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The Gray Rhino in the Room: The Fragility of Digital Technologies

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Protests around the world cast a glaring spotlight on the perils of discounting political risk. Populations stressed by social distancing, lockdown and financial uncertainties are responding with outrage to events that threaten the fabric of society. As these events unfold, it is important to remember that not one of them was unprecedented or unforeseeable. It is also important to examine the larger megatrends that have led to these vulnerabilities and how societies and the global economy can reduce fragility.

Source: Associated Press Photo, Alex Brandon

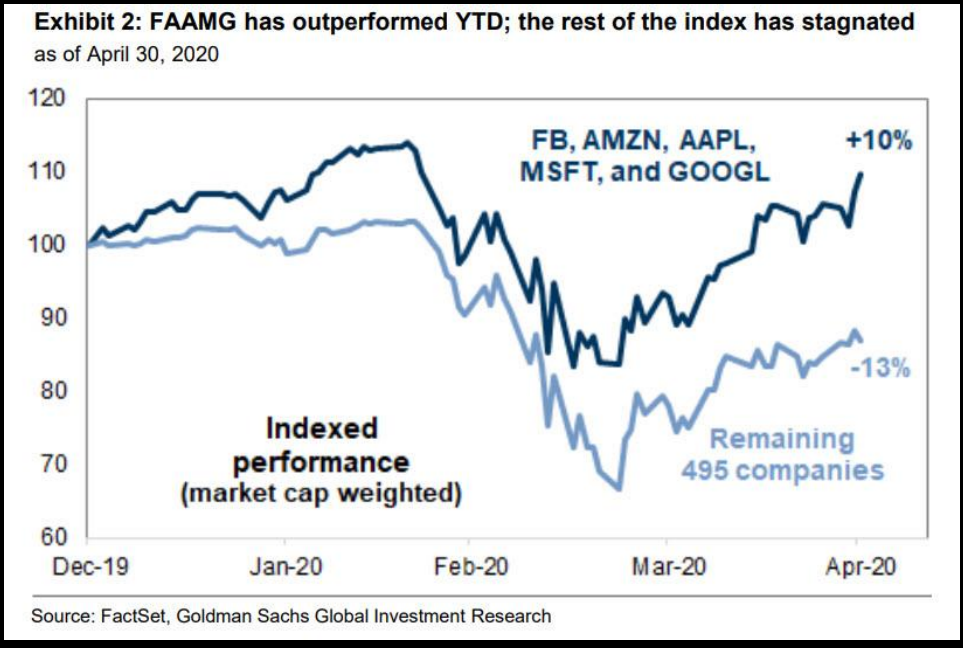
The consensus on recovery

The coronavirus pandemic has exposed deep fissures and weakness in global markets. In fact, it has shattered markets, supply chains and people's livelihoods. It's not fair to

place all the blame on the virus. This recession has been a long time coming, and is an inevitable consequence of years of debt-fuelled growth and increasingly brittle systems in the name of efficiency.

Fintech World's recent panel discussion on the market turmoil in Asia, while far from chipper, was ultimately optimistic about the market recovery later this year. It concluded that the downturn was a correction due to a number of bubbles deflating, while the abundance of emerging technologies, growing control over the coronavirus and strong government intervention would lead us out with a stronger, more pragmatic outlook. These comments seem to reflect a widespread consensus. Whether it's Warren Buffett's comments that "we owe them [the Fed] a huge thank you," a survey of commentators on Forbes that predicts recovery starting in the 2nd quarter, or the World Economic Forum offering tips on how digital investment can help recovery, the overall sentiment has been to trust in the power of governments and technology to pull us out of a recession. And the market has responded, with S&P up 30% since cratering in March.

At the same time, these developments highlight how much we rely on digital technologies. Beyond superficial uses like food delivery apps and Snapchat filters, digital technologies and the entities that provide them have become key pillars of the global economy. It has reached the point where the five FAAMG stocks (Facebook, Apple, Amazon, Microsoft, Google) are up 10% on the year to date, while the other 495 companies in the S&P 500 put together are down 13%.



Source: Zerohedge, The FAAMGs Are Up 10% In 2020; The Remaining 495 S&P Stocks Are Down 13%

But in the midst of even cautious optimism, we might need to pump the brakes and consider whether we've forgotten something. Is it possible that everyone has failed to account for a massive source of risk that has a non-trivial chance of exploding and wrecking our plans? It's another gray rhino: a "highly probable, high impact yet neglected threat," just like the January fires in Australia – related to massive changes in climate – and the coronavirus pandemic. Yet, no one seems to be talking about it.

The gray rhino in the room

Populations in wide swathes of the world, including the US, Western Europe, many parts of Southeast Asia and China have not experienced widespread warfare since 1945. The tense powder keg of the Cold War and widespread US-enforced security after the dissolution of the Soviet Union, and the resulting decades-long economic prosperity, have resulted in generations of people growing up with no direct experience of war or famine. The Internet and digital technologies have grown up in this environment, and our forecasts that rely on digital technologies as a driver for growth assume this environment will continue.

But the reality could be far from the case. Tensions between the US and China have ratcheted up dramatically, raising the spectre of a new great power competition. The World Food Program predicts a famine of "biblical proportions" as disruptions rip through the agricultural supply chain. Climate change continues to be an existential threat: the National Oceanic and Atmospheric Administration of the US predicts there is a 75% chance 2020 could be the hottest summer on record. There are many ways in which political instability can wreak havoc on the digital technologies of the future, and the ones we rely on today.

Infrastructure instability

In the middle of winter 2015, 30 substations in Ukraine's power grid were shut off, and about 230,000 people were left without electricity, in what was without question, a sophisticated cyberattack. While power was restored in 1 to 6 hours, the incident highlighted how an attacker could critically degrade living and economic conditions without firing a single shot. Adding to this risk, extreme weather from climate change could cause increased power outages. In a world that relies on global, coordinated growth to fill the hole left by the coronavirus, unstable infrastructure could exclude millions from the use of digital technologies.

Food instability

Based on research from Yaneer Bar-Yam of the New England Complex Systems Institute in Cambridge, Massachusetts, food prices are among the best predictors for social unrest. While the FAO Food Price Index is reported as dropping, local food inequality may spike, as major food exporters such as Russia and Vietnam implement food export restrictions. With food supply disrupted, focus could shift from driving growth through digital technologies to fulfilling needs that form the base of Maslow's pyramid of human needs – basic physiological needs like food and shelter.

Fragmented internet

Almost all digital technologies rely on the Internet in some way or form. But the Internet itself could be facing widespread fracturing. The US has repeatedly denied the approval for a Chinese-backed undersea data link, and has exerted significant pressure on the UK over its use of Chinese firm Huawei in their 5G infrastructure. China itself has proposed a new protocol known as "New IP" with stronger state control over content, which could fracture standards if adopted. Meanwhile countries such as Iran, Bangladesh, Ethiopia, India, and Myanmar have imposed Internet shutdowns for various reasons in recent years. A breakdown in Internet connectivity could render many digital technologies inert.

Reduced funding

Global stimulus spending has topped US$ 15 trillion, or about 17% of the global economy. Much of this will manifest as government deficits, which could impact the funding of programs for digital technology research. Even as governments and NGOs increase funding to fight the coronavirus, the broken window fallacy tells us this is all sucking away capital that could be used for other purposes. Finally, while businesses

invest in greater protective and sanitation measures for their employees and customers, budgets for updating and maintaining IT infrastructure will be negatively impacted. This will all reduce the impact of digital technologies.

Exposed supply chains

While global supply chains are and continue to be the first casualty of the lockdowns around the world as global trade has come to a screeching halt, political tensions that threaten manufacturing and supply of critical hardware infrastructure parts continue to be overlooked. For example, TSMC accounts for over 50% of global semiconductor manufacturing. Its location in Taiwan, an area that has seen repeated confrontations between Chinese and US naval forces, could be at high risk of disruption if tensions increase. Southeast Asia accounts for 7% of global exports, including components for hard drives and mobile phones, but increasing tensions in the South China Sea could disrupt even these economies.

Advanced persistent threats

Currently, data breaches cause a US$ 3 trillion loss to the global economy annually; this number is expected to go up to US$ 5 trillion by 2024 according to Jupiter Research, and it may be increasingly linked with geopolitical concerns. Recently, CNN reported that state actors were behind a recent wave of attacks to access coronavirus research. Video conferencing platform Zoom apologized for routing customer data through Chinese servers, prompting organizations including Google, NASA and the island of Taiwan to ban their employees from using the platform. To regain user trust, Zoom had to acquire Keybase and allow users an option to opt-out of using China-based servers.

Architecting for resilience and antifragility

Fortunately, many of these remain risks instead of realities. This gives us time to react and prepare. Not only can we better weather the storm, a change in environment could present new opportunities – and agile organizations can position themselves to take advantage of them.

Resilience is a system property that enables the system to bounce back and restore its structure in the face of stress and change, while antifragility refers to systems that – as a whole – grow stronger with stressors over time. The former will decrease the impact we face from the unexpected, while the latter can increase our capacity to adapt and

become market leaders in a new normal. Let's give some thought to some key guiding principles for becoming resilient and antifragile.

Simplification

The iPhone requires components from more than 200 companies around the world before being assembled by Foxconn in China. In the case of supply chain disruption, complex products like these are greatly impacted. We can identify areas where we need to simplify by reviewing the mission-critical processes in our organizations and tracing them back to each dependency. Simplicity also comes with a cost: in some cases, we might need to make difficult decisions that involve abandoning a more "advanced," but complex, solution in favor of more time-tested and robust methods. What we gain in return is greater certainty, which leaves us less exposed to sudden change, and reduced inertia, which gives us the freedom to rapidly change course as the sands shift below our feet.

Decentralization

If we start to assume restricted access to key resources is an increasing threat, technologies should be designed to operate with intermittent service as part of the working environment. This applies to not just commodities like electricity and Internet access, but also things like physical movement. The work from home movement has highlighted the advantages a distributed and digitally connected workforce has in the age of the coronavirus. We need to consider the need to decentralize across our entire stack, including factors like where our servers lie, who our suppliers are, and what core technologies we rely on. This extends to culture and governance as well: decision-making needs to be decentralized, so the organization can continue running even if key members are unavailable.

Agility

Ultimately, the only foolproof way to deal with change is to change ourselves. In an uncertain environment, we no longer have the luxury of executing years-long plans based on months of planning. Rather than trying to control everything and eliminate randomness, we should improve our ability to respond to the unknown. We need to first transform our organizations where we can be objective about the prospects of success for any given initiative, especially in highly adverse conditions, and construct a tighter feedback loop for making decisions around what works. Transitioning to higher usage of

DevOps and microservices-based architectures can help us keep up from an IT perspective.

Running with the rhinos

One thing is beyond dispute: we are entering into a brave new world, where we may need to re-examine what works and what doesn't. But times of great change are also times of great opportunity, and we're lucky enough to have some time to prepare and place our bets. While we don't know exactly what will happen, we can get ready for the known unknowns and leave space for the unknown unknowns. When the dust settles and we've gotten through this, those who were able to get their bearings and run with the rhinos will come through stronger than ever and ready to pick up the pieces.

> "Rushing into action, you fail. Trying to grasp things, you lose them. Forcing a project to completion, you ruin what was almost ripe." - Lao-Tzu, Tao Te Ching

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