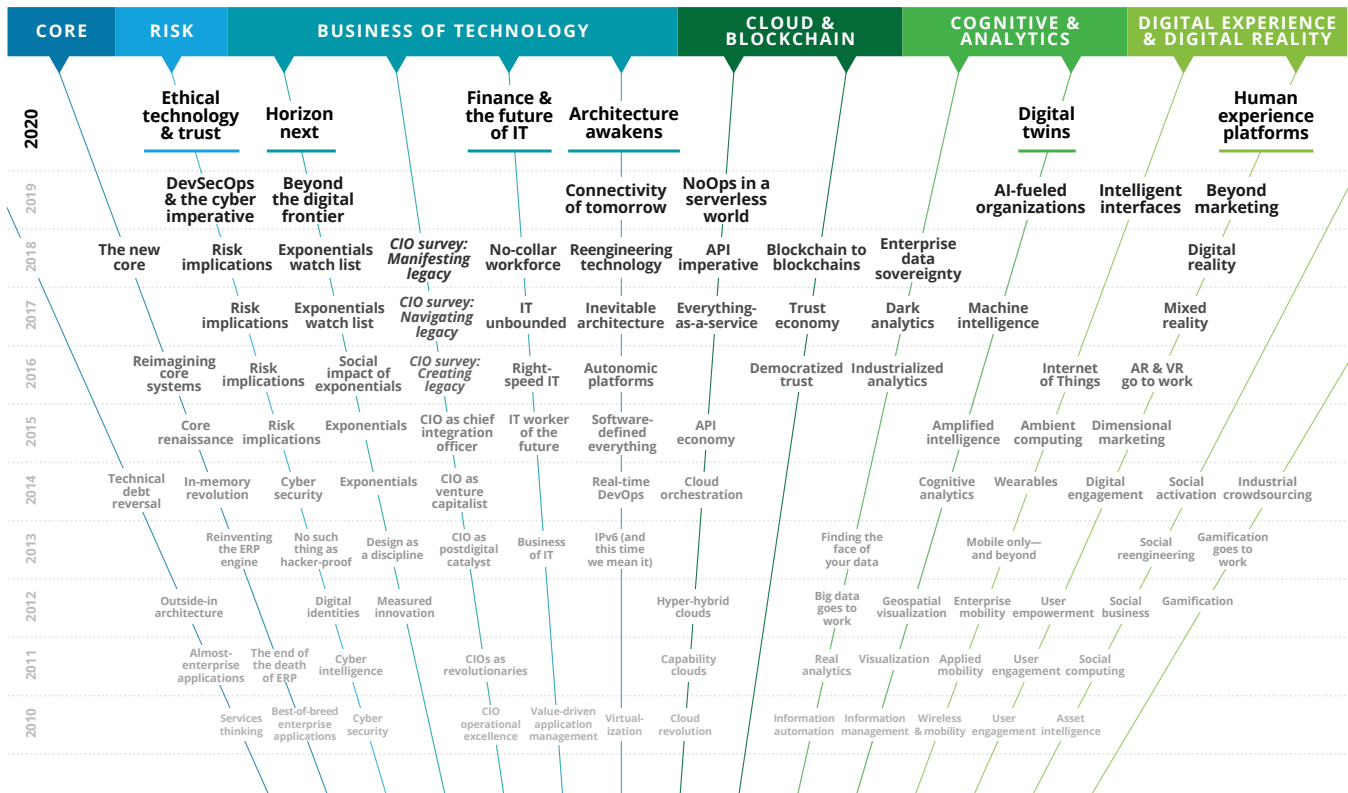




Tech Trends 2020

Trending the trends: Eleven years of research



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.

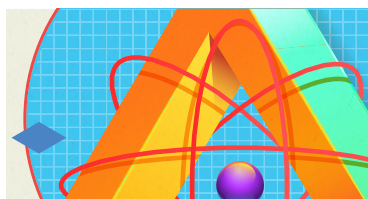


Kevin Govender
CIO Programme Leader
Deloitte Africa
kegovender@deloitte.co.za
+27 11 304 5088



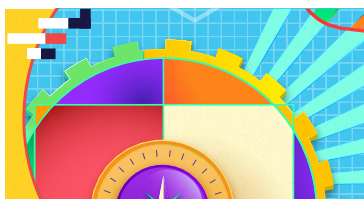
Arun Babu
Consulting Digital Leader and
Managing Director for Core
Business Operations
Deloitte Consulting Africa
arbabu@deloitte.co.za
+27 11 517 4114

Executive summary



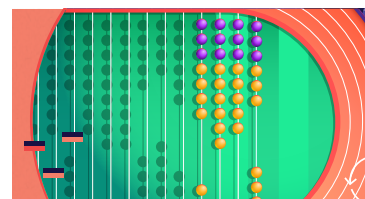
Macro technology forces

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.



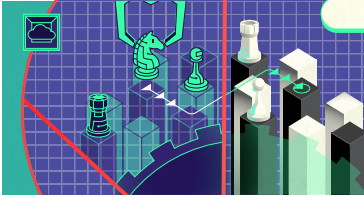
Ethical technology and trust

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.



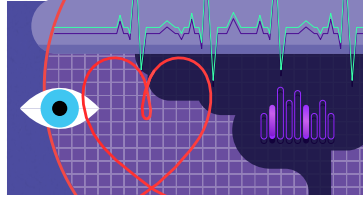
Finance and the future of IT

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.



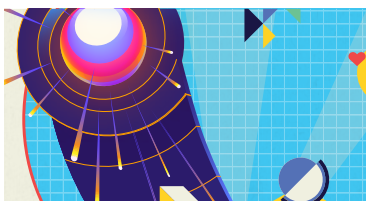
Human experience platforms

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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TechTrends@deloitte.com

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Executive editors

Bill Briggs

Global chief technology officer
Deloitte Consulting LLP
wbriggs@deloitte.com

Bill Briggs' 20-plus years with Deloitte have been spent delivering complex transformation programs for clients in a variety of industries, including financial services, health care, consumer products, telecommunications, energy, and the public sector. He is a strategist with deep implementation experience, helping clients anticipate the impact that new and emerging technologies may have on their businesses in the future—and getting there from the realities of today.

In his role as CTO, Briggs is responsible for research, eminence, and incubation of emerging technologies affecting clients' businesses and shaping the future of Deloitte Consulting LLP's technology-related services and offerings. He also serves as executive sponsor of Deloitte's CIO Program, offering CIOs and other IT executives insights and experiences to navigate the complex challenges they face in business and technology.

Scott Buchholz

Emerging Technology research director and
Government & Public Services chief technology officer
Deloitte Consulting LLP
sbuchholz@deloitte.com

With more than 25 years of experience in technology innovation and implementation, Scott Buchholz focuses on helping clients transform the way they deliver their missions and businesses through technology. He supports organizations across industries by providing advice and insights on how to evolve their technology and their organizations to improve performance, effectiveness, and efficiency.

In his role as CTO for Deloitte Consulting LLP's Government and Public Services practice, Buchholz works with clients to implement innovation across a diverse set of areas, including legacy modernization, eGovernment and eCommerce solutions, and solution architecture.

As the emerging technologies research director and the sponsor of *Tech Trends*, he helps identify, research, and champion the technology trends that are expected to have significant impact on the market and clients' businesses in the future.

Executive perspectives authors

STRATEGY

Benjamin Finzi

US Chief Executive Program leader | Deloitte Consulting LLP

Benjamin Finzi is a managing director with Deloitte Consulting LLP and coleads Deloitte's Chief Executive Program. As a founder of New York's Deloitte Greenhouse® Experience, he has designed and facilitated hundreds of immersive "lab" experiences for CEOs and their leadership teams, combining principles of business strategy with behavioral science and design thinking to address clients' challenges. Finzi has been focused for more than 20 years on researching and understanding how companies succeed in disruptive markets.

FINANCE

Ajit Kambil

CFO Program global research director | Deloitte LLP

Ajit Kambil is the global research director of Deloitte LLP's Chief Financial Officer Program. He oversees research in areas such as leadership, capital markets, and risk. Kambil created *CFO Insights*, a biweekly publication serving more than 38,000 subscribers, and developed Deloitte's Executive Transition Lab, which helps CXOs make an efficient and effective transition into their new role. He is widely published in leading business and technology journals.

Moe Qualander

Principal | Deloitte & Touche LLP

Moe Qualander is a principal with Deloitte & Touche LLP's Risk & Financial Advisory practice. He has more than 20 years of experience, specializing in assessing internal controls in financial business operations and IT. Qualander leads Deloitte's Chief Financial Officer Program's Center of Excellence, focusing on creating and enhancing relationships with clients' CFOs. As dean of Deloitte's Next Generation CFO Academy, he assists future finance executives with enhancing their leadership, influence, and competency skills.

RISK

Deborah Golden

US Cyber Risk Services leader | Deloitte & Touche LLP

Deborah Golden is a principal with Deloitte & Touche LLP and Deloitte's US Cyber Risk Services leader. She brings more than 25 years of information technology experience in industries that include government and public services (GPS), life sciences and health care, and financial services to the role, and previously served as Deloitte's GPS cyber leader, as well as GPS Advisory market offering leader. Golden also serves on Virginia Tech's Business Information Technology and Masters in Information Technology advisory boards.

Chapter authors

MACRO TECHNOLOGY FORCES

Bill Briggs

Global chief
technology officer
Deloitte Consulting LLP
wbriggs@deloitte.com

Scott Buchholz

Government & Public
Services chief technology officer
Deloitte Consulting LLP
sbuchholz@deloitte.com

Sandeep Sharma, PhD

Deputy chief
technology officer
Deloitte Consulting LLP
sandeepksharma@deloitte.com

ETHICAL TECHNOLOGY AND TRUST

Catherine Bannister

Technology Fluency and
Ethics global director
Deloitte Services LP
cbannister@deloitte.com

Deborah Golden

US Cyber Risk Services leader
Deloitte & Touche LLP
debgolden@deloitte.com

FINANCE AND THE FUTURE OF IT

John Celi

Business Agility US leader
Deloitte Consulting LLP
jceli@deloitte.com

Ajit Kambil

CFO Program global
research director
Deloitte LLP
akambil@deloitte.com

Khalid Kark

US CIO Program
research leader
Deloitte Consulting LLP
kkark@deloitte.com

Jon Smart

Business Agility UK leader
Deloitte MCS Limited
jonsmart@deloitte.co.uk

Zsolt Berend

Business Agility senior manager
Deloitte MCS Limited
zsoltberend@deloitte.co.uk

DIGITAL TWINS: BRIDGING THE PHYSICAL AND DIGITAL

Adam Mussomeli

Supply Chain & Network
Operations leader
Deloitte Consulting LLP
amussomeli@deloitte.com

Aaron Parrott

Supply Chain & Network
Operations managing director
Deloitte Consulting LLP
aparrott@deloitte.com

Brian Umbenhauer

Industrial Products and
Construction leader
Deloitte Consulting LLP
bumbenhauer@deloitte.com

Lane Warshaw, PhD

Analytics & Cognitive
managing director
Deloitte Consulting LLP
lwarshaw@deloitte.com

HUMAN EXPERIENCE PLATFORMS

Tamara Cibenko

US Digital Experience lead
Deloitte Consulting LLP
tcibenko@deloitte.com

Amelia Dunlop

Deloitte Digital chief
experience officer
Deloitte Consulting LLP
amdunlop@deloitte.com

Nelson Kunkel

Deloitte Digital chief design officer
Deloitte Consulting LLP
nkunkel@deloitte.com

ARCHITECTURE AWAKENS

Saul Caganoff

Platform Engineering chief
technology officer
Deloitte Consulting Pty Ltd
scaganoff@deloitte.com.au

Ken Corless

Cloud chief technology officer
Deloitte Consulting LLP
kcorless@deloitte.com

Stefan Kircher

Innovations & Platforms
chief technology officer
Deloitte Consulting LLP
skircher@deloitte.com

HORIZON NEXT: A FUTURE LOOK AT THE TRENDS

Mike Bechtel

Managing director
Deloitte Consulting LLP
mibecht@deloitte.com

Bill Briggs

Global chief technology officer
Deloitte Consulting LLP
wbriggs@deloitte.com

Scott Buchholz

Government & Public Services
chief technology officer
Deloitte Consulting LLP
sbuchholz@deloitte.com

Contributors

Mukul Ahuja, Zillah Austin, Randall Ball, Sonali Ballal, Tushar Barman, Neal Batra, Jonathan Bauer, Mike Brinker, Randy Bush, Rachel Charlton, Sandy Cockrell, Allan Cook, Megan Cormier, Amit Desai, Anant Dinamani, Sean Donnelly, Matt Dortch, Deborshi Dutt, Karen Edelman, Michael Fancher, Frank Farrall, Jourdan Fenster, Bryan Funkhouser, Andy Garber, Haritha Ghatam, Cedric Goddevrind, Jim Guszczca, Maleeha Hamidi, Steve Hardy, Blythe Hurley, Lisa Iliff, Siva Kantamneni, Mary-Kate Lamis, Blair Kin, Kathy Klock, Yadhu Krishnan, Michael Licata, Mark Lillie, Veronica Lim, Mark Lipton, Kathy Lu, Adel Mamhikoff, Sean McClowry, JB McGinnis, Meghan McNally, Kellie Nuttall, Melissa Oberholster, Arun Perinkolam, Ajit Prabhu, Aparna Prusty, Mohan Rao, Hannah Rapp, Scott Rosenberger, Mac Segura-Cook, Preeti Shivpuri, Lisa Smith, Gordon Smith, Tim Smith, David Solis, Alok Soni, Patrick Tabor, Sonya VasiliEFF, Aman Vij, Jerry Wen, Mark White, Drew Wilkins, Abhilash Yarala, Andreas Zachariou, and Jim Zhu.

Research team

LEADS

Cristin Doyle, Chris Hitchcock, Betsy Lukins, Dhruv Patel, Andrea Reiner, and Katrina Rudisel.

TEAM MEMBERS

Stephen Berg, Erica Cappon, Enoch Chang, Tony Chen, Ankush Dongre, Ben Drescher, Ahmed Elkheshin, Harsha Emani, Jordan Fox, Riya Gandhi, Dave Geyer, Maddie Gleason, April Goya, Adhor Gupta, Alex Jaime Rodriguez, Morgan Jameson, Solomon Kassa, Pedro Khoury-Diaz, Emeric Kossou, Dhir Kothari, Shuchun Liu, James McGrath, Hannan Mohammad, Spandana Narasimha Reddy, Gabby Sanders, Joey Scammerhorn, Kaivalya Shah, Deana Strain, Samuel Tart, Elizabeth Thompson, Samantha Topper, Kiran Vasudevan, Greg Waldrip, and Katrina Zdanowicz.

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Deloitte Insights contributors

Editorial: Matthew Budman, Blythe Hurley, Abrar Khan, Rupesh Bhat, Anya George Tharakan, and Nairita Gangopadhyay

Creative: Anoop K R and Emily Moreano

Promotion: Hannah Rapp

Cover artwork: Vasava

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