DELLTechnologies

CREATING VALUE
IN A DIGITAL WORLD

The Role
of Emerging
Technology

PART 3 IN A 3-PART SERIES

intel®

The Next Big Thing

Every day we hear about the "next big thing." None of us at Dell Technologies believe that we know with certainty what the future will hold. But we do know that "Emerging" technologies – Internet of Things, 5G, Artificial Intelligence, etc. – are being touted as the "next big thing" that will solve all our problems.

We're using our considerable resources to study the parts of this conundrum that are in our area of expertise: Transformative technologies. This report presents our understanding of the leading emerging technologies that will transform our world, organizations and our lives.

Emerging technology adoption rates among large enterprises are up to **10 times higher** than in small business.[1]
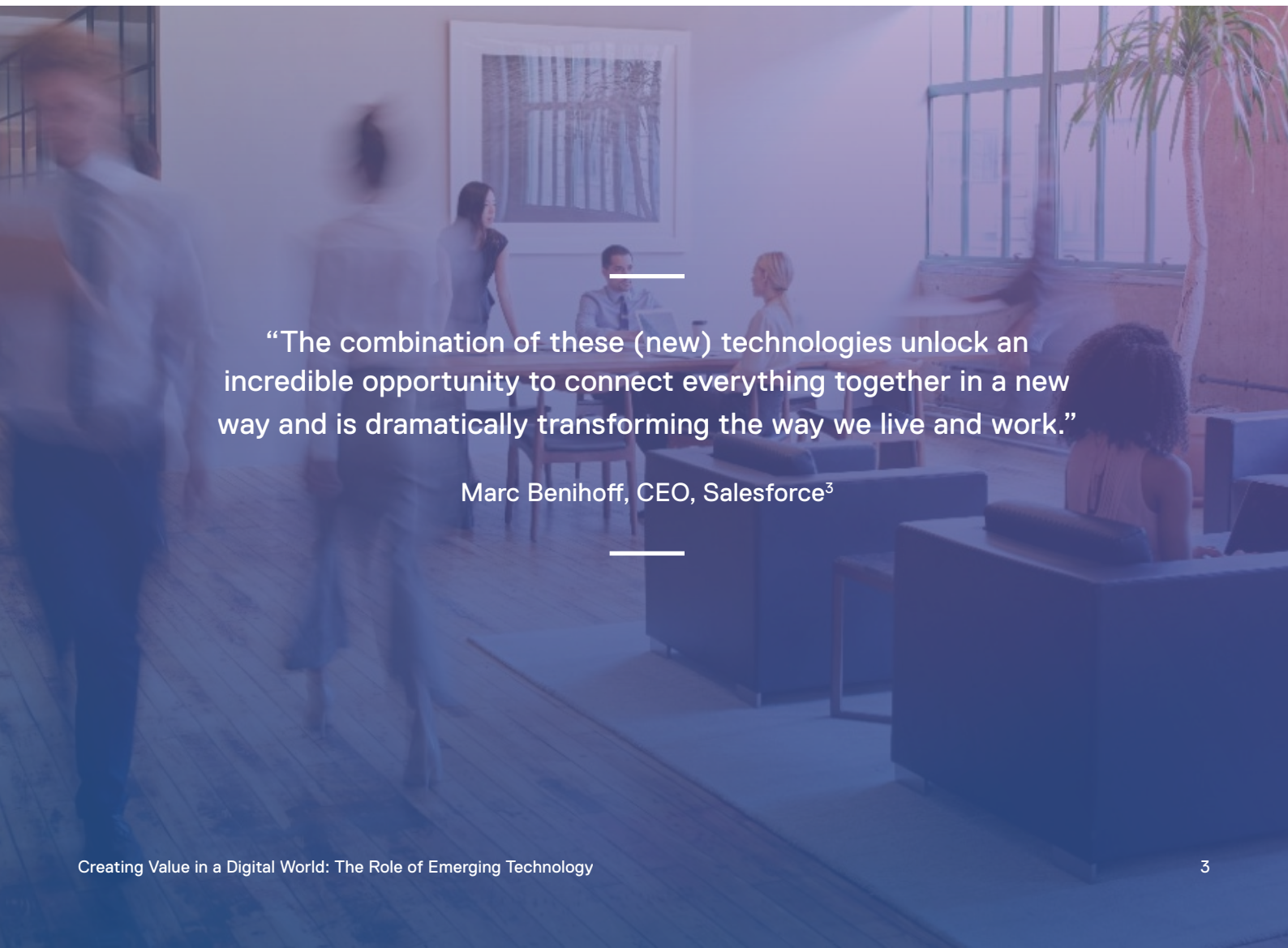
Creating Value at the Edge

Every business and organization have a unique set of business requirements that drive their strategic IT initiatives. But there are some commonalities. They all want to reduce costs and increase agility. And every CIO wants to create new value, whether that is in terms of revenue or new services.

Technology is at the heart of every one of these requirements, and the Edge is the starting point. The Edge is transforming how people and machines interact with digital services.

By acting on data closer to the source, the Edge is enabling entirely new experiences, enhance efficiency and improve control in businesses. It is at the Edge where you'll find the greatest opportunity to create new value for your business, especially as the world becomes more mobile and IoT becomes more prominent and practical.

Within the next 3-4 years mobile data traffic is expected to surge by 8 times. **45% of that data will be stored, analyzed and acted on at the Edge.** At the same time, Gartner[2] predicts Edge data will comprise 75% of enterprise data by 2022, up from 10% today.

"The combination of these (new) technologies unlock an incredible opportunity to connect everything together in a new way and is dramatically transforming the way we live and work."

Marc Benihoff, CEO, Salesforce[3]

Transformation is No Longer an Option

Over the past decade every industry and government sector, regardless of size or geography, has undergone digital transformation. Today, every organization must become a digital organization, powered by data, running in a multi-cloud world. The digital future is now, and it's only going to get more intense.

Just 5% of businesses can be classified as Digital Leaders, the same as when Dell Technologies first studied this same group in 2016.

"Data has the potential to drive **better outcomes, processes** and of course, **new technology** that could be the next major industry disruption and breakthrough."

John Roese, President
P&O Chief Technology Officer,
Dell Technologies
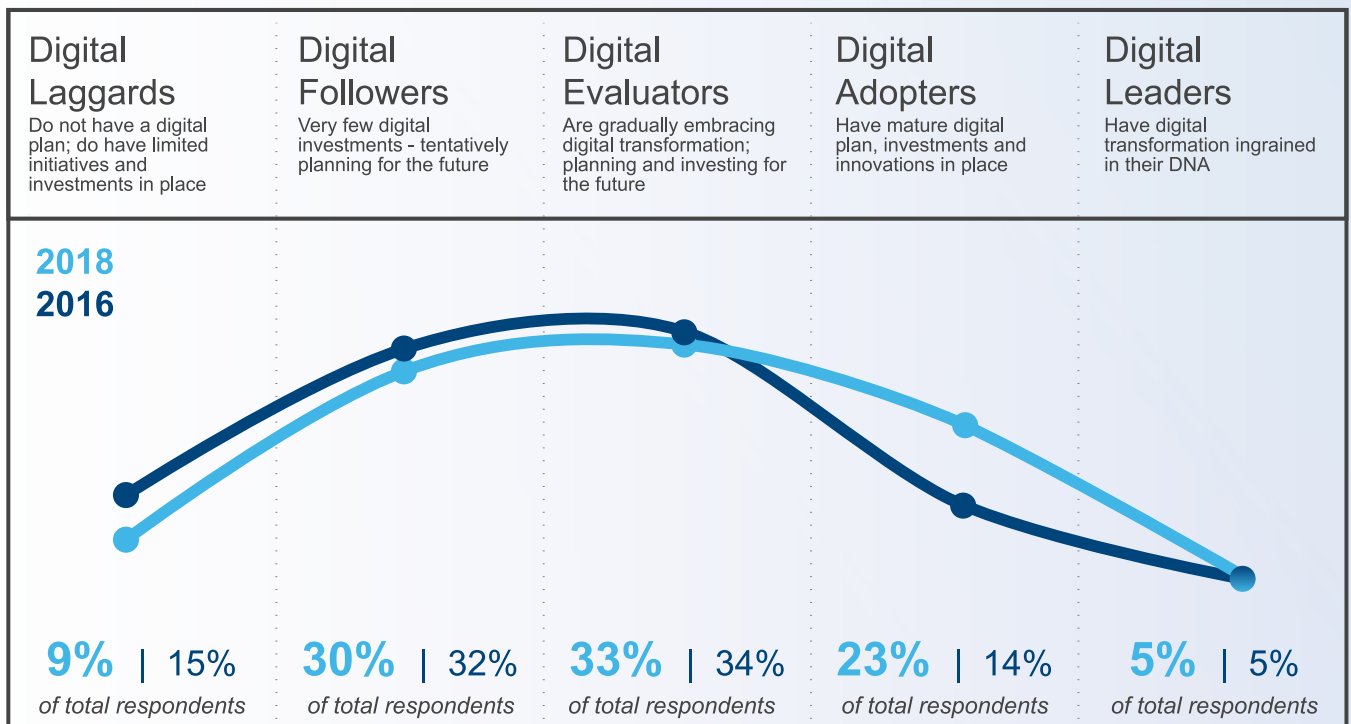
Are Organizations Prepared

To measure this and determine the state of transformation globally, the Dell Technologies Digital Transformation Index[5] studied more than 4,600 senior decision makers across 12 industries from 40+ countries. What it found was that the answer to this question was a resounding "not really." There is a major chasm between realizing the need for transformation and acting to make it happen today.

45%
said they were concerned about becoming obsolete in just 3-5 years

51%
believe they'll struggle to meet changing customer demands in the next five years

1 in 3
still feel they will be left behind

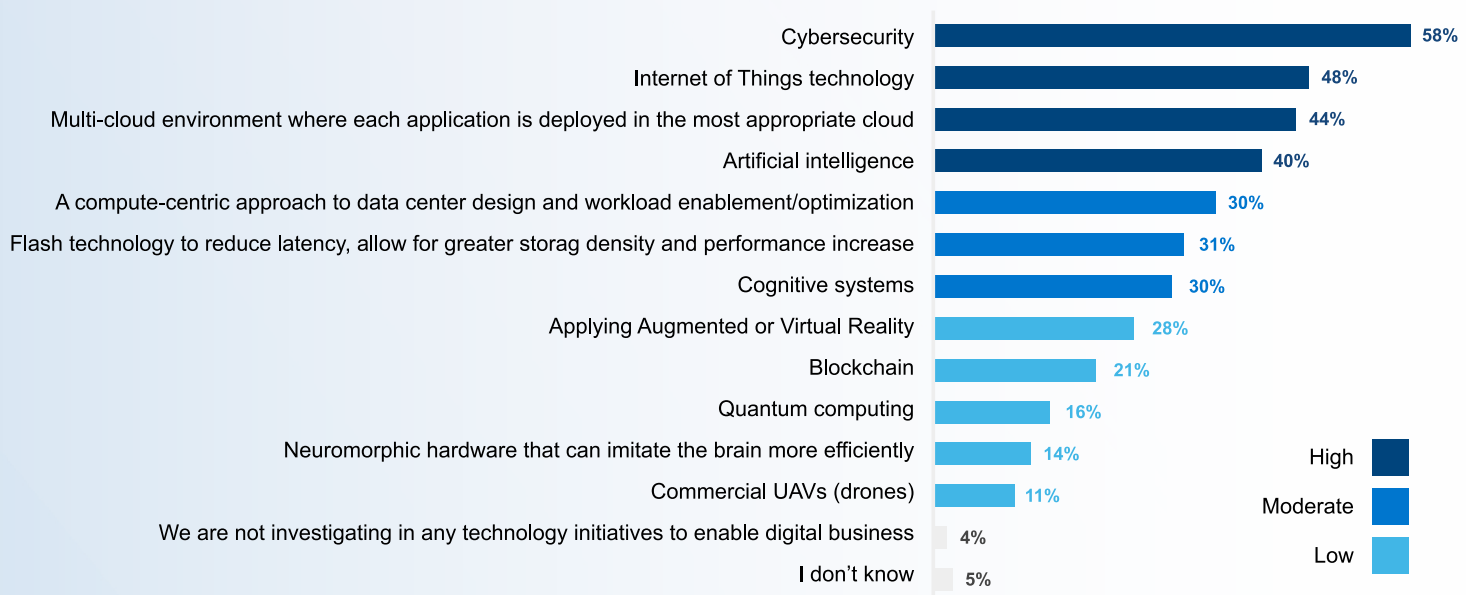## Digital Transformation Index: 2016 to 2018

Digital Laggards	Digital Followers	Digital Evaluators	Digital Adopters	Digital Leaders
Do not have a digital plan; do have limited initiatives and investments in place	Very few digital investments - tentatively planning for the future	Are gradually embracing digital transformation; planning and investing for the future	Have mature digital plan, investments and innovations in place	Have digital transformation ingrained in their DNA

2018
2016

9%	15%	30%	32%	33%	34%	23%	14%	5%	5%
of total respondents		*of total respondents*		*of total respondents*		*of total respondents*		*of total respondents*	

Priorities Based on Expected Value

The Digital Transformation Index showed that leading organizations invest in emerging technologies to make business transformation real.

Technology Investment Plans Over the Next 1-3 years

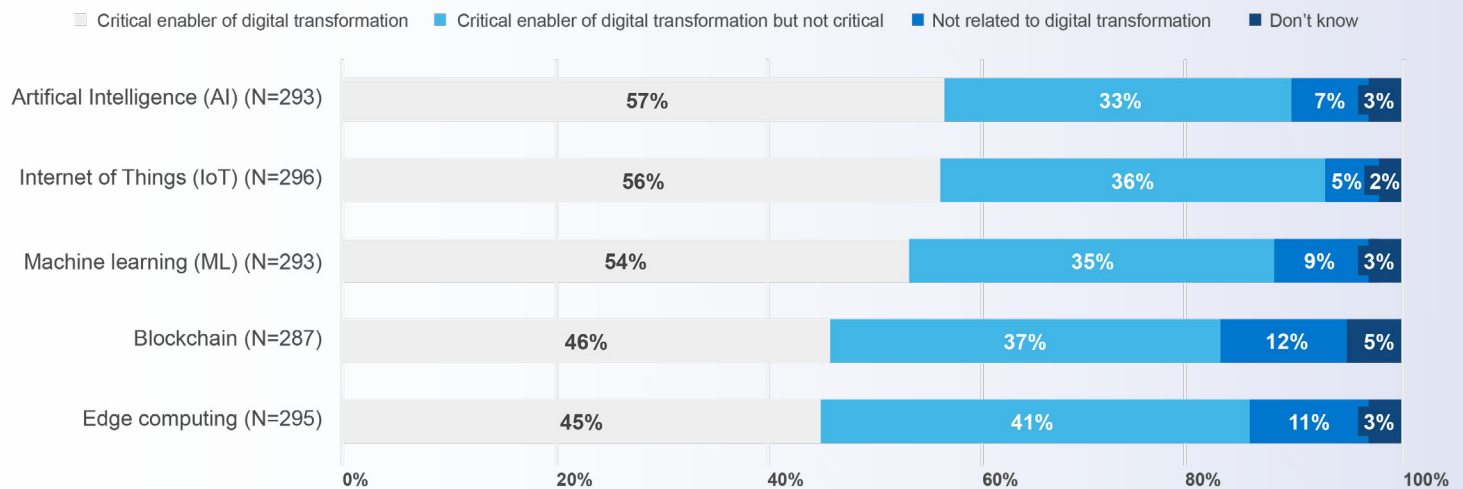| Technology	Percentage
Cybersecurity	58%
Internet of Things technology	48%
Multi-cloud environment where each application is deployed in the most appropriate cloud	44%
Artificial intelligence	40%
A compute-centric approach to data center design and workload enablement/optimization	30%
Flash technology to reduce latency, allow for greater storag density and performance increase	31%
Cognitive systems	30%
Applying Augmented or Virtual Reality	28%
Blockchain	21%
Quantum computing	16%
Neuromorphic hardware that can imitate the brain more efficiently	14%
Commercial UAVs (drones)	11%
We are not investigating in any technology initiatives to enable digital business	4%
I don't know	5%

Legend:
- High
- Moderate
- Low

> *"What excites me is how we will be able to transform. Machine learning, artificial intelligence and big data are going to allow us to make a fundamental change to NATO."*
>
> –DR. GREGORY EDWARD, DIRECTOR OF SERVICE OPERATIONS, NATO[10]

Emerging tech is critical

A 2019 study by the Enterprise Strategy Group[9] showed that most leading organizations already see the essential nature of emerging technologies. 82% of organizations agree or strongly agree that without emerging technology they will not be able to transform. And if they don't transform, a competitor will disrupt their business.

Emerging Technologies are Vital to Digital Transformation

Legend: ☐ Critical enabler of digital transformation ■ Critical enabler of digital transformation but not critical ■ Not related to digital transformation ■ Don't know

Technology	Critical enabler of digital transformation	Critical enabler of digital transformation but not critical	Not related to digital transformation	Don't know
Artifical Intelligence (AI) (N=293)	57%	33%	7%	3%
Internet of Things (IoT) (N=296)	56%	36%	5%	2%
Machine learning (ML) (N=293)	54%	35%	9%	3%
Blockchain (N=287)	46%	37%	12%	5%
Edge computing (N=295)	45%	41%	11%	3%

Failure to Embrace Emerging Technologies Will Hurt Business

If my IT organization does not embrace emerging technologies, my organization will not achieve its digital transformation goals

82% agree or strongly agree[19]

If my organization does not achieve its digital transformation goals, we will be disrupted by a competitor that will out innovate us
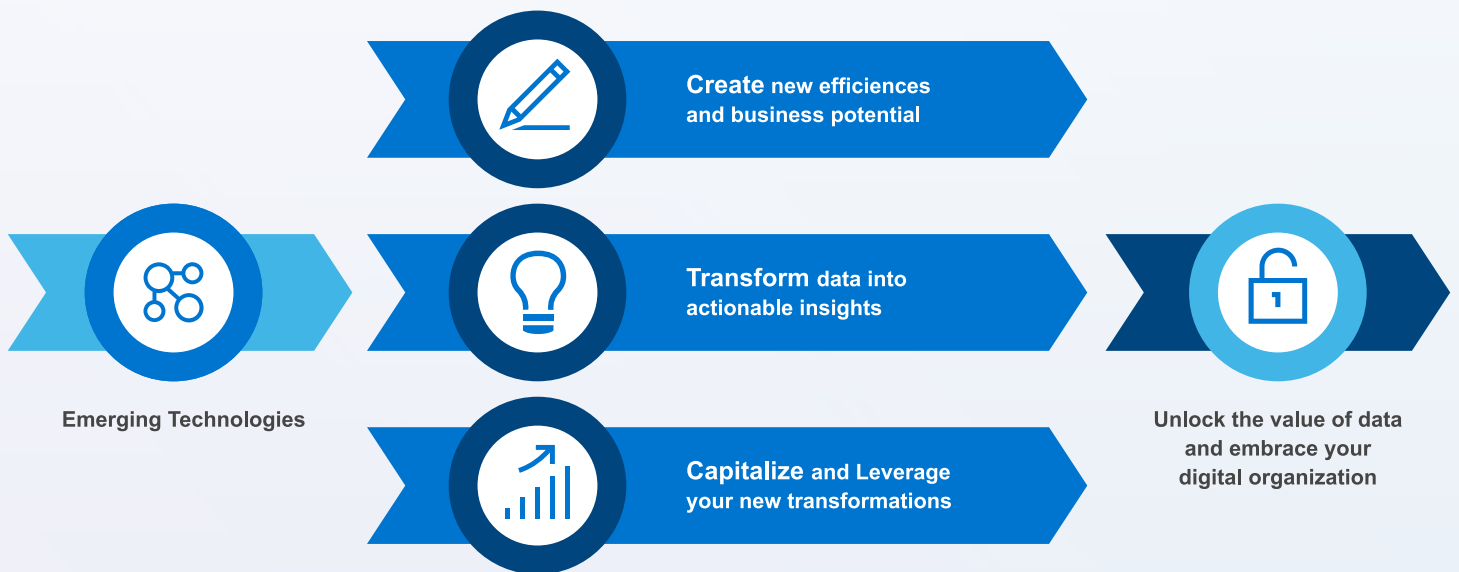
77% agree or strongly agree[19]

Creating Value with Emerging Technologies

What has become clear from our research is that the deployment and use of emerging technologies will be critical in the next decade. These will be powered by Edge computing and a multi-cloud strategy. On its own, each technology has the potential to spark major changes. In combination, they will redefine how organizations build and deploy software, how they modernize and simplify their infrastructure, how they inspire their workforce and secure their most critical assets.

The goal of emerging tech

Data has become the foundation for everything. As a result, the emerging technologies journey of organizations – no matter their industry or location – is dependent upon their ability to:

Create new efficiences and business potential

Emerging Technologies

Transform data into actionable insights

Unlock the value of data and embrace your digital organization

Capitalize and Leverage your new transformations

Start at the Edge

While "Edge" is defined in many ways, one thing is clear: The Edge is best defined by what it does. Edge transforms how people and machines interact with digital services. By enabling new types of interactions with digital services, the Edge can help you use data to create new opportunities for people and machines. It helps machines share data and optimize themselves with new services based on what's working best.

Edge

Edge Computing
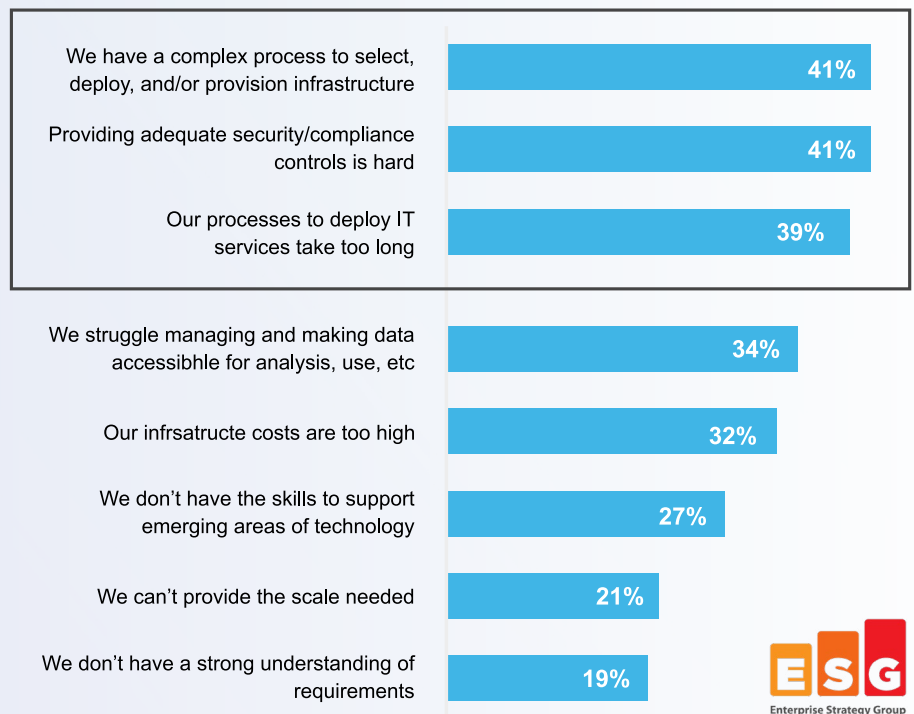
Multi-cloud

IoT

Analytics & AI

Next-gen connectivity
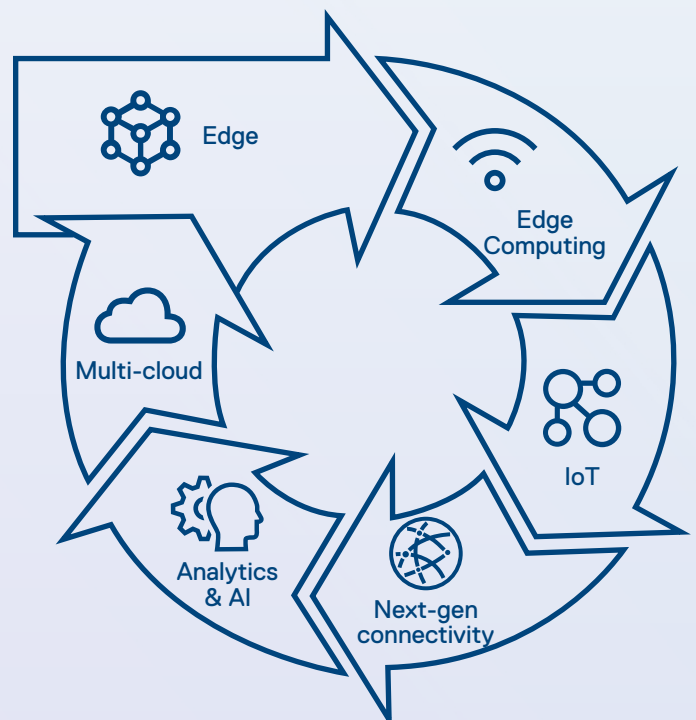
Barriers to Adopting Emerging Technologies

Right now, the clear majority (91%) of companies are struggling to overcome persistent barriers to transformation.[12]

Research from the Enterprise Strategy Group reveals even greater challenges when implementing emerging technologies. (Emerging Technology Momentum and the Impact on IT Infrastructure[9])
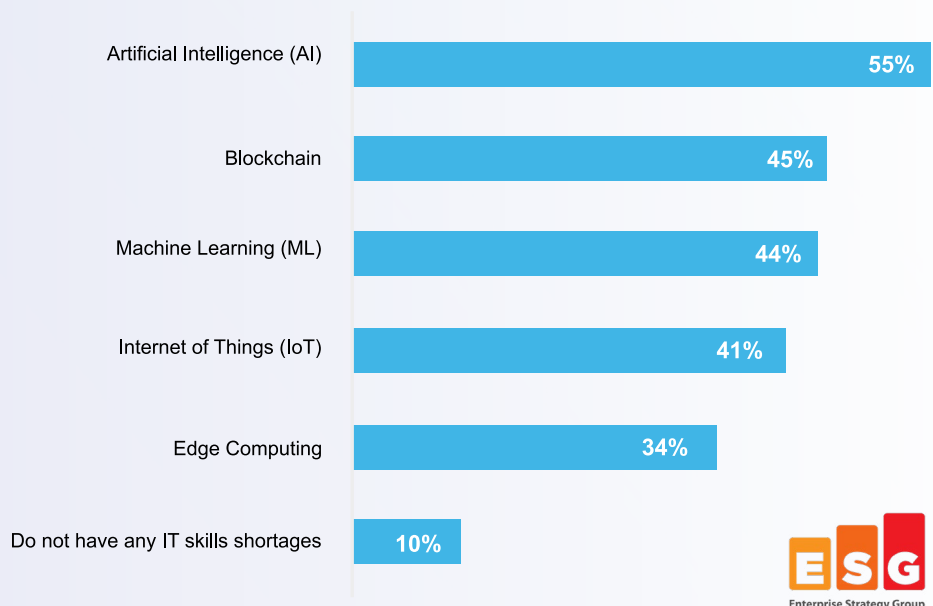
A digital organization is one that has doubled down on completing their digital transformations to get the most value from their investments—and at the same time, turning a strategic eye toward what's next.

Deploying IT Infrastructure to Support Emerging Technology is Complicated

We have a complex process to select, deploy, and/or provision infrastructure	41%
Providing adequate security/compliance controls is hard	41%
Our processes to deploy IT services take too long	39%
We struggle managing and making data accessibhle for analysis, use, etc	34%
Our infrsatructe costs are too high	32%
We don't have the skills to support emerging areas of technology	27%
We can't provide the scale needed	21%
We don't have a strong understanding of requirements	19%

ESG
Enterprise Strategy Group

Skills Gaps Present Problems

The research also identified which emerging technologies present a problematic shortage of existing skills.

Artificial Intelligence (AI)	55%
Blockchain	45%
Machine Learning (ML)	44%
Internet of Things (IoT)	41%
Edge Computing	34%
Do not have any IT skills shortages	10%

ESG
Enterprise Strategy Group

Our Point of View: Creating Value with Emerging Technologies

There has been so much excitement about new, emerging technologies. With all the noise, it's becoming harder to sort out the actual business value of each one, the priorities, and more importantly, which ones will get the greatest results for your organization. And each is in a different stage of hype versus reality.

It is clear that over the next decade, emerging technologies will mature and proliferate, ranging from 5G to advances in AI, Edge computing, Internet of Things, machine learning, and others. They will enable large-scale shifts in our economy and transform entire industries.

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A digital organization is one that has doubled down on completing their digital transformations to get the most value from their investments— and at the same time, turning a strategic eye toward what's next.

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Internet of Things (IoT): Moving Analytics to the Edge

The Internet of Things (IoT) is perhaps the purest possible expression of how the world is transforming from mechanical to digital. By digitally sensing the physical world, IoT transforms material things into streams of data, allowing people to sense and interact with them in entirely new ways and accelerate the pace of innovation. Edge computing augments IoT by enhancing our ability to analyze IoT data and act on it in real time.

"By applying technology like the IoT, we're able to measure everything – water use, temperature, soil composition, humidity, growth rates and more – to absolutely control and maximize every aspect of the process. Emerging technologies make this possible."

-DAVID ROSENBERG, CEO & CO-FOUNDER, AEROFARMS[13]

IDC forecasts worldwide technology spending on the Internet of Things to reach **1.2 trillion USD** in 2022.[14]

We Believe That the Implementation of IoT Technologies Requires Four Key Actions:

Architecting for flexibility at scale so you can innovate faster. When you deploy Edge and IoT solutions, you should always start small, have an end goal in mind and prepare to be inspired to do more.

Protecting and securing your operations so you can maintain productivity. IoT can expose your operational technology (OT) and processes to costly – even lethal – disruption. Whether it's a poorly timed software update or a malware intrusion, IoT comes with very real risk. Given this fact, we believe successful IoT implementations must be OT-trusted and IT-approved.

Harnessing the data deluge so you can capture greater value from IoT information. With the right systems in place, we believe massive IoT data sets can become a massive advantage. Research has proven that the more data AI algorithms are exposed to, the more accurate they become. You must work to ensure your ability to unlock the value of data at any scale.

Relying on trusted expertise so you can move ahead with confidence with less risk. The scope of IoT extends well beyond what any single company can handle. So, organizations should seek pre-built solutions, best practices and partner programs to get you the result you want.

Next-Generation Connectivity: Real-Time Connectivity Everywhere

5G is one of the most hotly anticipated technologies in the coming years, perhaps the most. It's understandable why. 5G promises to enable ultra-low latency response times for ubiquitous real-time connectivity, faster broadband speeds, and the ability to support over 1000 more devices per meter than 4G. Imagine what this kind of performance could mean in the digital future: faster video downloads, near instantaneous response times to web browsing, easy sharing of even giant files.

We believe that the implementation of 5G technologies, and by extension Wi-Fi 6, require three key actions:

1 **Leveraging the power of partners so you get there faster.** You'll need domain-specific experts from a rich mix of technology and services providers. This will help you can get to market faster.

2 **Making sure you can deploy efficiently anywhere to improve agility.** Using enterprise-grade infrastructure and devices will allow you to run reliably at the Edge – even in harsh environments. You'll also need to rely on software and services for agile application development and deployment.

3 **Architecting to make everything work together to deliver higher customer satisfaction.** Vendor integration services, data center-as-a-service (DCaS), and multi-vendor support across edge and cloud will deliver this.

> By 2024, 5G networks are poised to cover 40% of the globe and handle 25% of mobile traffic.[15]

A Multi-Cloud Strategy: The Thing That Connects Them All

The cornerstone of digital leadership is a clear and defined multi-cloud strategy. As digital organizations evolve, so do their needs. We believe that in a multi-cloud journey, there are three key pathways: A hybrid cloud path, a native cloud path and acquiring/managing Software-as-a-Service. This creates the agile, efficient and scalable platform needed to deploy and run emerging technologies. These three strategies can, and often do, exist simultaneously within an organization. They're complementary and equally important because they're based on unique priorities, opportunities and solution offerings. The key difference between laggards and leaders is often a comprehensive multi-cloud strategy that architects for flexibility, creates a consistent operational experience, and aims to continually improve capabilities.

Guidance and Best Practices

Our research around the world told us one important thing: To lead in a digital future, everyone in an organization must embrace the change – from the top to the bottom, and everyone in between. It requires a change in people – mindset, culture, and skills.

Transformation is Job #1

82%

of CEOs have a digital transformation initiative, up from 62% in 2018.

– Gartner[17]

77%

of CEOs plan to increase investment in digital capabilities and 74% in IT in 2019.

– Gartner[17]

> "With more than **$5 billion of venture capital investment over last 2 years**, artificial intelligence (AI) is poised to have a transformative effect on consumer, enterprise, and government markets around the world."
>
> - PWC[18]

Investing in Emerging Technologies is a "Must Have"

The Transformation Index showed that leading organizations invest in emerging technologies to make business transformation real.

Be Smart About the Process

While it might seem to be an elementary step, addressing future requires several key activities:

- Make sure the goals of leadership, technology and the enterprise are aligned.
- Call in an expert consultant: Look for ones that can view your technology infrastructure and future plans in an objective, holistic way, with expertise in IT, business processes, software, workforce, applications and security.
- Use a step-size approach to planning: There's a standard way to do it, but "do it yourself" isn't the best approach.

Use a Proven Approach

While each industry or sector will have its own unique business imperatives, there are four strategic imperatives that apply to virtually every digital organization.

- Increase your business agility by using a multi-cloud strategy.
- Create new value through the Edge.
- Transform engagement through workforce modernization.
- Meet sustainability goals through responsible IT asset disposal.

Action Today is Essential

We are all on a digital journey. We created Dell Technologies to provide not only the products and solutions, but also the services and expertise to help make business transformation real for you: one partner, purpose-built for your digital future.

Read parts 1 & 2 of this report:

Part 1
[Creating Value with Emerging Technologies:
The Differentiator for Digital Innovators](#)

Part 2
[Delivering Value with Emerging Technology:
Starting at the Edge](#)

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the Dell Technologies
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our capabilities

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Sources: 1. https://en.wikipedia.org/wiki/Emerging_technologies. 2. Gartner, "Smarter with Gartner," https://www.gartner.com/smarterwithgartner/what-edge-computing-means-for-infrastructure-and-operations-leaders/. 3. Marc Benioff, CEO of Salesforce. https://www.brainyquote.com/quotes/marc_benioff_532180. 4. Jeff Bezos, Amazon founder. https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/. 5. Dell Technologies Digital Transformation Index https://www.dellemc.com/en-us/collaterals/unauth/analyst-reports/solutions/dell_technologies_digital_transformation_index_ii_full_findings_report.pdf. 6. "Gartner Predicts by 2021, CIOs Will Be as Responsible for Culture Change as Chief HR Officers" Gartner 2019 https://www.gartner.com/en/newsroom/press-releases/2019-02-11-gartner-predicts-by-2021--cios-will-be-as-responsible. 7. "Gartner Predicts by 2021, CIOs Will Be as Responsible for Culture Change as Chief HR Officers" Gartner 2019 https://www.gartner.com/en/newsroom/press-releases/2019-02-11-gartner-predicts-by-2021--cios-will-be-as-responsible. 8. Gartner, https://www.gartner.com/en/information-technology/trends/midsize-enterprise-emerging-technology-roadmap. 9. Enterprise Strategy Group, Emerging Technology Momentum and the Impact on IT Infrastructure. 10. NATO, https://www.dellemc.com/en-us/video-collateral/demos/microsites/mediaplayer-video/winning-with-data.htm#. 11. Mark Rendall, OTTO Motors, https://www.dellemc.com/en-us/video-collateral/demos/microsites/mediaplayer-video/otto-motors-customer-reference-building-a-safer-workplace-with-self-driving-vehicles-and-ai.htm. 12. https://www.dellemc.com/en-us/collaterals/unauth/analyst-reports/solutions/dell_technologies_digital_transformation_index_ii_full_findings_report.pdf. 13. David Rosenberg, CEO & Co-Founder, AeroFarms, https://www.emc.com/collateral/customer-profiles/aerofarms-harvesting-insights-to-transform.pdf 14. IDC, https://www.idc.com/getdoc.jsp?containerId=prUS43994118. 15. https://www.ericsson.com/assets/local/mobility-report/documents/2018/ericsson-mobility-report-november-2018.pdf 16. Forrester, Business Aligned Tech Decision Makers Drive Enterprise AI Adoption Infographic, 2018 https://www.forrester.com/report/Forrester+Infographic+BusinessAligned+Tech+Decision+Makers+Drive+Enterprise+AI+Adoption/-/E-RES141957. 17. Gartner 2019 CEO Survey: The Year of Challenged Growth. https://www.gartner.com/doc/reprints?id=1-LRMK1E1&ct=190621&st=sb>. 18. PWC, https://www.pwc.com/CISAI?WT.mc_id=CT1-PL52-DM2-TR1-LS4-ND6-BPA1-CN_CIS-AI-AIsocial. ESG. https://www.esg-global.com/19. ESG: Failure to Embrace Emerging Technologies Will Hurt Business