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

2022 Comprehensive Report: Results and Observations from the SIM IT Trends Study

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The 2021 SIM IT Trends Study
The 2022 Comprehensive Report:

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This is the complete report of the Society for Information Management's 41st Anniversary IT Trends Study. This report is available to all SIM members at no charge https://trends.simnet.org. A preview of this report will appear in the December 2021 issue of the *MIS Quarterly Executive* and an edited report will appear in the March 2022 issue, both of which are also available free of charge to all SIM members.

December 1, 2021

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

These are the findings of the Society for Information Management's 41st Anniversary IT Issues and Trends Study, with responses from 737 IT executives, including 283 CIOs and 454 unique organizations. The average revenue of participating organizations was $6.8 billion (median $500 million). IT spending as a percentage of revenue was 5.7% and it appears that IT spending levels are returning from the COVID-induced highs of 2020. This is consistent with many other findings in 2021, including the percentage of organizations increasing both IT headcount and salaries. The top five IT management issues for organizations in 2021 were Cybersecurity, Alignment, Analytics, Digital Transformation, and Compliance; the top five largest IT investments were Cloud, Analytics, Cybersecurity, Application Development and ERP; while the five hardest to find IT technical skills were Cyber, Analytics, AI, Functional Knowledge and Cloud. The most common criteria for assessing CIO performance were User Satisfaction (Internal), Value of IT to the Business, Strategic Contribution of IT, IT Availability and Cybersecurity. The average tenure of CIOs is six years (median four) with almost 47% reporting to their CEO. A ten-year low of 22.6% report to their CFO. CIOs continue to come from outside organizations at record levels (again over 80%) and 24.1 came from prior non-IT positions, down significantly from the 2019 high of 31.1%.[1]

DEDICATION: Our esteemed colleague Ephraim R. McLean retired in 2021 just before we completed data collection. His contributions to this study these past nine years were inimitable, as were his more than 50 years of influence on IT practice, research, and education. This study, and each of us, were advanced by Eph's vast understanding of the intricacies and issues faced by IT leaders and their organizations. We dedicate this year's study and this report to him. Live long and prosper Eph!

[1] This article is being published as a SIM-sponsored report.

Introduction

Since 1980, the Society for Information Management (SIM) has surveyed its members to determine the issues of most concern to them and their organizations. Year-to-year comparisons are made to identify trends and track changes over time in the management and use of the information assets entrusted to their care. This year's SIM IT Trends Study marks the 41st anniversary of this undertaking. Over the years, the surveys have expanded to become one of the most comprehensive investigations of information technology (IT) executives and the management and use of IT.

Founded in 1968, 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 is both a national organization and a network of local chapters. SIM members, who comprise a broad cross-section of IT leaders, meet regularly to share, learn, and network. SIM succeeds because it provides value to its members, their organizations, and their communities. SIM co-founded both the MIS Quarterly and MIS Quarterly Executive.

The Trends Study's questionnaire is updated annually to improve its quality and reflect changes in the IT field. Questionnaire changes are kept to a minimum wherever possible so that year-to-year comparisons can best be made and trends tracked. In April 2021 a personal link to the questionnaire was e-mailed to each of SIM's 4,420 members. Nine weeks later, as is our practice, after weekly reminders, several e-newsletter articles, and a special competition among SIM chapters to encourage participation, 737 completed questionnaires were received for a response rate of 16.7% (compared to 26.4% in 2020).

Consistent with the practice since 2013, these 737 responses were used to create two intersecting datasets: "The CIOs dataset" of the 283 respondents who identified themselves as the "CIO or highest-ranking IT executive" and "the Unique Organizations dataset" of the 454 organizations represented by their CIO or highest-ranking IT executive responding (typically a direct report to the CIO in a large organization).

This report is divided into six main sections: Top IT Management Issues; Investments in Technology; IT Practices of Organizations, including spending, workforce, infrastructure, and cybersecurity; IT Performance Measures; CIO Tenure, Reporting, Background, and Activities; and Summary and Conclusions. In order to examine the ongoing effects of the COVID pandemic, the 2021 study follows up on last year's look at the readiness and response of IT management and their organizations. Those findings can be found at the very end of this report.

1. Top IT Management Issues and Concerns

1.1. The Top IT Management Issues of Organizations.

IT leaders identified their most important IT management issues or concerns by choosing up to five items from a list of 41. The top ten issues selected by the senior-most IT leader in each of the 454 unique organizations are presented in Table 1 in addition to their rank during the previous 10 years.

Table 1: Organizations' Top Ten Most Important IT Management Issues, 2011-21

IT Management Concerns/Issues [a]	2021 (% Selecting)	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
n (unique organizations)	454	624	618	793	769	801	785	717	484	195	275
Security/Cybersecurity/Privacy [b]	1 (42.5%)	1	1	1	1	2	2	2	7	9	8
Alignment of IT with the Business	2 (33.3%)	2	2	2	2	1	1	1	1	2	1
Data Analytics/Data Management	3 (24.7%)	3	3	3	3						
Digital Transformation	4 (24.4%)	4	4	7	8						
Compliance and Regulations [c]	5 (23.6%)	4	5	6	4	12	11	12	16		
Cloud/Cloud Computing	6 (19.4%)	9	6	13	14						
Business Continuity	7 (19.2%)	7	16	12	18	11	15	22			
Agility/Flexibility (IT) [d]	8 (18.3%)	12	11	5	10	4	7	13			
Agility/Flexibility (Business) [d]	9 (17.6%)	10	7	8	9	5	9	3	2	3	2
Cost Reduction/Controls (IT) [e]	10 (15.6%)	6	8	9	5	7 [f]	8 [f]	17 [f]	5 [f]		
Innovation	10 (15.6%)	11	9	4	7	3	4	8			

[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] "Compliance & Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.)" was "Legal Compliance - HIPPA, SarBox, SAS70, PCI, etc." in 2013.

[d] "Business Agility/Flexibility" and "IT Agility" were merged into an "Agility/Flexibility" category with Business and IT selections in 2015.

[e] "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 previous years.

[f] These values were incorrectly reported in earlier versions of this report.

Many of the top issues in 2021 are consistent with those identified by IT leaders in 2020. Cybersecurity, IT Alignment, Data Analytics, and Digital Transformation maintain their positions as the top organizational concerns, ranking 1st through 4th respectively. Two items made significant moves upward. Cloud Computing moved from 9th to 6th and IT Agility re-entered the top ten, moving from 12th to 8th. The importance of both items likely increased, in part, due to the need for IT flexibility and scalability demonstrated in many organizations in response to the COVID-19 pandemic. Innovation moved up slightly to tie for the 10th position, demonstrating the desire among IT organizations to continue creating novel solutions to improve efficiency and generate revenue.

COVID-19 posed unique challenges for IT departments in 2020. In particular, the economic uncertainty associated with the pandemic forced IT organizations to do more with less. In general, they responded well to the challenge, leveraging their capabilities to support remote workforces and maintaining organizational productivity during extremely difficult circumstances. While uncertainty remains about the future impact of COVID-19 on organizations in general and IT in particular, decreasing concern about cost reduction for both the business (8th to 13th) and IT (6th to 10th) may signal somewhat of a return to normalcy and an increased recognition of the overall enterprise value of IT.

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

IT leaders also selected up to five most personally important or worrisome IT management issues. These issues are shown in Table 2 along with results from prior years.

Table 2: IT Leaders' Personally Most Important/Worrisome IT Management Issues, 2011-21

IT Leaders' Most Important/ Worrisome Concerns [a]	2021 (% Selecting)	2020	2019	2018	2017	2016	2015	2014	2013
n (unique organizations)	454	624	618	793	769	801	785	717	484
Security/Cybersecurity/Privacy [b]	1 (46.9%)	1	1	1	1	1	1	1	2
Alignment of IT with the Business	2 (24.4%)	2	2	4	4	3	2	3	1
IT Talent/Skill Shortage/Retention	3 (22.2%)	5	3	2	3	2	3	2	3
Credibility of IT/Perception of IT Leadership [c]	4 (21.6%)	4	4	3	2	4	6	18	
Business Continuity	5 (17.4%)	3	8	5	8	5	7	13	4[d]
Compliance and Regulations [e]	6 (16.5%)	7	5	6	5	11	13	14	16
Agility/Flexibility – IT [f]	7 (14.3%)	8	12	7	6	8	5	16	
Digital Transformation	7 (14.3%)	6	11	17	19				
Data Analytics/Data Management	9 (14.1%)	12	7	8	7				
CIO Leadership Role	10 (13.0%)	10	9	17	15	14	9	14	10

[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] "Business Continuity" and "Disaster Recovery" were combined in the 2013 study.

[e] "Compliance & Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.)" was "Legal Compliance - HIPPA, SarBox, SAS70, PCI, etc." in 2013.

[f] "Business Agility/Flexibility" and "IT Agility" were merged into an "Agility/Flexibility" category with Business and IT selections in 2015.

Personal concerns among IT leaders remain consistent with those expressed last year, with continued focus on Cybersecurity (1st) and IT Alignment with the Business (2nd). Finding and retaining IT talent rounds out the top 3, possibly made a bit more important due to staffing challenges which emerged over the course of the past year. However, similar to changes in organizational concerns (Table 1), personal concerns related to the impacts of COVID-19 may be waning. Specifically, Business Continuity shifted from the 3rd position in 2020 to the

5th position this year. Similarly, Cost Reduction for IT fell out of the top ten, moving from 9th in 2020 to 16th in 2021.

Data Analytics was the only item to move into the top ten, up three spots from its 12th position in 2020. It is worth noting that its 9th place rank is similar to its pre-2020 position, also potentially signaling a shift in focus for IT professionals from COVID-19 disruptions to more traditional IT management concerns.

Table 3 contrasts the top ten IT management issues identified as most important to organizations and the top ten issues selected as most personally important to IT leaders.

Table 3: Top Ten Personal and Organizational IT Management Issues, 2021

IT Management Issues	Most Important to their Organizations *(2021 Rank)*	Most Important or Worrisome to IT Leaders *(2021 Rank)*
Security/Cybersecurity/Privacy	1 *(1)*	1 *(1)*
Alignment of IT with the Business	2 *(2)*	2 *(2)*
Data Analytics/Data Management	3 *(3)*	9 *(12)*
Digital Transformation	4 *(4)*	7 *(6)*
Compliance and Regulations (e.g., HIPAA, SarBox, SAS70, PCI, etc.)	5 *(4)*	6 *(7)*
Cloud/Cloud Computing	6 *(9)*	14 *(16)*
Business Continuity	7 *(7)*	5 *(3)*
Agility/Flexibility – IT	8 *(12)*	7 *(8)*
Agility/Flexibility – Business	9 *(10)*	18 *(15)*
Cost Reduction/Controls – IT	10 *(6)*	16 *(9)*
Innovation	10 *(11)*	14 *(16)*
IT Talent/Skill Shortage/Retention	16 *(18)*	3 *(5)*
Credibility of IT/Perception of IT Leadership	16 (20)	4 *(4)*
CIO Leadership Role	39 (29)	10 *(10)*
	n = most senior IT leader in 454 unique organizations	

As in prior years, there are interesting differences between those items perceived as most important to the organization and those viewed as most worrisome to IT leaders personally. For instance, Cloud Computing ranks as the 6th most important organizational issue but only 14th on the list of most worrisome to IT leaders. As the use of cloud solutions has increased and organizational focus has shifted from adoption and migration concerns to usage concerns (See Section 3.5), this difference may be attributable to IT leaders viewing future Cloud initiatives as simply "more of the same." Other differences between the two lists are likely driven by differences in whether the given concern is more broadly focused on organizational

capabilities (e.g., Business Agility) or more specific to operational issues of IT management (e.g., IT Talent Retention, IT Credibility, etc.).

2. Technology Investments and Worrisome Technologies

IT leaders were also asked to choose the technologies that represent their organization's largest current or near-term IT investments, those that should get more investment, and those of greatest personal concern ("i.e., they keep you up at night"). Participants selected up to five in each category from a list of 37.

2.1. Organizations' Largest IT Investments.

The 454 unique organizations participating in this year's study collectively identify their top ten largest current or near-term IT investment as shown in Table 4.

Table 4: Top Ten Largest IT Investments of Organizations, 2011-2021

Information Technologies [a]	2021 (% Selecting)	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
n (unique organizations)	454	624	618	793	769	801	785	717	481	195	275
Cloud Computing (e.g., SaaS, PaaS, IaaS)	1 *(43.0%)*	1	2	3	3	4	7	5	3	2	2
Security / Cybersecurity [b]	2 *(38.8%)*	3	3	2	2	3	3	7	14		11
Analytics/Business Intelligence / Forecasting / Big Data [c]	3 *(34.1%)*	2	1	1	1	1	1	1	1	1	1
Software Development / Maintenance [d]	4 *(28.6%)*	4	4	4	4	2	4	4	6	11	
ERP (Enterprise Resource Planning)	5 *(23.6%)*	6	6	5	5	6	2	3	4	3	3
CRM (Customer Relationship Management)	6 *(21.8%)*	5	5	6	6	5	5	6	2	5	5
Legacy Apps: Replacing / Re-platforming [e]	7 *(17.2%)*	7	7	9	9	11	9	15	16		
Data Center / Infrastructure	8 *(13.0%)*	9	8	7	7	7	6	2			
Network / Telecommunications	8 *(13.0%)*	10	11	8	8	8	8	8[f]	8	12	
Collaboration Tools	10 *(12.1%)*	8	16	18	20	15	13	15[f]	12	4	8
Customer/Corporate Portals	10 *(12.1%)*	11	13	13	14	13	12	13	9		

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

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

[c] 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).

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

[e] In 2016, "Legacy Applications" was split into "Legacy Apps: Replacing/Re-platforming" and "Legacy Apps: Maintaining (updating /consolidation)"

[f] These values were incorrectly reported in earlier versions of this report.

IT leaders indicate that the top ten largest IT investments remained stable, with all items identified in 2020 recurring in the 2021 list. While there were minor shifts in the ranks associated with some items, these changes were relatively minor. Investments in Cloud Computing remain high (1st) and Cybersecurity moved up slightly from 3rd in 2020 to 2nd

in 2021, while investments in Analytics fell to 3rd. This latter change may be the beginning of a trend as the rank of Analytics investments has fallen in the last 2 years. Interestingly, while Collaboration Tools fell from 8th to 10th, investments in these technologies remained above pre-COVID-19 levels. This may be due to the persistence of remote work triggered by the pandemic and hybrid workforce models implemented in many organizations[2].

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

IT leaders, presented with the same list of 37 investment options, also selected up to five technologies which they believe should get more funding and an additional five they find most personally worrisome. The top ten selections are presented along with the top ten IT largest investments in Table 5.

Table 5: Organizations' Largest IT Investments, those that Should Get More and the Most Personally Worrisome, 2021

Information Technologies	Largest IT Investments *(% Selecting) 2020 Rank*	Should Get More Investment *(% Selecting) 2020 Rank*	Those Most Personally Worrisome *(% Selecting) 2020 Rank*
Cloud Computing (e.g., SaaS, PaaS, IaaS)	1 *(43.0%) 1*	4 *(19.6%) 4*	5 *(13.7%) 7*
Security/Cybersecurity	2 *(38.8%) 3*	1 *(35.5%) 2*	1 *(51.1%) 1*
Analytics/Business Intelligence/Data Mining/Forecasting/Big Data	3 *(34.1%) 2*	1 *(35.5%) 1*	4 *(16.1%) 4*
App/Software Development/Maintenance	4 *(28.6%) 4*	15 *(11.5%) 15*	8 *(12.3%) 13*
ERP (Enterprise Resource Planning)	5 *(23.6%) 6*	18 *(9.5%) 20*	17 *(7.3%) 16*
CRM (Customer Relationship Management)	6 *(21.8%) 5*	14 *(11.9%) 9*	23 *(5.3%) 22*
Legacy Apps: Replacing/Re-platforming	7 *(17.2%) 7*	10 *(12.6%) 8*	7 *(12.6%) 6*
Data Center/Infrastructure	8 *(13.0%) 9*	25 *(4.8%) 25*	16 *(7.5%) 17*
Network/Telecommunications	8 *(13.0%) 10*	35 *(2.9%) 34*	31 *(3.5%) 21*
Collaboration Tools	10 *(12.1%) 8*	17 *(9.7%) 13*	28 *(4.0%) 28*
Customer/Corporate Portals	10 *(12.1%) 11*	15 *(11.5%) 19*	22 *(5.5%) 29*
Integration/Application Integration/Data Integration	12 *(10.1%) 13*	10 *(12.6%) 10*	11 *(10.1%) 10*
Disaster Recovery/IT Continuity Planning	15 *(9.7%) 14*	7 *(15.6%) 6*	2 *(26.2%) 2*
Data Integration/Data Quality	16 *(9.5%) 17*	12 *(12.3%) 7*	6 *(12.8%) 8*
AI/Machine Learning/Expert Systems	17 *(9.3%) 15*	3 *(20.0%) 3*	17 *(7.3%) 11*
Innovation/Disruptive Technologies	18 *(7.5%) 20*	6 *(15.9%) 5*	9 *(12.1%) 5*
Identity Management	19 *(7.3%) 23*	9 *(12.8%) 16*	10 *(10.6%)9*
BPM (Business Process Management	21 *(6.2%) 18*	8 *(13.9%) 13*	19 *(6.4%) 20*
IT Staff Development/Training/Retention/H1B	25 *(4.4%) 25*	5 *(16.7%) 11*	3 *(17.4%) 3*
n = most senior IT leader in 624 unique organizations			

[2] Williams, J. C., Korn, R. M., and Boginsky, M. 2021. "Don't Lose the Democratizing Effect of Remote Work," *Harvard Business Review*. (https://hbr.org/2021/08/dont-lose-the-democratizing-effect-of-remote-work).

As shown in Table 5, and consistent with previous years, while there is a fairly high degree of agreement between those technologies that should receive more investment and those that are of greatest personal concern to IT leaders, there is quite a bit of discrepancy between these lists and the list of largest IT investment. Such discrepancies may be largely attributable to three factors. First, some items are either highly technical IT concerns or related specifically to IT operations, somewhat removed from broader organizational awareness. Examples include items such as Data Integration and Quality, Identity Management, and IT Staff Development. Second, some investment areas, such as Disaster Recovery and Innovation, are difficult to tie to quantifiable organizational outcomes. Third, some things are simply big-ticket items (e.g., ERP, CRM) or in a period of increased investment (e.g., cloud, cybersecurity, analytics). Regardless, securing organizational funds for such technologies can be challenging.

Two items exhibit the interesting pattern of being highly ranked on the list of technologies that should receive more investment but low on the lists of largest investments and technologies IT leaders find personally worrisome, likely for different reasons. IT leaders positioned AI and Machine Learning as 3rd on the list of technologies that should receive more investment and 17th on the other two lists. This may be due to relatively low levels of organizational adoption of AI suppressing overall organizational investments and IT leadership concern about the topic. However, its high rank among technologies IT leaders believe should be funded at higher levels signals significant interest and future spending in the promise of AI. Business Process Management exhibits a similar pattern, ranking 8th, 21st, and 19th on the should-get-more, largest, and most worrisome lists. However, because BPM is well-established and the associated technologies are well understood, this may simply reflect a desire among IT leaders to fund BPM at a higher level to reap known benefits.

2.3. The Most Difficult to Find and Most Important IT Workforce Skills.

This year, IT leaders were asked to consider the most difficult to find and most organizationally important technical IT skills, a topic last examined in 2019. Participants selected up to five items they viewed as most difficult to find and five items they viewed as most important to the organization from a list of 22 “technical skills or capabilities.”

The technical skills viewed by IT leaders as most-difficult-to-find and most-important to the organization have remained fairly stable since 2017. Software Packages/COTS moved down from 10th and 11th on the most-difficult-to-find and most-important lists, to 11th and 14th respectively this year. As in 2017, there is significant overlap between those viewed as most-difficult-to-find and those most-important to the organization. Only four items presented in Table 6 are not in the top ten lists for both categories. Even among these items, rankings between the two lists are reasonably similar, corroborating the view that

organizationally important IT skills are generally a scarce resource. Taken as a whole, these findings point to a highly competitive environment for technically skilled IT employees and confirm that IT leaders are justified in their concerns about talent acquisition and retention (Table 2).

Table 6: Top Ten Most-Difficult-to-Find and Most-Important Technical Skills, 2019 & 2021

Technical Skill or Capability	Rank & Percentage Selecting	
	Most Difficult to Find *(% Selecting) 2019 Rank*	Most Important to Organization *(% Selecting) 2019 Rank*
Security / Cybersecurity	1 *(46.0%) 1*	1 *(50.2%) 1*
Analytics / Business Intelligence / Big Data / Data Scientist	2 *(36.8%) 2*	2 *(31.5%) 2*
AI / Machine Learning / Expert Systems [a]	3 *(23.8%)* [a]	14 *(12.1%)* [a]
Functional Area Knowledge	4 *(20.5%) 5*	5 *(20.9%) 9*
Cloud	5 *(20.3%) 6*	4 *(22.7%) 6*
Analyst --- Business	6 *(18.9%) 4*	3 *(30.8%) 3*
Architecture / Architect --- Application / Solution	7 *(17.0%) 3*	6 *(19.2%) 4*
Architecture / Architect --- Data / Information	8 *(16.7%) 7*	7 *(16.7%) 7*
Architecture / Architect --- Enterprise	9 *(16.5%) 10*	12 *(15.4%) 12*
Software Development / Programming Languages	10 *(16.1%) 8*	10 *(15.9%) 5*
Analyst --- Technical	11 *(15.4%) 9*	9 *(16.1%) 11*
ERP (Enterprise Resource Planning)	13 *(15.2%) 13*	8 *(16.3%) 10*
IT Project Manager	14 *(12.8%) 12*	10 *(15.9%) 8*

[a] New item

n = most senior IT leader in 454 unique organizations (618 in 2019)

There is a significant degree of similarity between the top ten items in these two lists. This year, eight items appear in the top ten of both lists with Security and Analytics ranking 1st and 2nd respectively on both lists. A new item, AI and Machine Learning debuts in the 3rd position on the list of technical skills most difficult to find. Interestingly, it ranks 14th on the list of skills most important to the organization, suggesting again that AI is gaining momentum but has not yet fully arrived as an organizational capability or investment priority. Functional Area Knowledge and Cloud skills remain in high demand and are viewed as highly important for many organizations. Similarly, there continues to be significant interest in skills related to architecture, as two out of three architecture skills (Application, Data, and Enterprise architecture) appear in the top ten of both lists. Finally, the data suggest that Technical Analysts, ERP professionals and IT Project Managers are viewed as highly important, but such skills are slightly more available than some other technical skills. Collectively, the responses of IT leaders point to IT technical skills as valuable and rare reflecting the overall concern with attracting and retaining high-quality talent (Tables 2 and 5).

3. Participating Organizations and their IT Practices

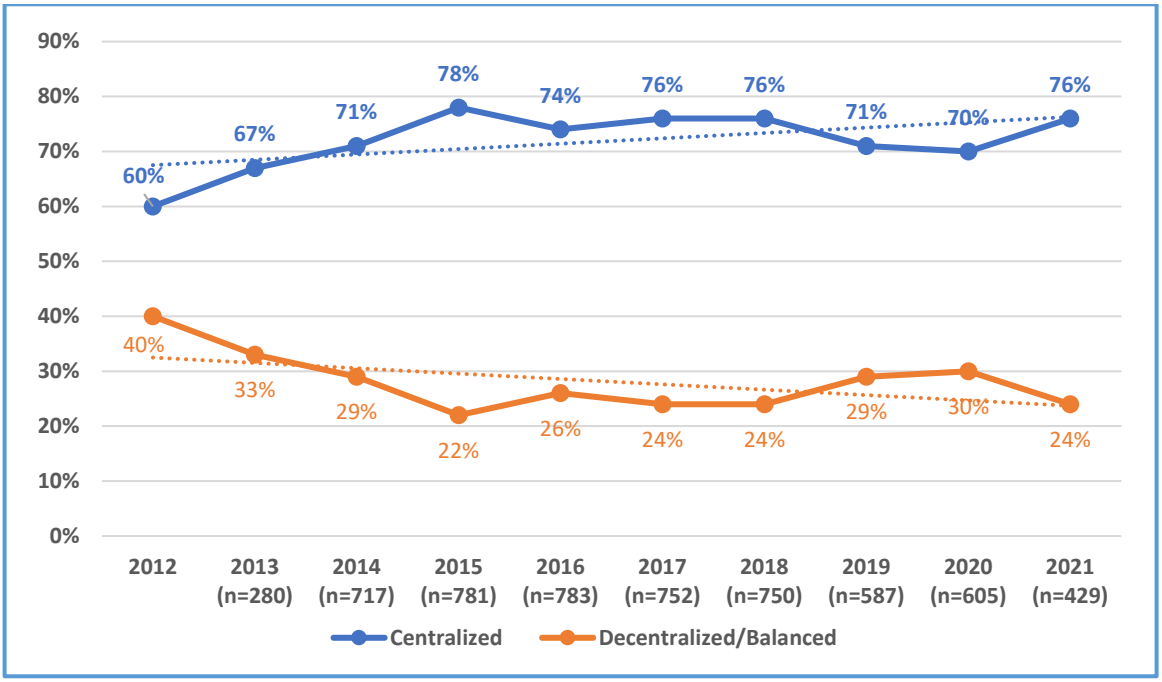
3.1. Location, Industry, Revenue, and IT Spending of Participating Organizations.

The 2021 sample, consisting of 454 organizations, looks similar to previous years in that 96.5% of responding IT leaders are located in the United States and represent 29 different economic sectors. The top 5 sectors represented nearly half of the sample: Finance/Insurance (14.1%), Healthcare/Medical (9.9%), Manufacturing (9%), Government (8.8%), and Education (7.7%). Publicly traded companies represent 25.1% of all responses, which is slightly lower than in previous years. The average annual revenue of the sample is $6.79 billion with a median of $500 million, both of which are up from prior years.

3.2. IT Organization Structure and Governance.

IT organizational structure has shown some cyclicality over the past decade, with the 2021 data showing a slight uptick in the percentage of organizations that have a centralized structure compared to the minor downturn observed in the last two years (Figure 1).

Figure 1: IT Organization Structure Trends, 2012-2021



After a break in 2020, respondents were asked to report on the degree of centralization of various IT governance activities in 2021. The results suggest that little has changed since 2019: decision-making for business unit applications tends to be less decentralized, while all

other activities are commonly conducted in a centralized or completely centralized manner (Table 7).

Table 7: Degree of Centralization/Decentralization of IT Governance Activities, 2021 vs. 2019

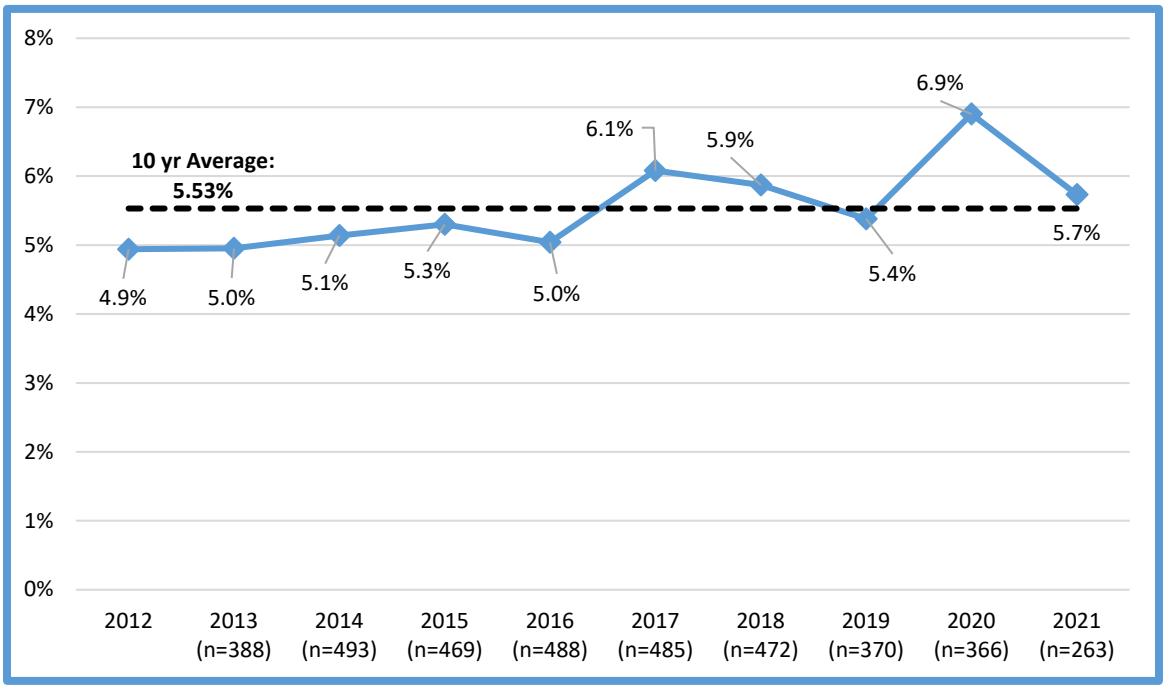
IT Organizational Activities	2019 Weighted Average	2019 n	2021 Weighted Average	2021 n	Completely Decentralized 2021				Completely Centralized
					1	2	3	4	5
IT Infrastructure/Support/ Operations/Services	4.2	592	4.1	438	0.9%	4.6%	15.8%	36.5%	42.2%
Enterprise-wide Business Applications	4.0	586	4.0	436	1.8%	8.0%	14.9%	37.4%	37.8%
IT Purchasing, Procurement, Investments	4.0	583	4.0	433	0.7%	8.5%	15.7%	38.3%	36.7%
Overall IT Governance	4.1	742	4.0	429	1.6%	6.8%	15.9%	39.4%	36.4%
Line-of-Business/Business Unit Applications	3.6	562	3.5	416	3.4%	16.3%	27.9%	29.3%	23.1%
IT Architecture/Standards	4.1	576	4.1	421	0.5%	9.3%	12.4%	37.5%	40.4%

* Note: Question not asked in 2020

3.3. IT Budget and Spending Trends.

The average IT budget for 288 organizations responding to that question was $81.2 million, down more than 30% from the 2020 average of $118 million. The median IT budget was $10 million, on par with 2020. The noticeable drop in average IT budget with no change in median budget is peculiar given the increase in average and median revenue, but could be related to the 2020 increase in IT budget as a percent of revenue (Figure 2), which was presumably due to the COVID-19 pandemic. Standardizing IT spend as a percentage of revenue, the average organization spent 5.7% on IT. This value represents a return to normalcy compared to the sizeable increase to 6.9% in 2020 (Figure 2). It is, however, worth noting that in 2021 organizations with less than $50 million in revenue averaged IT spending at 17% while those with revenues exceeding $5 billion only spent 2.7%.

Figure 2: Average IT Spending as a Percentage of Revenue, 2012-2021



In previous years, IT spending has differed considerably from one industry sector to another, and this trend continues for 2021. For those sectors with at least 10 reporting organizations, there are stark differences in the percent of annual revenue spent on IT (Table 8). Consulting (both business and IT), Energy, IT Hardware/Software, and Financial Services all spend more than the all-organization average, while Retail, Government, Transportation, Manufacturing, and Automotive spend noticeably less. These results are similar to previous years, though Education and Government both invested an above-average amount in 2020 while recording well below-average values in 2021. This could be indicative of the scramble to deploy additional computing resources to support these industries in the early months of the COVID-19 pandemic. However, in 2021, investment in IT has leveled off to pre-pandemic amounts.

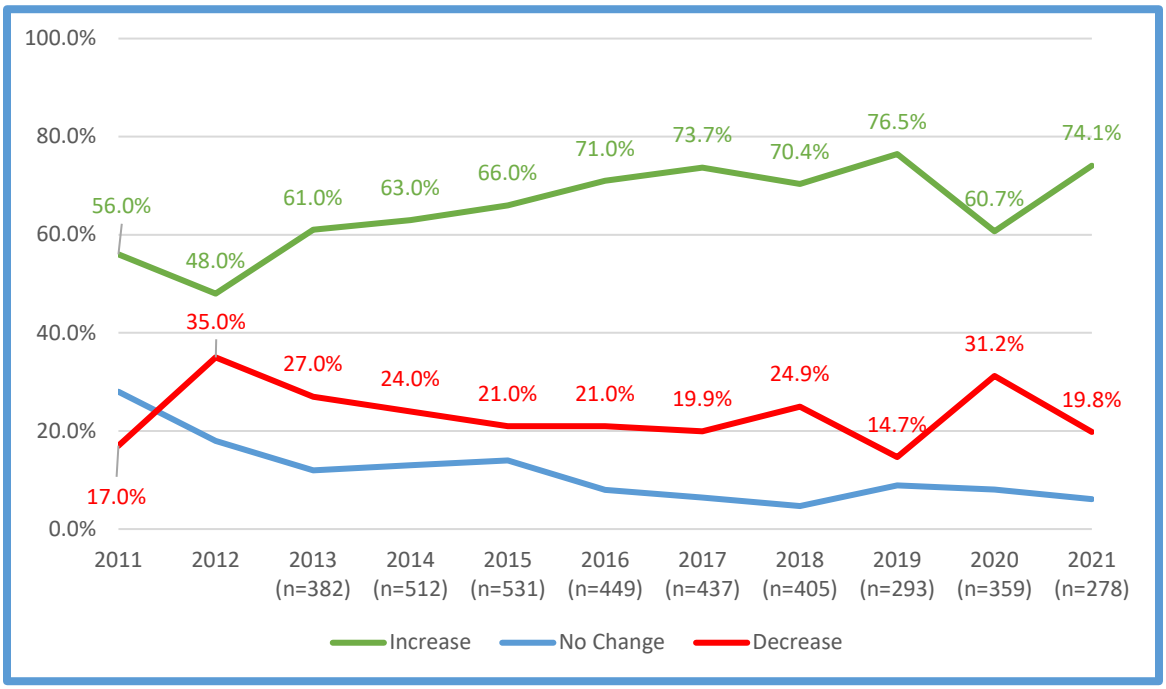
Table 8: IT Spending as Percentage of Revenue, by Business Sector, 2021

Sector [a]	Number of Organizations	Average % of Revenue Spent on IT
Business or Professional Services / Consulting	17	20.4%
IT Services / Consulting	23	17.1%
Energy	11	11.8%
Other for profit (specify):	18	10.8%
IT Hardware / Software	14	7.8%
Financial Services / Insurance / Banking	64	6.4%
Not-for-Profit	25	5.8%
Education	35	5.1%
Healthcare / Medical / Medical Technology / BioMedical	45	4.6%
Consumer Goods / Services	13	3.6%
Retail / Wholesale	15	2.9%
Government	40	2.7%
Transportation / Distribution / Logistics	14	2.0%
Manufacturing	41	1.8%
Automotive	10	1.2%

[a] Only sectors with at least 10 reporting organizations are included here.

When comparing 2021 IT budgets to 2020 IT budgets, the average organization reported an increase of 6.7%. This value is nearly identical to the 6.6% average increase in IT budget reported two years ago and is well above the 2.9% increase reported in 2020. When looking at the percentage of organizations in the sample reporting an increase (of any amount), decrease, or no change, 2021 represented a return to normal trends after a significant decrease in organizations growing their IT budgets last year (Figure 3).

Figure 3: Percentage of Organizations Increasing, Not Changing, and Decreasing IT Budgets from Prior Year, 2011-2021

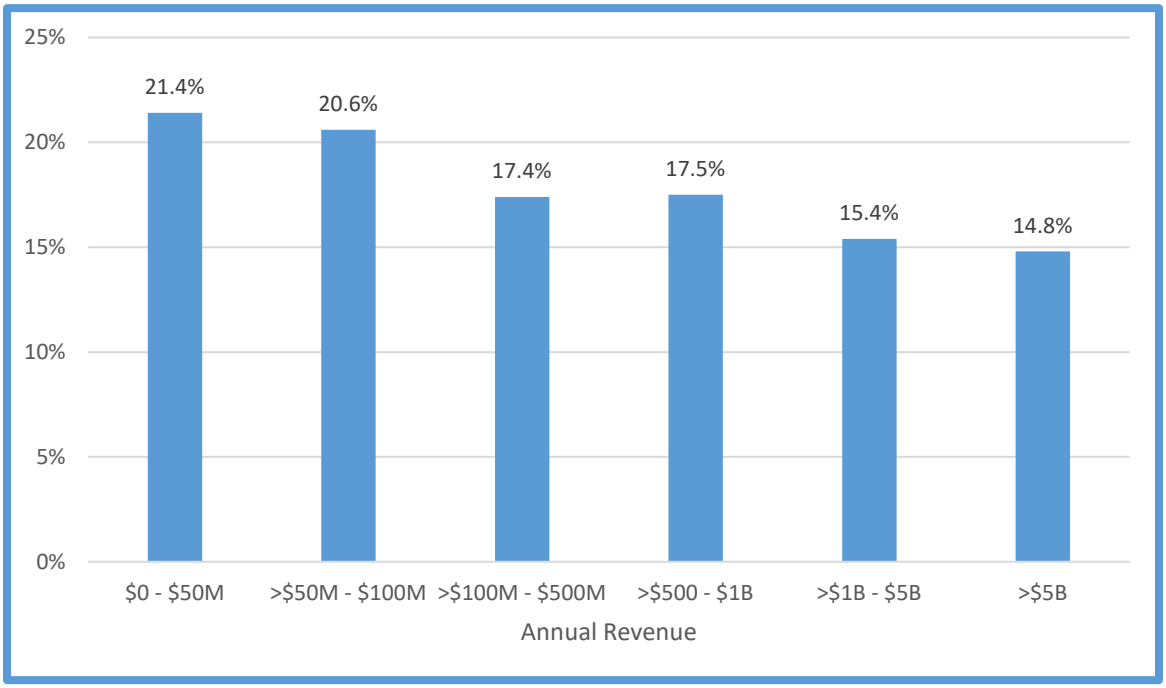


Looking at where organizations allocate their IT budgets across eight mutually-exclusive spending categories, the expansion of cloud spending continues in 2021 with offsetting decreases in hardware and software (see Table 9). In terms of cloud spending, smaller organizations (in terms of revenue) tend to spend a larger share of their IT budgets compared to larger organizations, as shown in Figure 4.

Table 9: IT Budget Allocations, 2018-2021

Budget Categories	% Allocated				
	2018	2019	2020	2021	% Change 2020-21
Hardware	11.9%	11.9%	11.5%	10.8%	-6.09%
Software	16.0%	15.1%	17.2%	15.2%	-11.63%
Facilities (including supplies & consumables)	4.8%	5.0%	3.7%	3.6%	-2.70%
Employees	35.2%	38.0%	33.9%	35.0%	3.24%
Consultants	7.4%	7.9%	8.0%	7.0%	-12.50%
Contractors	6.8%	6.9%	6.2%	7.2%	16.13%
Cloud Services (SaaS, PaaS, IaaS, process, +)	14.0%	15.5%	16.0%	18.2%	13.75%
Other	3.8%	1.9%	3.8%	3.0%	-21.05%
n = most senior IT leader in n unique organizations	434	274	366	225	
Annual totals may not equal 100% due to rounding					

Figure 4: Percentage of IT Budget Spent on Cloud, by Revenue – 2021



Breaking down IT budgets along functional, but non-mutually exclusive, categories there was a leveling off of analytics spending in 2021 but a continued increase in cybersecurity spending as shown in Table 10. Increases were also observed in offshore IT and outsourcing, perhaps a sign of increased trust in remote work after relying heavily on a remote workforce during the pandemic.

Table 10: IT Budget Allocations to Non-Mutually Exclusive Categories, 2018-2021

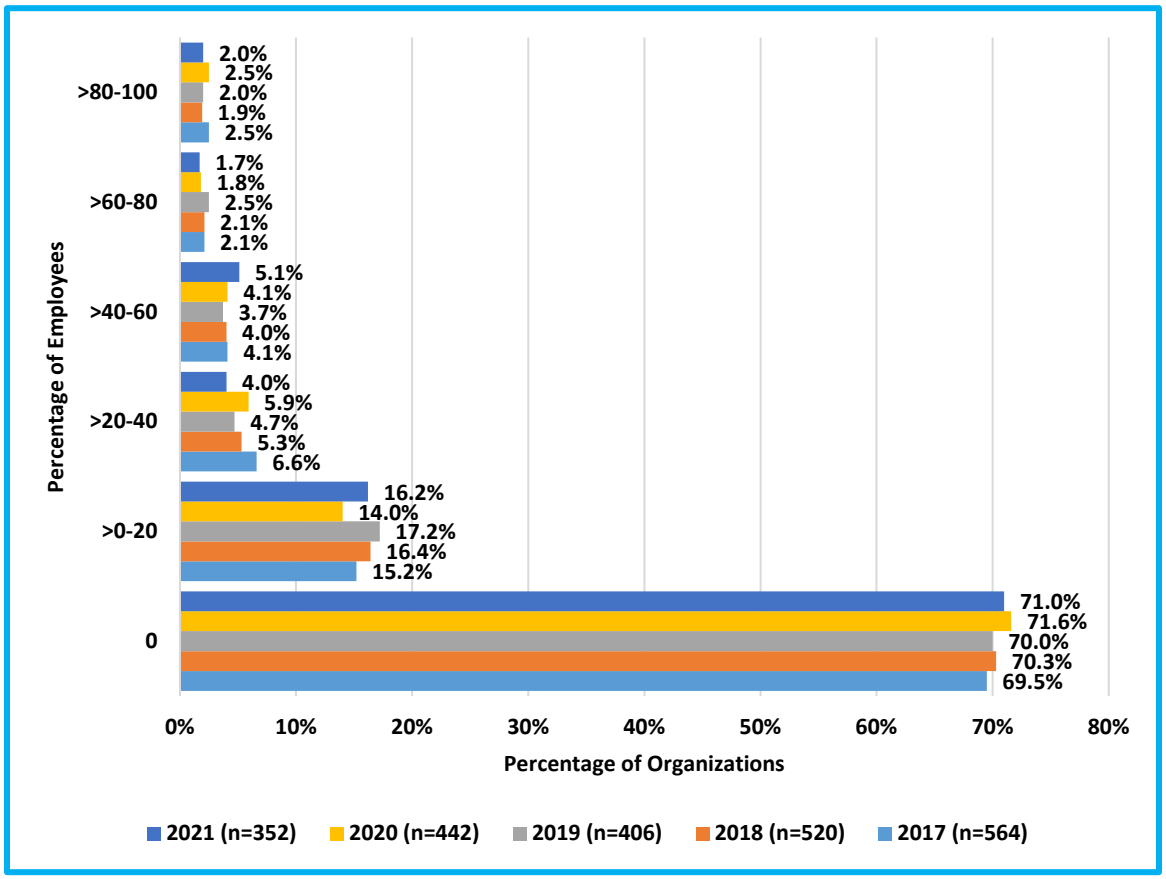
Non-Mutually Exclusive IT Budget Categories	% Allocated				% Change 2020 to 2021
	2018	2019	2020	2021	
Keeping the IT Lights On (KTLO)	48.9%	39.6%	39.4%	38.6%	-2.0%
Software Development & Maintenance	27.1%	18.6%	17.0%	14.8%	-13.1%
IT Capital Investment	18.4%	14.7%	14.2%	13.5%	-5.2%
Outsourcing	10.7%	8.2%	9.4%	10.2%	8.5%
Cybersecurity	7.7%	6.9%	8.6%	10.0%	16.6%
BI/Analytics	6.0%	6.1%	6.9%	6.4%	-7.2%
IT-Related R&D	5.3%	4.8%	5.3%	5.5%	3.4%
Offshore IT	5.8%	4.4%	4.5%	5.5%	22.5%
Management/Leadership Training	2.4%	2.0%	2.6%	2.4%	-5.9%
Technical Training	2.7%	2.2%	2.7%	2.7%	-0.7%
n = most senior IT leader	548	369	338	247	

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

3.4. IT Workforce and Salary Trends.

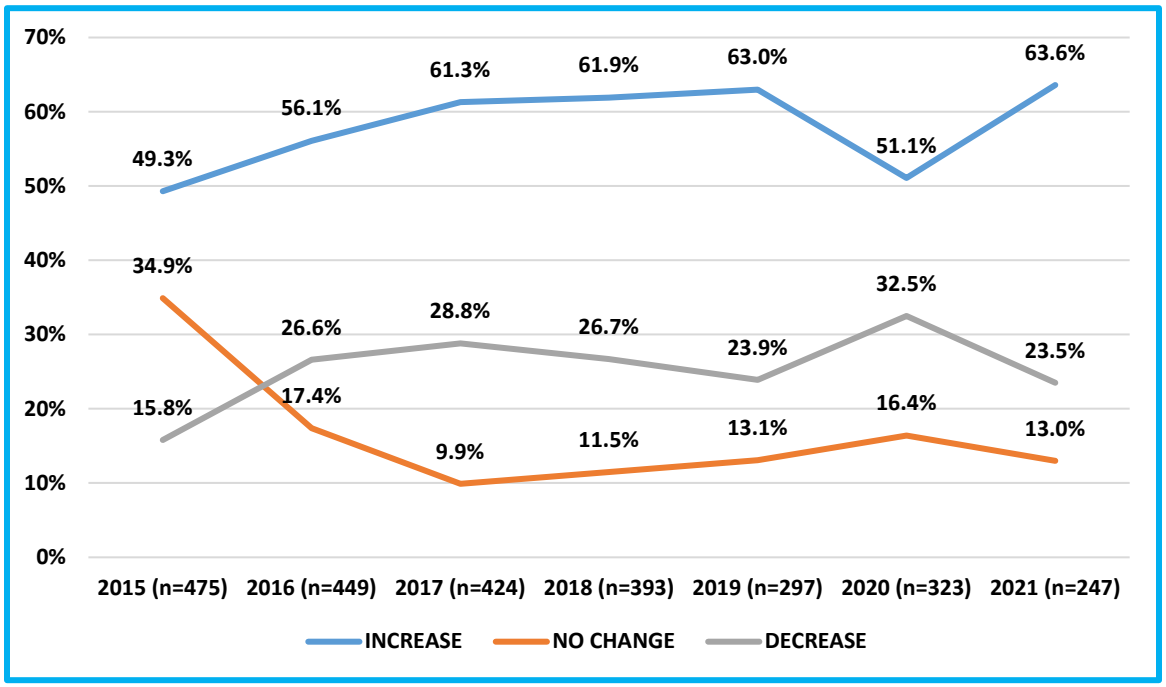
3.4.1. IT Employees and their Salaries. In 2021, the average number of "full-time IT employees (IT FTEs, not including contractors or consultants)" who "report to or under the top IT person" was 283 (n = 372). However, the median number of IT FTEs in 2021 was 26, which is consistent with prior years. 73% of responding organizations reported having 100 or fewer IT employees. Four organizations (1.1%) reported having no IT FTEs, presumably because they outsource all their IT. On average, 9.0% of IT FTEs in 2021 were "located outside their home country (i.e., offshore)" (n=352), down slightly from 9.2% in 2020. However, 71% of organizations reported having no IT employees outside of their home country (Figure 5).

Figure 5: Percentage of IT FTEs Located outside Employer's Home Country, 2017-2021



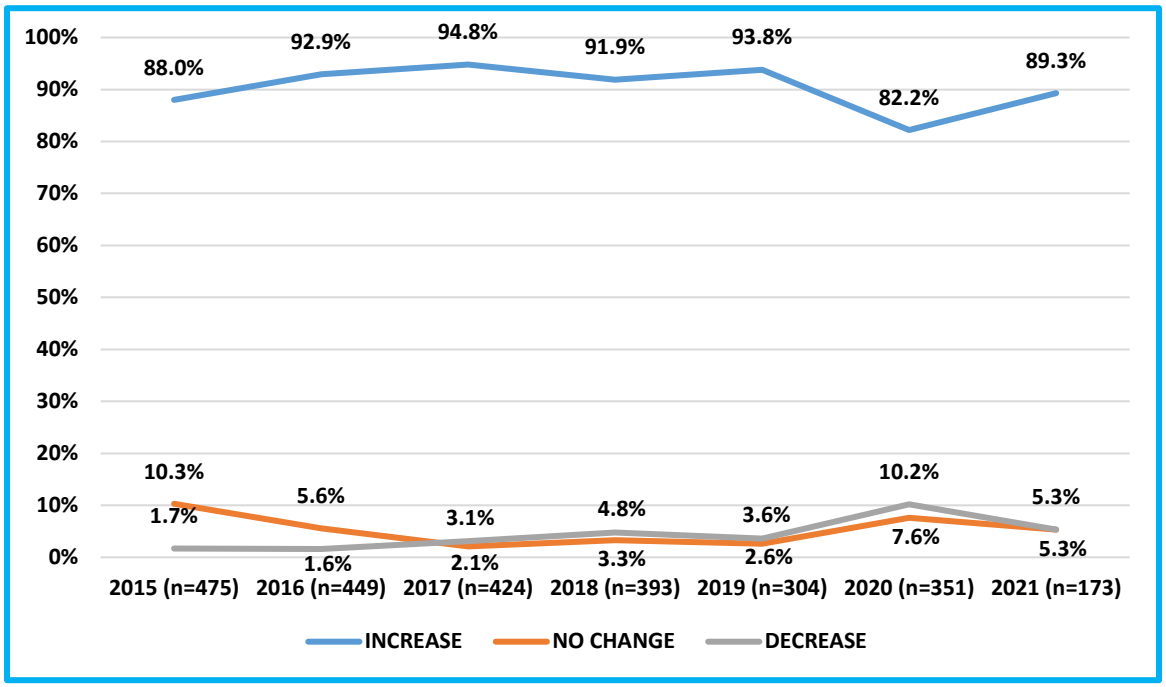
In 2021, 63.6% of 247 responding organizations reported an increase in the number of internal IT employees (Figure 6), this is up from 51.1% in 2020, but close to the 63.0% reported in 2019. The percentage reporting no change was 13%, down from 16.4% in 2020 but on par with 2019. Organizations reporting decreasing headcounts decreased to 23.5%, down from 32.5% in 2020. This may represent a return to pre-pandemic hiring levels.

Figure 6: Percentage of Organizations Reporting Increases, No Change and Decreases in Internal IT FTEs, 2015-2021



In 2021, 94.6% of organizations reported that average IT salaries increased or remained flat (Figure 7). This is up from 89.9% in 2020 but below the 2019 level of 96.4%. The average increase in IT salaries rose significantly compared to 2020 (2.3%) to 4.7% in 2021. Looking ahead to 2022, 95.6% of organizations are forecasting increases in average IT salaries, 1.8% believe they will remain the same, and 2.7% are forecasting lower average salaries in 2022.

Figure 7: Percentage of Organizations Reporting Increases, No Change and Decreases in Average IT Salary, 2015-2021

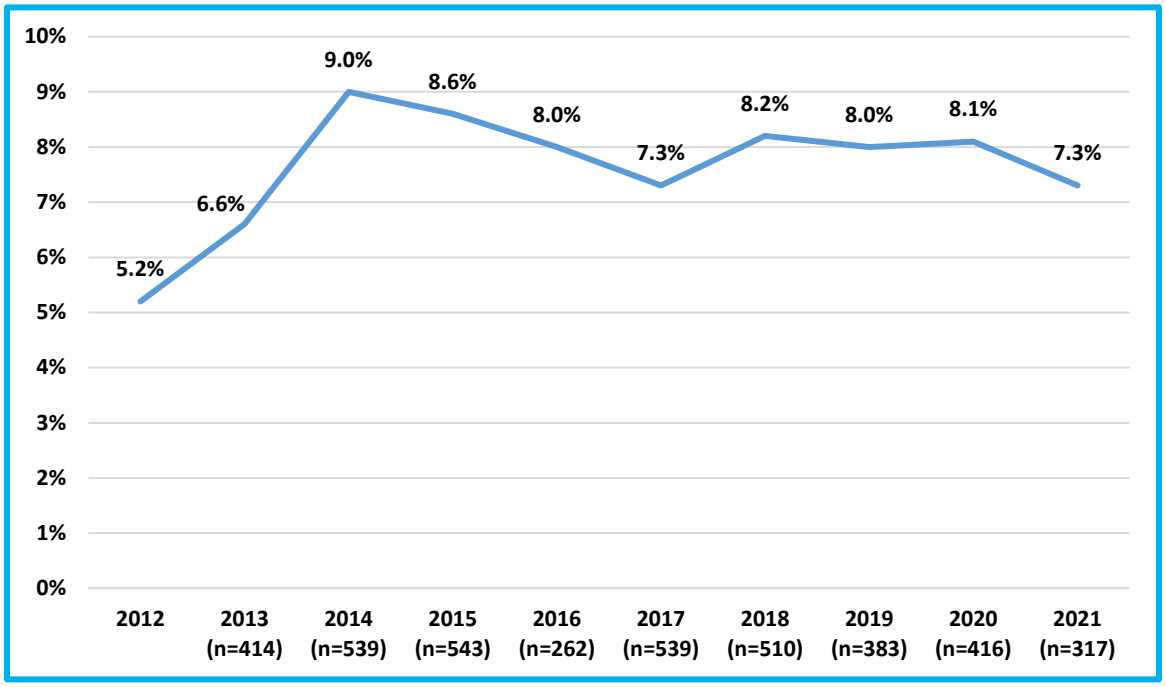


3.4.2. IT Contractors and Consultants. The average number of IT contractors and consultants decreased in 2021 to 57.7 (n=307). This continues a slow downward trend that began in 2017 (i.e., 2020 58.8, 2019 65.5, 2018 72.6, 2017 83.3). However, the median remained steady at 3 and the standard deviation was 281.5, indicating significant variability in the sample. 88.3% of respondents reported using less than 50 consultants and contractors, which is down slightly from 89.5% reported in 2020. 25.1% reported using no contractors or consultants which is down from 28.1% reported in 2020.

Of the 167 organizations that reported using IT contractors and consultants, 54.5% reported an increase in the number of IT contractors and consultants. This is 13.8% higher than 2020's 47.9%, but consistent with 2019's 54.4%. 23.4% reported no change, and 22.2% reported a decrease, which is 25.8% lower than the 29.8% in 2020. For 2022, 54.5% anticipate an increase in the use of IT contractors and consultants, 18.2% no change, and 27.3% a decrease.

3.4.3. IT Workforce Turnover and Retirements. Turnover rate fell from 8.1% in 2020 to 7.3% in 2021(Figure 8).

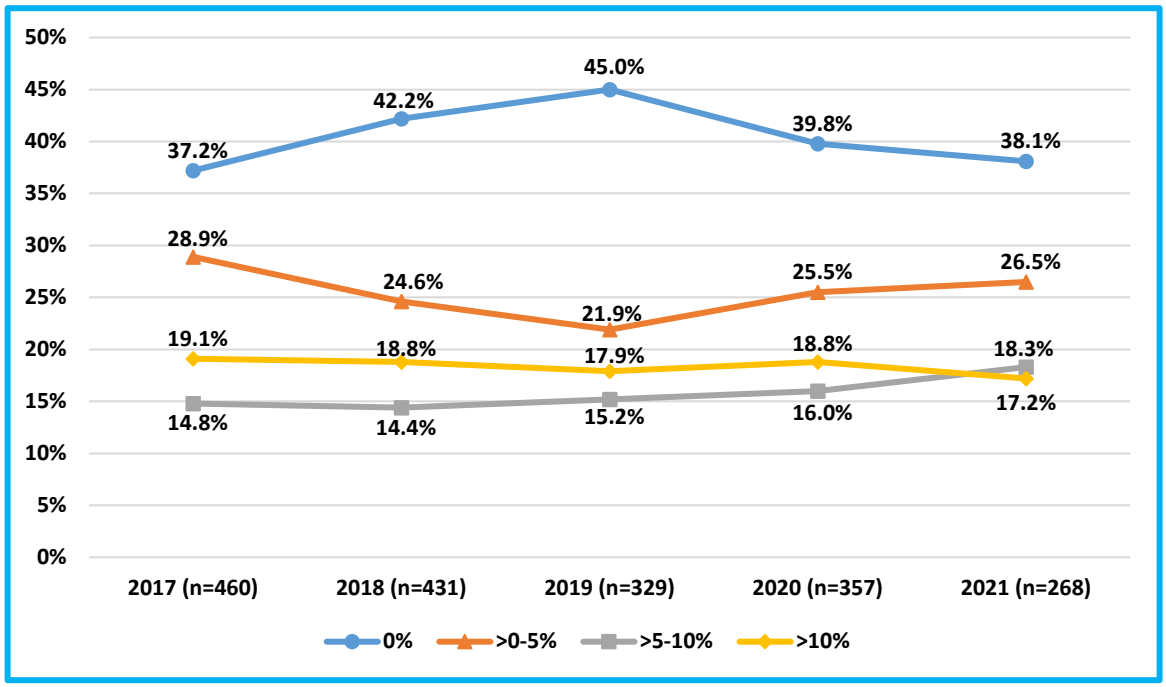
Figure 8: Turnover Rate for Full-time IT Employees, 2012-2021



Respondents provided estimates of the portion of their IT staff turnover that was "involuntary (i.e., the result of downsizing, layoffs, terminations, etc.)" rather than "voluntary (i.e., quitting, retirements, etc.)." Voluntary departures, on average, accounted for 71.2%, a significant increase from 52.9% reported in 2020, but closer to those reported in prior years (e.g., 67.7% 2019, 69.6% 2018). Involuntary departures rose from 22.8% in 2020 to 28.8% in 2021.

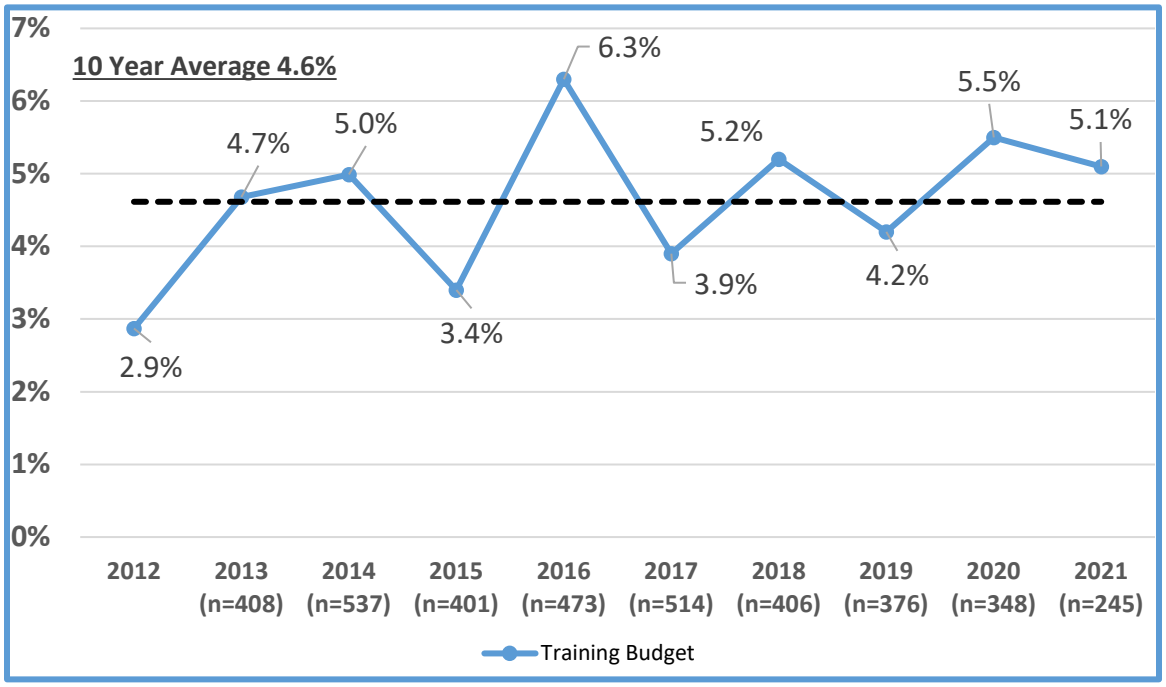
The percentage of IT employees expected to retire in the next five years remained steady at 7.0% (n=268). While this has remained relatively flat over recent years, it is not clear as to what extent specific skills may be more adversely affected by retirements (e.g., legacy systems, mainframe, COBOL, etc.). Also, when considering the distribution of organizations expecting retirements, the percentage of organizations anticipating no retirements dropped slightly from 39.8% in 2020 to 38.1% in 2021 (Figure 9).

Figure 9: Percentage of IT Employees Expected to Retire in the Next Five Years, 2017-2021



3.4.4. IT Workforce Training Expenditures. Overall investment in training remains above the 10-year average of 4.6%. IT leaders reported that the percentages of the IT budget allocated to managerial/leadership and technical training were 2.4% and 2.7% respectively. The combined 5.1% allocated to training in 2021 ranks 4th within the 10-year window shown in Figure 10. Though down 19.1% from a historic high of 6.3% in 2016, and down 7.3% from 2020, the budget allocation for training in 2021 remains relatively high and is consistent with efforts to attract, develop, and retain talent. In general, these efforts are reported to be effective, with over 75% of IT Leaders reporting Management Training as Moderately Effective or better, and over 80% reporting similarly for Technical Training.

Figure 10: Percentage of IT Budget Spent on Training 2012-2021[3]

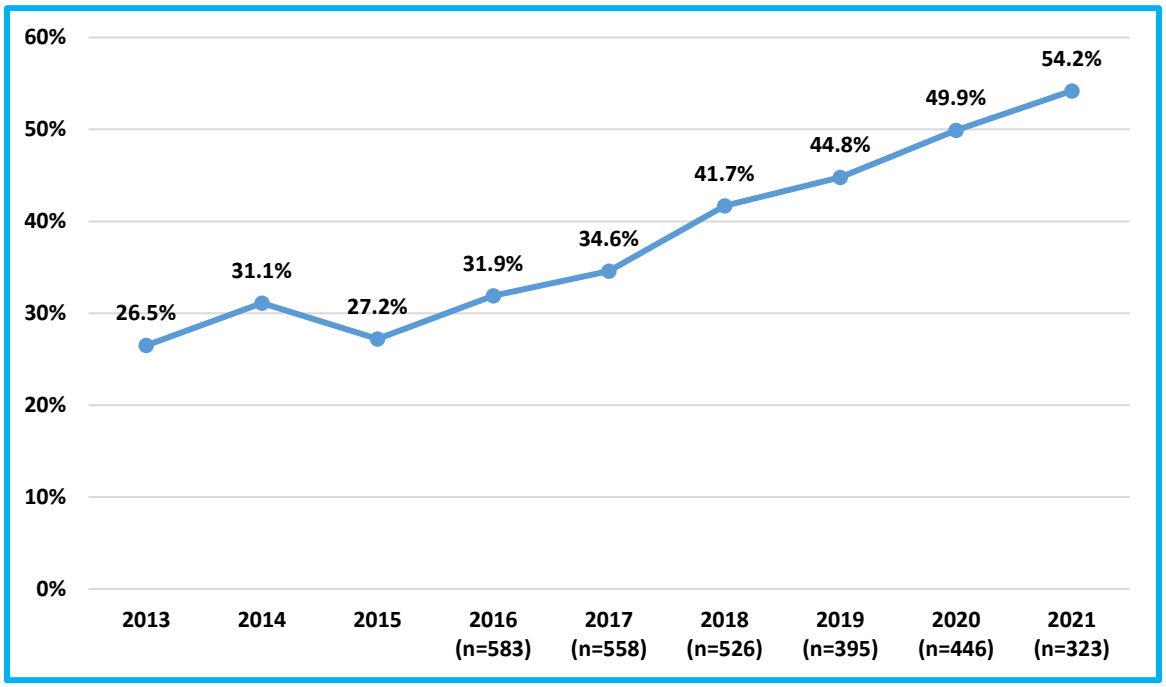


3.5. Use of Cloud and Shared Services.

Of the 323 reporting organizations, just as in 2020, 98.4% indicated that they used Cloud Services. Organizations on average, reported delivering 54.2% "of all IT services" via the cloud which continues the strong upward trend that began in 2015 (Figure 11). The median value remained the same as 2020 at 50%.

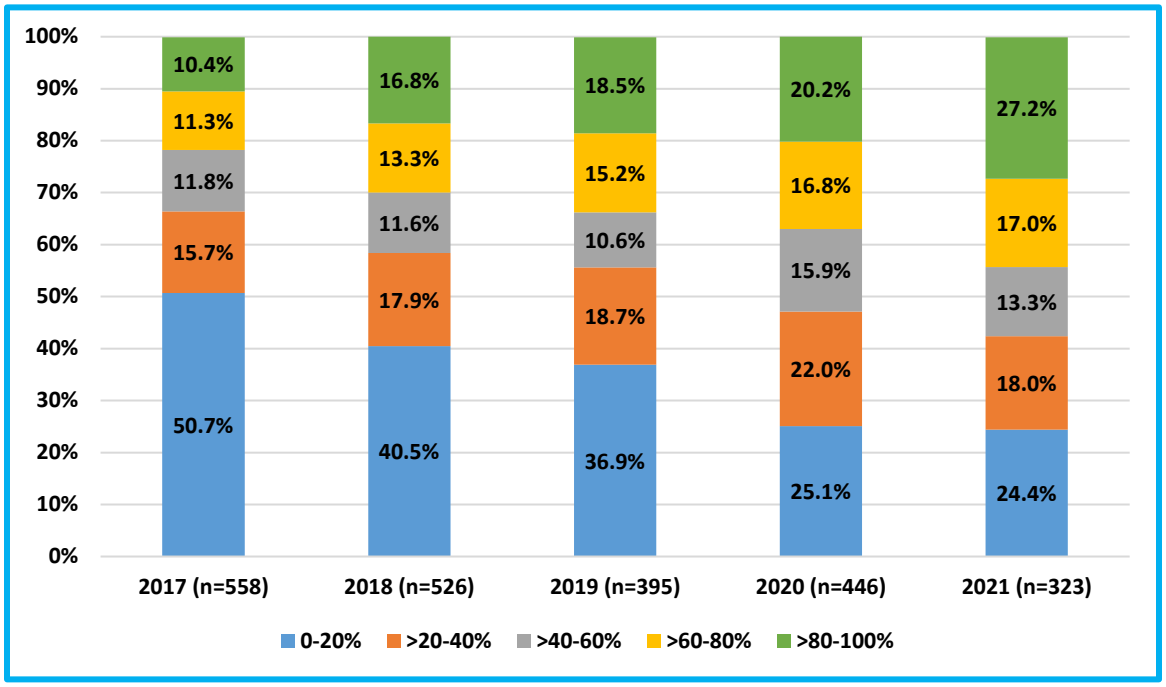
[3] Due to changes in the way data are cleaned and the retroactive application of those standards to prior year's data back to 2015, some historical values in this figure have been altered from previously reported values.

Figure 11: Average Amount of All IT Services Delivered by Organizations via the Cloud



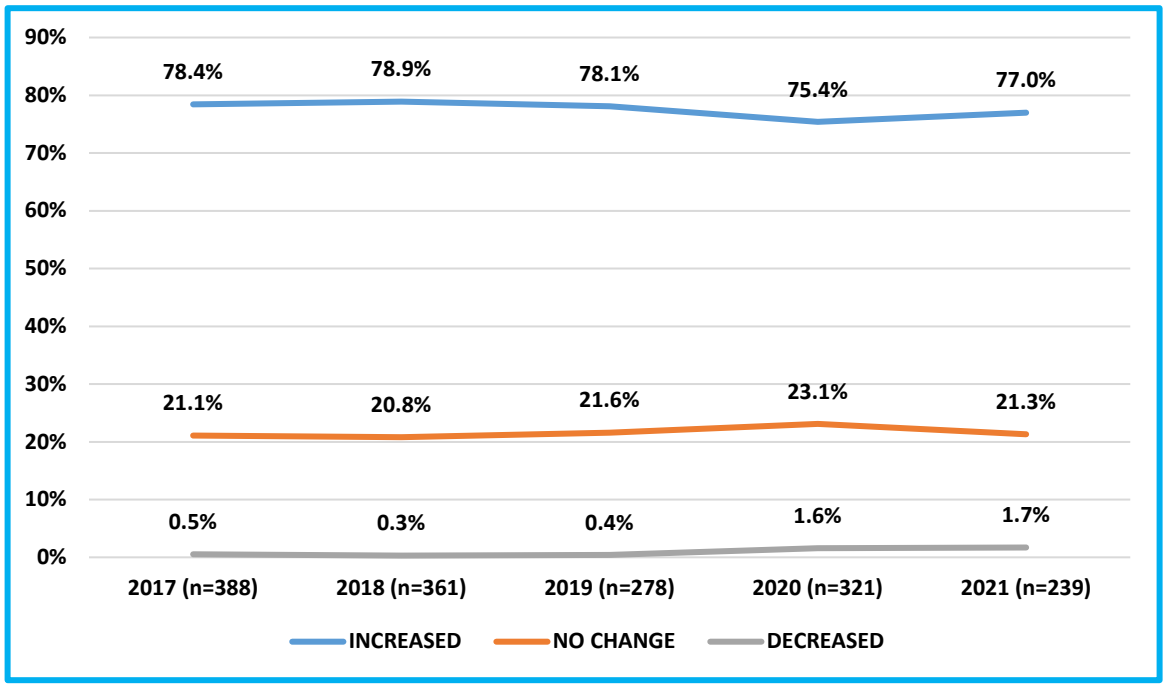
3.5.1. Cloud-Based IT Services and Solutions. Figure 12 shows how organizations are moving to deliver more IT shared services via the cloud. 1.5% of organizations reported no cloud-based IT services, the same as reported in 2020. However, 27.2% of organizations in 2021 reported delivering over 80% of their shared IT services via the cloud. This is up from 20.2% reported in 2020, an increase of 34.7%.

Figure 12: Percentage of IT Services Delivered via the Cloud, 2017-2021



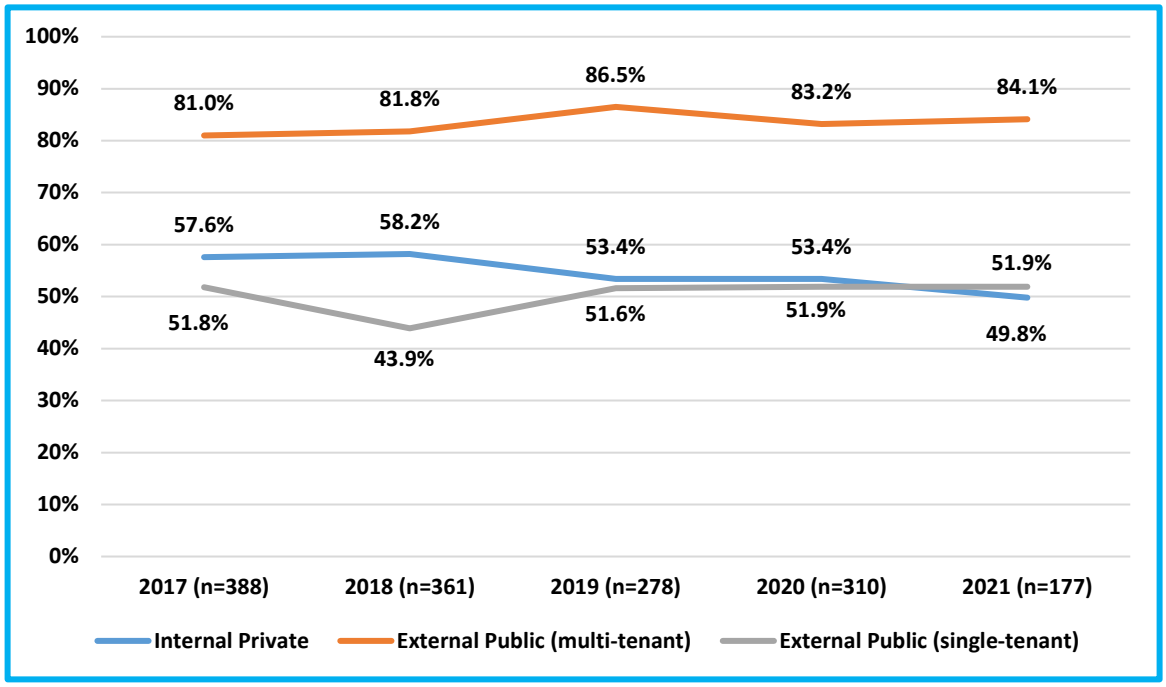
An increase in external cloud usage was reported by 77% of respondents, this is up from 75.4% reported in 2020. 21.3% reported no change and 1.7% reported a decrease (Figure 13). 79.1% reported increases in the number of cloud features purchased, while 20.1% reported no change, and 0.8% reported a decrease. Respondents reported that the average cost per seat for external cloud services increased by 10.6%, the unit cost of processing power increased by 0.7%, and storage unit costs increased by 0.7%.

Figure 13: Percentage of Organizations Reporting increases, No Change and Decreases in External Cloud Usage, 2017-2021



Shown in Figure 14, the use of external public multi-tenant cloud increased slightly from 83.2% in 2020 to 84.1% in 2021, while the use of external public single-tenant remained flat at 51.9% and internal private cloud fell from 53.4% to 49.8%. When considering external versus internal cloud usage, 94.6% of respondents reported using some form of external cloud while only a little over half (50.4%) reported using an internal private cloud.

Figure 14: Percentage of Organizations Using Each Cloud Category, 2017-2021



The distribution of cloud-based IT by category has remained relatively flat since 2018 (Figure 15). However, the percentage of companies using external public multi-tenant platforms for over 50% of their cloud-based IT dropped significantly from 51% in 2020 to 43.3% in 2021 (Figure 16).

Figure 15: Average Percentage of All Cloud-based IT Provided by Category, 2017-2021

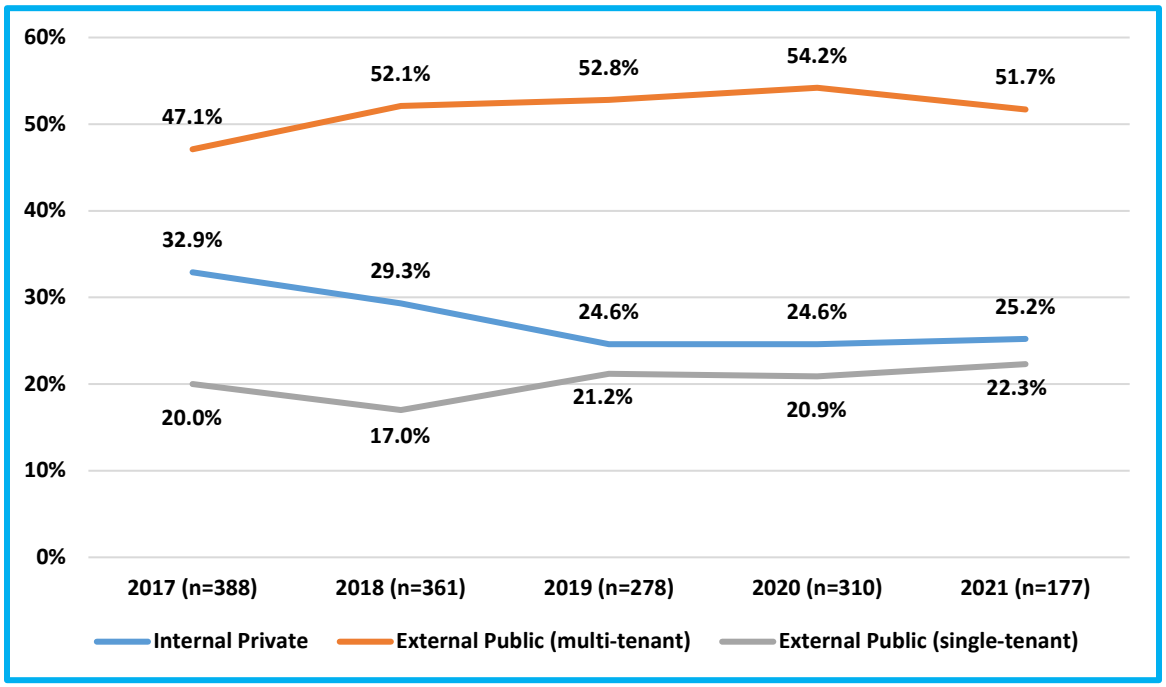
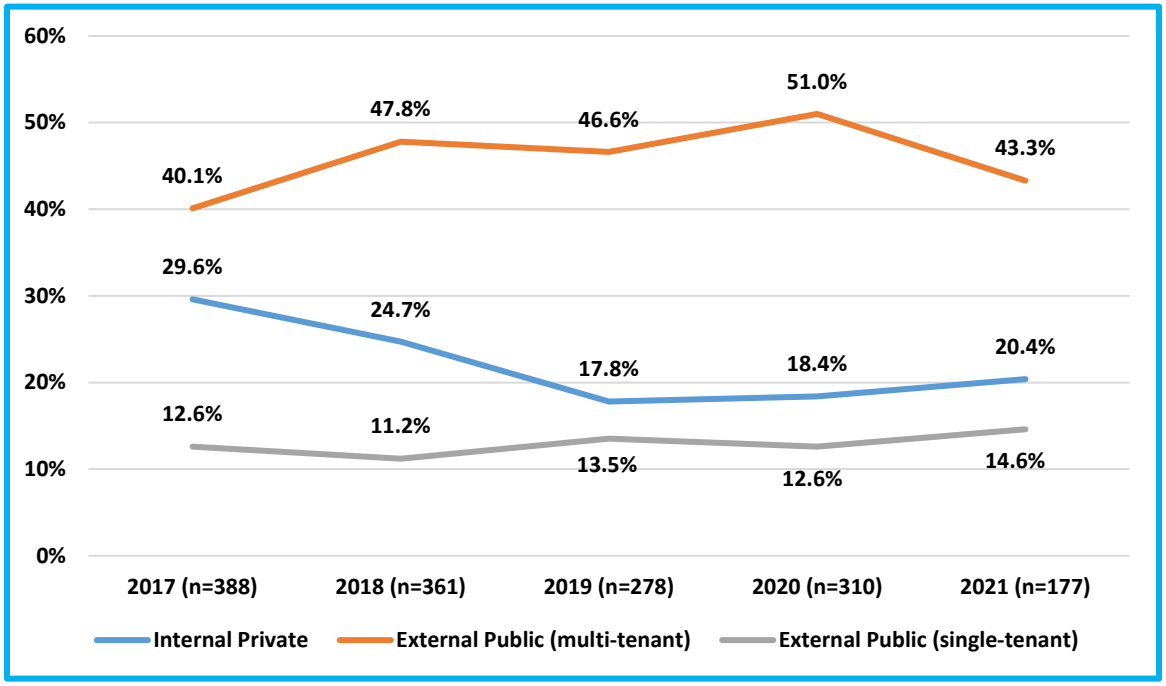


Figure 16: Organizations Using Each Category for Over 50% of Cloud-based IT, 2017-2021



Examining the cloud platform mix shown in Figure 17, respondents reporting using a combination of internal private and external public continues to decline. Those companies that reported using exclusively external public multi-tenant platforms increased slightly from 24.8% in 2020 to 25.5% in 2021. Companies utilizing only internal private and only external public single tenant platforms increased to 5.0% and 6.7% respectively.

Figure 17: Corporate Cloud Platform Mix, 2017-2021

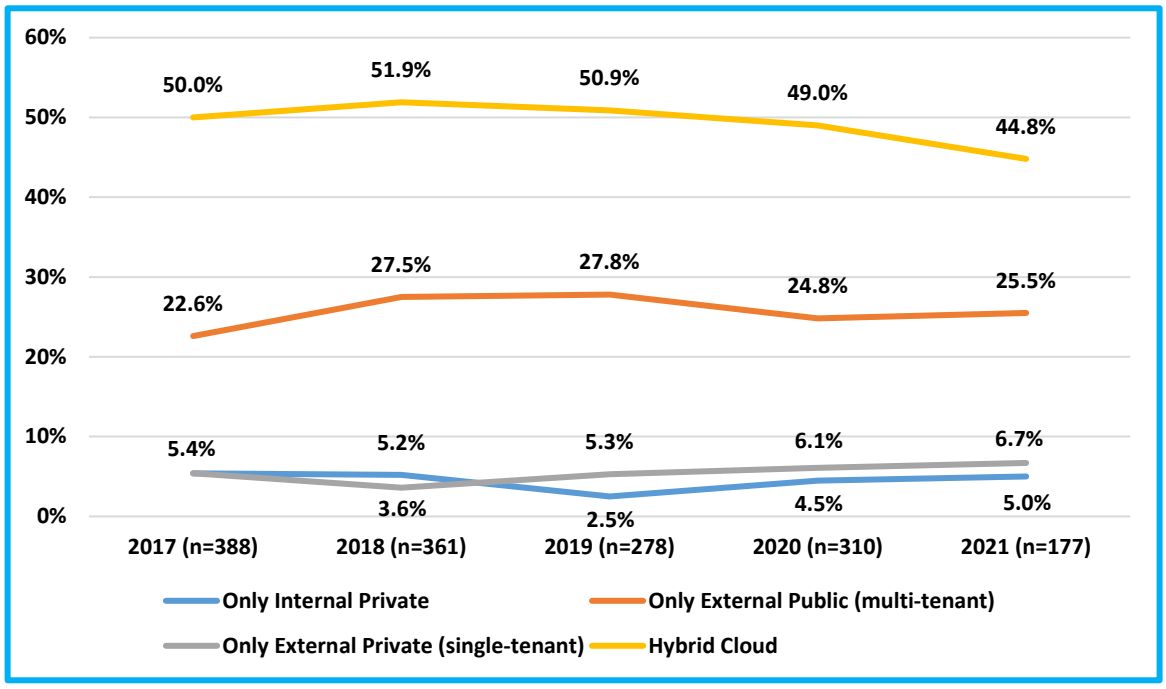
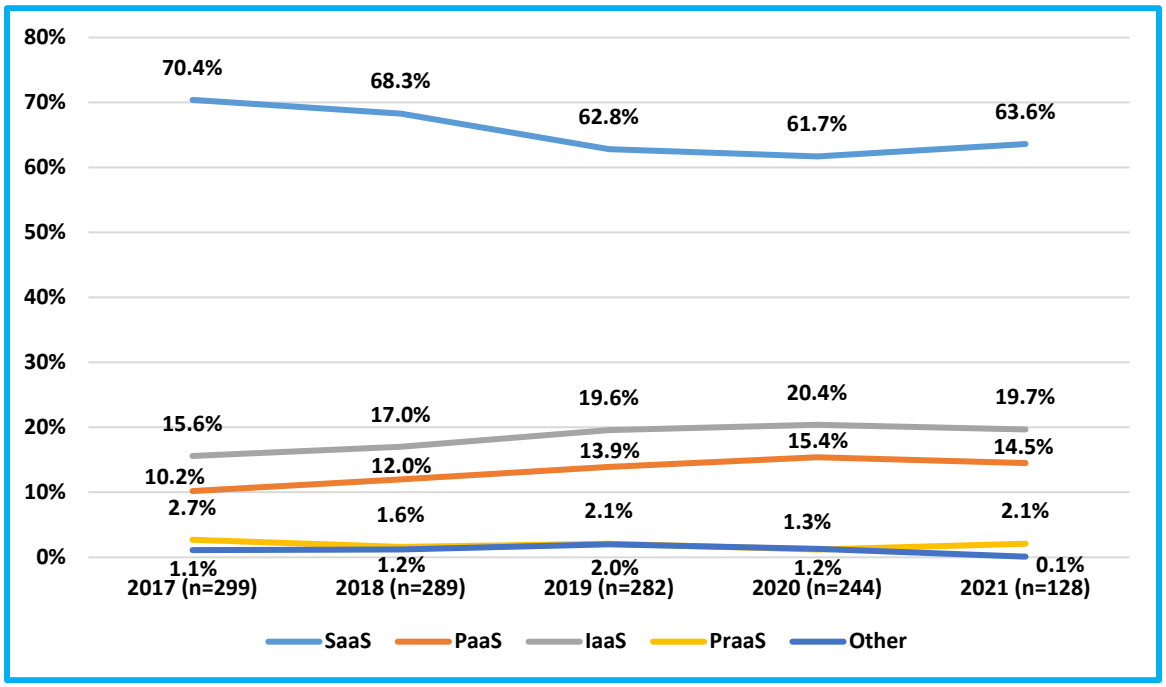


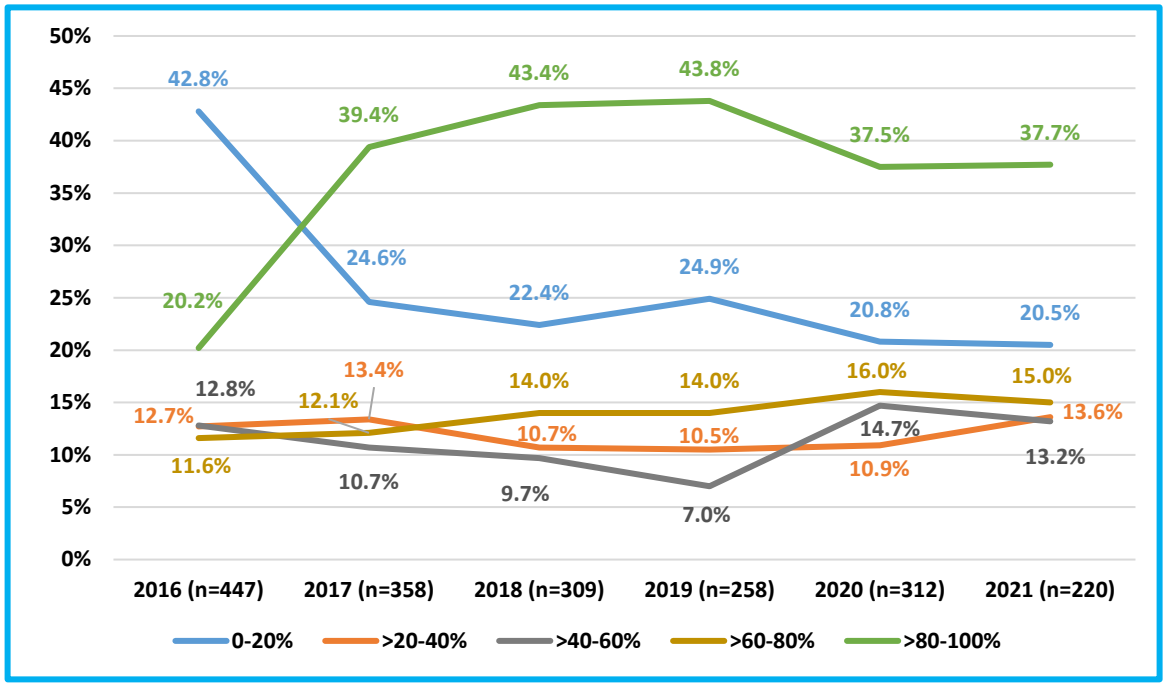
Figure 18 shows responses to the question: "What percentage of the external cloud-based IT services are provided in each of the following categories: Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Process as a Service (PraaS)?" In 2021, SaaS usage increased from 61.7% in 2020 to 63.6%, ending a four-year decline. IaaS and PaaS declined slightly to 19.7% and 14.5% respectively. Process as a Service (PraaS), an area of limited interest, increased in 2021 from 1.2% to 2.1%.

Figure 18: Percentage of External Cloud Services Delivered by Service Category, 2017-2021



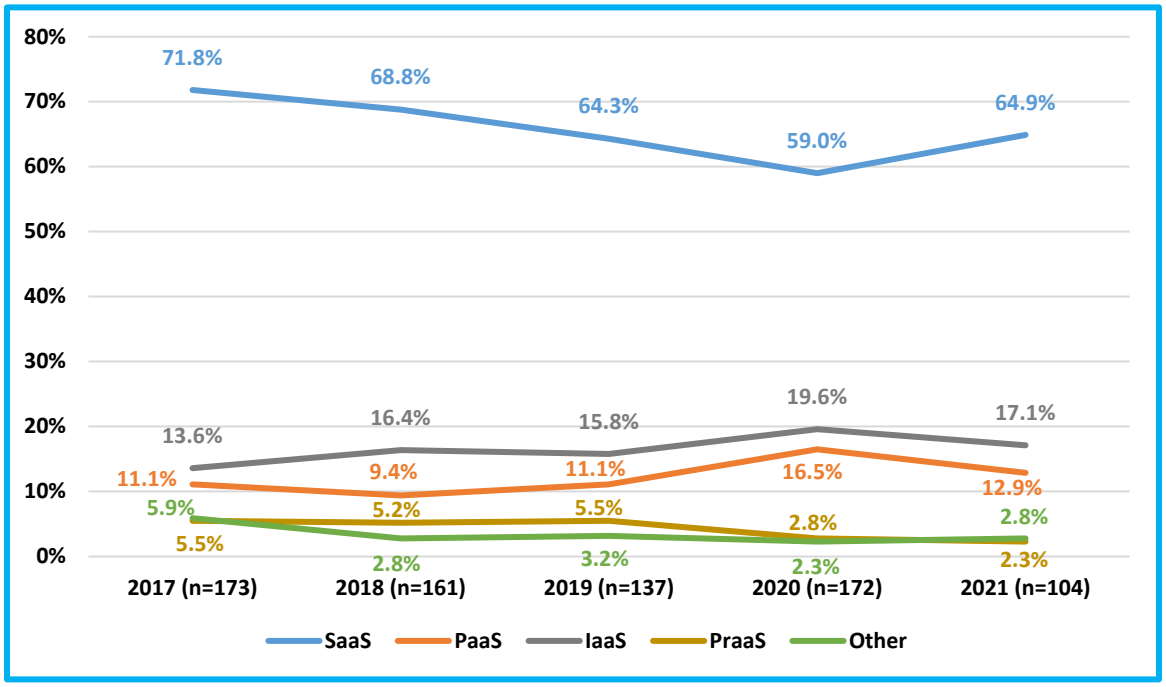
3.5.2. Shared Services for IT Delivery. In 2021, similar to 2017-2020, 90.9% of organizations indicated that they used at least some shared IT services. At 61.2%, the average amount of all IT services delivered as a shared service in 2021 is slightly lower than that reported in 2020 (62.7%) (Figure 19).

Figure 19: Percentage of All IT services Delivered as Shared Services, 2016-2021



Organizations where IT is delivered as a shared service through the cloud were asked "What percentage of IT shared services are provided in each of the following categories?" SaaS rebounded in 2021 to 64.9% from a downward trend that began in 2017, increasing 10% from 59% in 2020. Other areas such as PraaS dropped from 2.8% in 2020 to 2.3%, PaaS dropped from 16.5% in 2020 to 12.9%, and IaaS dropped from 19.6% in 2020 to 17.1% (Figure 20).

Figure 20: Percentage of IT Shared Services by Category, 2017-2021



3.6. Cybersecurity Practices.

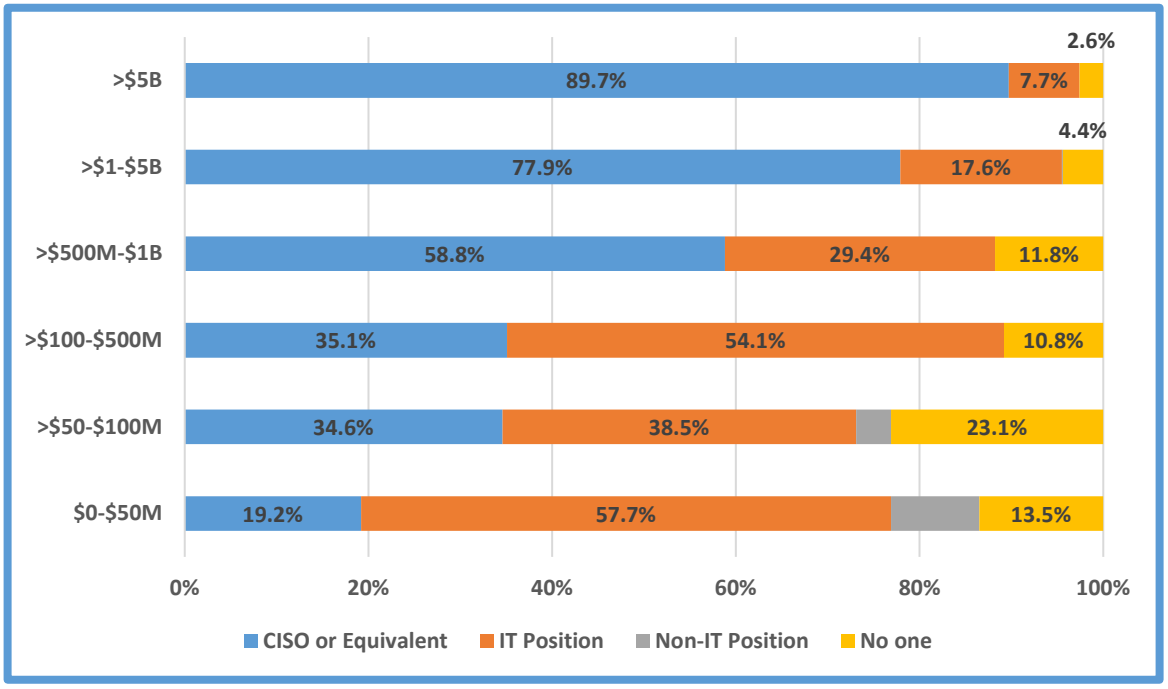
Despite the recent uptick in ransomware attacks and other significant concerns around cybersecurity, there was no real change in organizational cybersecurity leadership trends in 2021 (Table 11). Just over half of all organizations have a dedicated position (CISO, VP of Security, etc.), while approximately 84% of organizations have someone responsible for cybersecurity, among other responsibilities. Larger organizations are still much more likely to have formal cybersecurity leadership as shown in Figure 21.

Table 11: Cybersecurity Leadership, 2018-2021

Does your organization have a person with formal authority/responsibility over cybersecurity practices?	2018	2019	2020	2021
n (unique organizations)	670	537	550	403
Yes, a dedicated position (CISO, VP of Security, etc.)	45.5%	48.8%	50.4%	51.4%
Yes, someone in the IT function that also has non-cybersecurity responsibilities [a]			31.6%	33.3%
Yes, someone outside of the IT function that also has non-cybersecurity responsibilities [a]			2.5%	2.2%
No, there is no one with formal cyber authority/responsibility [a]			13.8%	11.7%
No [b]	53.1%	49.7%	48.0%	47.2%
I Don't Know	1.3%	1.5%	1.6%	1.5%

[a] New options presented in 2020
[b] 2017-2019 respondents were stating "no" in response to having a dedicated person in charge of cybersecurity. For comparison purposes from 2020 onward, the sum of all responses other than having a dedicated position for cybersecurity have been calculated.

Figure 21: Cybersecurity Responsibility by Revenue, 2021 (n=294)



When organizations have a dedicated position responsible for cybersecurity, there are many options for where this position can reside within the organization. The percentage of CISOs (or equivalent) reporting to the CIO rebounded from a low in 2020 to an all-time high in 2021 (67%) with the percent reporting to CTOs remaining relatively flat at 9.7% (Table 12). The data suggest that approximately 73% of all organizations place cybersecurity within the IT function[4].

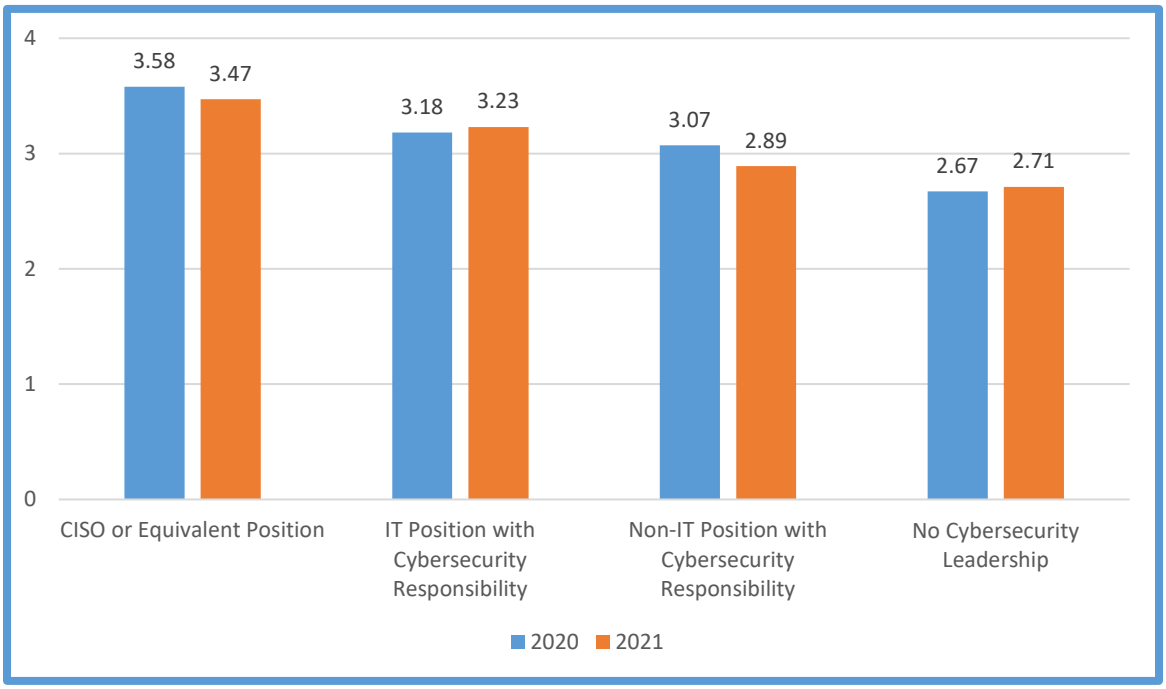
Table 12: To Whom Does the CISO (or Equivalent) Report? (2018-2021)

Position	% of Organizations			
	2018 (n=302)	2019 (n=256)	2020 (n=273)	2021 (n=206)
CIO (Information)	62.3%	62.9%	57.5%	67.0%
CEO/President	10.9%	12.1%	11.4%	7.8%
CTO (Technology)	7.3%	9.0%	9.9%	9.7%
Other	5.6%	4.3%	8.4%	7.8%
COO (Operating)	5.6%	4.7%	6.6%	4.9%
CFO/Treasurer/Finance	4.0%	2.0%	4.4%	1.9%
Board/Board Member	0.3%	3.5%	1.8%	1.0%
CLO (Legal)	2.3%	0.8%		
Internal Audit	1.0%	0.4%		
CCO (Compliance)	0.3%	0.0%		
CAO (Administrative)	0.3%	0.4%		

On a five-point scale ranging from "Not Ready" to "Extremely Ready", organizations reported an average cybersecurity readiness of 3.30 suggesting the typical organization believes it is "moderately ready" to address cybersecurity risks and threats. This value is in line with last year's reported readiness (3.32) and is slightly above the 2019 reported value (3.17). As was reported last year, readiness is correlated with cybersecurity leadership as shown in Figure 22.

[4] 76.9% of all organizations with a dedicated CISO report to the CIO or CTO. Since only 51.4% of organizations have dedicated CISOs, then 39.4% of all organizations have a dedicated CISO reporting to the CIO or CTO. 33.3% of all organizations reported having a non-dedicated cybersecurity position within the IT function so 72.7% (39.4 + 33.3) place cybersecurity within a technology function within the organization.

Figure 22: Average Cybersecurity Readiness, 2020 (n=541) vs. 2021 (n=397)



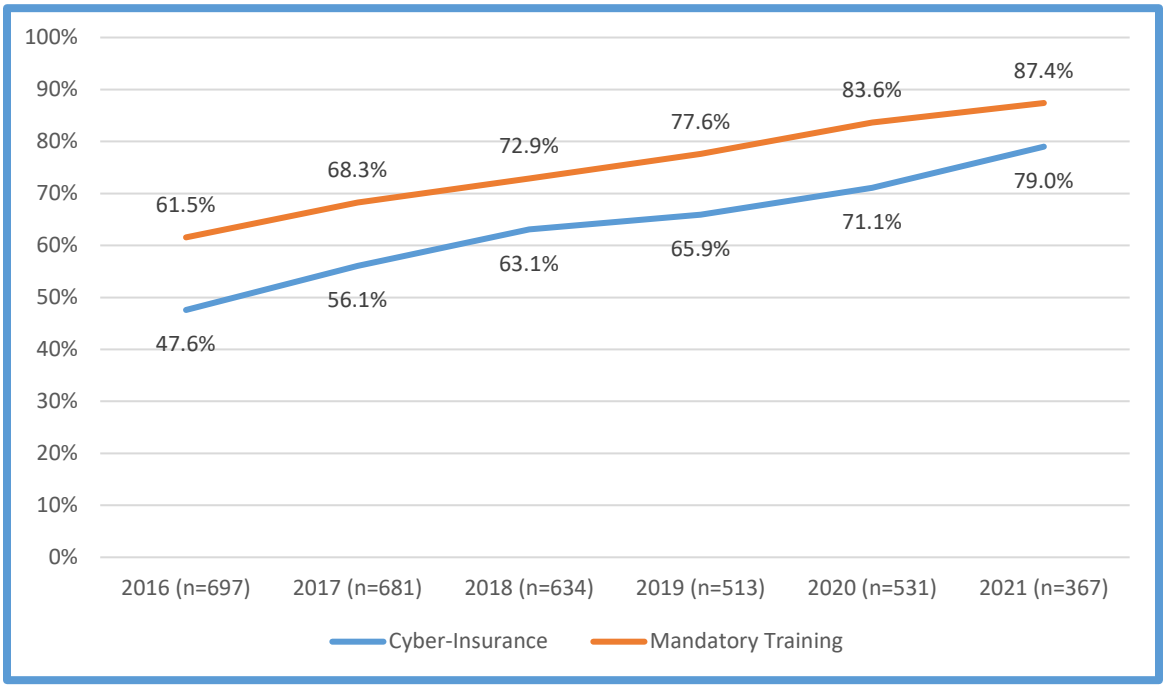
Some improvement was noted in the integration of cybersecurity into common business practices, particularly for IT procurement and business strategy (Table 13). The increase in cybersecurity involvement in procurement could reflect the need for purchasing new equipment and technologies to support a remote workforce in a way that does not introduce unnecessary risks to the organization. In terms of business strategy, again, the COVID-19 pandemic could have served as a wakeup call for business leaders to better incorporate risk management into overall strategic planning.

Table 13: Percentage of Organizations Considering Cybersecurity When Doing _____, 2017-2020

Business Process	2017	2018	2019	2020	2021
n (unique organizations)	668	627	501	527	389
IT Procurement/Purchasing	71.9%	75.3%	68.1%	76.3%	82.0%
Software/Systems Development	81.9%	82.0%	78.2%	83.1%	84.3%
IT Change Management (Hardware & Software)	78.3%	79.4%	73.9%	82.2%	81.0%
Developing Business Strategy	54.6%	51.8%	52.3%	53.9%	56.8%
Other	3.4%	4.0%	6.2%	3.8%	4.6%

Two areas that have shown significant improvement over the past five years are cyber-insurance and cybersecurity training. This trend continues for 2021, with more than 87% of organizations requiring cybersecurity training of all employees and almost 80% having some form of cyber-insurance (Figure 23).

Figure 23: Cyber Insurance and Cybersecurity Training. 2016-2021



In terms of the effectiveness of cybersecurity training programs, the average score in 2021 was 3.45 (between "Moderately Effective" and "Very Effective"). This is down slightly from 2020 (3.52) and essentially the same as in 2019 (3.46).

4. IT Performance Measurement

To evaluate how organizations assess the performance of their IT functions, respondents were asked to select up to five of the most important performance measures (from a list of 34) for internal IT, outsourced IT, and their personal performance.

4.1. Performance Measures for Internal and Outsourced IT.

As shown in Table 14, a total of 454 organizations provided input on performance measures for internal IT operations, while 282 reported on measures used to evaluate outsourced IT operations. The top ten measures for internal IT are similar to previous years, although the specific rankings have changed slightly. Cost Controls for IT were ranked third

last year and have dropped to fifth this year, signaling a slight shift away from focusing on budget measures as recovery from the pandemic continues. Overall, there is a solid balance between IT/operational, business-focused, and strategic measures for internal IT operations.

Table 14: Performance Measures for Internal and Outsourced IT, 2021

Focus	Performance Measure	Percentage Selecting	
		Internal IT (n=454)	Outsourced IT (n=282)
I	Availability / Up Time	1 (53.5%)	1 (46.1%)
I/B	Customer Satisfaction - Internal Users	2 (42.3%)	2 (27.3%)
I/B	Cyber-security Related	3 (28.9%)	6 (22.3%)
I	Help Desk Performance	4 (25.3%)	6 (22.3%)
I/B	Cost Control / Reduction - IT	5 (23.1%)	3 (24.5%)
S	Value of IT to the Business	6 (22%)	12 (9.9%)
I/B	IT Service Quality	7 (20%)	8 (20.2%)
I	Products Delivered - on Time	8 (18.5%)	4 (23%)
B	Customer Satisfaction - External Users	9 (17.6%)	11 (11.3%)
S	IT's Contribution to Strategy	10 (15.2%)	17 (6.4%)
B	Productivity Improvement - Business	11 (14.8%)	22 (5%)
I/B	IT Budget Compliance	12 (14.1%)	18 (6%)
I	Products Delivered - on Budget	13 (11.5%)	5 (22.7%)
B/S	Innovative New Ideas	14 (10.1%)	21 (5.3%)
I/B	IT Spending - as % of Revenue	15 (9.5%)	24 (2.8%)
B	Cost Control / Reduction - Business	16 (7.9%)	19 (5.7%)
S	Increases in New Products or Services	16 (7.9%)	14 (8.2%)
B	Improved Decision Making	18 (7.7%)	30 (1.1%)
I/B	Productivity Improvement - IT	19 (7.5%)	13 (8.5%)
I	IT Employee Retention	20 (6.6%)	26 (2.5%)
S	Revenue Growth	21 (5.5%)	26 (2.5%)
I	Time to Market - IT	21 (5.5%)	23 (4.3%)
B	Total Cost of Ownership	21 (5.5%)	15 (7.8%)
I	Headcount Reduction - IT	24 (5.1%)	19 (5.7%)
I	SLA Target Compliance	24 (5.1%)	9 (18.4%)
I	Software Quality / Defect Rates in Software	24 (5.1%)	10 (11.7%)
S	Profit Growth	27 (4.8%)	24 (2.8%)
B	Project Return on Investment	28 (4%)	16 (6.7%)
B	Time to Market - Business	29 (3.1%)	26 (2.5%)
-	NONE / No Measures are Used	30 (2.6%)	29 (2.1%)
B	Headcount Reduction - Business	31 (1.8%)	30 (1.1%)
S	Return on Equity	32 (1.5%)	30 (1.1%)
I	IT Spending - per Employee	33 (1.1%)	33 (0.7%)
B	Customer Satisfaction - External Suppliers	34 (0%)	34 (0%)

Focus: I=IT, B=Business Operations, S=Strategic

Looking at performance measures for outsourced IT, seven of the top ten also appeared in the top ten for internal IT. The three unique performance measures in the top ten for outsourced IT all relate to commonly outsourced services, such as IT project management, software quality, and service level agreement (SLA) compliance.

4.2. Performance Measures for CIOs.

To get a better sense of how CIOs are evaluated for their personal performance, the responses from 283 CIOs who provided input were examined (170 of whom also responded in relation to their outsourced IT operations). Table 15 displays the rankings of performance measures used for CIO personal performance, internal IT, and outsourced IT.

Table 15: Performance Measures for CIOs and Internal and Outsourced IT, 2019-2021

Focus	Performance Measures	Ranking								
		My Personal Performance			Internal IT			Outsourced IT		
	Year	2019	2020	2021	2019	2020	2021	2019	2020	2021
	n (CIOs)	376	345	283	376	345	283	252	225	170
I/B	Customer/User Satisfaction (Internal Users)	1	1	1	2	2	2	2	3	2
S	Value of IT to the Business	2	2	2	5	6	6	13	13	11
S	IT's Contribution to Strategy	3	3	3	10	13	10	22	24	15
I	Availability/Up Time	4	6	4	1	1	1	1	1	1
I/B	Cybersecurity Related	7	5	5	3	5	3	7	6	3
B/S	Innovative New Ideas	5	10	6	12	14	12	18	21	19
I/B	Cost Control/Reduction (IT)	6	4	7	7	4	5	4	2	8
B	Customer/User Satisfaction (External Users)	11	8	8	9	7	10	15	10	10
I/B	IT Service Quality	12	16	9	8	9	6	6	7	7
I/B	IT Budget Compliance	8	7	10	14	12	13	16	15	17
B	Productivity Improvements (Business)	10	9	11	11	10	8	10	17	24
B	Improved Decision Making	13	12	11	16	16	19	25	29	28
I	Projects Delivered on Time	9	11	13	6	8	8	3	9	4
I	Help Desk Performance	14	13	14	4	3	4	9	4	6
I/B	IT Spending as % of Revenue	18	14	14	18	14	17	30	20	23
S	Increases in New Products or Services	17	17	14	20	18	15	19	26	13
I	Projects Delivered on Budget	15	15	17	13	11	13	5	7	5
I	IT Employee Retention	22	22	17	28	28	24	32	31	28
S	Profit Growth	20	19	19	27	25	21	25	31	25
B	Cost Control/Reduction (Business)	16	18	20	15	17	16	16	16	19
S	Revenue Growth	21	24	20	19	19	20	28	29	25
B	Project Return on Investment	25	23	22	25	25	24	21	19	17
B	Total Cost of Ownership	19	19	23	17	19	27	12	11	15
I/B	Productivity Improvements (IT)	23	21	23	22	22	17	14	17	13
S	Return on Equity	28	25	25	32	33	31	30	26	33

I	SLA Target Compliance	26	27	26	21	22	22	8	5	9
I	Time to Market (IT)	23	29	26	23	28	26	19	21	21
B	Time to Market (Business)	26	26	28	25	22	27	22	24	25
I/B	Headcount Reduction (IT)	29	29	29	29	27	30	25	13	21
-	NONE/No Measures are Used	31	31	29	30	30	27	24	21	28
I	Software Quality/Defect Rates	29	27	31	24	19	22	10	11	12
I/B	IT Spending per Employee	32	32	31	33	30	33	29	33	31
B	Headcount Reduction (Business)	32	33	33	30	30	31	32	28	31
B/S	Customer/User Satisfaction (External Suppliers) [b]	34	34	34	34	34	34	34	34	34

Focus: I=IT, B=Business Operations, S=Strategic

CIO performance criteria remain relatively stable, including the greater emphasis on strategic-focused measures when compared to internal and outsourced IT. However, for the first time in 2021, IT Service Quality emerged in the top ten for CIOs and Innovative New Ideas" jumped from 10th to sixth. These changes may indicate that organizations are taking a macro-level approach to evaluating overall IT service delivery and rewarding creative solutions to the complex problems that organizations face.

5. CIO Tenure, Reporting, Background, and Activities

The average age of the 211 CIOs who responded to this question was 52.2 (standard deviation of 7.8 and median of 53). 79.5% of them were male, down significantly from 83.7% in 2020. As shown in Figure 24, average tenure as the top IT person decreased to 6.0 years in 2021 from 6.3 years in 2020 (standard deviation of 6 years and median of 4 years). Over 27.7% of the responding CIOs have been in their position for seven years or more, while 44.3% have had their position for three years or less.

Figure 24: Average Job Tenure of CIOs, 2012-2021

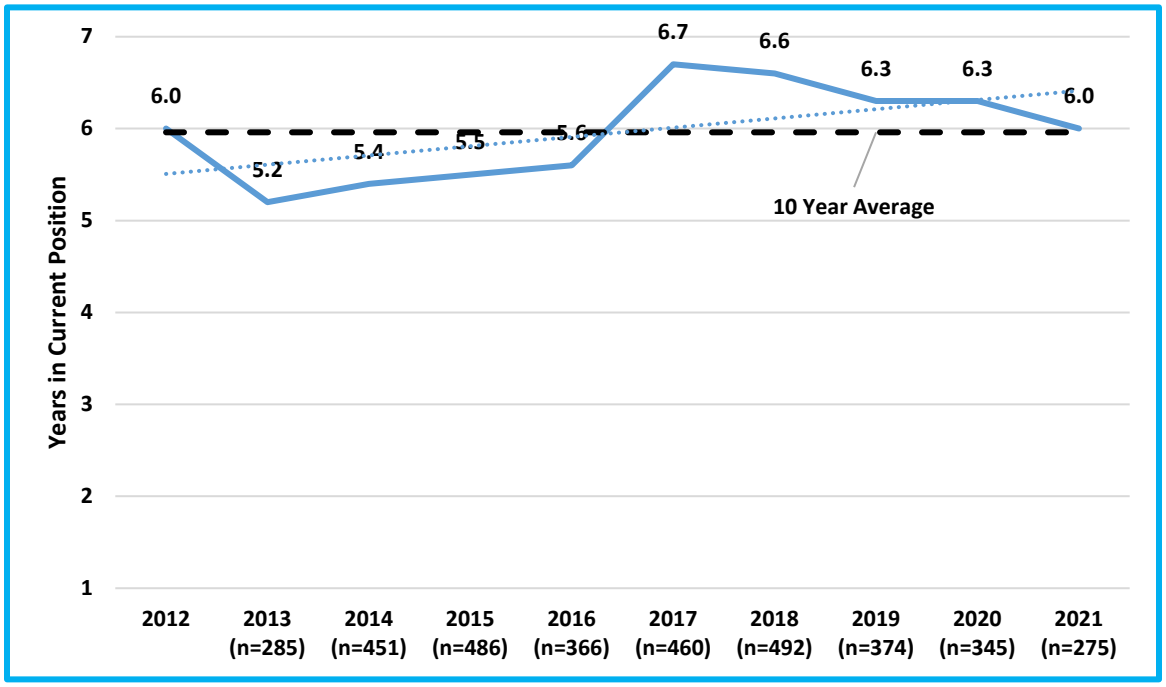


Table 16 shows CIO reporting relationships over the past decade and indicates that in 2021 87.5% reported to CEOs, CFOs, or COOs. This is down from 90.9% in 2020 but drop was all in those reporting to their CFO. The number of CIOs reporting to CFOs decreased to a new 10-year low from 26.3% in 2020 to 22.6% in 2021. Figure 25 displays the data from Table 16 graphically.

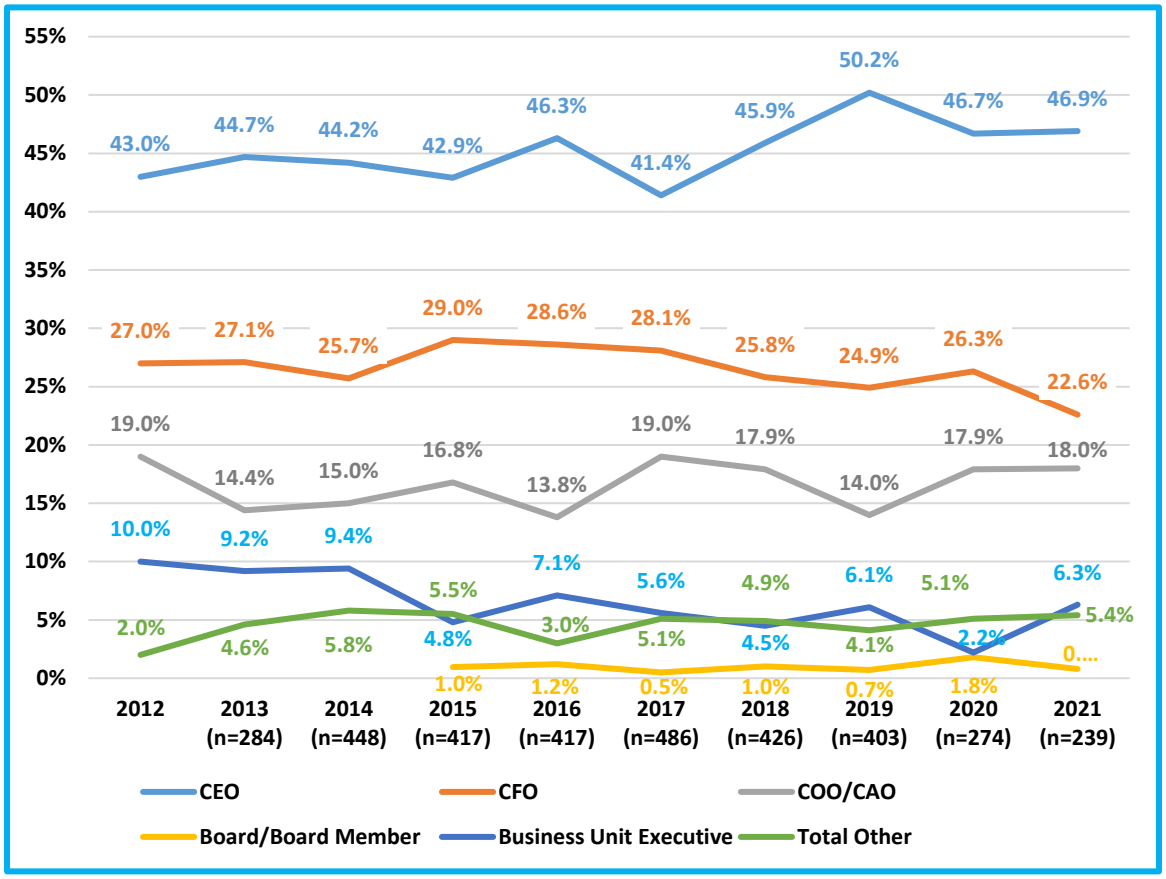
Table 16: To Whom Does the CIO Report, by Percentage of Respondents, 2012-2021

Entity to Whom CIO Reports [a]	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	AVG
n (unique organizations)	239	274	403	426	486	417	417	448	284		
CEO	46.9%	46.7%	50.2%	45.9%	41.4%	46.3%	42.9%	44.2%	44.7%	43.0%	45.2%
CFO	22.6%	26.3%	24.9%	25.8%	28.1%	28.6%	29.0%	25.7%	27.1%	27.0%	26.5%
COO/CAO	18.0%	17.9%	14.0%	17.9%	19.0%	13.8%	16.8%	15.0%	14.4%	19.0%	16.6%
Board/Board Member	0.8%	1.8%	0.7%	1.0%	0.5%	1.2%	1.0%				1.0%
Business Unit Executive	6.3%	2.2%	6.1%	4.5%	5.6%	7.1%	4.8%	9.4%	9.2%	10.0%	6.5%
Other (IT)[b]	2.9%	1.8%	1.7%	0.7%	1.3%	3.0%	5.5%	5.8%	4.6%	2.0%	2.9%
Other (non-IT)[b]	2.5%	3.3%	2.4%	4.2%	3.8%						3.2%
Total Other	5.4%	5.1%	4.1%	4.9%	5.1%	3.0%	5.5%	5.8%	4.6%	2.0%	4.6%

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

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

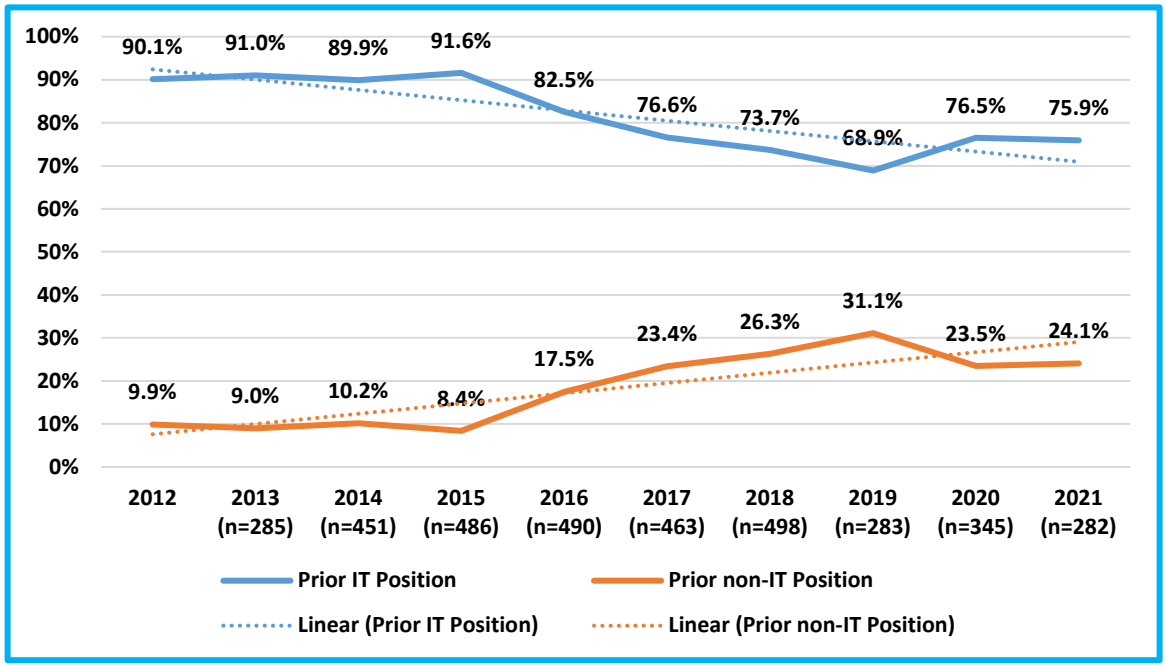
Figure 25: To Whom Does the CIO Report, 2012-2021



5.1. CIO Previous Employment.

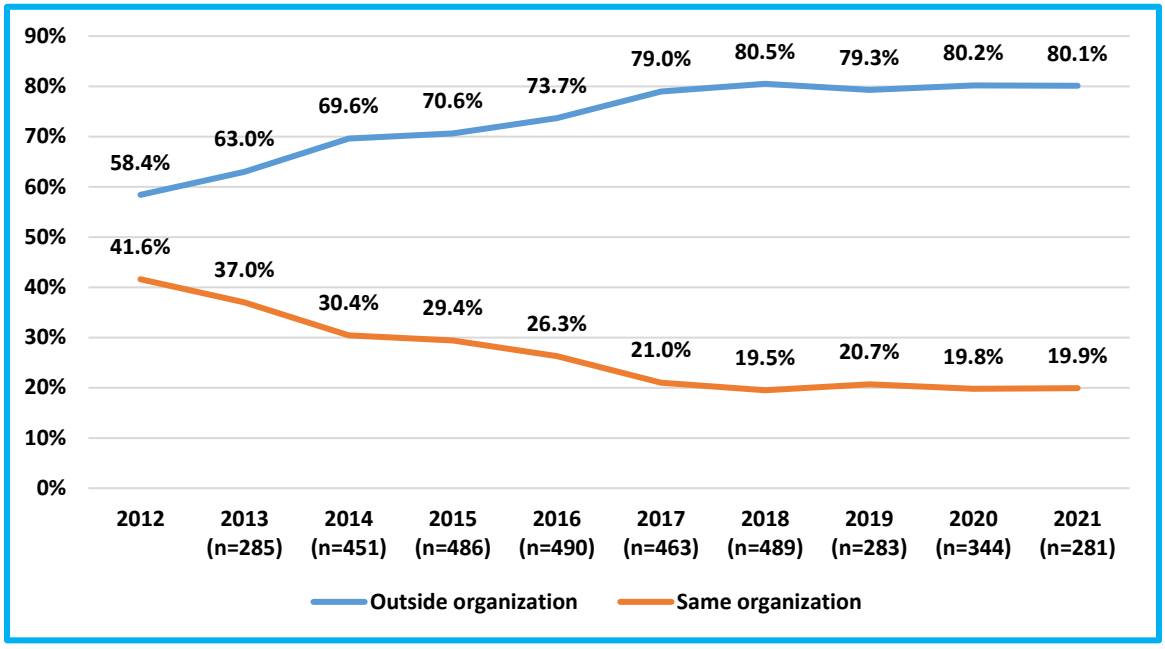
CIOs coming from prior IT positions declined slightly in 2021 to 75.9% from 76.5% in 2020, still higher than the 2019 low of 68.9% (Figure 26). CIOs coming from outside of IT rose to 24.1% in 2021.

Figure 26: CIOs Prior Position – IT versus Non-IT, 2012-2021



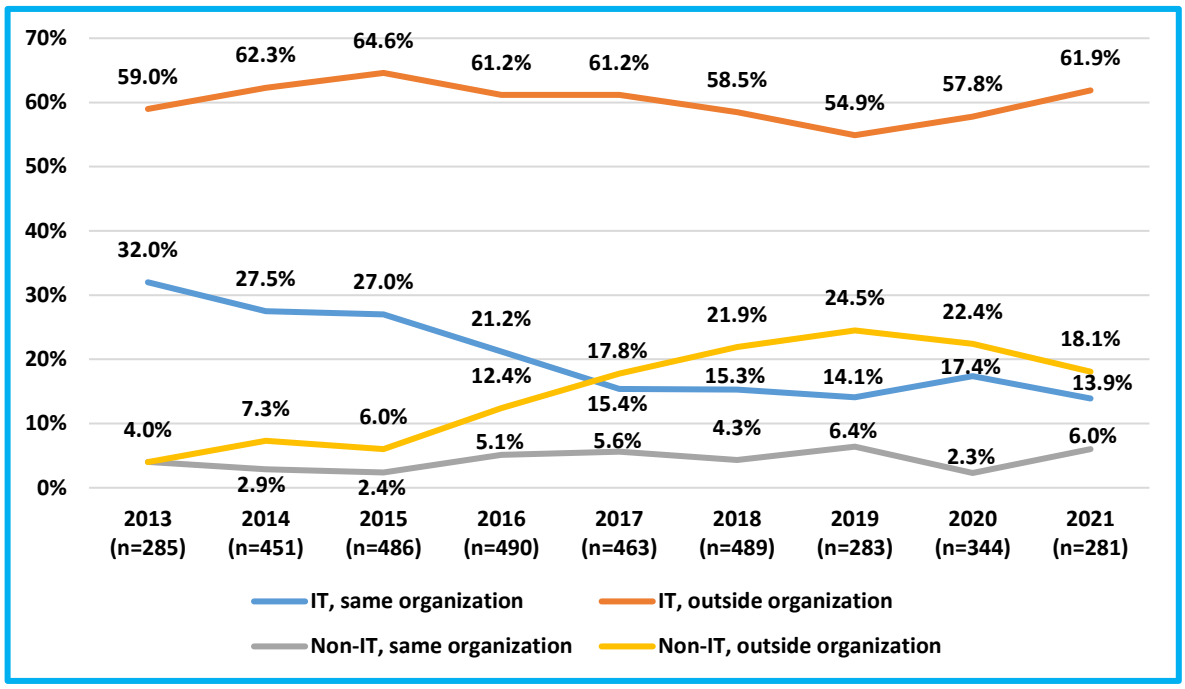
As shown in Figure 27, the percentage of CIOs coming from outside organizations has remained fairly flat since 2017. In 2021, 80.1% of CIOs came from outside their current organizations, similar to 80.2% reported in 2020.

Figure 27: CIOs Prior Position – Outside versus Within Current Organization, 2012-2021



In 2021, the number of CIOs coming from IT roles outside their current organizations increased from 57.8% in 2020 to 61.9% in 2021 (Figure 28). However, the percent of CIOs moving up from IT roles within their current organization fell from 17.4% to 13.9%. CIOs coming from non-IT positions outside their current organizations fell significantly in 2021 from 22.4% to 18.1%, while the percentage of non-IT CIOs coming from within their current organizations increased to 6.0% in 2021. Overall, over 80% of CIOs in 2021 came to their current position from other organizations.

Figure 28: CIO Prior Employment, 2013-2021



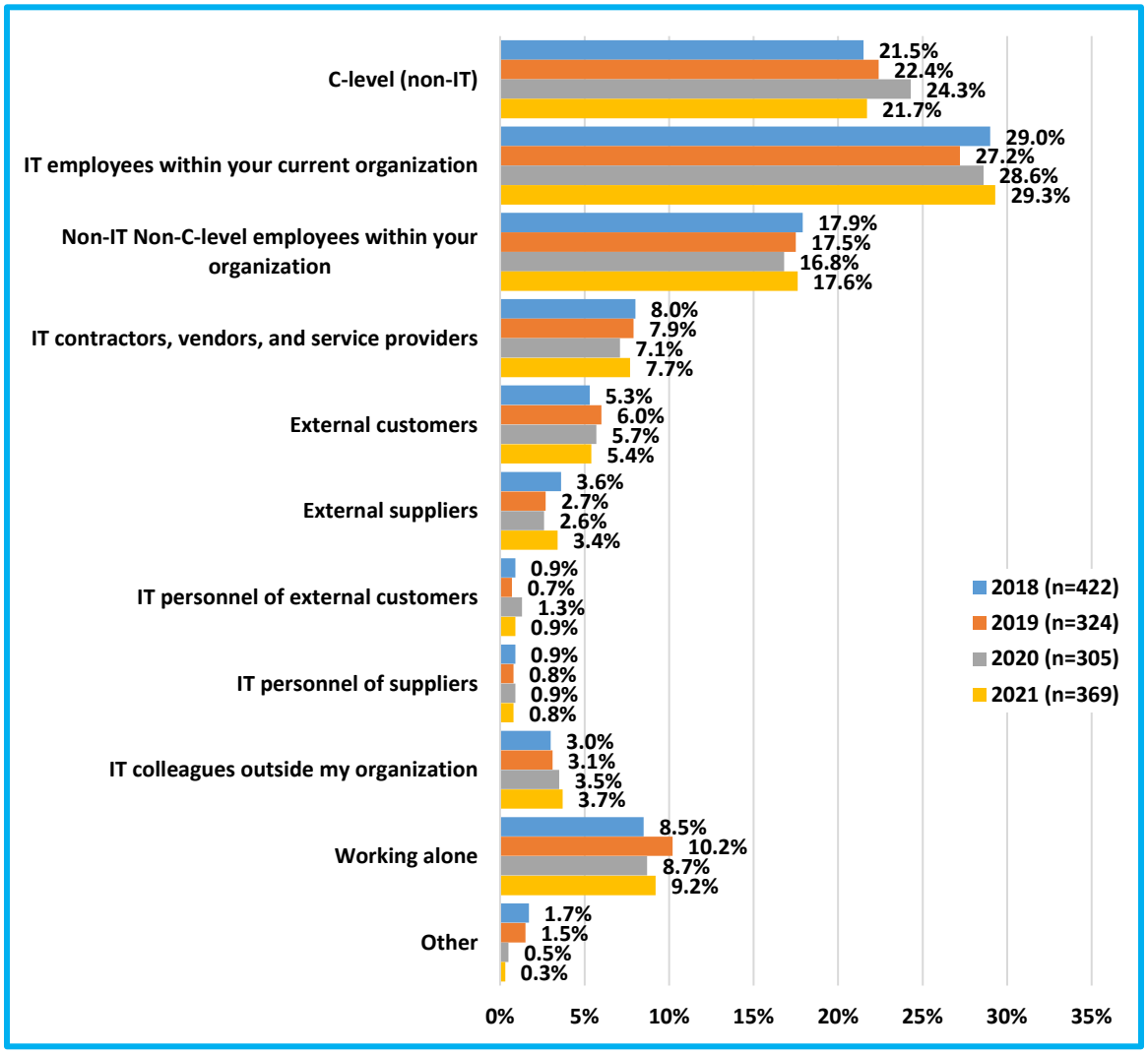
5.2. With Whom CIOs Spend their Time.

The job of the CIO is complex and involves interaction with people both inside and outside the organization. Figure 29 shows the average percentage of a CIO's time spent with different groups of people.

On average, the 369 responding CIOs spent more than three times more time with people in their own organization than with those from other organizations (68.6% vs. 21.9%). The percentage of time spent with non-IT C-level colleagues fell from 24.3% in 2020 to 21.7% in 2021 ending a three-year increasing trend. While time spent with individuals in other categories remained relatively flat over the past four years, the time spent with external IT colleagues increased gradually. The time spent with IT employees within their own

organization increased from 28.6% to a 4-year high of 29.3% in 2021, and the time spent with non-IT non-C-level employees within their current organization increased from 16.8% to 17.6%.

Figure 29: Average Percentage of CIO Time Spent Interacting with _____, 2018-2021



CIOs 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 17 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 2020 and 2021 in at-least-weekly interactions.

There was a significant increase in the amount of time spent with the CTO (10.7%) and a 17.7% decrease in time spent with the board of directors. Also, there was an increase of 8.9% in time spent with the CAO and time spent with the CEO decreased by 4.0%. Time with the CFO, CMO, and CLO all decreased to 7.7%, 7.7%, and 10.7% respectively.

Table 17: Percentage of CIOs Interacting with C-level Peers, by Frequency, 2015-2021

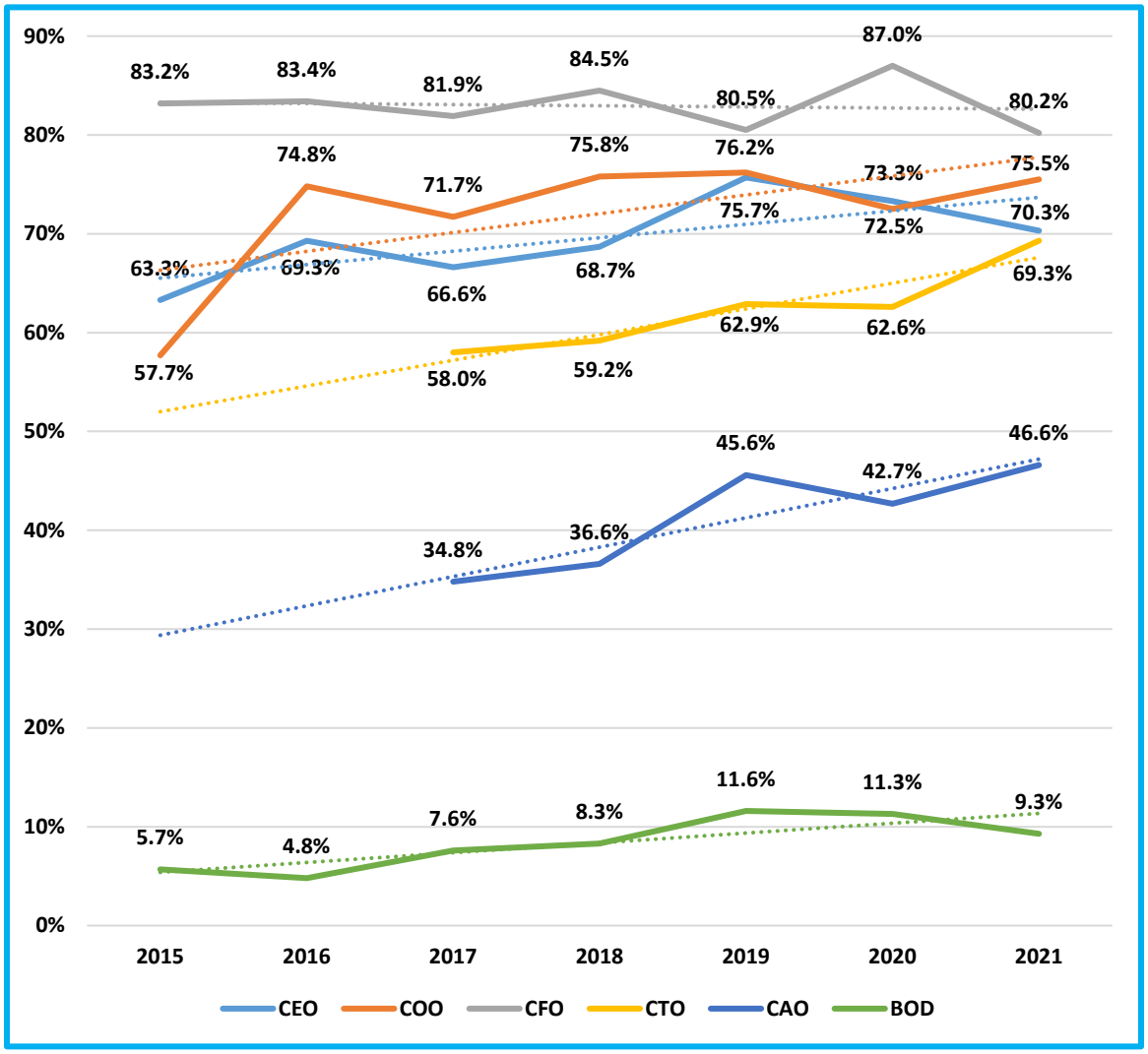
	Year	Daily	Weekly	At least weekly	% Change 2020-21	Monthly	Quarterly	Annually	None	n
CEO	2015	20.1%	43.5%	63.6%	-4.0%	24.6%	7.3%	1.2%	3.3%	423
	2016	25.2%	44.1%	69.3%		19.3%	7.9%	2.2%	1.2%	404
	2017	24.4%	42.2%	66.6%		20.9%	8.5%	1.5%	2.5%	398
	2018	25.4%	43.3%	68.7%		21.5%	6.0%	1.8%	2.1%	386
	2019	29.8%	45.9%	75.7%		15.4%	6.2%	0.7%	2.0%	305
	2020	29.2%	44.0%	73.3%		18.8%	6.5%	0.4%	1.1%	277
	2021	22.7%	47.6%	70.3%		18.2%	8.0%	1.3%	2.2%	225
COO	2015	22.0%	35.7%	57.7%	4.1%	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
	2019	31.4%	44.8%	76.2%		10.7%	2.7%	0.8%	9.6%	261
	2020	29.6%	42.9%	72.5%		16.2%	2.0%	0.8%	8.5%	247
	2021	28.1%	47.4%	75.5%		12.0%	1.0%	0.0%	11.5%	192
CFO	2015	31.0%	52.2%	83.2%	-7.7%	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
	2019	30.9%	49.7%	80.5%		14.1%	3.0%	0.7%	1.7%	298
	2020	32.3%	54.6%	87.0%		10.4%	1.1%	0.0%	1.5%	269
	2021	23.0%	57.2%	80.2%		13.5%	3.6%	0.9%	1.8%	222
CTO	2017	44.7%	13.2%	58.0%	10.7%	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
	2019	46.0%	16.6%	62.9%		8.5%	0.9%	0.9%	27.0%	211
	2020	42.6%	20.0%	62.6%		5.1%	0.5%	0.0%	31.8%	195
	2021	49.3%	20.0%	69.3%		4.0%	3.3%	0.0%	23.3%	150
CAO	2017	16.7%	18.0%	34.8%	8.9%	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
	2019	19.0%	26.7%	45.6%		6.7%	1.5%	0.0%	46.2%	195
	2020	14.0%	28.7%	42.7%		10.1%	1.1%	0.6%	45.5%	178
	2021	11.6%	34.9%	46.6%		7.5%	6.8%	1.4%	37.7%	146
CMO	2015	13.5%	30.0%	43.5%	-7.7%	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
	2019	20.2%	36.0%	56.2%		22.9%	3.1%	1.6%	16.3%	258
	2020	13.6%	42.4%	56.0%		21.0%	5.3%	0.0%	17.7%	243
	2021	13.8%	37.9%	51.7%		22.6%	7.2%	2.1%	16.4%	195
CLO	2015	3.8%	25.5%	29.3%	-10.7%	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
	2019	9.3%	30.8%	40.1%		23.1%	9.7%	5.3%	21.9%	247
	2020	7.9%	38.8%	46.7%		20.3%	11.9%	5.3%	15.9%	227
	2021	6.8%	34.9%	41.7%		27.1%	12.0%	3.6%	15.6%	192

BOD	2015	1.9%	3.8%	5.7%	-17.7%	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
	2019	6.6%	5.0%	11.6%		16.6%	33.4%	16.2%	22.2%	302
	2020	1.1%	10.2%	11.3%		14.3%	34.7%	16.2%	23.4%	265
	2021	2.3%	7.0%	9.3%		16.3%	32.6%	20.0%	21.9%	215
Single board member	2015	3.1%	7.6%	10.7%	-8.0%	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
	2019	3.2%	8.1%	11.3%		16.9%	23.0%	15.7%	33.1%	248
	2020	2.6%	6.1%	8.8%		15.4%	21.1%	15.8%	39.9%	228
	2021	1.6%	6.4%	8.0%		16.0%	21.4%	17.1%	37.4%	187
HR	2018	16.2%	51.4%	67.6%	-4.2%	24.9%	4.3%	0.5%	2.7%	370
	2019	15.7%	48.1%	63.9%		26.6%	4.4%	0.7%	4.4%	293
	2020	15.6%	52.8%	68.4%		25.3%	3.7%	0.7%	1.9%	269
	2021	10.6%	54.9%	65.5%		23.5%	6.6%	0.4%	4.0%	226

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

Figure 30 illustrates that the 70.3% of CIO meeting "at least weekly" with their CEO in 2021 continues the trend downward from the 2019 high of 75.7%. Similarly, the percent of CIOs meeting at least weekly with their CFO dropped in 2021 to a 7-year low of 80.2%. after reaching a 7-year high in 2020 of 87.0%, "At least weekly" interactions with COOs, CAOs, and CTOs all increased quite sharply to 75.5%, 46.6%, and 69.3% respectively. However, the time spent with the Board of Directors continued to decline since its 2019 high.

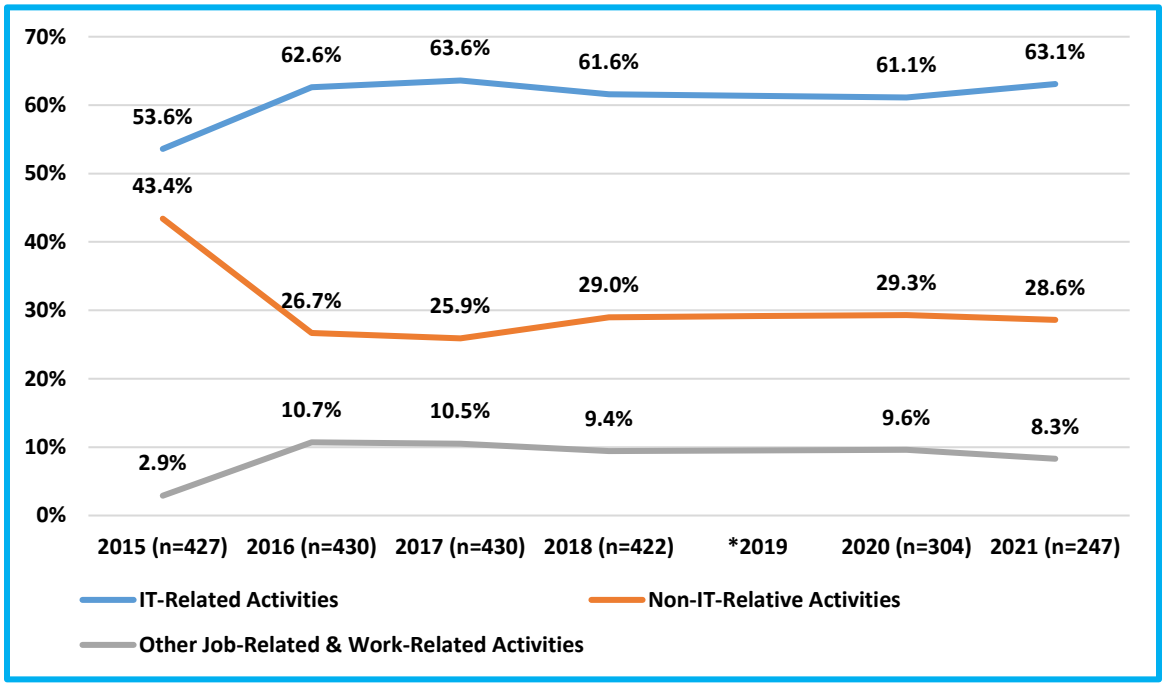
Figure 30: Trends in "at least weekly" C-level Interaction, 2015-2021



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. While there were significant changes in how CIOs allocated time across these three categories in 2015 and 2016, allocations from 2017 to 2021 have remained somewhat flat (Figure 31). Percentage of CIO time allocated to IT-Related activities increased from 61.1% in 2020 to 63.1% in 2021, while time allocated to Non-IT-Related activities fell slightly from 29.3% into 2020 to 28.6%. Similarly, the change in Other Job and Work-Related Activities also decreased from 9.6% in 2020 to 8.3% in 2021.

Figure 31: How CIOs Spend their Time, 2015-2021



* Value not measured for 2019

Separate activity lists were then provided for each of the three categories and respondents were asked to indicate the top three areas where they spend their time. As shown in Table 18, IT Priorities and Strategy remains the top priority IT-Related activity by far and Evangelist for IT and Innovation for IT round out the top 3.

Table 18: IT Areas where CIOs Spend their Time

IT Activities	2021 (n=242)	2020 (n=295)	2018 (n=369)	2017 (n=430)	2016 (n=430)
IT priorities / strategy	1 (74.4%)	1	1	1	1
Evangelist for IT	2 (36.8%)	3	6	3	2
Innovation for IT	3 (34.3%)	2	3	4	4
Project Management	4 (29.8%)	5	2	5	3
IT governance	5 (26.9%)	4	5	2	6
Resource allocation / budgeting	6 (21.5%)	6	10	10	10
IT operations / facilities management	7 (19.8%)	7	4	6	5
IT vendor management	8 (16.1%)	8	9	9	7
IT architecture	9 (14.0%)	9	7	7	8
IT HR and talent management	10 (12.0%)	10	8	8	9
Technical research	11 (7.0%)	11	11	11	11
Software development	12 (6.2%)	12	12	12	12
* 2016-18 were measured by individual time allocations (%)					

As illustrated in Table 19, for the second consecutive year, Organizational Priorities and Strategy remains the most commonly cited Non-IT Business area in which CIOs spend their time, an issue that has been present in the top four since 2016 when it was first added. Knowing the needs of internal IT customers as well as Managing organizational change moved into the number two and three positions, respectively.

Table 19: Non-IT Business Areas where CIOs Spend their Time

Business (Non-IT) Activities	2021 (n=235)	2020 (n=291)	2018 (n=369)	2017 (n=430)	2016 (n=427)
Organizational priorities / strategy	1 (63.0%)	1	3	3	3
Knowing the needs of internal IT customers	2 (58.3%)	2	1	1	1
Managing organizational change	3 (54.0%)	4	4	4	4
Knowing the needs of customers of the organization	4 (47.2%)	3	2	2	2
Organization or business innovation	5 (32.3%)	5	6	6	5
Evangelist for the organization	6 (25.5%)	6	5	5	6
Organizational research	7 (6.4%)	9	9	9	9
Knowing the needs of vendors and suppliers of the organization	8 (6.0%)	8	8	7	8
Organization architecture	9 (3.8%)	7	7	8	7
* 2016-18 were measured by individual time allocations (%)					

6. Summary and Conclusions

Every year since 2013, data collection for the SIM IT Issues and Trends Study begins in early April and continues for nine weeks until early June, so the effects of the pandemic in 2020 on IT management practices were still in their early stages when responses came in. In 2021's 41st anniversary study, there appears to be somewhat of a reversal of some of the changes associated with the onset of the COVID-19 pandemic that began in February 2020. Nevertheless, many trends remained fairly stable despite the pandemic and some changes exacerbated by COVID appear to be more lasting, at least for now.

In 2020 and 2021, the top five IT management issues for organizations were: Cybersecurity, Alignment, Analytics, Digital Transformation and Compliance & Regulations (Table 1). The top two issues keeping IT leaders "up at night" matched the top two organization concerns (Cybersecurity and Alignment), with the IT Skills Shortage, IT Leadership's Creditability and Business Continuity ranking 3rd, 4th and 5th (Table 2). The largest five IT investments in 2021 were similar to 2020: Cloud, Cybersecurity, Analytics, Application Development and ERP, which pushed CRM to sixth in 2021 (Table 4). However, when asked which technologies should get more investment or are most personally

worrisome, the top five look quite different (Table 5). The three most difficult to find IT Technical Skills in 2021 were Cybersecurity, Analytics and AI (Table 6)

IT spending as a percentage of organization revenue in 2021 was 5.7%, down from 2020's 6.9% which was the highest figure in 10 years and 27% higher than 2019's 5.4% (Figure 2). It is likely that pandemic-induced revenue reductions and spending increases accounted for much of 2020's percentage increase, given that IT budgets increased by only 2.9% on average between 2019 and 2020. The percentage of organizations increasing or decreasing their IT spending appears to be normalizing too (Figure 3). The percentage of IT budgets spent on Cloud continues to increase and averaged 18.2% in 2021 (Table 9), with smaller organizations spending relatively more (Figure 4), and the use of Cloud continues to increase on average (Figures 11 and 12).

Most organizations reported increases in both IT headcount and salaries in 2021 and both appear to be returning to their pre-COVID upward trends (Figures 6 and 7). Average IT employee turnover in 2021 returned to 2017's 7.3% level after three years above 8.0% (Figure 8). Cybersecurity continues to be a source of concern for most organizations (Tables 1, 2, 3, 4, 5, and 6), yet only 51.4% of organizations report having a single dedicated person in charge of it (Table 11). Although, organizations with revenue greater than $500 million fare better and it is not surprising that those with revenue of $50 million or less fare worse. Nevertheless, the percentage of organizations requiring cybersecurity training for all employees increased by 42.1% between 2016 and 2021 (Figure 23).

The average job tenure of the CIOs who participated in this study is six years and has been trending downward since a 2017 high of 6.7 years (Figure 24). Almost 47% report to their CEO, 22.6% to their CFO (a ten-year low) and 18.0% to their COO (Table 16 and Figure 25). In terms of assessing CIO performance, the most used criteria are Internal User Satisfaction, IT's Business Value, IT's Contribution to Strategy, IT Uptime/Availability and Cybersecurity (Table 15).

Between 2015 and 2019, there was a steady decrease in the percentage of CIOs who came from an IT background (from 91.6% to 68.9%). But that changed in 2020 and was at 75.9% in 2021 (Figure 26). Strangely, 80.1% of CIOs are recruited from other organization, up by more than 37% since 2012 (Figure 27). Yet less than one-seventh of organizations (13.9%) apparently believed they had internal IT talent worthy of promotion to the top IT position (Figure 28). The resulting CIO "musical chairs" between organizations likely accounts for the decrease in CIO tenure (Figure 24) and makes it hard to build organizational loyalty if talented mid-level IT managers feel that they must leave their current organizations to advance their careers. This is an issue worthy of management attention and further research.

Undoubtedly, the job of the CIO is increasingly complex and the COVID pandemic exacerbated the situation. At the same time, COVID also provided IT leaders with an opportunity to shine, at least in part, thanks to their concern over the past seven years for

overall IT Agility and Business Continuity (Table 2), despite the latter not being a top-ten concern to their organizations (Table 1). The need for CIOs to have a wide range of operational, organizational and strategic management capabilities (Table 15), in addition to significant people skills (Tables 16 and 17, Figure 29), arguably makes the job of CIO the most challenging in any organization. Nevertheless, the data from SIM's IT Trends Study indicates that many CIOs are successful at it and highly valued members of their top management teams.

Special Section

Readiness, Response, & Effects of the COVID Pandemic

In 2020, IT Trends Study data were collected in the early stages of the COVID-19 pandemic. More than a year into the pandemic, the 2021 questionnaire asked respondents to look back on their handling of the COVID-19 situation, to look forward to evaluate their preparedness for future disruptions, and to identify what, if any, operational changes were likely to remain.

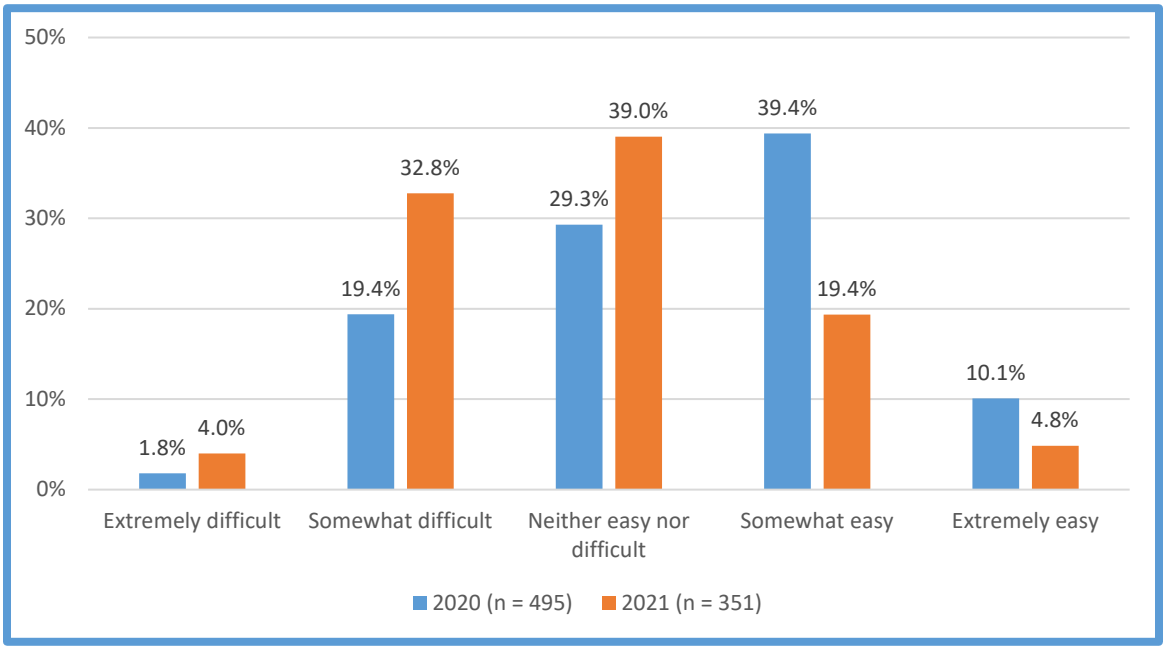
Looking Back

In the 2021 sample, only 65.7% of organizations had a continuity plan prior to 2020 (n = 382). Of the 34.3% of organizations that did not, 22.9% reported that they have a documented continuity plan, indicating that around 73.6% of organizations now have a formal plan in place.

When asked to what extent their organization was prepared to handle disruptions to operations prior to the beginning of the pandemic in 2020 (from extremely unprepared (1) to extremely prepared (5)), the average response was a 3.66 (n = 508). In 2021, the same question was asked and respondents were slightly less optimistic resulting in an average value of 3.55 (n = 360). The same trend was observed regarding to the readiness of IT infrastructure to handle the demands of a remote workforce: the average fell from 4.34 in 2020 (n = 507) to 4.19 in 2021 (n = 362). Note that this does not necessarily imply that organizations were less prepared in 2021 than in 2020. The differences noted between these two years could be attributed to some year-over-year sample variance and/or indicate a viewpoint influenced by respondents having lived with the effects of COVID for more than a year and thus may be more aware about their organization's pre- and post-pandemic preparedness. However, they are also more aware of what "preparedness" means and may have "raised the bar" on such assessments.

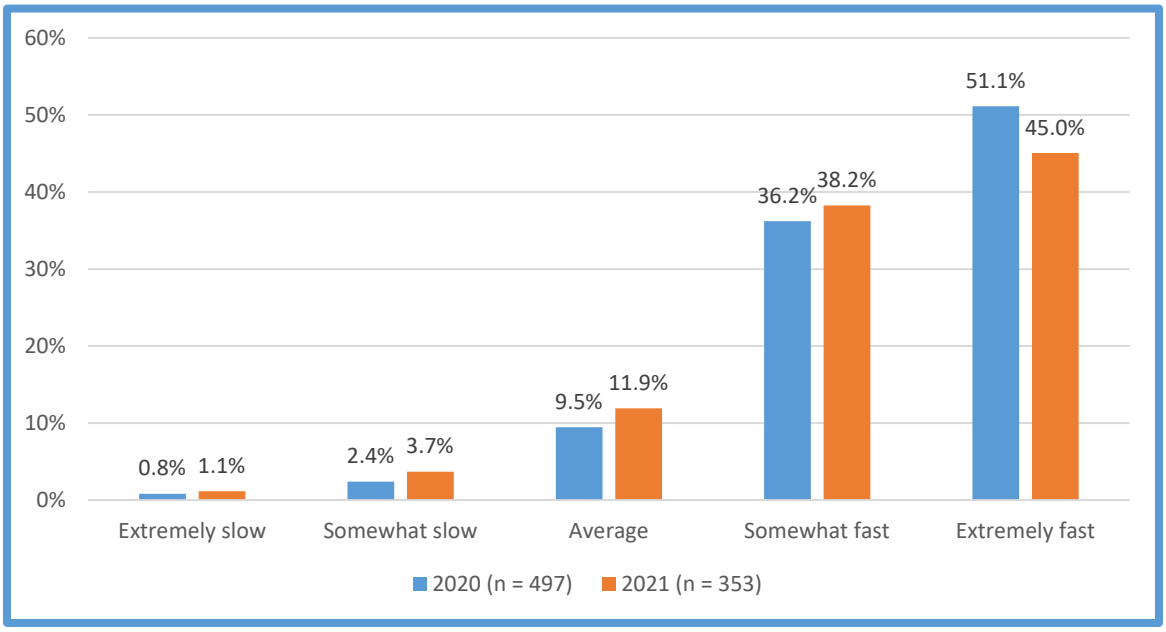
Another finding consistent with this notion of various biases in pre- and post-event assessments, organizations in the 2021 sample certainly reported having greater challenges during the pandemic. While almost 50% of respondents claimed that maintaining their business operations was Somewhat or Extremely Easy in 2020, this percentage dropped to under 25% in 2021 (Figure 32).

Figure 32: Maintaining Business Operations During COVID-19 Has Been ___. 2020 vs. 2021



In terms of the response time in implementing changes to deal with COVID-19, 2021 was more similar to 2020 in that 87.3% reported Somewhat or Extremely Fast implementation in 2020 compared to 83.3% in 2021 (Figure 33).

Figure 33: The Speed by Which Our Organization Implemented Changes in Response to COVID-19 Was… 2020 vs. 2021



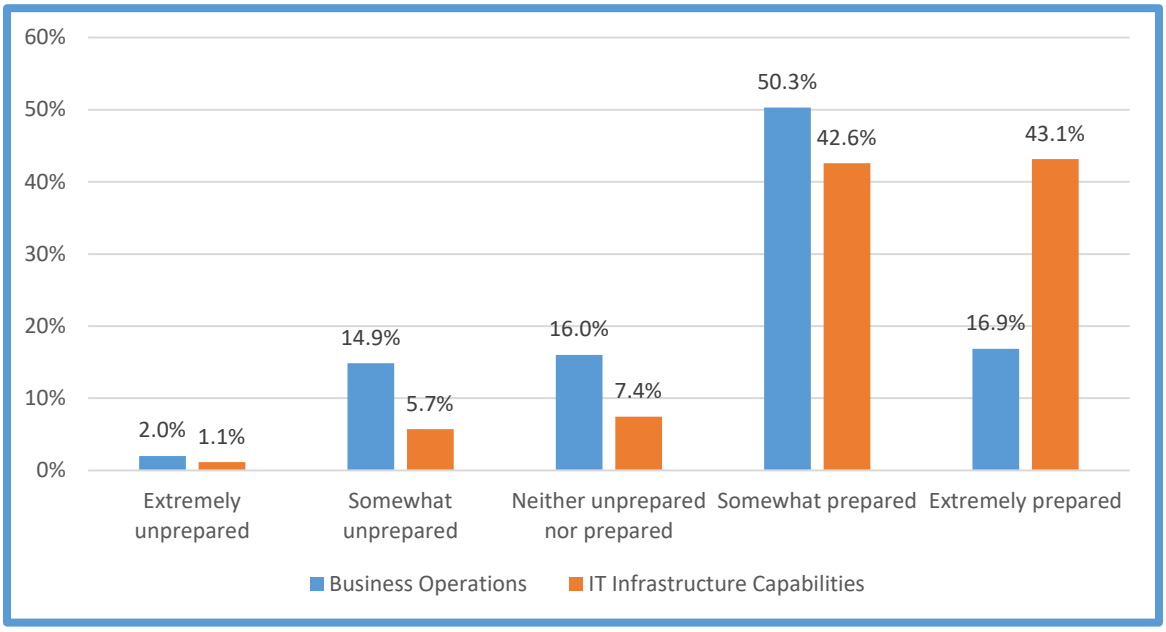
Among the myriad challenges posed by global shutdowns, disruptions to supply chains have been prominently reported across many industries. However, respondents in our sample did not report significant pains associated with supply chain disruptions. On a 1-5 scale asking the extent to which supply chains were impacted ranging from "None at all" to "A Great Deal", the average score was 3.02 up only slightly from 2.96 one year ago. This corresponds to "A Moderate Amount" suggesting that while supply chains have been affected, the overall impact was reasonably manageable. To further support this, respondents averaged a 2.60 on the same scale when asked whether they would be implementing new changes to their supply chain management in the future. As such, the typical organization is planning only minor updates to their supply chain practices going forward.

While many industry sectors employed "essential workers" that did not have the ability to perform their job duties remotely, other industries shut down their offices and employed a remote workforce throughout the pandemic. Prior to the pandemic, organizations averaged 14.9% of their FTEs in a remote work arrangement (n = 393). During the pandemic, this percentage unsurprisingly jumped to 75.3% (n = 390). The median value was 90% showing that at least half of the entire sample operated with an almost completely remote workforce.

Looking Ahead

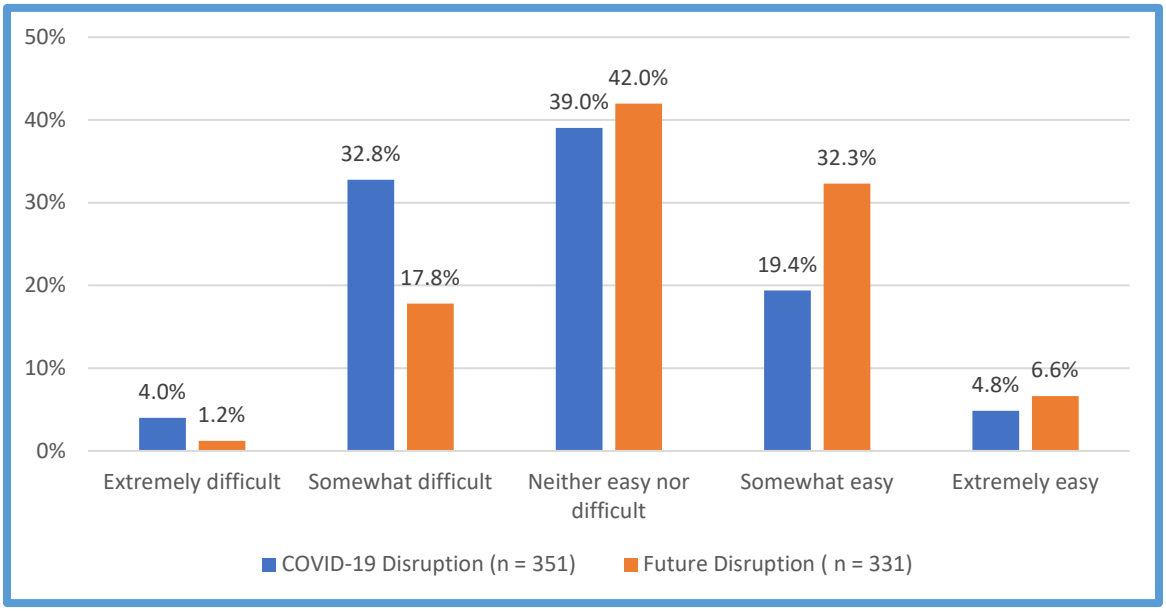
When asked to opine on their organization's preparations to face another major disruption to normal operations, respondents were quite pragmatic. On a 1-5 scale ranging from "Extremely Unprepared" to "Extremely Prepared" the average score was a 3.65 (n = 350) which was only slightly higher than the 3.55 average response asking respondents their readiness to handle disruptions before the pandemic (Figure 34). Interestingly enough, 14.4% of respondents indicated that they are less prepared now than prior to the pandemic, 65% said they were equally prepared, and 20.6% feel as though they are now more prepared than before. The results were similar regarding IT infrastructure preparedness with an average forward-looking score of 4.21 (n = 350) compared to a 4.19 pre-pandemic. 13.9% of respondents felt their IT infrastructure is less prepared to handle future disruptions compared to their pre-pandemic preparations, 73.5% reported the same level of preparedness, and 13.1% feel more prepared now than before.

Figure 34: Business Operations and IT Infrastructure Preparedness for Future Business Disruptions (2021, n = 350)



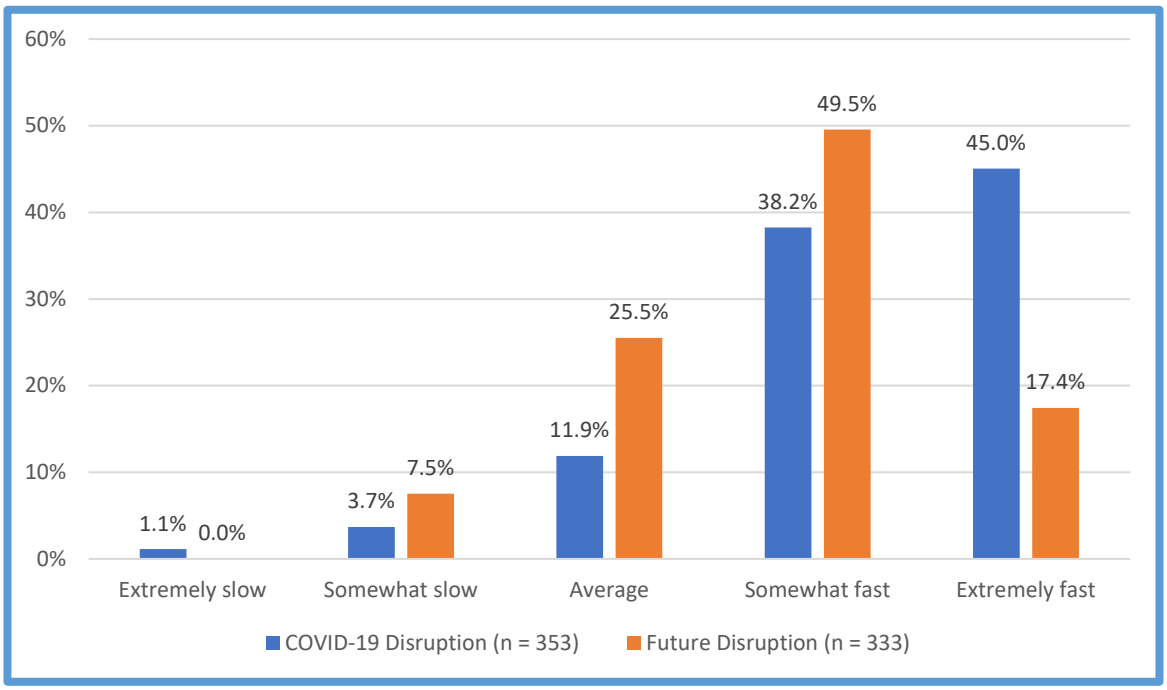
In a similar vein, respondents were asked to predict how easy it would be to maintain operations in the face of a future disruption. Figure 35 shows that respondents were slightly more optimistic when looking to the future compared to the difficulties they faced during the COVID-19 pandemic.

Figure 35: Difficulty of Maintaining Business Operations During COVID and Estimated Difficulty for Future Disruptions (2021)



When considering the speed of change, 45% of organizations indicated that they implemented changes "Extremely Fast" in response to COVID -19. In looking to the future, however, these same organizations were oddly much less optimistic, with only 17.4% expecting an "Extremely Fast" response (Figure 36).

Figure 36: Speed of Implementing Changes During COVID- 19 and Estimated Speed of Changes for Future Disruptions (2021)



Enduring Effects of COVID

A big question at this stage in the recovery process is what, if any, of changes to business and IT operations that were implemented during the pandemic are likely to be retained going forward. In last year's IT Trends Report, 62.7% of respondents "Somewhat" or "Strongly Agreed" with "The operational changes implemented so far are likely to remain in place after the pandemic is over." Given that a remote workforce was the most universal change organizations implemented, this year respondents were asked to estimate the percentage of FTEs likely to remain virtual/remote after the pandemic is over. Out of 358 unique organizations, the average percentage was 45.5%, far higher than the 14.2% working remotely before COVID-19. While no discernable differences were noted between smaller and larger organizations, sizeable differences were noted across industries. Table 20 shows the average

remote workforce pre-COVID and expected remote workforce post-COVID for all industries for which more than 10 organizations responded.

Table 20: Remote Workforce Pre-COVID-19 and post-COVID-19, by Industry

Industry	Remote FTE % Pre-COVID	Expected Remote FTE % Post-COVID	Absolute Percentage Change
Consumer Goods / Services	4.3%	49.6%	45.3%
Financial Services / Insurance / Banking	9.2%	46.9%	37.0%
Energy	1.3%	38.1%	36.9%
Government	10.5%	45.4%	34.3%
IT Hardware / Software	14.6%	52.0%	33.0%
Healthcare / Medical / Medical Tech. / BioMedical	14.3%	45.6%	30.9%
Automotive	6.0%	37.9%	30.1%
Retail / Wholesale	4.7%	35.0%	29.9%
Not-for-Profit	12.1%	40.6%	28.9%
Education	10.9%	39.5%	27.3%
IT Services / Consulting	40.3%	70.8%	26.1%
Business or Professional Services / Consulting	42.5%	66.3%	24.8%
Manufacturing	13.4%	31.5%	17.3%
Transportation / Distribution / Logistics	15.0%	25.9%	10.9%

Despite the mixed views on whether respondents believe their organizations are better prepared to handle major disruptions in the future, their financial outlook is generally quite positive. When asked to report their overall "General Success" compared to rivals within their industry, their average score was a 3.79 (n = 289) on a five-point scale ranging from "Much Worse" to "Much Better" while 63% of all organizations responded with "Somewhat" or "Much Better" and no organizations responded with "Much Worse."

Since the pandemic is still in play, it is not clear what its long-term effects will be. We do know for sure that it has impacted far more than just the information assets and operations of organizations. In fact, it is likely that the COVID-19 pandemic has meaningfully affected just about every person on earth.