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This document offers current research on "Predictions 2021 and BEYOND", focusing on providing a concise reference about tech industry predictions. Enhanced sections are included, followed by a list of sources. This service would be useful to anyone who needs to know about Information Technology (IT) and Economic World Predictions quickly. ProResearch provides Library research assistance in finding the best resources to inform your business objectives.
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Predictions 2021 and BEYOND

Executive Summary   January 07, 2021

"2020 has been a year like no other. We saw the world come to a near standstill, confronted by compounding challenges: a public health and economic crisis, persistent issues of racial injustice and inequity, and the effects of climate change. Amid this disruption, I'm proud of how our ecosystem of customers and partners stepped up to help people and organizations use technology to be resilient and transform." - Satya Nadella. Through digital platforms and quick response times, tech companies have been able to emerge from the pandemic with new work models and an increase in demand to support customers' business continuity.

However, the state of vaccination is perhaps the most important prediction. According to World Health Organization (WHO)[1], a multilateral effort to develop and distribute vaccines has secured almost 2 billion doses, potentially allowing some vulnerable groups in participating countries to get vaccinated in the first half of next year. Johns Hopkins researchers found that by mid-November, wealthy nations have reserved 51% of various vaccine doses, even though they are home to only 14% of the world's population. According to WHO, at least 1.3 billion donor-funded doses will be made available to 92 relatively poor countries by the end of 2021. With two vaccines approved, Covishield and Covaxin, India is set to begin its mass vaccination program in January 2021 through 30 vaccination hubs.

On global Gross Domestic Product (GDP), after a 4.2% decline in 2020, GDP is projected to increase by ~4.6% in 2021. The average emerging market (excluding China) GDP is expected to expand by 5.9% in 2021, after a 6.1% contraction.

In the US, the dollar is expected to weaken in 2021, while consumer spending has nearly returned to pre-COVID-19 levels and average personal incomes of the US households surpassed pre-pandemic levels in September. A sustainable US recovery is projected with a GDP growth of 5.9% in 2021.

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[1] Learn more about the vaccine at WHO

Further, in 2021, environmental concerns will come back into focus. Environmental, Social, and [corporate] Governance (ESG) will: "exacerbate the financing difficulties of energy and commodity producers, as new investments are scrutinized for their ESG contributions." The tech industry can also expect:

- Tech spending to rebound to 4% growth or higher.
- Tech Initial Public Offerings (IPOs) in 2021 to number more than those in 2020.
- AI expertise to play a critical role in talent sourcing.

Other continuing trends include digital fatigue, security, deepfakes, and transition to the cloud:

- Remote work has led to Zoom Fatigue and cybersecurity challenges for organizations. The world is expected to have 3.5 million unfilled cybersecurity jobs by the end of 2021.
- Deepfake technology is rapidly improving and proliferating, with deepfake content going mainstream in the US and a meaningful portion of the population initially believing it to be real.
- In 2021, security technologies such as Confidential Computing, quantum-safe, and Fully Homomorphic Encryption will make even the most regulated industries move to the hybrid cloud.

2021 will continue to witness global government scrutiny[2] on tech company practices, including privacy, anti-trust, platform control, and security. The tension[3] between Facebook and Apple is expected to grow across platform costs and rules, social media user-privacy/tracking, and eventually, the Augmented Reality/Virtual Reality market.

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[2] Access The Financial Times at aka.ms/newshub

[3] Access The Information at aka.ms/newshub

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Macro-Economic Predictions

The macroeconomic and commodities related predictions are sourced from IHS Markit, Saxo Bank, Bank of America Merrill Lynch, JP Morgan, S&P Global, and Capital.com.

IHS Markit Macro-Economic Predictions

- While the COVID-19 virus will stay, effective treatments and vaccines will be widely available to large populations by mid-2021, facilitating a transition to the post-pandemic economy.
- After a 4.2% decline in 2020, global world GDP is projected to increase by about 4.6% in 2021. The reopening of economies and the availability of vaccines will gradually unleash the new wave.
- In 2021, Emphasis on Environmental, Social, and [corporate] Governance (ESG) will exacerbate the financing difficulties of energy and commodity producers, as new investments are scrutinized for their ESG contributions.
- The Fed's new approach reinforces that its 2% inflation objective is an average, not a ceiling. The European Central Bank (ECB) will likely follow the Fed's lead on Foreign Affairs and International Trade (FAIT) when it concludes its strategy review in mid-2021.
- Regulatory reforms that followed the global financial crisis have yielded substantially larger capital buffers and improved liquidity conditions across international banks.
- Commodity prices rose sharply in the second half of 2020 as the global economy rebounded; these cost increases will be pushed downstream in supply chains for the next six to nine months, pressuring margins and leading to higher prices for finished goods in 2021.
- After an estimated 7.5% contraction in 2020, eurozone real GDP is projected to rise by about 3.5% in 2021, with the return to pre-pandemic levels not expected until late 2022.
- The expected launch of effective COVID-19 vaccines, pent-up demand, and a low base effect will help the Chinese economy to grow 7.5% in 2021, its highest rate since 2013.
- The US dollar is expected to weaken in 2021 in a lagged response to the Fed's sharp pivot to monetary accommodation in early 2020, an increase in investor risk tolerance, and a widening trade deficit.

Saxo Bank Predictions

- 2021 sees Amazon and other online monopoly and infotech giants casting an increasingly wary eye on governments looking to take them down a notch for having become too powerful and for paying very low tax rates.
- Before the Covid-19 pandemic outbreak, public debt was flirting with the 100% of GDP threshold, and private debt was skyrocketing, reaching nearly 140% of GDP – far more than that of Italy (106%) or Spain (119%).
- The Digital Currency Electronic Payment (DCEP) will be a blockchain-based digital version of the Yuan (CNY), and in 2019, 80% of all payments in China were via WeChat Pay and AliPay.
- The SPARC fusion reactor design from MIT, which has been validated in 2020 as a viable path to less costly fusion energy, is massively improved by this new AI model.

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- A Citizens Technology Fund is created that transfers a portion of asset ownership of capital assets to everyone, with an extra portion going to displaced workers, allowing them and everyone else to participate in the digital era's productivity gains.

Morgan Stanley Predictions
- In 2021, the V-shaped recovery that the team forecast in their 2020 midyear outlook is now entering a new self-sustaining phase and is on track to deliver 6.4% GDP growth.
- In the US, consumer spending has nearly returned to pre-COVID-19 levels, while average personal incomes of the US households surpassed pre-pandemic levels in September. A sustainable US recovery is projected with a GDP growth of 5.9% in 2021.
- The economics team forecasts 5% GDP growth in 2021 for Europe, which is slightly below the consensus estimate. The team's 2022 outlook for the eurozone, however, pegs GDP growth at 3.9%, versus a consensus estimate of 2.8%.
- At the same time, emerging markets should benefit from widening the US current account deficits, low US real interest rates, a weaker dollar, and accommodative macroeconomic policies.
- A 7.4% GDP growth for emerging markets in 2021, led by a forecast 9.8% improvement in India, is projected.
- China, the first to impose COVID-19 closures, has quickly regained ground as consumption roars back. Morgan Stanley projects that its economy will expand 9% in 2021 before moderating toward 5.4% in 2022.

Bank of America Merrill Lynch Predictions
- Aggressive monetary and fiscal stimulus continue to support a positive, self-reinforcing growth dynamic that is expected to receive an additional boost from vaccinations, unleashing pent-up demand all over the world in 2021.
- With the help of fiscal stimulus, the personal savings rate is relatively high, while at the same time, wealth is rising (rising home and equity prices are helping), and financial obligations are low, a powerful setup for consumer spending in 2021.
- Job and wage growth should be supportive of consumer spending in the year ahead, and we expect the unemployment rate to drop below 5.0% by 2021.
- Residential construction is estimated for another strong year in 2021, even if existing home sales slow and home price growth normalizes.
- Inflation growth should pick up in the first half of the year and eventually run above the Federal Reserve's (Fed's) 2.0% target.
- The Organisation for Economic Co-operation and Development (OECD) forecasts faster economic growth in the US in 2022 than in 2021 (3.5% versus 3.2%).
- Bank of America (BofA) Global Research expects the 10-year Treasury yield to reach 1.5% by the end of 2021.
- Since the March highs, the broad, trade-weighted US dollar remains slightly overvalued even after the greater-than-10% depreciation.

JP Morgan Predictions
- The global GDP growth reaching 5.0% and notes that optimism about 2021 global growth builds on the back of news that vaccines are now being rolled out to permanently sever the link between the COVID-19 virus and mobility.
- Next year's expansion of central banks' balance sheets is expected to be half the size seen in 2020, and as a result, global fiscal policy should turn to a modest 1.5% drag after the 4.7% record fiscal thrust provided in 2020.
- The above-average returns on equities (10-20% across regions) compared to small losses for fixed income (-2% on Developed Market bonds) or below-average gains (1% to 4% on parts of credit)
- Emerging markets (EM) growth is poised to rebound to 6.8% from 2.1%, led by China's 8.6% growth, providing an anchor, despite the lasting damage from COVID-19.
- The US dollar downside is likely to be limited as the great interest rate convergence of 2020 that accompanied much of this past year's dollar weakness is now complete. EUR/USD should end-2021 near 1.18, where it has been trading in recent months.

S&P Global Predictions
- Emerging Markets continue to recover from a sharp drop in economic activity. The average Emerging market (excluding China) GDP to expand by 5.9% in 2021, after a contraction of 6.1% in 2020.
- In Latin America, the 2021 forecast remains broadly unchanged at a 3.8% growth, implying that the region will still be about 3% below its pre-pandemic GDP level by the end of next year.
- Latin America's GDP expanded 10% in quarterly terms in the third quarter (non-annualized), after declining 13.5% in the second quarter, compared with our expectation of 7.5%. Still, by the end of the year, the region will be about 5% below its pre-pandemic GDP level.
- Turkey's economy grew 15.6% (6.7% year-on-year), powered by a large credit stimulus. Turkey's large credit stimulus ushered a strong recovery in consumer spending, with retail sales up more than 9% in September year-on-year.
- In emerging Asian economies (excluding China and India), retail sales in September were more than 6% below year-on-year, while the average gap in Latin America was 1.5%.
- The emerging Asian economies to grow 7.6%, compared with our previous forecast of 7.7% next year, following an estimated 1.6% contraction this year.
- China's economy to grow 7.0% in 2021, marginally higher than our previous forecast of 6.9%, after an estimated 2.1% growth this year.
- Russia's central bank has reached the end of the easing cycle and expects to keep the key rate at the current level of 4.25% in 2021.

Capital.com Predictions
- Organization of the Petroleum Exporting Countries (OPEC) has cut its crude oil demand forecast for 2021 by 1 million barrels per day to 95.89 million barrels per day, downgrading its forecast for the first three quarters of the year, given the impact of Covid-19 on the global economy.
- The oil price estimates for 2021 remain unchanged for the time being, with an average price range of $45-50/barrel; for WTI, $41-45/barrel.

Microsoft

- A weaker dollar will support oil prices traded in dollars. However, the upward price potential will be limited by the large (reserve) production capacity. If the price rises too much, it allows for a rapid increase in oil production by OPEC+ countries.

Predictions for Microsoft

- Microsoft's Return on Equity is forecast to be high in 3 years (50.82%); analysts are confident in the firm's ability to generate a return on equity efficiently.
- Microsoft is forecast to generate higher Return on Assets (20.83%) than the US Software - Infrastructure industry average (13.86%).
- Microsoft's earnings are forecast to grow faster (9.42% per year) than the US Software - Infrastructure industry average (8.95%).
- Microsoft's revenues are forecast to grow faster (8.83% per year) than the US market average (6.42%).

IT Leaders Predictions

- "In the next 5 years, increased data and privacy regulation will have a big impact on the way we design Artificial Intelligence / Machine Learning models. As a result, investment in data management is going to be critical in determining the success of AI systems. Companies that have better data management frameworks, platforms and systems will win in building effective AI tools."

  - Sri Viswanath, Chief Technology Officer, Atlassian

- "Automation will be inevitable in 2021. As more engineering organizations migrate their infrastructure to the cloud and adopt a microservices architecture, the next challenge they'll face is figuring out how to manage and keep pace with an unwieldy, distributed system. Whereas, automation has been seen as an emerging tool in the past, it will become essential for survival in 2021."

  - Mike Tria, Head of Platform, Atlassian

- "Digital Transformation Projects Accelerate: Digital transformation (DX) was already a hot topic in boardrooms before the pandemic hit in 2020, with IDC predicting that it would account for more than 50% of all IT spending by 2023. What many IT executives learned last year, however, is that the gaps to fill in order to evolve were greater than expected, and those who had previously prioritized DX were able to adapt more quickly to evolving market conditions."

  - Joe Garber, Vice President of Strategy, Micro Focus

- "The coronavirus pushed last year's predictions way off track, becoming a critical driver behind IT trends in 2020. For 2021, COVID-19 continues to be a central story and a galvanizing force behind this year's forecast. Digital companies had clear advantages in 2020, and in 2021 those with a strong digital plan will have the flexibility to pivot as needed."

  - Jan Gilg, President of SAP S/4HANA at SAP

Microsoft

- "More enterprises are focused on Site Reliability Engineering (SRE) as a way to reduce toil through smart, targeted automation. Choosing to invest in high-value automation with the least complexity will be the focus for most infrastructure and ops teams in 2021. Automating yesterday's problems was yesterday's problem. Automating tomorrow's growth is today's future".
  – Emily Brand, Chief Architect, Red Hat

- "2020 has brought in constraints in human-to-human interaction due to unforeseen health concerns, which has rocked the foundations of human interaction prior to COVID-19. Contactless and touchless mechanisms of consumer and employee interaction will therefore gain more adoption in 2021. This trend extends the application of automation technologies to the areas requiring human-to-human contact which can refine the overall customer experience. It also serves as a catalyst expediting the automation of repetitive and routine tasks within and across the extended network of enterprises. Automation is meant for times like these."
  - E.G. Nadhan, Chief Architect and Strategist, North America, Red Hat

- "In 2021, transparency rules the day. Consumers currently appreciate it, but soon they will come to expect it. No longer will consumers take a company's word for it: when it comes to billing, voting, healthcare, and government processes, customers want to see their forms being submitted and approved. While paper processes continue to be necessary, digital access from mobile accounts or Customer Relationship Management (CRM) tools will become increasingly popular. This functionality is rapidly becoming standard as companies reengineer how they interface with customers, especially in the healthcare and government verticals."
  - Scott Francis, Technology Evangelist, Fujitsu

- "Companies will need immersive augmented reality (AR) to bring their buying experiences to life. This pandemic has had a severe impact on businesses around the world. It changed consumers' shopping behaviors and the way they consider and purchase goods and services. The pandemic may be responsible for accelerating the pace of AR adoption. For eCommerce and real estate industries especially, a high-quality AR experience is a must; consumers want to be able to see/visualize how the product looks within the environment, and AR offers the next best thing to in-person viewing. While the AR experience is not designed to replace the in-store experience, it is set to enhance it. The expectation of great AR experiences has never been higher."
  - Andy MacMillan, CEO, UserTesting

- "While IT leaders have routinely increased their tech investments with an eye toward more speed and efficiency, COVID-19 only accelerated this momentum by exposing organizations' inherent weaknesses when confronted with sudden workforce shifts. Looking ahead to 2021 and beyond, it's not necessarily the technology itself that will make the biggest impact on a company's success, but rather how well organizations deploy and manage their digital solutions. In short, the success of a digital strategy hinges on the organization's larger people strategy: recruiting, retaining and reinventing the right talent to manage their technology investments."
  - Rocky Subramanian, Senior Vice President & Managing Director, SAP

- "Virtual Private Networks (VPNs) were installed, licenses were increased and Bring Your Own Device (BYOD) programs were set up. The forward-looking companies also recognized that they're part of a bigger ecosystem. Building trust with partners, suppliers and customers becomes that next crucial step to succeed in times of crisis. Despite efforts, 30% of Chief Information Officers (CIOs) will fail in protecting trust next year as executives fail to find adaptive ways to counter escalating cyberattacks, unrest, trade wars and sudden collapses."

  - Pete Lindstrom, VP - Security Research, IDC

- "In a time of isolation, humanity got closer in 2020. Digital technologies made it possible. Seeing into our colleagues' homes and sharing challenges around childcare, health, or loneliness brought greater empathy to our work lives. I expect this trend to continue in 2021. Work will shift to a hybrid model, with few of us returning to the office every day. And the best collaboration platforms will support a deeper level of interaction, inclusion, and work/life flexibility, from any corner of the world, securely, and through any crisis. In 2021, emerging technologies like AI will continue to enhance collaboration tools, further freeing us for what's most important: creativity and human connection."

  - Kevin Delaney, Writer/editor/podcast producer, Cisco

- "COVID-19 expedited the future of work: this is how we work now. We experienced a digital transformation on steroids, enabling us to work from anywhere. The next question is: are people working in sustainable ways? Sustainable productivity focuses on performance ánd recovery, on balancing results with personal wellbeing. This requires leaders with a focus on empathy and compassion, who are skilled to bring out the best in people, achieve results and can do so remotely. Selecting and enabling those leaders is key to success and the challenge of 2021."

  - Anita Lettink, Strategist at HRTechRadar

- "AI adoption will continue to gain traction in 2021 with emphasis on decisions that are not at the mercy of seismic shifts resulting from the ongoing pandemic. The focus will remain on applying AI to automating and augmenting core business processes where the problem space is relatively stable and desired outcomes are well-bounded. While this may seem reactionary, this continues a 2020 trend in which AI adopters at all levels reported that enhancing existing products and services was their number one AI priority."

  - Kimberly Nevala, the AI Strategic Advisor at SAS

- "Advances in AI technologies, including generative adversarial networks, will make disinformation through fake content, such as deepfake videos and auto-generated social media posts, virtually indistinguishable from real content."

  - Steve Grobman, the Chief Technology Officer of McAfee

- "Cloud and AI will turn the customer support between both the enterprise and their customers/employees and between the enterprise and their infrastructure vendor upside down. With cloud AI, the vendor will let the enterprise customer know when there is a hardware or

software problem. The days of arguing with their vendors on hardware and software problems are over."

                                            - Bob Friday, the Chief Technology Officer at Mist Systems, a Juniper Networks company

Analyst Predictions

IDC Predictions

IDC offers predictions for every aspect of the IT World, with detailed analysis. Below listed are a few glimpses of the predictions. The complete list of predictions can be found here. These predictions reports can be accessed through Single Sign On (SSO). Please refer to Access Notes for the details.

IT Industry Predictions

- By the end of 2021, based on lessons learned, 80% of enterprises will put a mechanism in place to shift to cloud-centric infrastructure and applications twice as fast as before the pandemic.
- By 2023, reactions to changing workforce and operations practices during the pandemic will be the dominant accelerators for 80% of edge-driven investments and business model changes in most industries.
- By 2023, 75% of Global 2000 (G2000) companies will commit to providing technical parity to a workforce that is hybrid by design rather than by circumstance, enabling them to work together separately and in real-time.
- Through 2023, coping with technical debt accumulated during the pandemic will shadow 70% of CIOs, causing financial stress, inertial drag on IT agility, and "forced march" migrations to the cloud.
- In 2022, enterprises focused on digital resiliency will adapt to disruption and extend services to respond to new conditions 50% faster than ones fixated on restoring existing business/IT resiliency levels.
- By 2023, an emerging cloud ecosystem for extending resource control and real-time analytics will be the underlying platform for all IT and business automation initiatives anywhere and everywhere.
- By 2023, driven by the goal to embed intelligence in products and services, one-quarter of G2000 companies will acquire at least one AI software start-up to ensure ownership of differentiated skills and Intellectual Property (IP).
- By 2024, 80% of enterprises will overhaul relationships with suppliers, providers, and partners to better execute digital strategies for ubiquitous deployment of resources and for autonomous IT operations.
- By 2025, 90% of G2000 companies will mandate reusable materials in IT hardware supply chains, carbon neutrality targets for providers' facilities, and lower energy use as prerequisites for doing business.
- Through 2023, half of the enterprises' hybrid workforce and business automation efforts will be delayed or will fail outright due to underinvestment in building IT/Security/Development and Operations (DevOps) teams with the right tools/skills.

SMB (Small and Medium-Sized Businesses) Predictions

- Overall Digitization Acceleration: By 2024, 60% of SMBs will have accelerated their digitalization by making significant investments into Software-as-a-Service (SaaS), improving their customer experience mechanisms, and becoming more data-driven.
- Digital Commerce: By 2022, 70% of SMBs of all sizes will have digitized the essential components of the customer buying journey, using digital commerce to survive and transform.
- Transform Operations: By 2022, at least 30% of lagging SMBs will accelerate digitalization focusing on internal processes and operations, while digital leaders will commit to delivering dynamic experiences to differentiate.
- Digital Labour: By 2023, By 2023, 40% of all SMBs will tap into digital labor to augment and complement their resources, addressing major gaps in skills.
- Better Connectivity: By 2023, 40% of SMBs will upgrade their connectivity to better meet the changing business needs of connectivity, communication, and mobility while enabling business continuity and resiliency.
- AI & Analytics: Driven by the need to become resilient, by 2023, 60% of digitally determined SMBs will increase their AI/analytics and Robotic Process Automation (RPA) investments to reduce human intervention through agile processes.
- Future of Work: By 2021, at least 70% of digitally enabled SMBs will operate under a hybrid model of working, with remote work emerging as a norm.
- Digital Trust: By 2024, 60% of SMB will take proactive measures to ensure cyber resiliency fostering customer and community trust, leaving behind reactive approaches to cybersecurity.
- Public Cloud: By 2024, 60% of SMBs will have adopted public cloud platforms for some aspect of their technology architecture, with the digitally determined deepening their public cloud platform adoption most.
- Ethical SMBs: By 2024, 30% of start-ups will have a purpose-driven element as part of their company ethos, with sustainability, inclusion, and responsible production becoming increasingly important.

Smart Cities and Communities Predictions

- Due to Internet of Thins (IoT) ecosystem vulnerabilities, in 2021, 20% of deployed local government devices will be compromised by malware and ransomware attacks, leading to increased adoption of AI/ML Security Orchestration & Automated Response (SOAR) capabilities.
- By 2021, 45% of communities will shift to a hybrid workforce using cloud-based applications, digital collaboration tools, and mobile technologies to maintain services and ensure work-life-health balance.
- By 2022, 40% of cities will use digital space planning tools, such as digital twins, to speed socioeconomic recovery from COVID-19 and ensure the safe movement of people, goods, and services.
- By 2022, 40% of police agencies will use digital tools, such as live video streaming and shared workflows, to support community safety and alternative response framework approaches to policing.

Microsoft

- By 2023, 20% of midsize Smart Cities will appoint a dedicated staff lead to drive innovation and digital transformation to meet growing community demands to improve service offerings and delivery.
- As a result of COVID-19 transit service and revenue pressures, by 2023, 40% of cities with 500,000+ residents will adopt technologies and platforms to increase private transportation solution usage.
- By 2024, spending by Smart Cities and Communities will be $203 billion with focused areas of investment in a wide range of areas such as public safety, civic engagement, and Smart City platforms.
- As high-speed internet is a critical infrastructure for constituents to participate fully in society, by 2025, 75% of cities will provide interventions in the market to end the digital divide.
- By 2025, 30% of cities will leverage automation via IoT, AI, and digital twins, to blend the physical and digital and improve the remote management of critical infrastructure and digital services.
- By 2026, 20% of city products and services will be delivered using high-touch digital and hybrid digital/physical experiences, transforming constituent interaction with local government.

Data and Analytics Predictions
- By 2023, 60% of organizations will have begun implementing Data Operations (DataOps) programs to reduce the number of data & analytics errors by 80%, increasing trust in analytic outcomes & efficiency of Generation Data (Gen-D) workers.
- By 2023, 50% of organizations will adopt a "data supermarket" strategy to unify data storage, access & governance capabilities to deliver a consistent data experience and maximize the value of data.
- By 2024, 70% of enterprises will have integrated their edge generated data with cloud-based enterprise systems to allow for real-time actioning based on IoT analytics, including AI/ML.
- By 2021, 75% of enterprises will use new, external data sources to enhance their cross-functional decision-making capabilities in ways that increase value compared with using internal data alone.
- By 2025, 30% of SMBs will adopt cloud-native data-driven apps that intelligently adapt their behavior to the needs of the business.
- By 2022 50% of G2000 companies will have active development teams seeking to externally monetize their data to enhance traditional offerings, drive innovation, or deliver Data & Analytics as a Service.
- By 2023, only 10% of G2000 will establish a strategic automation-specific Center of Excellence (COE) to intelligently collect, process, and realize the full potential of unstructured data in business resilient workflows.
- By 2025, 25% of enterprises will have headless analytics embedded into the business, thereby improving real-time operational decision making and achieving process automation.
- By 2024, 50% of analytics services that organizations receive will be delivered via software-enabled automation, driving a higher level of consistency in delivery processes and shorter delivery time.
- By 2024, 25% of organizations will use crowdsourcing for data and analytics innovation initiatives to compensate for the scarcity of advanced analytics skills and speed up the innovation process.

Microsoft

Worldwide Connected Devices and Consumer DX 2021

- By 2021 more enterprises and small and businesses will leverage systems based on Chrome OS as the platform grows to exceed 15% of total Worldwide commercial PC shipments.
- To more efficiently onboard and drive the continued development of employees, 30% of enterprises will explore virtual reality technologies for both hard and soft skills training in 2021.
- Consumer spend on technology-based services will continue to expand, with year-over-year growth topping 10% in 2021.
- In 2021, 25% of Fortune 1000 companies with blue-collar employees who work close to each other will begin piloting wearables to detect and enforce safe minimum distances.
- By 2022, 30% of enterprises will provision some 5G PCs as they adapt to a significant percentage of employees working from home permanently and the resulting connectivity and security issues.
- In 2022, Premium video on demand (PVOD) reshapes movie releases and drives 20% of worldwide "box office" revenue.
- By 2023, 40% of enterprises will enter multiple device-as-a service contracts as they explore the benefits of the consumption-based procurement models and accelerated device refresh rates.
- More than 70% of service-focused enterprises will use augmented reality technologies to drive remote self-assistance, expert assistance, and knowledge capture and transfer by 2023.
- By 2024, more than 33% of Global 2000 companies will have deployed smart assistant driven work from home solutions to facilitate more frictionless collaboration and improve employee productivity.
- In 2025, technology-enabled "live sports and concerts 2.0" will add 10% incremental annual revenue to the global live consumer events market.

Intelligent Enterprise Resource Planning (ERP) Predictions

- By 2022, 60% of organizations will use HR virtual agents to understand the intent of an employee to handle repeatable requests and transform employee efficiency and experience.
- By 2023, 70% of decision-makers will gain access to insights within their business applications by using newly deployed cloud enterprise apps with embedded advanced analytics.
- By 2023, driven by the need to become resilient, 65% of organizations will invest in highly configurable AI-infused ERP applications to achieve greater autonomy in business operations.
- By 2022, 60% of G2000 will fill at least three functionality gaps in their enterprise application portfolio with cloud-native suites to address business continuity, remote work, and new tasks.
- By the end of 2021, 30% of the G2000 will have purchased modular enterprise applications that are new and unique applications, built by their enterprise application provider or System Integrator (SI).
- By 2024, 70% of organizations will adopt an outcome-asset impact model by integrating at least 5 data sources to a system to obtain a 360 view of key enterprise assets and drive better performance.
- By 2022, 50% of G2000 organizations will have purchased business applications tailored to industry requirements, allowing the line of business user more flexibility.
- Given the rise in Business to Business (B2B) digital commerce, 50% of G2000 will purchase financial applications that natively incorporate digital payment technology by 2022, allowing Chief Financial Officers (CFOs) greater payment visibility.

- By 2024, 80% of G2000 will have filled in automation gaps with TaskApps, ultimately leading the digital enterprise towards an autonomous organization.
- By 2022, 75% of organizations will use mobile solutions to improve unstructured data collection at the point of activity, better support remote/hybrid workers, and optimize resource productivity.

Developer and DevOps Predictions
- Up to a quarter of Fortune 500 companies will become software producers by 2025, to digitally transform and maintain their F-500 Status.
- Driven by competitive pressures and continued social distancing, 40% of development activities in 2021 will reprioritize design and user interface to support contactless process automation.
- Reuse of third-party code in new apps and digital solutions will increase from 40% in 2020 to 80% of code in 2024, leading to a corresponding increase in the number of apps produced each year by 1.5.
- By 2024, nearly 60% of organizations' new custom-developed applications will be built and managed using microservices and containers as foundations for stronger and higher performing automation.
- To make DevOps data actionable by 2023, 70% of enterprises will embrace ML, AI, and robotic process automation with scriptless automation to improve efficiency, remote collaboration, and execution.
- By 2025, the Return on Investment (ROI) for individual enterprise apps has increased 35% after rigorous assessment efforts help cull low business value projects.
- By 2024 55% of organizations will be using business-driven value stream management as a means of tracking business value and ROI throughout the DevOps pipeline.
- Automation accelerates development, DevOps and DevSecOps, that by 2023 90% of new apps will be built/released on-demand using policy-driven security and compliance assessments in the delivery pipeline.
- By 2022, more than 60% of DevOps teams will be evaluated on Key Performance Indicator (KPIs) and performance metrics, including criterion tied to business outcomes such as customer satisfaction or new revenue gains.
- By 2024, a new class of devs responsible for managing digital estates represents 10% of all full-time developers. This new class of devs is charged with sourcing and reusing digital solutions.

AI Predictions
- By 2022, over 60% of consumer-focused AI decisioning systems in finance, healthcare, government, and other regulated sectors will include provisions to explain their analysis and decisions.
- By 2023, rather than continue to move away from the voice channel, over 30% of organizations will have added AI capability to their inbound call handling environment.
- By 2024, 50% of knowledge workers will regularly interact with their own AI-enhanced robot assistant, which will help identify and prioritize tasks, collect information, and automate repetitive work.
- By 2025, the number of data analysts and scientists to adopt Automated machine learning (AutoML) for the end-to-end machine learning pipeline from data preparation to model deployment will triple.

Microsoft

- By 2024, Artificial Intelligence for IT (AIOps) will become the new normal for IT operations, with at least 50% of large enterprises adopting AIOps solutions for automating major IT system and service management processes.
- By 2026, 20% of all AI solutions will be closer to Artificial General Intelligence (AGI) — leveraging neuro-symbolic techniques that combine deep learning with symbolic methods to create robust humanlike decision making.
- By 2022, at least 65% of G2000 companies will leverage AI tools such as Natural Language Processing (NLP), Machine Learning (ML), and Deep Learning (DL) businesswide to enable 60% of use cases across areas such as customer experience (CX), security, facilities, and procurement.
- By 2024, over 30% of G2000 companies will run AI workloads distributed more evenly from the core to edge to cloud and will be managed by AI software platform providers, making the infrastructure "invisible".
- By 2023, 70% of enterprises will run varying levels of analytic and AI models at the edge, and 30% of those edge AI applications will be accelerated by heterogeneous accelerators.
- By 2023, 80% of G2000 enterprises will invest in internal learning platforms and third-party training services to recapture freed employee capacity and address new skill needs driven by AI adoption.

Services Predictions
- By 2025, three-quarters of organizations looking to drive revenue growth will only select vendors that can offer a portfolio of strategy, design, and technology services.
- By 2024, nearly 55% of firms will utilize Platform as a Service (PaaS) as the primary application development platform to develop custom applications and drive DevOps maturity deeper through their application portfolios.
- By the end of 2021, 70% of organizations with mature Employee Experience (EX) programs will have returned to pre-2020 growth trajectories compared with only 20% of organizations with immature EX programs.
- By 2022, over 90% of vendors' innovation centers will be repurposed as hybrid virtual and physical innovation networks rather than as dedicated spaces where people must meet face-to-face to innovate.
- By 2023, more than 70% of firms will use multi-cloud management platform capabilities as part of managed cloud services to standardize toolsets, ensure the quality of service, and enable demand management.
- By the end of 2021, 32% of organizations will be leveraging employee persona-based profiles to provide an enhanced employee experience.
- By 2023, over two-thirds of G2000 organizations will have incorporated service delivery resilience assessment and assurance into over 75% of their externally sourced business and IT services.
- By 2022, just over 50% of organizations with 1,000+ employees will accelerate their digital transformation projects (as 36% are accelerating now), making the remaining firms increasingly disadvantaged.
- By 2024, over 75% of organizations will implement some level of automation across multiple processes to drive a higher level of process optimization and to free up operational cash.
- By 2024, more than 45% of organizations will prioritize faster turnaround and speed to value as one of the top 3 vendor criteria in selecting services vendors.

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Cloud Predictions

- Through 2021, all enterprises will struggle with app modernization and data integration across cloud silos; 20% will adopt connected cloud architectures to overcome these concerns.
- By 2021, over 80% of enterprises evaluating cloud services for privacy-sensitive workloads will mandate maintenance of data sovereignty and data control capabilities across geographies.
- To gain business agility, enterprises will commit to modernizing over half of their existing applications by 2022, through the use of turnkey cloud-native development and deployment services.
- Through 2022, the belief that they are wasting at least 20% of their public cloud spending will drive enterprises to invest in public cloud cost management, with the goal of cutting cloud waste in half.
- By 2022, enterprises will allocate 20% of new cloud services spending to cloud solutions that meet specific industry and ecosystem data-sharing requirements for their vertical segment.
- By 2023, over a quarter of new workloads being deployed on public clouds will use purpose-built silicon and infrastructure components from providers, to optimize for use case–specific requirements.
- By 2023, enterprise demand for portable, feature-rich Software-as-a Service (SaaS) solutions, consumable on their choice of cloud, will drive over 60% of Independent Software Vendors (ISVs) to re-architect or build new portable cloud-native applications.
- By 2023, over 55% of enterprises will replace outdated operational models with cloud-centric models that facilitate rather than inhibit organizational collaboration, resulting in better business outcomes.
- By 2024, 25% of organizations will improve business agility by integrating edge data with applications built on cloud platforms, enabled by partnerships across cloud and communications service providers.
- By 2025, over a quarter of new cloud applications will use data-centric event-driven architectures rather than traditional code-centric ones, enabling better automation and business agility.

Government Predictions

- By 2021, 90% of G20 countries will grow investments in monitoring and mitigation tools that address social engineering, social deception, fake news, and other digital propaganda.
- By 2021, 45% of governments will begin processing citizen services in real-time, leveraging better customer intelligence and robotic process automation.
- By 2022, 60% of agencies will deploy AI-enabled technologies to recruit, train, and retain key personnel, enhancing their future work capabilities.
- By 2023, 35% of governments globally will invest in containerization, cloud usage monitoring, federated identity management, and other tools to deploy services seamlessly in a multi-cloud environment.
- Taking the path of least resistance, 25% of agencies will stop seeking best-of-breed solutions by 2023, refocusing on standard application portfolios offered by cloud providers and systems integrators.
- To ensure effective continuity of operations, by 2024, 30% of agencies will invest in intelligent and prescriptive intelligent digital workspaces supported by digital-led operating models.

Microsoft

- Edge is transforming the citizen experience; by 2022, 20% of federal data will be collected and processed outside of traditional datacenters, boosting processing speed and government response times.
- Blockchain adoption is slow but steady; by 2025, 15% of governments will use smart contracts powered by blockchains to ensure transparent governance of data exchanges across departments and agencies.
- To ensure trust, by 2025 65% of agencies will protect the security and privacy of digital assets wherever they reside, using predictive analytics to identify, contain, measure, and address security risks.
- By 2021, 55% of governments will aggressively audit external and cloud service providers performance to bolster and create resiliency and trust around service.

Supply Chain Predictions

- By the end of 2021, 90% of all manufacturing supply chains will have invested in the technology and business process necessary for true resiliency, resulting in productivity improvements of 15%.
- By 2024, 30% of manufacturers will have invested in Industrial Internet of Things (IIoT) and B2B collaborative network ecosystems to support reshoring/onshoring of strategic supply to align with nationalistic government policy.
- By 2023, 65% of digitally transforming procurement organizations will have continuous savings tracking with real-time reconciliation to budgets and other business plans.
- By 2024, 50% of manufacturers will improve agility by postponing final production time by 15%, on average, contributing to a 2% increase in revenue.
- By 2022, 50% of manufacturers will accelerate the deployment of service robots to better manage specific operational tasks, leading to 15% cost reductions and improved supply chain responsiveness.
- By 2025, half of all manufacturers will have extended visibility to tier 3 supply, enabling more agile supply chains and a 50% reduction in the impact of supply-side disruptions.
- By 2023, 60% of G2000 manufacturers will leverage artificial intelligence to dynamically reserve and position service vehicle and customer-site spares stock, decreasing mean time to repair by 25%.
- Facing increased disruption, manufacturers will digitally transform and accelerate sustainable innovation to improve supply chain operations from concept to commerce, increasing revenue by 20% in 2025.
- By 2023, 25% of enterprises will ship freight using an independent, SaaS-enabled marketplace platform, resulting in improved efficiencies in load matching and reduced shipping costs.
- By 2024, 50% of manufacturers using supply chain orchestration control towers will have integrated supply chain digital twins for a 10% improvement in innovation delivery and disruption avoidance.

Future of Work Predictions

- By 2022, 45% of repetitive work tasks in large enterprises will be automated and/or augmented by using "digital coworkers" (powered by AI, robotics, and Intelligent Process Automation), furthering human-machine collaboration.

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- By 2025, 40% of the G2000 will augment human staff with "digital coworkers" (powered by AI, robotics, and Intelligent Process Automation) to navigate and manage large ecosystems to perform complex cross-business interactions.
- By 2022, 25% of G2000 firms will deploy technologies imbued with data manipulation and visualization capabilities, driving collaborative productivity via conference calls for a hybrid workforce.
- By 2023, 75% of the G2000 will commit to providing technical parity to a workforce that is hybrid by design rather than by circumstance, enabling them to work together separately and in real-time.
- By 2024, 50% of the G2000 will rely on connected, secure, and prescriptive digital ecosystems that recommend the next best action.
- By 2021, 65% of knowledge and frontline workers will include health considerations in addition to social, environmental, and humanitarian actions as key criteria to employment decisions.
- By 2023, G2000 companies that deploy embedded AI-driven dynamic learning and digital adoption platforms that support adaptive, reconfigurable teams will achieve a 20% increase in productivity.
- By 2025, 55% of G2000 firms will have remodeled, relocated, or constructed office facilities for the purposes of improved employee health protection and optimized business continuity.
- By 2022, an additional $2 billion will be spent on desktop and workspace as a service by the G2000, as 75% incorporate employee's home network/workspace as part of the extended enterprise environment.
- By 2025, G2000 firms will increase spending on business-critical infrastructure by 25% to support solutions for employee safety such as contact tracing, temperature sensing, and proximity monitoring.

CIO Predictions
- Prediction 1 - #CIOAIOPS: By 2022, 65% of CIOs will digitally empower and enable front-line workers with data, AI, and security to extend their productivity, adaptability, and decision-making in the face of rapid changes.
- Prediction 2 - #Risks: Unable to find adaptive ways to counter escalating cyberattacks, unrest, trade wars, and sudden collapses, 30% of CIOs will fail in protecting trust —the foundation of customer confidence — by 2021.
- Prediction 3 - #TechnicalDebt: Through 2023, coping with technical debt accumulated during the pandemic will shadow 70% of CIOs, causing financial stress, inertial drag on IT agility, and "forced march" migrations to the cloud.
- Prediction 4 - #CIORole: By 2023, global crises will make 75% of CIOs integral to business decision making as digital infrastructure becomes the business OS while moving from business continuation to re-conceptualization.
- Prediction 5 - #Automation: To support safe, distributed work environments, 50% of CIOs will accelerate robotization, automation, and augmentation by 2024, making change management a formidable imperative.
- Prediction 6 - #RollingCrisis: By 2023, CIO-led adversity centers will become a permanent fixture in 65% of enterprises, focused on building resilience with digital infrastructure, and flexible funding for diverse scenarios.

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- Prediction 7 - #CX: By 2025, 80% of CIOs alongside Line of Business (LOBs) will implement intelligent capabilities to sense, learn, and predict changing customer behaviors, enabling exclusive customer experiences for engagement and loyalty.
- Prediction 8 - #Low/NoCode: By 2025, 60% of CIOs will implement governance for low/no-code tools to increase IT and business productivity, help Line of Business (LOB) developers meet unpredictable needs and foster innovation at the edge.
- Prediction 9 - #ControlSystems: By 2025, 65% of CIOs will implement ecosystem, application, and infrastructure control systems founded on interoperability, flexibility, scalability, portability, and timeliness.
- Prediction 10 - #Compliance: By 2024, 75% of CIOs will absorb new accountabilities for the management of operational health, welfare, and employee location data for underwriting, health, safety, and tax compliance purposes.

Digital Business Models and Monetization Predictions

- By 2022, 45% of software companies will deploy commercial usage analytics solutions to improve customer engagement, product bundling, discover value metrics, and enable consumption/outcome pricing.
- By 2022, 55% of SaaS vendors will use anonymized data collected within their platforms to provide insights & benchmarks, leading to increased value & differentiation for their offerings.
- By 2023, 60% of organizations deploying IoT will leverage the data to create new data-driven offerings with recurring business models.
- By 2023, 25% of G2000 companies will be using AI-driven pricing solutions to dynamically recommend priced offerings and bundles to increase customer expansion.
- By 2024, 25% of technology and software will be priced using new price optimization and guidance capabilities, leading to predictable revenue management across channels.
- By 2025, 60% of enterprises will be leveraging AI to effectively govern contractual third-party relationships as well as financial risks related to monetized subscription services.
- By 2021, over 51% of software revenue will come from the recurring business model, which includes on-premises software sold as subscription and software as a service.
- By 2023, the need for G2000 companies to manage and monetize multi-partner solutions will lead to 5x growth in marketplaces due to easier to deploy SaaS-based ecosystem orchestration platforms.
- By 2024, over 35% of all B2B commerce will occur digitally, causing more manufactures and distributors to adopt a digital quote to revenue process to streamline their sales process.
- By 2024, 60% of companies doing business internationally will accept five or more local payment methods per country to smooth cross-border transactions and reduce churn.

Digital Transformation Predictions

- Accelerated Digital Transformation (DX) investments create economic gravity. The economy remains on its digital destiny with 65% of global GDP digitalized by 2022 and will drive over $6.8 trillion of direct DX investments from 2020 to 2023.
- Digital organization structures and roadmaps mature. By 2023, 75% of organizations will have comprehensive DX implementation roadmaps, from 27% today, resulting in true transformation across all facets of business and society.

- Digital management systems mature. By 2023, 60% of leaders in G2000 organizations will have shifted their management orientation from processes to outcomes, establishing more agile, innovative, and empathetic operating models.
- The rise of the digital platform and extended eco-systems. By 2025, driven by volatile global conditions, 75% of business leaders will leverage digital platforms and ecosystem capabilities to adapt their value chains to new markets, industries, and ecosystems.
- A digital-first approach. While "digital first" prevails in every experience, 60% of enterprise will invest heavily in digitalizing employee experience in 2021, transforming the relationship between employers and employees.
- Business model reinvention. By 2021, at least 30% of organizations will accelerate innovation to support business and operating model reinvention, fast-tracking transformation programs, to future proof their businesses.
- Sustainability and DX. By 2022, the majority of companies realize greater value by combining digital and sustainability, giving rise to digitally-driven and sustainably enabled projects as the de-facto standard.
- Digitally native cultures. To thrive in a digital supremacy economy, 50% of enterprises will implement the organizational culture optimized for DX in 2025, based on customer-centric and data-driven.
- Accelerating Digital Experiences. By 2022, 70% of all organizations have accelerated the use of digital technologies, transforming existing business processes to drive customer engagement, employee productivity, and business resiliency.
- Business innovation platforms. Business Innovation Platform (BIP); By 2023, 60% of G2000 companies will build their business innovation platform to support innovation and growth in the new normal.

Health Industry Predictions
- The economic and clinical vulnerability resulting from the pandemic will drive 20% of healthcare organizations to embrace integrated care to improve outcomes during 2021.
- By the end of 2021, 7 of the 10 leading wrist-worn wearables companies will have released algorithms capable of early detection of potential signs of infectious diseases, including COVID-19 and the flu.
- Accelerated by the emergence of the new coronavirus, investments by life science companies in digital initiatives to support the utilization of real-world evidence globally will double by 2022.
- Alarmed by COVID-19 pandemic shortages, life science, and healthcare provider companies will increase investments in AI and advanced analytics by 50% by 2022 to avoid future supply chain disruptions.
- By 2023, 65% of patients will have accessed care through a digital front door as healthcare providers look for better ways to improve access, engagements, and experiences across all services.
- Fueled by COVID-19, digitally-enabled remote care and clinical trials will drive 70% growth in spending on connected health technologies by providers and life science companies by 2023.
- By 2023, 60% of health insurance products will be characterized by two communities, standard or individualized, which will be portable and accommodate social determinants of health.

Microsoft

- By 2024, the proliferation of data will result in 60% of healthcare organizations' IT infrastructure being built on a data platform that will use AI to improve process automation and decision making.
- To enable immersive training for healthcare professionals and enhance customer experience, 60% of providers will move from proof of concept to full deployment of AR/VR technologies by 2025.
- By 2026, 65% of medical imaging workflows will use AI to detect underlying disease and guide clinical intervention, while 50% will use teleradiology to share studies and improve access to radiologists.

Future of Trust Predictions
- By 2022, budgets for modern software-defined secure access solutions will quadruple as flaws in legacy VPN remote access solutions are illuminated by the massive work-from-home migration.
- By 2023, to reduce security complexity faced by limited staff, 55% of enterprise security investments will be on a unified ecosystem and platform frameworks.
- By 2024, two of the three largest public cloud providers will be among the top 5 largest managed security services providers following multiple multibillion-dollar acquisitions.
- By 2025, 80% of chief trust officers will demand vendors to incorporate security and risk capabilities to measure corporate trust including vendor relationships and employee reputation.
- By 2023, collective risk management requirements between primary and third parties will force 50% of third-party risk and security service providers to employ advanced analytic tools.
- By 2023, privacy regulations in 50% of G20 countries will require that social media providers provide the option to delete content and data about children under age 16 as they become "of age".
- By 2021, 40% of organizations will leverage employee productivity software to monitor and improve the digital workflows of their full-time, work-from-home employees.
- By 2022, a consortium of healthcare, insurance providers, and technology vendors will adopt a digital identity framework used for contact-tracing applications using distributed ledger technologies.
- By 2023, 42% of organizations will be held to regulatory certification that their AI- and ML-based algorithmic systems are ethical (free of bias and discrimination) and transparent.
- By 2023, 35% of the largest organizations must demonstrate social responsibility initiatives through internal structures and processes and publicly reporting the results in financial statements.

Gartner Predictions

Gartner offers predictions for every aspect of the IT World with detailed analysis. Below are listed a few glimpses of the predictions. The complete list of predictions could be found here. The predictions reports can be accessed through federated login. Please refer to Access Notes for the details.

Gartner's Top Strategic Predictions for 2021and Beyond
Gartner's Top Strategic Predictions for 2021 and Beyond: Resetting Everything
- By 2025, traditional computing technologies will hit a digital wall forcing the shift to new computing paradigms such as neuromorphic computing.

Microsoft

- By 2024, 30% of digital businesses will mandate Deoxyribo Nucleic Acid storage (DNA storage) trials, addressing the exponential growth of data poised to overwhelm existing storage technology.
- By 2025, 40% of physical experience-based businesses will improve financial results and outperform competitors by extending into paid virtual experiences.
- By 2025, customers will be the first humans to touch more than 20% of all products and produce.
- By 2024, 25% of traditional large enterprise CIOs will be held accountable for digital business operational results, effectively becoming "Chief Operating Officer (COO) by proxy".
- By 2025, 75% of conversations at work will be recorded and analyzed, enabling the discovery of added organizational value or risk.
- By 2025, customers will pay a freelance customer service expert to address 75% of their customer service needs.
- By 2024, 30% of major organizations will use a new "voice of society" metric to act on societal issues and assess the impacts to their business performance.
- By 2023, large organizations will increase employee retention by more than 20% through repurposing office space as on-site childcare and education facilities.
- By 2024, 30% of large organizations will identify content moderation services for user-generated content as a C-suite priority.

Governments
Governments Tackle Transformation: Out of Necessity
- By 2024, over 40% of public-sector knowledge workers will permanently work from home, contributing up to 20% in capital cities' economic decline.
- By 2023, over 60% of governments will have tripled citizen digital services, but less than 25% will be integrated across organizational silos.
- By 2023, over 20% of governments will leverage a digital twin of government for at least one major system, up from 4% in 2020.

Artificial Intelligence in Enterprise Applications
- By 2024, the degree of manual effort required for the contract review process will be halved in enterprises that adopt advanced contract analytics solutions.
- By 2023, three-quarters of HR service management inquiries will be initiated through conversational platforms.
- By 2024, 10% of digital commerce orders will be predicted and initiated by AI.
- By 2023, ERP data will be the basis for 30% of AI-generated predictive analyses and forecasts.
- Through 2023, up to 10% of AI training data will be poisoned by benign or malicious actors.

Cloud Computing
Building on Cloud Computing as the New Normal
- By 2025, 50% of large enterprises will enable transformational business models using "distributed cloud" services at a location of their choice.
- By 2023, 70% of mainstream organizations will use a composability metric to select new cloud applications and platform services.

- By 2025, 85% of organizations will run containers in production, up from less than 30% in 2020.
- By 2025, the proportion of current enterprise applications that are containerized will rise to 15%, up from 5% in 2020.
- By 2025, 85% of enterprises will have a cloud-first principle.

CIOs
CIOs Must Adjust Talent and Leadership Direction for Digital Acceleration
- By 2024, 20% of IT departments in large enterprises will adopt talent-sharing schemes, easing the shortage of technical professionals by 25% globally.
- By 2024, 80% of large-enterprise CIOs will have a neurodiversity talent strategy that will comprise 3% to 5% of their IT workforces.
- By 2023, 75% of companies will have an Employee Value Proposition (EVP) tailored for attracting and retaining technology talent across borders.
- By 2021, 70% of the hiring processes of new CIOs will highly rank two critical personal characteristics: determination and sensitivity.
- By 2025, 50% of large-enterprise IT leaders will require operations technology management (OTM) skills to support artificial intelligence and augmented intelligence.

Corporate Legal and Compliance Technology
- By 2025, legal departments will increase their spend on technology threefold.
- By 2024, legal departments will replace 20% of generalist lawyers with nonlawyer staff.
- By 2024, legal departments will have automated 50% of legal work related to major corporate transactions.
- By 2025, corporate legal departments will capture only 30% of the potential benefit of their contract life cycle management investments.
- By 2025 at least 25% of spending on corporate legal applications will go to nonspecialist technology providers.

CRM Customer Service and Support
- By 2025, 40% of customer service organizations will become profit centers by becoming de facto leaders in digital customer engagement.
- By 2025, 80% of customer service organizations will have abandoned native mobile apps in favor of messaging for a better customer experience.
- By 2025, 10% of customer service organizations will revamp hierarchical staffing models to create "huddle groups" committed to the well-being of specific customer segments.
- By 2025, proactive (outbound) customer engagement interactions will outnumber reactive (inbound) customer engagement interactions.

Data and Analytics Leaders
Data and Analytics Leaders Are Poised for Success but Risk an Uncertain Future
- By 2023, 50% of chief digital officers in enterprises without a chief data officer (CDO) will need to become the de facto CDO to succeed.

Microsoft

- By 2024, widespread adoption of cloud will raise the CFO's influence over the chief data officer's decisions due to explicit linkage of workloads to cost, bringing disruption to the CDO role.
- By 2024, 75% of organizations will have established a centralized data and analytics (D&A) center of excellence to support federated D&A initiatives and prevent enterprise failure.
- By 2023, organizations with shared ontology, semantics, governance and stewardship processes to enable interenterprise data sharing will outperform those that don't.
- Through 2023, title inflation will drive 50% of chief data officer appointments, leading to the CDO being an internal service rather than a strategic business peer.

Data Management Solutions

Data Management Solutions: Operational Efficiency Rises to the Top
- By 2025, 50% of independent database management system (DBMS) vendors will cease operations, causing customers to adjust strategies and migrate back to their strategic DBMS suppliers.
- By 2024, organizations that utilize active metadata to enrich and deliver a dynamic data fabric will reduce time to integrated data delivery by 50% and improve the productivity of data teams by 20%.
- By 2024, 75% of organizations will have deployed multiple data hubs to drive mission-critical data and analytics sharing and governance.
- Through 2024, 50% of organizations will adopt modern data quality solutions to better support their digital business initiatives.

Digital Workplace Infrastructure and Operations

- By 2024, more than half of organizations will consolidate to a unified console for endpoint management and security tasks, up from less than 5% in 2020.
- Through 2023, more than 80% of desktop virtualization projects deployed primarily to save cost, rather than to improve security or business continuity will fail to meet their objectives.
- By 2024, endpoint analytics and automation will help digital workplace service staff shift 30% of time spent on endpoint support and repair to continuous engineering.
- By 2024, 50% of digital workplace services leaders will be promoted from Infrastructure and operations (I&O) to a CIO/CDO direct report, an increase from 5% in 2020.
- By 2025, organizations that transform Windows application delivery through MSIX and application virtualization will eliminate over 50% of the time spent managing those applications.

Digital Workplace Applications:

Digital Workplace Applications: Evolve to Support Remote, "Force Multiplier" Staff
- By 2025, organizations that create a formal program for citizen development, analytics, and automation will be far more agile than those that do not.
- By 2023, more than 10% of workers will seek to trick AI-driven metrics every day.
- By 2023, more than 40% of workers will work remotely at least one day a week, up from under 30% before COVID-19.
- By 2024, 50% of digital workplace services leaders will be promoted into direct CIO or CDO reports, up from 5% in 2020.

Identity and Access Management (IAM) and Fraud Detection

- By 2025, cybersecurity mesh will support more than half of all IAM requests, paving the way to a more explicit, mobile, and adaptive unified access management model.
- By 2023, 40% of IAM application convergence will primarily be driven by Managed Security Service Providers (MSSPs) that focus on the delivery of best-of-breed solutions in an integrated approach, shifting influence from product vendors to service partners.
- By 2024, 30% of large enterprises will newly implement identity-proofing tools to address common weaknesses in workforce identity life cycle processes.
- By 2024, a truly global, portable, decentralized identity standard will emerge in the market to address business, personal, social and societal, and identity-invisible use cases.
- By 2022, 95% of organizations will require that identity-proofing vendors prove that they are minimizing demographic bias to protect their brand, up from less than 15% today.

IT Sourcing and Procurement

IT Sourcing and Procurement in an Effort to Become a Trusted Advisor

- By 2025, 50% of large enterprise IT Sourcing, Procurement and Vendor Management (SPVM) teams will have dedicated data analyst roles, enabling high-value insights that drive effective sourcing strategies.
- By 2025, 30% of enterprises will be using blockchain capabilities to source technology services and products, halving the time needed to onboard new vendors.
- By 2024, 40% of enterprises will use software asset management as the primary mechanism for reducing SaaS contracts costs with "dominant" vendors.
- By 2023, 35% of organizations utilizing bring-your-own-license offerings in cloud environments will no longer do so due to challenges managing compliance.
- By 2023, 70% of global organizations will have a structured diversity and inclusion program that directly affects sourcing, procurement, and vendor management.

Midsize Enterprises

The Opportunity for Midsize Enterprises to Rightsize IT

- Through 2023, midsize enterprises that opted out of premium solutions and services to cut costs in 2020 will not encounter performance or reliability issues.
- By 2023, IT-business communications in 40% of midsize enterprises will deteriorate due to an increase in remote interactions.
- By 2023, 50% of the roles in midmarket IT departments will spend half of their time supporting demand created by technology producers on business teams.

Customer Experience

Technology Will Become More Critical to CX With or Without the IT Department

- By 2022, 70% of customer experience projects will make use of information technology.
- By 2025, one in 10 technology leaders will find themselves the de facto leader of customer experience for their organization.

Microsoft

- By 2024, organizations with IT teams that understand the needs of customers will outperform other organizations' customer experience metrics by 20%.

Cloud and Edge Infrastructure
- Through 2023, enterprises that isolate/segment their campus network devices will experience 25% fewer successful cyberattacks.
- By 2023, 40% of all enterprise workloads will be deployed in cloud infrastructure and platform services, up from 20% in 2020.
- By year-end 2023, 20% of installed edge computing platforms will be delivered and managed by hyper-scale cloud providers, compared to less than 1% in 2020.

Infrastructure Operations and Cloud Management
- By 2023, 40% of product and platform teams will use AIOps for automated change risk analysis in DevOps pipelines, reducing unplanned downtime by 20%.
- Through 2022, 80% of organizations adopting cloud services without using a performance-focused approach for dependency mapping will experience a decrease in service quality levels.
- By 2024, 75% of organizations monitoring Infrastructure as a Service/Platform as a Service environments will consume metrics via cloud providers' Application Programming Interfaces (APIs).
- By 2025, 70% of new cloud-native application monitoring will use open-source instrumentation instead of vendor-specific agents for improved interoperability.
- Through 2024, enhancements in digital workplace infrastructure processes driven by analytics and automatic remediation capabilities will refocus 30% of IT operations efforts, from support to continuous engineering.

Forrester Predictions

Forrester offers predictions for every aspect of the IT World with detailed analysis. Below are listed a few glimpses of the predictions. The complete list of predictions could be found here. The prediction reports can be accessed only with a seat. Please refer to Access Notes for getting a seat.

Customer Experience
- Customer experience leaders must be prepared for the continuing impact of the pandemic into 2021.
- Consumers will flock to trusted brands for in-person experiences.
- "Zero UI" will skyrocket, but companies will find it's harder to implement than it looks.
- Shortsighted diversity and inclusion efforts will be focused on employees only — but the best will extend to CX, too.

Employee Experience
- Employee experience (EX) leaders: Remote work will settle at 3x pre-pandemic levels, offering an opportunity for firms to snap up top talent and keep them happier. Read this report to discover the ways in which EX will evolve in 2021.

Microsoft

- Automation will flourish and pivot toward helping employees be more effective in their daily work.
- Powerful new learning options will emerge as universities and big tech align around enterprise learning.
- HR leaders will need to strengthen ties with technology leaders to gather data and better enable a remote workforce.

Artificial Intelligence
- While artificial intelligence (AI) didn't predict the pandemic, it will help AI executives rethink the future of work; drive more efficiency, elasticity, and scale in operations; and reimagine customer and employee experiences.
- Companies that adopt AutoML will massively multiply their number of AI use cases, including for employee augmentation and automation.
- With this expected hypergrowth in AI, we will also see the proliferation of artificial data and the beginnings of a blockchain-based approach to data trust.

Automation
- Business and technology leaders interested in the impact of the pandemic on automation should read our predictions for 2021.
- The "great lockdown" of 2020 will make the drive for automation in 2021 both inevitable and irreversible.
- Remote work, new digital muscles, and pandemic constraints will create millions of pragmatic automations in 2021; document extraction, RPA from anywhere, drones, and various employee robots will proliferate; and, as expected, the mad dash to automate will bring trouble.

CIO
- CIOs should read this research to understand how 2021 will be a challenging year for most but will see some winners.
- The COVID-19 pandemic accelerated every company's digital transformation strategy — exposing most, paralyzing some, and leaving others forever lost in the wake of a challenging 2020 recovery.
- Business-savvy tech leaders will adapt their firm's technology strategy to the rapidly and newly formed business and operating models required to succeed in this unsettled time.
- Geopolitical posturing and brinksmanship from the world's biggest economies will force the CIO, traditionally taught to think global, to act locally.
- Remote work is here to stay, with the number of remote workers remaining at 3x pre-pandemic levels. Successful CIOs will turn up the scope and scale of technology that makes working from anywhere possible in the real and virtual world.

Cloud Computing
- Clouds were built to handle massive scale. Pandemic responses lean heavily on this scalability to adapt to new business demands. As such, Amazon Web Services (AWS), Azure, Google Cloud, and Alibaba saw demand and revenue escalate, and they will grow even faster in 2021.

Microsoft

- In 2021, companies target fast wins with immediate advantages like shunning on-premises backups and finally moving disaster recovery to the cloud.
- Cloud-native tech will continue to power digital transformation strategies: By the end of next year, 60% of companies will leverage containers on public cloud platforms and 25% of developers will leverage serverless.
- But cloud adoption won't go on without challenge in 2021. Governments will also start to exert more influence over where and how companies can use cloud.

Cybersecurity
- Pandemic-related uncertainty, remote work conditions, and employee experience collide to create ideal insider incidents conditions. One-third of security breaches will be caused by insider threats in the coming year. Security and risk professionals must adapt to this new reality.
- The US grip on control of the cybersecurity startup scene will erode further, with investment activity exploding in Europe and the Asia Pacific in response to rising geopolitical tensions.
- Consumer buying patterns will force brands into direct-to-consumer models, which will also increase security breaches as marketplaces and digital experience initiatives leave companies exposed.

Digital Business
- COVID-19 has been the tipping point for digital business, turning what was once too-often considered optional into an imperative. The response in 2021 will be to accelerate digital business programs with a focus on new products, partners, and places to sell.
- Firms won't go it alone: They'll turn to the cloud for essential building blocks, and they'll work with service providers to design and orchestrate their unique business architecture and value proposition.
- Digital experiences will get a jolt of rocket fuel as content-driven commerce and shoppable moments move out into the omnichannel world that customers inhabit. Deep personalization will propel the value proposition for shopping and loyalty.
- The new bedrock of business will be manifest in new digital operating platforms — the revamped and AI-powered software formerly known as ERP. Industry solutions and newly focused systems integrators will become the accelerant in this market.

Edge Computing
- Infrastructure and operations (I&O) leaders should read this research to understand how new business models will facilitate the deployment of an edge in production.
- A wide variety of players coexist in the edge market. New businesses that simplify edge deployment for clients and development for I&O teams will rise to prominence. Edge will eat into public cloud growth, fueled by this vendor diversity and venture investments in edge.
- Edge computing will push out further away from central data center locations and closer to the consumer, with evolutions in 5G and AI for edge use cases propelling this.

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Internet Of Things (IoT)

- Technology leaders interested in or responsible for IoT solutions should read this to learn how healthcare, smart offices, location services, remote asset monitoring, and new networking technologies will drive market growth in 2021.
- The growing range of networking options, including satellite, cellular, Wi-Fi, Bluetooth, Zigbee, Wireless Communication Protocol developed by Zensys (Z-Wave), and Citizens Broadband Radio Service (CBRS) in the US, are creating new IoT use cases across different environments and geographies.
- 2021 will see significant momentum for new IoT use cases, such as capturing patient health data from wearables and healthcare devices, enhancing the employee experience in smart offices, and extending the deployment of remote monitoring for connected machines.
- The use of consumer or employee location data will be essential to delivering compelling, convenient experiences. Today, only 23% of brands use location to trigger engagement with consumers.

Software Development

- Application Development and Delivery (AD&D) pros read on to get a glimpse into the coming changes across the landscape for 2021.
- At least one-third of AD&D professionals will leverage machine learning to improve test automation.
- Remote development will force collaborative work management and value stream management revolution.
- After a few AD&D pros paused modernization efforts in 2020, they will accelerate again in 2021.

Advertising

- Marketers, take warning: Data deprecation and the fallout from the COVID-19 pandemic will reshape advertising and compete for your attention in 2021 — but the pandemic will take precedence.
- An AI-fueled ad creation frenzy will double investments in brand-owned virtual influencers.
- A smorgasbord of new pandemic advertising, from videoconferencing pre-roll ads to sponsored face masks, will emerge.

Healthcare

- Healthcare gets a new home in 2021: Virtual care visits will continue to surge, and healthcare leaders will invest in hospital care at home to recover a $350 billion loss due to declining visits.
- Physical healthcare spaces will lose their allure as health systems transform waiting rooms and make the care process virtual and touchless; healthcare organizations will struggle to meet accessibility needs.
- Every company is a healthcare company in 2021 as employers look to reopen offices, safeguard employees, and mitigate the spread of COVID-19 as the pandemic continues.

eMarketer Predictions

eMarketer offers predictions for media and advertising, with detailed analysis. Below listed are a few glimpses of the predictions. The complete list of predictions can be found underline here. The prediction reports can be accessed only with a seat. Please refer to Access Notes for getting a seat.

Key Digital Trends
- Big Tech May Be Reined in, but No Breakups in the Immediate Future.
- A Federal Privacy Law Will Pass.
- A Retail Media Trio Rises Up to Challenge the Duopoly's Dominance.
- Advertisers Will Test New Targeting and Measurement Techniques.
- First-Party Data Will Reign.
- Virtual Event Shortcomings Will Drive Marketers to Accelerate Event Transformation.
- 'Brandstanding' Will Become the New Normal.
- Social Commerce Will Stall at Checkout.
- Social Entertainment Is Here to Stay.
- Disney Will Become a Streaming Heavyweight.

Future of Retail
- Direct to Consumer (D2C) Brands Riding the Ecommerce Wave Will Encounter Stiffer Competition from Established Brands.
- Media and Commerce Will Converge as Checkout Attaches to Shoppable Content.
- Click-and-Collect Momentum Will Drive Market Share Gains for Big-Box Retailers.
- Grocery Ecommerce Gains Will Evolve from Trial to Habit Formation.
- Retail Media Trio Will Disrupt the Duopoly's Digital Ad Market Dominance.
- Premium Subscriptions Will Drive Cross-Channel Loyalty for Leading Retail Brands.
- Digital Fitness Will Emerge as a Megatrend, as Aspirational Brands Segue into Consumer Health Market.
- Next-Gen Marketplaces Will Leverage the Economics of Scarcity to Forge New Flywheels.
- Frictionless 'Stores of the Future' Will Land and Expand.
- 'Buy Now, Pay Later' Options Will Hit an Inflection Point amid Strained Discretionary Budgets.

Mobile Advertising Trends
- The Pandemic Shifted Consumer Behavior in Ways that Will Accelerate Mobile Ad Spend Growth.
- App Clips Will Shift App Install Advertising.
- iOS 14 Will Accelerate the Shift from Waterfall Auctions.
- Local Search Will Recover Strongly.
- iPhone 12 Will Supercharge Mobile AR.
- Regulations Will Further Squeeze the Supply of Precise Location Data.
- iOS 14 Makes First 24 Hours After Install More Important.
- Mobile Will Gain More Premium Over-the-top (OTT) Minutes.
- Turmoil in Casual Game Market Will Open Opportunities for Brands.
- In-App Contextual Advertising Will Take a Big Step Forward.

The Information Predictions

The Information analysts track the leading technology companies and offer predictions of them in 2020. The predictions report can be accessed with credentials. Please refer to Access Notes for the details.

Apple
- Apple is expected to make a bigger push into movies for its Apple TV+ streaming service through buying older shows and hiring its own production head.
- Apple will accelerate efforts to diversify away from China by building more products in Vietnam and India. Simultaneously, it will encourage more Chinese-owned companies to invest in its supply chain and give them more orders to demonstrate to Chinese officials that it is still committed to the country.
- Apple will try to expand its wearables business by launching new variations of its popular AirPods line. That might include cheaper versions of the AirPods Pro noise-canceling earphones or an upgraded version of its standard AirPods.

Amazon
- Amazon Freight will begin catering to big corporate customers, putting it in competition with industry giants like C.H. Robinson and XPO Logistics.
- Amazon will also officially roll out a program to lease Amazon-branded tractors (the cab units at the front of semitrucks) to small trucking companies.
- Amazon may strike a deal with the European Commission, which leveled antitrust charges against the company for its conduct in France and Germany. A deal could involve Amazon agreeing to loosen its grip on the huge troves of aggregated data it controls. Such an agreement might even pave the way for the company to share more insights with third-party merchants on its Marketplace platform.
- Amazon won't mandate the vaccine for its hundreds of thousands of warehouse workers, many of whom are considered frontline workers. The company will instead likely offer the vaccine for free to employees. There will also be a scandal regarding black-market or fake vaccines on Amazon, which the company will move quickly to remove from the Marketplace.
- Jeff Bezos' personal fortune will pass $200 billion in 2021. He will increase the amount of money he gives to philanthropic foundations.

Google
- Google will announce a major upgrade to its cloud-based call center service, as AWS and Microsoft made improvements in 2020.
- Alphabet will announce a new "other bet" unit, potentially focused on quantum computing.
- Google will launch its new operating system, Fuchsia, in its first public product, the Google Nest Hub. The release will raise the question of whether Fuchsia will one day replace Android as the operating system on mobile devices.
- Google's share of the US digital ad spending will continue to decline in 2021, while Facebook's and Amazon's shares continue to rise.

Facebook

- The types of content that Facebook allows will become more restricted due to pressure from employees, governments, and activists. Facebook will find it difficult to resist calls for tougher measures on other kinds of speech in 2021.
- The tension between Facebook and Apple will grow. As Apple continues tightening its grip on what data developers can collect from its users, Facebook will flex its leverage as Apple's largest developer. The two are also racing to release competing augmented reality headsets.

Tesla

- Tesla CEO Elon Musk won't launch a fully self-driving car to the public in 2021.
- Tesla is testing a "full self-driving" software upgrade to Autopilot, the automated steering and braking features used in its car, with a special group of Tesla owners.
- Even if the company releases the software to a broader group, Tesla will continue to make the human driver legally and practically responsible for the system's errors.

Venture Capitals and Start-ups

- As drug companies distribute coronavirus vaccines, venture capitalists will turn their attention away from sectors like remote work and virtual learning and back toward areas that were hot before the pandemic, like hospitality and real estate tech.
- Remote-only startup teams will become the norm. Investors will encourage companies to forgo leasing office space in their early days.
- As geographic boundaries become increasingly less important, there will be a funding boom in startups located outside the San Francisco Bay Area in places such as Miami and Puerto Rico, in addition to known hubs like Austin, Texas.
- The lines between IPOs and direct listings will blur further. Companies issuing IPOs will loosen lockup restrictions to improve the outcome for employees.
- There will be more tech IPOs in 2021 than in 2020 as firms that had planned to list before the pandemic and didn't make it to the public markets last year sell shares.
- The Biden administration will drop Trump's threat to ban TikTok, but ByteDance will proceed with the creation of a US-based joint venture with Oracle and Walmart to leverage Walmart's e-commerce expertise for its own retail efforts in China.
- China will use its new antimonopoly law to force Ant Group to divest major parts of its business and will start scrutinizing WeChat.

Tech Policy and Regulation

- The battle lines between content companies such as News Corp and AT&T and digital platforms, including Facebook and Google, will become more clear in Washington. The content companies are going to ratchet up their lobbying campaign to hold digital platforms more accountable for users' unauthorized posting of copyrighted material.
- The Biden administration is going to follow Europe's lead and propose a new federal agency to regulate tech.
- The European Commission will move against Apple's App Store fees in 2021. This would be a major win for Spotify. The commission may also make a decision about whether to hit Apple for antitrust breaches related to Apple Pay, but it will deal with those issues separately.

MSLibrary

Microsoft

- Europe's sweeping overhaul of internet laws, the Digital Services Act and Digital Markets Act, will dominate the continent's regulatory debate in 2021. Once released, smaller and medium-sized companies will begin voicing concerns about how the new laws will hurt their core businesses.

Other Predictions

IBM Predictions

- In 2021, security technologies such as Confidential Computing, quantum-safe, and Fully Homomorphic Encryption will make even the most regulated industries move to the hybrid cloud.
- AI will also improve cloud developers and reliability engineers; from automating the modernization and deployment of applications onto new environments to assist with the day-to-day application management.
- Open-source tools will help unify clouds, making the skills developers need to program and use a hybrid cloud a lot simpler.
- Coupled with 5G advances, sustainable AI computing at the edge could erase the border between cloud and edge – offering a key technological upgrade for hybrid cloud infrastructures and a major advancement for AI models' privacy and security by keeping more data at the edge.
- 2021 will be focused on improving AI's power and efficiency to help businesses meet a number of challenges to securely deploying, simplifying, and managing hybrid cloud environments for a larger number of users.
- Hardware systems that provide these security capabilities will be widely adopted to protect on-premise and public cloud workloads. These hardware systems, such as LinuxONE and IBM Z, provide a higher level of security for open source and traditional workloads.

Forbes Predictions

Healthcare
- 2021 will see an accelerated deployment of virtual and augmented reality in treatment and care delivery. Payors and providers are waking up to the efficacy of these treatments and the scale that they can deliver through a remote offering.
- The COVID-19 pandemic spotlights the capabilities of telemedicine, as patients accessed important care from the safety of their homes. Regulatory changes helped to accelerate adoption, and many patients tried virtual visits for the first time.
- We will see a surge in mental health services, and services will get more specific for patient populations like teens, women, seniors, etc.
- The pandemic also has people taking a hard look at assisted living facilities and reimagining senior care.
- 2020 has been a challenging year, but the major catalyst on the healthcare front has been the accelerated shift from traditional in-person visits to virtual and remote care.

- 2020 saw the Food and Drug Administration (FDA) approve the first cohort of Prescribed Digital Therapeutics (PDTs), software programs (websites or smartphone-based products) that deliver evidence-based therapeutic interventions to prevent, manage, or treat a medical disorder disease.
- Viz.ai, software that leverages medical imaging artificial intelligence to reduce time to treatment for stroke victims drastically, will likely continue to thrive in 2021.

Artificial Intelligence
- Deepfake technology is rapidly improving and proliferating. 2021 will be the year that a piece of deepfake content goes mainstream in the United States, with a meaningful portion of the population initially believing it to be real.
- Data privacy is becoming an increasingly urgent issue for consumers and regulators. Given this, privacy-preserving AI methods will continue to gain momentum as the most sustainable way to build machine learning models.
- Silicon chips purpose-built for AI workloads are the future of the semiconductor industry. In 2021, to prevent itself from being disrupted, another legacy chipmaker will make a major acquisition of an AI chip startup.
- In 2021, one of the major pharmaceutical companies will pay up to acquire an AI drug discovery startup, bringing its technology and talent in-house.
- The transformer "arms race" will continue in 2021 with the first model's publication, with over 1 trillion parameters. Most likely, this model will come from OpenAI and be named Generative Pre-trained Transformer 4 (GPT-4).
- Startups building specialized "point solutions" will be scooped up by larger players seeking to develop comprehensive, end-to-end model development platforms. Intel's dual acquisitions of SigOpt and Cnvrg.io this year are canaries in the coalmine.
- In 2021, expect regulators and commentators to begin invoking AI more frequently as they frame how and why these companies are unfairly stifling competition.
- In terms of academic research, startup funding, and mainstream media attention, biology will increasingly emerge as the highest-impact, highest-consequence field to which to apply AI.

DataQuest Predictions
- With 2021 primed to grip the world's attention with several major events, such as the Summer Olympics in Tokyo and the Wimbledon Championship, cloud technology is poised to reinvent the fan experiences completely.
- Multi-tenant cloud solutions will become critical technology differentiators, helping businesses remain agile and innovative while also reducing their e-waste footprints and helping them move closer to their sustainability targets.
- AI will enable HR departments to become more proactive in their hiring and help them determine a candidate's cultural fit by using data to measure a hire's quality.
- By applying machine learning to real-time global data sets, healthcare professionals can more accurately track contact between staff and infected patients, enable accurate diagnoses, utilize

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predictive analytics to track personal protective equipment (PPE), optimize workforce allocations, and develop more effective and lasting vaccinations.

ZDNet Predictions

- In 2021, AI will be critical in hiring, enabling the processing of a large volume of candidates and giving everyone a fair chance of getting hired. Proven and potential capability will be paramount, and equally so in many cases.
- As the need for additional AI applications grows, businesses will need to invest in technologies that help them accelerate and democratize the data science process. This has given rise to what some call "no-code" AI.
- As organizations face increased pressure to optimize their workflows, more and more businesses will ask Business Intelligence (BI) teams to develop and manage AI/ML models.
- The wave of AI-enabled digital transformation will expand from "early adopters" such as financial services, insurance, and manufacturing to all other industries. AI and machine learning will be embedded in multiple business functions across key business areas.
- AutoML 2.0 platforms that provide for automated discovery and engineering of data "features" will be used to provide more clarity, transparency, and insights as businesses realize that data features are not just suited for predictive analytics but can also offer invaluable insights.
- The increasing reliance on AI, including by governments and agencies, will also force an evolution in accountability and ethics.

Deloitte Predictions

- From 5G to the cloud to virtual reality, a range of enterprise and consumer technologies will continue to offer opportunities to the worldwide business ecosystem.
- Deloitte Global predicts that the percentage of virtual video visits to doctors will rise to 5% globally in 2021, up from an estimated 1% in 2019. Around 8.5 billion doctor's visits, worth a total of approximately US$500 billion, took place in the 36 Organisation for Economic Co-operation and Development (OECD) countries in 2019 alone.
- It also predicts that led by corporations and educational institutions, sales for enterprise and educational use of wearable headsets for virtual, augmented, and mixed reality—collectively known as Extended Reality (XR) or digital reality—will grow by 100% in 2021 over 2019 levels.
- The revenue growth will remain greater than 30% for 2021 through 2025 as companies migrate to the cloud to save money, become more agile, and drive innovation.
- In 2021, the intelligent edge's global market will reach $12 billion, continuing a Compound Annual Growth Rate (CAGR) of around 35%. That increase is being driven primarily by telecommunications companies and their expanding 5G networks, along with hyper-scale cloud providers.
- Open and virtualized radio access networks (RANs) give mobile network operators (MNOs) the potential to reduce costs and increase vendor choice as they adopt 5G.

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Cisco Predictions

- Cybercriminals tactics are always changing and growing in sophistication, promising the threat landscape in 2021 will bring all-new challenges. The world is expected to have 3.5 million unfilled cybersecurity jobs by the end of 2021.
- In 2021, more hackers will get access to original training data and manipulate the models by injecting poisoned data, creating a dubious system. This manipulation will have a domino effect due to automatic processing by downstream applications.
- In 2021, expect attackers to move beyond just targeting individuals to targeting businesses as well. Since the social media controls around posting, verification, and Uniform Resource Locator (URL) redirection vary in how they're managed, especially for small/medium businesses, expect new attacks, like malicious websites, to flourish.

Tech Republic Predictions

- In 2021, instead of using 5G for mobile and IoT devices, research predicts wireless technologies will reveal overlapping value: Bluetooth, Zigbee, and near-field communication (NFC) all address similar IoT use cases.
- Expensive corporate real estate will be a thing of the past; 48% of decision-makers anticipate a higher percentage of permanent remote workers due to COVID-19.
- As is the case with many technologies and artificial intelligence, gathering data will be critical. Because of COVID-19, locating customers and employees is important to deliver convenient employee and customer experiences, i.e., social distancing.
- Field service firms and industrial Original Equipment Manufacturers (OEMs) in 2021 will now connect machines and meet customers' demands, rather than trying to convince customers to sample new connected services.

Barron's IT Predictions

- 2020 will be the year of the 5G supercycle, with Apple, the clear winner.
- Tesla finds success in China with its Giga 3 factory, hitting 100,000 deliveries more quickly than in the US and Europe.
- Microsoft wins the next stage of the cloud war over Amazon.
- Streaming wars will result in clear winners and losers, with Walt Disney "the juggernaut" that disrupts 10% of the Netflix installed base.
- Consolidation is coming in cybersecurity, with "both financial and strategic buyers…aggressively looking at acquiring public/private vendors".
- Uber Technologies will need to curtail or shut down Uber Eats, given its lack of profitability and competitive headwinds.
- Google, Apple, and Amazon expand further into health care and banking.
- California's Assembly Bill 5 (AB5) legislation will be a "gut punch" to the gig economy, disrupting the business models of Uber, Lyft, DoorDash, Postmates, and other players.

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- Google will "make a major strategic acquisition" to help it chase Amazon and Microsoft in the public cloud.

Silicon ANGLE Predictions

- Tech spending will rebound to 4% growth in 2021 and could go even higher. The pandemic forced a giant proof-of-concept on the technology world and will serve as an excellent predictor of what will work for a digital business.
- The percentage of remote workers settles in at 34% by year-end 2021 – double pre-COVID levels.
- Productivity increase will lead organizations to double down on the successes of 2020, benefiting selected productivity apps. Employees are willing to invest in maintaining productivity gains this year.
- Identity access management, cloud security, endpoint, and zero-trust security have seen upstarts CrowdStrike, Okta, Zscaler Inc., and others thrive. These names are expected to continue to show 30% to 50% or more revenue growth into 2021.
- The "internet of things" and the edge will begin to contribute meaningful revenue to enterprise tech companies in the coming years. Lots of edge-oriented M&A are expected in 2021 to set up for the future.
- The automation mandate accelerates in 2021 as UiPath and Automation Anywhere go public, but Microsoft remains a threat.
- 5G rollouts push new edge/IoT workloads and necessitate new systems architectures.

CXO Today Predictions

- Investment in data management is going to be critical in determining the success of AI systems. Companies that have better data management frameworks, platforms, and systems will win in building effective AI tools.
- SaaS companies won't survive without a strong ecosystem. Companies will need to be persistent in providing the highest level of security and privacy controls across the entire ecosystem at all times.
- Software companies will be held to higher numbers of reliability. As companies rely more on cloud services to collaborate remotely, customers will have higher expectations for uptime.
- Automation will be inevitable in 2021. As more engineering organizations migrate their infrastructure to the cloud and adopt a microservices architecture, the next challenge they'll face is figuring out how to manage and keep pace with an unwieldy, distributed system.

ForcePoint Cybersecurity Predictions

- Cybersecurity has become the enabling engine that permits businesses to accelerate their pivot to the cloud and take advantage of digital transformation speed, scale, and resilience.
- The changing demands at the top will deliver metamorphosis within the cybersecurity industry. The need for a converged, digital, cloud-delivered platform will see the emergence of the "Zoom of Security".

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- This defragmentation of the market and shift to cloud and converged platforms alongside vendor consolidation should mean that security gets easier for business leaders and, hopefully, for the professionals on the front line. In 2021, the cloud will become part of cybersecurity's DNA.

IoT World Today Predictions

- In 2021, to further expand Tiny Machine Learning (TinyML) on a device, many enterprises will turn to TinyML as a service (TinyMLaaS). An IoT device concretely takes part in the execution of intelligent services.
- More capable microcontrollers combined with on-device machine learning at the edge are poised to develop further in 2021. These developments with further advances in video surveillance, manufacturing, and more.
- The pandemic has certainly slowed down the silicon supply chain. It could slow the development/large-scale adoption of these technologies as the resources need to be used in more established/essential technologies like cell phones, computers, and medical devices.

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Further Reading

The articles listed below provide additional insights to the predictions for the coming year from various technology industry-based sources.

- Macroeconomic Outlook 2021: 21: It Was A Very Good Year
- 2021 Economic Outlook Forecasts 7.8% Expansion in Equipment and Software Investment Growth and 4.7% GDP Growth Despite Uneven Recovery
- 14 tech predictions for 2021 and beyond
- 2021 Technology Predictions
- 21 Predictions about the Software Development Trends in 2021
- AI predictions for 2019-2021
- 10 Global CIO Agenda 2021 Predictions
- 4 predictions for security in 2021
- Top Digital transformation trends in 2021
- Top Cybersecurity trends in 2021
- The Top 21 Security Predictions for 2021
- Neural's AI predictions for 2021
- 50 Emerging Technology Themes to watch out for in 2021
- An alternative technology prediction list for 2021
- 2021 Cybersecurity Predictions
- 8 predictions on how technology will impact our lives in the coming year
- The future of IoT: 5 major predictions for 2021
- 2021 IT Predictions and 2020 Results
- AI predictions 2021
- Predictions for cloud computing in 2021
- 2021 Tech predictions: king cloud, IoT and the technologies of the new normal
- 10 Future Cloud Computing Trends To Watch In 2021
- A revolution is coming for data and the cloud: 6 predictions for 2021
- Cloud computing will power pandemic recovery in 2021
- 5G in 2021: What Analysts Predict
- 2021 PREDICTIONS Growth, 5G and IoT – some trends to watch out for telecoms, media and technology 2021
- Looking ahead: 5 predictions for crypto and blockchain in 2021
- Bitcoin, Cryptocurrency, And Blockchain Predictions For 2021
- Blockchain trends in 2021: Expect the unexpected
- The Mobile Future: Predictions for 2021 and Beyond

Provide feedback: take the research report survey

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