SIM IT TRENDS STUDY
Taking the Pulse of IT 2019

Issues, Investments, Concerns, & Practices of Organizations and their IT Executives

2019 Comprehensive Report: Results and Observations from the SIM IT Trends Study

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The 2018 SIM IT Trends Study
The 2019 Comprehensive Report:

Issues, Investments, Concerns and Practices of Organizations and their IT Executives

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This is the complete report of the Society for Information Management's 38th Anniversary IT Trends Study. This report and the slidedecks from the IT Trends keynote and breakout sessions at the 2019 SIM Connect Live conference will be available to all SIM members at no charge at http://www.simnet.org/IT-Trends. A preview of this report will appear in the December 2018 issue of the *MIS Quarterly Executive* and an edited report in the March 2019 issue, both of which will also be available free of charge to all SIM members.

November 6, 2018

We have done our very best to make this report error free. But, it is software; and you know how that goes sometimes. So if you find errors or have questions, please let me know via Leon.Kappelman@unt.edu.

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Executive Summary

This article presents the findings of the Society for Information Management's 38th Anniversary IT Trends Study, conducted in 2018, with responses from IT executives in 793 organizations, including 495 CIOs. Positive trends endure, with IT budgets, salaries, hiring, and CIOs' time spent with their C-suite peers all up. Mirroring last year, the top five IT investments this year are Analytics, Cybersecurity, Cloud, Software Development/Maintenance, and ERP. CIOs' most "worrisome" IT management issues are Cybersecurity, IT Talent Shortage, Credibility/Perception of IT Leadership, Business-IT Alignment, and Business Continuity. Over 80% of CIOs came to their present positions from outside organizations and the percent coming from non-IT backgrounds has more than tripled in 36 months to 26.3%.

The average annual revenue of these 793 organizations is $5.7 billion or about $4.5 trillion total. This represents about 23.3% of the $19.4 trillion GDP of the U.S. in 2017. On average their IT budgets represent 5.9% of revenue or about $336.3 million each. Therefore, these 793 organizations expect to spend about $267 billion on IT in 2018. On average, their IT budgets increased about 4.9%, a bit slower than the 5.3% reported in 2017. They report IT employment up 3.9% in 2018 over 2017 and average IT salaries up 4.4%, higher than 2017's 4.2% increase and 2016's 3.5%. The annual turnover of their IT employee in 2018 increased 12.3% over 2017 to 8.2%. The cost of cloud is rising yet nearly all organizations (97.5%) use cloud to deliver on average 41.7% of all IT services, up from 34.6% in 2017, 31.9% in 2016, and 27.2 in 2015. 63.3% of all IT in 2018 was delivered as a shared service, up from 59.2% in 2017. Cybersecurity practices are improving, but much more is needed.

The average tenure of these 495 CIOs is 6.6 years, the media 4.3, and the 10 year average 5.5. 45.9% of these CIOs report to their CEO, 25.8% the CFO, and 17.9% the COO. They spend 68.4% of their time interacting with fellow employees in their organizations including 21.5% of it with C-suite peers, 29% with IT employees, and nearly 18% with non-IT, non-C-suite management. 21.7% of the average CIO's time is spent with contractors, vendors, consultants, customers and suppliers of the organization and their IT people, and IT colleagues from other organizations. On average, these CIOs report that 61.5% of their working time is spent doing IT activities, 29% on business activities, and 9.4% on other work-related activities.

These and many other findings and trends are discussed in greater detail in this report, along with projections of trends into the future. This *SIM Trends Study Comprehensive Report* is divided into six main sections:

1. Top IT Management Issues and Concerns
2. Technology Investments and Worrisome Technologies
3. Participating Organizations and Their IT Practices.
4. Performance Measurement
5. CIO Tenure, Reporting, Background, and Activities
6. Summary and Conclusions

Introduction

Beginning in 1980, the Society for Information Management (SIM), in collaboration with MIS academics, has surveyed its members, asking questions about themselves, their practices, and their concerns as IT leaders. These surveys have expanded over the years to become one of the most comprehensive investigations of IT executives and practices in organizations. The total revenue of the 793 organizations participating in this year's study represents 23.3% of the U.S.'s 2017 GDP of $19.4 trillion.

Each year, the SIM IT Trends Study's questionnaire is updated to improve the quality of the questions and to reflect changes taking place in the IT field. These changes are minimized whenever possible so that year-on-year comparisons can be made and trends identified. In April 2018, a unique questionnaire link was sent to each of 3,971[1] members of SIM, a broad cross section of IT leaders in the U.S. Nine weeks of weekly emails, bi-weekly e-newsletter articles, and a chapter competition later, 1,295 competed questionnaires were received for a response rate of 32.6% (compared to 28.7% in 2017).

Consistent with practices since 2013, two distinct but overlapping datasets were created from the responses. The "CIO dataset" contains the 495 respondents who identified themselves as the "CIO or highest-ranking IT executive" in their organization. The "Unique Organizations dataset" consists of the 793 organizations represented by a CIO or the most senior IT executive who responded but who is not necessarily the CIO — typically a direct report to the CIO in a large organization. These two datasets are the basis for the findings in this article.

1. Top IT Management Issues and Concerns

1.1. The Top IT Management Issues of Organizations

Study participants chose up to five IT management issues or concerns they considered the most important to their organizations from a list of 41 options. The top 10 issues as reported by the senior-most IT leader in each of the 793 unique organizations are presented in Table 1, along with 10 years of prior results.

[1] 4,060 emails were sent, 89 bounced as undeliverable, leaving 3971.

Table 1: Organizations' Top 10 Most Important IT Management Issues, 2008-18

IT Management Concerns/Issues [a]	2018 (% Selecting)	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
n (unique organizations)	793	769	801	785	717	484	195	275	172	243	291
Security/Cybersecurity/Privacy [b]	1 (38.3%)	1	2	2	2	7	9	8	9	9	8
Alignment of IT with the Business	2 (32.8%)	2	1	1	1	1	2	1	3	2	1
Data Analytics/Data Management	3 (26.9%)	3									
Innovation	4 (20.3%)	7	3	4	8						
Agility/Flexibility (IT) [c]	5 (20.2%)	10	4	7	13						
Compliance and Regulations	6 (19.9%)	4	12								
Digital Transformation	7 (19.5%)	8									
Agility/Flexibility (Business) [c]	8 (18.2%)	9	5	9	3	2	3	2	2	3	13
Cost Reduction/Controls (IT) [d]	9 (17.8%)	5	6	10	9	4					
Cost Reduction/Controls (Business) [d]	10 (14.5%)	6	7	8	17	5	5	10	8	5	7

[a] Blank cells, unless otherwise noted, indicate that the issue was not included that year.

[b] In previous years, "Security/Cybersecurity/Privacy" was "Security/Privacy."

[c] "Business Agility/Flexibility" and "IT Agility" were merged into an "Agility/Flexibility" category with Business and IT selections in 2015. "Agility/Flexibility (IT)" was "Architecture Agility" in 2008.

[d] "Business Cost Reduction/Controls" and "IT Cost Reduction/Controls" were merged into a "Cost Reduction/Controls" category with Business and IT selections. "Business Cost Controls" was combined with "Business Productivity" in prior years.

The top 10 most important IT management issues remained remarkably stable from 2017 to 2018, with no change in composition and several changes in rank. This consistency is unique in the history of the IT Trends Study. The top three issues identified by IT leaders in 2017 remain in their respective positions this year, despite minor changes in the percentage of respondents selecting each (Cybersecurity/Privacy -3.6%, Alignment -4.5%, and Analytics +3.5%).

Despite the stability exhibited by the overall top 10, there were some interesting movements within the list. Both Innovation (7th to 4th) and Agility/Flexibility (IT) (10th to 5th) rose considerably in importance as IT management issues this year. Examining the last five years of data for each issue in Table 1, it is possible that interest in these is somewhat cyclical, as IT organizations balance operational issues against those that enable more strategic contributions to business success. This premise is partially supported by the lower priority placed this year on IT Cost Controls (5th to 9th) and Business Cost Controls (6th to 10th).

1.2. IT Leadership's Top IT Management Issues and Concerns

As in prior years, each participating IT leader was also asked to identify up to five IT management issues they find most important or worrisome personally. Their top 10 issues of personal concern are presented in Table 2, along with five prior years of results. Historically, these issues have remained relatively stable. This trend continues this year with only rank order changes to the top eight items and two new issues entering the top 10. Disaster Recovery, a common issue top 10 most personally worrisome concern, returns to the list in the ninth position. Both Business Continuity and Disaster Recovery reflect basic obligations on the part of the IT organization to business success and continue to be of significant concern to senior IT professionals. Interestingly, Velocity of Change (Technology) rose considerably

from 18th position in 2017 to 10th in this year's study. While the reason for this is unclear, this highlights rapid change as an omnipresent challenge for IT professionals.

Table 2: IT Leaders' Personally Most Important/Worrisome IT Management Issues, 2013-18

IT Leaders' Most Important/Worrisome Concerns [a]	2018 *(% Selecting)*	2017	2016	2015	2014	2013
n (unique organizations)	793	769	801	785	717	484
Security/Cybersecurity/Privacy [b]	1 *(46.4%)*	1	1	1	1	2
IT Talent/Skill Shortage/Retention	2 *(25.6%)*	3	2	3	2	3
Credibility of IT/Perception of IT Leadership [c]	3 *(22.1%)*	2	4	6	18	
Alignment of IT and/with the Business	4 *(19.8%)*	4	3	2	3	1
Business Continuity	5 *(17.4%)*	8	5	7	13	4 [f]
Compliance and Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.) [d]	6 *(16.3%)*	5	11	13	14	16
Agility/Flexibility (IT) [e]	7 *(15.8%)*	6	8	5	16	
Data Analytics/Data Management	8 *(14.1%)*	7				
Disaster Recovery	9 *(12.7%)*	12	6	9	10	4 [f]
Velocity of Change (Technology) [g]	10 *(12.5%)*	18	12	18	7	6

[a] Blank cells, unless otherwise noted, indicate that the issue was not included that year.
[b] In previous years, "Security/Cybersecurity/Privacy" was "Security/Privacy."
[c] "Credibility of IT/Perception of IT Leadership" was "Credibility (IT)" in 2015.
[d] "Compliance and Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.)" was "Legal Compliance - HIPPA, SarBox, SAS70, PCI, etc." in 2013.
[e] "Business Agility/Flexibility" and "IT Agility" merged into an "Agility/Flexibility" category with Business and IT selections in 2015.
[f] "Business Continuity" and "Disaster Recovery" were combined in the 2013 study.
[g] "Velocity of Change (Technology)" was "Velocity of Change (IT)" in 2014 and 2015. In 2014, "Time to Market/Velocity of Change" was split to reflect that the velocity of change might be related to either business or technological advancement.

Improving IT Communications and Relationships with the Business fell out of this year's personal top 10, moving from 9th position in 2017 to 11th in 2018. Nevertheless, there is certainly overlap between this issue and the Credibility of IT (3rd) and Alignment (4th). Innovation also exited the top 10, moving from 10th in 2017 to 12th this year. This downward movement, though slight, is interesting in light of Innovation's increasing importance to the organization (Table 1); which may indicate that IT leaders are reasonably satisfied with the ability of IT to innovate for business success.

The top 10 lists of most important organizational IT management issues and those most personally important to IT leaders are presented in Table 3. Of the 15 unique issues, only five appear in the top 10 of both lists. These items, Security, Alignment, Analytics, IT Agility, and Compliance, are relatively high profile issues in which a failure on the part of IT may have significant impact to both the organization and the professional career of the IT leader. However, the significant differences in these lists reflect the need for IT leaders to balance both strategic business goals and the day-to-day operational concerns of running the IT organization.

Table 3: Top 10 Personal and Organizational IT Management Issues, 2018

IT Management Issues	Most Important to their Organizations *(2017 Rank)*	Most Important or Worrisome to IT Leaders *(2017 Rank)*
Security/Cybersecurity/Privacy	1 *(1)*	1 *(1)*
Alignment of IT and/with the Business	2 *(2)*	4 *(4)*
Data Analytics/Data Management	3 *(3)*	8 *(7)*
Innovation	4 *(7)*	12 *(10)*
Agility/Flexibility (IT)	5 *(10)*	7 *(6)*
Compliance and Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.)	6 *(4)*	6 *(5)*
Digital Transformation	7 *(8)*	18 *(19)*
Agility/Flexibility (Business)	8 *(9)*	27 *(27)*
Cost Reduction/Controls (IT)	9 *(5)*	15 *(20)*
Cost Reduction/Controls (Business)	10 *(6)*	40 *(39)*
Business Continuity	12 *(18)*	5 *(8)*
IT Talent/Skill Shortage/Retention	17 *(17)*	2 *(3)*
Credibility of IT/Perception of IT Leadership	22 *(21)*	3 *(2)*
Velocity of Change (Technology)	23 *(28)*	10 *(18)*
Disaster Recovery	25 *(25)*	9 *(12)*
n = most senior IT leader in 793 unique organizations		

2. Technology Investments and Worrisome Technologies

Study participants were also asked to select up to five technologies from a list of 37 in each of three separate categories: (1) their organization's largest current or near-term IT investments; (2) technologies that should get more investment; and (3) technologies of greatest personal concern ("i.e., they keep you up at night").

2.1. Organizations' Largest IT Investments

The top 10 largest current or near-term investments identified by the 793 unique organizations participating in this year's study are presented in Table 4. IT investment priorities are also quite consistent with no change at all in this year's top 10 list. While this list has traditionally been relatively stable – the same top seven items for the past five years – this year-over-year consistency suggests that investments have settled into a pattern heavily weighted towards forward-looking technologies that allow organizations to seize opportunities and exercise agility (e.g., Analytics, Cloud), as well as those that serve to protect the organization from threats (e.g., Cybersecurity). The remaining investments (4-10), while significant, represent ongoing expenditures towards core technological capabilities necessary to support ongoing operations.

Table 4: Top 10 Largest IT Investments of Organizations, 2008-2018

Information Technologies [a]	2018 *(% Selecting)*	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
n (unique organizations)	793	769	801	785	717	484	195	275	172	243	291
Analytics/Business Intelligence/Data Mining/ Forecasting/Big Data [b]	1 *(37.7%)*	1	1	1	1	1	1	1	1	1	2
Security/Cybersecurity [c]	2 *(37.1%)*	2	3	3	7	14		11	8		8
Cloud Computing (e.g., SaaS, PaaS, IaaS) [d]	3 *(33.9%)*	3	4	7	5	3	2	2	5	17	
App/Software Development/Maintenance [e]	4 *(30.6%)*	4	2	4	4	6	11				
ERP (Enterprise Resource Planning)	5 *(26.6%)*	5	6	2	3	4	3	3	3	3	14
CRM (Customer Relationship Management)	6 *(23.7%)*	6	5	5	6	2	5	5	9	13	
Data Center/Infrastructure	7 *(21.9%)*	7	7	6	2						
Network/Telecommunications	8 *(17.9%)*	8	8	8	9	8	12				
Legacy Apps: Replacing/Replatforming [f]	9 *(15.0%)*	9	11	9	15	16					
Legacy Apps: (Maintain/Update/Consolidate) [f]	10 *(11.7%)*	10	10	9	15	16					

[a] Blank cells, unless otherwise noted, indicate that this item was not included that year.

[b] In 2015, "Analytics/Business Intelligence" was combined with "Data Mining" (17th in 2013, 32nd in 2014) and "Forecasting" (25th in 2013, 23rd in 2014). "Big Data" was incorporated in 2016 (10th in 2012, 5th in 2013, 9th in 2014 and 16th in 2015).

[c] In 2006 and 2008, this was "Security Technologies" and simply "Security" in 2010, 2011 and 2013.

[d] In 2009, 2010 and 2011, "SaaS" separately ranked 15th, 9th and 6th respectively.

[e] In 2013, this was "Apps" and in 2012 "Application Development."

[f] Prior to 2016, these items were combined as "Legacy Applications."

2.2. Most Worrisome Technologies and Those That Should Get More Investment

In addition to identifying current investment priorities, IT leaders were also asked to select up to five technologies from the same list to which greater investments are needed and up to five technologies they find most personally worrisome. Table 5 presents the combined top 10 lists: Largest current investments, technologies that should receive more investment, and technologies that worry IT leaders. Appearance on all three lists suggests concerns of IT leaders that are largely addressed through current spending. This is true for four technology categories: Analytics, Security, Cloud, and Replatforming Legacy Applications. However, there are some significant differences among these lists, suggesting concerns of IT leaders that may be invested inadequately by the organization.

Table 5: Organizations' Largest IT Investments, Those That Should Get More and the Personally Most Worrisome, 2018

Information Technologies	Largest IT Investments *(% Selecting) 2017 Rank*	Those that Should Get More Investment *(% Selecting) 2017 Rank*	Those Most Personally Worrisome *(% Selecting) 2017 Rank*
Analytics/Business Intelligence/Data Mining/Forecasting/Big Data	1 *(37.7%) 1*	1 *(42.2%) 1*	3 *(19.9%) 3*
Security/Cybersecurity	2 *(37.1%) 2*	2 *(34.9%) 2*	1 *(52.7%) 1*
Cloud Computing (e.g., SaaS, PaaS, IaaS)	3 *(33.9%) 3*	3 *(24.5%) 3*	7 *(13.5%) 7*
Application/Software Development/Maintenance	4 *(30.6%) 4*	13 *(10.5%)10*	8 *(12.0%) 8*
ERP (Enterprise Resource Planning)	5 *(26.6%) 5*	18 *(9.1%) 16*	12 *(9.3%) 10*
CRM (Customer Relationship Management)	6 *(23.7%) 6*	7 *(13.6%) 8*	17 *(7.3%) 17*
Data Center/Infrastructure	7 *(21.9%) 7*	22 *(7.3%) 27*	14 *(9.2%) 13*
Network/Telecommunications	8 *(17.9%) 8*	27 *(5.4%) 30*	18 *(6.9%) 19*
Legacy Applications—Replacing/Replatforming	9 *(15.0%) 9*	9 *(12.1%) 6*	5 *(16.8%) 6*
Legacy Applications (Maintaining/Updating/Consolidation)	10 *(11.7%) 10*	34 *(3.9%) 37*	9 *(11.9%) 16*
Integration/Application Integration/Data Integration	11 *(10.7%) 12*	15 *(10.2%)18*	10 *(10.2%) 15*
Disaster Recovery/IT Continuity Planning	12 *(10.6%) 11*	5 *(18.5%) 5*	2 *(25.9%) 2*
Innovation/Disruptive Technologies	15 *(8.6%) 13*	4 *(21.8%) 4*	4 *(17.4%) 4*
Collaboration Tools	18 *(7.2%) 20*	9 *(12.1%) 19*	28 *(3.8%) 30*
BPM (Business Process Management	24 *(5.3%) 23*	8 *(12.5%) 12*	20 *(6.4%) 18*
Staff Development/Training/Retention/H1B [a]	30 *(3.8%) 28*	6 *(14.2%) 7*	6 *(15.1%) 5*

[a] H1B is a visa that allows U.S. employers to employ foreign workers in specialty occupations

n = most senior IT leader in 793 unique organizations

The most significant disconnect between IT leaders and organizational spending is related to Staff Development/Training/Retention/H1B. This item, ranked 30th on the list of largest investments and 6th on the other two lists, reflects the challenge of maintaining a highly competent IT workforce in order to meet the needs of the organization. Disaster Recovery/IT Continuity Planning is another operational investment that may be receiving inadequate attention as an organizational budgetary item. Ranked 12th on the list of largest investments, IT leaders largely believe additional funding should be allocated to this item (5th) and are extremely concerned about the possibility of a disruption to IT operations (2nd).

Innovation/Disruptive Technology investments represent another interesting budgetary discrepancy, with a middle-of-the-road ranking on the list of largest investments (15th) but a rank of 4th on the lists of technologies that should receive more funding and most concerning IT leaders. This incongruity is particularly troubling given that Innovation is viewed as such an important organizational concern (see Tables 2 and 3). It is possible, however, that budgetary alterations are simply lagging behind shifts in organizational priorities and the differences will resolve themselves in the near future.

Finally, Table 5 reveals two technologies that IT leaders do not find particularly worrisome but believe should receive additional funding. Collaboration Tools (18th largest investment) and BPM (24th largest investment) are established technologies that rank 9th and 8th

respectively on the list of technologies that should receive more funding. While BPM has some history of being viewed as underfunded[2], this situation is new for Collaboration Tools.

3. Participating Organizations and their IT Practices

3.1. Location, Industry, Revenue, and IT Spending of Participating Organizations

96.6% of the 793 unique organizations are located in the U.S with six sectors representing 51% of the total sample (Financial/Insurance, 12.7%; Healthcare/Medical,11.7; Manufacturing, 9.6%; Not-for-Profit, 6.2%; Education, 6.1%; and IT Services/Consulting, 4.8%). The average revenue of the 539 organizations that provided data was $5.7 billion (up from $4.75 billion in 2017) with a median of $350 million (down from $400 million in 2017).

Reported in dollars, average IT budgets increased 6.3% from $107 million in 2017 to $118 million in 2018 (n=521), while the median IT budget decreased slightly to $9 million (from $10 million in 2017). Alternatively, IT budgets reported as a percentage of revenue averaged 5.9% (n=472). This puts the average IT budget at an ostensibly more accurate[3] $336.3 million[4]. Thus total IT spending for the sample is approximately $266.7 billion[5]. As depicted in Figure 1, IT spending as a percentage of revenue appears to be leveling off from last year's high, but remains well above the 10-year average.

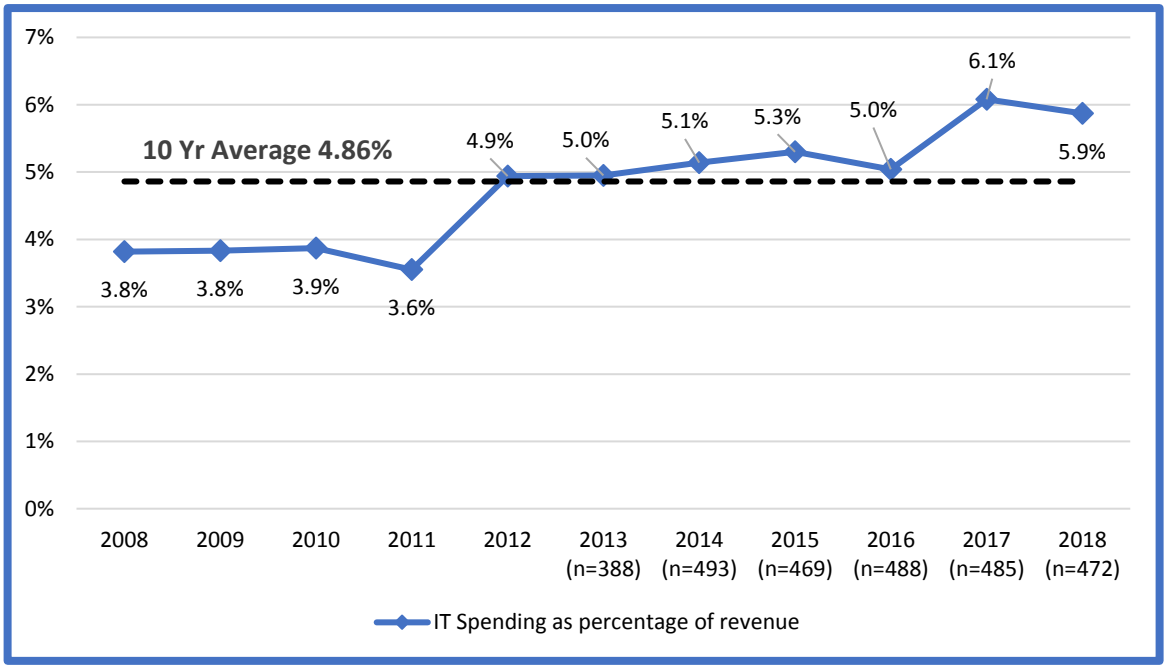
[2] Kappelman, L., McLean, E. R., Johnson, V., Torres, R. R., Nguyen, Q., Maurer, C., & Snyder, M. (2017). The 2016 SIM IT Key Issues and Trends Study. *MIS Quarterly Executive*, 16(1), 47–80.

[3] "More accurate" since it is the average of IT spending reported as a percent of revenue, which standardizes for difference in the size of IT budgets across the diverse sample of 793 organizations. The use of reported IT budget as a percentage of revenue is a direct measure of the variable of interest. The divergence in results between these two questions is due to a great extent to the large number of smaller organizations in the sample, since smaller organizations have less revenue and therefore spend fewer dollars on IT than larger organizations. The effect of size is supported by the relatively small medians, when compared to the averages, for revenue and IT spending.

[4] Calculated by multiplying the average IT budget (5.9% of revenue) by average revenue ($5.7 billion).

[5] Calculated by multiplying the average IT budget ($336.3 million) by 793 organizations.

Figure 1: Average IT Spending as a Percentage of Revenue, 2008-2018



IT spending can vary considerably across industry sectors. Table 6 displays IT spending as a percentage of revenue for those sectors in which at least 10 organizations reported.

Table 6: IT Spending as Percentage of Revenue, by Business Sector, 2018

Sector	Number of Organizations	Average % of Revenue Spent on IT
Financial Services / Insurance / Banking	50	10.8%
IT Hardware / Software	12	9.9%
Education	21	9.8%
Not-for-Profit	34	8.6%
Food Services / Hospitality / Leisure / Tourism	13	7.9%
IT Services / Consulting	24	7.1%
Construction / Architecture	15	6.6%
Healthcare / Medical / Medical Technology / BioMedical	55	6.3%
Government	21	5.9%
Business or Professional Services / Consulting	21	5.2%
Transportation / Distribution / Logistics	20	2.7%
Consumer Goods / Services	22	2.6%
Retail / Wholesale	20	1.9%
Energy	14	1.8%
Manufacturing	46	1.8%
Automotive	10	1.2%

3.2. IT Organization Structure and Governance

Respondents were also asked to specify the degree of centralization (from Completely Decentralized, 1. to Completely Centralized, 5). Little has changed over the past few years, with an overwhelming majority of organizations opting for a more-centralized approach to IT governance, as shown in Figures 2 and 3.

Figure 2: IT Organization Structure 2018 vs. 2017

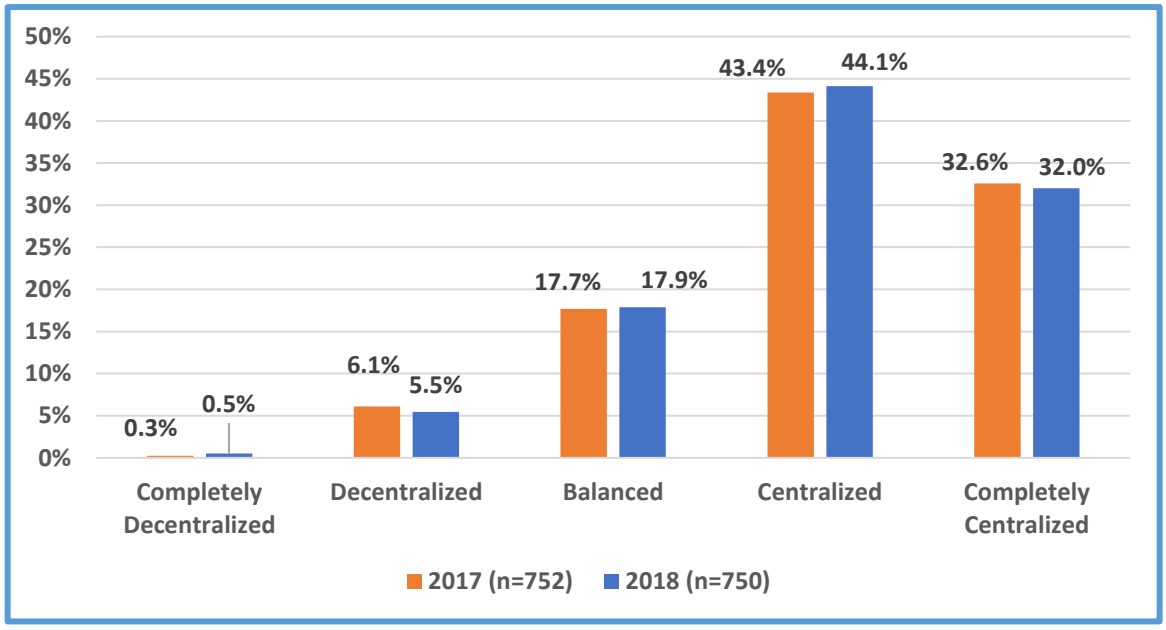
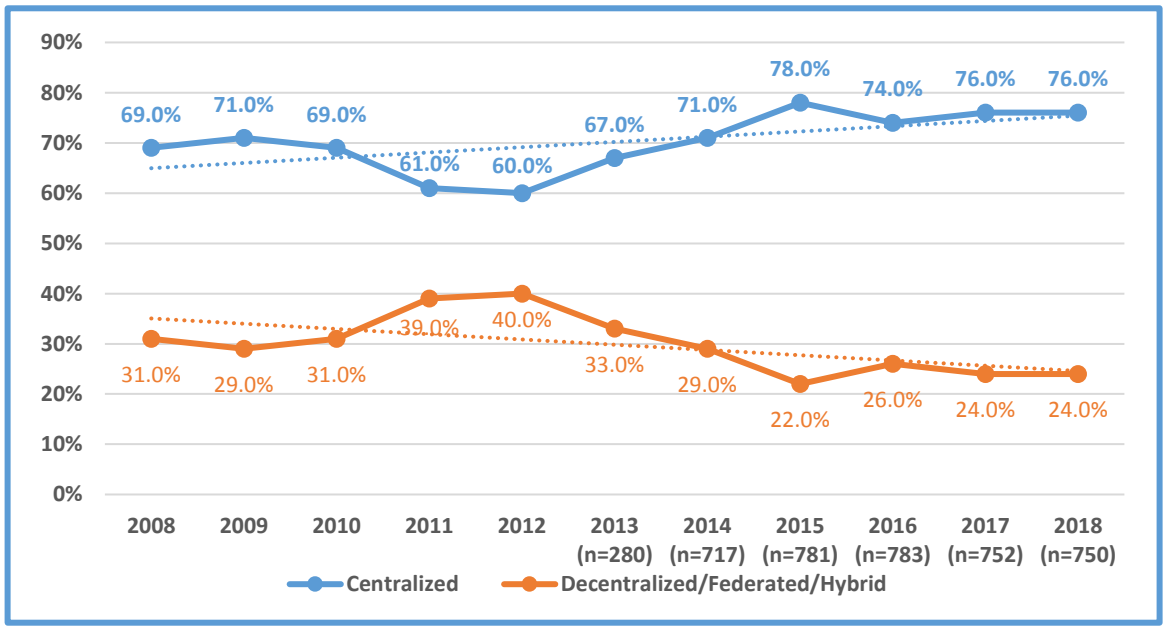


Figure 3: IT Organization Structure Trends, 2008-2018



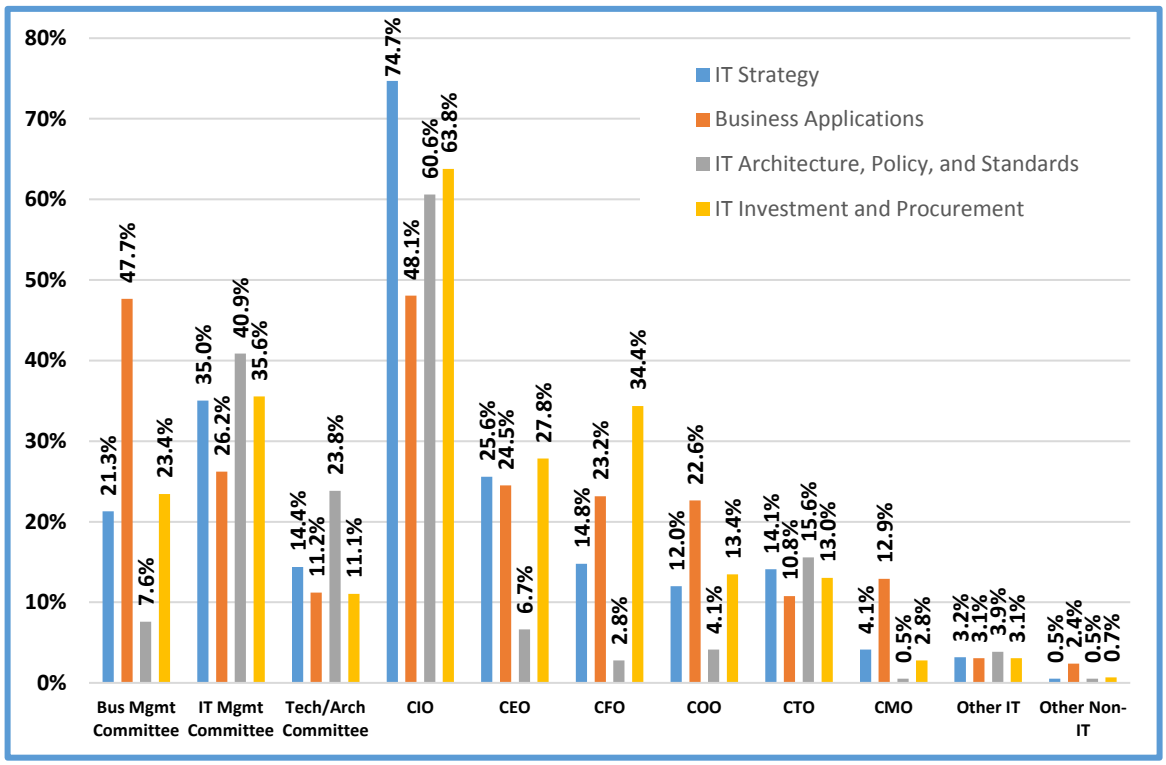
Governance is multifaceted and Table 7 breaks down responses by individual governance activities. No significant changes were observed this year.

Table 7: Degree of Centralization/Decentralization of IT Governance Activities, 2018 vs. 2017

IT Organizational Activities	2017 Weighted Average	2017 n	2018 Weighted Average	2018 n	Completely Decentralized 1	2	3	4	Completely Centralized 5
IT Infrastructure/Support/ Operations/Services	4.2	753	4.3	753	1.2%	3.7%	12.2%	33.2%	49.7%
Enterprise-wide Business Applications	4.2	744	4.1	746	1.7%	6.0%	16.0%	33.4%	42.9%
IT Purchasing, Procurement, Investments	4.1	743	4.1	750	1.7%	6.8%	13.6%	39.1%	38.8%
Overall IT Governance	4.1	736	4.1	742	1.5%	6.3%	14.8%	36.5%	40.8%
Line-of-Business/Business Unit Applications	3.7	725	3.6	728	2.5%	15.2%	27.1%	28.0%	27.2%
IT Architecture/Standards	4.2	733	4.2	737	1.9%	6.0%	11.7 %	36.2%	44.2%

Respondents were also asked who was involved in decisions related to IT Strategy, Business Applications, IT Architecture, and IT Investments. The extent to which various parties are involved in these decisions is shown in Figure 4. Most interesting is the sharp increase in CIO decision making and less reliance on committees for determining IT strategy and operations. Last year, 53.8% of organizations stated that CIOs were directly in charge of IT strategy and 56.4% involved some form of IT Management Committee (i.e., CIO and direct reports). This year, involvement of the committee fell to 35.0% and CIO involvement rose to 74.7%, possibly signaling a consolidation of power at the top of IT hierarchies and/or an increased level of trust in CIOs. The role of the Business Management Committee (i.e., C-level business executives including the CIO) and "Technology/Architecture Committee (i.e., CTO and direct reports) saw similar results.

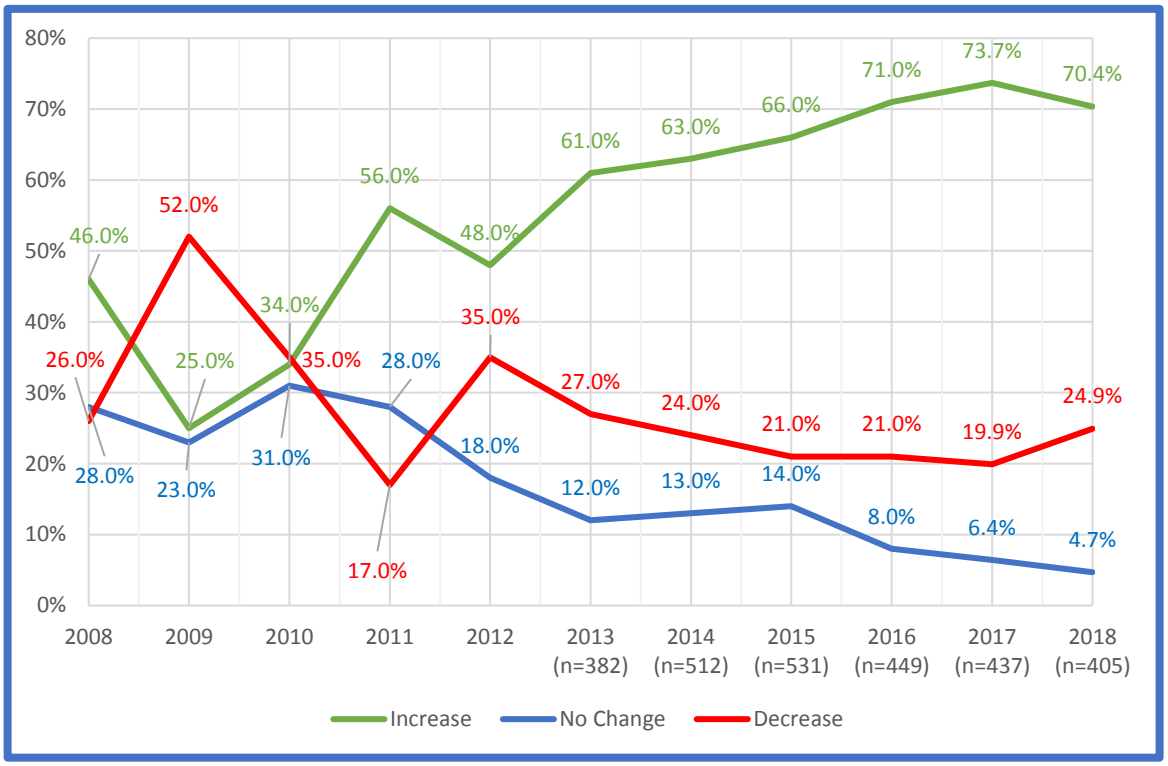
Figure 4: Who Makes IT Architecture, Policy, and Procurement Decisions? (2018, n = 751)



3.3. IT Budget and Spending Trends

IT budgets increased an average of 4.9% (n = 405) from 2017 to 2018, slightly down from 5.3% increases from 2016 to 2017. Furthermore, the percentage of organizations increasing IT budgets dropped for the first time since 2012, down to 70% from 73.7% in 2017 (Figure 5). Despite the small decline, a large majority of organizations continue to scale IT budgets up to support their growing needs.

Figure 5: Percentage of Organizations Increasing, Not Changing, and Decreasing IT Budgets from Prior Year, 2008-18



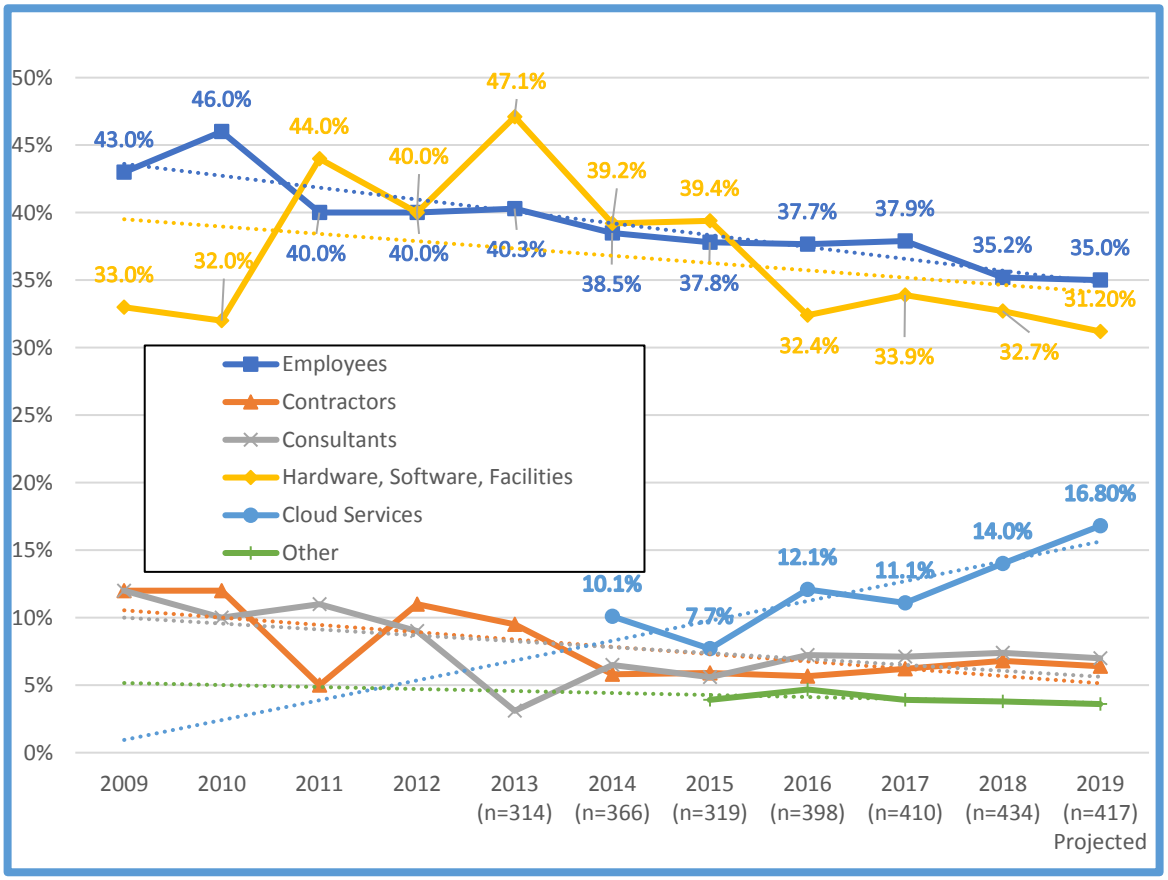
To see where IT dollars are spent, respondents broke down their IT budgets into eight mutually exclusive budget categories (Table 8). After an 8.3% decline from 2016 to 2017, Cloud spending recorded a 26.1% increase in 2018 with further increases projected for 2019. Minor increases in Consultants, Contractors, and Facilities were also observed in 2018 while all other budget categories saw decreases. Looking to 2019, the general pattern of allocations is expected to be similar, with increases in Cloud spending taking a small portion from all other categories. Figure 6 graphically depicts the gradual reallocation of funds from traditional Hardware, Software, and Facilities expenses to Cloud Services over the past five years.

Table 8: IT Budget Allocations, 2015-2018 (Actual) and 2019 (Projected)

Budget Categories	% Allocated					Projected % Change 2018-19
	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Projected	
Hardware	15.8%	12.0%	12.6%	11.9%	10.8%	-9.2%
Software	17.9%	15.4%	16.6%	16.0%	15.8%	-1.3%
Facilities (including supplies & consumables)	5.6%	5.0%	4.7%	4.8%	4.6%	-4.2%
Employees	37.6%	37.7%	37.9%	35.2%	35.0%	-0.6%
Consultants	5.6%	7.2%	7.1%	7.4%	7.0%	-5.4%
Contractors	5.9%	5.7%	6.2%	6.8%	6.4%	-5.9%
Cloud Services (SaaS, PaaS, IaaS, process, +)	7.7%	12.1%	11.1%	14.0%	16.8%	20.0%
Other	3.9%	4.7%	3.9%	3.8%	3.6%	-5.3%
n = most senior IT leader in n unique organizations	319	398	410	434	417	417

Annual totals may not equal 100% due to rounding

Figure 6: IT Budget Allocations, 2009-18, 2019 (Projected), with Trendlines



To gain a more granular perspective on IT spending, respondents also provided 2018 actual spending and projected 2019 in 10 overlapping categories (Table 9). Note that increases were reported in every category in 2018, with the largest year-over-year percentage increases in Cybersecurity, Management Training, IT R&D, and Software Development. BI/Analytics and Cybersecurity are projected to see strong growth in 2019.

Table 9: IT Budget Allocations to Non-Mutually Exclusive Categories, 2016-18

Non-Mutually Exclusive IT Budget Categories	% Allocated				Actual % Change 2017 to 2018	Projected % Change 2018 to 2019
	2016 Actual	2017 Actual	2018 Actual	2019 Projected		
Keeping the IT Lights On (KTLO)	42.0%	40.5%	48.9%	47.3%	20.7%	-3.3%
Software Development & Maintenance	24.4%	20.1%	27.1%	27.6%	34.8%	1.8%
IT Capital Investment	12.4%	14.6%	18.4%	18.8%	26.0%	2.2%
Outsourcing	10.6%	9.1%	10.7%	10.9%	17.6%	1.9%
Cybersecurity	6.2%	5.3%	7.7%	8.9%	45.3%	15.6%
BI/Analytics	6.1%	5.3%	6.0%	7.6%	13.2%	26.7%
IT-Related R&D	4.7%	3.9%	5.3%	5.9%	35.9%	11.3%
Offshore IT	4.7%	4.5%	5.8%	6.0%	28.9%	3.4%
Management/Leadership Training	3.4%	1.7%	2.4%	2.6%	41.2%	8.3%
Technical Training	3.5%	2.1%	2.7%	3.0%	28.6%	11.1%

- Average annual totals do not equal 100% because these categories are overlapping and not mutually exclusive.

n = most senior IT leader in 548 organizations (2018 actual & 2019 projected), 530 (2017 actual), 481 (2016 actual)

298 organizations responded that they allocate some of their IT budget to Outsourcing and 65.8% of this is spent domestically, up from 57.3% last year. Organizations expect domestic outsourcing to remain fairly constant with 2019 projections averaging 64.8%. Since the average outsourcing allocation was 10.7% of IT budgets in 2018, we can infer that 7% of IT budgets are spent on domestic outsourcing and 3.7% on offshore outsourcing. To gain clarity on what organizations are outsourcing, respondents were asked to select up to three of their largest outsourcing expense categories (from a list of six). Software Development and Data Center/Infrastructure were the two most frequently outsourced services (Table 10).

Table 10: IT Outsourcing Service Categories (n=298), 2018

Outsourcing Category	Percent of Respondents
Software & Application Development, Maintenance, Support, & Programming	76.8%
Data Center, Infrastructure, IT Operations	50.3%
Network Administration & Management	29.9%
Software / System Testing & Quality Assurance	17.4%
Help Desk / Service Desk	31.2%
Cyber Security / IT Security	31.2%

Software development continues to be a major budget line item and spending in this area can be quite diverse. Respondents were asked to select up to three of their largest development expenses from a list of 10. Internet of Things (IoT) and Mobile were newly added to the list in 2018. As shown in Table 11, investment in New Development rose sharply in 2018 while spending on modification of off-the-shelf software dropped, potentially signaling organizations are investing more in customized solutions rather than looking to purchase pre-packaged software and configure it to fit their needs.

Table 11: Top Software Development Spending Categories, 2016-2018[a]

Software Development Categories	2016	2017	2018	% change 2017-18
n (unique organizations)	377	337	326	
Integration	67.6%	65.3%	67.8%	3.8%
Maintenance/Enhancement of legacy	51.5%	49.3%	48.2%	-2.2%
Customization	46.2%	38.0%	38.0%	0.1%
Web		33.8%	31.0%	-8.4%
New custom/Bespoke development	27.9%	18.1%	22.4%	23.7%
Maintenance/Enhancement (other than legacy)	19.4%	23.4%	19.9%	-14.9%
Migration	28.1%	14.5%	14.7%	1.3%
Mobile			13.5%	N/A
Modification of COTS	15.9%	14.2%	10.1%	-28.9%
Internet of Things (IoT)			6.4%	N/A

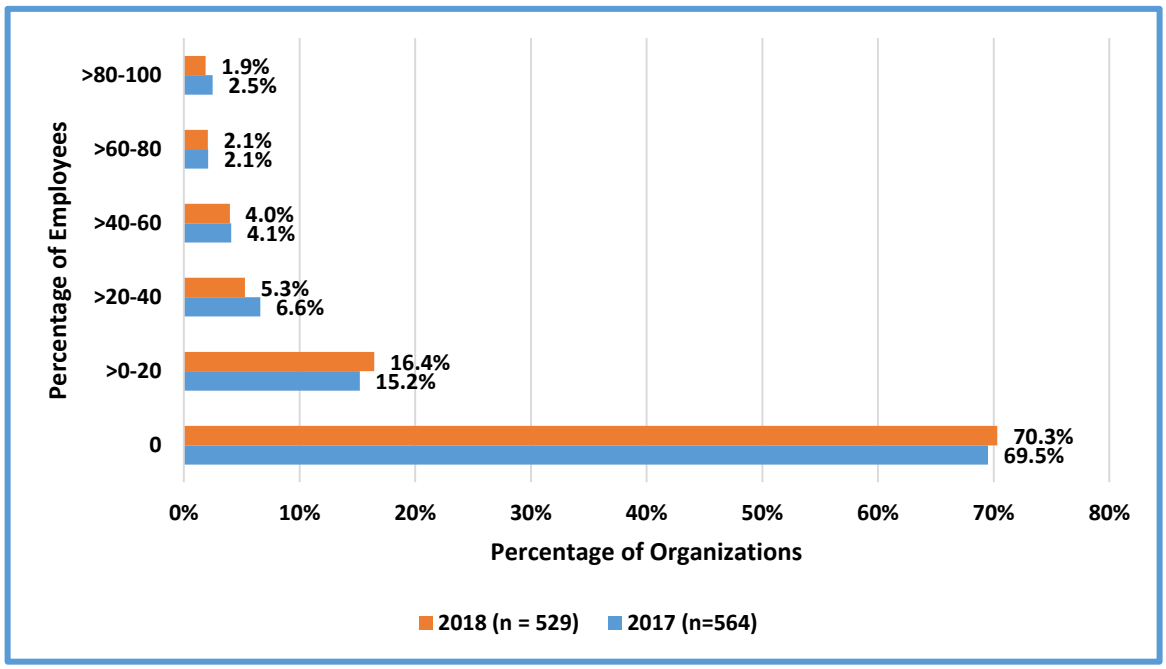
* Blanks represent a category not present in the survey that year
[a] Percentage of respondents who ranked this category as one of their top three largest

Respondents were also asked to break down their analytics spending into seven categories. With 327 organizations reporting, 57.5% of analytics spending went to human capital (35.1% employees, 14.5% consultants, 7.9% contractors). Software (28.6%), Hardware (6.1%), Training (4.4%), and Other (3.4%) consumed the rest.

3.4. IT Workforce and Salary Trends

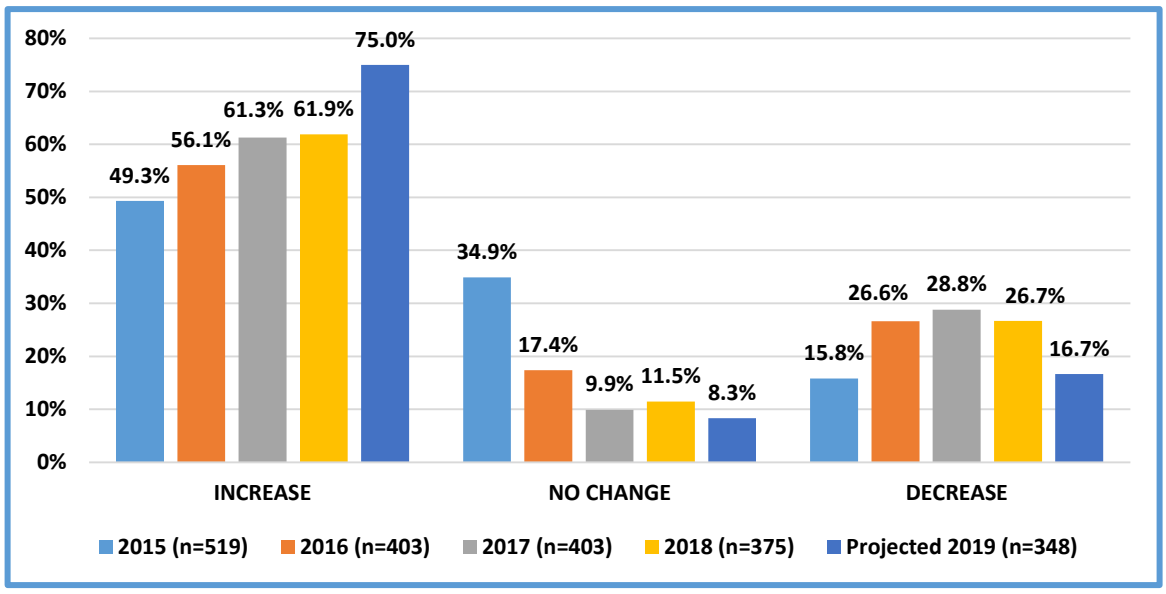
3.4.1. IT Employees and their Salaries. In 2018, the average number of "full-time IT employees (IT FTEs, not including contractors or consultants)" who "reported to or under the top IT person" was 874 (n = 582). This is considerably larger than the 397 reported in 2017, but closer to the 692 reported in 2016. The median number of IT FTEs in 2018 was 26, which is much more consistent with the 30 reported in 2017 and 28 reported in 2016. 76.5% of responding organizations reported having 100 or fewer IT employees, which is slightly higher than the 73.9% reported last year. 13 organizations (2.2%), reported having no IT employees at all; presumably, outsourcing all their IT work. On average, 8.8% of IT FTEs are "located outside their home country (i.e., offshore)" (n = 529). This is down from 9.8% reported in 2017. Moreover, 70.3% of organizations reported having no IT employees outside their home country (Figure 7).

Figure 7: Percentage of IT FTEs Located Outside Employer's Home Country, 2018 vs. 2017



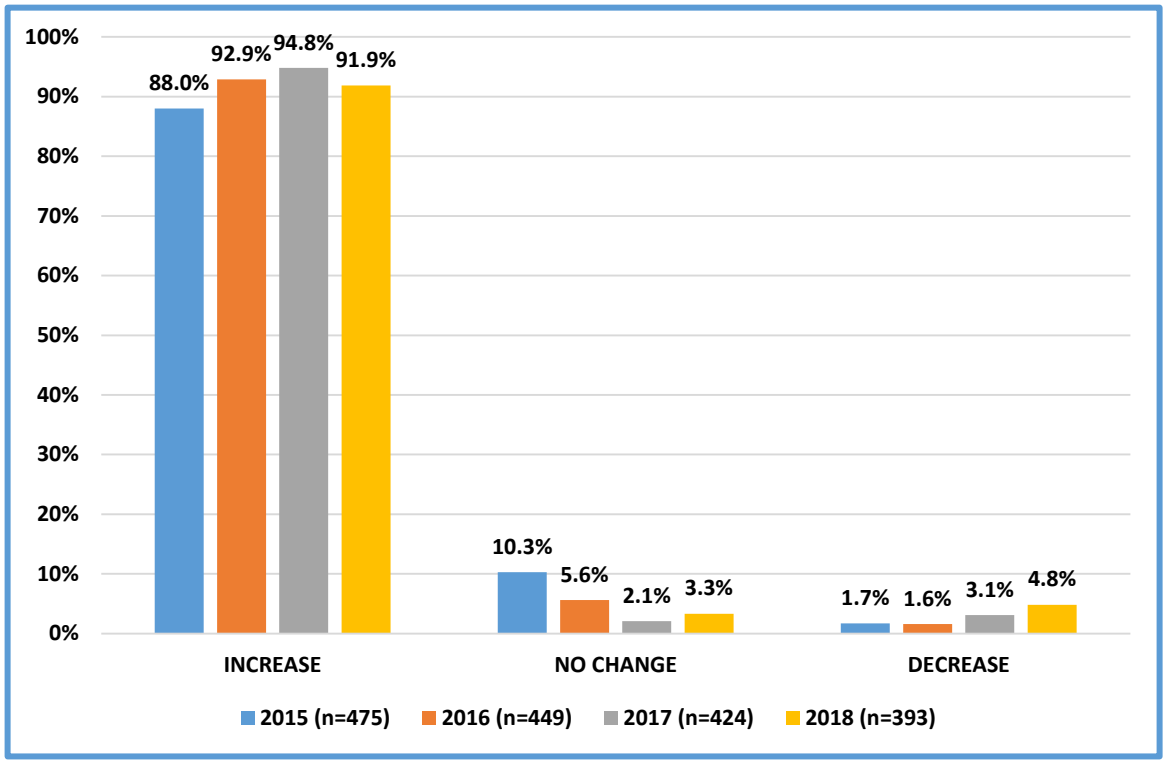
In 2018, 61.9% of 375 responding organizations reported an increase in the number of internal IT employees (Figure 8), slightly up from 61.3% in 2017. Optimistically, 75% projected 2019 increases. The percentage of organizations reporting no change was up 16.2% from 9.9% in 2017 to 11.5%, while organizations reporting decreasing headcount fell 7.3% from 28.8% to 26.7%. Overall, there was an average increase of 3.9% in IT FTEs.

Figure 8: Percentage of Organizations Reporting Increases, No Change, and Decreases in Internal IT FTEs, 2015-18, 2019 projected



This year, 95.2% of organizations reported that average IT salaries increased or remained flat (Figure 9). This is down slightly from 96.9% in 2017. However, the average increase in IT salaries for 2018 was 4.4%, up from 4.2% in 2017 and 3.5% in 2016. Given the increases in the size of the IT workforce and average IT salaries, it is not surprising that total spending on IT salaries increased by an average of 5.0% (n = 424) in 2018, which is up considerably from 4.5% in 2017.

Figure 9: Percentage of Organizations Reporting Increases, No Change, and Decreases in Average IT Salary, 2015-18

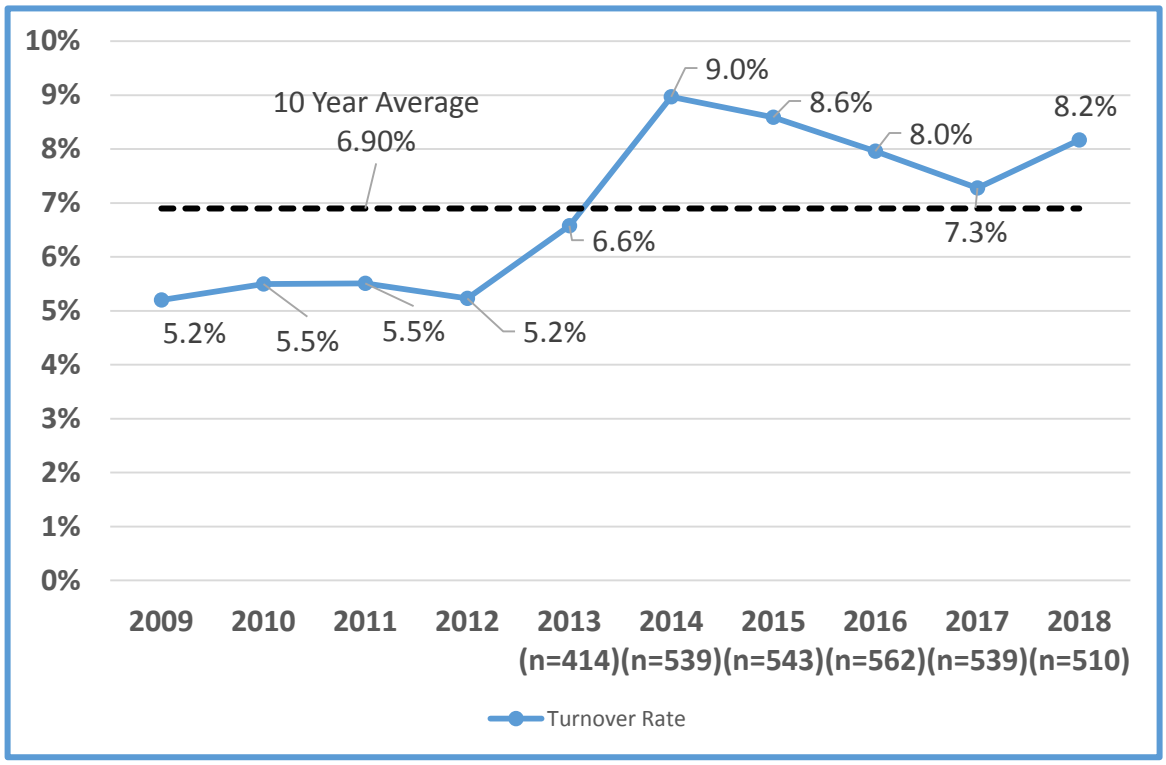


3.4.2. IT Contractors and Consultants. The average number of IT contractors and consultants used by the 467 responding organizations in 2018 was 72.6, down from 83.3 in 2017. However, the median was 3 and the standard deviation was 494.3, indicating a great deal of variability in the use of contractors and consultants. 90.1% reported using less than 50 which is up slightly from 89.1% in 2017. 26.3% reported no use of contractors or consultants up from 22.2% in 2017.

Of the 234 organizations that reported using IT contractors and consultants, 52.1% said they had increased their numbers, nearly 11% lower than 58.4% in 2017. In 2018, 13.7% reported no change in the number of IT contractors and consultants and 34.2% reported a decrease, up from 24.8% in 2017. For 2019, 59.8% of the respondents anticipate an increase in the use of IT contractors and consultants, 12.1% expect no change, and 28.1% project a decrease.

3.4.3. IT Workforce Turnover and Retirements, Education, and Training. Figure 10 presents the IT employee turnover rate in organizations as reported by 510 IT leaders. The 12.2% uptick in IT turnover over 2017 to 8.2% in 2018 concludes a three-year downward trend from the 2014 high of 9.0%. This is likely a consequence of the tight IT labor market resulting in increased opportunities for IT professionals. The increased pressure to retain high-performing IT personnel, already an issue of critical concern for IT leaders (Table 2), may indicate why Management/Leadership Training expenditures increased of 40% in 2018 (Table 9).

Figure 10: Turnover Rate for Full-Time IT Employees, 2009-18

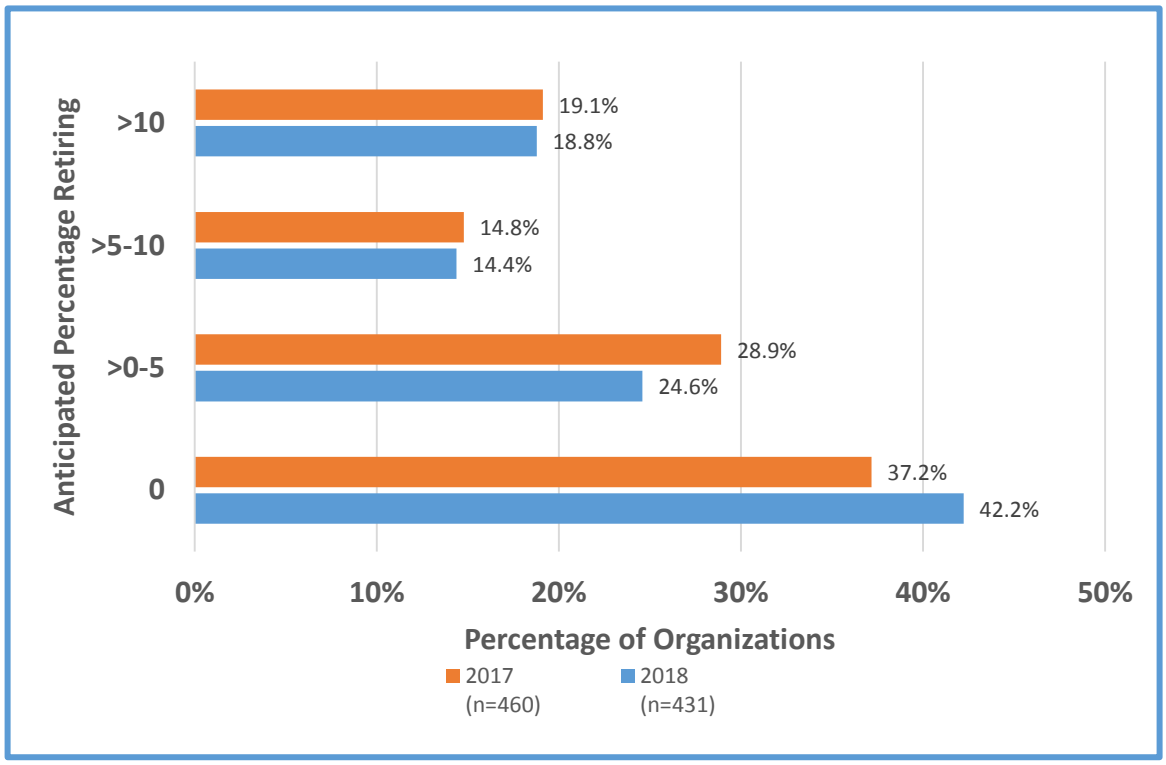


Participating IT leaders also provided estimates regarding what portion of their turnover was "involuntary (i.e., the result of downsizing, layoffs, terminations, etc.)" versus the portion considered "voluntary (i.e., quitting, retirements, etc.)." Voluntary departures accounted for 69.6% of turnover, a minor increase over the 68.4% reported in 2017. The remaining 30.4% of turnover was involuntary, accounting for approximately 2.5% of the 8.2% total turnover rate.

431 organizations provided estimates of the percentage of IT employees expected to retire within the next five years (Figure 11). Overall, participants reported that 6.9% of their IT employees would retire within this period. This estimate is consistent with 2017 responses and suggests that IT organizations have no immediate concerns about retirements negatively

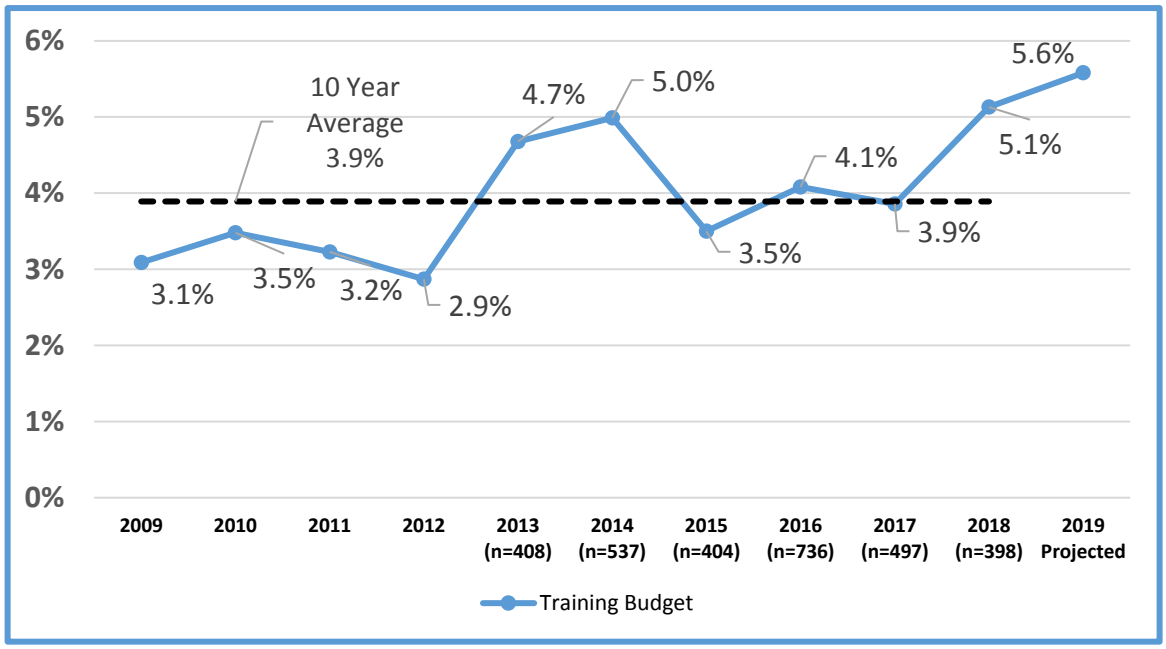
impacting their ability to meet organizational commitments; although, it is unknown if specific skill sets may be adversely affected (e.g., mainframe, COBOL).

Figure 11: Percentage of IT Employees Expected to Retire in the Next Five Years, 2018 vs. 2017



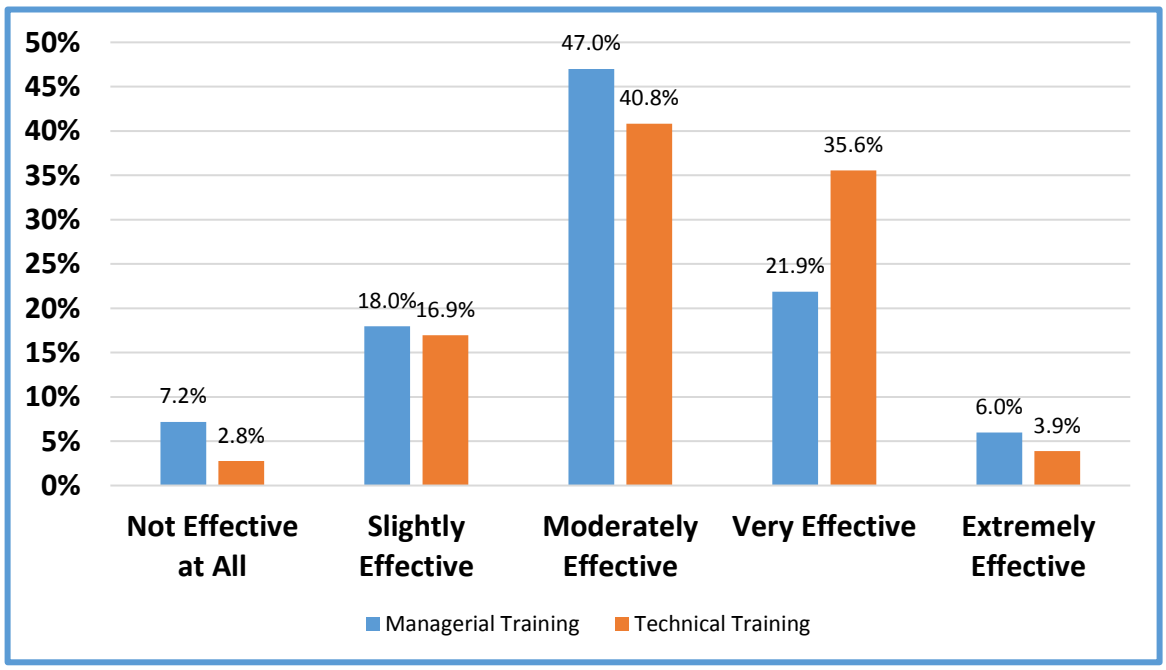
3.4.4. Training Expenditures, and their Effectiveness. Figure 12 presents the trend in percentage of IT budget spend on training. This year, IT leaders reported significant increases in spending on training, as the percentage of IT budget allocated toward training IT personnel jumped over 30.0% from 3.9% in 2017 to 5.1% in 2018. This marks a ten-year high for training and may reflect increased efforts to attract and retain superior IT talent. Interestingly, IT leaders foresee even higher spending on training in 2019. Funds for 2018 were primarily directed towards "Technical Development and Training" (2.7%, n=411), with "Managerial and Leadership Development Training" accounting for the remaining 2.4%, n=408).

Figure 12: Percentage of IT Budget Spent on Training 2009-18, 2019 (Projected)



Participants also commented on the effectiveness of their training programs on a five-point scale ranging from "Not Effective at All" (1) to "Extremely Effective" (5). As expected, Figure 13 shows that the majority of firms consider both their managerial and technical training programs to be moderately effective.

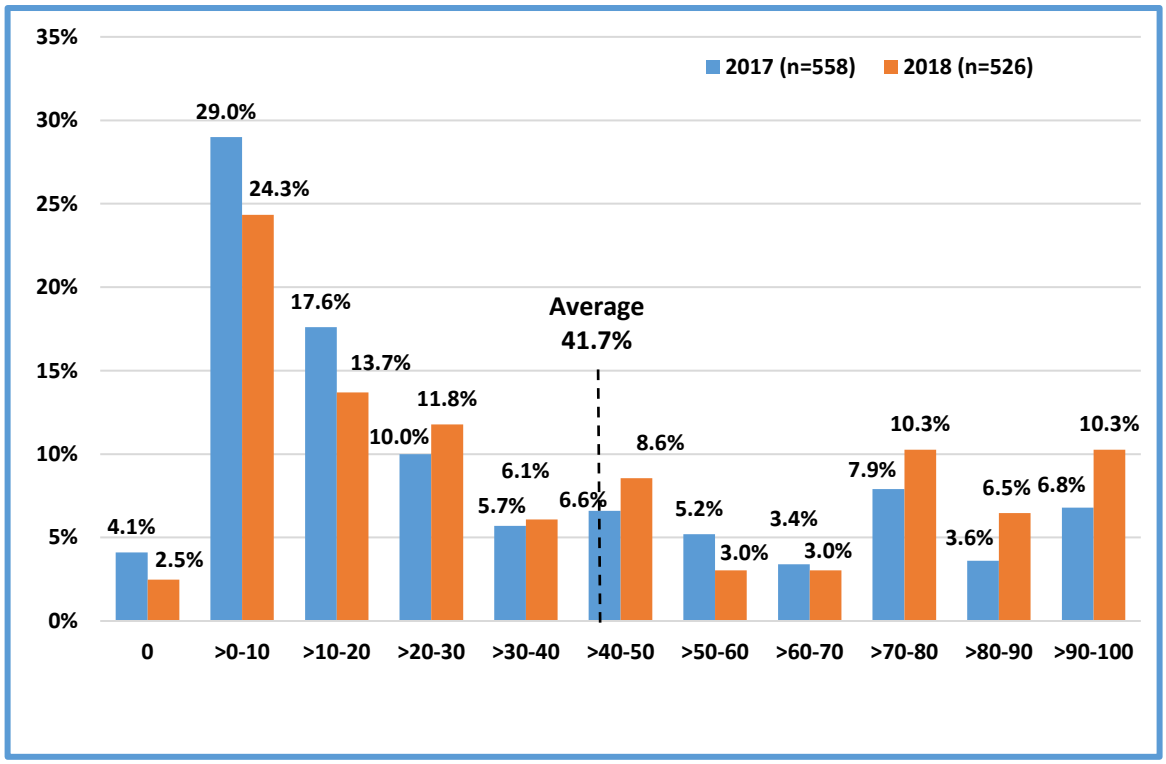
Figure 13: Effectiveness of Managerial (n=334) and Technical (n=360) Training, 2018



3.5. Use of Cloud and Shared Services

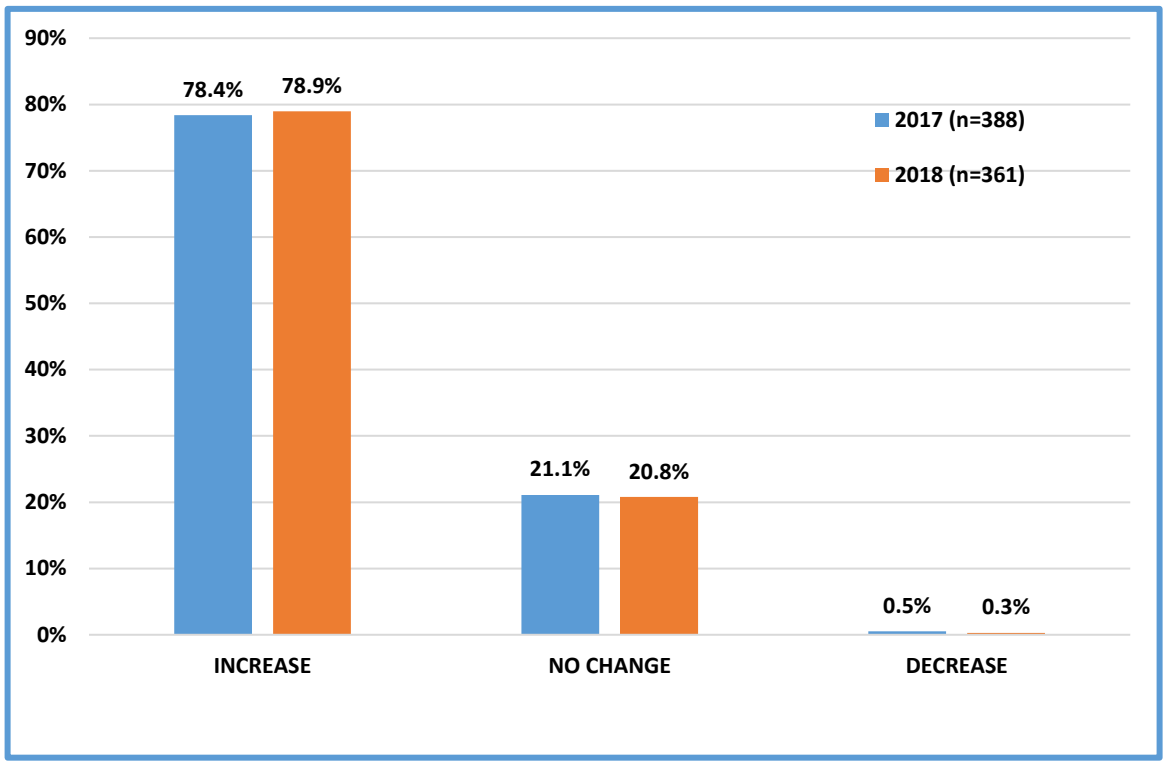
3.5.1. Cloud-Based IT Services and Solutions. Of 526 reporting organizations, 97.5% indicated they used Cloud Services and Solutions, up from 95.9% in 2017. These organizations, on average, delivered 41.7% "of all IT services" via the Cloud, up from 34.6% in 2017, 31.9% in 2016, and 27.2% in 2015. As shown in Figure 14, the distribution has shifted to the right with more organizations delivering more IT services via the cloud. 2.5% of organizations reported no cloud-based IT services, down significantly from 4.1% reported in 2017, and 52.3% reported less than 30% of IT services are cloud-based, down from 60.8% in 2017 and 72.0% in 2016. Also, the median increased from 20% reported in 2017 to 30% in 2018.

Figure 14: Percentage of IT Services Delivered via the Cloud, 2018 vs. 2017



As shown in Figure 15, 78.9% of 361 respondents reported an increase in external cloud usage in 2017, 20.8% reported no change, and 0.3% reported a decrease. This is very similar to what was reported in 2017. Increases in the number of cloud features purchased were reported by 76.5% while 23.2% reported no change. Respondents reported that the cost per seat for External Cloud Services increased on average by 8.3%, the unit cost of processing power increased by 2.0%, and the cost per unit of storage increased by 0.2%.

Figure 15: Percentage of Organizations Reporting Increases, No Change, and Decreases in External Cloud Usage, 2018 vs. 2017



Respondents were then asked "What percentage of your cloud-based IT services are provided in each of [three sourcing] categories?" Table 12 shows the breakdown of their responses. On average, these organizations have been using external cloud services for 4.5 years.

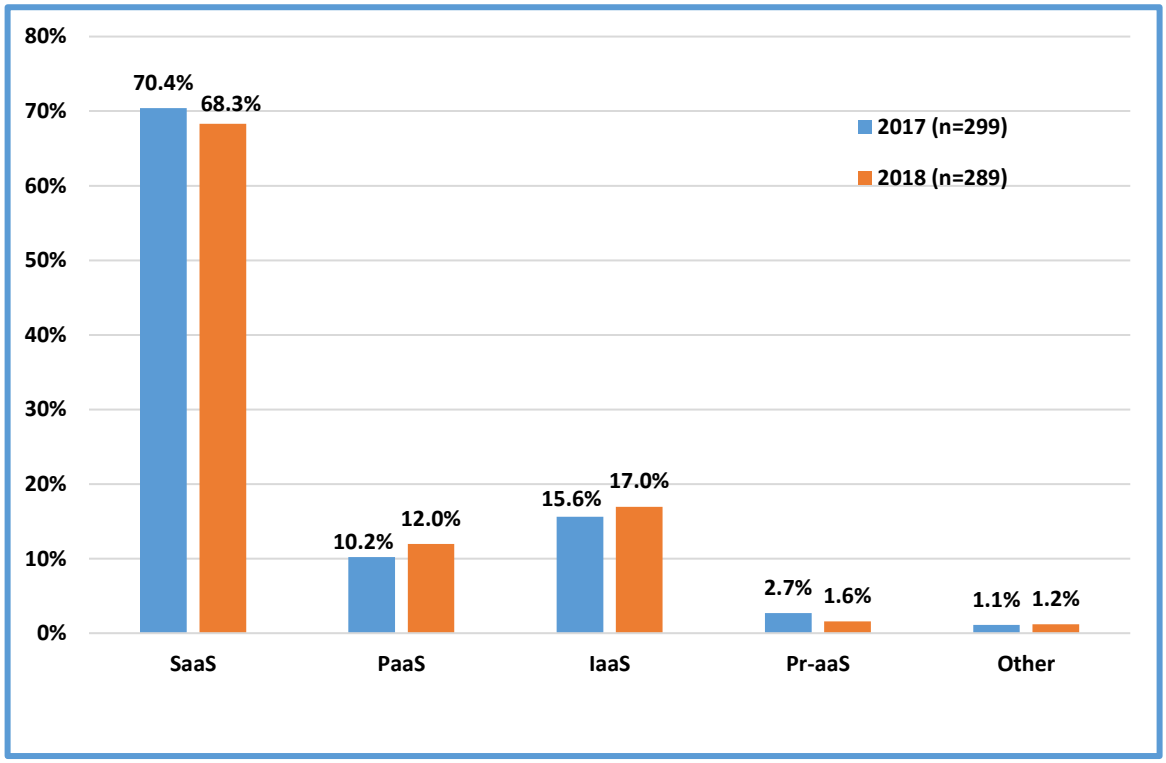
Table 12: Use of Various Cloud Sourcing Categories, 2018 vs. 2017

Cloud Sourcing Category	Percentage of Organizations Using This Category		Average Percentage of All Cloud-Based IT Provided by This Category		Organizations Using This Category for Over 50% of Cloud-Based IT		Organizations Using Only This Category	
	2017	2018	2017	2018	2017	2018	2017	2018
Internal Private Single-Tenant	57.6%	58.2%	32.9%	29.3%	29.6%	24.7%	5.4%	5.2%
External Public	81.0%	81.8%	47.1%	52.1%	40.1%	47.8%	22.6%	27.5%
External Public Single-Tenant	51.8%	43.9%	20.0%	17.0%	12.6%	11.2%	5.4%	3.6%
n (2018) = 385 most senior IT leaders in unique organizations n (2017) = 390 most senior IT leader in unique organizations								

Respondents were also asked: "What percentage of the external cloud-based IT services are provided in each of the following categories: Software as a Service (SaaS), Platform as a

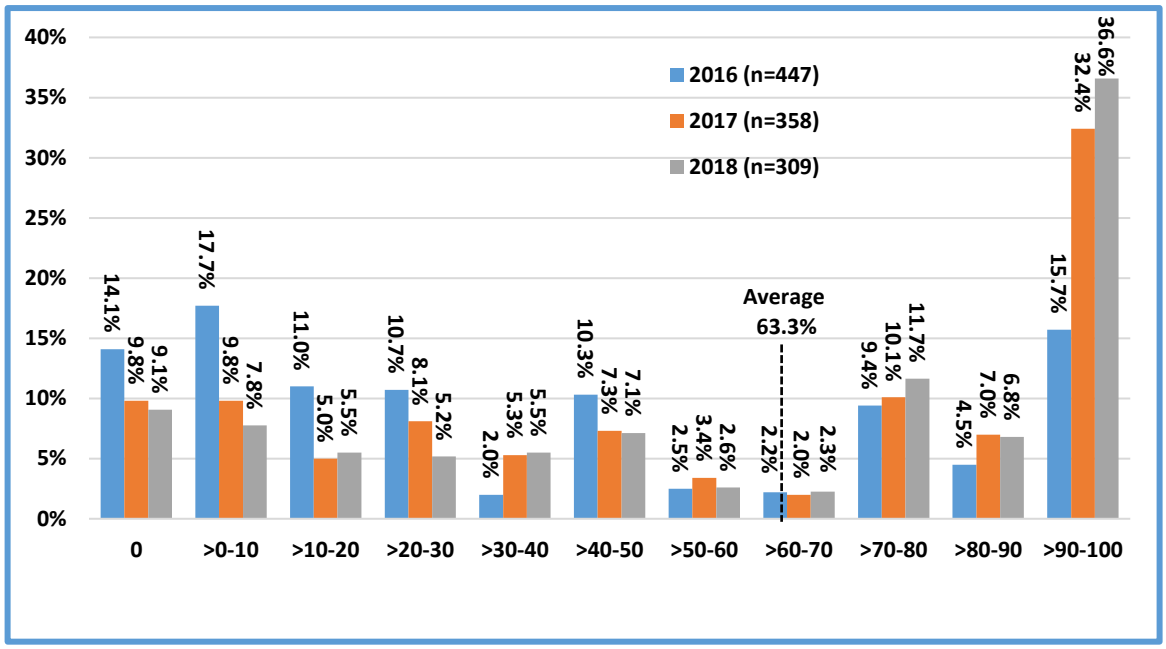
Service (PaaS), Infrastructure as a Service (IaaS), and Process as a Service (PraaS)?" Figure 16 shows the responses from 289 organizations. SaaS (68.3%) and PraaS (1.6%) are down from 2017 while PaaS (12.0%) and IaaS (17.0%) are each up.

Figure 16: Percentage of External Cloud Services Delivered by Service Category, 2017-18



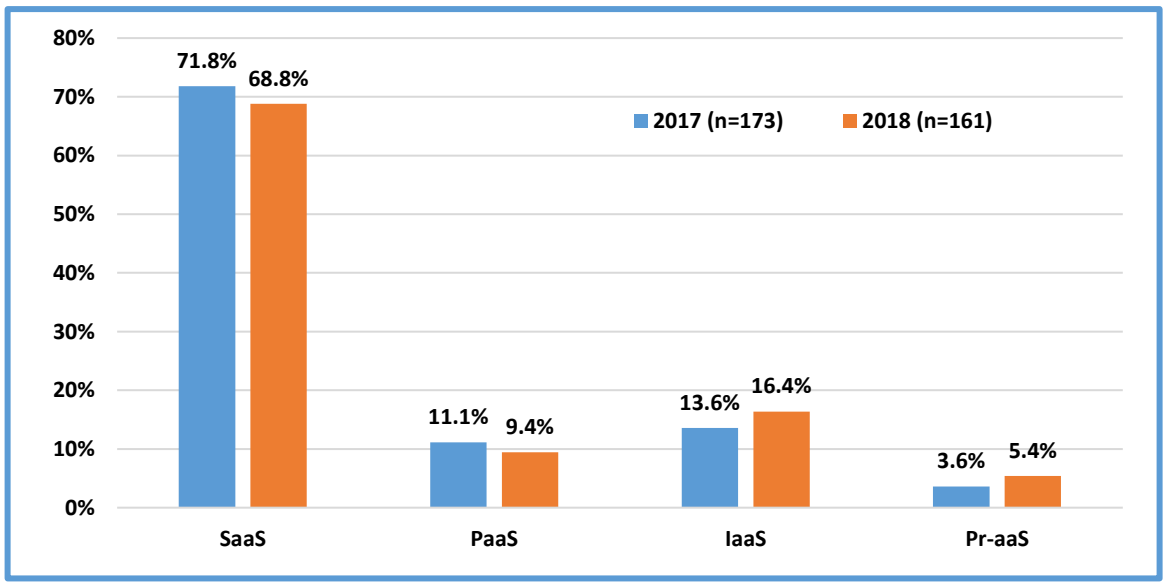
3.5.2. Shared Services for IT Delivery. Similar to 2017, over 90% of 309 organizations indicated they used at least some shared services in 2018. The average amount of shared IT services delivered in 2018 is up from 59.2% in 2017 to 63.3%. As can be seen in Figure 17, there has been a significant shift by organizations since 2016 to offer a higher percentage of shared IT services. The number of organizations reporting "no shared IT services" dropped for a third year from 14.1% in 2016 to 9.1%.

Figure 17: Percentage of All IT Services Delivered as Shared Services, 2016-18



Responses from IT leaders in 161 organizations to the question "What percentage of IT shared services are provided in each of the following categories: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Process as a Service (PraaS)?" are shown in Figure 18. SaaS at 68.8% is down slightly from 71.8% in 2017. Also, PaaS has dropped slightly from 11.1% in 2017 to 9.4%. Both IaaS and PraaS have increased from 13.6% in 2017 to 16.4% and from 3.6% to 5.4%, respectively.

Figure 18: Percentage of IT Shared Services by Category, 2017-18



3.6. Cybersecurity Practices

45.5% of organizations (n=670) stated they had a "Chief Information Security Officer (CISO) or equivalent" position in 2018. While this number is down slightly from both 2016 and 2017 (Table 13), these changes are not significant and likely attributable to differences in the respondent sample from year to year rather than a downward trend; specifically, a higher percentage of smaller organizations that are less likely to have a dedicated CISO (Figure 19). Organizations without a CISO have a higher average IT budget as a percent of revenue (7.3% compared to 6.8% for organizations with a CISO); however, cybersecurity budgets are higher for organizations with CISOs (10.5% of the overall IT budget compared to 5.6%).

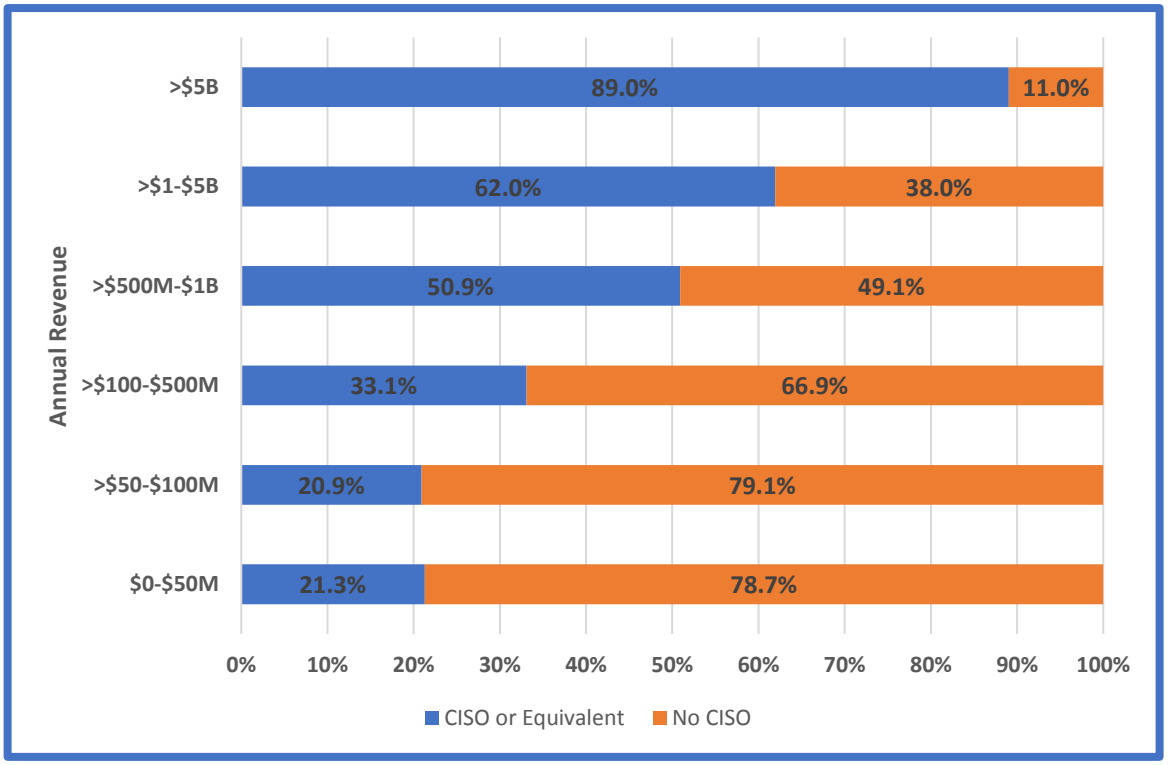
Table 13: Cybersecurity Leadership 2016-2018

Does your organization have a CISO or equivalent position?	2016	2017	2018
n (unique organizations)	705	695	670
Yes	45.8%	46.2%	45.5%
No	54.2%	52.8%	53.1%
I Don't Know[a]		1.0%	1.3%

[a] Option not provided to respondents in 2016

The presence of a CISO or equivalent to lead cybersecurity continues to have a strong correlation to organization size, with larger organizations more likely to have a dedicated leadership position for cybersecurity (Figure 19). While the percentage of organizations without CISOs remains too high, especially among those with revenue over $500 million, it is worth noting that most of these organizations still have cybersecurity budgets. There is simply no dedicated position with sole responsibility for overseeing cybersecurity operations and investments. This year, a larger percent of organizations with revenue greater than $5 billion have a CISO, which is a positive development (89% versus 84.2%).

Figure 19: Percentage of Organizations by Total Revenue with a CISO, 2018 (n = 490)



As in years past, most CISOs report to the CIO (Table 14). CISO reporting relationships also appear to be related to organization size with larger organizations situating cybersecurity within the IT function. 82% of organizations with annual revenue in excess of $500 million have their CISO report to either the CIO or CTO. For organizations with revenues under $500 million, this percentage is only 54%. Smaller organizations are more likely to have the CISO report to either the CEO or COO.

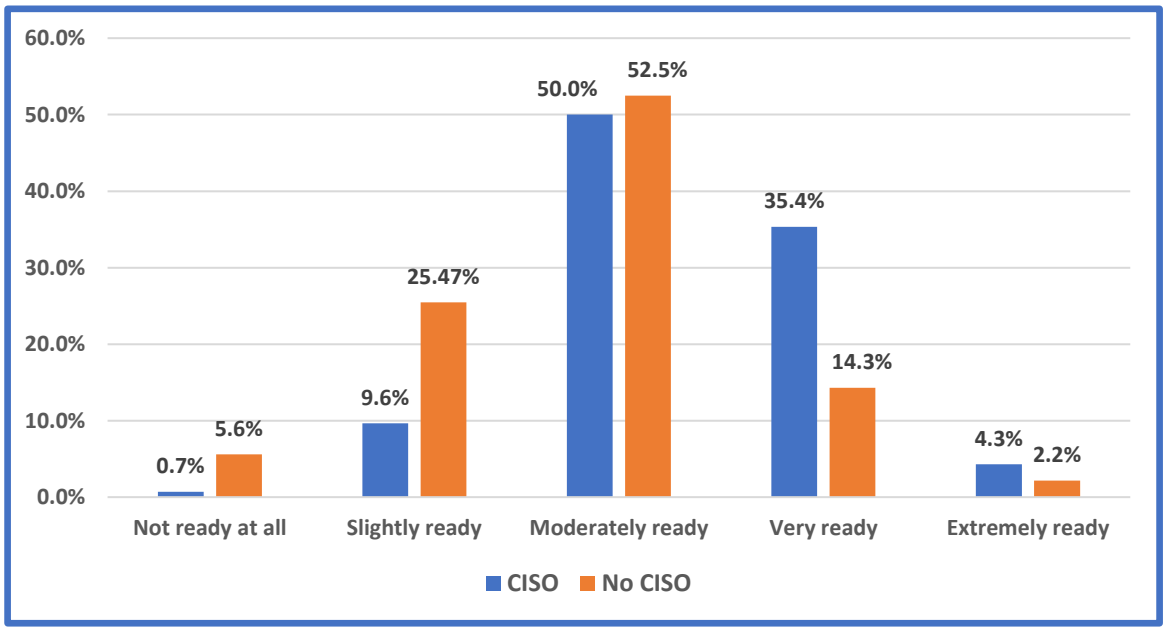
Table 14: To Whom Does the CISO (or Equivalent) Report? (2018)

Position	% of Organizations
CIO (Information)	62.3%
CEO/President	10.9%
CTO (Technology)	7.3%
COO (Operating)	5.6%
Other	5.6%
CFO/Treasurer/Finance	4.0%
CLO (Legal)	2.3%
Internal Audit	1.0%
Board/Board Member	0.3%
CCO (Compliance)	0.3%
CAO (Administrative)	0.3%

n = most senior IT leader in 302 unique organizations

New for 2018, respondents were asked to evaluate their overall cybersecurity readiness along a five-point scale (1 - "Not Ready at All" to 5 - "Extremely Ready"). The average score was slightly above neutral at 3.06, signaling abundant room for improvement in the average organization's readiness to handle the risks and threats associated with cybersecurity. Unsurprisingly, the average readiness for organizations with a CISO is higher than those without (3.3 vs. 2.8) (Figure 20).

Figure 20: Cybersecurity Readiness, 2018 (n = 602)



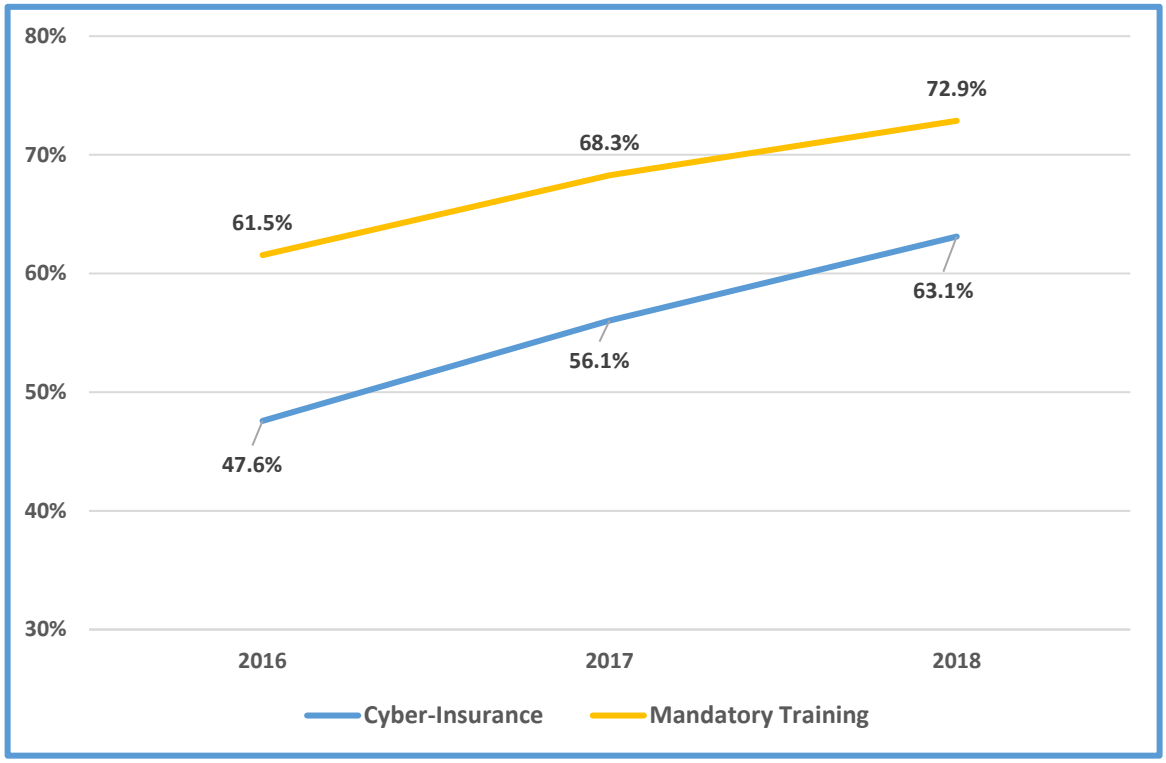
Cybersecurity is an overall business problem and therefore it is important to consider risks when performing various business processes. Respondents were asked whether cybersecurity was considered explicitly when performing five common IT and business processes (Table 15). Except for "Developing Business Strategy," all percentages have increased, signaling that organizations continue to integrate security into various business activities.

Table 15: Percentage of Organizations Considering Cybersecurity When Doing _____, 2016-2018

Business Process	2016	2017	2018	% Change 2017-18
N (unique organizations)	685	668	627	
IT Procurement/Purchasing	53.6%	71.9%	75.3%	4.7%
Software/Systems Development	79.3%	81.9%	82.0%	0.1%
IT Change Management (Hardware & Software)	79.0%	78.3%	79.4%	1.4%
Developing Business Strategy	49.1%	54.6%	51.8%	-5.1%
Other	6.0%	3.4%	4.0%	17.6%

Cyber-insurance continues to grow in popularity with 63.1% of organizations currently covered. Mandatory cybersecurity training for all employees also increased to 72.9% for all participating organizations in 2018. While this steady increase in cybersecurity attention may bring some comfort, the lack of increase in CISO positions suggests that companies may be taking what they consider to be positive steps toward securing their infrastructure but are doing so without a holistic approach and fully investing in a culture of secure computing.

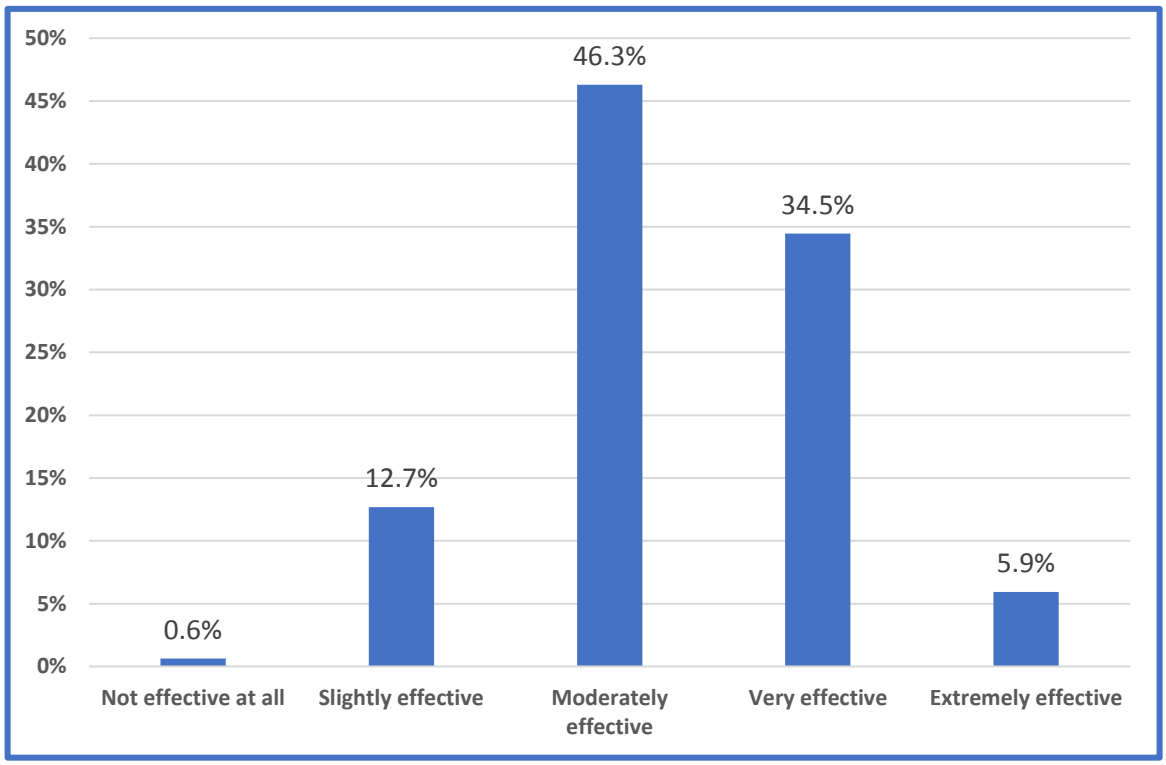
Figure 21: Cyber Insurance and Cybersecurity Training in Organizations, 2016-2018



Insurance question: 2016 n = 662, 2017 n = 628, 2018 n= 591
Training question: 2016 n = 697, 2017 n = 681, 2018 n = 634

While training is an important component of security readiness, training must be of high quality. On a scale of 1 to 5 ("Not Effective at All" to "Extremely Effective"), the average of 473 organizations responding was 3.32 (Figure 22). This is down slightly from 3.41 in 2017 but the small decline does not necessarily indicate a downward trend. It is also worth noting that the distribution of responses closely mirrors overall technical training effectiveness, as shown in Figure 10.

Figure 22: How Effective is Your Organization's Cybersecurity Training? 2018, (n = 473)



4. IT Performance Measurement

Participants were asked to "Select up to five (5) of your organization's most important performance measures" from a list of 34 in each of three separate categories: "internal IT," "outsourced IT" [if applicable] and "your personal performance."

4.1. Performance Measures for Internal and Outsourced IT

648 respondents provided the top performance measures for their internal IT operations, and the 448 respondents reporting that they outsourced at least some of their IT operations provided measures for outsourced IT. Measures are classified according to their focus: IT (I), Business (B), Strategic (S). Table 16 displays the ranking of all performance measures with the top 10 in each category highlighted.

Table 16: Performance Measures for Internal and Outsourced IT, 2018

Focus	Performance Measure	Percentage Selecting [a]	
		Internal IT (n = 648 organizations)	Outsourced IT (n = 448 organizations)
I	Availability/Up Time	1 (52.3%)	1 (26.4%)
B/I	Customer / User Satisfaction (Internal Users)	2 (45.5%)	2 (18.1%)
I/B	Cybersecurity Related	3 (27.6%)	9 (11.9%)
I/B	Cost Control/Reduction (IT)	4 (26.1%)	3 (17.6%)
I	Help Desk Performance	5 (24.8%)	6 (14.4%)
S	Value of IT to the Business	6 (21.9%)	15 (4.8%)
I/B	IT Budget Compliance	7 (18.8%)	11 (5.9%)
B/S	Customer / User Satisfaction (External Users)	8 (18.4%)	12 (5.6%)
I/B	Projects Delivered on Time	9 (17.4%)	7 (13.6%)
I/B	IT Service Quality	10 (16.4%)	4 (15.1%)
S	IT's Contribution to Strategy	11 (14.5%)	26 (1.7%)
B/S	Innovative New Ideas	12 (13.7%)	16 (4.6%)
B	Productivity Improvements (Business)	13 (10.3%)	21 (3.7%)
I/B	Projects Delivered on Budget	14 (10%)	8 (12.2%)
I/B	IT Spending as % of Revenue	15 (9.9%)	22 (3.5%)
B	Total Cost of Ownership	16 (8.5%)	12 (5.6%)
S	Revenue Growth	17 (7.9%)	29 (1.2%)
B	Improved Decision Making	18 (7.6%)	28 (1.4%)
B	Cost Control/Reduction (Business)	19 (7.4%)	19 (4.2%)
B	Project Return on Investment	20 (7.1%)	20 (3.9%)
I	Software Quality/Defect Rates in Software	21 (6.8%)	10 (10.2%)
I	SLA Target Compliance	22 (6.6%)	4 (15.1%)
S	Increases in New Products or Services	22 (6.6%)	18 (4.3%)
I/B	Productivity Improvements (IT)	24 (6.2%)	14 (5.2%)
I	Time to Market (IT)	25 (6%)	17 (4.5%)
I	IT Employee Retention	25 (6%)	33 (0.6%)
S	Profit Growth	27 (5.4%)	32 (0.9%)
B	Time to Market (Business)	28 (3.9%)	25 (2.8%)
I/B	Headcount Reduction (IT)	29 (3.1%)	23 (3.4%)
I/B	IT Spending per Employee	30 (2.9%)	27 (1.5%)
-	NONE/No Measures are Used	31 (2.6%)	24 (3.2%)
S	Return on Equity	32 (1.9%)	34 (0.3%)
B	Headcount Reduction (Business)	33 (1.2%)	29 (1.2%)
B/S	Customer / User Satisfaction (External Suppliers) [b]	34 (0.6%)	29 (1.2%)

[a] Duplicate rank numbers indicate a tie.
[b] New performance measure added in 2018
Focus: I=IT, B=Business Operations, S=Strategic

The top five performance measures for Internal IT also appear in the top ten for Outsourced IT and they indicate a strong focus on IT operations and customer service. The remaining top ten for Internal IT include some measures that evaluate Business and Strategic elements as well; however, the full top ten for Outsourced IT remains predominantly focused on IT. Of the top ten Internal measures, seven also appear in the top ten for Outsourced IT. Value of IT to the Business, IT Budget compliance, and Satisfaction for External Users all appear in the Internal top ten but not the Outsourced.

Conversely, of the three measures in the top ten for Outsourced, but not for Internal IT, Projects Delivered on Budget and Software Quality are focused on software projects, a top expenditure for over three-quarters of organizations that outsource (Table 10). The third, SLA Compliance, appears to be concerned with Data Center and IT Operations, a major expense for over half of outsourcing organizations (Table 10).

4.2. Performance Measures for CIOs

418 CIO respondents were asked to select up to five performance measures (from the same list of 34) most frequently used to evaluate their Personal Performance, Internal IT, and Outsourced IT (if applicable). Table 17 summarizes their responses over the past three years.

Table 17: Performance Measures for CIOs and Internal and Outsourced IT, 2016-18

Focus	Performance Measures	Percentage Selecting [a]								
		My Personal Performance			Internal IT			Outsourced IT		
	Year	2016	2017	2018	2016	2017	2018	2016	2017	2018
	n (CIOs)	490	469	418	490	469	418	312	276	276
B/I	Customer/User Satisfaction (Internal Users)	3	1	1	13	2	2	6	2	2
S	Value of IT to the Business	1	2	2	20	7	6	13	16	19
S	IT's Contribution to Strategy	4	3	3	10	10	10	17	25	30
I	Availability/Up Time	2	3	4	1	1	1	1	1	1
I/B	Cost Control/Reduction (IT)	7	7	5	22	6	5	3	3	6
I/B	Cybersecurity Related	5	5	6	7	3	4	7	6	3
I/B	IT Budget Compliance	8	9	7	16	10	11	15	13	11
B/S	Innovative New Ideas	10	8	8	28	15	13	24	19	17
I/B	IT Service Quality	9	10	9	23	9	7	2	3	4
I/B	Projects Delivered on Time	12	11	10	12	8	8	5	9	4
B	Improved Decision Making	17	12	11	30	22	17	28	28	28
B	Customer/User Satisfaction (External Users)	6	6	12	7	5	8	10	10	13
B	Productivity Improvements (Business)	15	15	13	4	14	12	18	13	19
I/B	Projects Delivered on Budget	11	13	14	14	12	14	7	6	8
I	Help Desk Performance	16	20	15	4	4	3	9	8	6
I/B	IT Spending as % of Revenue	13	16	16	26	12	15	21	22	22
I	IT Employee Retention	17	17	17	20	17	26	33	33	34
S	Revenue Growth	20	18	18	30	25	16	28	31	26
S	Increases in New Products or Services	23	23	18	26	22	18	19	17	14
S	Profit Growth	17	14	20	33	18	23	28	26	28
B	Project Return on Investment	24	22	21	32	22	23	20	21	18
B	Cost Control/Reduction (Business)	14	19	22	2	15	18	11	15	15
B	Total Cost of Ownership	20	20	23	25	21	21	11	12	12
I	Time to Market (IT)	26	24	23	28	26	22	16	22	16
B	Time to Market (Business)	28	27	25	17	32	28	27	30	24
I	Software Quality/Defect Rates	26	28	26	11	19	20	14	11	10
I/B	Productivity Improvements (IT)	22	30	26	9	31	23	23	26	19
I/B	IT Spending per Employee	31	32	28	19	28	30	28	32	30
I	SLA Target Compliance	25	25	29	15	19	26	4	5	9
S	Return on Equity	28	26	30	3	27	31	32	22	33
-	NONE/No Measures are Used	33	29	30	23	28	29	25	20	22
B/S	Customer/User Satisfaction (External Suppliers) [b]			32			33			25
I/B	Headcount Reduction (IT)	28	30	33	6	30	32	21	17	26
B	Headcount Reduction (Business)	32	33	34	18	33	33	25	29	32

[a] Duplicate rank numbers indicate a tie.
[b] New measure added in 2018
Blank = not collected that year.
Focus: I=IT, B=Business Operations, S=Strategic

Little has changed in CIO performance measurement over the past three years. CIOs are commonly evaluated on strategic-oriented measures like Value, Contribution to Strategy, and Innovation. Interestingly enough, Customer/User Satisfaction for External Users dropped out of the top ten for CIO personal performance for the first time in three years. CIO's responses for performance measures related to Internal IT and Outsourced IT mostly mirror what was

observed in the organization sample (Table 16). Performance measures like Availability/Up-Time, Internal User Satisfaction, Cybersecurity-related, IT Service Quality, and Projects Delivered on Time rank in the top ten across all three categories. Clearly CIO performance measurement places strong emphasis on providing high quality, reliable IT services while also making valuable, strategic contributions to the organization.

5. CIO Tenure, Reporting, Background, and Activities

The average age of the 356 CIOs who responded to this question was 51 years old (standard deviation of 7.9 years and median of 52 years) which is consistent with what was reported in 2017. Also consistent with 2017, 85.7% are male. Their average time as the top IT person decreased slightly from 6.7 years to 6.6 years (standard deviation 6.3 years and median of 4.3 years) (Figure 23), but still above the ten-year upwards trend line and the ten-year average of 5.5 years. Over 34.6% of respondents have been in their current position for seven years or more, while 37% have had the job for three years or less.

Figure 23: Average Job Tenure of CIOs, 2009-18

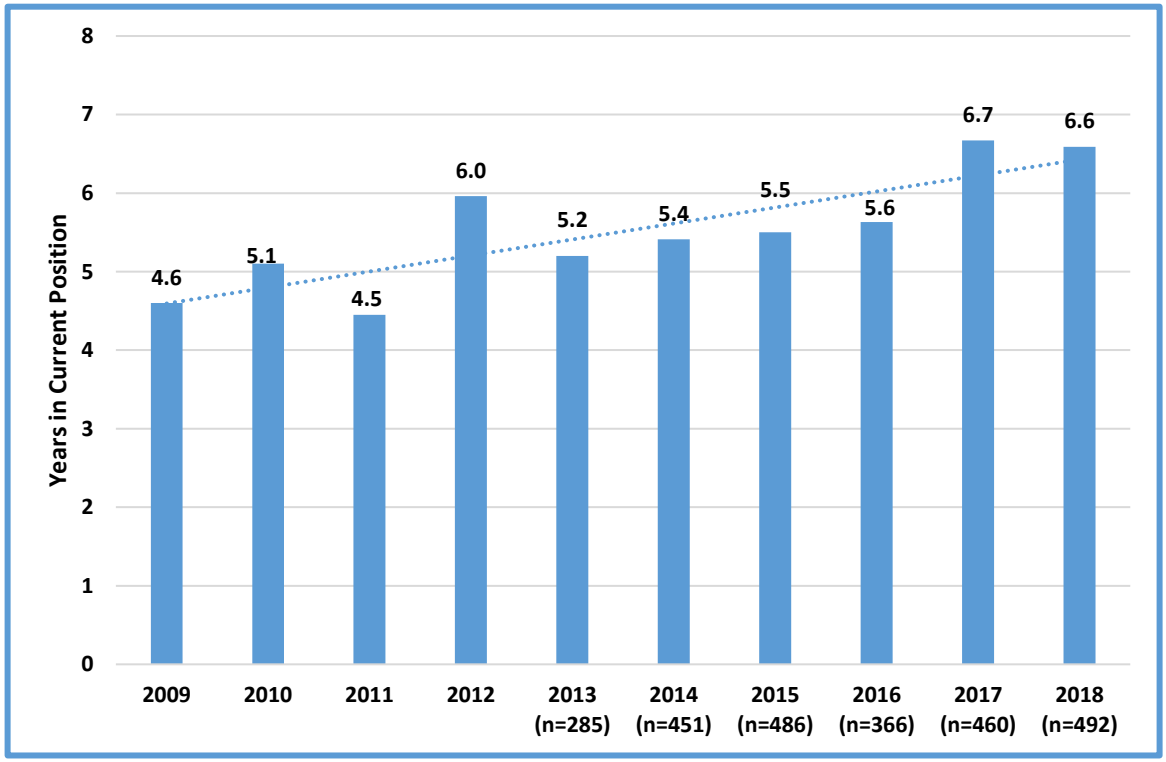


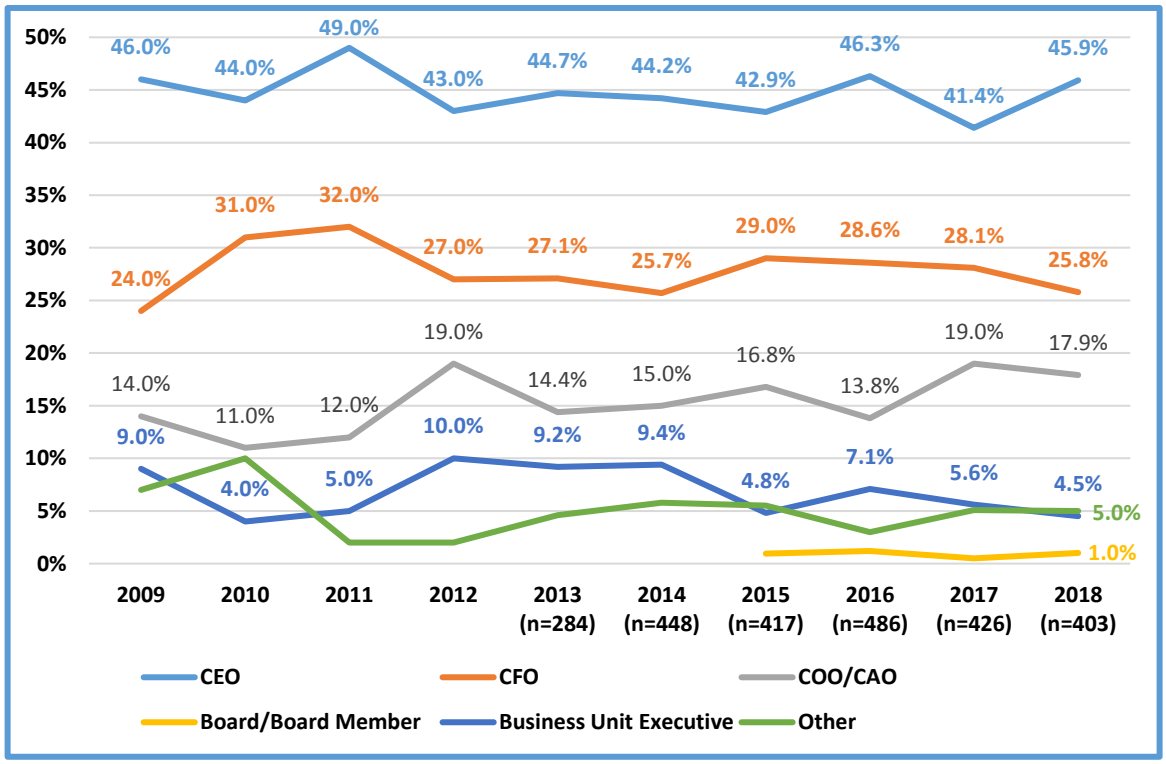
Table 18 shows CIO reporting relationships over the past decade and indicates that in 2018, 88.5% of CIOs reported to CEOs, CFOs, or COOs. Figure 24 displays the data from Table 18 graphically.

Table 18: To Whom the CIO Reports, by Percentage of Respondents, 2009-18

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg.
CEO	46.0%	44.0%	49.0%	43.0%	44.7%	44.2%	42.9%	46.3%	41.4%	45.9%	44.7%
CFO	24.0%	31.0%	32.0%	27.0%	27.1%	25.7%	29.0%	28.6%	28.1%	25.8%	27.8%
COO/CAO	14.0%	11.0%	12.0%	19.0%	14.4%	15.0%	16.8%	13.8%	19.0%	17.9%	15.3%
Board/Board Member						*New Question*	0.96%	1.2%	0.5%	1.0%	0.9%
Business Unit Executive	9.0%	4.0%	5.0%	10.0%	9.2%	9.4%	4.8%	7.1%	5.6%	4.5%	6.9%
Other (IT) [a]	7.0%	10.0%	2.0%	2.0%	4.6%	5.8%	5.5%	3.0%	1.3%	0.7%	1.0%
Other (non-IT) [a]									3.8%	4.2	4.0%
Total Other	7.0%	10.0%	2.0%	2.0%	4.6%	5.8%	5.5%	3.0%	5.1%	4.9%	5.0%
n = number of responding CIOs					284	448	417	486	426	403	

[a] In 2017, the "Other" category was split into two new categories: Other (IT) and Other (non-IT).

Figure 24: To Whom the CIO Reports, 2009-18



5.1. CIO Previous Employment

Before becoming the top IT executives in their current organizations, 73.7% of the 492 responding CIOs reported that they were in an IT position, but only 19.5% came from within their current organization. This continues a nine-year trend of fewer CIOs coming from an IT position or from within their current organization (Table 19).

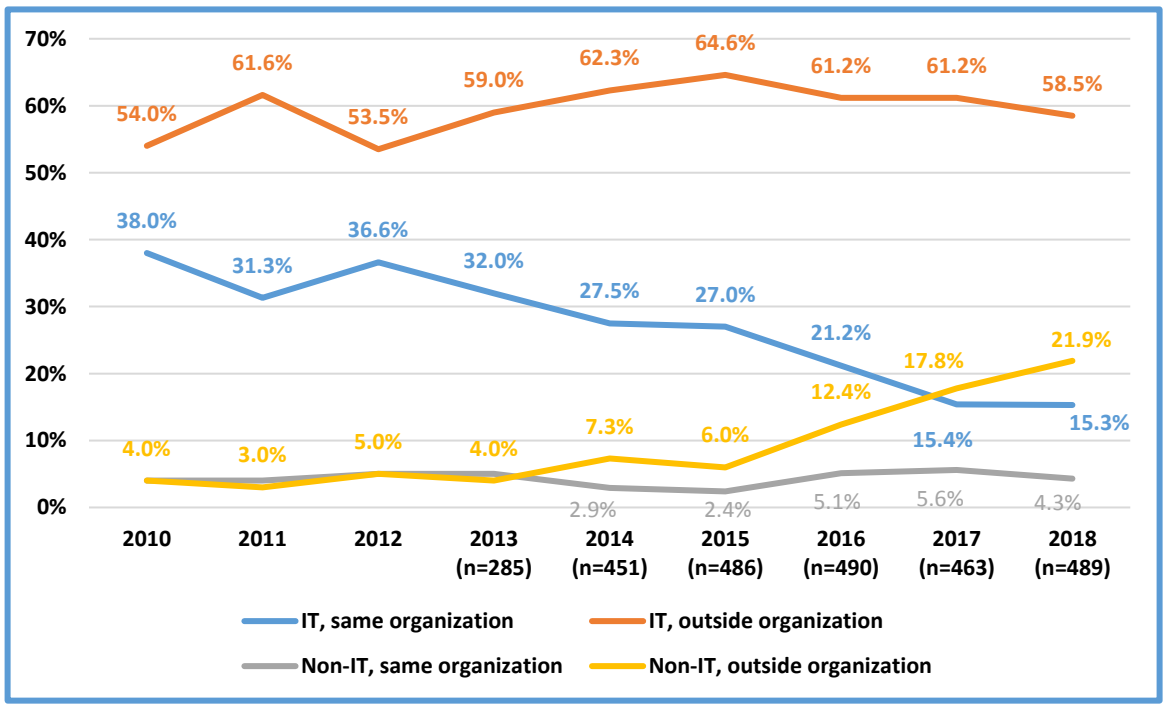
In 2018, the percentage of CIOs who came from outside their current organization (80.5%) is the highest since this question first appeared in 2010. Similarly, the number of CIOs from non-IT positions increased by 12.4% this year to 26.3% and is up 229% since 2010.

Table 19: CIO Prior Employment, with Subtotals, 2010-18

	2010	2011	2012	2013 n=285	2014 n=451	2015 n=486	2016 n=490	2017 n=463	2018 N=489	9-year Avg.
IT, same organization	38.0%	31.3%	36.6%	32.0%	27.5%	27.0%	21.2%	15.4%	15.3%	28.6%
IT, outside organization	54.0%	61.6%	53.5%	59.0%	62.3%	64.6%	61.2%	61.2%	58.5%	59.7%
Non-IT, same organization	4.0%	4.0%	5.0%	5.0%	2.9%	2.4%	5.1%	5.6%	4.3%	4.3%
Non-IT, outside organization	4.0%	3.0%	5.0%	4.0%	7.3%	6.0%	12.4%	17.8%	21.9%	7.4%
Outside organization	58.0%	64.6%	58.4%	63.0%	69.6%	70.6%	73.7%	79.0%	80.5%	67.1%
Same organization	42.0%	35.4%	41.6%	37.0%	30.4%	29.4%	26.3%	21.0%	19.5%	32.9%
Prior IT position	92.0%	92.9%	90.1%	91.0%	89.8%	91.6%	82.5%	76.6%	73.7%	88.3%
Prior non-IT position	8.0%	7.1%	9.9%	9.0%	10.2%	8.4%	17.5%	23.4%	26.3%	11.7%

The data in Table 19, is displayed graphically in Figure 25. The largest change in 2018 is CIOs with non-IT backgrounds coming from outside organizations. This group was up 23.0% to 21.9% of CIOs compared to 17.8% in 2017. Moreover, there was a 23.2% drop in CIOs with non-IT backgrounds coming from within their own organization. Other categories remained relatively flat when compared to 2017.

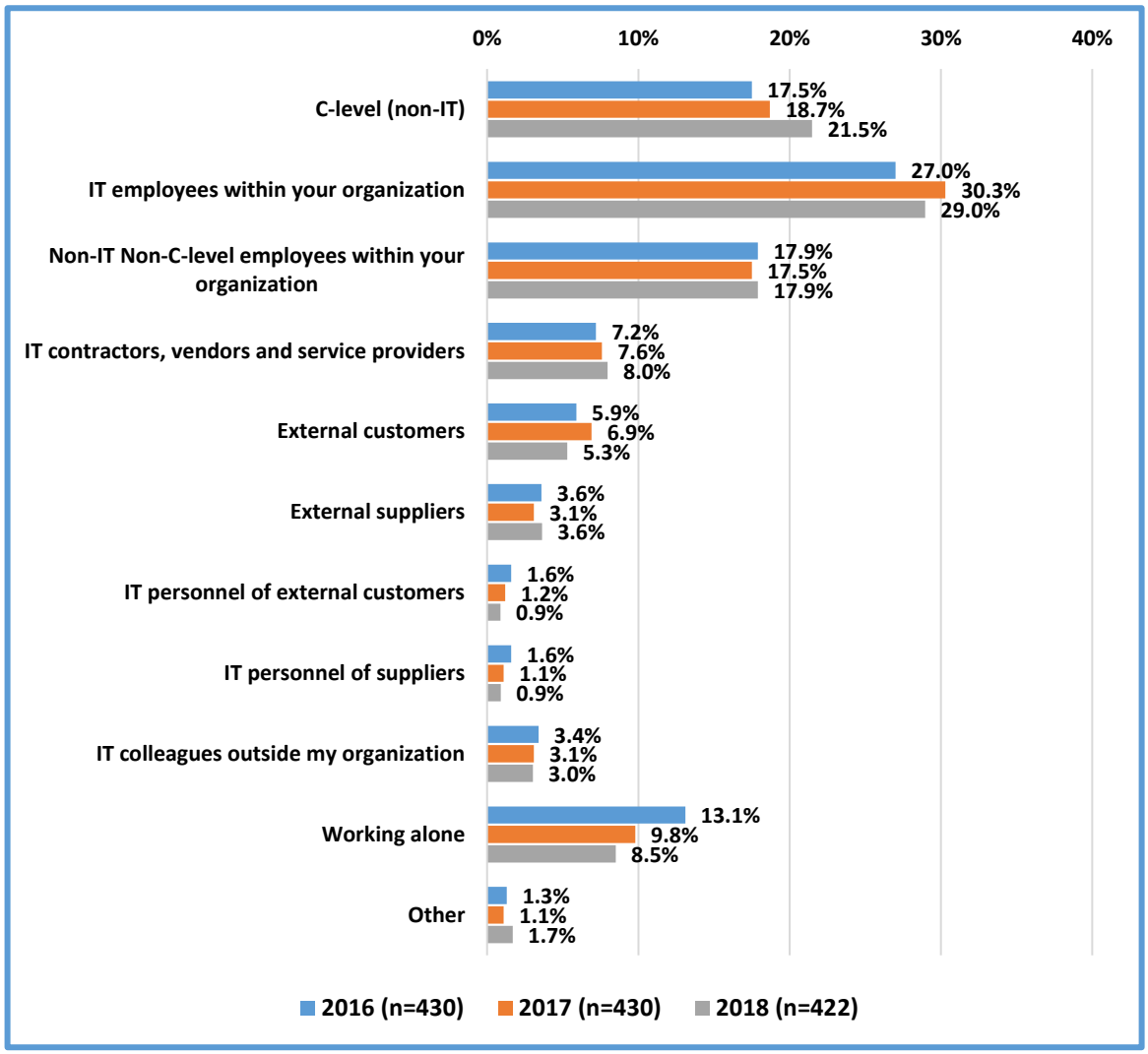
Figure 25: CIO Prior Employment, with Trendlines, 2010-18



5.2. With Whom CIOs Spend their Time

The job of the CIO is complex and involves interaction with people both inside and outside the organization. Figure 26 shows the average percentage of a CIO's time spent with different groups of people.

Figure 26: Average Percentage of CIO Time Spent Interacting with _____, 2016-18



On average, the 422 CIOs who responded to this question in 2018 spent more than three times as much time with other employees in their own organization than with those from other organizations (68.3% vs. 21.7%). CIOs continue to spend more time interacting with C-level non-IT employees. In 2018, there was nearly a 15% increase over 2017 to 21.5% in the average amount time CIOs spent with this C-level group, and 22.9% increase since 2016. Also, while interaction with IT contractors, vendors, and service provides appears to be

trending upward since 2016, time spent with IT personnel of suppliers and customers of the business trends downward.

CIOs who indicated spending any time with "C-level (non-IT) personnel" were also asked about the frequency of those interactions - specifically, if they met daily, weekly, monthly, quarterly, or annually with C-level executives and/or board members. Table 20 summarizes their responses and highlights the percentage of CIOs reporting "at least weekly" interactions (i.e., daily plus weekly), as well as the percentage change between 2017 and 2018 in these at-least-weekly interactions. Since the initial jump in interaction times with the C-suite in 2016, these have remained relatively stable to upward trending. All of the "at least weekly interactions" in 2018 have slightly increased with the exception of those with individual board members.

Table 20: Percentage of CIOs Interacting with C-level Peers, by Frequency, 2015-18

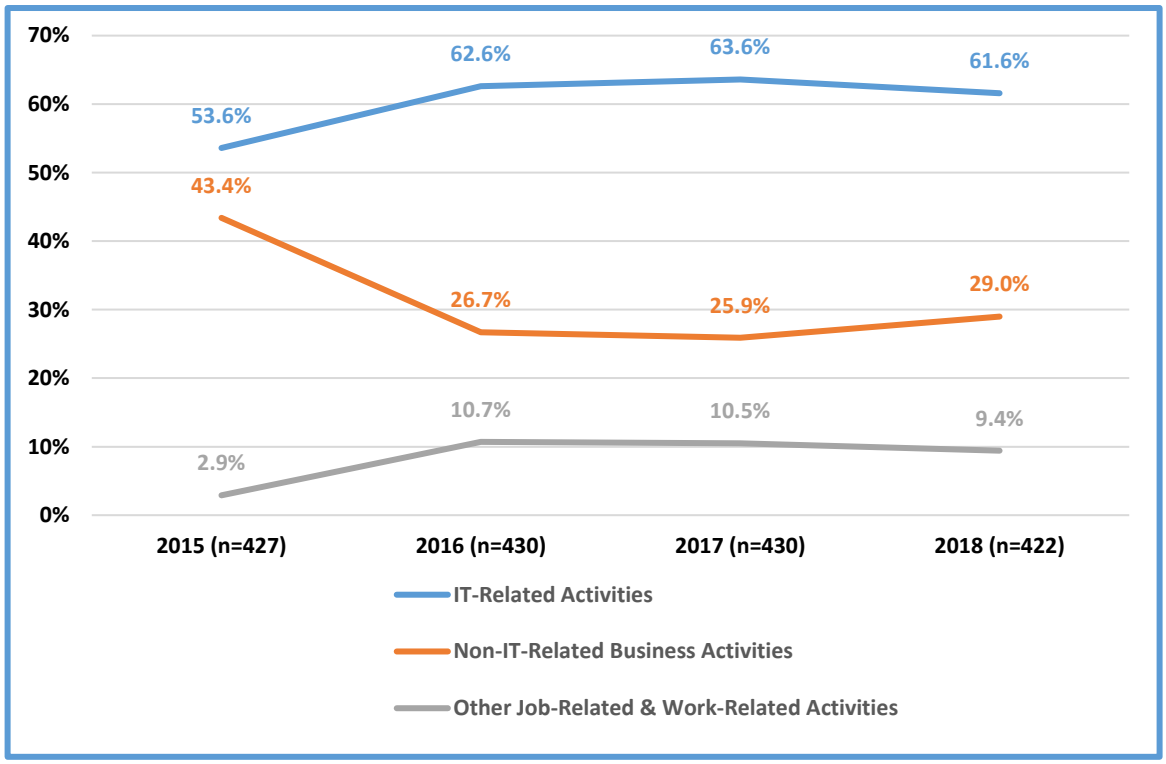
	Year	Daily	Weekly	At least weekly	% Change 2017-18	Monthly	Quarterly	Annually	None	n =
CEO	2015	20.1%	43.5%	63.6%	3.2%	24.6%	7.3%	1.2%	3.3%	423
	2016	25.2%	44.1%	69.3%		19.3%	7.9%	2.2%	1.2%	404
	2017	24.4%	42.2%	66.6%		20.9%	8.5%	1.5%	2.5%	398
	2018	25.4%	43.3%	68.7%		21.5%	6.0%	1.8%	2.1%	386
COO	2015	22.0%	35.7%	57.7%	5.7%	12.5%	2.4%	0.5%	27.0%	423
	2016	31.1%	43.7%	74.8%		12.3%	2.8%	0.3%	9.7%	318
	2017	31.7%	40.0%	71.7%		12.9%	4.0%	0.3%	11.1%	350
	2018	33.9%	41.8%	75.8%		10.6%	1.5%	0.6%	11.5%	330
CFO	2015	31.0%	52.2%	83.2%	3.2	9.9%	2.8%	0.2%	3.8%	423
	2016	33.8%	49.6%	83.4%		11.8%	3.1%	0.0%	1.8%	391
	2017	31.0%	50.9%	81.9%		12.9%	3.1%	0.8%	1.3%	387
	2018	34.5%	50.0%	84.5%		9.2%	3.5%	1.1%	1.6%	368
CTO	2017	44.7%	13.2%	58.0%	2.1	4.7%	2.3%	0.4%	34.6%	257
	2018	41.6%	17.6%	59.2%		2.6%	2.1%	1.3%	34.8%	233
CAO	2017	16.7%	18.0%	34.8%	5.2	9.9%	0.9%	0.4%	54.1%	233
	2018	11.5%	25.1%	36.6%		10.6%	2.6%	0.4%	49.8%	227
CMO	2015	13.5%	30.0%	43.5%	2.0	19.4%	6.4%	1.2%	29.6%	423
	2016	14.6%	40.4%	55.0%		24.2%	5.0%	1.9%	14.0%	322
	2017	16.7%	38.4%	55.1%		19.1%	7.9%	0.9%	17.0%	341
	2018	17.3%	39.0%	56.2%		21.7%	6.7%	0.6%	14.7%	313
CLO	2015	3.8%	25.5%	29.3%	2.8	25.5%	9.7%	5.9%	29.6%	423
	2016	7.5%	32.6%	40.1%		26.0%	12.9%	5.1%	15.9%	334
	2017	9.5%	29.2%	38.8%		20.9%	16.9%	5.8%	17.5%	325
	2018	7.2%	32.7%	39.9%		25.2%	10.8%	3.9%	20.3%	306
BOD	2015	1.9%	3.8%	5.7%	9.2%	14.7%	31.9%	17.5%	30.3%	423
	2016	1.1%	3.7%	4.8%		17.0%	37.0%	15.4%	25.8%	367
	2017	2.4%	5.1%	7.6%		14.4%	30.9%	20.9%	26.3%	369
	2018	2.9%	5.4%	8.3%		12.6%	32.6%	19.7%	26.9%	350
Single board member	2015	3.1%	7.6%	10.7%	-3.6%	13.0%	18.2%	13.5%	44.7%	423
	2016	19.7%	29.6%	49.3%		19.7%	8.5%	0.0%	22.5%	71*
	2017	2.3%	8.8%	11.1%		16.7%	19.6%	13.7%	38.9%	306
	2018	4.1%	6.6%	10.7%		15.9%	18.3%	17.6%	37.6%	290
HR	2018	16.2%	51.4%	67.6%	n/a	24.9%	4.3%	0.5%	2.7%	370

* Low response on "individual board member" in 2016 may skew results

5.3. What CIOs Do with their Time

To understand how CIOs spend their time, a preliminary question asked about the overall percentage of time spent on three general activity categories: Business (Non-IT), IT-Related, and Other Work-Related activities. In 2018, there were decreases in the amount of time spend on "IT Related Activities" and "Other Job- and Work- Related Activities," 3.1% and 10.5% respectively. Interestingly, there was a 12% increase in the amount of time spend by CIOs on "Non-IT-Related Business Activities" (Figure 27). This may reflect the greater focus on internal IT customers (Table 17), the increase in CIO time spent with C-level executives (Figure 28, Table 20),and the ongoing concerns CIOs with alignment, business value, and strategic contribution (Tables 1, 2, & 17)

Figure 27: How CIOs Spend their Time, 2015-18



Separate activity lists were then provided for each of the three categories and respondents were asked to indicate what percentage of their time was spent on each, with each category totaling 100%. The averages of their responses to those questions, weighted by each respondent's answers to the questions shown in Figure 27, are shown in Table 21.

Table 21: How CIOs Spend their Time, 2015-18

Activities Performed by CIOs: What CIOs Do with their Time	Average percentage of time spent on an activity				% Change 2017-18
	2015 n=427	2016 n=430	2017 n=430	2018 n=369	
Business (Non- IT) activities					
Organization Architecture [a]	16.2%	1.2%	1.0%	1.1%	10.0%
Organization Priorities, Strategy [a]		4.0%	3.7%	4.4%	18.9%
Organization Research	4.0%	1.0%	1.1%	1.1%	0.0%
Evangelist for the Organization	3.0%	2.8%	3.7%	3.6%	-2.7%
Knowing the Needs of Internal IT Customers	6.4%	5.2%	4.4%	5.6%	27.3%
Managing Organizational Change	4.8%	3.7%	3.2%	3.8%	18.8%
Organizational or Business Innovation [b]		2.6%	2.3%	1.1%	-52.2%
Knowing Needs of Customers of the Organization	4.7%	4.9%	4.5%	5.2%	15.6%
Knowing Needs of Vendors & Suppliers of Organization [b]		1.1%	4.5%	1.1%	-75.6%
Non-IT related activities [c]	4.3%				
IT-related activities					
Evangelist for IT	4.9%	5.0%	6.5%	6.3%	-3.1%
IT Architecture [b]		4.8%	5.8%	4.9%	-15.5%
Innovation for IT [b]		6.1%	6.0%	6.0%	0.0%
IT Governance	6.3%	5.4%	6.5%	5.3%	-18.5%
IT HR and Talent Management	6.0%	4.6%	4.7%	4.0%	-14.9%
IT Operations/Facilities Management	8.0%	5.6%	5.9%	5.5%	-6.8%
IT Priorities/Strategy	11.9%	9.9%	10.3%	9.4%	-8.7%
Project Management	7.0%	6.6%	6.3%	6.3%	0.0%
Software Development	1.8%	2.5%	2.1%	2.0%	-4.8%
Technical Research	3.0%	2.8%	2.6%	2.6%	0.0%
Resource Allocation/Budgeting	4.7%	4.0%	3.5%	3.5%	0.0%
IT vendor Management [b]		4.7%	4.2%	4.9%	16.7%
Other activities					
Managing my Personal Network	2.9%	5.5%	5.7%	4.3%	-24.6%
Personal Development/Education/Training [b]		6.2%	6.0%	4.5%	-25.0%

[a] "Business priorities, strategy, architecture" in the 2015 study was split into two categories in the 2016 study.
[b] New item for 2016.
[c] Item eliminated in 2016.
Due to rounding, column totals may not equal 100%.

In "Business Non-IT Activities," there were significant increases in time spent on Knowing the Needs of Internal Customers, Organizational Priorities and Strategy, Managing Organizational Needs, and Knowing the Needs of Customers of the Organization. At the same time, there were significant drops in Knowing the Needs of Vendors and Suppliers of the Organization and in Organizational or Business Innovation. In IT-Related Activities, there was a significant increase in IT Vendor Management, but all other categories either remained unchanged or decreased. The most significant decreases were in the areas of IT Governance,

IT Architecture, and IT HR and Talent Management. In addition much less time was spend in area such as Managing Personal Networks and Personal Development.

Conclusions

There are signs of stability in the midst of massive change in the world of IT management. Some of this year's findings are close to last year's. The top three IT management issues of organizations this year – Cybersecurity, Alignment of IT with the Business, and Analytics – were the same top three last year. Similarly, the top five IT investments this year – Analytics, Cybersecurity, Cloud, Application Development, and ERP – were identical to last year's top five investments. The job tenure of CIOs continues to be high and IT spending as a percent of revenue is too.

Some increasing trends endure with IT budgets, salaries, and employment all up. The use of cloud and shared services continue to rise, as does the cost of cloud services. There also appears to be a shift toward domestic outsourcing while increasing offshore IT employees. Turnover of IT employees is also up, an indication of the strong job market; but so is spending on training and salaries to ameliorate voluntary turnover. Cybersecurity practices also appear to be gradually improving; although, faster progress is desirable.

The trend of CIOs coming from non-IT backgrounds appears to be accelerating and is now over 25%. More CIOs continue to come from other organizations too. CIOs are spending more than two-thirds of their time with other employees in their organization and the amount of time CIOs spend with C-level executives continues to increase as does the time they spend on non-IT business-related activities. CIO performance continues to be measured by a combination of IT operations, business operations, and strategic metrics.

Clearly, the job of the CIO is becoming increasingly complex. CIOs need a wide range of operational, organizational, and strategic management capabilities to apply to fulfilling the promise of digital transformation, delivering business analytics and innovation, mitigating cybersecurity threats, and coping with skill shortfalls, new regulations, and cost-cutting pressures. In combination, these requirements make the job of CIO arguably the most challenging of all. The facts that CIO tenure is up and they are spending more time interacting with their C-suite peers and focusing more on strategic issues suggests that many CIOs are succeeding and becoming highly valued members of the top management team. This holds out hope for all of us who find being an IT professional both important and rewarding.

Appendix: The Society for Information Management (SIM) — Where IT Leaders Connect

Founded in 1968 as a professional society for IT executives, the Society for Information Management (SIM) is a community of senior IT leaders who share their experiences and explore future IT directions. SIM is the oldest and largest not-for-profit professional organization in the U.S. for CIOs, senior IT executives, prominent academicians, advisors, and other IT leaders. SIM co-founded both *MIS Quarterly* and *MIS Quarterly Executive*.

SIM is built on a foundation of strong local chapters whose members regularly meet to share, learn, network, and contribute positively to SIM's members, their organizations, and their communities. SIM's mission is to unite IT leaders and encourage them to share, network, and give back to their communities through their local chapters.

In addition to the many activities and opportunities offered by its chapters, SIM provides national programs. The IT Trends Study has been a SIM national program since 1980. Conducted annually, this high-profile study benchmarks various areas within the IT industry, including major management issues, technology investments, sourcing, CIO roles, staffing, spending, salaries, IT management practices, and much more. The results empower SIM members and enable SIM to speak for its members with a unified voice.

For more information about SIM's chapters and programs, the benefits of SIM membership, how to become a SIM member, and the numerous networking and learning opportunities SIM offers, please visit http://www.simnet.org/.