GUIDE

2022 Virtusa Trend Almanac

virtusa

Contents

Foreword

Welcome to Virtusa's 2022 Trend Almanac. Now in its fourth year, this annual report examines key technology and business trends through the lens of our own team of data scientists and digital engineers.

Each year, this team of thought leaders explores how innovation is driven across organizations—from HR and finance to software development and sustainability. Scouring hundreds of outstanding real-world examples, they engage, debate, and determine the top trends, curating the handful of examples that this report features.

Because today's organizations are more agile, they can pounce quickly on the opportunities these trends present. The ability to take advantage of them and embrace new and emerging technologies requires hard work, determination, and sometimes, calculated risks. It also demands IT modernization, cloud migration, and performance optimization for effective results.

This year's format differs from previous editions in how we present the trends. First, we describe the individual trends and then explain how they work with each other. By understanding the impact of the combined trends, you can discover new ideas for using your existing technologies to create future applications and opportunities for your organization.

As you read this almanac, you'll see that much has changed over the past two years, particularly with the technologies. You might notice that what you previously considered impossible is now possible. Think about how your organization can tap into these trends, specifically the barriers to overcome and the short-term and long-term growth opportunities.

The new pace of business and innovation is gaining speed. Now is the time to find new ways to position your organization for growth. Let our almanac help you realize the possibilities.

—**Ram Meenakshisundaram**, *Chief Technology Officer, Virtusa*

2022 emerging trends

This year, our data scientists and digital engineers identified four key trends:

- Web 3.0 and the metaverse: A frontier for innovation
- Future of work: Employee-owned experience
- Low-code development: A faster way to build
- ESG and sustainability: A business imperative

Individually, these trends can transform every dimension of your organization. Your success might not be in unlocking any single innovation but in the power of bringing technologies together to achieve what you once thought unachievable.

If some of these areas are already on your radar, use this almanac to motivate you into action. Getting started can be as simple as speaking with your peers about the trend and getting their perspectives on it. It's a great time to work in technology, so spark interest and encourage new ways of thinking with those around you.

Web 3.0 and the metaverse: A frontier for innovation

The future is now with Web 3.0 and the metaverse. These trends will change the way the world adopts and interacts with technology. As adoption rapidly gains momentum, financial analysts are considering Web 3.0 and the metaverse to drive investment with generational opportunity, thanks to its trillion-dollar valuation potential. What's driving their interest?

Web 3.0 and the metaverse represent a transformative shift. They move the world away from today's dependencies on the internet to a few highly centralized applications with decentralization, openness, and greater user utility as core foundations. As a result, they shift control to individual users, creators, and application developers.

That's great news for individuals, but what about businesses? Web 3.0 and the metaverse create substantial new opportunities as platform companies and technologies empower enterprises to design, develop, maintain, and monetize digital assets. In doing so, they enable enterprises to create more personalized, secure, and collaborative working methods by merging physical and virtual worlds.

As companies move to the metaverse, the massive transformation will impact our daily lives. It will change how we work, learn, interact, shop, and engage with the world and people around us. For example, over the next few years, work meetings may transfer to the metaverse. Unlike video conferencing, these experiences will feel like real-life business meetings and customer interactions.

Already, metaverse real estate is becoming available, causing businesses, governments, and consumers to quickly acquire land. BrandEssence Market Research expects the metaverse real estate market to grow at an annual compound rate of 31% until 2028.

The more businesses and industries move to Web 3.0 and the metaverse, pay close attention. While they might get in early on this trend, watch the impact they'll make.

Future of work: Employee-owned experience

The rise of a remote and hybrid workforce, the Great Resignation, the gig economy, and the emergence of the metaverse have forced businesses to rethink the future of work. The job market is highly competitive, making hiring and retaining top talent harder. Employees expect more from their employers.

With the widespread adoption of artificial intelligence (AI), machine learning (ML), 5G, and collaboration tools, today's employees can work, connect, and contribute from anywhere. They're finding ways to be more productive as they strive for a better work-life balance and look for a clear career path.

These factors make it critical for organizations to give employees the tools and resources they need to excel in their job—and reduce potential burnout. Organizations are tapping into AI/ML, integrating applications, and automating workflows to streamline processes and reduce repetitive tasks.

Misconceptions about AI/ML center on replacing humans in the workplace. In fact, according to a 2021 Grayscale Research report, by 2025, while AI will eliminate 85 million jobs, it will create 97 million new ones—an addition of 12 million jobs. Organizations that are hungry for greater speed, agility, and productivity will fuel this workforce transformation.

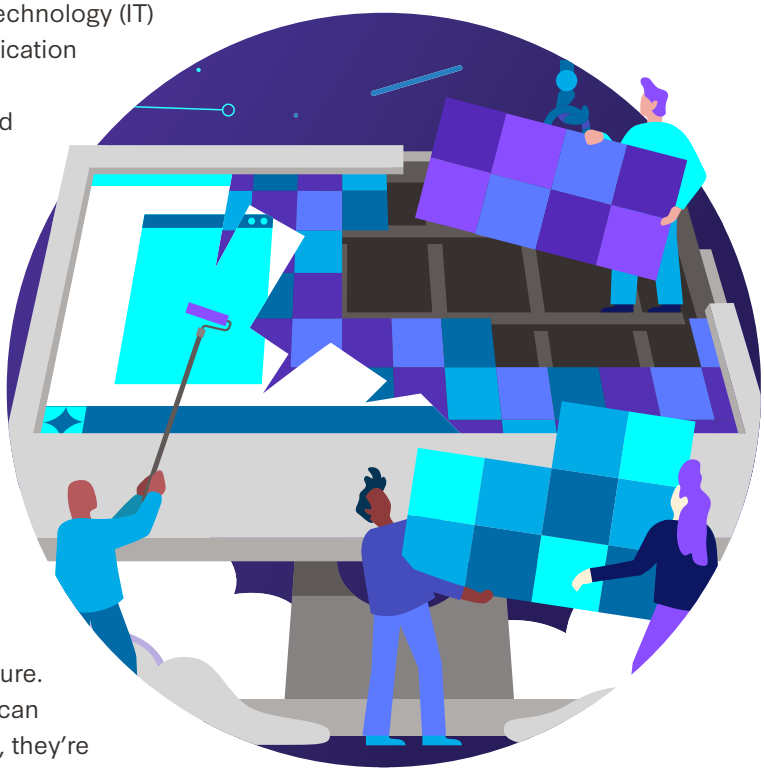
Building a high-performing organization requires a range of training and development programs. These programs include upskilling, reskilling, and cross-functional skilling to retain employees and keep them engaged, learning, and motivated. By using a range of new technologies, businesses are finding better and more engaging ways to upskill and reskill.

The success of an organization is based on its people. So it's no surprise the future of work focuses on business leaders creating the best environment for their employees. As we settle into the new normal, these trends will impact how organizations use technology to transform the way we work.

These technologies enable us to rethink how we work, who we work for, and what the future holds. By using them to reshape the workplace, organizations can better meet the needs of their employees and customers.

Low-code development: A faster way to build

In search of greater speed, efficiency, and innovation, organizations no longer must depend on a centralized information technology (IT) department for software updates, coding, and application integration. Low-code development and the citizen developer help organizations keep up with the rapid pace of digital transformation and reduce the workload on IT departments and professional programmers.



Low code has emerged as a viable approach for organizations of all sizes as they hire a new type of developer, or upskill or reskill current employees. McKinsey & Company estimates that around 40 percent of workers will require reskilling in six months or fewer. These efforts help close the skills gap by training employees in areas they might not have experience with. Low code has lowered that barrier to entry.

Low-code solutions accelerate an organization's path to a more agile, profitable, and sustainable future. By embracing low-code development, companies can move faster with more productive employees. Plus, they're in a better position to drive innovation and revenue.

By embracing low-code development, organizations gain the following significant benefits:

- **Speed and agility**: Low-code tools enable non-programmers to develop the software they need and solve their technical challenges with drag-and-drop features. In a 2021 survey on low-code/no-code by Creatio, 29% of respondents found low-code development to be 41%–60% faster than traditional development.
- **Quality**: Less is more, even with code. Pre-built and tested components drastically reduce the risk of bugs and developer error. Building software with low code significantly simplifies the software development process. With less code, citizen developers can avoid steps like planning systems architecture, setting up backend frameworks, hard coding, and endless rounds of testing. Instead, they can focus on creating quality applications.
- **Talent pool**: By lowering the barrier to entry for a new class of developers, organizations can address the growing skills gap while investing in growth for current employees. Gartner predicts that low-code/no-code solutions will make up 65% of application development by 2024 because the technology helps address productivity issues, skill shortages, and business project backlogs.

Low-code development is the way to the future. It creates new jobs, making it easier and faster to develop innovative applications and solutions. And it transforms how developers build, update, and combine applications.

ESG and sustainability: A business imperative

Environmental, social, and governance (ESG) and sustainability have emerged as a top priority for businesses and consumers in 2022. In a 2021 survey by PwC, 76% of consumers responded they will stop buying from companies that "treat the environment, employees, or the community in which they operate poorly."

For companies that underscore investments in ESG, the benefits are clear. An article published by Forbes states that supporting support social and environmental issues makes 92% of Americans more likely to trust a business. Meanwhile, the article also states employee churn decreases by 25%–55% for companies with dynamic ESG programs, while stock returns rise by 5%–10%.

Businesses worldwide have deepened their commitment to diversity, inclusion, and equity. Over the last two years, many companies have doubled their responsibilities to support equity and inclusion in technology.

ESG and sustainability efforts are critical in meeting compliance and business growth targets, attracting talent, and reducing costs. Younger generations want to work with and for businesses that are committed to sustainability, social responsibility, and better governance models. A survey by The Harris Poll with CNBC Make It found that 33% of millennials exclusively invest in companies with solid ESG programs, compared to only 2% of baby boomer investors.

These initiatives can have far-reaching benefits as businesses work to find better ways of quantifying those outcomes. An even greater focus is on measuring sustainability efforts. With new net-zero targets set at the UN Climate Change Conference in Glasgow (COP26), sustainability has emerged as a substantial driving force for organizations in 2022. At the same time, enterprises face increasingly complex systems, supply chains, and a lack of skills and resources to accelerate digital transformation.

In addition to net-zero targets, regulatory and governance factors require businesses to reduce their impact on the environment. As the world prioritizes ESG, regulatory changes will soon mandate companies to report ESG issues. Meanwhile, many countries have released climate-related financial risks and opportunities.

Achieving ESG and sustainability takes a significant commitment, with investments totaling in the trillions by 2050. Technology, such as using AI/ML to monitor and predict carbon emissions, is a critical component that businesses will continue investing in. When done right, the key benefits of having a sound ESG strategy include top-line growth, cost reductions, regulatory and legal interventions, and investment and asset optimization.

Converging trends

Each trend in this report is poised to have a massive impact of its own accord. When combined, these trends will further transform how we live, work, and socialize. In examining where they intersect, along with current real-world examples, the art of the possible comes into focus. Use these connections to inspire the next stage of your own digital transformation.

Web 3.0 and the metaverse + future of work

Web 3.0 focuses on who will own the internet of tomorrow, while the metaverse centers on user experience (UX). By combining them, organizations are quickly uncovering new and better ways of working.

While still nascent in many respects, Web 3.0 and the metaverse have become big business. Technology leaders and gaming giants, such as Meta (previously Facebook), Microsoft, Epic Games, and Roblox, are all creating their virtual worlds or metaverses.

It might sound like fun and games, but the real business impact is on the future of work. Web 3.0 and the metaverse promise to bring additional levels of social connection, mobility, and collaboration to a world of virtual work. Already in play, avatar-based immersive reality platforms focus on interactive working, collaboration, and learning solutions. They remove the feelings of isolation that can result from remote and hybrid work.

Web 3.0 and the metaverse also enable workers to tackle problems visually. Industries like healthcare and manufacturing are on the precipice of great change with the introduction of 3D-modeling. Along with lowering costs, 3D models boost design precision, assessment, and decision-making.

Many organizations are limited by space—physically and digitally—but not with Web 3.0 and the metaverse. Thanks to the development of virtual workspaces, teams can meet virtually with access to digital whiteboards and workstations. Employees can create 3D avatars to enable face-to-face meetings without needing conferencing equipment.

Organizations are also using metaverse technologies to collaborate across teams and teach employees technical and communications skills. When done purposefully, the metaverse can enrich and simplify our lives with true-to-life interactions, products, and services.

Use cases in action

Stream your next paycheck

Sablier—a decentralized finance (DeFi) protocol—enables users to manage their digital finances in real time. It also helps employers reduce the need for payroll administrators. An organization can design a payroll to pay staff every 15 minutes, hourly, or per job commit, rather than monthly or biweekly.

After a onetime deposit, smart contracts stream the money to payees automatically without employer involvement. Employees see their earnings increase in real time right in the Sablier wallet.

Transform training and customer support

MGM Resorts has teamed up with Strivr to use the metaverse so potential employees can try a job in virtual reality (VR) before they accept an offer. If they realize a job isn't right for them after trying it in VR, MGM saves time and money by not having to train and then replace them if they leave after a short time. In the metaverse, trainees can also practice engaging with customers to learn techniques and boost their confidence before they interact with them in real scenarios with higher stakes.

Web 3.0 and the metaverse + low-code development

The trends for 2022 empower employees to work faster and smarter as they upskill to grow with their organization. Part of that empowerment is owed to the advent of low-code development. With these platforms, developers—regardless of their level of programming knowledge—can create back-office, web, and mobile applications and automate business processes.

As Web 3.0 and the metaverse gain momentum, expect to see the pace of low-code adoption increase dramatically. In return, low-code developers will play a major role in how Web 3.0 and the metaverse take shape. Today's low-code developers have an opportunity to get into Web 3.0 and the metaverse early and lead us into the future.

The success and adoption of Web 3.0 and the metaverse depend on our ability to infuse the entire experience with AI/ML capabilities. This opportunity opens the door for low-code developers to be at the forefront of the next wave of internet innovation. Adoption will rise exponentially with the ability to simply drag and drop AI functionality into Web 3.0 applications and services.

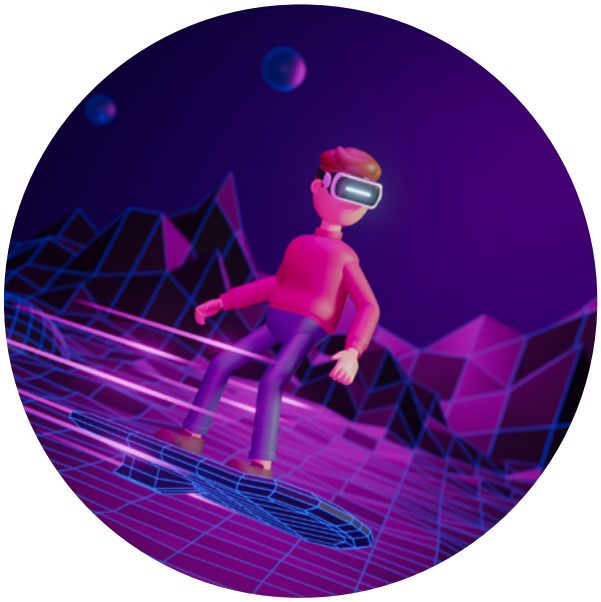
Web 3.0 and the metaverse pave the way for new types of applications that are controlled by all users, not just a single entity. This natural evolution stems from today's rising use of low-code development platforms. So more developers—and citizen developers—gain the ability to quickly build new applications.

According to a recent Electric Capital Developer Report, the Web 3.0 developer community is gaining serious momentum, with over 18,000 monthly active developers committing code in open source crypto and Web 3.0 projects. The report also found that in 2021 alone, over 34,000 new developers committed code.

Use cases in action

Strip away crypto complexities

Biconomy designs products for low-code developers who are building applications in Web 3.0. By leveraging a scalable relayer protocol, Biconomy strives to simplify complicated UX and fragmented multichain infrastructure. As new protocols emerge, developers can streamline operations and integrations at scale.



Create 'Rooom' for the metaverse

Leveraging the idea of the citizen developer, Rooom is on a mission to give everyone the opportunity to develop 3D models and spaces using metaverse software. With customizable templates, the company aims to democratize the metaverse, with access to virtual showrooms, merged realities, and immersive, true-to-life experiences.

Web 3.0 and the metaverse + ESG and sustainability

The emergence of Web 3.0 and the metaverse has created an opportunity for businesses to reinvigorate and harden ESG and sustainability efforts. From greater governance practices to energy savings, Web 3.0 and sustainability can help organizations better align business goals with environmental, societal, and governance goals.

Web 3.0 isn't immune to bad actors, but it makes efforts to protect against them. Similarly, the metaverse forces organizations to reimagine the rules of engagement for users, including how they collect taxes, govern data, and comply with regulations. A decentralized digital world requires robust security while keeping authenticity at the forefront to minimize the spread of fake information—a problem that's plagued Web 2.0 since its inception.

A decentralized approach enables distributed ledgers and smart contracts, eliminating the need for negotiations, manual intervention, and mediation. This strategy eliminates power centralization while reducing cost. Additional benefits include enabling multi-dimensional inclusion, reinforcing reliability and traceability, and ensuring the highest level of governance. In addition, having the ability to monitor improvements in energy efficiency is critical to sustaining Web 3.0 and the metaverse.

Another way Web 3.0 and the metaverse impact sustainability is by considerably reducing the need for human travel. As a result, we'll see less traffic, fewer accidents, and less pollution, consequently reducing global warming. The metaverse will also help reduce pollution caused by job-related activities. For example, governments might conduct military training activities, such as pilots flying warplanes, in the virtual world in the metaverse, lowering emissions.

Reducing the impact of metaverse-powering datacenters is a priority for top companies, including Google and Microsoft, that commit to carbon reduction targets. For example, Google aims to operate on carbon-free energy across its data centers by 2030. And Microsoft will be carbon-negative by the same year and is committed to achieving 100% renewable energy by 2025 to power its operations.

Turning to blockchain, energy efficient alternatives to proof of work (PoW) are gaining momentum. Ethereum 2.0 will eliminate PoW in favor of proof of stake (PoS), using approximately 99.95% less energy than the current standard.

As organizations rush to Web 3.0 and the metaverse, it's critical to understand the potential impact on ESG and sustainability efforts and recognize this opportunity to get it right for good.

Use cases in action

Teach a man to fish

Fishcoin is a peer-to-peer network that enables independent industry stakeholders to use the power of blockchain. It works as a decentralized ecosystem that incentivizes data capture. This way, an ecosystem of companies and third-party developers benefit by adding value to the network.

Using an incentivization model, Fishcoin encourages seafood supply chain stakeholders to exchange data from the point of harvest to consumption. This business model increases revenue for fishers, but it fosters sustainability through biodiversity protection and food waste reduction. Along with connecting fragmented seafood supply chains, the network stakeholders access a shared protocol with secure, authentic, and trusted data.

Deliver ESG goals with decentralized programs

The UN World Food Programme (WFP) is a humanitarian organization that delivers food and nutrition assistance to communities in times of emergency. To streamline distribution and secure money transfer, it uses DeFi protocols to eliminate the need for cash and empower refugees who often have no access to financial institutions.

DeFi enables financial applications built on blockchain technology to design smart contracts, eliminating intermediaries. The WFP uses it to create custodian wallets on behalf of the beneficiary to enable the transfer of digital vouchers between the beneficiary and merchant, reducing transaction fees by 98%.

Future of work + low-code development

The rapid need for digitalization combined with an overstretched global workforce drives businesses to embrace more intuitive ways of programming. Future-forward enterprises seek adaptability, and turn to no-code and low-code development as the winning strategy. By empowering employees to learn and develop applications without formal IT training, these enterprises save time and resources.

Gartner predicts that, by 2024 65% of application activity will result from no-code development. The research company reports that businesses are relying more heavily on employees outside of IT, with 41% of employees developing or customizing solutions.

Low-code development decreases the time and cost of software development and offers a more agile and streamlined process to get applications built and deployed. Looking to the future of work, low-code tools reduce development time by 90% and save enterprises on average $1.7 million annually in operational costs.

This ability is quickly transforming the way companies do business. Users can use drag-and-drop functions with visual code blocks and pre-built integrations and connectors. Instead of manually coding applications, engineers can embrace their passion for science, building, and testing applications—fundamentally changing the future of work.

The growth rate for low-code developers is expected to reach 3.2 times that of traditional developers, according to IDC. The solution is poised to boom with more than 500 million applications and services created over the next four years. Having flexibility at the core, employees can learn low-code development anywhere, any time that fits their schedule.

To capitalize on the trend, businesses must invest in learning and development opportunities for employees and encourage participation across all skill and training levels. The return on the investment is an engaged workforce that's nimble, adaptive, and fueled by opportunities to progress within and outside of your organization.

Use cases in action

Take remote work to the future

Provider Assist's team built its MyVitals application by using the simple click and drag-and-drop functions of low-code development. The benefits of this development process are two-fold. First, employees get first-hand experience in learning to develop the application. And second, end users get streamlined access to funding and healthcare services, improving patient outcomes.

Drive client experience with digital transformation

Bendigo Bank, an Australian financial institution, focused on driving customer experience by enabling its employees and citizen developers to create 25 customer-focused enterprise applications using a low-code platform. To speed innovation, the bank relied on the agility and flexibility of low-code tools to develop applications for everything from ATM, fraud, and credit card management to loan and mortgage processes.

Future of work + ESG and sustainability

As organizations navigate toward the future of work and set meaningful ESG benchmarks, they can better allocate resources. They can also plan for their company and employees' sustained growth and do their part to help the planet.

This converging trend isn't just about managing risks. It's about creating opportunities for more people around the world and embracing diversity, equality, and inclusion (DEI) initiatives. Growing evidence points to diverse, well-trained, and well-cared-for workforces that are able to make better decisions. Any company that fails to embrace diversity, or support its employees' well-being, could hinder its ability to hire and retain top talent—impacting shareholder value.

The future of work looks promising with technology opening the door to drive much needed change. But execution is everything, and future leaders will be the ones who stay the course on ESG and sustainability.

Use cases in action

Work in paradise

Bitcoin Beach, a local community in El Zonte, El Salvador, has created a sustainable bitcoin economic ecosystem—the first of its kind. This system supports many locals who don't have access to bank accounts and are unable to qualify for merchant accounts, which are required to accept credit card payments. Now many local businesses in El Zonte can accept cryptocurrency as payment and pay workers in bitcoin.

Empower low-income communities and lower waste

Nigeria-based RecyclePoints is a social venture recycling program that addresses the country's waste issues, as well as over 71,000 tons of waste from other countries. With a points-based incentive model, low-income communities are rewarded for collecting and returning waste.

The clean-tech start-up employs 80% women, known as "Wastebusters." They ride electric tricycles through communities to collect recyclable waste, which is then processed and sold to recycling plants as raw material for new products.

Low-code development + ESG and sustainability

To keep moving at today's rapid pace and remain competitive, businesses need the ability to develop applications faster, with fewer resources and bugs. At the same time, they must factor in ESG and sustainability efforts. Using standardized components with low-code development means lower maintenance requirements and better sustainability as less time is needed to review custom code and maintain legacy software.

Low-code solutions, especially ones that use standardized components, serve experienced developers by saving time, enhancing reusability, and reducing maintenance effort. These solutions make it easier to understand the reasons and methods for creating the original application and for updating them. For traditionally developed applications, this information can be difficult to understand, especially when it's not properly documented or the original developer or developers have left the company.

For these reasons, low-code development has become a top priority for companies that are focused on ESG initiatives. Reducing the resources required for software development positively impacts environmental and sustainability efforts. On the societal front, the growing demand for low-code developers creates an opportunity for non-technical workers to enter some of the fastest-growing careers.

From a governance perspective, and ever-changing regulations, how can organizations keep up? Low-code development enables fast change, so enterprises can meet regulatory requirements and stay ahead of deadlines.

Low-code development is good for business and good for employees. It also has the potential to advance ESG efforts. With a competitive job market and the growing need to retain top talent, top employers demonstrate significantly higher ESG scores than their peers. As millennials and Gen Zers make up most of the global workforce, ESG performance will become increasingly important to attract and retain talent.

Use cases in action

Know your CO2

CodeCarbon is a software integration for Python. It determines how much carbon dioxide (CO2) is generated by the cloud or in running code for personal computing. With real-time visibility into emissions, developers can pivot to optimize their code or host their cloud infrastructure in areas around the globe that prioritize the use of renewable energy.

Reduce food waste with a low-code solution

Female-owned business FoodPrint is leading the way with a mission to reduce food waste and reduce carbon emissions in the hospitality and restaurant business. By reimaging and digitizing its workflow using a leading low-code platform, the business drives customer experience by using a user-friendly solution that scales with global expansion.

The solution prioritizes automation and compliance with real-time data and analytics, and a virtual onboarding platform. Because the team used low-code technology to build the platform, adapting it to meet customer demand is straight-forward and easy to achieve.

A new way forward

In 2022, many enterprises must rethink their strategies to better align with today's business environment, regulations, customer expectations, and tomorrow's opportunities for growth. The trends and technologies featured in this report will be instrumental in helping your organization navigate a path to a more productive, profitable, and sustainable future.

Enterprises that embrace change will gain a long-lasting competitive advantage. They'll be prepared to address additional situations as they emerge, including workforce dynamics, global health issues, climate change, and social and political disruptions.

What lies ahead will bring world-changing opportunities as we collectively transform the way we live and work forever. By daring to push the limits of technology, we can build a legacy of transformation that continues to accelerate innovation well into the future.

2022 Virtusa Trend Almanac

About Virtusa

A global provider of digital business strategy, digital engineering, and IT services and solutions, Virtusa Corporation helps clients change, disrupt, and unlock new value through innovative engineering. The company serves Global 2000 companies in the Banking, Financial Services, Insurance, Healthcare, Communications, Media, Entertainment, Travel, Manufacturing, and Technology industries.

Clients rely on Virtusa to grow their business with innovative products and services that create operational efficiency using digital labor, future-proof operational and IT platforms, and rationalization and modernization of IT applications infrastructure. Virtusa achieves these goals through a unique approach that blends deep contextual expertise, empowered agile teams, and measurably better engineering. In doing so, it creates holistic solutions that drive their clients' business forward at unparalleled velocity enabled by a culture of cooperative disruption.

virtusa