Annual FTI Letter: 2019 Review + 2020 Preview

In 2009, I began creating an end-of-year inventory of signals, outliers and trends. It was my way of methodically reflecting and getting myself organized for the coming year. It is a practice I've refined and honed. Far from being a nostalgic look back at what was or might have been, or a list of predictions that might not be any more accurate than the local weather forecast, my annual inventory is something entirely different: a way to think about the evolution of technology, science and humanity as part of a long continuum.

But this isn't just the end of a year, it is the beginning of a new decade. I am reminded of a few famous science fiction stories set in the 2020s. **Soylent Green**, a 1973 dystopian thriller film based on a book by Harry Harrison, was set in the year 2022, a time when global warming and pollution results in food and water shortages. Unchecked capitalism leads to an unprecedented, massive wealth divide, where affordable housing is scarce and human "furniture" fulfills all of the needs of the uber-rich. Another seminal work, Alan Moore and David Lloyd's **V for Vendetta**, was adapted by the Wachowskis. In the wake of an unstoppable super-virus, regulation and nationalism lead to the catastrophic rise of a police state in the year 2020. Masked freedom fighters are pitted against the government – difficult decisions have to be made.

It's hard not to think about the coming decade within the context of these two stories. We will need to tackle difficult challenges that span the evolution of capitalism, technology, climate change, workplace automation, regulation and human migration. There are inflection points lurking around corners. So as I look ahead not just to the next year, but indeed a new decade, I'm thinking very broadly about the intersection of tech, science, business and government and what the downstream implications look like for all of us caught in the middle who must make informed decisions. There is plenty of opportunity ahead if you know where to look.

I do know this: we must confront deep uncertainty with deep questions. Because failing to plan is planning to fail.

What follows is the big end-of-year inventory I made for myself. I'm sharing it with you, as I do every year, to help catalyze your own thinking for 2020. I'll warn you in advance: *this is a very long email*. Keep it in your inbox or **download and save the PDF version**.

I wish you all the best for a good and happy new year.

– Amy Webb

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First, a look back.

The U.S. Women's Soccer Team wins both the World Cup and our hearts... we see first glimpses of a black hole's event horizon... vaping is proven dangerous... impeachment... wildfires... Ok Boomer / poor Karen...   CRISPR in clinical trials... Brexit is happening/ isn't happening/ is happening... measles on the rise in the U.S.... WeWork's apparently not working after all... so many bugs! (FaceTime, Firefox), so many data breaches! (Capital One, TorGuard)... wild claims about quantum supremacy... racing to the moon (again)... deadly heat waves across the Northern Hemisphere...   the rise of teen activists... Libra makes announcement(s)... the Galaxy Fold fiasco... Amazon's sad HQ2 pageant... record FTC fines...

WhatsApp spyware hacks... Hurricane Dorian decimates the Carribean... Boeing breakdown...

Many decisions were made in 2019 –– some which were entirely or partially within our control and others that were made on our behalf, or in secret, or areas of the world unknown to us. We cannot know the outcomes immediately, but we do know that every decision made influences the future. It's important to track these decisions and ask: what impact could this decision have on delivering our preferred futures? Which stakeholders will benefit/ lose? What are the risks and opportunities that could unfold? Here are some to consider, in no particular order:

Breakthroughs
- Plant-based meat products sold at scale
- The Dactyl robot (looks like a human hand) taught itself to flip a toy cubes in its fingers
- ECG-enabled smart watches gained regulatory approval
- Scientists imaged a supermassive black hole for the first time
- China's Chang'e-4 mission put a rover on the far side of the moon
- NASA launched the first solar-powered spacecraft
- Japan landed a spacecraft on the surface of an astroid
- SpaceX launched the first commercial spaceship into orbit
- Anthropologists discovered teeth and bones from a new species of human ancestor
- Researchers captured quantum entanglement on camera for the first time ever. (In quantum mechanics, two particles can be paired and separated, yet remain intimately and instantly connected across vast distances. One particle will affect the other no matter how far apart they are. And yet remarkably –– a photo!)
- New treatments, REGN-EB3 and mAb-114, saved about 90% of newly-infected Ebola patients in the Congo –– which means it is no longer an incurable virus
- DeepMind's StarCraft2 AI proved better than 99.8% of all human players
- Lots of AI-healthcare breakthroughs, including rapid disease discovery
- CRISPR trials editing human DNA are under way. In November, researchers from the University of Pennsylvania delivered early results from the first-ever clinical trial to genetically edit the immune cells of cancer patients, which suggest that CRISPR could be feasible and safe in humans.

AI and Automation

- Connected devices made autonomous decisions, and not always intelligent ones. In 2019, the June Smart Oven turned itself on in the middle of the night and preheated to 400 degrees or higher.
- China strengthened its AI position, flooding capital into Chinese companies.
- The time needed to train a machine vision algorithm on ImageNet fell from three hours in October 2017 to just 88 seconds in July 2019.
- $7.7 billion –– close to 10% of global private investment –– went into autonomous vehicles, followed by medical research and facial recognition (around $4.7 billion).
- Alibaba's founder and CEO, Jack Ma, "retired" from his post. There was also a reshuffle at Baidu, when co-founder and CEO Robin Li announced he was also stepping down. In FTI's CIPHER model, this represents a contradiction, and I've been wondering if a decision was made by Beijing to replace two of the BAT's leaders to further the CCP's grand plans for AI.

Amazon

As one of the most dynamic (if controversial) companies in the world, Amazon gets its own category. There's so much to think about: Ring cameras and productizing visual data to sell to law enforcement, AWS growing at a rapid clip, record sales for Amazon.com during the holidays, warehouse woes, Amazon's fights with FedEx over shipping and logistics, Amazon's fight with Microsoft to win (back) the JEDI contract, the HQ2 debacle (and expansion into NYC), human reviewers listening to private Alexa recordings in order to tweak and improve the algorithms, moving its Prime delivery system from two days to an inconceivable 24 hours, Alexa-powered devices that include microwaves and cameras, *personal* Alexa devices including Echo Buds earbuds, Echo Frames smart glasses and the Echo Loop ring, the rise of employee activism within the company, calls by Sen. Elizabeth Warren (and others) to break apart Amazon *a la* AT&T in 1984... and we haven't even talked about Blue Origin, which should probably have its own category.

China
- Hong Kong pro-democracy protesters held their ground for months (with no end in sight).
- The plight of China's Uighur population ~finally~ attracted global attention.
- At the G20, China attacked the US as the world's biggest source of instability.
- The CCP further deployed the Belt and Road Initiative worldwide, making inroads into Europe.
- Mandatory facial recognition: all Chinese mobile phone and internet users must submit their biodata to a national registry.
- Proliferation of the Social Credit Score system into even more cities and towns.
- The launch and proliferation of the Corporate Social Credit Score program, which scores companies doing business in China.
- Chinese scientists made decisions to use somatic cell nuclear transfer, genomic editing, and other techniques to modify animal, plant and human life.
- Huawei made big inroads throughout Europe in the past year, even as America rejects its technology.
- Chinese police departments cloned and successfully deployed police dogs. (This is real.)
- 5G launched for commercial use.
- China made sweeping decisions about climate science. It made big diplomatic efforts throughout Africa, Southeast Asia and Latin America where America has little presence. And it staged a big military parade for all the world to see.

M&A in 2019
- Google acquired Fitbit for $2.1 billion, which is a great price considering all the data they got in the deal.
- Google Cloud acquired analytics software company Looker for $2.6 billion.
- A week after the Looker deal was announced, Salesforce acquired Tableau for a whopping (insanely whopping!) $15.7 billion.
- HPE acquired supercomputer manufacturer company Cray for $1.3 billion.
- Facebook acquired brain machine interface startup CTRL-labs for somewhere between $500 million and $1 billion.
- Uber acquired Middle East ride-hailing rival Careem for $3.1 billion.

- PayPal acquired the Honey Science Corporation –– best known as the maker of the popular deal-finding browser add-on Honey –– for $4 billion, making it the company's largest acquisition.
- HR and finance SaaS vendor Workday acquired Scout RFP for $540 million in cash.
- Spotify acquired Gimlet Media and Anchor to boost its podcast presence.
- Twilio acquired SendGrid for close to $3 billion.
- Microsoft-owned GitHub acquired Semmle, an analytics tool for software development process management.
- It also acquired cloud migration specialist Movere.
- VMware acquired platform-as-a-service vendor Pivotal ad anti-malware company Carbon Black for a combined $4.8 billion.
- McDonalds acquired Dynamic Yield and Apprente in an attempt to transition its drive-through operations from human to machine-operated. (Another CIPHER contradiction: POTUS seems to love McD's hamburgers but doesn't seem to mind the company automating a huge part of its workforce.)
- Mastercard acquired Nets, a Danish payments platform, for around $3.1 billion.
- Apple acquired Intel's modem business for $1 billion.

Corporate Decisions
- Corporate sustainability emerged as a trend. Protecting the long-term bottom line is compatible with long-term environmental sustainability.
- Executives decided to invest in artificial intelligence at significant rates.
- Amazon, Google, Apple, Microsoft, Oracle, Salesforce and IBM all made decisions about how to provide products and services to the US government and military.
- Some of the biggest tech companies fortified their corporate foreign policy groups to build relationships with counterparts in foreign governments. (Microsoft is furthest ahead.)
- Wireless carriers around the world began deploying 5G next-gen technology –– while lawmakers waited to weigh in on ecosystem standards.
- Companies everywhere made decisions about what to include in their employee behavior policies. Or they made decisions not to develop or even revise them. Some companies chose to deal with sexual misconduct scandals by doling out lucrative severance packages rather than disciplinary actions.

- Companies large and small made investments in startups and incubators.
- R&D departments made staggering developments, product teams came up with exciting new ideas and projects, and innovation continued to bubble up across different industry sectors.

Court Decisions, Policy and Regulation
- SCOTUS decided that iPhone users can sue Apple over excessive prices at its exclusive App Store.
- Members of congress, the FTC and FCC all worked on various plans to regulate big tech.
- Cities around the world decided to allow transportation-as-a-service companies to set up shop including electric scooters and bikes, along with ride sharing apps.
- Lawmakers in the U.S. decided not to develop a national strategy (or even point of view) on biology and automation.
- An Executive Order on AI signed by President Trump gained traction in the past year, but ultimately the findings aren't binding.
- CRISPR-edited babies arrived, and regulators around the world are still racing to catch up.
- For another year, U.S. lawmakers chose not to act after gunmen murdered American citizens in El Paso, Virginia Beach, Dayton, Odessa, San Diego, Jersey City, Aurora (Illinois) and many other communities.
- Bank regulations were loosened.
- The California Consumer Privacy Act (CCPA) passed and takes effect in January 2020. (It's similar to the GDPR in Europe.)
- Impeachment dominated our news cycles for months but ultimately might not lead to a change in leadership. It has certainly divided Americans further.
- We endured trade wars, tariffs, and a general lack of a long-term vision for global trade.

Privacy
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- Remember when Facebook announced its "pivot to privacy?"
- Related: in the past year, WhatsApp rebranded itself "WhatsApp by Facebook" and found itself in serious trouble because of a spyware

vulnerability, which allowed attackers to remotely send malicious data packets to victims' Android and iOS devices.

- Facebook was fined a record $5 billion by the FTC for the Cambridge Analytica scandal. According to some inside FB and the FTC, the fine was a slap on the wrist and didn't change operations or standard practices.
- Obviously related: Fake news spread prolifically on Facebook and Twitter through sponsored posts, advertisements, bots, adversarial accounts and –– unfortunately –– unwitting users.
- Twitter and Facebook both made decisions about their proprietary algorithms and what constitutes hate speech and intimidation, effectively preserving the status quo for another year.
- iPhones could receive a random FaceTime call and before you even picked up, someone else could listen in on the audio of whatever was happening in the room.
- Consumers made a decision to buy peripherals rather than investing in newer phones that haven't added features or functionality. The sale of smartphones plateaued worldwide. Apple stopped releasing sales figures for its phones while Samsung's much-anticipated Galaxy Fold was a flop.
- While we certainly complain about our privacy, we haven't changed our behaviors. Clearly the benefits of using our devices far outweighed the drawbacks of third parties scraping and using our data.

Climate and Earth Science
- U.N. climate talks ended without firm multilateral commitments.
- The Kincade fire burned more than 10,000 acres in California.
- Disturbing photos and video show that the roaring Victoria Falls have slowed to a mere trickle of water.
- Greenland's ice losses have septupled. The worst-case scenario for sea level rise appears to be likely.
- Teen activism catalyzed a global conversation about...teen activism.

Geopolitical and Geoeconomic Decisions
- The Trump Administration launched a sixth branch of the U.S. armed forces –– the United States Space Force. Which is less about fighting aliens and more

about protecting satellites and commercial space operations and developing off-planet military capabilities.

- However... space agencies worldwide made decisions to allow dozens of companies to launch tens of thousands of cubesats and other micro satellites into orbit without a long-term plan.
- NASA began work on an air traffic control system for drones and spacecraft that will roll out over the next few years. Not clear on whether NASA is coordinating with the new USSF.
- Countries around the world, including the U.S., France, U.K., Germany and many others, made decisions about how to address climate change. The decision was not to coordinate on long-range plans.
- The Trump Administration's involvement in the Ukraine scandal compromised geopolitical relations between the U.S. and other nations.
- Populist policies in Brazil and Mexico eroded investor confidence.
- Tensions were high between Russia and the West, especially as Russia used digital tools to spread misinformation during election cycles.
- The U.S. withdrawal fro the Iranian nuclear deal in 2018 led to increased tensions and new risks in the past year. Iran is now retaliating for lost oil exports and is attempting to strike a divide between the U.S. and our allies in the Middle East.
- Israel dealt with scandal after scandal and an unprecedented election with no clear victor.
- The Trump Administration made decisions to separate families seeing asylum and to deploy forces to the southern U.S. border.
- The U.K. held Parliamentary elections that resulted in a decisive victory for PM Boris Johnson and his pro-Brexit contingent.
- North Korea signaled several times that it is gearing up for military demonstrations and policy moves. White horses, declarations made on mountain tops, the whole shebang.

Other Decisions

- Local city governments made decisions about whether or not to invest in cyber security. (Most did not make the requisite investments.)
- Universities made decisions about their curricula, which impacts the future of our workforce.

- Boards of directors made decisions about board composition, which impacts who's making critical decisions in the coming years.

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Now, a look forward...

I'm tracking a significant number of signals for 2020 and for the decade ahead. Here are some of the highlights from what's on my radar:

2020 is the year of smart glasses
Yes, you read that correctly. The augmented vision ecosystem will see increased activity in the coming year, beginning with audio augmented reality (or AAR). Bose has developed a pair of open-ear audio sunglasses that allow you to listen to music, conference calls or podcasts while you stay aware of your surroundings. Think of it as augmented reality for audio. Amazon's Echo Frames give users all-day access to Alexa, and they can be fitted with prescription lenses.

While you shouldn't expect to see everyone wearing smart glasses by this time next year, you will certainly start to notice some important developments throughout 2020. Google, Amazon, Apple, Microsoft and Facebook are all working on some part of the connected glasses and augmented vision ecosystem. Niantic Labs, which developed the popular AR phone game Pokemon Go, is working on a pair of affordable smart glasses that overlay digital information into the visual field.

I know that Google Glass was a commercial failure. Before you write smart glasses off as a failed technology in search of an audience, consider this: according to the American Optometric Association, more than 40% of adults are now myopic (nearsighted). My other half is an eye doctor, who has plenty of anecdotal evidence from the 5,000 patients he sees every year. He also has a compelling explanation for why we can't see clearly. Our human anatomy isn't evolving at the same pace as technology. Human eyes are built for survival, which means focusing at farther distances for predators rather than at tiny glowing screens. Half of us are going to need glasses that correct our vision. The old guard in the prescription glasses space — Zeiss and Essilor (lens manufactures), Luxottica and Safilo (frames), and even the new

upstarts like Warby Parker — will either need to find new partners in tech or will instead find their organizations disrupted.

AI, cloud wars, and policy setting at the Big Nine tech companies

Google, Amazon, Facebook and Apple will intensify M&A activity even though they're facing regulatory and antitrust scrutiny. Employee organizing will continue to pressure the management of Amazon and Google. With Sundar Pichai at the helm, Alphabet's management structure will likely change, which also means some of the company's operating procedures will be shaken up. Cloud businesses will continue to drive key decisions, especially as AI-as-a-Service applications become more common. I'm looking to see more automation offerings from Google, Microsoft and AWS. Amazon's AWS For Everyone –– a low-code/no-code platform built to enable anyone to create business applications using their company data –– will be a huge differentiator when it launches.

Streaming mega-platforms emerge

It's not the individual streaming apps that interest me –– it's the emergence of mega-platforms. Apple, Amazon and Google have a God's-eye view of what we're watching and our behavior while we're consuming video. I'm curious to see how the ownership of our data influences product offerings, services, M&A, show development, and real-world experiences in the coming year. My FTI colleagues and I built some models testing the ceiling for all digital subscriptions (including video, games, exercise apps) –– and in the U.S., consumers tap out at around $38 per month. I'm interested to see who survives, since the current model appears to be flooding the platforms with lackluster content and personalization algos that don't really work.

Regulation is coming

Expect heated debate, lots of lobbying dollars spent and a ton of new proposals on how to regulate and/or break up Big Tech. But don't expect real action in 2020. It's an election year, so getting comprehensive regs passed is going to be difficult. That said, even if proposals for regulation stall or ultimately fail to pass, going through the process will prove a serious distraction and cause pain for big tech companies.

Elections are coming

We have a very tough fight ahead: fake news and misinformation campaigns are gearing up already to influence our next election. Our incoming elected officials will inherit a difficult economy, damaged relationships with our allies, a confusing regulatory environment, a sharply divided electorate and a growing wealth divide.

China will gain power and strength

China will continue to assert prolific dominance in 2020 across multiple areas: diplomacy throughout Southeast Asia, Africa, Latin and South America and Europe; the development of critical digital infrastructure; artificial intelligence; data collection and scoring; bioengineering and space.

The Olympics should be a boon for Japan

The 2020 summer Olympics should be a huge boost for Japan's economy, and it is a great opportunity for Japan to showcase its hospitality and tourism, robotics, consumer technology and transportation sectors.

You'll play with new interfaces

Smartphone sales will continue to decline while smart peripherals will see a bump. I expect to see many new kinds of wearables: connected performance clothing, headbands, shoes and of course, glasses. Which means that interfaces won't just be screens that we look at. In the coming year, we'll look through them, too. Get ready for augmented sensory experiences: biophysical, gesture, tactile and kinetic.

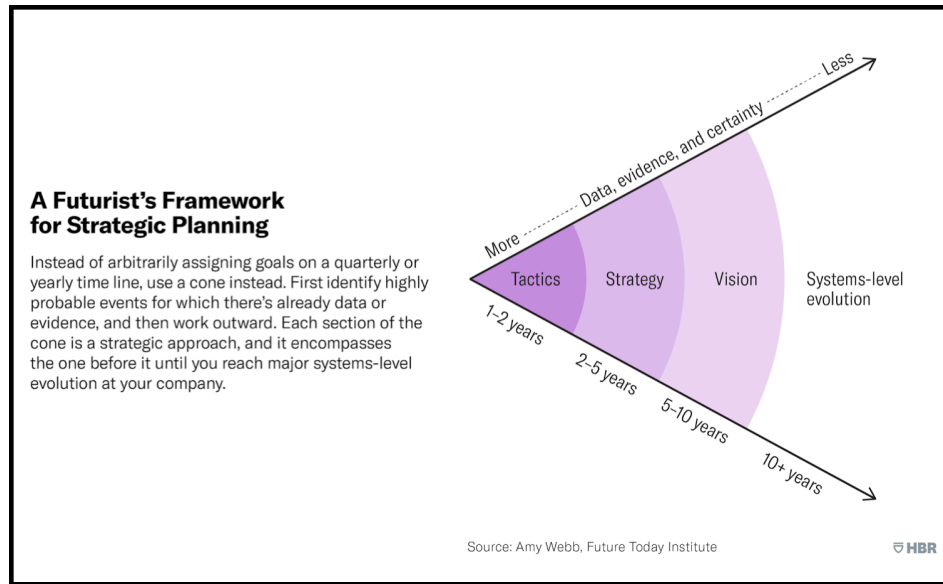**Finally, a few key anniversaries and events to note:**

- California's Consumer Privacy Act goes into effect in January and could set the stage for similar regulation in other states
- Super Tuesday happens on March 3rd and will help determine the two presidential nominees for the November election
- America hosts the G7 summit –– though not at a Trump resort as originally planned
- The 75th anniversary of the signing of the United Nations charter
- 2020 Summer Olympics in Tokyo
- Launch window for Mars missions opens in July and closes in September

- Expo 2020 opens in Dubai in October
- The 75th anniversary of the end of WWII
- The 25th anniversary of the creation of the World Trade Organization
- The 25th anniversary of the Beijing Declaration, when 189 countries unanimously adopted a progressive blueprint for advancing women's rights
- The 50th anniversary of Black September when members of the Popular Front for the Liberation of Palestine hijacked three commercial jets bound for NYC
- The 50th anniversary of Japan launching a satellite into orbit, making it the fourth country after the Soviet Union, US and France to enter space
- The centennial of the ratification of the Nineteenth Amendment, giving American women the right to vote
- The 400th anniversary of the Mayflower's voyage to America
- UN's COP 26 climate change conference happens in Glasgow
- New Zealand decides whether to legalize cannabis
- The US decides whether to raise the legal age from 18 to 21 to purchase tobacco products
- Beethoven's 250th anniversary
- December 21 will be 50 years since President Nixon and Elvis Presley shook hands for a photographer. To date, it is the most-requested item from the National Archives –– more than the Bill of Rights or Constitution. I don't know how I feel about that.

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Planning Ahead for 2020

2020 Tech Trends

Our 13th annual Emerging Tech Trends Report **launches at SXSW in March 2020**, and we have some new features in store for you. We're tracking 350 trends across 30 different industry sectors. And we're aiming to make the report interactive and to give you the ability to search online by topic, industry area and company. We also have an Uncertainty Index in the works! As a newsletter subscriber, you'll receive a link to download a free copy of the report during launch weekend.

A Futurist's Framework for Strategic Planning

Instead of arbitrarily assigning goals on a quarterly or yearly time line, use a cone instead. First identify highly probable events for which there's already data or evidence, and then work outward. Each section of the cone is a strategic approach, and it encompasses the one before it until you reach major systems-level evolution at your company.

More — Data, evidence, and certainty — Less

Tactics · Strategy · Vision · Systems-level evolution

1–2 years · 2–5 years · 5–10 years · 10+ years

Source: Amy Webb, Future Today Institute

HBR

Frameworks For Uncertain Futures

Leaders often make common errors as they make strategic decisions about the future: they under-predict or over-predict change. The reason? Most of us find uncertainty uncomfortable, so we are reluctant to confront it. We can't solve for future uncertainty, but we can prepare ourselves to think critically about signals and decisions –– to understand all the dependencies we should consider that might impact the future.

I use two tools along with my end of year inventory to think about plausible implications and future scenarios. The first is called the **Axes of Uncertainty**, which you can learn more about and **download here**.

The second framework is what I call a **Time Cone**, and I recently wrote about how to make one in the Harvard Business Review. You can **download the article here**.

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FTI: 2019 Review + 2020 Preview

2019 was an extraordinary year! We welcomed futurist Marc Palatucci and journalist Jennifer Alsever to our team, we opened a new office in Manhattan and we expanded our Affiliates to include experts in fintech, blockchain, quantum computing, biotech and media. We worked with clients in 42 cities and 5 countries. We published 6 new open source tools and frameworks. And we published our largest Emerging Tech Trends Report to date: with 315 tech trends across 26 industries, it weighed 5.5 pounds in print!

Coming in 2020...

New events! Beginning in February, we are launching a series of conversations and salons. We'll send announcements and invitations in the New Year. Our first FTI Conversation will feature the **Rev. Taka Kawakami** in conversation about corporate anxiety, uncertainty, risk, long-term planning, futures and Zen Buddhism.

An expanded Future Today Institute team: We will be making an announcement early in 2020 about all of our new team members.

World Economic Forum: We'll be in Davos all week. If you're going to be there, **please let us know** if you and your team would like to meet up.

13th Annual Emerging Tech Trends Report Launch: The report launches officially at the SXSW Festival in Austin, Texas in March 2020.

PPTK is baaaack! For those in the know, PowerPoint Karaoke is back! Coming to DC and NYC this spring!

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Many, many thanks...

At the end of every year, I also like to take a personal inventory of the people and organizations who support and elevate our work at FTI. First and foremost, I am grateful to **Stern Strategy Group**, and especially Danny Stern and Mel Blake, who are wonderful business partners and have been the primary drivers of FTI's growth these past few years. I've observed that the best partners tend to be great teachers, and working with Mel and Danny is like being in an ongoing, hyper-personalized master class. They've helped me learn how to position my work to make an impact, how to best serve our clients, and how to achieve a better work/life balance.

The faculty and staff at NYU Stern are wonderfully supportive, and my graduate students are an absolute delight. I was honored to have taught 80 brilliant people in 2019 who will go on to build the future of numerous organizations all around the world.

Every three years, I publish a new book and I'm humbled and grateful to get to work with people like **Mark Fortier** and Lisa Barnes at Fortier PR. Mark and his colleagues were instrumental in helping launch The Big Nine earlier in the year, and Mark especially prepped me to communicate the main arguments of my book. It is because of another great teacher-partner, my editor John Mahaney, and my team at **PublicAffairs** that I get to research and write books about the future. Of course, there would be no books at all with Carol Franco. At the start of every project, Carol and her husband Kent Lineback welcome me into their home for a week to workshop my ideas, hone an architecture, and develop a clear promise. Getting to study and learn with them is part of the reason I write.

To all of them, and to you our readers, I'd like to offer my deepest appreciation, gratitude and well wishes for the year ahead.