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SURVEY

Constellation Research 2018 Digital Transformation Study

Digital Transformation Efforts Yield Positive ROI

AUTHORS

Courtney Sato
Director of Research Development

R "Ray" Wang
Founder and Principal Analyst

Copy Editor: Jim Donahue
Layout Editor: Aubrey Coggins

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EXECUTIVE SUMMARY

This report examines the state of digital transformation among the first movers, early adopters and fast followers that constitute Constellation Research's subscriber base.

This report is based on findings from the Constellation Research 2018 Digital Transformation Survey, in which Constellation asked survey respondents to identify the major priorities of their digital transformation efforts today, who is leading digital transformation, impediments to digital transformation, challenges that particularly vex executives, the state of implementation of emerging technologies, the state of investment in maturing digital technologies, workforce issues and digital transformation's impact on innovation in the enterprise.

While organizations' digital transformation strategies may have varied goals and challenges, one thing is clear: with 68 percent of respondents reporting positive ROI for digital transformation strategies, digital transformation is now a profitable endeavor, and many are enjoying its results.

Eighty-one respondents completed the survey in the second and third quarters of 2018. We collected responses from Constellation's subscriber base on Constellation's website and ZDNet.com.

Business Themes


New C-Suite


Digital Marketing & Sales Effectiveness


Matrix Commerce


Technology Optimization


Data to Decisions


Future of Work


Next-Generation Customer Experience


Digital Safety and Privacy

Methodology

The Constellation Research 2018 Digital Transformation Survey was conducted in the second and third quarters of 2018. There were 81 respondents in the final sample. The survey targeted organizations with a defined digital transformation strategy. Constellation collected responses from its subscriber base on its website and from readers of ZDNet.com.

Constellation limited respondents to people with purchasing authority for their organizations. Fifty-eight percent of responses came from members of the C-suite, with CIOs making up 25 percent of the sample; CEOs, 12 percent; chief digital officers (CDOs), 10 percent; CTOs, 6 percent; chief marketing officers (CMOs), 1 percent; CFOs, 1 percent; and other C-level executives, 3 percent. Senior VPs, board members/non-executive directors and IT managers (up to director) made up 33 percent of the sample. Line-of-business managers and IT employees made up 7 percent of the sample.

The sample consisted of respondents from 13 sectors, mostly in the United States. Sectors were automotive; consumer electronics; consulting and systems integration; education; finance, insurance and real estate; government; healthcare, medical and pharmaceutical; media, interactive and public relations; news and entertainment; retail; technology (hardware, software and services); telecommunications; and travel and hospitality.

Total revenue of respondents' firms in 2017 ranged from less than $10 million to more than $1 billion. Eighteen percent of respondents said revenue was less than $10 million; 7 percent reported revenue between $10 million and $50 million; 22 percent cited revenue between $50 million and $500 million; 15 percent reported revenue between $500 million and $1 billion; and 37 percent said their organizations earned over $1 billion.

RESULTS FROM THE CONSTELLATION RESEARCH 2018 DIGITAL TRANSFORMATION SURVEY

The survey asked respondents to identify the major priorities of digital transformation efforts today, who is leading digital transformation, impediments to digital transformation, challenges that particularly vex executives, the state of implementation of emerging technologies, the state of investment in

maturing digital technologies, workforce issues and digital transformation's impact on innovation in the enterprise. This study sheds light on the state of digital transformation among the first movers, early adopters and fast followers that make up Constellation's subscriber base.

The Constellation Research 2018 Digital Transformation Survey reveals areas of both consistency and change when results are compared with the 2017 Digital Transformation Survey. In 2017, nearly half of respondents said they were investing in the Internet of Things (IoT), while a minority (25 percent) reported investments in artificial intelligence (AI). But AI investment surged in 2018, with 58 percent of respondents reporting they'll spend money on the technology. IoT investment remained relatively flat, with a healthy 51 percent of respondents reporting investment in the technology.

The 2018 survey also revealed that CIOs and CDOs are helming a greater percentage of digital transformation projects compared with 2017. Thirty-three percent of survey respondents indicated their CIO leads their organization's digital transformation strategies, with the CEO leading in 23 percent and the CDO leading in 20 percent. Last year, CEOs led the highest percentage of digital transformation efforts, at 29 percent; CIOs guided 19 percent; and CDOs headed just 8 percent of such efforts.

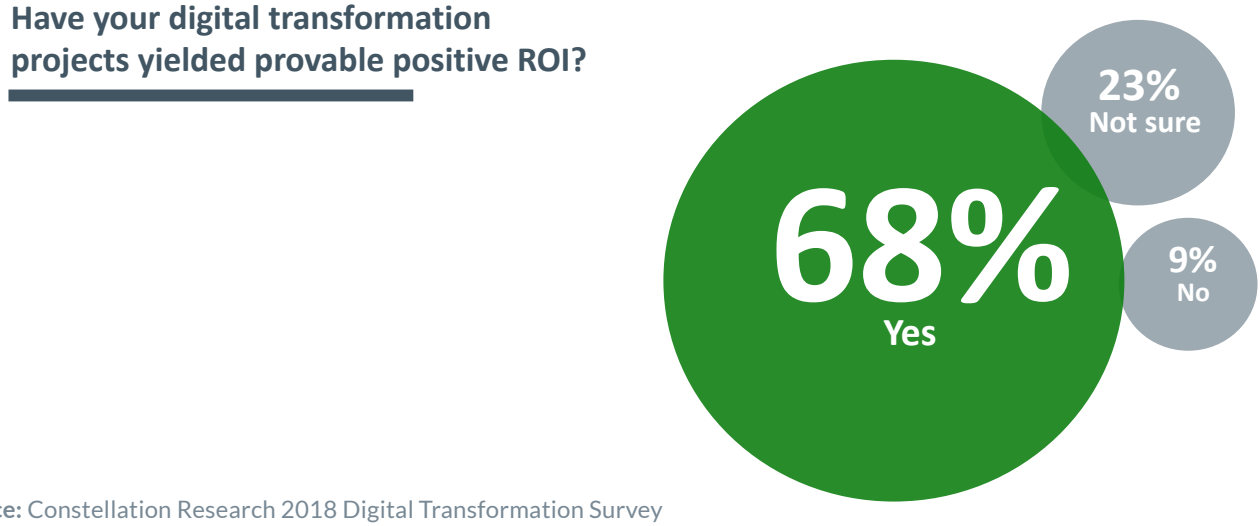
Workforce concerns continue to persist into 2018, and the war for digitally proficient talent shows no signs of abating. Fifty-one percent of respondents said their organizations need to make significant hires to staff digital transformation projects. In addition, 61 percent of respondents identified a lack of talent as an impediment to successful digital transformation projects.

DIGITAL TRANSFORMATION YIELDS POSITIVE RETURNS

Today, business leaders recognize digital transformation as vital to the success of the enterprise, and the data from this year's survey shows digital transformation efforts validated by a positive return on investment (ROI).

In 2010, Constellation Research declared digital business a necessity for organizations seeking to persist in the modern business environment. Businesses that are still operating today appear to have heeded the call. In 2018, 68 percent of businesses surveyed said their digital transformation efforts have yielded a positive ROI (Figure 1).

Figure 1. Return on Digital Transformation Investment



Source: Constellation Research 2018 Digital Transformation Survey

THE GOALS OF DIGITAL TRANSFORMATION IN 2018

Constellation asked respondents to identify the three most important goals of their organization's digital transformation strategy.

Collectively, the top five goals of respondents' digital transformation are as follows: reaching and engaging customers more effectively, at 50 percent; building a competitive advantage in the current market, 46 percent; implementing new, data-driven business models, 36 percent; increasing revenue, 35 percent; and modernizing legacy IT systems and processes and reducing costs, 31 percent (Figure 2).

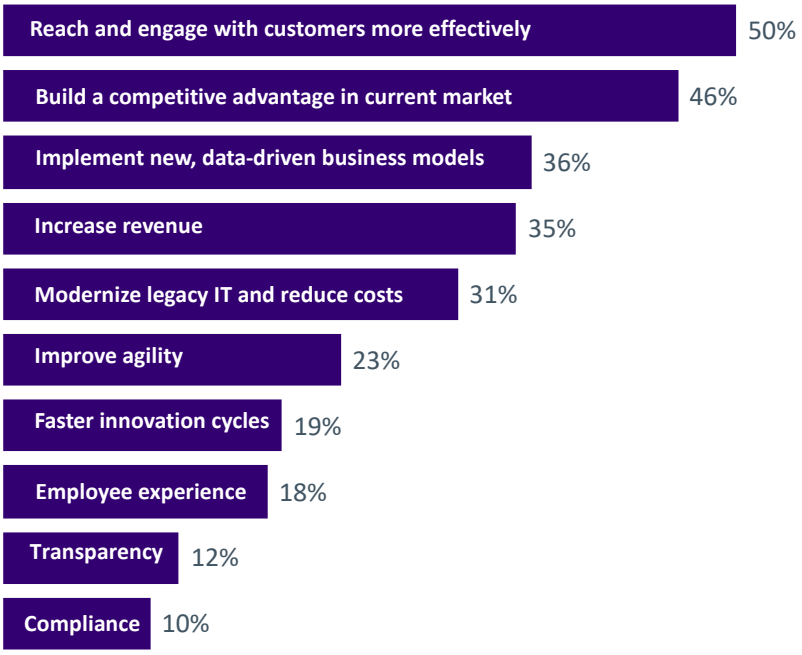
CIOS TAKE THE REINS

Thirty-three percent of survey respondents indicated their CIO leads their organization's digital transformation strategies, with the CEO leading in 23 percent of organizations, the CDO in 20 percent and the CMO in 9 percent (Figure 3).

This marks a change from last year, when CEOs led the highest percentage of digital transformation efforts at 29 percent, while CIOs trailed at 19 percent.

Figure 2. Digital Transformation Goals in 2018

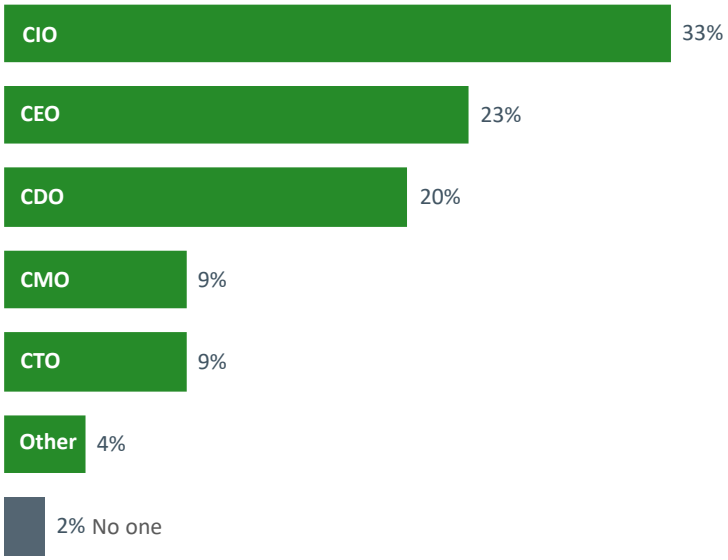
What is the most important goal of your digital transformation strategy?



Source: Constellation Research 2018 Digital Transformation Survey

Figure 3. Leadership of Digital Transformation Projects

Who leads your digital transformation strategy?



Source: Constellation Research 2018 Digital Transformation Survey

Also of note is the rise in prominence of the CDO compared with last year. In 2017, just 8 percent of respondents said the CDO led digital transformation efforts in their organizations. Constellation attributes this change to the growing emphasis on digital transformation among large (over $1 billion in revenue) enterprises.

Revenue Matters

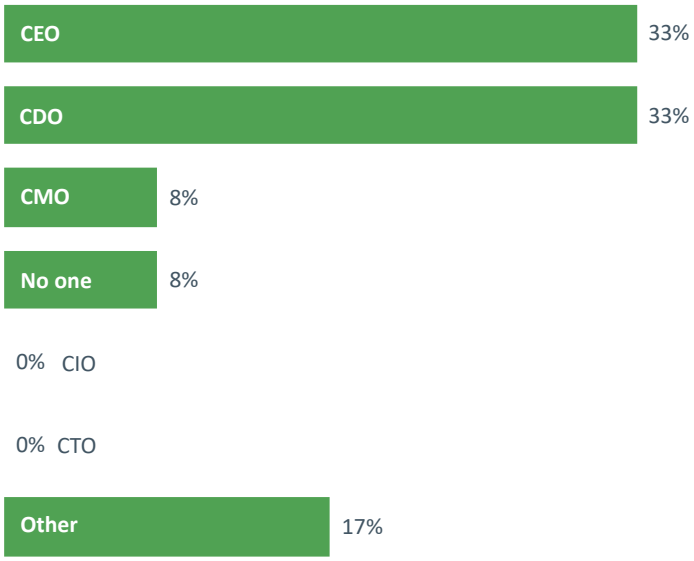
Digging deeper into the data reveals a correlation between digital transformation leadership and company revenue.

Among small businesses (revenue less than $10 million), CDOs and CEOs lead an equal share of digital transformation efforts, at 33 percent each. The CIO leads 0 percent of digital transformation efforts among small businesses surveyed (Figure 4).

Figure 4. Leadership of Digital Transformation Projects in Organizations with Less than $10 Million in Revenue

Organizations with revenue < $10 million

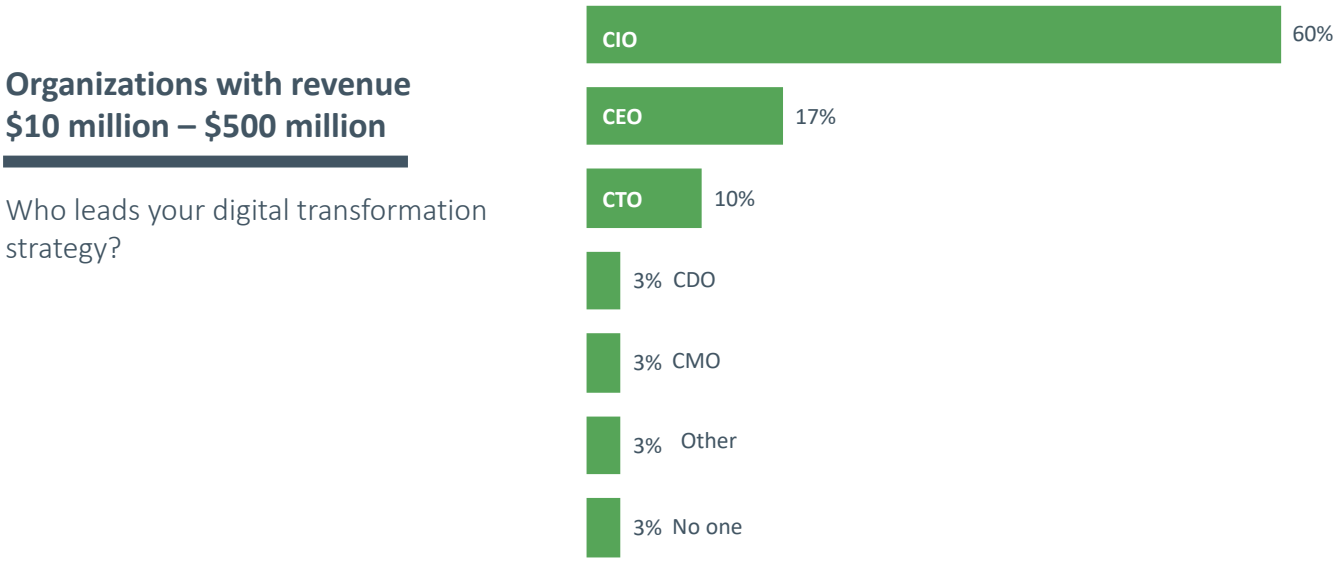
Who leads your digital transformation strategy?



Source: Constellation Research 2018 Digital Transformation Survey

In larger businesses ($10 million to $500 million in revenue), CIOs are leading 60 percent of digital transformation efforts; CEOs lead 17 percent. Among these organizations, too, CDOs guide 3 percent of such efforts (Figure 5).

Figure 5. Leadership of Digital Transformation Projects in Organizations with Revenue Between $10 Million and $500 Million



Source: Constellation Research 2018 Digital Transformation Survey

However, among enterprises with revenue over $1 billion, CDOs stand as the leader of choice for digital transformation efforts. Thirty-two percent of enterprises with revenue over $1 billion said the CDO leads their digital transformation efforts, with CIOs at 24 percent and CEOs at 12 percent (Figure 6).

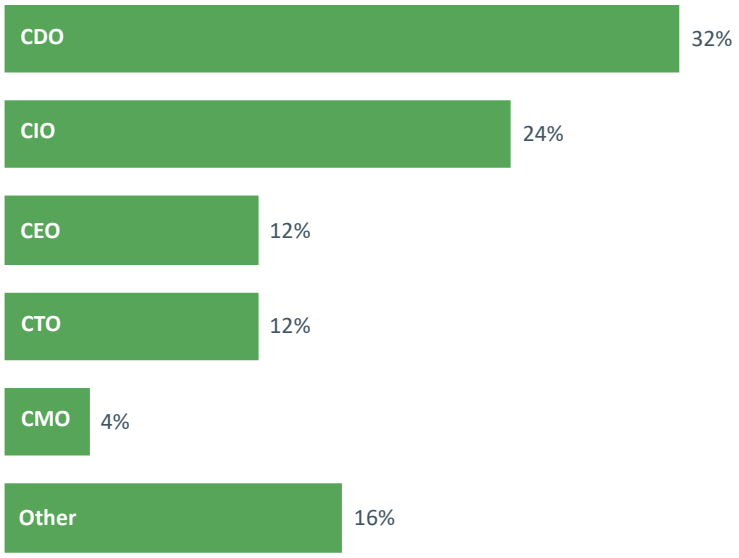
Leadership Reveals Priorities

The goals of digital transformation strategies vary from organization to organization. The survey data reveals different leaders are selected to lead transformation efforts depending on the goal of the transformation. In the 33 percent of organizations whose digital transformation efforts are led by the CIO, prominent goals include modernizing IT systems, building a competitive advantage and reaching and engaging with customers more effectively (Figure 7).

Figure 6. Leadership of Digital Transformation Projects in Organizations with More than $1 Billion in Revenue

Organizations with revenue > $1 billion

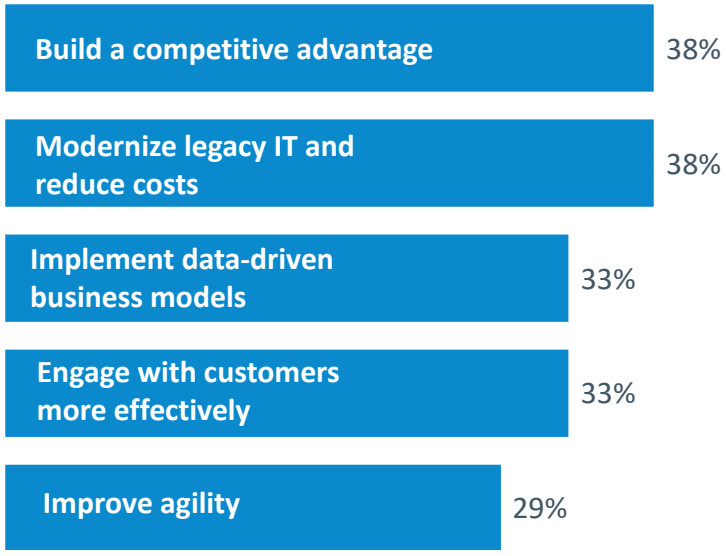
Who leads your digital transformation strategy?



Source: Constellation Research 2018 Digital Transformation Survey

Figure 7. Priorities for CIO-Led Digital Transformation

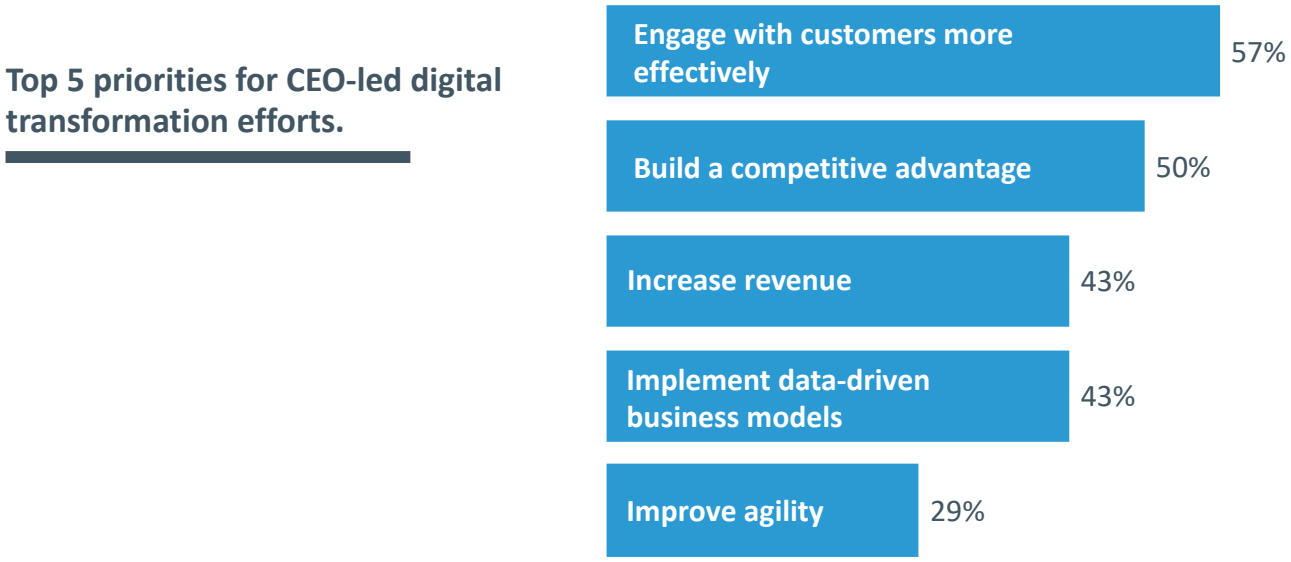
Top 5 priorities for CIO-led digital transformation efforts.



Source: Constellation Research 2018 Digital Transformation Survey

Among the 23 percent of organizations in which the CEO leads digital transformation efforts, the most important goal is reaching and engaging with customers more effectively (Figure 8).

Figure 8. Priorities for CEO-Led Digital Transformation

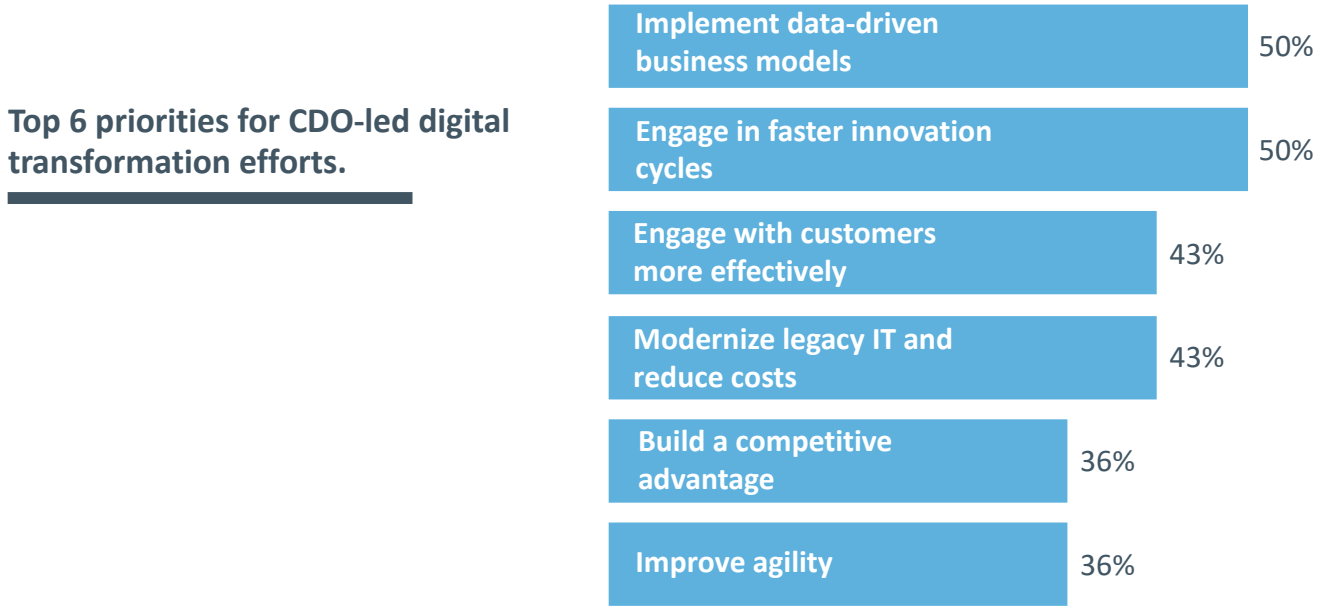


Source: Constellation Research 2018 Digital Transformation Survey

The 20 percent of digital transformation strategies led by the CDO focus on engaging in faster innovation cycles, implementing data-driven business models, and reaching and engaging with customers (Figure 9).

The lesser prominence of the CDO in organizations with less than $1 billion in revenue may be attributable to some organizations not having a CDO position or having a CDO who reports to another executive in the C-suite. However, as we predicted last year, more organizations have brought on CDOs to take responsibility for the digital strategy. Constellation expects this trend to persist. As digital initiatives continue to integrate into the business, the CDO eventually will report to the CEO on matters pertaining to the implementation of new business models or the CIO on matters concerning the improvement of technology. Eventually, as organizations complete their digital transformations, the CDO role may be phased out.

Figure 9. Priorities for CDO-Led Digital Transformation



Source: Constellation Research 2018 Digital Transformation Survey

IMPEDIMENTS TO DIGITAL TRANSFORMATION

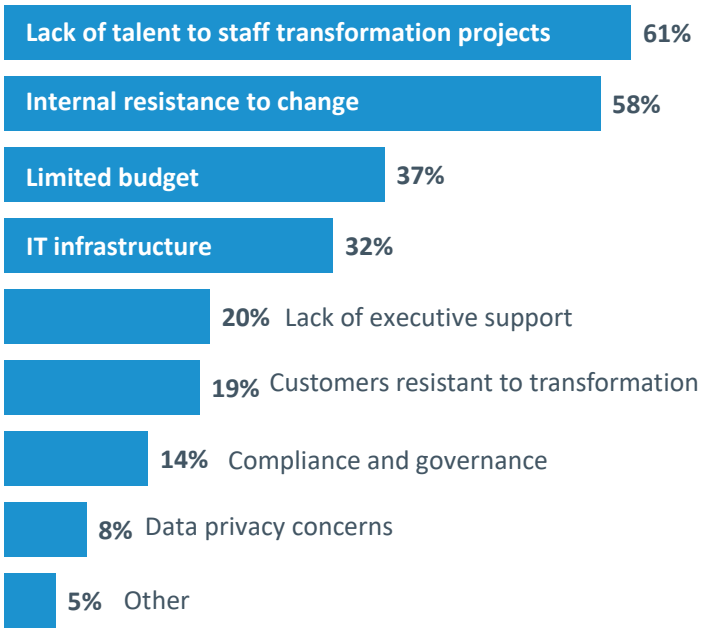
Talent, Resistance and Budget Pose Hindrances

Constellation asked respondents to identify up to three factors that impede digital transformation efforts in their organizations.

Respondents' top three hindrances to digital transformation include lack of talent to staff transformation projects, at 61 percent; internal resistance, 58 percent; and limited budget, 37 percent (Figure 10).

Figure 10. Factors Impeding Digital Transformation

Indicate the factors impeding digital transformation.



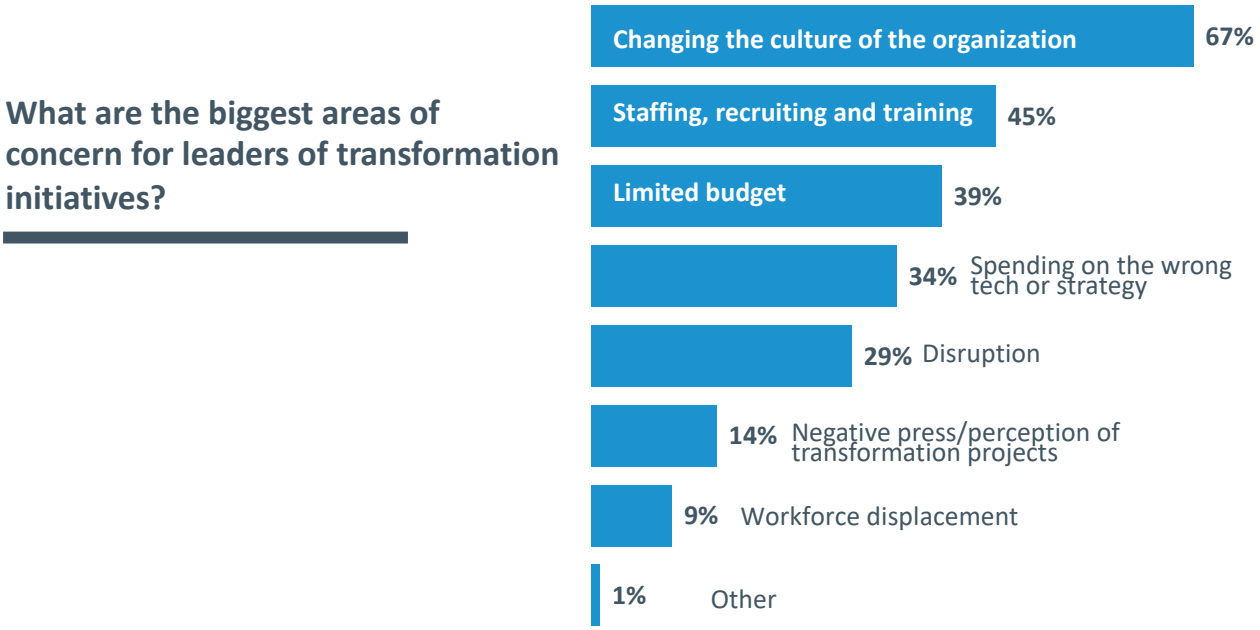
Source: Constellation Research 2018 Digital Transformation Survey

Keeping Leaders up at Night: Culture Transformation, Staffing and Budget

We asked respondents to identify three areas of concern for leaders of digital transformation efforts in order to understand how leaders' concerns aligned with concerns of the organization as a whole.

Respondents identified the top concerns for leaders of digital transformation efforts as follows: changing the culture of the organization and promoting adoption (or building a digital-first culture), at 67 percent; staffing, recruiting and training challenges, 45 percent; and limited digital transformation budget, 39 percent (Figure 11).

Figure 11. Factors Keeping Leaders up at Night



Source: Constellation Research 2018 Digital Transformation Survey

EMERGING TECHNOLOGIES

With the Constellation Research 2018 Digital Transformation Survey, we sought to understand the adoption and investment in emerging technologies that are enabling a new wave of digital transformation efforts.

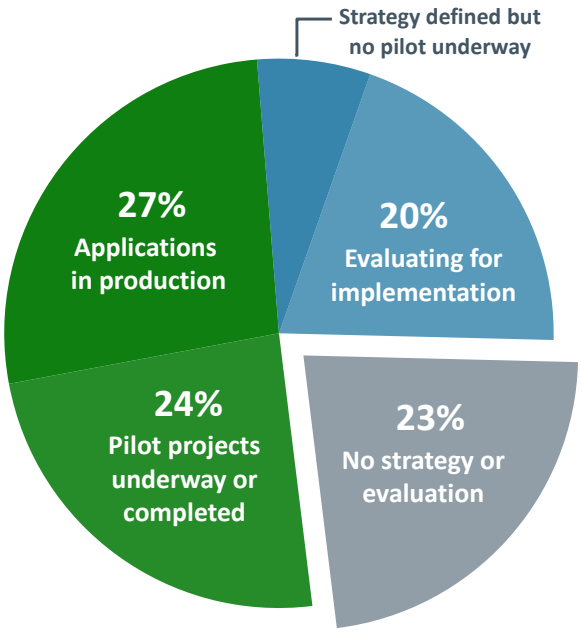
Internet of Things Rising Steadily

When asked to indicate the status of IoT investment in their organizations, 51 percent said IoT projects are either in production (27 percent) or pilot projects are underway or completed (24 percent) (Figure 12).

Figure 12. Internet of Things Investment

Indicate the status of Internet of Things investment in your organization.

Fifty-one percent of respondents indicate IoT in production or pilots.



Source: Constellation Research 2018 Digital Transformation Survey

This represents a slight increase over last year. In 2017, 19 percent reported IoT projects in production, while 28 percent reported pilot projects underway.

In fact, 77 percent of organizations surveyed are either investing in or evaluating investments in IoT technology.

Constellation expects IoT investment to rise steadily over the next few years as 20 percent of respondents said their organization is evaluating IoT for implementation.

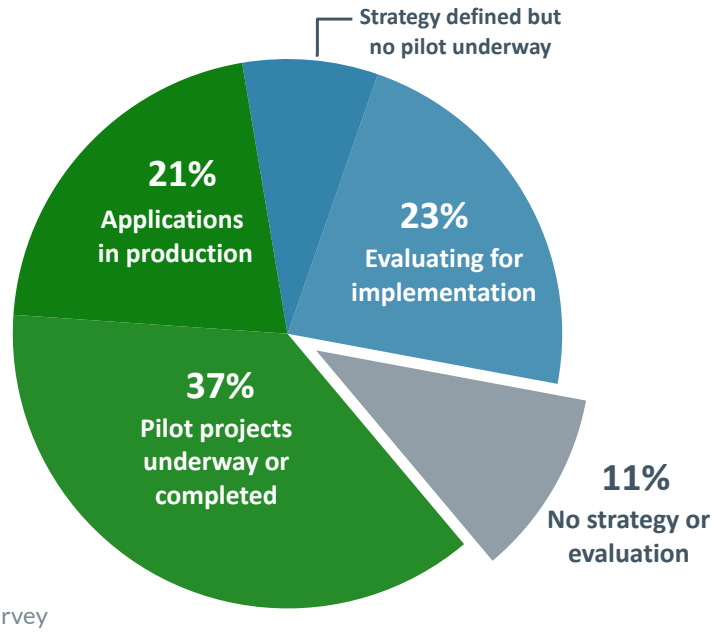
Artificial Intelligence Investment Soars

Constellation asked respondents to indicate the status of investment in AI and constituent technologies, including machine learning (ML), deep learning (DL) and process automation. Fifty-eight percent said AI applications are either in production (21 percent) or AI pilot projects are underway or completed (37 percent) (Figure 13).

Figure 13. AI Investment

Indicate the status of AI investment in your organization.

Fifty-eight percent of respondents indicate AI in production or pilots.



Source: Constellation Research 2018 Digital Transformation Survey

This represents a marked increase in investment over last year, when only 25 percent of respondents reported investments in AI technologies.[1] At that time, Constellation anticipated a sharp rise in AI investment by 2018 because of the growing availability of open source AI frameworks, cloud-based ML and DL services, and AI-enabled applications.

Data from Constellation's 2018 Artificial Intelligence Survey revealed organizations employ three primary modes of AI development, with 46 percent of respondents indicating they employ more than one mode.

Three Primary Modes of AI Development

1. *Developing homegrown applications by building out data science teams and using open source frameworks (e.g., TensorFlow, Caffe, Torch)*
2. *Developing homegrown applications using cloud-based ML and DL services (e.g., Azure ML, AWS Rekognition, Google Cloud ML, etc.)*
3. *Adopting packaged applications with AI capabilities (e.g., Salesforce Einstein, Oracle Adaptive Intelligent Apps)*

This multifaceted approach to AI investment suggests organizations are attempting to balance time- and resource-intensive methods of developing AI with more immediate modes of attaining AI capabilities.

Constellation expects AI investment to continue to rise as implementations proliferate throughout the corporate structure. Early adopters will enjoy a head start on competitors because they are already training their algorithms and refining their data sets.

For more information on the state of AI investment, development and deployment, read the "**Constellation Research 2018 Artificial Intelligence Study**."

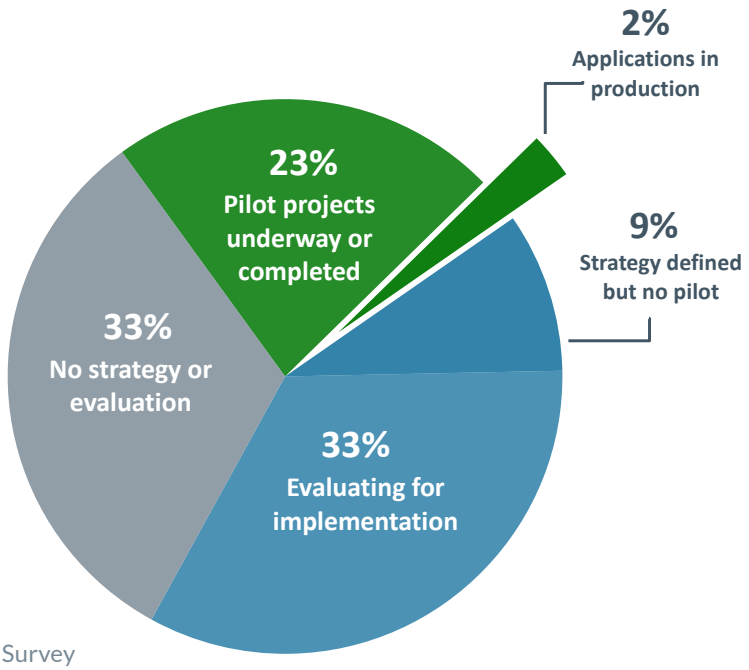
Blockchain's Potential Still Awaits Market Standards and Catalysts

Blockchain and its descendants, defined as synchronous ledger technologies (SLT)[2] by Constellation principal analyst Steve Wilson, continued to receive much attention from early adopters and the press in 2018. However, much as in 2017, blockchain and SLT remain in the experimental phase, with just 2 percent of survey respondents reporting blockchain applications in production (Figure 14).

Figure 14. Blockchain Investment

Indicate the status of blockchain investment in your organization.

Two percent of respondents indicate blockchain in production.



Source: Constellation Research 2018 Digital Transformation Survey

The data suggests that early adopters are conducting research and development while fast followers wait on the sidelines for market standards and case studies to emerge. When asked to describe their organization's adoption of blockchain technology, 23 percent reported blockchain pilot projects or R&D is underway. Those holding off include the 9 percent that reported a defined blockchain strategy but no pilot project or R&D underway as well as the 33 percent of respondents who said their organizations are evaluating blockchain for implementation.

Thirty-two percent of respondents reported no blockchain strategy or evaluation, a change from 2017, when 47 percent said their organizations had not considered or adopted any blockchain technologies.[3]

First-generation blockchain refers to the digital ledger technology that underpins the bitcoin digital currency. Its purpose and single use case is to provide a decentralized mechanism to ensure a token is spent just once per transaction, thereby preventing double spending of the currency.

SLTs are next-generation ledger technologies that evolved from blockchain. SLTs are digital ledgers that can be designed to execute a range of actions, from compiling trade manifests and tracing supply chains to automating contract terms using decentralized mechanisms inspired by first-generation blockchain.

Blockchain and SLT remain difficult to understand on a conceptual level for many organizations and are still viewed in the mainstream as mostly appropriate for cryptocurrencies such as bitcoin and Ethereum rather than broader enterprise applications. While there is the potential for blockchain and SLTs in enterprise apps, the lack of standards and successful case studies make it too risky for most organizations to feel comfortable investing in these technologies at this time.

Over the next three to five years, as industry and academic consortia such as Hyperledger coalesce around mature open source platforms and vertical use cases grow in number and maturity, Constellation expects SLTs to evolve into a critical element of enterprise IT. As the technology matures, efficiencies resulting from improvements in trust and the reduction of duplicates should outweigh most of the costs.

Early adopters may seek to identify use cases for SLTs beyond monetary uses, such as record keeping, supply chain provenance, commerce networks, land titles, electronic medical records and academic transcripts. Expect some chaos as new players emerge and consortia decide on common standards.

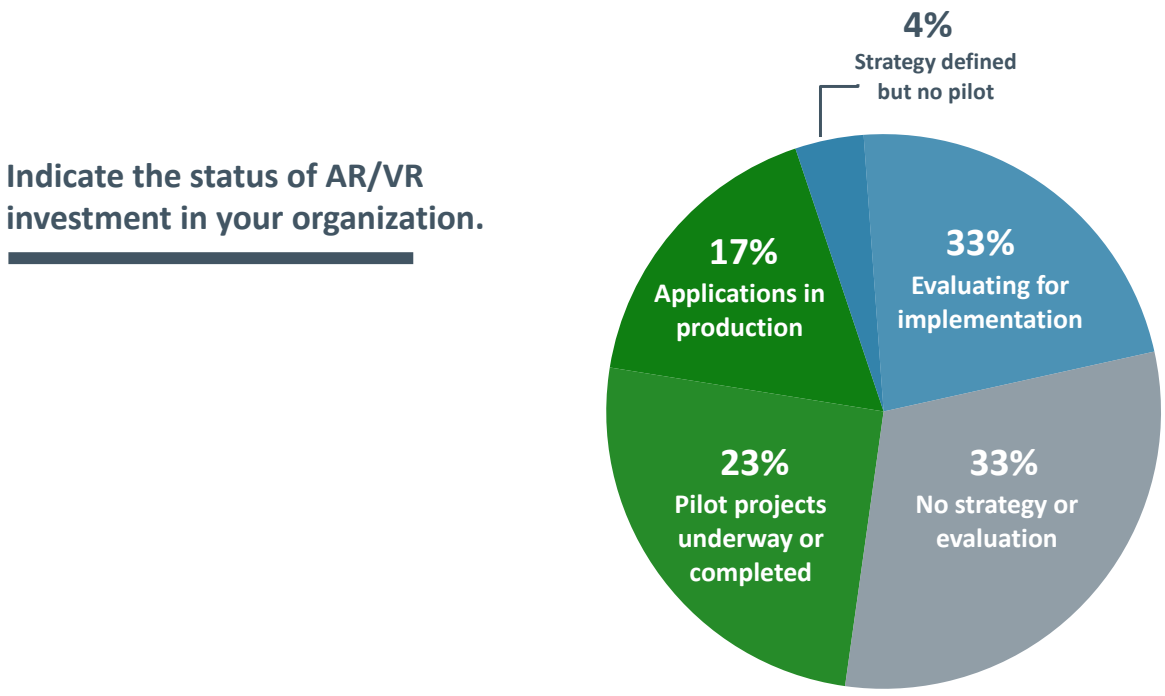
SLT standards will evolve to fit the needs of each industry in which SLT is deployed; thus, early adopters should seek to build industry-centric coalitions to accelerate adoption. This presents an opportunity to pool R&D resources, spreading out both the costs and risks.

Virtual, Augmented and Mixed Reality

Less than half of respondents indicated their organizations have invested in virtual, augmented or mixed reality. Seventeen percent said virtual/augmented/mixed reality projects are in production; 23 percent said pilot projects are underway or complete (Figure 15).

However, 33 percent of respondents indicated their organizations are evaluating virtual/augmented/mixed reality for implementation. For that reason, Constellation expects adoption to tick up over the next two to three years.

Figure 15. Augmented and Virtual Reality Investment



Source: Constellation Research 2018 Digital Transformation Survey

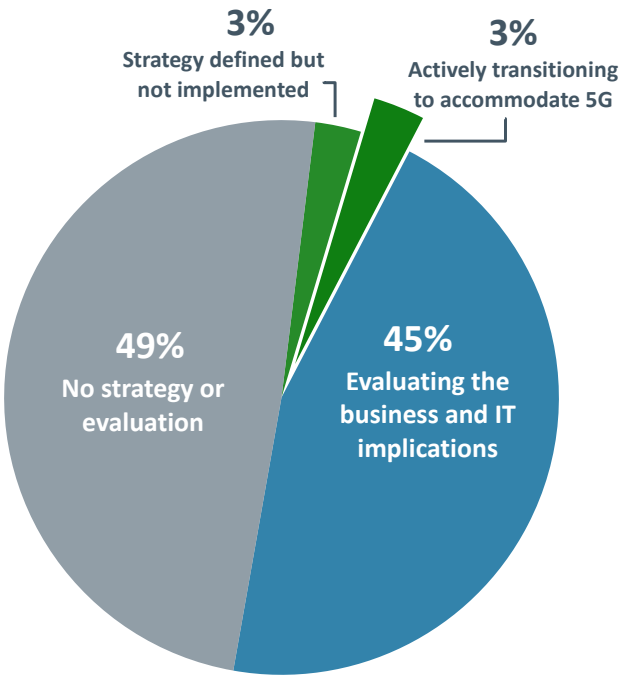
5G

Fifth-generation or 5G networking promises major advances over 4G: the bandwidth to connect a million devices per square kilometer and the ability to move data exponentially faster with lower latency. However, the survey data reveals organizations are dragging their feet when it comes to prepping for 5G. Just 3 percent of respondents said they are actively transitioning IT and business processes to accommodate 5G. Another 3 percent said their organization has a 5G transition strategy that has not yet been implemented. Meanwhile, 45 percent of respondents said their organizations are evaluating the implications of 5G, and a full 49 percent said their organization has no 5G strategy at all (Figure 16).

The enterprise knows 5G will arrive soon, but the data suggests that preparing for it is a low priority. The lack of enterprise use cases and the fact that existing 4G and other network technologies currently meet the needs of many organizations are dampening enthusiasm for 5G.

Figure 16. Preparation for 5G

Describe the organization's preparedness for 5G.



Source: Constellation Research 2018 Digital Transformation Survey

However, Constellation expects this to change in the next two to three years as IoT matures and 5G expands. When 5G networks are generally available throughout the U.S. and the standard can support enterprise-level concerns such as data security, organizations with an IoT strategy will rush to adopt 5G.

MATURE TECHNOLOGIES

For emerging technologies, Constellation sought to understand adoption rates. In the case of mature technologies, however, Constellation wanted to understand investment plans. This is because investment in mature technologies provides insight into organizations' preparedness to deploy emerging technologies.

Mature technologies are technologies that are generally deployed throughout most organizations and are not considered emerging or disruptive technologies.

Big Data and Cloud Grow to Support Digital and Emerging Tech

As companies refine their digital strategies and begin to incorporate AI and IoT into their business models, investment in big data and cloud technology becomes a priority. Seventy-eight percent of respondents said their organization will increase investment in big data technologies over the next year. A full 76 percent of respondents said their organizations would increase investment in software-as-a-service (SaaS) or cloud technology over the next 12 months; 53 percent of that total said the increase in investment would be greater than 10 percent (Figure 17).

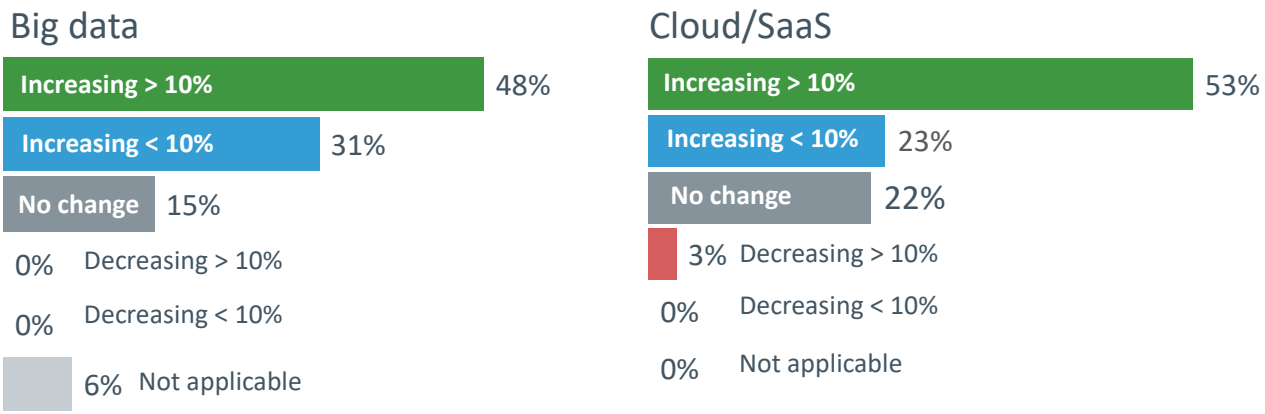
Results remain largely in line with reported planned investments from last year's survey, when 75 percent said they planned to increase investments in big data and 77 percent planned to increase investment in cloud/SaaS in the next 12 months.

Digital business models such as "as-a-service" and "mass personalization at scale" require large amounts of data and computing power to execute. In addition, the connections for IoT are in the cloud and AI processing increasingly will rely on cloud-based services.

Figure 17. Investment in Big Data and SaaS/Cloud

What is your company's plan for investment in big data and SaaS/cloud in the next year?

Investments in big data and cloud technology grow to support emerging tech.



Source: Constellation Research 2018 Digital Transformation Survey

Constellation expects investment in AI and IoT to continue to drive investment in big data and cloud/SaaS technologies for the foreseeable future.

WORKFORCE

Talent War Heats Up

Continuing a trend from previous years, survey respondents signaled their concern over the dearth of human talent available to implement and take advantage of digital initiatives. When asked if the organization has the workforce talent necessary to implement digital transformation projects, just 5 percent of respondents answered in the affirmative. By contrast, 94 percent of respondents said their organizations need to hire additional people to implement digital transformation projects, and 51 percent reported needing to make significant talent acquisitions to support their projects (Figure 18).

Figure 18. Workforce Talent Needs

Does your organization have the workforce talent it needs to implement successful digital transformation solutions?

Ninety-four percent of respondents need to hire additional human capital to implement DT solutions.

Source: Constellation Research 2018 Digital Transformation Survey

To fully understand how this demand for talent might affect competition for qualified employees, we asked respondents how they acquire talent for digital transformation solutions. Recruiting ranked as the top method, with 78 percent of organizations saying they find talent from outside the organization for digital transformation projects. Internal training (48 percent) of respondents and internal peer networking (40 percent) round out the top three avenues by which firms obtain talent for digital transformation projects (Figure 19).

Rising demand for digitally proficient talent coupled with a preference to recruit new talent from outside the organization signals an intensification of the already fierce competition for talent. The Constellation Research 2018 Digital Transformation Survey did not assess the supply of talent, but we can surmise, all things being equal, that these trends will culminate in a talent shortage followed by a battle over talent. Constellation clients have expressed a growing frustration about the lack of qualified applicants to staff digital transformation efforts.

Figure 19. Workforce Sourcing

How does your organization obtain talent necessary for successful digital transformation projects?

Seventy-eight percent of organizations recruit talent from outside the organization.

Source: Constellation Research 2018 Digital Transformation Survey

Consulting firms, too, pose competition for talent. Large consulting firms plan to double or triple the size of their digital practices in 2018, creating further pressure on the talent supply.[4]

The introduction of new, emerging technologies such as 5G, AI, IoT and blockchain will further drive demand for qualified talent. With training and internal peer networking occurring in less than half of the organizations surveyed, many staffers and executives may find themselves unable to acquire the skills necessary to function in business models powered by emerging technologies.

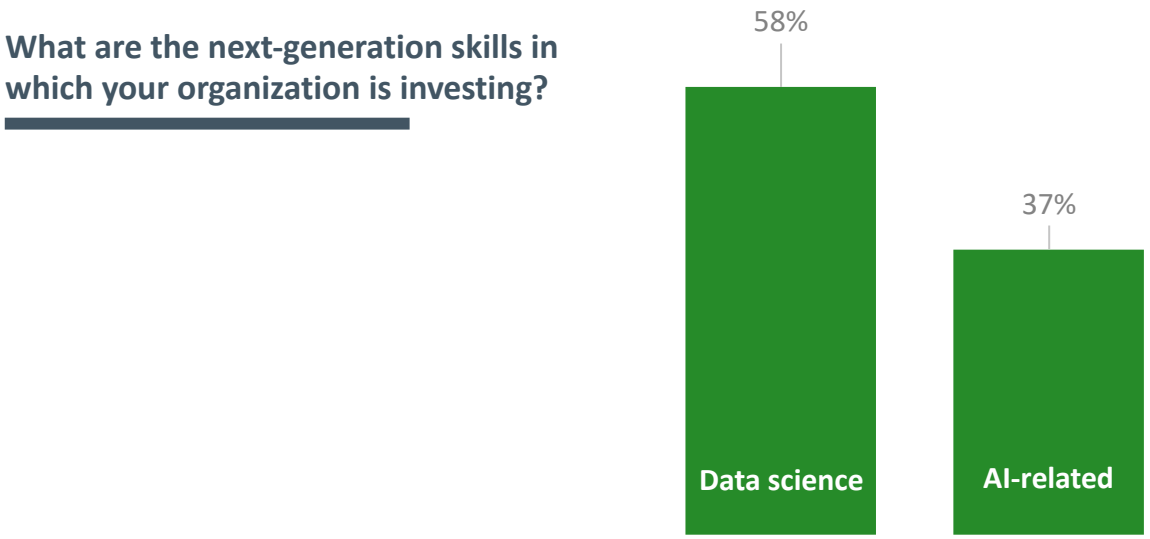
It is imperative that organizations focus on the supply of digitally proficient people in-house or their digital transformation efforts will be hindered by lack of talent. Recall that 61 percent of respondents identified the lack of qualified talent as an impediment to successful digital transformation projects. Organizations should hedge against the threat of competitive recruiting while preventing a hollowing out of the midlevel workforce by cultivating a pool of digital talent within the organization. All enterprises undergoing digital transformation should implement a strategy to provide training, share best practices and inform the workforce of the digital transformation methodologies. The strategy must also try to identify and groom leaders within an organization's existing ranks.

Constellation's clients report some success with network of excellence and change agent models in their attempts to cultivate digital talent from within. Developing talent in-house is time intensive and results may be uneven, so businesses should take care to institute training programs sooner rather than later.

AI and Data Science Skills in Demand

To understand the skills most in demand, Constellation asked respondents to indicate the top skills in which their organizations are investing. AI and data science skills ranked as the skills most in demand among respondents of the 2018 survey. Fifty-eight percent of respondents said their organization is investing in data science, data analysis or data skills, and 37 percent said their organization is investing in AI skills (Figure 20).

Figure 20. Investment in Next-Generation Skills



Source: Constellation Research 2018 Digital Transformation Survey

In-House Software

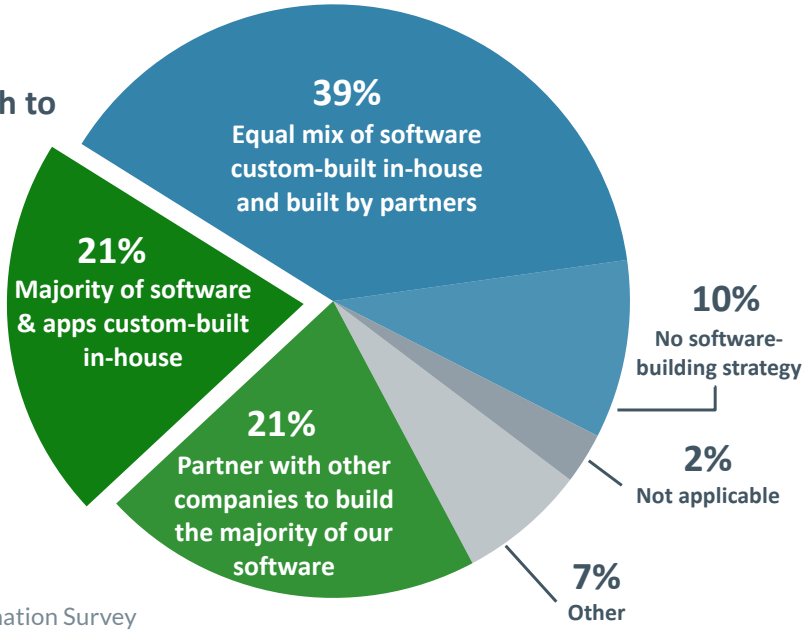
For decades, analysts predicted that some day, every company would become a software company. Almost seven years ago, in his now-famous essay, "Why Software Is Eating the World," Mark Andreessen proclaimed: "We are in the middle of a dramatic and broad technological and economic shift in which software companies are poised to take over large swathes of the economy."[5] Constellation Research sought to diagnose the state of this shift, asking survey respondents to describe their organization's approach to building software.

According to the survey data, Andreesen's prediction has not yet come to fruition. Just 21 percent of respondents indicated the majority of their software and apps are custom-built in-house. Another 21 percent of respondents said the majority of their software is built for them by other companies, while 39 percent said about half of their software is built in-house and the other half is built by other companies (Figure 21).

Figure 21. In-House Software Development

Describe the organization's approach to building its own software in-house.

All companies are not yet becoming software companies.



Source: Constellation Research 2018 Digital Transformation Survey

Legacy Technical Debt

Constellation sought to understand the frequency with which business undergoing digital transformation audit their legacy technical debt. Thirty-six percent of respondents said their organizations audit the debt once per year. Twenty-four percent of respondents audit their legacy debt twice per year. Eighteen percent audit their debt once every four or five years, while 17 percent never audit their legacy technical debt (Figure 22).

Figure 22. Evaluating Legacy Technical Debt

Source: Constellation Research 2018 Digital Transformation Survey

SUMMARY

Today, digital transformation is recognized as vital to the success of the enterprise, and many organizations are experiencing a positive return on their digital investments. CIOs have taken control of digital transformation aiming to use digital means to build a competitive advantage.

Talent, resistance, cultural change and budget pose the biggest challenges to transformation efforts. Constellation anticipates competition for talent to intensify as more organizations adopt emerging technologies such as AI, IoT, SLT and 5G. Although organizations prefer to recruit digitally proficient talent, Constellation advises its clients to prioritize internal cultivation of talent to address potential talent shortages.

Lastly, digital transformation is still a work in progress. Yes, many organizations have achieved positive ROI from their digital investments and have adopted emerging technologies, but with less than a quarter of respondents saying they produce their own software, we're still a ways away from a future in which every company is a software company.

ENDNOTES

[1] *Chris Kanaracus, Courtney Sato, and R "Ray" Wang, "Constellation Research 2017 Digital Transformation Study," Constellation Research, October 2017. https://www.constellationr.com/research/constellation-research-2017-digital-transformation-study*

[2] *Steve Wilson, "Synchronous Ledger Technology Companies to Watch," ZDNet, August 11, 2017. https://www.zdnet.com/article/synchronous-ledger-technology-blockchain-companies-to-watch/*

[3] *"Constellation Research 2017 Digital Transformation Study."*

[4] *Madison Marriage, "Management Consultants Split on How to Make Digital Add Up," The Financial Times, January 17, 2018. https://www.ft.com/content/6dd91d80-caf8-11e7-8536-d321d0d897a3*

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AUTHOR BIO

Courtney Sato

Director of Research Development

Courtney Sato served previously as director of research development at Constellation Research. She designed and implemented Constellation's primary research initiatives, which seek to identify drivers of digital transformation, priorities for the innovation-minded C-suite and the direction of business evolution in the digital age.

As director of research development, Courtney worked closely with Constellation analysts to develop research hypotheses, produce research reports and set Constellation's research agenda.

@courtneysato linkedin.com/in/courtneysato/

R "Ray" Wang

Founder and Principal Analyst

R "Ray" Wang is Founder, Chairman and Principal Analyst of Constellation Research, Inc., and the author of the popular enterprise software blog, "A Software Insider's Point of View." He previously was a Founding Partner and Research Analyst for enterprise strategy at Altimeter Group.

A background in emerging business and technology trends, enterprise apps strategy, technology selection and contract negotiations enables Wang to provide clients and readers with the bridge between business leadership and technology adoption. Wang has been recognized by the prestigious Institute of Industry Analyst Relations (IIAR) as the Analyst of the Year, and in 2009, he was recognized as one of the most important analysts for Enterprise, SMB and Software. In 2010, Wang was recognized on the ARInsights Power 100 List of Industry Analysts and named one of the top Influential Leaders in the CRM Magazine 100 Market Awards.

Wang graduated from the Johns Hopkins University with a B.A. in natural sciences and public health. His graduate training includes a master's degree from the Johns Hopkins University in health policy and management and health finance and management.

@rwang0 constellationr.com/users/r-ray-wang linkedin.com/in/rwang0

ABOUT CONSTELLATION RESEARCH

Constellation Research is an award-winning, Silicon Valley-based research and advisory firm that helps organizations navigate the challenges of digital disruption through business models transformation and the judicious application of disruptive technologies. Unlike the legacy analyst firms, Constellation Research is disrupting how research is accessed, what topics are covered and how clients can partner with a research firm to achieve success. Over 350 clients have joined from an ecosystem of buyers, partners, solution providers, C-suite, boards of directors and vendor clients. Our mission is to identify, validate and share insights with our clients.

Organizational Highlights

- Named Institute of Industry Analyst Relations (IIAR) New Analyst Firm of the Year in 2011 and #1 Independent Analyst Firm for 2014 and 2015.
- Experienced research team with an average of 25 years of practitioner, management and industry experience.
- Organizers of the Constellation Connected Enterprise—an innovation summit and best practices knowledge-sharing retreat for business leaders.
- Founders of Constellation Executive Network, a membership organization for digital leaders seeking to learn from market leaders and fast followers.

www.ConstellationR.com

@ConstellationR

info@ConstellationR.com

sales@ConstellationR.com

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