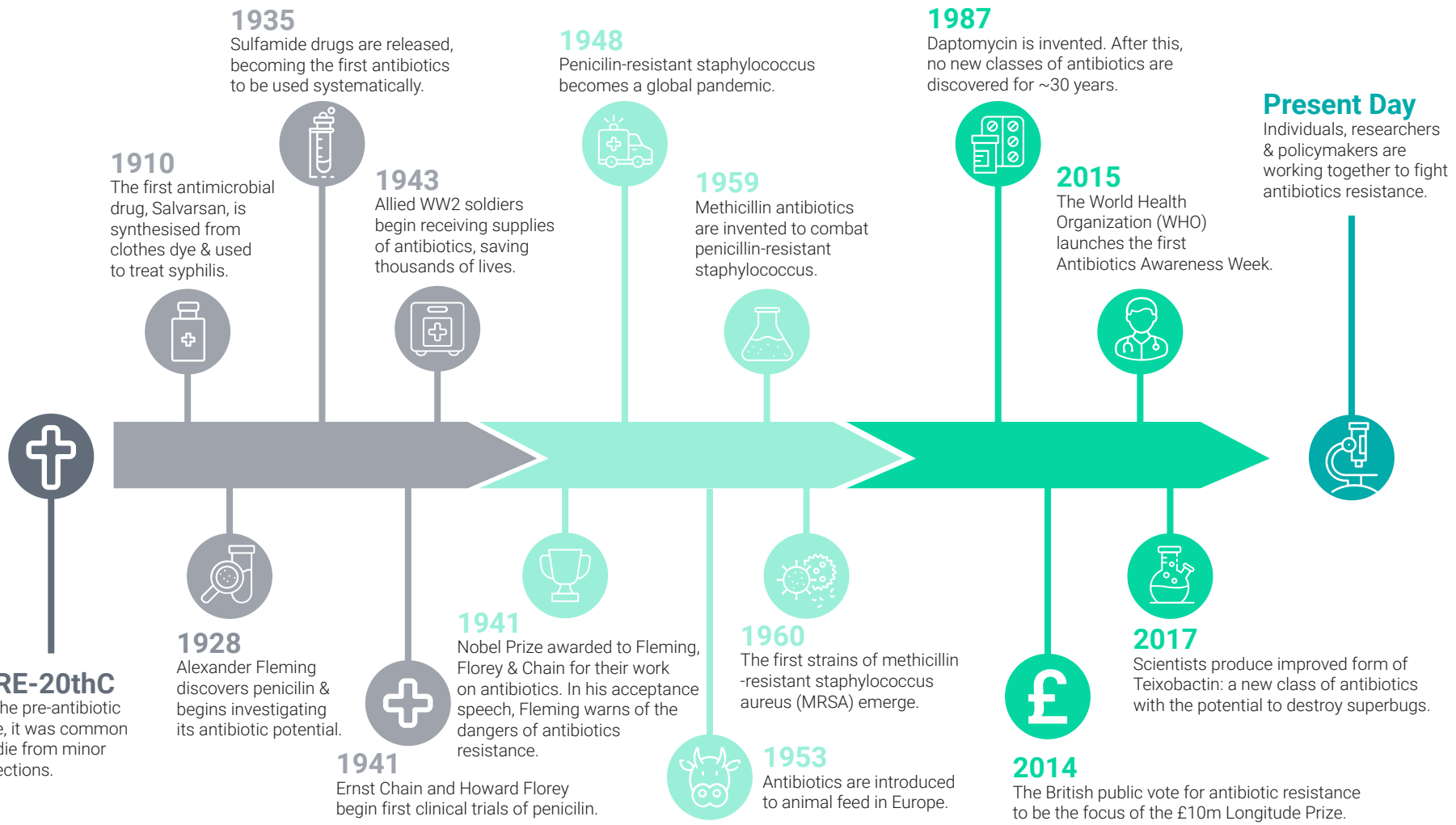
** Anti Microbial Resistance*

SOURCE:
The Lancet Infectious Diseeases Vol 15 Issue 12 December 2015; KPMG and RAND European Antibiotic resistance as a global threat: Evidence from China, Kuwait and the United States

Several Mechanisms Of Resistance



History Of Antibiotics Resistance



SOURCE:
AMR Initiative

New Weapons To Weaken Superbugs

Development of new antibiotics is difficult

The development of a new antibiotic is long and difficult because the mechanism of antibiotic resistance is complex. Safety issues have emerged, and tolerance must be very good compared to existing treatments.

- Common antibiotics also affect non-pathogenic bacteria. They represent a reservoir of resistance genes that can be transmitted to pathogenic bacteria.
- When the bacterial species responsible for infection is known, it is preferable to use a targeted antibiotic that will have less effect on the microbiome and resistance development.

The business model is challenging

Commercial opportunities are low, mainly because resistance can be developed in relatively short time, making the risk-reward not sufficient for the pharma companies to develop new antibiotics.

- The number of companies developing new antibiotics has halved since the late 1990s.

Finding alternative strategies to antibiotics

Given the difficulty of designing new antibiotics, alternative strategies are being considered.

- Phage therapy consists of eliminating bacteria thanks to specific viruses (called phages) killing a species' bacteria. Most players are still in early phase or working on food safety. Armata, Adaptive Phage Therapeutics and, Locus Bioscience are working on a clinical use.
- Fecal microbiota transplantation (FMT) has also gained popularity. However, donor stools and FMT are not regulated by the FDA, and often are affected by contamination problems.

NEW ANTIBIOTICS APPROVED BY THE FDA

SOURCE:
Antibiotic Resistance and Newer antibiotics- An overview
Seres Therapeutics' report

Boosting Our Microbiome To Fight Back

Recurrent CDI : a promising target for microbiome drugs

45% of *C. Difficile* infections (CDI) are recurrent due to the vicious circle linked to antibiotics. The recent understanding of the role of the microbiome in CDI opens the way to promising new therapeutic approaches.

- CDIs are usually treated with two antibiotics. Ironically, they lead to an imbalance in the gut's "ecosystem", called dysbiosis.
- In recurrent CDI, there is a decrease in intestinal diversity and a loss of resistance to a new infection.

Mechanism of microbiome-based drugs

The inspiration for reconstituting a healthy microbiome is based on FMT. The idea is to restore the diversity of the intestinal flora, to re-establish resistance to colonization and to allow the elimination of *C. Difficile*.

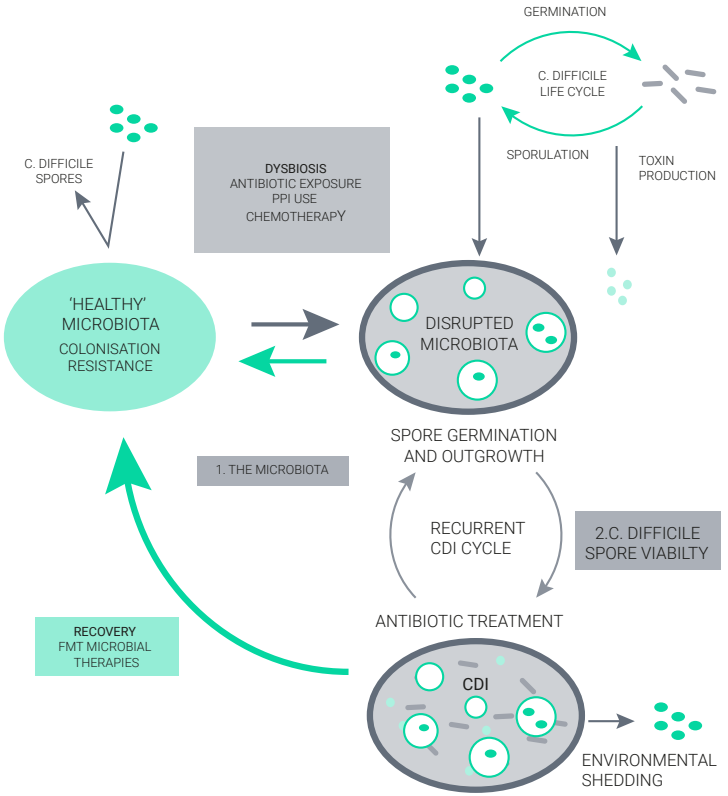
- In FMT, stools from healthy donors are transplanted into the colon/gastrointestinal tract to restore a normal intestinal microbiota without any selection.
- Microbiome drugs are more targeted. They consist of a highly purifying consortium of spores from multiple specific bacteria, sourced from healthy donors' stools and packaged into oral capsules.

Players fighting recurrent CDI with the microbiome

Two companies are looking to microbiome therapeutic for recurrent CDI.

- Seres Therapeurics' lead candidate is in phase 3. During 3Q 2020, the candidate has shown a clear clinical and safety profile, raising the hope of microbiome therapy's first approval.
- Finch Therapeutics also has a microbiome-based drug (Phase 2) but less targeted than Seres' one. It delivers the full spectrum of consortia of bacteria.

VICIOUS CIRCLE OF ANTIBIOTICS USE IN CDI



SOURCE:
Microbiologic factors affecting Clostridium difficile recurrence

Seres Therapeutics: Our Top Pick In The Field

The first FDA approved microbiome drug?

The Phase 3 data on recurrent CDI evaluating SER-109 showed promising results, paving the way for filing a regulatory submission in 2021 with a potential launch in 2022.

- The ECOSPOR III trial had been redesigned to address the patient selection and dosing issues of the Phase 2 study, and as a result it showed a statistically significant improvement.
- Only 11% of the recurrent CDI patients experienced recurrence compared to 41.3% of patients on placebo.

High value collaborations

Seres Therapeutics has high-value collaborations on almost all its drugs, which may lead to a potential buy-out by these partners.

- Seres is partnered with Nestlé Health Sciences outside U.S. on SER-109 and SER-287/SER-301 - both oral drugs to treat Ulcerative Colitis.
- Seres is also looking to the potential role of the microbiome in immuno-oncology. SER-401 is being evaluated in this area in collaboration with Astra Zeneca.

A unique manufacturing process

Seres benefits from an in-house manufacturing process leveraging its leading ability to analyze disease-specific bacterial signatures in patients.

- Firstly, the company studies bacterial consortiums and their impact on several disease pathways.
- Once the consortia design has been established, Seres sources the bacterial consortia from healthy donors. Potential germs are inactivated, instead of simply screening donor samples.
- Finally, the purified spores are packaged in an oral capsule and are metabolically inactivated until they reach germination conditions in the gastrointestinal tract or colon.

SOURCE:
Microbiologic factors affecting Clostridium difficile recurrence

Catalysts

- **New incentives.** Antibiotics resistance is considered one of the greatest health threats. To encourage new drugs development, the field benefits from significant funding, (WHO, BARDA, REPAIR Impact Fund, the Global Antibiotic Research & Development Partnership (GARDP), CARB-X).
- **Seres Therapeutics' results.** Following the positive interim results of Phase III study, Seres is expected to file a Biologics Licence Application (BLA) for SER-109 in recurrent CDI during 2021.
- **Development of tools to understand the microbiome.** The disease target identification and the understanding of the cause-and-effect relationship are possible thanks to recent advances in metagenomics and bioinformatics.

Risks

- **Commercial risk.** The sales could be low because these treatments are mainly used on resistant infections and are used for a short time.
- **Complexity of the microbiome.** The microbiome is composed of trillions of bacteria expressing 3 million genes. It is also dynamic and can be influenced by several factors, which makes the identification of pathological bacteria difficult.
- **COVID-19.** The review of COVID-19 treatments and vaccines tops the FDA's list of priorities, and the review of other drugs may be delayed.

Bottom Line

- Bacterial infections are devastating, and antibiotics are becoming less effective because of their widespread use. Besides, they can create an unfavorable environment for the proliferation of recurring infections by killing harmful but also good bacteria. The development of new types of antibiotics is difficult, mainly due to companies' lack of economic incentives. Understanding the relationship between the microbiome and several diseases has evolved considerably in recent years and is finally paving the way for new drugs.
- We have recently added Seres Therapeutics to our biotechnology portfolio, as we anticipate the company can receive the first approval of a microbiome-based drug. Beyond infectious diseases, microbiome disruption has implications in many diseases (neurological diseases, immuno-oncology, etc.).

Companies mentioned in this article:

Adaptive Phage Therapeutics (Not listed), Armata Pharmaceuticals (ARMP US), AstraZeneca (AZN LN), Finch Therapeutics (Not listed), Locus Bioscience (Not listed), Nestlé (NESN SW), Seres Therapeutics (MCRB US)

INSURANCE INDUSTRY DESPERATE FOR UPGRADE

Insurtechs: Crucial For Insurance Survival

The last resort to retain clients

The insurance sector needs innovation. Although most insurers have transitioned to advanced databases, insurance claiming is slow, and customers are unsatisfied. Insurtechs (see our 04.03.2020 issue for an introduction) is the last resort for insurers.

- Insurtechs increase customer satisfaction, offer automated AI-powered pricing and claims management, provide safer and faster access to data via blockchain.
- Many insurtech startups further specialize workflows modernizing client onboarding and billing or focus on niche sectors like travel or rental-vehicles' insurance.

COVID-19 sparking innovation

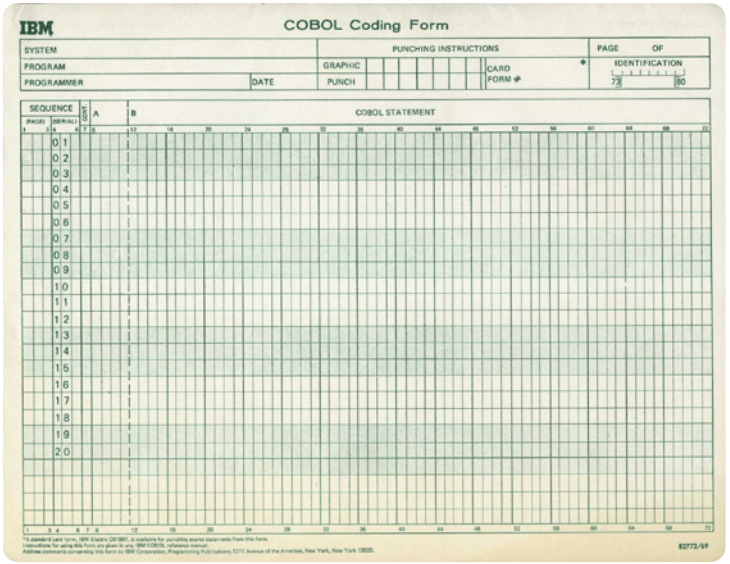
The industry is suffering losses unseen before due to poor market performance and financial strain caused by COVID-19. The value of Insurtech, its cost savings capability, and its ability to attract and retain clients is becoming clear.

- Insurers will face more claims, lower revenues, and less active customers. Any technology that will help them cut costs, digitize paper workflow, and automate costly and inefficient analysis will be vital to businesses.

Deal count involving insurtechs is up and climbing

With most investors putting on hold investment in Q1, Q2 saw an increase in deal activity, funding, and overall investor confidence in insurance related startups.

- Q2 2020 saw 4 mega-rounds from Oscar Health, Duck Creek, Pie Insurance, and
- States Title raising $225mn, $230mn, $127mn, and 125mn, respectively.
- Mega-rounds were accompanied by a strong round from BoughtByMany ($98mn), and the IPO of the first-ever Insurtech unicorn, Lemonade.



SOURCE:
AtonRâ Partners, Insurers Face A Crisis. Now, Innovation Is No Longer Optional,
Why New Jersey's Unemployment Insurance System Uses a 60-Year-Old Programming Language
Brush up your COBOL: Why is a 60 year old language suddenly in demand?

The Last Resort to Retain Clients

Attracting clients with improved personalization and customer service

Historically, insurers have been laggards in adopting modern technology that caters to users, but with the emergence of Insurtechs, "experience" has started to take a more prominent role in the insurance business model.

- Many insurers are still relying on ancient COBOL or FORTRAN systems built in the 1960s, because it is "simply working" and upgrade is deemed expensive. Customers, however, must wait days to open their accounts and get insured.
- In the first week of April, a US state insurance received ~200k applications for relief packages crashing the 60 y.o. server and spiking demand for COBOL developers.

Insurers are forced to rethink their business models

Customer stickiness in the insurance sector is notoriously low. When lower premiums are not an option, customer experience is the main competitive differentiator.

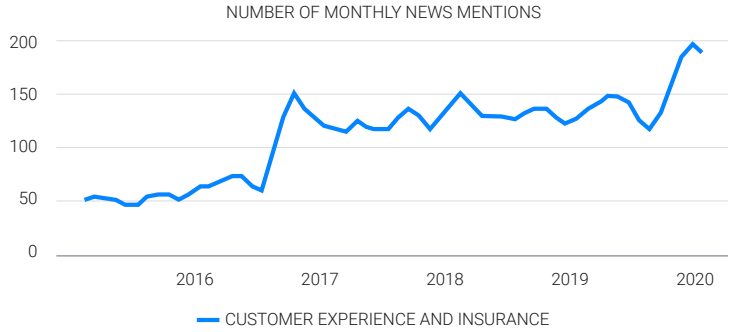
- According to CBInsights, 65% of people who had a negative experience filing a claim are likely to switch to another insurance provider.
- Insurtechs use AI algorithms to assess car damages and ensuing costs, or to allow users to submit pictures of their property to create 3D renderings for initial appraisals and further claims processing.

Insurtechs are helping to retain only honest clients

Keeping clients is only one side of the story but keeping revenue-generating and limiting loss-making clients is another. Financial difficulties caused by COVID-19 have pushed people to cheat their insurers and thus fueling anti-fraud insurtechs.

- AI Insurtech Shift Technology helps to identify fraudulent claims by analyzing claim forms, and while doing so, also simplifies the claims process and reduces costs.

INSURANCE CUSTOMER EXPERIENCE INTEREST CONTINUES TO RISE



SOURCE:
AtonRâ Partners, Top Technology Trends Disrupting the Insurance Industry
40+ Startups Driving Digitization And Efficiency In P&C Claims Management

COVID-19 Sparking Innovation

COVID has ignited demand for insurance but impacted the mix

The epidemic is transforming habits and is shifting demand to new types of insurance. As remote working has become a new paradigm, the need for car, travel, and accident insurance has decreased, however, health and telemedicine plans are wanted.

- Proportion of $US funding dedicated to Life and Health has soared from 17% to 32%, with property insurance responsible for the remaining 68%.
- A Paris-based insurtech Alan, which offers telemedicine through its partnership with Livi, raised $54mn in a Series C funding round.

A spate of forced cost-cutting ahead

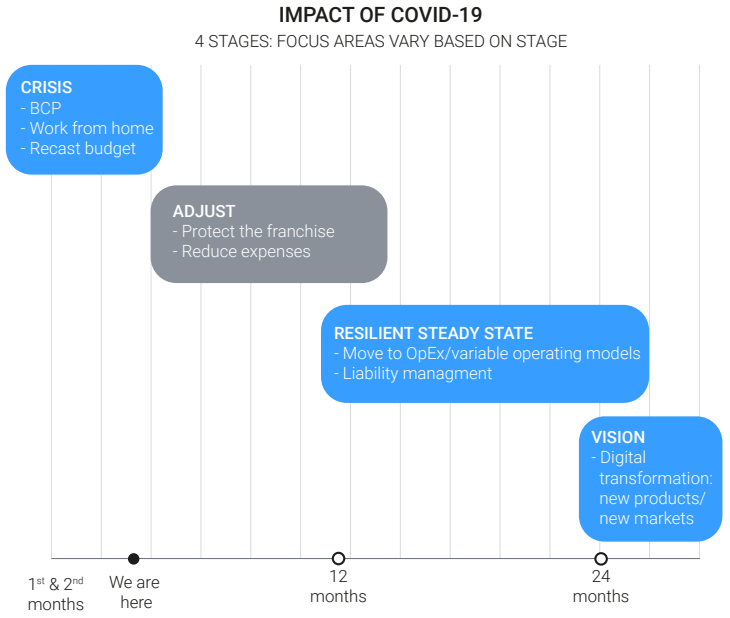
COVID-19 also brought lower interest rates and closure of many businesses as relief package help is drying out. Thus, insurers' revenue streams are shrinking forcing them to reduce expenses to protect their franchises.

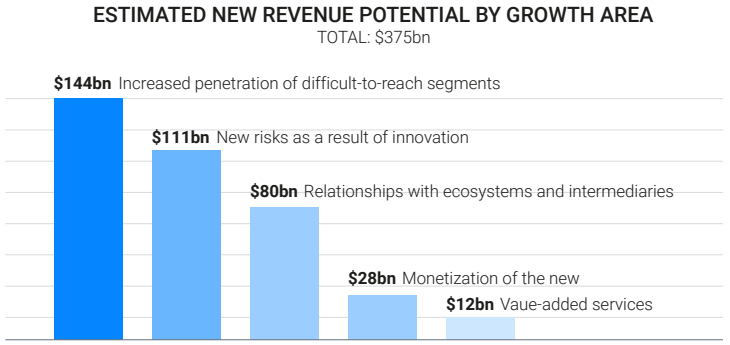
- Despite Q1 2020 profits being up 21% YoY, insurances are starting to feel the true economic impact of consumers not returning to regular consumption patterns, i.e. travelling, renting, driving.

Insurance as a "living business"

To overcome losses caused by the pandemic, insurers need to monetize new "ecosystems" and become "living" businesses, i.e. customer-centric, agile, easy, and relevant.

- According to Accenture there exists a $375bn potential insurance revenue from insuring new risks and offering value-added services, e.g. Drone Insurance.





SOURCE:
AtonRâ Partners,
Insurers Face A Crisis. Now, Innovation Is No Longer Optional
$375 billion in new insurance revenue up for grabs—if you are a 'living' business

Investor Optimism Back On The Rise

Investment activity post COVID-19 is more vibrant than ever

The need to upgrade outdated tech and processes outweighed a pandemic-related cautious stance for both insurers and investors alike.

- In Q2 insurance startups raised an astonishing $1.56bn in 74 deals, a 71% YoY increase, with new geographies such as Croatia, Taiwan, and Hungary joining in.
- New partnerships have hit a record high 34 deals.

Strong M&A activity nurtures the industry

The ink for signing M&A deals has been flowing as the first half of the year has seen numerous vertical and horizontal integrations both among insurtechs and for insurtechs with established insurers.

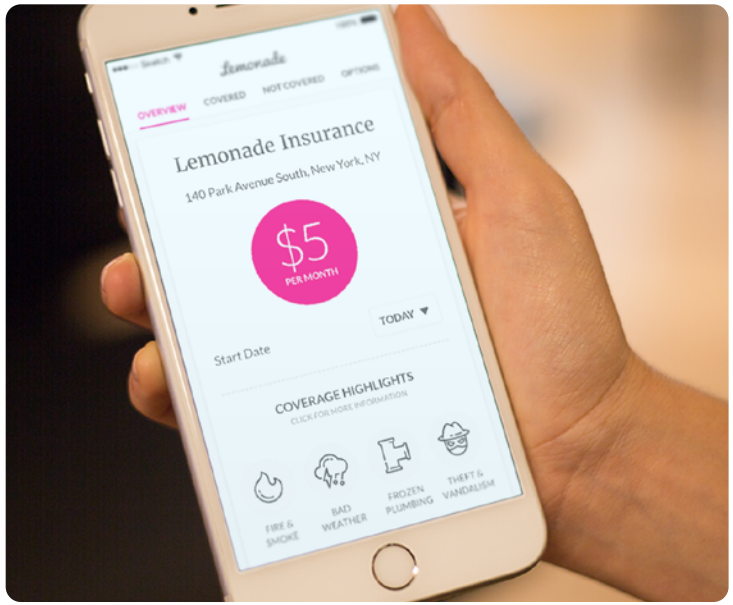
- As an example, Hippo acquired Spinnaker and Pie Insurance for $100M to become a licensed insurance company and solidify its position in the market.

After $780mn raised, the first Insurtech unicorn is born

Lemonade became the first insurtech to go public. It uses Artificial Intelligence and Big Data to facilitate insurance subscription and claim filing, catering to tech-savvy millennials whose loyalty is notoriously the toughest to maintain.

- 70% of the customers are under the age of 35, with a 90% customer retention rate thanks to their pricing model.
- The first day of trading the stock closed +139%.

Lemonade



SOURCE:
AtonRâ Partners,
Insurtech startup Lemonade sees shares jump 139% on IPO
Insurers Face A Crisis. Now, Innovation Is No Longer Optional
Meet Lemonade, The Latest Insurtech to File for an IPO

Catalysts

- **Natural Language Processing.** Insurances have historically lowest customer satisfaction with countless possibilities for improvement. Chatbots will both reduce the costs of customer helpdesk and attract more customers.
- **Adoption of Usage-based insurance/UBI.** Advanced telematics (behavior, distance driven, and speed monitoring devices) will better align auto insurance holders with premiums and attract a significant customer base.
- **Wider regulatory approval of virtual claims.** Insurtech will greatly profit from the new insurance claiming process, where a policyholder takes a photo of the relevant damage avoiding the common unpleasant in-person experience.

Risks

- **COVID slowing Peer-to-peer insurance.** Considered by many as a main growth driver of Insurtech, investment in P2P insurance has been put on a back burner in favor of more tech-oriented but stable growing startups.
- **Slow integration with Smart home.** An important step of property insurtechs remains connecting with smart homes, therefore slower adoption of Smart homes may in turn slow down Insurtech growth.
- **Drone Inspections.** While innovative and directly linked with Insurtechs, drones are subject to strict flight regulation and labor intensity that may hinder innovation.

Bottom Line

- Insurtechs continue to improve the insurance value chain, automate slow and costly processes, and improve user experience. Slightly slowed and shook by COVID-19, the market is still on track to triple by 2025 growing at a 5Y CAGR of 25%.
- Juicy growth is supported by multiple legacy players and VCs who are starting to realize the value of technology for the insurance sector and invest in Insurtech startups. We already have Insurtech players in our Fintech portfolios and are monitoring for opportunities to increase our exposure to the sector.

Companies mentioned in this article:

Alan (not listed), BoughtByMany (not listed), Duck Creek (not listed), Hippo (not listed), Hover (not listed), Lemonade (LMND US), Matterport (not listed), Oscar Health (not listed), Pie Insurance (not listed), Shift Technology (not listed), Slice Labs (not listed), Spinnaker (not listed), States Title (not listed), Tractable (not listed)

CONSOLIDATION IN THE U.S. RESIDENTIAL SOLAR MARKET

M&A Attracts The Spotlight

U.S. solar residential market overview

The solar residential market in the U.S. really started to take off in 2008 when the concept of leasing solar panels to people through power purchase agreements (PPAs) appeared.

- Since 2005, the number of newly installed residential solar systems has grown by approx. 40% per year, or over 100x in total.
- Today, there are approximately 2.3mn residential photovoltaic (PV) systems in the US, still representing only about 1.9% of total U.S. households.

A big deal shaking up the industry

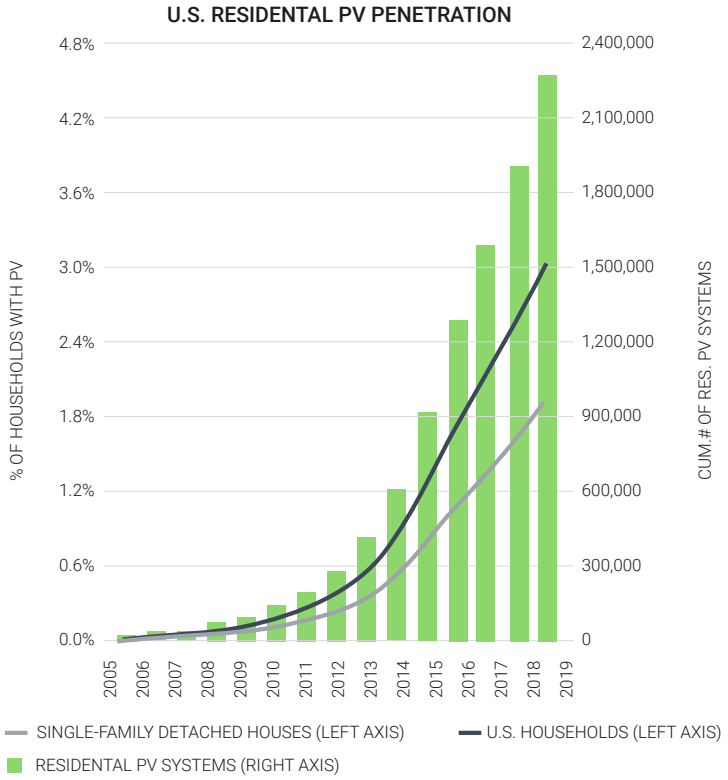
In July, Sunrun confirmed its plan to acquire Vivint Solar in an all-stock deal valued at $3.2bn. The deal, which is to close in late 2020, will combine the U.S. no.1 and no.2 leading players in residential solar, creating the undisputed market leader.

- The combined company would gather about 500'000 customers.

Strategic position for the future

We expect more consolidation to happen in the sector, as the competitive landscape is shaped by an increasingly competitive business environment, the anticipated subsidies reduction and the ongoing challenging context (COVID-19 & social distancing measures).

- The U.S. investment tax credit (ITC) for new residential solar systems is to step down from 26% in 2020 to 22% in 2021 and 0% in 2022.
- Holding a large customer base will be key for expanding a company's offer to new solutions such as batteries or grid support services.



SOURCE:
Solar Industry Update, Q4 2019/Q1 2020, NREL
Solar Investment Tax Credit (ITC)
Q42019/Q1 2020Solar Industry Update

U.S. Residential Solar Market Overview

Solar energy is gaining ground

Solar photovoltaic (PV) represents a small but growing portion of the U.S. electricity generation mix, contributing 2.6% of the total annual generation in 2019 (vs. less than 0.1% in 2010). Plummeting module costs along with supportive policies and innovative sales models have fueled the growth of the segment which now represents a large chunk of new power generation installations.

- Since 2016, solar has represented approx. 30% of all newly installed power generation capacity.

Utility, commercial and residential scales

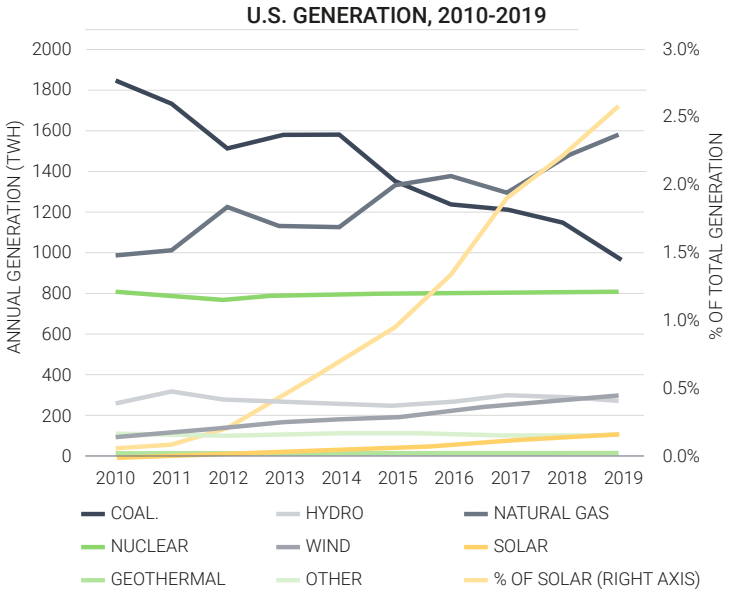
Solar installations are often divided into 3 categories relative to their scale: utility-scale, commercial & industrial (C&I) and residential. Utility-scale projects are of >10MW power capacity and usually owned by utility companies or independent power producers. Residential and C&I projects are smaller-scale projects where solar panels are installed on the rooftop of buildings/houses and often involve third-party companies for financing, installation and monitoring.

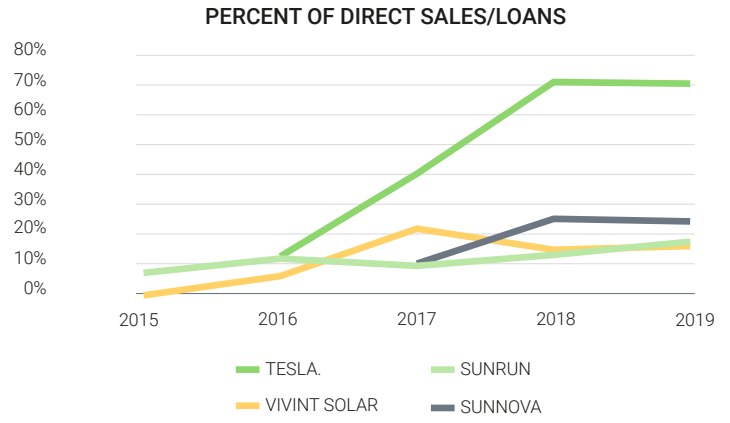
- Out of the 13.4GW U.S. solar PV installed in 2019, ~9GW were for utility-scale projects while residential and C&I made up ~4GW together.

Multiple business models coexist

Different sales models address the residential solar market. Some players such as Tesla (ex. SolarCity) are mostly running on direct sales & loans where the customer ends up owning the entire system while others (e.g. Sunrun, Vivint Solar or Sunnova) favor solar leases & PPAs.

- Today, 46% of residential systems installed in the U.S. are third-party owned.





SOURCE:
Solar Industry Update, Q4 2019/Q1 2020, NREL
Comparing Solar PV Ownership Models
Q42019/Q1 2020Solar Industry Update

The Sunrun-Vivint Solar Deal

Sunrun and Vivint to become a residential superpower

By year-end, Sunrun is to acquire Vivint Solar in a historical deal that will merge the two leading U.S. residential solar companies. The acquisition is to provide complementary sales channel (Vivint leading the door-to-door model while Sunrun focusing on online sales) as well as geographic expansion & increased market share (both target the same states but attract different types of customers).

- Together, the two companies represent 15-20% of the U.S. market share.

Lessening competition to cut down customer acquisition costs

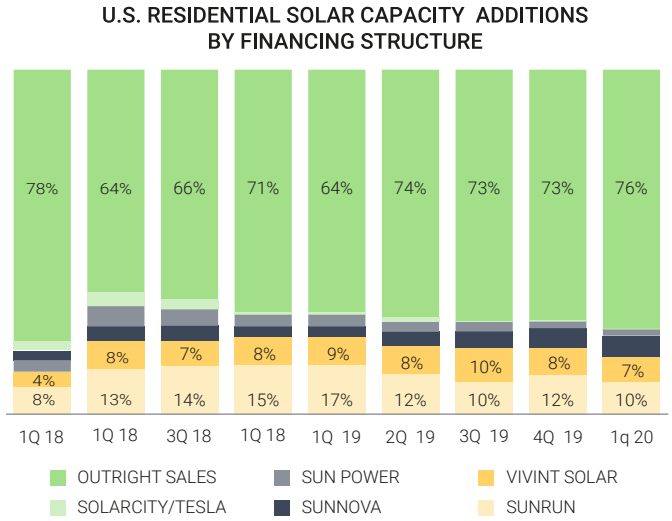
The main challenge for the industry is to scale up at a national level while keeping customer acquisition costs low. Reductions in hardware and installations costs is somehow limited by labor costs, hence customer acquisition remains the area with the biggest cost reduction potential.

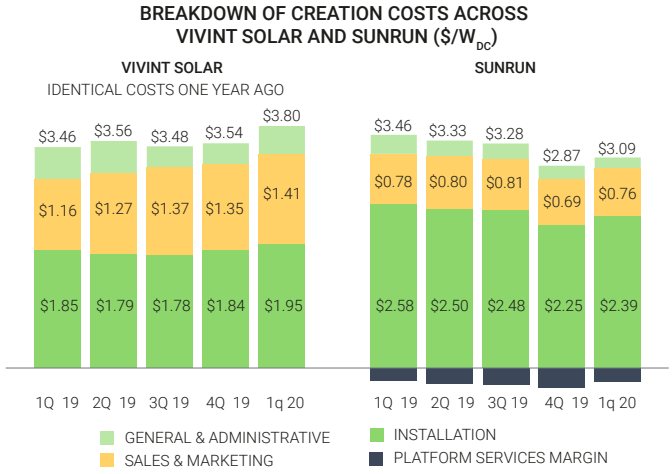
- Customer acquisition costs represent close to a third of the overall cost stack.
- Sunrun is also taking its main competitor out of the bidding arena and thus reducing direct competition and related pressure to drive costs down.

The bigger the better

The larger asset base should bring more leverage on negotiating the procurement of new solar modules with suppliers thanks to larger order volumes. Size also helps to solidify its national leadership and potentially overtake local actors.

- Local and regional installers still hold >70% of the US residential solar market.
- Acquiring solar systems that are under leases and PPAs means additional recurrent revenues to be collected in the long run.





SOURCE:
Sunrun Acquires Vivint Solar to Form Residential Solar Supernova, July 2020, BNEF, BloombergNEF

A Future Beyond Solar Panels

Energy storage as a natural first step

Recent wildfires in California have stimulated people's interest in combining solar PV with energy storage solutions to secure electricity during outages. Vivint is lagging on this front, but Sunrun is emerging as a main player in the U.S. thanks to its Brightbox storage solution (batteries developed by LG Chem).

- US energy storage market is to grow form ~$1.5bn in 2020 to ~$7bn by 2025.
- Sunrun recently reported Brightbox' attachment rate (to solar panels) of 20% US-wide and peaks over 50% in certain regions.

Strategic positioning to provide grid services

Expanding customer base is key to access grid services capabilities going beyond the simple solar + storage position. Many solar residential players aim to become fully-fledged actors on the wholesale market, providing services such as peak shaving, demand response, energy arbitrage, back-up power, etc.

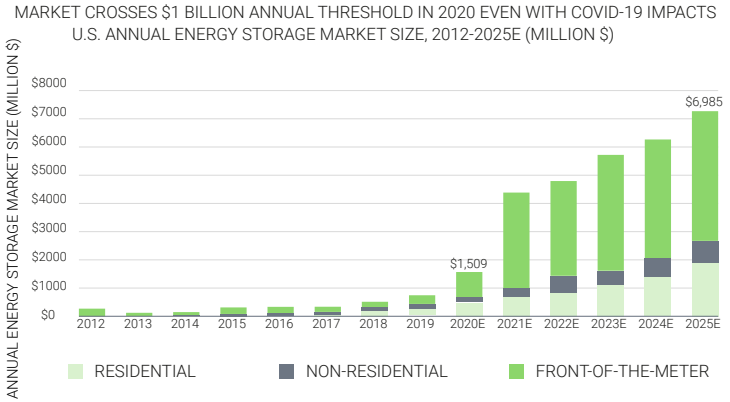
- Sunrun already announced $50mn of grid services revenue (already contracted or in the pipeline).
- Home solar + batteries could unlock a new $50bn annual market of utility capex.

A growing market with increasing competition

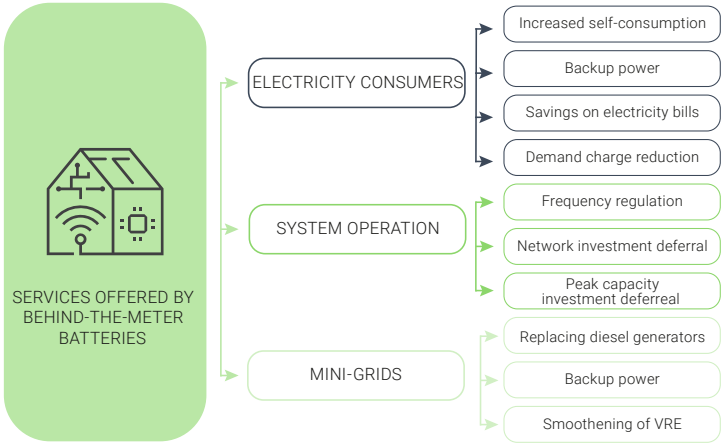
Aware of the huge market potential, multiple actors are willing to enter the distributed generation & storage market and disrupt the traditional utility business model. These range from electric vehicle manufacturers such as Tesla, solar inverter providers e.g., SolarEdge and Enphase or other solar panel providers.

- Sunpower recently completed the spinoff of its solar manufacturing business (Maxeon) to entirely focus on the downstream residential & commercial markets.

U.S. ENERGY STORAGE WILL BE A $6.9 BILLION ANNUAL MARKET IN 2025



SERVICES PROVIDED BY BTM BATTERY STORAGE SYSTEMS



SOURCE:
Sunrun Investor Presentation, August 2020
Behind-The-Meter Batteries, Innovation Landscape Brief, 2019, IRENA
U.S. energy storage monitor: Q3 2020 executive summary

Catalysts

- **EV demand.** Soaring demand for electric vehicle is to drive residential solar & storage sales in the US, with homeowners looking for solutions to cope with increasing electricity needs.
- **US elections.** If elected, Joe Biden promised a $1.7tn clean energy investment plan targeting 100% carbon-free electricity and extending energy tax credits.
- **Climate Change.** An increasing number of people is facing power outages imposed by utilities due to high wildfire risks., a trend which is likely to further foster people's interest for residential solar & storage.

Risks

- **Covid-19.** The impact of coronavirus on consumer's spending might show negative effects on residential solar demand with people seeing it as a non-essential good.
- **ITC stepdown.** The planned stepdown and expiration of the solar Investment Tax Credit (ITC) might negatively impact solar system demand in the short term.
- **Deal delays.** Delays or failure in the Sunrun – Vivint Solar deal would negatively impact both companies and most likely the entire US residential sector.

Bottom Line

- The US residential sector is a niche & fast-growing market with multiple players willing to grab a piece of the cake and where more consolidation is likely to occur in the foreseeable future.
- We believe that an inflection point has been reached where solar deployment will keep growing at a double-digit rate, driven by competitive pricing (grid parity), innovative sales channels, and supportive measures. Thus we maintain close to 25% of our current Sustainable Future portfolios exposed to the solar sector.

Companies mentioned in this article:

Enphase (ENPH US), LG Chem(051910 KS), Maxeon (MAXN US), SolarEdge (SEDG US), Sunnova (NOVA US), Sunpower (SPWR US), Sunrun (RUN US), Tesla (TSLA US), Vivint Solar (VSRL US)

CHARTS FOR THOUGHTS

Premises Of A Universal Basic Income?

Unequal impact across classes

The Covid-19 pandemic resulted in political measures designed to curb the spread of the virus (e.g. lockdown or the closing of brick and mortar businesses). But their economic impact has not been equal across the society, hitting low skilled, low paid, non-digital jobs.

- About half of the people earning less than $75k experienced a loss of employment income since mid-March, compared to less than a third of those earning more than $200k.
- Non-digital jobs are those that are suffering the most.

State help for all

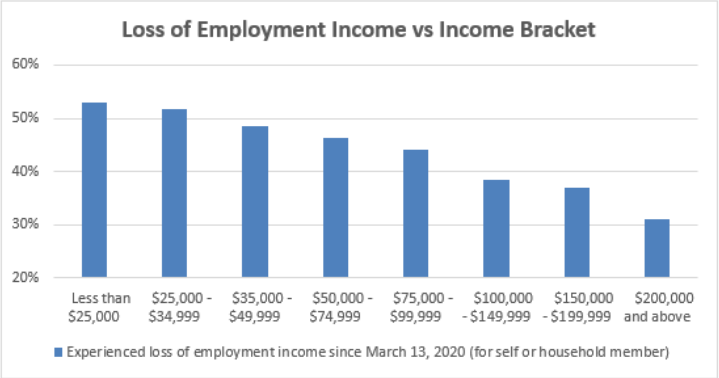
To mitigate the financial burden and social unrest of the job and income losses, the politicians are extending direct checks to everyone, irrespective of income levels or any other criteria.

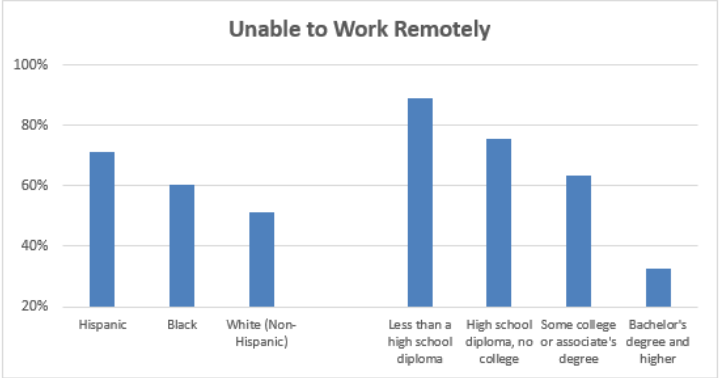
- CARES Act gives up to $2,400 for a married couple and $500 per child.

Buying social peace?

The inevitable digitalization of the society, highlighted and accelerated by the Covid pandemic, is widening the social gap. Governments need to seriously consider how automation and digitization will shape the future of work and society, to keep social tensions under control.

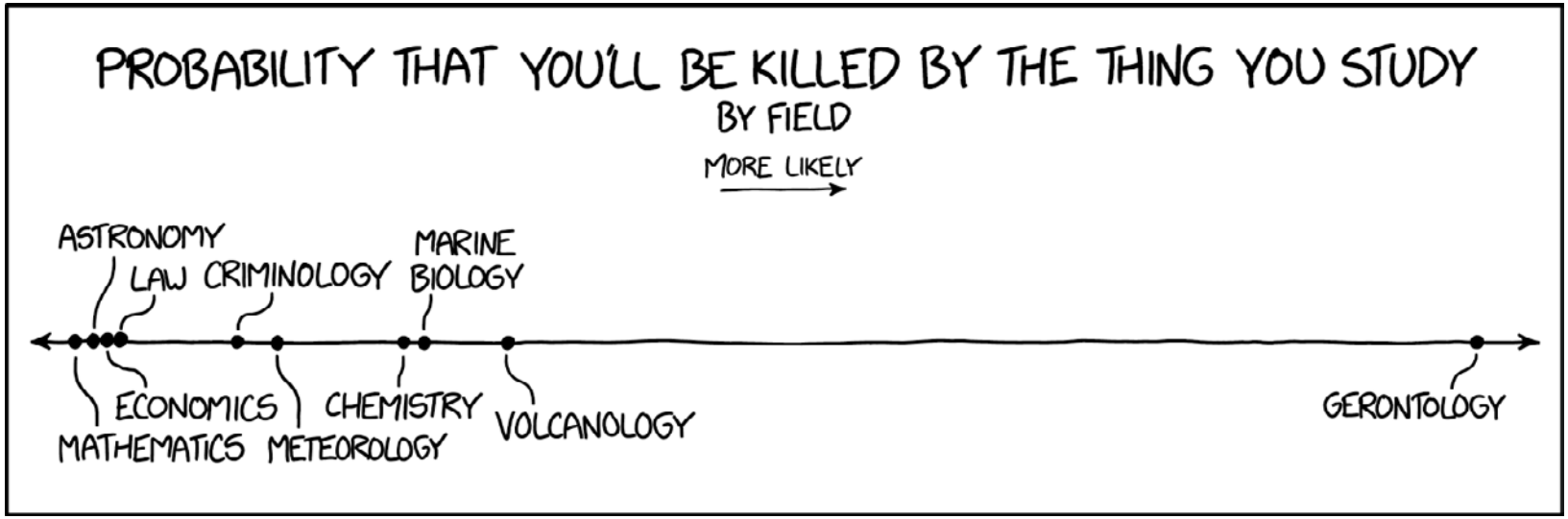
- Are the Covid payments the first step toward a Universal Basic Income?





SOURCE:
Week 13 Household Pulse Survey: August 19 – August 31
Ability to work from home: evidence from two surveys and implications for the labor market in the COVID-19 pandemic

CASUAL FRIDAY



SOURCE:
https://xkcd.com/2142/

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