



THE FUTURE OF

Summary Report

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About GIC Insights

Established in 2016, GIC Insights is an invitation-only event that gathers top leaders from our key partners, investee companies, and counterparties to explore pertinent long-term issues. In these extraordinary times, GIC presented a new digital platform, GIC Insights LIVE, to connect thought leaders around the world to exchange perspectives on fundamental themes and forge new relationships. The theme was **The Future Of**.

The Future Of

The global community is navigating a public health crisis, an economic crisis, and financial turmoil all at once — an unprecedented combination in modern times. Profound uncertainty surrounds the future, as the crisis on multiple fronts has brought underlying vulnerabilities to the fore and accelerated shifts that could shape lasting changes to the global investment landscape. At the same time, there are also considerable growth opportunities, particularly in the areas of sustainability, healthcare and technology.

At GIC Insights LIVE, we sought perspectives from thought leaders around the world on how current developments will impact The Future Of these fundamental themes, and their business and investment implications over the long term.

Foreword



Reimagining the Future

A very warm welcome to GIC Insights LIVE 2020.

With all the big changes going on in the world, we need to re-imagine the future - by identifying the key forces at work, deducing their implications and formulate our plans.

At [last year's forum](#), I highlighted three of those forces: rising inequality, disappearing interest rates and technology disruption. They are still very much in play. This year, let me add three more to the list.

First on the list: Large policy interventions

With the COVID-19 emergency, policymakers have doubled down on government interventions. These actions are necessary to avert an immediate economic collapse. They have boosted financial markets, benefitting all investors.

But they are not by themselves a long-term solution. Most emergency spending and lending have gone towards relieving short-term pressures. They are a liquidity bridge. Solvency remains an issue.

The resulting low interest rates, debt piles and heavy financial

market reliance on policy support could lead to large distortions of economic decisions, macro instability and market fragility.

We expect the economic environment to be volatile and challenging. But for long-term investors like GIC, we are prepared for new risks and hopeful of new investment opportunities, and welcome new collaboration opportunities.

Second on the list: Great dispersion

There are a great many divisive trends at work, in economics, politics, technology and geopolitics, which are likely to be with us for many years. This will require us to adapt and adjust to the resulting wide dispersion of outcomes, by:

- Looking carefully at the range of dimensions differentiating winners and losers. This applies whether it is a company, sector, country or asset class. In GIC, we believe size, technology capability and domicile will matter a great deal.
- Understanding history more carefully; being more circumspect about extrapolations and mean reversion. As an example, bond yields cannot repeat their historical declines.
- Looking under market aggregates and indices more thoroughly, as important risks and opportunities may be hidden in them. For example, in the area of emerging market equities, the doubling of China's weight just within the last five years has surely impacted the overall risk-return characteristics of the asset class.

To these ends, we will continue to collaborate with our partners and leverage our collective capabilities, especially in going in deeper and at earlier stages, into various market segments, to seek opportunities.

Third on the list: Sustainability

Sustainability is firmly at the forefront. This represents an opportunity for all of us to do good and do well.

As a large and long-term investor, GIC’s fortunes are tied to the larger investment universe. We are concerned about sustaining it for future value creation. In other words, we care about growing the pie and taking care of the goose.

Sustainability is hence critical and forms an essential part of GIC’s investment strategy, risk management and corporate culture.

It is important to note that this issue goes beyond climate change. As highlighted by the COVID-19 crisis, there are other gaps and opportunities. Examples include social inequality issues around access to technology, healthcare, jobs, and social safety nets. Let me share a few examples of what GIC is doing in this space:

- In the investment area, we are seeking more sustainability-related opportunities. This includes renewable energy assets, “green” buildings, and emerging technologies that support the low-carbon transition. We already have an impact investing effort, done both internally and externally. But what we really hope to see,

in the long run, is that all our investments are impact investments, meaning they are profitable both commercially and socially. In that regard, our effort is not limited to new assets, but existing ones too, through thorough engagement in transition efforts.

- In terms of industry participation, we are a supporter of TCFD (Task Force on Climate-related Financial Disclosures) and are working with World Economic Forum’s International Business Council to help harmonise the many reporting metrics. Getting to a common set of reporting standards will be a big step in the ESG (Environmental, Social, Governance) effort.
- In our own organization, we are learning and improving our own ESG practices, including committing to zero-emissions and supporting efforts to build up communities and fostering diversity and inclusion. An example is our “With Love, GIC” initiative which has enabled us to support many ground-up community projects by our own staff around the world.

Sustainability is a global existential issue that no single party can solve. We need to work collectively to find solutions.

Focus on partnerships

In summary, as we re-imagine the future, we need to identify and embrace these changes and adapt our approach accordingly.

But one thing that does not change, with or without a pandemic, is our continued commitment to connect our partners, exchange views, and learn from one another.

This brings me to the GIC Insights LIVE series. We were extremely privileged to have distinguished thought leaders share their insights on three areas of great interest – sustainability, healthcare and technology.

I hope you find the takeaways from these sessions insightful.

Lim Chow Kiat, CEO, GIC

The Future of Sustainability

At GIC Insights LIVE 2020, we were privileged to have **Al Gore**, Former Vice President of the United States, and Chairman of Generation Investment Management, share his rich perspectives on the future of sustainability.

The session was moderated by **Rachel Teo**, Head of Futures (Research) Unit, and Senior Vice President, Economics & Investment Strategy, GIC.

Sustainable investing has been on the rise in recent years, compelled by stronger evidence and greater awareness. It has become increasingly clear that sustainability issues like climate change have a material impact on investment returns. However, the perfect translation of theory to action remains elusive.

What does the future of sustainability look like, and how has COVID-19 affected this? What are the most compelling investment risks and opportunities in themes like climate change?



Turning point seen in the battle against climate change

Climate change has accelerated and intensified in the last decade. At this point, 2020 could likely be the world's hottest year ever measured with instruments. The five hottest years ever measured have been in the last five years¹; 19 of the 20 hottest years have occurred since 2001². Clear examples of climate-related extreme weather events include the forest fires in California and the melting icebergs in Antarctica and Greenland.

But the solutions to the crisis are now also here, along with greater acceptance of the reality and severity of the problem, and the resolve to address it.

“ Mother Nature is now driving this debate. We have to understand what Mother Nature is telling us, and each of us in finance, in the investment community, in business, and in our role as citizens of countries where decisions affect the future when they are made collectively – we need to all speak up.

[1] NOAA (15 January 2020), 2019 was 2nd hottest year on record for Earth say NOAA, NASA, <https://www.noaa.gov/news/2019-was-2nd-hottest-year-on-record-for-earth-say-noaa-nasa>
[2] NASA Global Climate Change (2019), Global Climate Change: Vital Signs of the Planet, <https://climate.nasa.gov/vital-signs/global-temperature/>

The link between the climate crisis and COVID-19

Comparing the climate crisis to another major crisis confronting the world – COVID-19 – reveals similarities and interconnections. Both crises have highlighted the importance of listening to scientists and other experts, who had warned of the risks of a global pandemic as well as the even more serious consequences of climate change. In many countries, both crises have brought urgent problems such as rising inequality to the fore, given their disproportionate impact on the poor.

Reliance on fossil fuels has worsened the impact of the pandemic. A recent study by the Harvard T.H. Chan School of Public Health revealed that people with COVID-19 who live in US regions with high levels of air pollution are more likely to die from the disease than people who live in less polluted areas³. We should also take into account the fact that the continued encroachment on previously wild areas and destabilisation of ecosystems are resulting in the emergence of new viruses, such as the SARS-CoV-2 virus which causes COVID-19.

“ It is not as if there is a competition for mindshare between the pandemic, the problem of inequality and the climate crisis. They are all interlinked.

Given these multiple connections, solutions to the climate crisis can contribute to mitigating the negative effects of current and future pandemics. Additionally, while the economy has had to be dampened in order to solve the pandemic, the solutions to the climate crisis present significant job creation opportunities that will be greatly needed as we come out of the pandemic. This is also true for the inequality crisis – the Oxford Review of Economic Policy recently reported that dollars invested in sustainability actually reduced inequality and created more jobs, as compared to dollars continually invested in the fossil fuel economy⁴.

We are already seeing the outlines of a plan that will enable us to solve the climate crisis – development of clean energy sources, acceleration in the adoption of electric vehicles, sustainable forestry, regenerative agriculture, circular manufacturing, retrofitting of more efficient buildings, as well as the push towards sustainable investing by businesses and investors around the world.

[3] Harvard University (18 September 2020), COVID-19 PM2.5: A national study on long-term exposure to air pollution and COVID-19 mortality in the United States, <https://projects.iq.harvard.edu/covid-pm>

[4] Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J. & Zenghelis, D. (2020), Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?, Oxford Review of Economic Policy, 36(1), 359-381, <https://doi.org/10.1093/oxrep/gra015>



Falling cost of renewable energy sources

Alternative energy sources have become increasingly popular around the world. In 2019, renewables accounted for 80% of new electricity-generating capacity installed worldwide⁵.

This is linked to falling costs – five years ago, electricity from renewable sources was cheaper than electricity from new fossil sources in only 1% of the world. Today, this is true in more than two-thirds of the world. Five years from now, electricity from solar and wind energy is expected to be cheaper than burning gas, coal or oil in almost all of the world.



Next set of technologies to enable a net-zero economy

AI for hyper-efficiency

A major trend that will enable us to achieve a net-zero economy is the application of artificial intelligence (AI) and machine learning to achieve hyper-efficiency in processes. With these new tools, we are experiencing the ability to enhance energy efficiency and conservation far beyond what many had thought possible. For example, Google reduced energy consumption at its data centres by 40%⁶ by applying machine learning technology developed by DeepMind, a UK-based company it acquired in 2014. They were able to reduce energy use without any new hardware, instead learning how to utilise the same process in a far more efficient way with the use of new technologies.

Surge of interest in “green” hydrogen

It was previously impractical to extract hydrogen from water because of the amount of energy required. The dramatic expansion of the amount of wind and solar electricity, which is zero marginal cost renewable electricity, has made it now possible to create hydrogen sources, or “green” hydrogen, economically, and at scale. Hydrogen can then be burnt to produce extremely high temperatures, and applied to processes such as steelmaking and other high-temperature use cases. Germany has already begun subsidising the accelerated development of green hydrogen, and the European Union is following its lead.

Growth of carbon markets worldwide

While the idea of carbon taxes has been largely controversial, we have seen the emergence of indirect carbon pricing through emissions trading schemes in markets like China, the European Union, and US states like California, New York, Oregon and Washington. Markets in need of revenue can benefit from this as under the international treaties, prices on carbon are treated like value-added taxes collected at the border from countries that do not have them, and rebated to domestic exporters when they are being used in export.

[5] Frankfurt School-UNEP Centre/BNEF (2020), Global Trends in Renewable Energy Investment 2020, https://www.fs-unep-centre.org/wp-content/uploads/2020/06/GTR_2020.pdf

[6] DeepMind (20 July 2016), DeepMind AI Reduces Google Data Centre Cooling Bill by 40%, <https://deepmind.com/blog/article/deepmind-ai-reduces-google-data-centre-cooling-bill-40>

“ One of the solutions to the climate crisis is to stop subsidising the destruction of humanity’s future, and instead give more encouragement to a faster transition to renewable energy, to electric mobility, to circular manufacturing, to sustainable forestry and to regenerative agriculture.

Reform of metrics needed

There is now considerable evidence to show that investors and companies that are fully integrating ESG into their portfolios and business plans are performing better over time.

However, to effectively change the detrimental aspects of the current way of managing the global economy, and to draw the link between real economy issues and the investment world, we need to reform the system of metrics. Factors that are often left out, such as inequality, must be included. Reviewing how and what we measure as “value” is crucial to spur greater change. For example, the Gross Domestic Product (GDP) system leaves out four important aspects:

1. **Negative externalities** – Pollution is a key example of an externality that should be but has not been included in the accounting system.

2. **Positive externalities** – Investment in public goods like healthcare, education and family services which bring longer term benefits, are instead counted as expenses.
3. **Depletion of crucial resources** – This includes topsoil, underground water aquifers and biodiversity.
4. **Distribution of wealth** – Hyper-inequality has reached levels that threaten public support in many countries for capitalism and democracy. The capture of the policy process by the wealthy elites also needs to be re-examined.

We need to take advantage of what modern information theory tells us. This will allow us to tap on the wisdom of crowds, and find ways for all aspects of societies to better understand and hence participate in the benefits of solving these challenges, for a brighter future.



The Future of Sustainability - in Practice

Panellists **Jeremy Grantham**, Co-Founder of GMO, **Bob Litterman**, Chairman of the Risk Committee at Kepos Capital, **Debbie McCoy**, Head of Sustainable Investing at BlackRock's Systematic Division, and **Jaap van Dam**, Principal Director Investment Strategy for PGGM, discussed the future of sustainability – in investment practice.

The session was moderated by **Liew Tzu Mi**, Chief Investment Officer, Fixed Income, and Chair, Sustainability Committee, GIC.

While the growing focus on sustainability offers new investment opportunities, portfolio exposure to risks and disruption also need to be carefully managed.

Long-term investors are increasingly integrating sustainability considerations into their investment frameworks, strategies and processes, while also navigating associated challenges.

There are profound underlying threats to the long-term survivability of our species and civilisation, including “unlivable” climate conditions affecting a significant share of the world’s population, loss of global food production capacity, declining populations in the developed world due to below-replacement fertility rates, as well as growing inequality, distrust and divided government responses to global crises.

At the same time, technology is enabling great advancements. There is also a higher degree of awareness, transparency and sense of shared community that presents opportunities to address these issues. The investment world can contribute positively to collective action for better outcomes.

“ On one hand, the climate is clearly deteriorating despite our best efforts. We are in that sense, racing towards the cliff edge. But on the other hand, the technology, particularly in America, is making incredible progress.

Jeremy Grantham, Co-Founder, GMO

A poll of session attendees showed that 43.6% of respondents do not believe there is a trade-off between sustainability outcomes and investment returns, 35.5% believe there is a trade-off, with the remainder uncertain.



Panellists acknowledged the complexities of this issue and encouraged a more nuanced approach that goes beyond choosing either returns or sustainability. While returns and sustainability often go hand-in-hand, this is by no means a law of nature. Often, many factors have to coincide in order to realise better returns per unit of risk taken. For example, laws and regulations, technological development and consumer behaviour. This belief in a positive outcome should therefore never be mechanically applied.

An alternative way to view this issue is through a matrix which outlines areas where sustainability and returns will go hand-in-hand as well as areas where they conflict. This will help investors to understand, by topic or asset class, the right actions to take for the relevant investment horizon.

The starting point is key – if investors begin with the assumption that a sustainability factor will not have a return implication, the “trade-off” quandary cannot be resolved. Instead, it would be meaningful to start by quantifying what sustainability is and applying this to the early part of the portfolio building and analysis process, rather than making modifications based on sustainability considerations at the later stages.

It is also important to consider the potential for investors to transform society by engaging sustainably. If investors can be ahead of the curve, they stand to benefit both in terms of doing good and performing well financially, at the same time supporting the transition to a more sustainable society.

Lessons from risk management

There are valuable lessons from risk management that can be applied to the response to climate change.

- Risk management requires consideration of the full distribution of potential outcomes, including worst-case scenarios. Similarly, it is essential to consider the extreme but plausible scenarios that could result from climate change, as these could be catastrophic if realised.
- Time is a scarce resource in managing risk, as well as in responding to climate change — where time is running out, yet issues have not been fully addressed.
- The purpose of risk management is not to minimise risk, but to ensure appropriate compensation for the risk taken. In the area of climate change, the fundamental flaw is that risk today is not adequately priced. Taking into account risk and the worst-case scenarios would imply a higher price today, rather than the traditional notion that price should be low today and rise slowly over time to a higher price in the distant future.
- Economists often make a distinction between risk and uncertainty. Risks are the model-based metrics that we create, while uncertainty is what we manage in the real world. There is great uncertainty around potential outcomes relating to climate change. Erring on the side of caution is necessary.

The belief is that applying these lessons, and pricing risk, will reveal an inevitable higher price on emissions, which will result in a dramatic phase change in all areas of the economy. Investors should be prepared for this.

“ To get to net-zero by 2050 is going to be a very rapid transition. It will happen. We will price emissions globally in a harmonised way, and that will create different incentives and affect the profitability and valuations of all assets around the world. When it will happen is hard to say, and so there is risk.

Bob Litterman, Chairman of the Risk Committee, Kepos Capital



Putting sustainability into investment practice

Drawing from their extensive experience in sustainable investing, the panel shared ways in which sustainability can be applied to investment practice effectively:

- Investors should formulate **clear, long-horizon strategic goals** that incorporate sustainability. Conversely, adding sustainability as an incremental layer to existing investment practices often leads to sub-optimal results and to greenwashing, which will not stand the test of time.
- With the significant amount of data and information available, investors should **apply advanced analytics to an expanded set of data** to inform portfolios. This can help investors better understand and capture the interaction between societies, companies and returns, and also incorporate traditionally understudied areas. Examples of how this has been applied include using geospatial images after climate disasters to understand economic restarts, and human development data to understand the impact of diseases on populations.
- **Alpha or beta?** Seeing sustainability as a source of short-term alpha can lead to disappointments, as companies and economies are on the whole expected to move in a more sustainable direction over time. On the other hand, applying a “better beta” lens will ensure a well-constructed, future-proof portfolio that is likely to generate better, more resilient returns over the long run.

- **Exclusion is not the most productive way to run a portfolio.** Investors should leverage the range of instruments at their disposal to generate better returns per unit of risk and influence positive outcomes. One example is going short in areas that are expected to underperform. Having a clear view of what sectors and companies will do well, and constructing a portfolio based on these views is key.

“ We are able to use sophisticated processing tools to consume information about the world around us and expand the realm of what we are able to look at. We think that is required to take into account the human experience, to take into account the physical world, and figure out what will make our portfolios resilient, and also the world around us more resilient.”

Debbie McCoy, Head of Sustainable Investing, BlackRock Systematic Division, BlackRock



“ If you allocate your scarce productive capital in the wrong way, you will produce waste. Not only waste for you as an investor and your beneficiaries, but also waste to society as a whole. Let’s recognise the role we play in allocating the scarce capital of this world, in the right direction.

Jaap van Dam, Principal Director Investment Strategy, PGGM

Investment opportunities

Attractive opportunities exist in the general area of carbon-related assets that seek to reduce emissions, which are trading cheaply. For example, carbon allowances around the world, which have the potential for appreciation. Fundamentally, every tonne of carbon dioxide that goes into the atmosphere today is very likely going to have to be pulled out of the atmosphere at some point in the future, and this will involve paying those who are willing to do this.

Other promising areas include the bio-engineering of microbes to produce energy to sequester carbon and to create protein, food and new materials, as well as the fusion companies that are showing steady progress towards commercially useful products.

There is also a larger opportunity for investors to influence outcomes through investment decisions. This requires a mindset shift away from the traditional belief that investors are exogenous to outcomes of the world, and towards recognising that allocation of capital thoughtfully, and in the right direction, can make a positive difference in solving fundamental sustainability issues.

Setting organizations up for success

Sustainability is a long-term journey with multiple stages of maturity. Panellists offered guidance on how to bring organizations, that are made up of individuals with differing viewpoints, on this journey.

- **Produce research and insights** that can be used to inform and support robust portfolios built around sustainable investing. At the same time, offer options to stakeholders, to demonstrate the implications of potentially investing in a different way.
- **Set the right tone at the top.** Sustainable investing requires a long-term horizon, and having the board and management look beyond traditional short-term objectives and articulate strong investment beliefs around sustainability sets the organization on the right path towards success.
- **Build on-the-ground commitment, not compliance.** This could mean starting with small steps in areas that have the potential to create attention without jeopardising overall results, then cascading knowledge and experience to other teams. This could also mean hiring differently, if needed.
- **Create diverse teams.** Place those who are closer to the subject – for example, young people – in positions of power where they can build mandates, make decisions and integrate sustainability effectively. Investment professionals also need to be not just finance-educated, but also well-versed in their understanding of sustainability.

The Future of Biopharma Supply Chains

Panellists **Marc Casper**, Chairman, President & CEO of Thermo Fisher Scientific, **Chris Chen**, CEO of WuXi Biologics, and **Erez Israeli**, CEO of Dr. Reddy's, shared their views on the outlook for supply chain onshoring, drug costs and pricing dynamics, and the potential winners and losers in the post-pandemic world.

The session was moderated by **Doreen Chia**, Managing Director, Public Equities, and Co-Chair of the Healthcare Business Group, GIC.

Due to COVID-19, various countries imposed limits or bans on some medical supply exports. In response, the US has passed the 'Mitigating Emergency Drug Shortages Act' to better track drug supplies and assess national security risks, and is considering tightening laws to force federal agencies to buy locally-made pharmaceutical and medical equipment.

Low labour costs, state subsidies and easier regulations have helped make markets like China and India attractive as manufacturing hubs; reversing this trend will not be easy.

The COVID-19 pandemic has exposed vulnerabilities in the global biopharmaceutical supply chain, and raised renewed concerns over the offshoring of facilities to Asia as well as the heavy reliance on large producer markets like China and India for critical medical supplies.

When the virus began to spread in early 2020 and countries started closing their borders, this brought about significant disruptions in the manufacturing and distribution of drugs, diagnostics, devices and personal protection equipment. Acute shortages in various critical medical products and hospital supplies were experienced.

Disruptions from COVID-19

Panellists shared their experiences navigating the logistical disruptions to their operations during the weeks of global lockdowns. The combination of local restrictions on the movement of labour and goods, and global air travel grinding to a halt, posed challenges that were unprecedented and unanticipated by regular business continuity plans.

Supply chains have moved offshore over time, and in many instances, span multiple countries. For example, India manufactures and supplies 40% of generic drugs to the US, and China is a major supplier of pharmaceutical raw materials to India. Many large manufacturers with broad product portfolios have manufacturing plants spread across different states and countries.



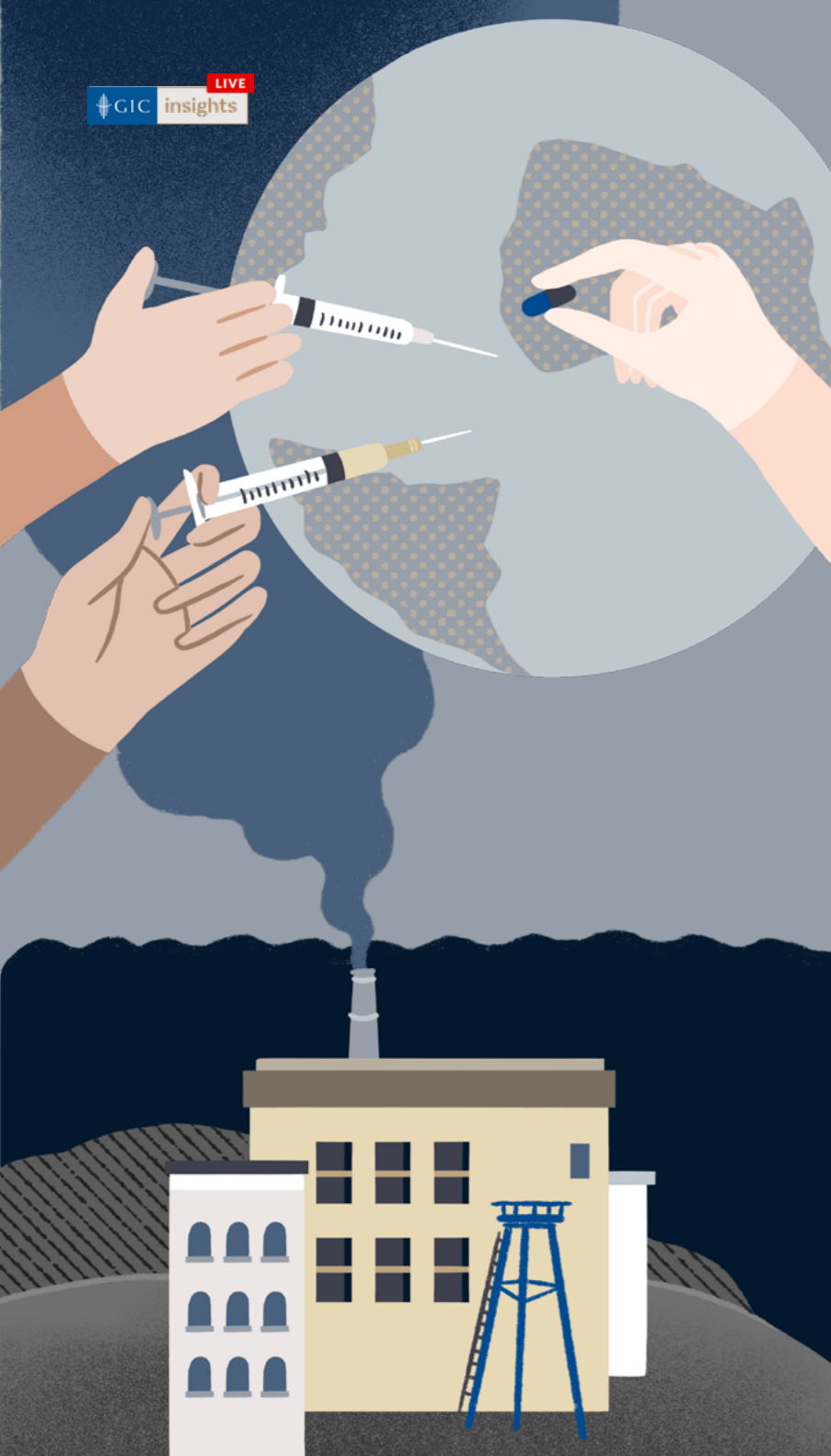
Companies that manufacture products in single locations for global markets were the most acutely impacted during the early onset of the pandemic. Many of these companies had to turn to governments for help in getting raw materials and finished goods across borders.

Review of supply chain strategy and management

There have been unprecedented levels of collaboration amongst industry players and regulators. The pandemic, while global in nature, has affected countries unevenly, and also exposed the degree of interconnectedness and interdependence of biopharma supply chains globally. Private and public stakeholders around the world have had to collaborate to overcome supply chain disruptions.

Nonetheless, policymakers will be compelled to review supply chain strategy and management for assurance of supply and mitigation of risks.

A heavily discussed area in the US has been the manufacturing of critical APIs (active pharmaceutical ingredients) and medical supplies that are often concentrated outside of the US, in countries like India and China. Governments, hospitals and private retailers are now under increased pressure to scrutinise the footprint of their medical supplies; governments will likely seek to increase the security of supplies through a certain degree of onshoring and diversification.



That said, such decisions are not straightforward. The supply chain has evolved over decades into an interconnected network of suppliers around the world, in order to optimise cost and efficiency. The economic burden of widespread onshoring and unwinding of the global supply chain remains an issue that has yet to be addressed.

“ Eventually, there may be a supply chain in US, one in Europe, one in China, and an additional one in the rest of the world. Post-COVID, it will be a very different business environment.

Chris Chen, CEO, WuXi Biologics

Reshoring is a costly undertaking

Reshoring is a massive and costly undertaking that involves considerable time and resources. While the strategic rationale of national security is clear, the economic rationale remains to be seen.

The offshoring of facilities from the US to China and India over time had been driven by the search for cost and labour efficiencies alongside tough environmental laws in the US. Despite President Trump’s Executive Order to “buy America” for essential products, it may be neither economical nor easy

to replicate the infrastructure and capacity found in China and India, in the US, on a large scale. The US government is also not the biggest buyer of generic medicines in the US; most of the supply goes to commercial mega-buyers in the channel like Red Oak Sourcing and Walgreens Boots Alliance.

Whether widespread reshoring can be achieved without heavy government subsidies is also unclear. Companies will learn from the COVID-19 experience, streamline operations and strengthen end-to-end supply chain processes, to increase their resilience should another pandemic hit. But ultimately, in the corporate world, changes to supply chain strategy will still have to be driven by cost and capital efficiencies.

Strategic shifts in the supply chain may benefit countries with export-oriented economies and policies like Switzerland and Singapore, rather than the US.

On the COVID-19 vaccine

It is unlikely that one vaccine alone will end the spread of the virus. Instead, it will likely be a multi-year, multi-solution approach, comprising a combination of vaccines, boosters and other pharmaceuticals, as well as methodical implementation to make the vaccine accessible globally to frontliners and eventually, the broader population.

The question of who will get the vaccine first has been greatly debated, with concerns raised about vaccine nationalism by rich

nations, at the expense of poorer ones. International agencies like the World Health Organization, and well-endowed institutions like the Gates Foundation, may have to step in.

“ It is a multi-year, complex type of dealing to manage this disease. It will be a combination of vaccines, pharmaceuticals, treatment and diagnostics in order to deal with different populations in different places in the world.

Erez Israeli, CEO, Dr. Reddy's

Towards a more resilient future

The crisis has shaped many lessons about the impact of globalisation on pharmaceutical manufacturing and the extent of interdependencies. The astounding level of collaboration among governments and other private and public stakeholders, coupled with the use of digital tools and artificial intelligence for faster, better solutioning, also bode well for the future. The collaboration among the global scientific community to develop a COVID-19 vaccine at “pandemic speed” has also been unprecedented. This gives hope that a COVID-19 solution will emerge sooner rather than later, and best practices learnt will put the world in a stronger position to navigate the next crisis.

Looking ahead, the pandemic has generated greater interest from both the scientific community and investors in traditionally under-invested areas like vaccines and infectious diseases. There is optimism that the accelerated development and testing of new drug modalities today will continue to drive further breakthroughs, to strengthen global pandemic readiness post-COVID.

“ There will be very significant investments in basic life sciences research and the expansion of infectious disease capabilities, in terms of how to respond, from diagnostics to vaccines. Going forward, this will be applied to the many challenges that society faces.

Marc Casper, Chairman, President & CEO, Thermo Fisher Scientific



The Future of Tech-enabled Healthcare

At GIC Insights LIVE 2020, our panel on **The Future of Tech-enabled Healthcare**, featuring **Todd Park**, Co-Founder & Executive Chairman of Devoted Health, **David Simmons**, Chairman & CEO of PPD and **John Cai**, Vice Chairman & Group President of WeDoctor, explored how innovative efforts are shaping global healthcare for the future.

The session was moderated by **Brad Yale**, Senior Vice President, Private Equity, and Co-Chair of the Healthcare Business Group, GIC.

The pandemic is putting our healthcare system to the test. The healthcare industry, historically slow to embrace technology, is rising to the challenge and experiencing accelerating change, as COVID-19 continues to catalyse innovation in care delivery, clinical therapy and vaccine discovery.



Enhancing the clinical trial process

In clinical trials, the use of technology to identify and monitor patients is lowering the cost and time to deliver therapies to market. Technology applications also streamline the pre-screening and monitoring process for patients. This is safer as it reduces patient exposure to healthcare facilities, and also alleviates the time burden on patients for participating in a clinical trial.

The cost trade-offs are harder to quantify when it comes to monitoring and validating the data collected in the course of a clinical trial, since some medical procedures and tests can only be carried out by trained staff. Sending nurse practitioners to patients' homes, for example, involves higher costs than if the data were collected centrally. Moreover, complex procedures such as tissue biopsy require specialised equipment available only in clinics and hospitals. There are also additional costs involved in extending the supply chain to send equipment and medicine to the homes of patients.

Technology enables interactions between sites and study sponsors to be completed remotely. At the peak of the COVID-19 pandemic in late April and early May 2020, nearly 90% of clinical trial site monitoring was carried out remotely as many physical sites were shut. This high penetration of remote monitoring is unlikely to persist, but may settle at the levels of 60% onsite and 40% remote, consistent with a 3 to 5+ year pre-pandemic outlook.

The pandemic has driven customers to embrace new forms of technology applied to the clinical trial process, providing

an opportunity to test these new technologies and process changes in a forceful way.

Telemedicine in the US

The pandemic has increased the take-up of virtual consultations. For seniors in the US above the age of 65 and on Medicare, the number of telemedicine visits rose by a factor of 100 in mid-April 2020, compared to prior to the COVID-19 outbreak. Many of these telemedicine visits will return to in-person visits after the crisis passes; however, a significant portion of these visits will persist as patients, providers, payers and regulators all increase adoption and familiarity with the practice. The US has already begun to update the regulatory and payments framework for innovations like telemedicine, which helped to catalyse its increased use during the pandemic.

Telemedicine often involves sending equipment such as pulse oximeters, blood pressure cuffs and wireless scales to homes so that patients can be monitored in between visits to the clinic or hospital. A large proportion of the kind of care needed, particularly for chronic illnesses, can be done virtually. As such, the significant shift in that direction is set to continue, where telemedicine will be an integrated extension of the relationship patients have with their existing providers.

China's experience with telemedicine

China is also experiencing robust telemedicine adoption. During COVID-19, 50,000 doctors in China were deployed to Wuhan to assist in the city's fight against the virus, while another 50,000 doctors provided advice and consultation through online hospitals, which could hand out prescriptions and deliver drugs to patients' homes.

The company that provided the platform for most of the online doctors in Wuhan during this period said it now has the technological capacity to support millions of patient visits in a day. It is also building an online platform for Chinese hospitals so that they can share information in a more secured way, centralise procurement and improve the quality of service to patients.

The massive acceleration in the adoption of telemedicine has been aided by a change in the attitudes of authorities, who now regard virtual healthcare as a "must have" rather than a "nice to have". For example, online consultations are now covered by the medical insurance system in China.

Patient trust in telemedicine has also improved as a great number of experienced specialists and doctors – including several prominent names – have started to integrate telemedicine with their offline practices, adding to the credibility of the platform.



Paying for value

Another key emerging trend in the US is the deployment of new technologies to shift the healthcare system to pay-for-value, with a focus on outcomes, versus pay-for-volume, which incentivises escalating volumes and cost.

With the improvements in technology, it is now possible to gather data from multiple points so that outcomes and value can be measured more accurately. The integrated information helps healthcare providers better understand their patients, in order to deliver the right care, in the right place, at the right time.

Recruiting talent

Looking ahead, the healthcare sector can continue recruiting the talent needed to support the increased adoption of technology, despite the strong competition for talent across other industries. One key driver is the mission to directly save and improve lives at scale, which is a powerful pitch to attract the best talent.

The future of tech-enabled healthcare

Technology adoption in healthcare is expected to continue to grow. The industry is also moving beyond online consultations and delivery of drugs, to providing broader integrated care solutions that leverage technology for a better patient experience and outcome, alongside lower costs. Examples include following up on patients with chronic illnesses, and providing preventive care.

The biotechnology industry is also making leaps and bounds in innovation, especially over the past 10 years. Technology continues to be applied to new approaches to discover and develop medicines faster, and stimulate increased investment in new clinical development technologies. This includes gene and cell therapy applications to develop more precise therapies and vaccines – including many of the companies rushing to develop a vaccine for COVID-19.



The Future of Communications

Eric Yuan, Founder and CEO of Zoom, shared his views on how people and businesses will adapt their communications needs in a post-COVID world, and the challenges and opportunities that lie ahead as the digital communications landscape evolves.

The session was moderated by Ethel Chen, Senior Vice President, Technology Investment Group, GIC.

With the onset of COVID-19 and resultant lockdowns around the world, Zoom Video Communications (“Zoom”), a company founded in 2011 with the core value of “Delivering Happiness” to its customers, has within a short time become the go-to videoconferencing platform for millions of people who are staying and working from home.



Can you tell us the story behind Zoom?

Eric: I started Zoom in 2011. Prior to that, I was at Cisco for several years, and I came to Silicon Valley in 1997 and joined WebEx as one of the first several founding engineers. The reason why I left to start Zoom was that I wanted to build a new solution to deliver a better user experience and serve the evolving needs of customers.

Our service was initially built for enterprise customers, but during this pandemic crisis, the number of use cases increased dramatically – wedding ceremonies, online yoga classes, telemedicine. It is great that we can help people be connected.

I can also share an interesting story behind the name “Zoom”. A few weeks before our launch, we still did not have a very good name, so I called one of our advisors who gave me four names, and I picked Zoom. The reason I picked this was because out of the four names, only Zoom is a verb. At the time, we already had a vision that as more and more people use Zoom, ideally they should use the phrase “let’s Zoom”. That was our goal from day one when we launched our product.

As Zoom opened to non-business users, some users experienced meeting disruptions such as “Zoom bombs”. How did Zoom manage that challenge?

Eric: First, we took a step back to understand why those issues happened. Zoom had many security features which our enterprise customers could decide to enable and disable depending on their needs. They would also go through an official onboarding process before they started using Zoom. This was not the case for first-time users like schools. We responded by adding more features to cater to the wide range of users and use cases. Meeting rooms and passwords were enforced, and additional IT support provided for non-enterprise users. Other measures included recruiting a chief security information officer, doubling-down on security engineers, and launching a new debugging programme, to reinforce security for our users.



How do you stay ahead of your competitors?

Eric: Core to Zoom’s approach is the philosophy of “Delivering Happiness”. We constantly focus on customer experience and satisfaction, and building trust.

“ If the customer is not happy, you’ve got to change quickly. The customer may have liked our solution yesterday, but that does not mean they will like our solution today or tomorrow. You’ve got to always keep an eye on the customer experience or customer happiness, otherwise you will lag behind.

The way for us to look at the competitive landscape is that we really do not look at it from our competitors’ perspective. We really want to focus on product. As long as you are the first company to understand the customer’s pain point and go back to work as hard as you can to come up with the solution, ahead of your competitors, and you keep doing that every quarter every year – you will be alright.

We do not focus on replicating our competitors’ features as these may not be relevant, and diverts our attention away from focusing on the customer.

Can you share more about your global expansion plans?

Eric: International expansion is a priority for Zoom. To scale effectively, we apply a “hub” model, particularly to data centre infrastructure and team distribution. Having a data centre in



each country is neither viable nor scalable. Instead, we establish data centres in hubs that all users in the region can connect to. Similarly, a “cover” concept is preferred, where we concentrate large teams of support staff, engineers, customer success managers and sales representatives in hubs to cover the region and ensure effective support is available across different time zones.

We have 19 data centres worldwide to better serve our growing global customer base. We recently announced a site in Singapore, which we see as a hub connecting our growing user base in the Asia Pacific region.

As we enter new geographies, establishing a clear set of processes to follow, and understanding local regulations and data policies, are priorities. Each country is different and there is no shortcut.

In your view, what will be the new work model, post-COVID?

Eric: The pandemic has proved that there is no productivity loss from working from home. By using the right tools like video communications to connect and collaborate, people can still work together and get the job done.

The new work model beyond the pandemic will likely be a hybrid one – today, we all work from home, or tomorrow, we all work in the office. I think that model is sustainable. In contrast, if you give the employee the choice to work from

home or from the office, and you want to hold a meeting, you have no idea where each employee is. That model is not sustainable. Allowing a hybrid model also has the benefits of a reduced commute and need to travel for business. This will help save time and is good for climate change.

One challenge is how to balance engagement and ensure even participation in meetings, when most are in the office while some join from a remote location.

Can you tell us more about Zoom's company culture?

Eric: The philosophy of "Delivering Happiness" is core to Zoom both externally and internally. With over 3,400 staff, we seek an office culture where employees deliver happiness to one another, by establishing trust and helping one another. We encourage them to speak up and ask questions, to promote openness and transparency. Happy employees also make for happy customers who will continue using the platform.

“ We keep focusing on our core values, which is to care about the community, customer, company, team, as well as yourself.

Lastly, reinforcing a self-learning and self-motivation mentality is also very important, because no matter what you do, no matter how great your experiences are, you must always be prepared to start over and learn new things.

How do you see the video communications industry evolving?

Eric: The evolution of the industry will likely see phone and videoconferencing systems converging onto a single platform with the same front-end experience and same back-end architecture. This means a user could dial a phone number using the system, and with one click, both parties could upgrade to a video call. The convergence would simplify deployment and provide a unified, enhanced, yet cost-effective communications experience.

In the future and with much greater advances in technology, videoconferencing could potentially deliver a better experience than face-to-face meetings, where experiences can be shared, and language and physical location are no longer barriers.





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