



Tech Trends 2020

Executive summary

Introduction

IN 2020, THE next stage of digital's evolution welcomes us with the promise of emotionally intelligent interfaces and hyperintuitive cognitive capabilities that will transform business in unpredictable ways. Yet as we prepare for the coming decade of disruptive change, we would be wise to remember an important point about yesteryear's leading-edge innovations: Architects of the 1980s designed mainframe systems that continue to run and generate business value today. Sure, they're outmoded by today's standards, but how many of us will build systems that run for decades? And how's that for a legacy?

Architecting for longevity and adaptability requires a deep understanding of both today's realities and tomorrow's possibilities. It requires an appreciation for the technology and market forces driving change. And finally, it requires a long-term commitment to focused and incremental progress.

Against this backdrop, we present *Tech Trends 2020*, Deloitte's 11th annual examination of the emerging technology trends that will affect your organization over the next 18 to 24 months. Several of this year's trends are responses to persistent IT challenges. Others represent technology-specific dimensions of larger enterprise opportunities. All are poised to drive significant change.

We begin *Tech Trends 2020* with a timely update on the nine *macro technology forces* we examined in last year's report. These forces—digital experience, analytics, cloud, core modernization, risk, the business of technology, digital reality, cognitive, and blockchain—form the technology foundation upon which organizations will build the future. This year's update takes a fresh look at enterprise adoption of these macro forces and how they're shaping the trends that we predict will disrupt businesses over the next 18 to 24 months. We also look at three technologies that will likely become macro forces in their own right: ambient experience, exponential intelligence, and quantum.

In subsequent chapters, we discuss trends that, though grounded in today's realities, will inform the way we work tomorrow. Our chapter on *ethical technology and trust* takes an in-depth look at how every aspect of an organization that is disrupted by technology becomes an opportunity to lose—or earn—the trust of customers, employees, and stakeholders. We follow with a discussion of *human experience platforms* that will enable tomorrow's systems to understand context and sense human emotion to respond appropriately. Pioneering organizations are already exploring ways in which these platforms can meet the very human need for connection.



Trends evolve in unexpected ways. And often, the most interesting opportunities happen at the places where they intersect. Several of this year's trends represent fascinating combinations of macro forces and other technology advances. For instance, *digital twins* represents the culmination of modernized cores, advanced cognitive models, embedded sensors, and more—a recipe that is in itself a trend, even as it builds on evolving individual technologies.

We hope *Tech Trends 2020* offers the insights and inspiration you will need for the digital journey ahead. The road from today's realities to tomorrow's possibilities will be long and full of surprises, so dream big and architect accordingly.



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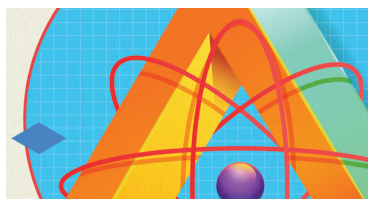
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Meet the trends



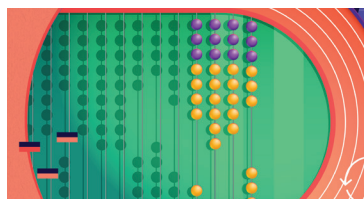
Macro technology forces

Last year's *Tech Trends* report explored nine macro technology forces that form the backbone of business innovation and transformation. For a decade, we've been tracking the emergence and eventual ascent of digital experience, analytics, cloud, digital reality, cognitive, blockchain, the business of IT, risk, and core modernization. This year's update takes a fresh look at enterprise adoption of these macro forces and explores how they're shaping the tech trends we predict will disrupt businesses over the next 18 to 24 months. To realize the full promise of these forces, organizations are exploring how they intersect to create more value as well as new ways to manage technology and the technology function. This necessary step is becoming increasingly important as businesses prepare to tackle emerging forces that appear farther out on the horizon: ambient experience, exponential intelligence, and quantum.



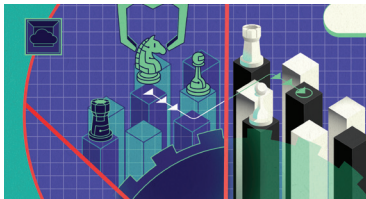
Ethical technology and trust

In a growing trend, leading companies are realizing that every aspect of their organization that is disrupted by technology represents an opportunity to gain or lose trust. They are approaching trust not as a compliance or public relations issue, but *as a business-critical goal* to be pursued. In this light, trust becomes a 360-degree undertaking to ensure that the many dimensions across an organization's technology, processes, and people are working in concert to maintain the high level of trust expected by their many stakeholders. Business leaders are reevaluating how their products, services, and the decisions they make—around managing data, building a partner ecosystem, and training employees, among others—build trust. CIOs are emphasizing “ethical technology” and creating a set of tools to help people recognize ethical dilemmas when making decisions on how to use disruptive technologies. Leaders who embed organizational values and tech ethics across their organization are demonstrating a commitment to “doing good” that can build a long-term foundation of trust with stakeholders.



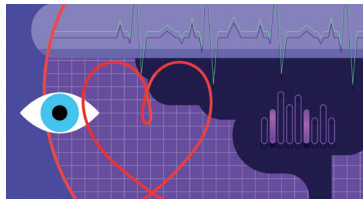
Finance and the future of IT

As technology strategy has increasingly become a core part of business strategy in organizations, the demand for improved outcomes has grown. To achieve this, we expect to see more IT and finance leaders working together to develop flexible approaches for innovating and operating at the speed of agile. Whether under the name of supporting innovation, defending against disruption, or enabling digital transformation, IT will need finance's support to effectively rethink governance of technology innovation, adapt to Agile methodologies, and secure creative capital. The work of transitioning to new finance, budgeting, and accounting processes that support innovation will not happen overnight. But there are strong incentives for both CIOs and CFOs to find ways to effectively fund innovation. Some companies are already embracing this trend and are exploring possibilities. They are at the leading edge and will likely be the first to enjoy the competitive advantages that come when finance funds innovation at the speed of agile.



Digital twins: Bridging the physical and digital

The idea of using virtual models to optimize processes, products, or services is not new. But organizations are finding that increasingly sophisticated simulation and modeling capabilities, power visualization, better interoperability and IoT sensors, and more widely available platforms and tools are making it possible to create simulations that are more detailed and dynamic than ever. Digital twins can increase efficiency in manufacturing, optimize supply chains, transform predictive field maintenance, aid in traffic congestion remediation, and much more. Organizations making the transition from selling products to selling bundled products and services, or selling as-a-service, are increasing use of digital twins. As capabilities and sophistication grow, expect to see more organizations use digital twins to optimize processes, make data-driven decisions in real time, and design new products, services, and business models. In the long term, realizing digital twins' full promise may require integrating systems and data across entire ecosystems.



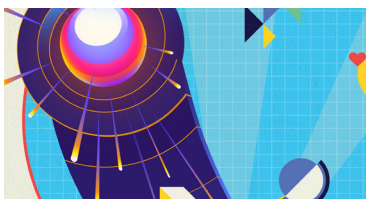
Human experience platforms

A growing class of AI-powered solutions—referred to as “affective computing” or “emotion AI”—are redefining the way we experience technology. In the coming months, more companies will ramp up their responses to a growing yet largely unmet demand for technology to better understand humans and to respond to us more appropriately. Historically, computers have been unable to correlate events with human emotions or emotional factors, but that's changing as innovators are adding an emotional quotient (EQ) to technology's IQ, at scale. Combining AI, human-centered design techniques, and technologies currently being used in neurological research to better understand human needs, human experience platforms will be able to recognize a user's emotional state and the context behind it, and then respond suitably. Indeed, the ability to leverage emotionally intelligent platforms to recognize and use emotional data at scale is one of the biggest, most important opportunities for companies going forward.



Architecture awakens

Growing numbers of technology and C-suite leaders are recognizing that the science of technology architecture is more strategically important than ever. Indeed, to remain competitive in markets being disrupted by technology innovation, established organizations will need to evolve their approaches to architecture—a process that can begin by transforming the role technology architects play in the enterprise. In the coming months, we expect to see more organizations move architects out of their traditional ivory towers and into the trenches. These talented, if underused, technologists will begin taking more responsibility for services and systems. Likewise, they will become involved in system operations. The goal of this shift is straightforward: move the most experienced architects where they are needed most—into software development teams that are designing complex technology. Investing in architects and architecture and promoting their strategic value enterprisewide can evolve this IT function into a competitive differentiator in the digital economy.



Horizon next: A future look at the trends

There's growing interest among enterprises in looking beyond *what's new* to *what's next*, and no wonder—an understanding of what's coming may inform early planning and enable relationships that could make reaping future rewards possible. Leading organizations have disciplined, measured innovation programs that align innovation with business strategy and a long-term technology landscape. They take a programmatic approach to sensing, scanning, vetting, experimenting, and incubating future macro technology forces—such as ambient experiences, exponential intelligence, and quantum—until the technology, the market, and the business applications are ready on an enterprisewide scale. Other organizations should consider following suit, using the knowledge gained to reimagine and transform their enterprises, agencies, and organizations before they themselves are disrupted. In a world of seemingly infinite unknowns, it is possible to focus attention on a meaningful collection of known technologies that, taken together, can help you chart a path to the next horizon.

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