



# IT TRENDS STUDY

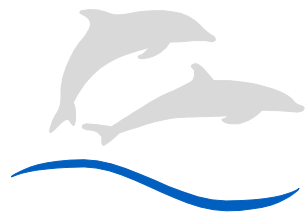
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2016

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

Results and Observations from the  
2016 SIM IT Trends Study

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# The 2016 SIM IT Trends Study:

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

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## Comprehensive Report (Price: \$895)

**\*\* Free download to SIM Members at <http://www.simnet.org/?ITTrendsStudy> \*\***

This is the complete report of the Society for Information Management's 36th Anniversary IT Trends Study. It will be released and presented at SIM's annual SIMposium conference, held this year in Charlotte on November 1-3. After the conference, this report and the IT Trends keynote slidedeck will be available at no charge to all SIM members at <http://www.simnet.org/?ITTrendsStudy>, and the slidedeck of the IT Trends breakout session will be available to the public there too. A preview of this report will appear in the December 2015 issue of the *MIS Quarterly Executive* and an abridged report will appear in the March 2016 issue, both of which are also available free of charge to all SIM members.

November 9, 2015

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](mailto:Leon.Kappelman@unt.edu).

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## **Executive Summary and Introduction**

Since 1980, the Society for Information Management (SIM), in a joint effort with prominent academicians, has conducted a study to identify the most important IT management issues. Over time these studies expanded to include questions pertaining to spending, workforce sizing and salaries, sourcing, reporting relationships, performance measurement, success skills, and various other IT organizational and management practices and concerns. They also explored how IT executives spend their time, with whom they spend it and what they do with them, as well as their assessment of the role and state of IT in their organizations. In addition to providing a snapshot of the state of IT, another important contribution of this multi-year research effort is its ability to identify important trends across the industry and the IT profession.

This comprehensive report presents the findings of SIM's 36th Anniversary IT Trends Study, based on responses from 1218 individual SIM members, including 486 CIOs, representing 785 unique organizations. This is the largest response in the history of the study. Although there is significant diversity among SIM member organizations in terms of size, economic sector, and other factors, the average annual revenue of these responding organizations is \$6.23 billion, the median is \$500 million, and their total revenues of nearly \$5 trillion is approximately 28% of the 2014 GDP of the United States. On average, their IT spending is 5.3% of their gross revenues, the highest level since the study began tracking it in 2005. Moreover, IT budgets, hiring, and salaries are increasing by nearly 5% on average, and IT executives are optimistic that this trend will continue into next year.

### **A. A Major Shift in the Focus of IT Executives**

The bottom line is that senior IT leadership is focusing its attention and resources on being more pragmatic, holistic, and business customer-focused. This is a very important and positive change, which bodes well for the whole economy.

Since its inception, the study has examined the IT management issues that IT leaders consider most important to their organizations and, more recently, most personally worrisome to themselves. This year's new entrants to the top-ten most personally most worrisome list are all about making IT more responsive to the organization, while the four items that dropped off the top ten are all about things IT cannot control. Thus, for example, IT agility and IT credibility replace velocity of business change and the pace of technology change. This is very realistic and likely leads to real improvements to IT and IT's ability to enable the business.

The IT skills shortage has been a top concern of IT executives the past few years. This year the study examined the specifics of the shortage in both technical and soft skills. This revealed very high and unsatisfied demand for architects, analysts, designers, and others who are able to bridge the communication chasm between IT and the business, while doing so in the context of the organization as a whole. This is pragmatic since it's the key to not just getting aligned, but staying aligned as well; and alignment has been a top IT management concern since the inception of the study nearly four decades ago.

Overall, the study finds IT is becoming more pragmatic, holistic, strategic and business-focused, while also working to optimize IT operations and services, with priorities like agility, innovation, time to market, security, and the strategic value of IT to the business. For example, on average, CIOs are spending twice as much time as last year on business priorities, strategy, and architecture



(16.2% versus 8.1%). Interestingly, an increasingly large majority of CIOs are coming from other organizations.

It is quite likely that the CIO position is the most complicated and demanding job in organizations today. Not only must today's CIO, and his or her team, manage an increasingly more complex IT infrastructure, as well as multifaceted IT organization structures and governance processes, in order to ensure aligned, robust, flexible, nimble, and secure IT services for their organizations, but they must also constantly scan for new and emerging technologies in order to increase IT's business value and help shape the future of the enterprise. And all this in a world filled with uncertainty and risk, growing regulation, legal ambiguity, competitors from around the globe, and more sophisticated and aggressive cyber criminals. In the face of these challenges, it is undoubtedly a tough time to be a CIO; or for that matter any IT leader.

But it is also a great time to be in IT, if you're up for the excitement and challenges. IT is changing products, services, processes, work, and organizations; as well as transforming communities, industries, markets, economies, societies, even whole countries, and indeed the world. Not all organizations and CIOs, and their C-suite brethren, will make it successfully through this transition period. However, we hope, in some small way, that the SIM IT Trends Study and this report will assist those who read it to be among those who emerge as winners.

## **B. The Organization of This Report**

This report is organized into the following seven main sections, followed by two appendices describing SIM and the conduct of the study.

- I. The Top IT Management Issues and Concerns
- II. The Largest IT Investments and Most Important Technologies
- III. IT Workforce Skills: The Most Important and Most Difficult to Find
- IV. Participating Organizations and Their IT Practices
- V. Performance Measurement
- VI. CIO Tenure, Reporting Relationships, Background, and Time Allocation
- VII. The Role of IT in Strategy and Innovation
- Appendix A: The Society for Information Management (SIM): Where IT Leaders Connect
- Appendix B: Research Method, Design, and Data Collection for SIM's 36th Anniversary IT Trends Study

## I. The Top IT Management Issues and Concerns

The top IT management issues and concerns has been a central component of the SIM IT Trends Study since its inception. This year, participants were asked to select up to five IT management issues or concerns that they considered most important to their organization. In addition, respondents selected up to five issues from the same list that they considered most important or worrisome to themselves personally. This dual approach, in which participants are asked to provide the perspectives of both their organization and themselves, was introduced in 2013. For a detailed discussion of all changes to this year's questionnaire, please refer to Appendix B.

Table 1 presents the organizations' top ten most important IT management concerns as reported by the senior-most IT leader in each of the 785 unique organizations. Rankings for these concerns in prior years (since 2005) are provided for comparison. All of the top ten IT management issues appeared in previous years of the study; although, as described in Appendix A and in Table 1's notes, some items were rephrased to improve their clarity. On average, each respondent selected 4.7 items.

**Table 1: Organizations' Top Ten Most Important IT Management Issues, 2005-2015**

IT Management Concerns/Issues	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Alignment of IT and/with the Business	1	1	1	2	1	3	2	1	2	1	1
Security/Privacy	2	2	7	9	8	9	9	8	6	3	2
Speed of IT Delivery/IT Time-to-Market	3	5	Combined with “Velocity” in 2013 and “Agility” through 2012.								
Innovation	4	8	Introduced in 2014.								
Productivity/Efficiency (Business) (a)	5	4	3	1	4	1	1	7	4		
IT Value Proposition to the Business	6	6	Introduced in 2014.								
Agility/Flexibility (IT) (b)	7	13	Introduced in 2014; “Architecture Agility” in 2008 (23)								
Cost Reduction/Controls (IT) (c)	8	17	5	5	10	8	5	7	4	5	10
Agility/Flexibility (Business) (b)	9	3	2	3	2	2	3	13	17	7	
Cost Reduction/Controls (Business) (c)	10	9	4	Combined with “Business Productivity” in prior years.							
(a) “Business Productivity” and “IT Efficiency” were merged into a single “Productivity/Efficiency” category with separate Business and IT items to select.											
(b) “Business Agility/Flexibility” and “IT Agility” were merged into a single “Agility/Flexibility” category with separate Business and IT items to select.											
(c) “Business Cost Reduction/Controls” and “IT Cost Reduction/Controls” were merged into a single “Cost Reduction/Controls” category with Business and IT items to select.											
(-) Blank cells, unless otherwise noted, indicate that the issue was not asked in that year of the study.											
n = senior-most IT leader in 785 unique organizations											

n = senior-most IT leader in 785 unique organizations

As indicated by the 11 years of rankings in Table 1, the organization's top ten IT management issues, fairly stable on the whole, reflect a continued focus on strategic and organizational issues, as well as on IT becoming more efficient, swift, secure, nimble, and innovative. The high rankings of both the business and IT dimensions of agility and cost control further supports a desire by organizations to achieve strategic and organizational IT benefits while also improving IT operations.

Eight of this year's top ten also ranked in the top ten last year, although the orderings did change, particularly Innovation (fourth) and "Agility/Flexibility (Business)" (ninth). The two new top ten items, "Agility/Flexibility (IT)" (seventh) and "Cost Reduction/Controls (IT)" (eighth), were reworded with their business counterparts as indicated in the table's notes. Two items fell out of the top ten: "Velocity of Change in Business," a new item last year which ranked seventh, fell to

15<sup>th</sup> this year; and “Revenue Generating IT Projects,” a top ten issue since 2009, moved from tenth last year to 18<sup>th</sup>.

## A. The Five Most Important IT Management Issues and Concerns of Organizations

“Alignment of IT and/or with the Business,” which has ranked in the top three for over a decade, retained the number one position it has held since 2013. Similarly, “Security/Privacy” retained the number two position that it achieved last year. “Speed of IT Delivery/IT Time-to-Market” ranked third this year, followed in fourth by “Innovation,” the only new entrant to the top five. “Business Productivity/Efficiency,” a top five concern since 2009, ranked fifth this year.

### 1. Alignment of IT and/or with the Business

Aligning IT with the business has been a top-ten issue since it first appeared in the SIM Trends Studies in 1984. This year, 333 of 785 organizations, or 42.4% of all the responding organizations, identified alignment as one of their top five IT management concerns. Alignment is generally thought of as the fit between the objectives of the business and the IT organization, or how well IT knows and supports the activities and satisfies the requirements of the organization. Although alignment has received considerable attention from both academics and practitioners, it continues to remain a challenge for many organizations. It is possible that alignment remains a persistent issue due to the changing nature of business and the difficulty that the IT organization has in responding to these changes. In other words, it is one thing to *become* aligned, but quite another to *stay* aligned. The high rankings of IT Time to Market (third) and IT Agility (seventh) suggests that companies recognize that these are key ways to staying aligned.

### 2. Security/Privacy

“Security/Privacy” has been a top-ten issue for over a decade, moving into the top five last year. Ranked number two again this year, 31.5% of respondents selected security and privacy as a top IT management issue for their organization. This is not surprising given the number of high profile IT security breaches, jeopardizing the intellectual property, reputations, and privacy of organizations and their customers and employees, and causing millions of dollars in costs for losses, investigations, notifications, credit monitoring, legal expenses, and fines. As a result, we see this in the increased security spending this year (see section II, The Largest IT Investments and Most Important Technologies, and sections IV C and IV D, IT Budget and Spending Trends and IT Budget Allocations). We anticipate that security and privacy will remain a major concern for IT organizations the foreseeable future.

### 3. Speed of IT Delivery/IT Time-to-Market

“Speed of IT Delivery/IT Time-to-Market,” is in third position this year, up from fifth last year; it is critical for IT to get this right in order to stay aligned with the organization’s changing requirements and objectives. Since IT is part of just about every business process and product, IT time to market can significantly affect revenue, market share, customer acquisition and retention, employee satisfaction and loyalty, brand image, profit margins, and more. This issue was selected as a top IT management concern by 196 (24.8%) of responding organizations. Given its role in achieving alignment (first), security and privacy (second), business productivity (fifth), and business agility (ninth); and as well as its importance in IT’s value

proposition (sixth) and dealing with the velocity of business change (15th), it is no surprise that organizations consider the speed of IT delivery an important IT management concern.

#### 4. Innovation

“Innovation” in fourth, moved up considerably from eighth last year. It was selected as a top concern by 184 (23.4%) of responding organizations. Scholars and business practitioners alike recognize the difficulty in sustaining innovation. However, both also recognize that when successfully achieved, innovation has the ability to achieve both revenue growth and cost reduction. In fact, innovation can help with just about all of the IT management issues. The data also suggest that the vast majority (67.5%) of responding organizations believe that IT is a valuable source of innovations for their businesses (see section IV B, Role of IT in Strategy and Innovation).

#### 5. Productivity/Efficiency (of Business)

Business productivity and efficiency was selected as a top IT management concern by 155 organizations (19.8%). This has been consistently ranked in the top five in all but one year since its inclusion in 2007. Its relative importance has dropped a bit over the last four years; and yet, productivity is and will continue to be an important priority for companies. It is possible that organizations are beginning to concentrate on other issues, or simply that “doing more with less” has become second nature to management. Perhaps organizations are optimizing more holistically, rather than simply maximizing productivity and cost savings. Recent research has indicated that the relentless pursuit of improving productivity at the expense of other important goals, such as customer service or product quality, may result in negative financial results<sup>1</sup>.

### B. The IT Management Issues Most Important or Worrisome to IT Leaders

This year’s study continued the trend of asking respondents to report not only their organization’s most important IT management concerns, but also to select up to five issues that were most personally important or worrisome. On average, they selected 4.5 items. As shown in Table 2, some stability is evident in the personal concerns of senior IT leaders, with six items in this year’s top ten appearing in last year’s list, and the same top three since inception. Additionally, two items (“Business Continuity,” and “CIO Leadership Role”) return to the top ten after falling out last year. Two items (“Agility/Flexibility (IT)” and “Credibility (IT)”) are new to the top ten personal concerns. It is noteworthy that all four of these additions to the personal top-ten list can directly affect business outcomes.

“Security/Privacy” remains in first position this year, with 289 (36.8%) of 785 senior IT leaders selecting it as one of their five personally most important or worrisome IT management issues. “Alignment of IT and/or with the Business” was selected by 233 respondents (29.7%), moving it from the third to second position. Falling from second to third this year, “IT Talent/Skill Shortage” received 222 selections (28.3%). The “Speed of IT Delivery” maintained fourth position with 154 selections (19.6%). Appearing for the first time in the top ten this year, and rounding out the top five, “Agility/Flexibility (IT)” was selected by 153 senior IT leaders (19.5%).

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<sup>1</sup> Huang, M.-H., Rust, R.T. (2014), “Should Your Business Be Less Productive?” *MIT Sloan Management Review*, Vol. 55 No. 55316, pp. 67–72.

**Table 2: IT Leaders' Top Ten Personally Most Important IT Management Issues, 2013-15**

Most Important/Worrisome Concerns to the IT Leader	2015	2014	2013
Security/Privacy	1	1	2
Alignment of IT and/with the Business	2	3	1
IT Talent/Skill Shortage	3	2	3
Speed of IT Delivery/IT Time-to-Market	4	4	9(a)
Agility/Flexibility (IT) (b)	5	16	
Credibility (IT)	6	18	
Business Continuity (c)	7	13	4
IT Value Proposition to Business	8	5	
CIO Leadership Role	9 (d)	14	10
Disaster Recovery (IT) (c)	9 (d)	10	4
(a) In 2013, this category was “Time-to-Market/Velocity of Change” but was neither business nor IT specific. (b) “Business Agility/Flexibility” and “IT Agility” were merged into a single “Agility/Flexibility” category with separate Business and IT items to select. (c) “Business Continuity” and “Disaster Recovery” were combined in the 2013 study. (d) Selected by the same number of respondents, these tied at ninth. (-) Blank cells, unless otherwise noted, indicate that the issue was not asked in that year of the study. n = senior-most IT leader in 785 unique organizations			

The four items that dropped out of the personal top ten are Prioritization Process for IT Projects (was sixth, now 12th), Velocity of Change in IT (was seventh, now 16th), IT Strategic Planning (was eighth, now 18th), and Velocity of Change in Business (was ninth, now 22nd). This year's top-ten items in Table 2 are fairly balanced between IT and business concerns. This suggests that while operational IT issues remain personally important to IT leadership, there is also a significant concern about the role IT plays in supporting the operational and strategic objectives of the organization. Personal concerns like alignment, business continuity, time to market, agility, and IT's value proposition demonstrates that IT leaders not only consider themselves technology leaders, but also recognize the significant role they play in the achievement of organization goals.

### C. Comparing the Top Ten IT Management Issues of Organizations and those of IT Leaders

Combining the top ten organizational and personal IT management issues from Tables 1 and 2, respectively, results in 15 items as shown in Table 3. Only five of these 15 are in the top ten of both; however, there are significant commonalities given that three of these — Security, Alignment, and IT Time-to-Market — are in the top five of both. Also in the top ten of both lists are IT Value Proposition and IT Agility. All five of these are IT activities that directly improve the organization. However, as has been the case since 2013 when these comparisons were reported for the first time, there are also significant differences between the personal and organizational IT management concerns.

IT leaders appear to place roughly equal emphasis on their role in achieving the organization's goals and the operational issues required to “keep the IT lights on.” However, it is generally a failure to address the latter that will almost always result an IT leadership change. Thus it is not surprising that four of the five items that appear on the IT leaders' personal top ten list – but not on the organization list – mostly concern the operational responsibilities of IT leaders, including

IT Talent and Skill Shortage (IT leader, third; organization 14th), IT Credibility (IT leader, sixth; organization, 20th), CIO Leadership Role (IT leader, ninth; organization, 31st), and IT Disaster Recovery (IT leader, ninth; organization, 23rd). These four items are the basics of IT management. The fifth, Business Continuity (IT leader, seventh; organization, 16th), although not obviously an IT responsibility, is in fact critical to effectively setting priorities for IT continuity, disaster recovery, and security. Failure in any of these five items, plus a failure in security, will jeopardize an IT leader's credibility and job. Understandably, these IT operational concerns are undoubtedly important to IT leadership.

**Table 3: Personal & Organizational Top Ten IT Management Issues Compared, 2014-2015**

IT Management Issues	Most Important or Worrisome to IT Leaders (2014)	Most Important to their Organizations (2014)
Security/Privacy	1 (1)	2 (2)
Alignment of IT and/or with the Business	2 (3)	1 (1)
IT Talent/Skill Shortage	3 (2)	14 (18)
Speed of IT Delivery/IT Time-to-Market	4 (4)	3 (5)
Agility/Flexibility (IT)	5 (16)	7 (13)
Credibility (IT)	6 (18)	20 (30)
Business Continuity	7 (13)	15 (22)
IT Value Proposition to Business	8 (5)	6 (6)
CIO Leadership Role	9* (14)	31 (34)
Disaster Recovery (IT)	9* (10)	23 (27)
Innovation	11 (12)	4 (8)
Cost Reduction/Controls (IT)	21 (30)	8 (17)
Agility/Flexibility (Business)	25 (17)	9 (3)
Productivity/Efficiency (Business)	32 (24)	5 (4)
Cost Reduction/Controls (Business)	40 (33)	10 (9)
* Selected by the same number of respondents, "CIO Leadership Role" and "Disaster Recovery (IT)" tied for ninth, completing the top ten personal issues. n = senior-most IT leader in 785 unique organizations		

The five items in the organizational top ten, but not the individual's list – Innovation (organization, fourth; IT leader, 11th), Business Efficiency (organization, fifth; IT leader, 32nd), IT Cost Control (organization, eighth; IT leader, 21st), Business Agility (organization, ninth; IT leader, 25th), and Business Cost Control (organization, tenth; IT leader, 40th) – are all largely business responsibilities. Still, the fact that these ten items are only found on the organization list and not on the personal list, does seem to indicate some kind of misalignment. This seems particularly so with the much lower concern that IT leaders give to IT Cost Control. However, given that they were only asked to select "up to five" issues, the fact that security, disaster recovery, and keeping the IT lights on ranked higher than IT cost control, maybe the priorities of IT leaders are sufficiently well aligned with those of their organizations after all.

## II. The Largest IT Investments and Most Important Technologies

### A. The Organizations' Largest IT Investments

To complement their *management* concerns, participants were asked to select up to five *technologies* in three separate categories from a list of 39 items: (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"). On average, respondents selected 4.1 "largest investments," 4.1 "should invest more," and 3.8 "most worrisome technologies." As with the list of IT management issues, the list of technologies was modified this year; and a complete description of the changes can be found in Appendix B.

The top-ten technologies identified as the largest current investments for the 785 responding organizations are shown in Table 4, along with their rankings since 2005. As in previous years, there is clearly diversity in IT investments across organizations, with only 11.5% of the respondents needed to select an item for it to make into the top ten. There is also some stability in the rankings, with eight of the top-ten investments appearing in the top ten last year; although, some shifts in rankings occurred. Two items fell out of this year's top ten: Integration (from eighth to 11<sup>th</sup>) and Big Data (from 10<sup>th</sup> to 16<sup>th</sup>), replaced by Legacy Applications (ninth) and Virtualization (10<sup>th</sup>).

**Table 4: The Largest IT Investments of Organization's (2005-2015)**

Information Technologies	2015 (% Selecting)	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Analytics/Business Intelligence/Data Mining/Forecasting (a)	1 (38.0%)	1	1	1	1	1	1	2	2	2	3
ERP (Enterprise Resource Planning)	2 (32.2%)	3	4	3	3	3	3	14	6		5
Security/Cybersecurity (b)	3 (28.9%)	7	14		11	8		8		1	
Application/Software Development (c)	4 (28.8%)	4	6	11							
CRM (Customer Relationship Management)	5 (24.5%)	6	2	5	5	9	13				
Data Center/Infrastructure	6 (24.2%)	2									
Cloud Computing (e.g., SaaS, PaaS, IaaS) (d)	7 (22.9%)	5	3	2	2	5	17				
Network/Telecommunications	8 (18.7%)	9	8	12							
Legacy Applications	9 (12.6%)	15	16								
Virtualization	10 (11.5%)	11	13	15	7	2					

(d) This year, "Analytics/Business Intelligence" was combined with "Data Mining" (17 in 2013, 32 in 2014) and "Forecasting" (25 in 2013, 23 in 2014)

(e) In 2006 and 2008, this was listed as "Security Technologies" and simply "Security" in 2010, 2011, and 2013.

(f) In 2013, this was "Apps" and it was "Application Development" in 2012.

(g) In 2009, 2010, and 2011 "SaaS" was included separately and ranked 15<sup>th</sup>, 9<sup>th</sup>, and 6<sup>th</sup>, respectively.

(-) Blank cells, unless otherwise noted, indicate that the item was not asked in that year of the study.

n = senior-most IT leader in 785 unique organizations

### B. The Five Largest Technology Investments of Organizations

To be a top-five largest IT investment this year required 24.5% of participating organizations selecting it as one of their top five. Analytics/Business Intelligence, in its seventh year in the number one position, was selected by 38.0% of responding organizations. Enterprise Resource Planning (ERP), also regularly a top IT investment, is number two with 32.2% of organizations selecting it as one of their five largest this year. Making its way into the top five for the first time

since 2006 is Security, selected by 28.9%. Application Development and Customer Relationship Management round out the top five, with 28.8% and 24.5% of participants, respectively.

### **1. Analytics/Business Intelligence/Data Mining/Forecasting**

Analytics/Business Intelligence was merged with the related topics of Data Mining and Forecasting this year due to their low selection rate last year. Ranked in first since 2009, it has been a top three IT investments for well over a decade. Analytics/Business Intelligence/Data Mining/Forecasting was selected as a largest IT investment by 298 organizations (38.0%). Organizations recognize the value of improved decision making in improving functional and financial performance; thus investments in technologies that increase the availability, usability, and value of the organization's data assets is not unexpected.

### **2. ERP (Enterprise Resource Planning)**

Investments in ERP systems have ranked in the third position or higher in six of the last seven years. Of the organizations surveyed, 253 (32.2%) selected ERP as one of their top five largest IT investments. ERP implementations, by their very nature, are large, long-term transformational projects. Moreover, through standardization of processes and simplification of software assets, ERPs can help improve both the efficiency and effectiveness of business and IT operations, as well as address many of the top IT management issues listed in Table 3 such as cost control, productivity, and the value of IT to the enterprise.

### **3. Security/Cybersecurity**

Security/Cybersecurity was selected by 227 respondents (28.9%) as one of their largest IT investments this year. A fairly consistent item in the top ten, this marks the first time since 2006 that Security has been a top-five investment. The numerous, large, and high-profile cybersecurity breaches in the last several years, along with SEC and other regulatory actions, has brought concerns about IT security and privacy to the forefront in the minds of business leaders. Thus it is not surprising to see IT security investments in third place, up from 14<sup>th</sup> as recently as 2013. Given its high ranking as an IT management issue for both the business and its IT leadership (see Table 3), significant investments in IT security will likely continue.

### **4. Application/Software Development**

For the second year in a row, Application/Software Development ranks fourth, selected by 226, or 28.8% of the 785 respondents. Application/Software Development appears to be trending upward since its introduction 2012. Given the standardization inherent in cloud and off-the-shelf options, custom software development helps organizations differentiate themselves. Whether done in-house or outsourced, the development and maintenance of custom applications is often necessary when packaged products fail to sufficiently meet the organization's requirements. There is also a widespread need for relatively unique mobile and Web-based applications.

### **5. CRM (Customer Relationship Management)**

CRM systems have been a top ten largest investment in six of the seven years since they first appeared in the questionnaire in 2009. Selected by 192 organizations (24.5%) as a significant IT investment, this year marks the fourth time spending on CRM systems has made the top five list. There are natural synergies between CRM, ERP, Analytics/Business Intelligence,

and other information technologies that relate well to addressing many key IT management issues (as seen in Table 3).

Data Center/Infrastructure and Cloud Computing were top-five largest IT investments last year, but remained in the top ten this year. Data Center investments fell from second to sixth, while Cloud Computing fell from fifth to seventh. Network and Virtualization investments, moving up a little to eighth and tenth largest, respectively, this year, are also IT infrastructure investments, and could account for some of this shift. However, although such infrastructure investments are required to sustain, improve, and increase the delivery of software services, it is possible that significant infrastructure investments (particularly cloud-based) over the past several years have allowed organizations to shift their spending focus to software-, rather than hardware-oriented, expenditures.

### C. Information Technologies That Should Get More Investment

This year we introduced a new question that asked respondents to select up to five technologies that *should* get more investment. This question replaced last year's question that asked participants to identify technologies which were most important to their organizations. As shown in Table 5, some overlap exists between actual IT investments and those that IT leaders would like to see get more investment. Five items from the list of largest current IT investments appear on the list of technologies for which additional investment should be made. These include Analytics/Business Intelligence (more investment, first; largest investment, first), Security (more, second; largest, third), Cloud Computing (more, third; largest, seventh), Application Development (more, seventh; largest, fourth), and CRM (more, eighth; largest, fifth).

**Table 5: Comparing Largest IT Investments to Those That Should Get More Investment**

Information Technologies	ITs That Should Get More Investment	Largest IT Investments
Analytics/Business Intelligence/Data Mining/Forecasting	1	1
Security/Cybersecurity	2	3
Cloud Computing (e.g., SaaS, PaaS, IaaS)	3	7
Disaster Recovery/IT Continuity Planning	4	13
Innovation/Disruptive Technologies	5	22
Big Data	6	16
Application/Software Development	7	4
CRM (Customer Relationship Management)	8	5
Master Data Management	9	20
Collaboration Tools	10	13
ERP (Enterprise Resource Planning)	13	2
Data Center/Infrastructure	16	6
Network/Telecommunications	25	8
Legacy Applications	32	9
Virtualization	34	10

n = senior-most IT leader in 785 unique organizations

The differences between the two lists in Table 5 are revealing. Four items have ranking differences of ten or more. Disaster Recovery is fourth position on the should-get-more list, but 14th on the largest current-investment list. Similarly, Innovation/Disruption is fifth in terms of where money should be spent and 23rd in the list of largest current investments. Interestingly, as a top IT management issues, Disaster Recovery is a top ten concern for IT management but not the organization, while the opposite is true for Innovation (see Table 3). Data technologies also exhibit significant differences between the largest and need-more lists, with Big Data and Master Data Management at sixth and ninth positions, respectively, on the need-more list, but sixteenth and twentieth on the list of current IT expenditures.

#### D. The Most Worrisome Information Technologies for Senior IT Leaders

For the third year, we asked IT leaders to select up to five technologies that they consider most personally worrisome (i.e., “things that keep you up at night”). The top ten most worrisome for the senior-most IT leaders in 785 unique organizations are presented in Table 6, along with their rankings since 2013.

**Table 6: Personally Most Worrisome Information Technologies (2013-2015)**

Information Technologies	2015 (% Selecting)	2014	2013
Security/Cybersecurity	1 (50.2%)	1	2
Analytics/Business Intelligence/Data Mining/Forecasting	2 (28.4%)	2	1
Disaster Recovery/IT Continuity Planning	3 (27.9%)	3	3
Cloud Computing (e.g., SaaS, PaaS, IaaS)	4 (19.0%)	6	4
Innovation/Disruptive Technologies	5 (16.8%)	7	
Data Center/Infrastructure	6 (14.5%)	10	
ERP (Enterprise Resource Planning)	7 (13.1%)	9	9
Integration	8 (13.0%)	4	7 (a)
Application/Software Development	9 (12.4%)	5	15 (b)
Legacy Applications	10 (11.5%)	7	8
(a) Listed as “Enterprise Application Integration (EAI)” in 2013. (b) In 2013, “Apps” ranked 15 <sup>th</sup> and “Mobile/Wireless Applications” ranked 14 <sup>th</sup> . (-) Blank cells, unless otherwise noted, indicate that the item was not asked in that year of the study. n = senior-most IT leader in 785 unique organizations			

All of the top ten personally most worrisome technologies this year were in the top ten last year, with the top three exactly the same. The most worrisome by a large margin is Security, selected by over half (50.2%) of respondents. Analytics/Business Intelligence was selected by 28.4% and remains in second. Disaster Recovery/IT Continuity Planning selected by 27.9% is third again this year.

Combining this year’s data from Table 5 and Table 6, Table 7 compares the largest IT investments to those technologies senior IT leaders find most personally worrisome. There is a high degree of alignment between the lists, with seven of the most worrisome technologies commanding the largest IT investments. The concerns of IT leaders and organizational spending are in sync on Security (most worrisome, first; largest current investment, third), Analytics/Business Intelligence

(worrisome, second; largest, first), Cloud (worrisome, fourth; largest, seventh), Data Center (worrisome, sixth; largest, sixth), ERP (worrisome, seventh; largest, second), Software Development (worrisome, ninth; largest, fourth), and Legacy (worrisome tenth; largest, ninth). Additionally, Integration, although not on both top-ten lists (worrisome, eighth; largest, 11th), are quite close and appear well aligned too.

**Table 7: Comparing the Top Ten Largest IT Investments to the Most Personally Worrisome ITs**

Information Technologies	ITs Most Personally Worrisome	Largest IT Investments
Security/Cybersecurity	1	3
Analytics/Business Intelligence/Data Mining/Forecasting	2	1
Disaster Recovery/IT Continuity Planning	3	14
Cloud Computing (e.g., SaaS, PaaS, IaaS)	4	7
Innovation/Disruptive Technologies	5	23
Data Center/Infrastructure	6	6
ERP (Enterprise Resource Planning)	7	2
Integration	8	11
Application/Software Development	9	4
Legacy Applications	10	9
CRM (Customer Relationship Management)	14	5
Network/Telecommunications	20	8
Virtualization	31	10

n = senior-most IT leader in 785 unique organizations

However, there are two items where significant discrepancies exist. Investments in IT Disaster Recovery and prevention (worrisome, third; largest, 14th), needed to avoid and mitigate those rare, but significantly negative, organizational events are often difficult to justify; especially in light of the low ranking of both Business Continuity and IT Disaster Recovery as important organizational IT management issues (see Table 3). However, like Security, IT-related business disruptions can cost IT leaders their jobs, as well as damaging their reputations, careers, and organizations. Innovation (worrisome, fifth; largest, 23rd) represents another disconnect between the two lists. But unlike Security and IT Disaster Recovery, failure to innovate is important, but not typically grounds for termination; despite the fact that it ranks fourth as an organizational IT management issue (see Table 1). On the other hand, innovation can be quite important to job and career advancement. Yet, innovation is difficult to achieve consistently; and many organizations prefer the follower approach rather than incurring the costs, risks, and complexities of innovating.

#### **E. Comparing the Largest IT Investments, ITs That Should Get More Investment, and IT Leadership's Most Worrisome Technologies**

Table 8 combines this year's top-ten lists from Table 4 (the largest organizational IT investments), Table 5 (the technologies IT leaders believe should receive additional funding), and Table 6 (the technologies IT leaders find most personally worrisome). These three top-ten lists contain 16 unique items. There is some degree of overlap among these three lists, with four of the 16 appearing on all three top-ten lists, six on two of the lists, and six on only one of the lists.

Analytics, Security, Software Development, and Cloud appear in all three of these top-ten lists. Given the long standing place of Analytics at or near the top of the largest investment list, it is noteworthy that IT leaders still find it particularly worrisome and believe that it needs even more attention and investment. This points to the importance and high stakes associated with these technologies. Some concern may also be related to substantial non-technical investments, such as the recruitment and retention of scarce data scientists, analysts, and architects, as well as the training and investment required to develop true data-driven decision making.

While Security is a relatively recent entrant into the top five largest IT investments, it has been one of the two most worrisome technologies since the question was introduced in 2013. Again, we believe the multitude of recent security breaches has focused the attention of business and IT executives on this topic, leading to investments designed to prevent such issues from occurring within their organizations.

The fact that Software Development appears in the top ten of all three lists was quite unexpected, in light of the widespread availability of commercial-off-the-shelf (COTS) software packages and cloud-based SaaS offerings. This may require a deeper look next year at what is being developed, what kinds of development is taking place, and who is doing it (in-house verses contracted). Finally, the presence of Cloud Computing on all three top ten lists is perhaps not surprising given that the motivation of going to the cloud is often to reduce IT capital investment. But it is not clear whether the Cloud in question is a public cloud, a private cloud, or some combination of the two. As with Analytics, Cloud investments are often an initiative of the business, not the IT organization, and thus the stakes are high for IT leaders to ensure that these investments succeed.

There are a number of items that IT leaders believe should receive more investment or are of great personal concern but do not appear to be current financial priorities in their organizations. Many of these technologies are necessary to optimize and ensure IT service delivery but may not be in the limelight as far as the business is concerned: Integration, Disaster Recovery, Big Data, and Master Data Management technologies are notable examples, the latter two often a requirement of the first. Perhaps the most significant discrepancy between the concerns of IT leaders and where finances are actually allocated is related to Innovation/Disruptive Technologies.

**Table 8: Comparing Organizations' Largest IT Investments, ITs That Should Get More Investment, and the Most Worrisome Technologies**

<b>Information Technologies</b>	<b>Largest IT Investments</b>	<b>ITs That Should Get More Investment</b>	<b>ITs Most Personally Worrisome</b>
Analytics/Business Intelligence/Data Mining/Forecasting	<b>1</b>	<b>1</b>	<b>2</b>
ERP (Enterprise Resource Planning)	<b>2</b>	13	<b>7</b>
Security/Cybersecurity	<b>3</b>	<b>2</b>	<b>1</b>
Application/Software Development	<b>4</b>	<b>7</b>	<b>9</b>
CRM (Customer Relationship Management)	<b>5</b>	<b>8</b>	14
Data Center/Infrastructure	<b>6</b>	16	<b>6</b>
Cloud Computing (e.g., SaaS, PaaS, IaaS)	<b>7</b>	<b>3</b>	<b>4</b>
Network/Telecommunications	<b>8</b>	25	20
Legacy Applications	<b>9</b>	32	<b>10</b>
Virtualization	<b>10</b>	34	31
Integration	11	14	<b>8</b>
Collaboration Tools	13	<b>10</b>	21
Disaster Recovery/IT Continuity Planning	14	<b>4</b>	<b>3</b>
Big Data	16	<b>6</b>	13
Master Data Management	20	<b>9</b>	15
Innovation/Disruptive Technologies	23	<b>5</b>	<b>5</b>
n = senior-most IT leader in 785 unique organizations			

### III. IT Workforce Skills: The Most Important and Most Difficult to Find

Senior IT Leaders reported that the “IT Talent/Skills Shortage” as their second or third personally most worrisome IT management concerns since that question was introduced in 2013 (see Table 2). So this year, we asked participants which IT skills, capabilities, and attributes are most difficult to find and most important to their organizations. IT leaders were asked to select up to five from each of two separate lists: “technical skills or capabilities” and “soft skills or personal attributes.”

#### A. Technical/Hard Skills and Capabilities

The technical expertise of those who work in IT departments is critical to the departments’ ability to support the activities and processes of the organizations of which they are a part. Technical skills, in particular, are central to the IT function. The 785 participating IT leaders selected up to five technical skills in two categories: the most difficult to find and those they considered most important to their organizations. Their top ten items from each category are presented in Table 9.

**Table 9: Technical Skills: The Top Ten Most Difficult to Find and Most Important (2015)**

Technical Skills or Capabilities	Percentage Selecting n = 785 unique organizations	
	Most Difficult to Find	Most Important to Organization
Analytics/Business Intelligence/Big Data/Data Scientist	1 (46.1%)	2 (47.1%)
Security/Cybersecurity	2 (45.1%)	1 (51.3%)
Data/Information Architecture	3 (26.0%)	3 (28.5%)
Functional Area Knowledge	4 (24.8%)	4 (23.8%)
Enterprise Architect	5 (23.2%)	6 (22.3%)
Application/Solution Architecture	6 (21.4%)	5 (23.2%)
Agile software development	7 (15.7%)	8 (19.6%)
ERP (Enterprise Resource Planning)	8 (15.3%)	8 (19.6%)
User Interface/User Experience/Usability Architect	9 (15.2%)	11 (13.5%)
IT Project Manager	10 (14.3%)	6 (22.3%)
Cloud	13 (13.0%)	10 (16.6%)

As indicated in Table 9, there is a significant amount of agreement between the technical skills IT leaders identify as most difficult to find and those they believe are most important to their organizations. This is particularly true for those skills at the top of the list, with Analytics/Big Data, Security, Data/Information Architecture, and Functional Area Knowledge appearing as the top four technical skills in both categories. The only significance difference between the two lists is that Cloud-related skills are ninth on the most-important list and 13<sup>th</sup> most-difficult-to-find list.

The top two most difficult to find technical skills, Analytics/BI and Security/Cybersecurity, map directly to the technologies in which organizations are investing most heavily (see Table 4). The next four – Data Architecture, Functional Area Knowledge, Enterprise Architecture, and Application/Solution Architecture – all center around holistic systems thinking, requirement capabilities, and knowing your organization and IT customers. The soft skill rankings confirm the importance of these kinds of skills with “Systems Thinking/Holistic Thinking” ranking as the third most difficult to find.

## B. Soft Skills, Capabilities, and Personal Attributes

Increasingly, IT professionals are called upon to be business people first, and technologists second. This is particularly true for those on a managerial career track, which is the case for most SIM members, who are the respondents of this study. While knowing the customer – the business – is good for the career development, of IT professionals, identifying individuals with the appropriate soft skills is often a challenge. As with the technical skills question, respondents were asked to select up to five soft skills which are (1) most difficult to find and (2) most important to their organization. Their top ten items from each category are presented in Table 10.

**Table 10: Soft Skills: The Top Ten Most Difficult to Find and Most Important (2015)**

Soft Skill or Personal Attributes	Percentage Selecting n = 785 unique organizations	
	Most Difficult to Find	Most Important to Organization
Strategic Thinking/Strategic Planning	1 (44.1%)	2 (40.5%)
Leadership/Providing Leadership	2 (43.8%)	1 (45.2%)
Systems Thinking/Holistic Thinking	3 (33.5%)	7 (27.0%)
Business Analysis	4 (31.0%)	3 (39.0%)
Change Management (Organizational)	5 (27.6%)	4 (29.7%)
Innovation/Innovative	6 (27.4%)	5 (28.0%)
Problem Solving	7 (21.7%)	8 (25.7%)
Emotional Intelligence/Empathy	8 (21.5%)	13 (18.1%)
Communication (Written)	9 (20.5%)	14 (17.2%)
Decision Making	9 (20.5%)	11 (19.7%)
Project Management	12 (18.3%)	9 (21.4%)
Collaboration with Others	13 (17.5%)	6 (27.6%)
Customer Service	15 (11.7%)	10 (21.3%)

Compared to the “hard skills” in Table 9, there is less agreement between the two categories of soft skills most difficult to find and most important, as selected by these 785 senior IT leaders. However, the two categories do share seven in their top ten, and four in their top five. The one exception is Systems Thinking/Holistic Thinking” which is the third most difficult to find soft skill and only the seventh most important. Soft skills such as Emotional Intelligence/Empathy, Written and Oral Communication skills, and Decision Making are viewed as difficult to find but of lower relative importance to the organization. While Project Management, Collaboration with Others, and Customer Service skills appear to be important skills for the organization but are apparently somewhat easier to locate.

In general, the skills that are hard to find are also largely important. It is possible that some skills may be considered important because they are hard to find and thus require more managerial attention. But for the most part, there appears to be a problem of more demand than supply in many important, both technical and soft, IT-related skills. This is a troubling, but not a new, characteristic of the aggregate IT workforce. In other words, these data indicate that many critical and necessary technical and soft skills are in short supply in the marketplace. This points to an opportunity for academics and practitioners to work together to increase the number of individuals available in the workforce with these skills.

## IV. Participating Organizations and Their IT Practices

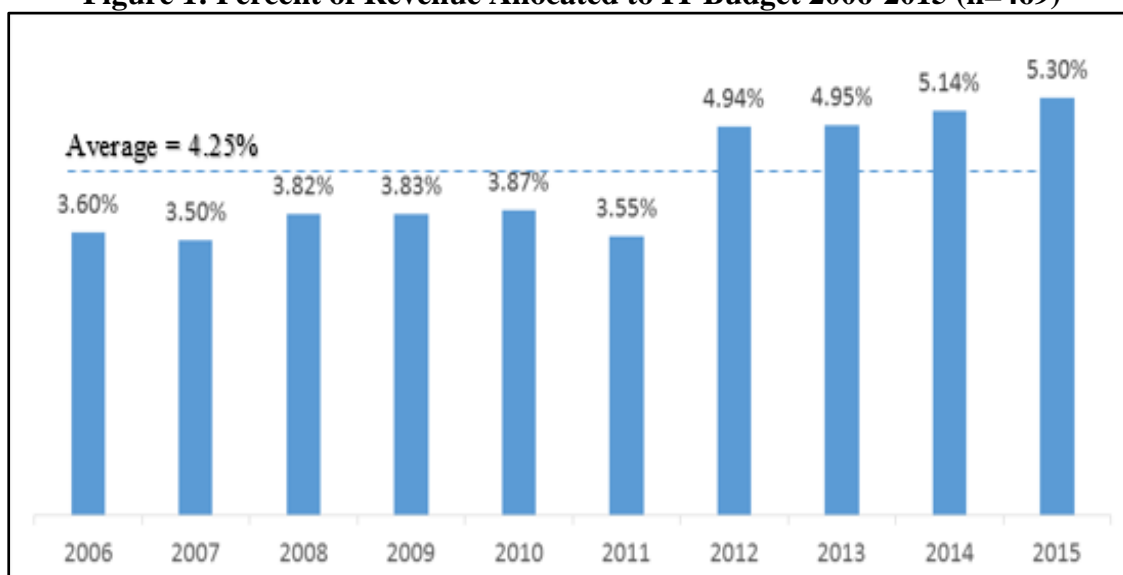
### A. Location, Industry, Revenue, and IT Spending of Participating Organizations

There are 785 unique organizations, represented by the senior-most IT responding leader, in the study's organization dataset. Nearly all (94.75%) of these are based in the U.S. Most economic sectors and industries are represented, with the top five making up 47.8% of the sample (Financial Services, 13.3%; Manufacturing, 10.4%; Health/Medical, 9.9%; Education, 8.5%; and Government, 5.8%). See Table 26 for complete distribution by industry and other information about these 785 organizations.

For the 582 organizations that reported their revenue, their average revenue is \$6.23 billion, up from \$5.58 billion last year. Assuming that all 785 of the organizations in the respondent dataset have about the same average revenue as this subset, they represent nearly \$5 trillion in annual revenue or more than 28% of the \$17.42 trillion 2014 U.S. Gross Domestic Product. As indicated in Figure 26, the majority (56.9%) have revenue between \$100 million and \$5 billion; and their median revenue of \$500 million is about the same as last year. All sizes and industries are represented, much like the U.S. economy.

IT spending as a percentage of revenue averaged 5.30% for the 469 organizations that provided their data, up from 5.15% last year, with a median of 2.82%, up from 2.50% last year (see Figure 1). This represents a more than a 2.9% increase in the percentage of revenue expended on IT this year over last. Assuming that all 785 organizations spent the same average of 5.30% of their \$4.89 trillion in aggregate revenue on IT this year, then nearly \$259 billion in total IT spending is represented in the organizations in this year's IT Trends Study. Alternatively, using the average IT spending of \$295 million reported by 512 organizations, up from last year's \$287 million or about 2.8%, and assuming that all 785 organizations have about the same level of IT spending as this smaller subset, then the organization sample represents over \$230 billion in annual IT spending. Reality is likely somewhere between these two estimates – \$259 billion and \$230 billion – or about a quarter of a trillion dollars in IT spending for the 785 organizations.

**Figure 1: Percent of Revenue Allocated to IT Budget 2006-2015 (n=469)**

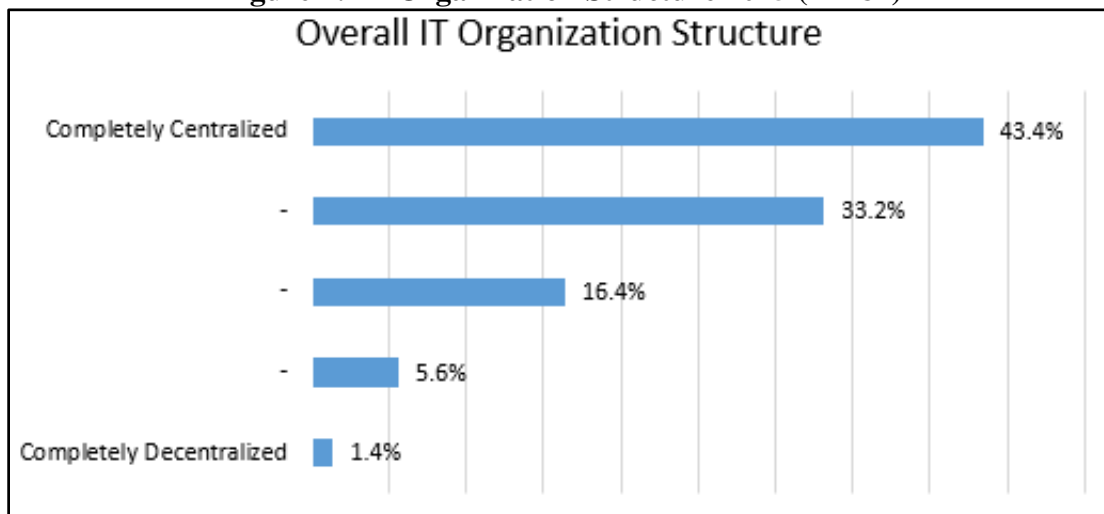


As indicated in Figure 1, average IT spending as a percentage of revenue for the past four years has been significantly above the ten-year (2006-2015) average of 4.25%. This may represent a “new normal,” the result of new investments in cloud, shared services, digital marketing, analytics, health care informatics, data centers, and security, as well as the increasing digitization of organizations in general. However, since many of these investments are expected in time to reduce IT spending, as capital investments are replaced by operating costs, only time will tell if this increased level of expenditure will sustain in the years to come.

## B. IT Organization Structure and Governance

In previous years, we asked respondents to characterize their organization as either centralized, decentralized, or “federated/hybrid/matrix/composite – some IT centralization and some decentralization.” The nine-year averages through last year were 69.7% centralized and 30.3% all the others, with last year’s results at 71.1% and 28.9%, respectively. In order to better understand IT organization structure, this year we provided a five-point scale that ranged from completely decentralized to completely centralized and asked “Overall, how would you characterize your IT organization’s structure?” We also asked three additional questions about specific aspects of IT organizational structure. This year’s results for the overall organizational structure question are shown in Figure 2. In order to map this new, more granular scaling to prior year results, we sum “Completely Centralized” and “Centralized” to represent centralized, and sum the other three answer choices as decentralized. We continue to see an overwhelming majority (76.6%) of the respondents rate their IT organization as mostly centralized.

**Figure 2: IT Organization Structure 2015 (n=781)**



Next, we drilled deeper into the IT organizational structure and asked respondents to characterize “How the following IT activities are organized/structured in your organization” on the same five-point scale: Business Applications, IT Infrastructure/Operations/Services/Support, and Purchasing. The results are shown in Table 11, which shows the distribution of their responses, which are weighted from five (for Completely Centralized) to one (for Completely Decentralized)

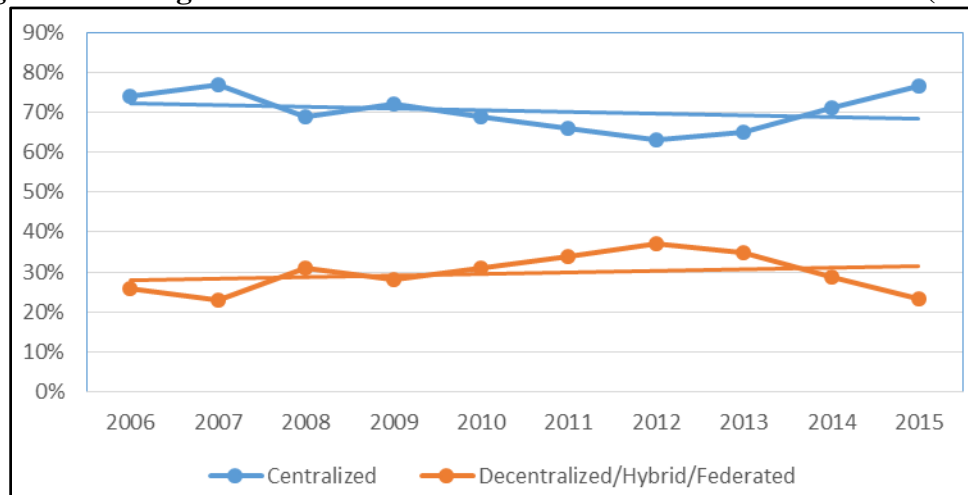
in order to calculate a weighted average. Overall, and the three specific activities of the IT organization, are generally characterized as centrally organized, with each averaging at least 4.0 on a scale of 1 to 5. Even the least so, Business Applications, was indicated as Completely Centralized or Centralized by 68.8% of the 781 responding organizations. The other three range from 71.1% for Purchasing to 83.0% for IT Infrastructure.

**Table 11: Degree of Centralization of Various IT Activities (n=781 organizations)**

IT Organizational Activities	weighted average	Completely Centralized				Completely Decentralized
		5	4	3	2	1
Overall IT Organization Structure	4.1	43.4%	33.2%	16.4%	5.6%	1.4%
Business Applications	4.0	43.4%	25.4%	20.9%	7.2%	3.2%
IT Infrastructure/Ops/Services/Support	4.4	59.7%	23.3%	12.0%	2.8%	2.2%
Purchasing	4.0	48.4%	22.7%	17.5%	6.7%	4.7%

Analyzing the data with respect to past years in order to determine a trend is somewhat problematic given this year's additional granularity. However, if we combine the top two categories as before into "centralized" and the other three into another "decentralized/federated /hybrid" then we can get a rough comparison to past years. This is shown in Figure 3, which seems to suggest that there is a cyclical shifting between centralized and decentralized IT organizational structures. The centralization trend line appears to have a slight downward slope; however, it does seem to have turned upwards toward more centralization, in the last three years.

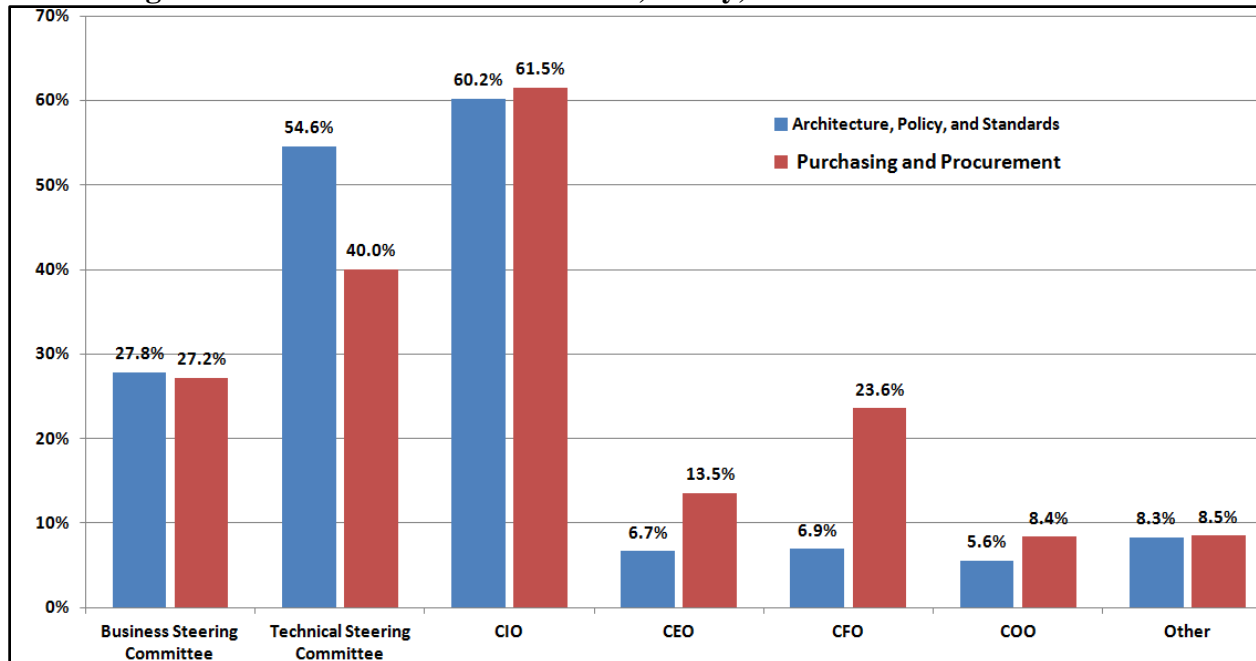
**Figure 3: IT Organization Structure with Linear Trendline 2006-2015 (n=781)**



Another new question added this year asked respondents to report on who in the organization makes decisions about "IT Architecture, Policy, and Standards" and "IT Purchasing and Procurement." Respondents were allowed to select as many of the options that applied and the results are shown in Figure 4 for the responding organizations. These results indicate that CIOs are most often involved as decision makers regarding both Architecture, Policy, and Standards and

Purchasing and Procurement, with just over 60% of organizations selecting them for both categories. The Technical Steering Committee (TSC) was the next most frequently selected, with 55% and 40% respectively selecting them for Architecture and Procurement.

**Figure 4: Who Makes IT Architecture, Policy, and Procurement Decisions?**



These are surprisingly low participation rates for CIOs and the TSC, especially for decisions regarding Architecture, Policy, and Standards, since these are largely internal IT decisions. Moreover, every respondent who selected TSC also selected CIO, which means that in 40% of organizations IT architecture, policy, and standards decisions are not made by senior IT personnel. Factoring in that almost 70% of those selecting “other” and writing in an answer indicating that the decision was made by IT personnel, still leaves about one-third of these decisions not made by senior IT personnel. The CEO, CFO and COO appear to have limited involvement in these key IT decisions too; although, as expected, the CEO and CFO are more involved in procurement decisions.

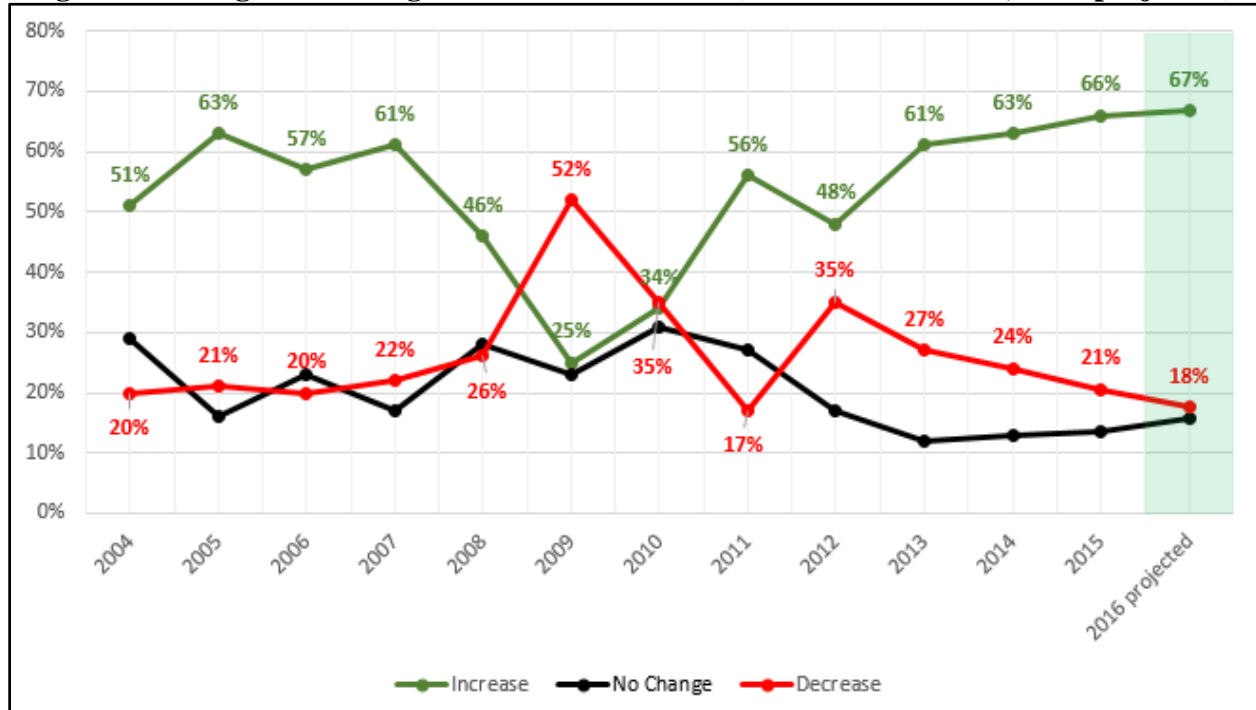
These new structure and governance questions provide us a better understanding of the state of IT structure and governance. However, as is often the case in these situations, they raise many new questions too. We expect the IT Trends Study will be digging deeper into these matters in future studies.

### C. IT Budget and Spending Trends

As the economic conditions continue to improve we see a steady increase in IT budgets. As seen in Figure 5 below, since 2012 the percentage of organizations reporting IT budget increases grew from 48% to 66%, and it is projected to increase again next year. Correspondingly, the percentage of organizations reporting a reduction in IT budgets fell from 35% to 21%, and it is projected to fall further next year.

Interestingly, projections for next year, unlike last year's projections for this year, are quite positive, with 67% of 472 organizations projecting increases and only 18% projecting decreases. This is in stark contrast to last year's projections when only 52% of organizations projected increases and 30% projected decreases. This year's IT budgets have significantly exceeded those expectations.

**Figure 5: Change in IT Budget from Previous Year (2004 to 2015 actual, 2016 projected)**



IT budget increases also appear to be relatively large. For the 531 organizations providing data this year, and including the 34% of them (21% + 13%) reporting flat or decreased IT spending this year, the average IT budget still increased by 4.6%. Projections for next year are quite sanguine too, despite 33% (18% + 15%) of 472 responding organizations projecting flat or decreasing IT spending levels, the average IT budget is expected to increase by 4.8%.

#### D. IT Budget Allocations

Although overall IT budgets on average increased this year, as indicated in Table 12 this increase is not evenly distributed among the individual budget categories. However, comparisons between this year and last are somewhat problematic due to improvements to the question, particularly the addition of an “Other” category and the change of “Services” to “Cloud Services.” Moreover, keep in mind that the data in Table 12 indicate the *allocation* of the average IT budget to the various categories, not the *magnitude* of that spending. Still, it is worth noting that projections for next year indicate more than a 20% increase in spending for “Cloud Services” and nearly a 4% increase for Software, while relative decreases are projected for every other category, including approximately 6% drops for Hardware and Contractors, and almost a 5% decrease for Consultants.

**Table 12: Actual IT Budget Allocations for 2014 and 2015 and Projected for 2016**

Budget Categories	% Allocated			% change projected 2015 to 2016
	2014 Actual	2015 Actual	2016 Projected	
Hardware	15.68	15.84	14.91	-5.84%
Software	17.88	17.89	18.59	3.88%
Facilities (including supplies and consumables)	5.59	5.55	5.50	-0.83%
Employees	38.46	37.63	37.09	-1.46%
Consultants	6.49	5.57	5.30	-4.78%
Contractors	5.79	5.92	5.56	-6.18%
Cloud Services (SaaS, PaaS, IaaS, processes, etc.) (1)	10.09	7.68	9.27	20.77%
Other	N/A	3.92	3.78	-3.50%
(1) In 2014 this category was labeled “Service (SaaS, PaaS, IaaS, cloud, processes, etc.)” and there was no “Other” category.				
(2) n unique organizations = 319 (2015, actual), 282 (2016, projected), 366 (2014, actual)				
(3) Annual totals may not = 100% due to rounding				

As for how these numbers stack up against the six years of IT Trends Study data from 2009 to 2014<sup>2</sup>, as indicated in Table 13, the people-related budget categories (i.e., Contractors, Consultants, and Employees) align fairly well with last year. Since Hardware, Software, and Facilities were combined in a single category prior to last year, adding together the Hardware, Software, and Facilities categories for each of the past two years also yields a reasonably comparable situation. These results are also shown graphically in Figure 6.

**Table 13: 2009-2015 IT Budget Allocation (Actual) and 2016 (Projection)**

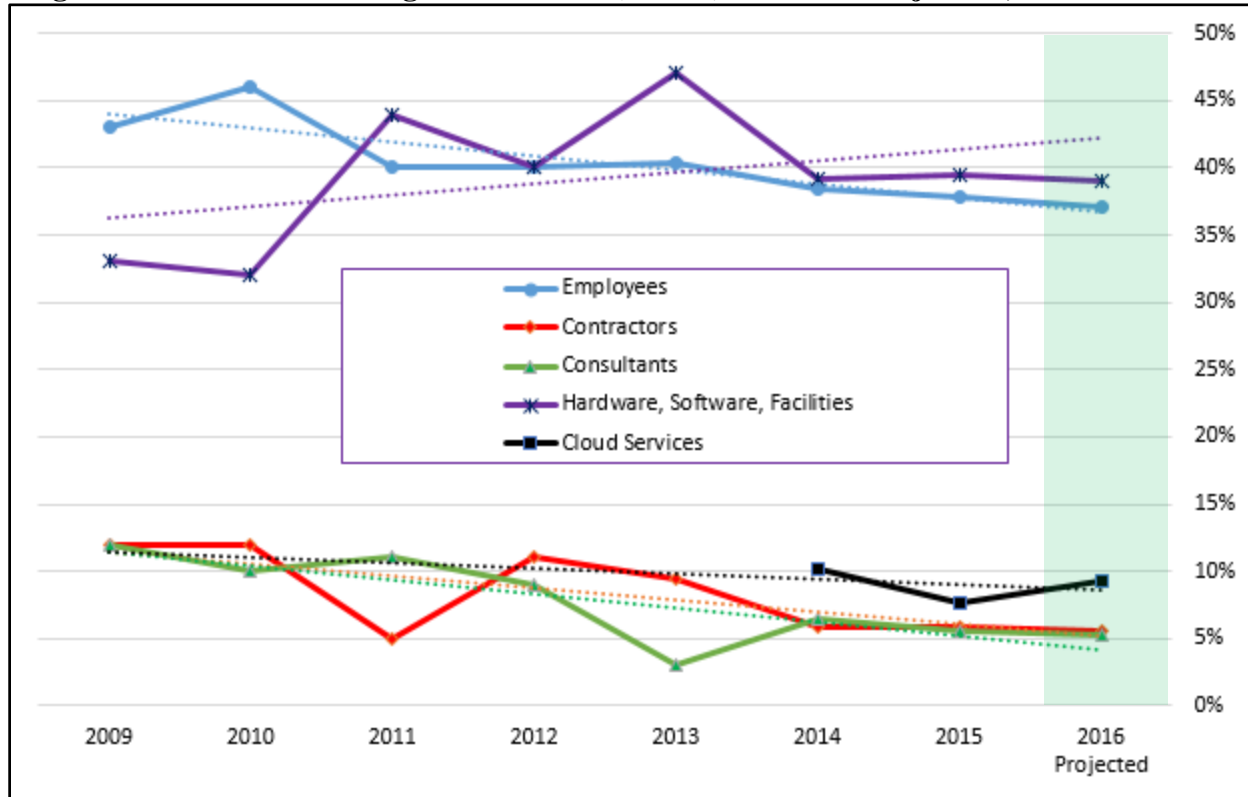
Budget Categories	2009	2010	2011	2012	2013	2014	2015	2016 Projected	2009-2015 Average
Employees	43.0%	46.0%	40.0%	40.0%	40.3%	38.5%	37.8%	37.1%	40.8%
Contractors	12.0%	12.0%	5.0%	11.0%	9.5%	5.8%	5.9%	5.6%	8.7%
Consultants	12.0%	10.0%	11.0%	9.0%	3.1%	6.5%	5.6%	5.3%	8.2%
Hardware, Software, Facilities	33.0%	32.0%	44.0%	40.0%	47.1%	39.2%	39.4%	39.0%	39.2%
Cloud Services						10.1%	7.7%	9.3%	8.9%
Other							3.9%	3.8%	

Albeit an imperfect mapping, especially since there is no way to determine what amount in prior years should go into the new Cloud Services or Other categories, some insights can be gleaned

<sup>2</sup> For details about the budget allocations previously used in the IT Trends Study, see Kappelman, L. A., McLean, E. R., Johnson, V., & Gerhart, N. (2014). “The 2014 SIM IT Key Issues and Trends Study,” *MIS Quarterly Executive*, 13(4), 237-263; with online Appendix, A1-A6.

from this analysis. Not surprisingly, in light of the inclusion of these two new categories, this year every spending category is below its seven-year (2009-2015) average.

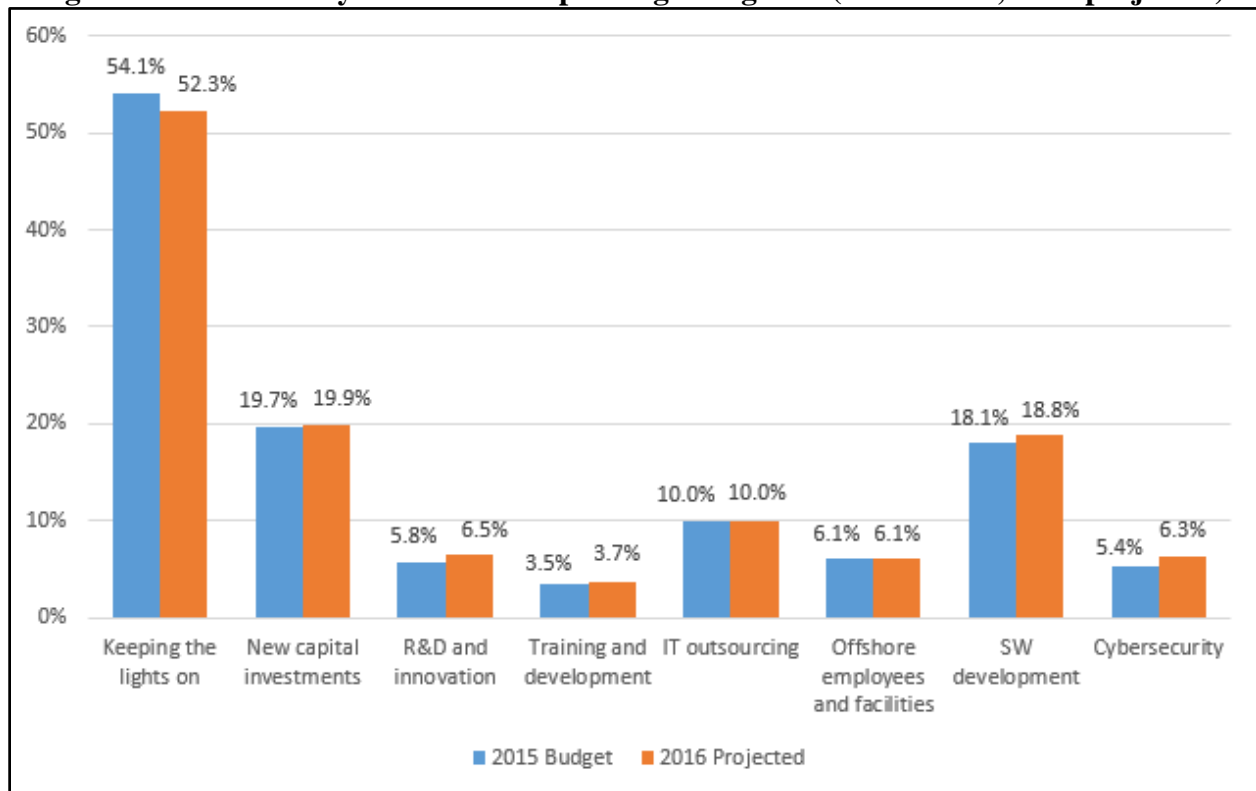
**Figure 6: 2009-2015 IT Budget Allocations (Actual) and 2016 Projection, with Trendlines**



Recall that these data represent the relative percentages of the average IT budget going to these different categories, not the absolute amount of money actually being spent. In fact, the budget of an individual organization, as well as the total for all organizations as a whole, could be increasing or decreasing while the percent of those budgets going to different categories would always total 100%. So Table 12, Table 13, and Figure 6 represent the *relative* amounts of 100% going into each IT budget category each year.

### E. A Different Look at IT Spending

This year, in order to gain more insight into IT spending, we asked respondents to report on this year's and next year's spending in several broad and not mutually exclusive categories, such as day-to-day operations, security, outsourcing, and research and development (R&D). Unlike the largely independent and mutually exclusive budget categories in Table 12 and Table 13, each of these shown in Figure 7 tend to cross several of those independent categories.

**Figure 7: Not Mutually Exclusive IT Spending Categories (2015 actual, 2016 projected)**

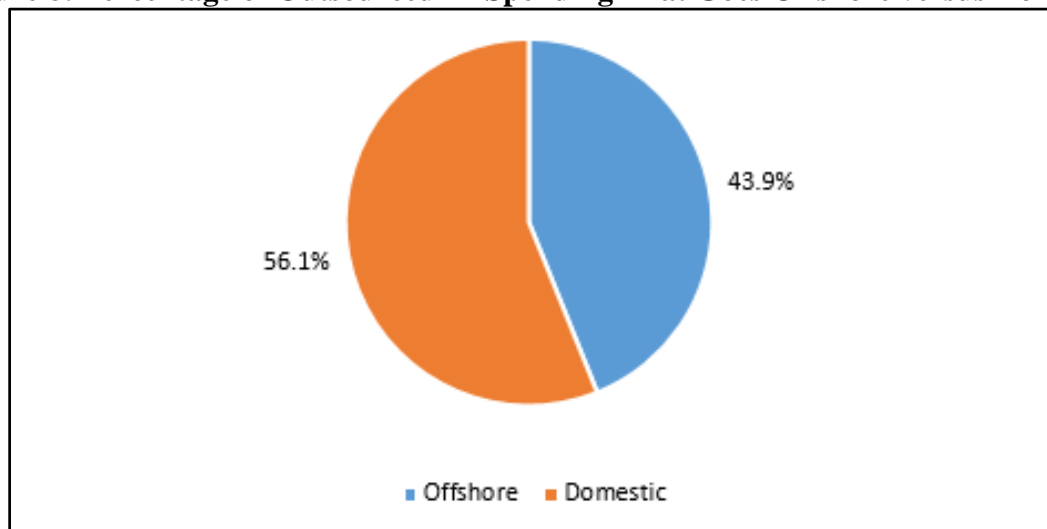
As indicated in Figure 7, over half of the IT budget is spent on the day-to-day operational activities of “keeping the IT lights on.” The next largest categories are new capital investments and software development. For next year, respondents are projecting a 3.25% decline in spending on day-to-day operations to 52.3% of total IT budget and a 17.9% increase in cybersecurity spending to 6.3%. Moreover, spending is projected to increase by 11.5% for R&D, 6.6% for training, 3.9% for software development, and 1.0% for capital investment; while outsourcing and offshore spending are expected to remain unchanged.

Pushing a little deeper into the responses, the decile distributions of IT spending in these eight categories are shown in Table 14. Notice that the distributions for all the spending categories are heavily skewed toward the low end, except for day-to-day IT operations which is skewed toward the high end, with 32.1% of the companies spending 40% or less on operations and 43.3% spending greater than 60% of their IT budget on it. In fact, spending on operations is the only category for which the median is greater than the average. On the other hand, more than 25% of organizations do not report investments in IT R&D, nearly 30% do no IT outsourcing, and over 60% spend no IT funds offshore.

**Table 14: Decile Distribution of 2015 IT Spending by Category (zero values removed)**

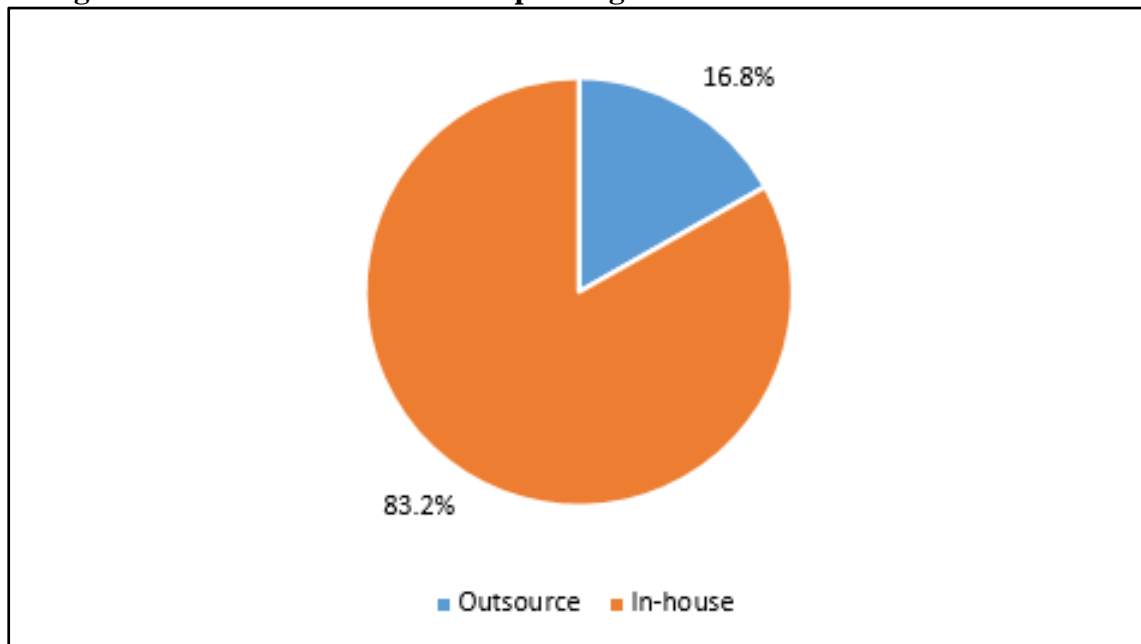
PERCENT OF ORGANIZATIONS IN VARIOUS SPENDING RANGES BY CATEGORY 2015								
	Keeping Lights on	Capital Investment	R&D Innovation	Training	IT Outsourcing	Offshore	Software Development	Cybersecurity
0	0.7%	4.5%	25.2%	8.8%	29.0%	60.3%	9.0%	12.0%
<=10	6.5%	39.1%	90.2%	97.7%	73.9%	85.0%	47.3%	91.3%
<=20	13.8%	69.0%	95.5%	100.0%	86.8%	89.4%	71.0%	99.2%
<=30	25.3%	87.4%	98.7%	100.0%	92.7%	94.1%	86.6%	99.4%
<=40	32.1%	92.4%	98.9%	100.0%	96.2%	97.4%	92.1%	100.0%
<=50	44.5%	96.4%	99.5%	100.0%	98.1%	98.8%	94.5%	100.0%
>50	55.5%	3.6%	0.5%		1.9%	1.2%	5.5%	
>60	43.3%	2.1%			0.8%	0.9%	2.5%	
>70	26.4%	1.2%			0.5%	0.6%	1.9%	
>80	9.3%	0.5%			0.3%	0.3%	0.5%	
>90	2.5%	0.2%					0.3%	
Average	54.06%	19.65%	5.82%	3.47%	9.98%	6.09%	18.11%	5.38%
Median	60%	15%	5%	2%	5%	0%	15%	5%
N	443	422	377	387	372	340	366	357

In addition, we asked the 372 respondents who indicated at least some spending on IT outsourcing what percentage of that outsourcing will be spent domestically this year and next. Their responses are shown in Figure 8 that indicates that over half (56.1%) of outsourced spending is domestic. Given that just under 10% of the IT budgets of these organizations' are spent on outsourcing, we estimate that on average approximately 4.4% of IT spending goes to offshore outsourcing and the remaining 1.69% of offshore spending is on their own employees and facilities.

**Figure 8: Percentage of Outsourced IT Spending That Goes Offshore versus Domestic**

We also asked the 340 respondents who indicated at least some offshore IT spending to report on the percentage of that offshore spending that was outsourced, rather than spent on their own offshore employees and facilities. As indicated in Figure 9, 16.8% of offshore IT spending is outsourced. In light of these responses, it is reasonable to conclude that at least 90% of IT spending in the USA is spent in the USA. Of course, some organizations do spend much more than the averages reported here, but many more spend few if any IT dollars offshore.

**Figure 9: Percent of Offshore IT Spending that is Outsourced versus In-House**



## F. IT Workforce and Salary Trends

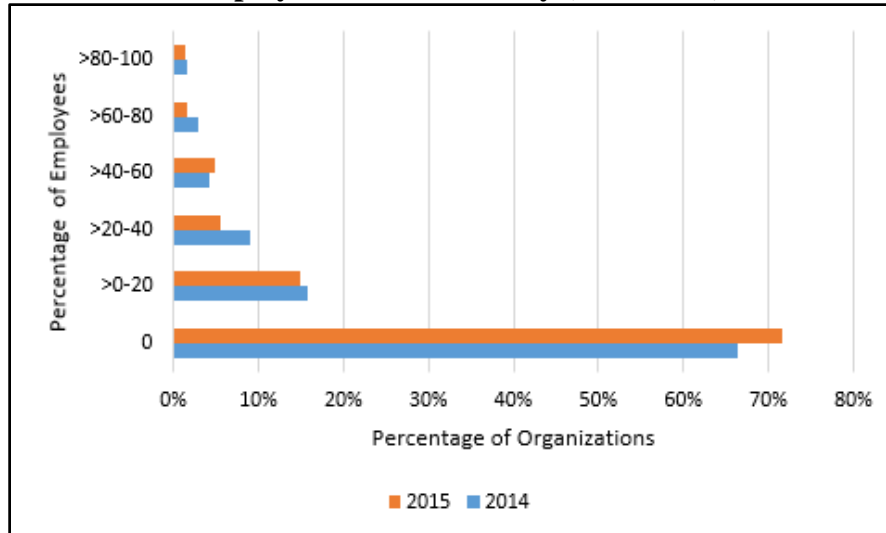
### i. IT Employees and Their Salaries

The average number of “full-time IT employees (IT FTEs, not including contractors or consultants)” who “report under or to the top IT person” is 354 for the 680 unique organizations reporting. This is up slightly from the 342 reported last year. However, despite this year’s higher average, 72.2% of the respondents reported having 100 or fewer employees, which is up a bit from last year’s number of nearly 70%. Given the diversity among responding SIM member organizations, it is also noteworthy that the median number of employees is only 33, and seven respondents reported no IT FTEs at all. The largest number of IT full-time employees reported is 35,000.

The average number of total corporate full-time employees is 8,111 for the 705 organizations reporting and the median is 600 employees, so the average number of 354 IT FTEs represents 4.36% of the total number of all FTEs, and the median number of IT FTEs represents 5.50% of the median number of all FTEs. As indicated in Figure 10, with 626 organizations reporting, on average 8.33% of their IT FTEs are “located outside their home country (i.e., offshore).” This is down from the 10.44% reported last year. The biggest shift year-over-year is that over 71.6% report having no IT employees outside the U.S. as compared to 65.1% last year. Some year-over-

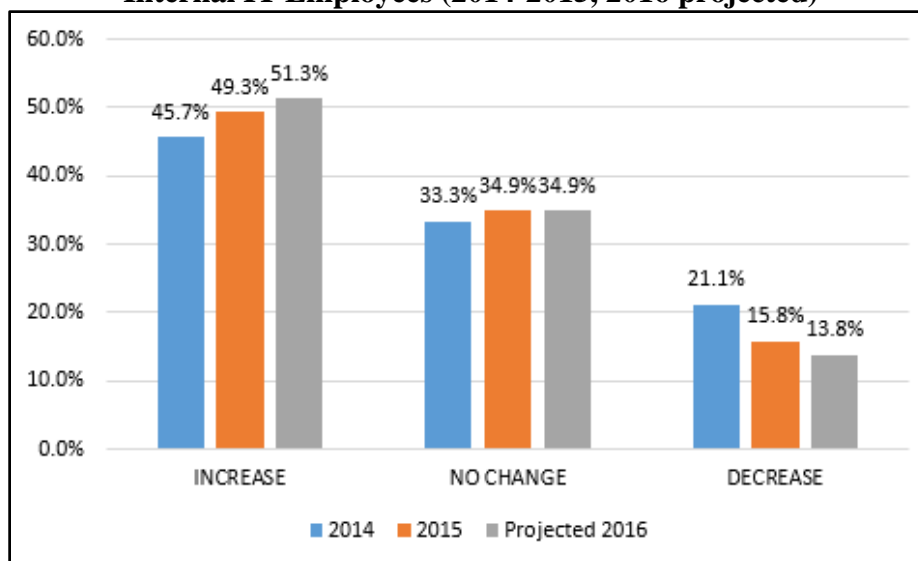
year differences observed in the IT Trends Study may be indicative of sample variations rather than changes in trend, and thus it may take several years of data to confidently discern a trend.

**Figure 10: Percent of Full-Time IT Employees Located Outside Employer's Home Country (2014-2015)**



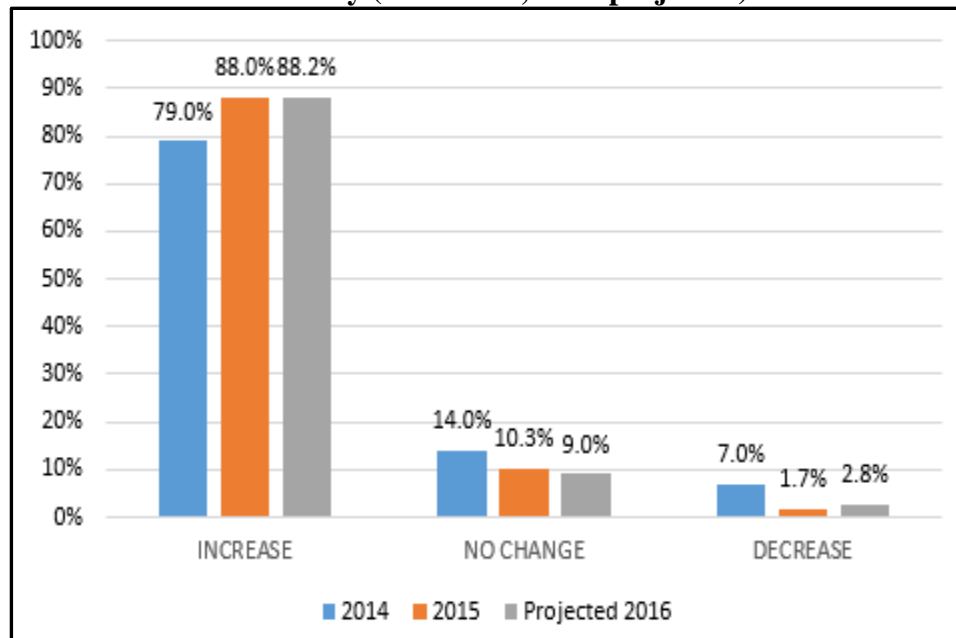
Nearly half (49.3%) of the 519 organizations that responded report an increase of internal IT employees in 2015, only 15.8% report a decrease, and 34.9% report no change at all. As shown in Figure 11, this is nearly an 8.0% increase over last year. The average increase in the number of IT employees is 3.03%, including those organizations reporting a decrease or no change at all. The outlook for next year is quite optimistic too with 51.3% of the 478 responding organizations anticipating an increase, 34.9% a decrease, and 13.8% no change.

**Figure 11: Percent of Organizations Reporting Changes in Number of Internal IT Employees (2014-2015, 2016 projected)**



Over 98% of the 475 responding organizations report that average IT salaries either remained flat or increased this year, with 88% reporting increases and 10.3% reporting no change. This is a significant improvement over what was reported last year and is illustrated in Figure 12 below. The average increase in average IT salaries reported this year for these 475 organizations is 3.37%. Also, with 433 reporting, the outlook for next year is quite encouraging, with 88.2% anticipating increases in average IT salaries, 9% anticipating salaries to remain flat, and an overall average increase of 3.72% projected.

**Figure 12: Percent of Organizations Reporting Changes in Average IT Salary (2014-2015, 2016 projected)**



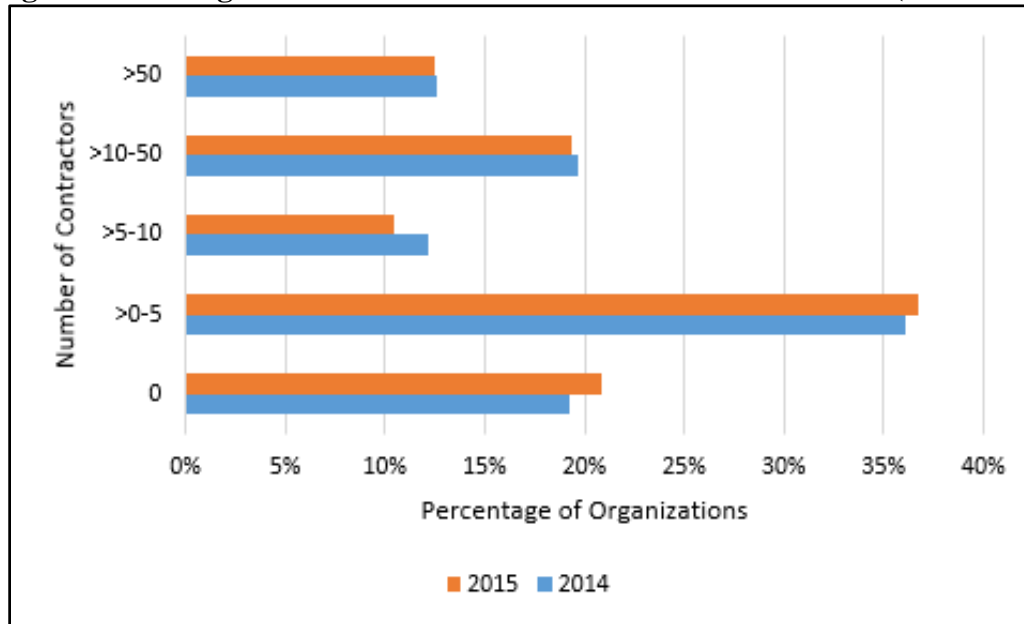
In light of these increases in IT workforce and average salaries, it is not surprising that total IT salaries increased an average of 4.3% for the 507 organizations reporting, including the 4.9% reporting decreases and 8.3% reporting no change at all. The 460 organizations offering projections for next year expect total IT salaries to increase further by 4.6%, including the 4.6% expecting no change and 6.5% expecting a decrease. This year, 86.8% reported increases in total IT salaries, while only 4.9% reported decreases; next year, 88.9% project increases, with only 6.5% expecting decreases.

## ii. IT Contractors and Consultants

The average number of contractors and consultants utilized by the 574 responding organizations is 104.1, which is up considerably from 63.7 reported in 2014; however, the median is five and the standard deviation of 1091 is a quite large. Looking at the distribution in Figure 13, the 20.9% of organizations reporting no contractors or consultants this year is similar to, but represents more than an 8% increase over last year's 19.3%. Also, 87.5% of organizations report having fewer than 50 IT contractors and consultants, which is very similar to the 87.3% reported last year. Nearly 16% (15.97%) of all IT contractors and consultants were reported "offshore" (i.e., outside

the employer's home country) for the 524 organizations responding; on the other hand, 67.9% reported no offshore consultants at all.

**Figure 13: Change in Number of IT Contractors and Consultants (2014-2015)**

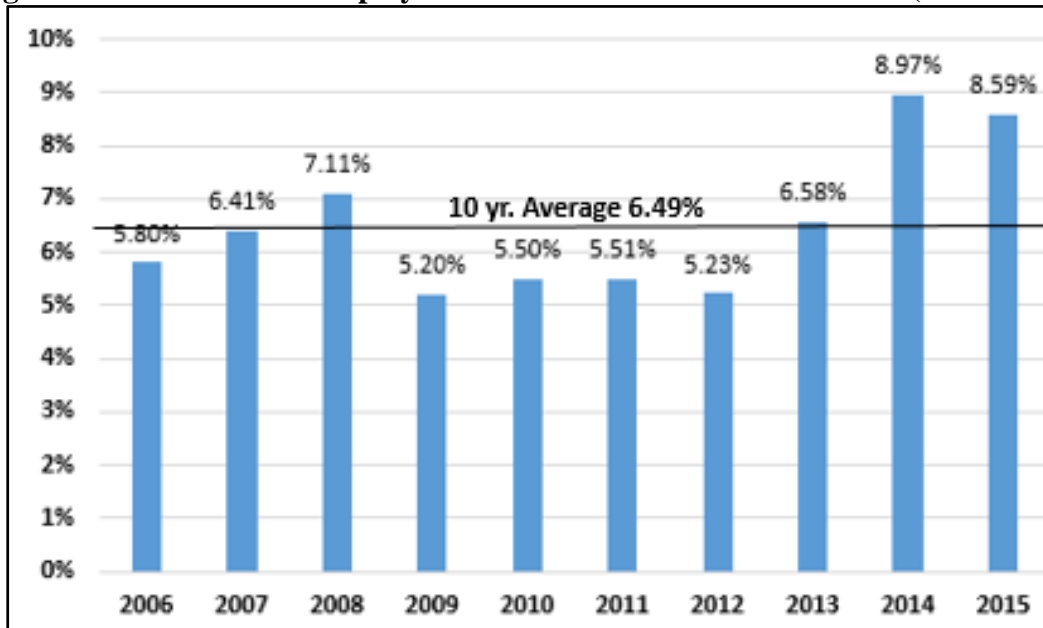


The number of IT contractors and consultants increased this year in 45.6% of the 476 organizations reporting, and remained unchanged in 41.4%. Only 37.5% of 440 responding organizations expect increases next year and 47.0% predict no change. The average percentage increase in the number of IT contractors and consultants for all respondents is 2.98% this year and is projected to be 1.51% next.

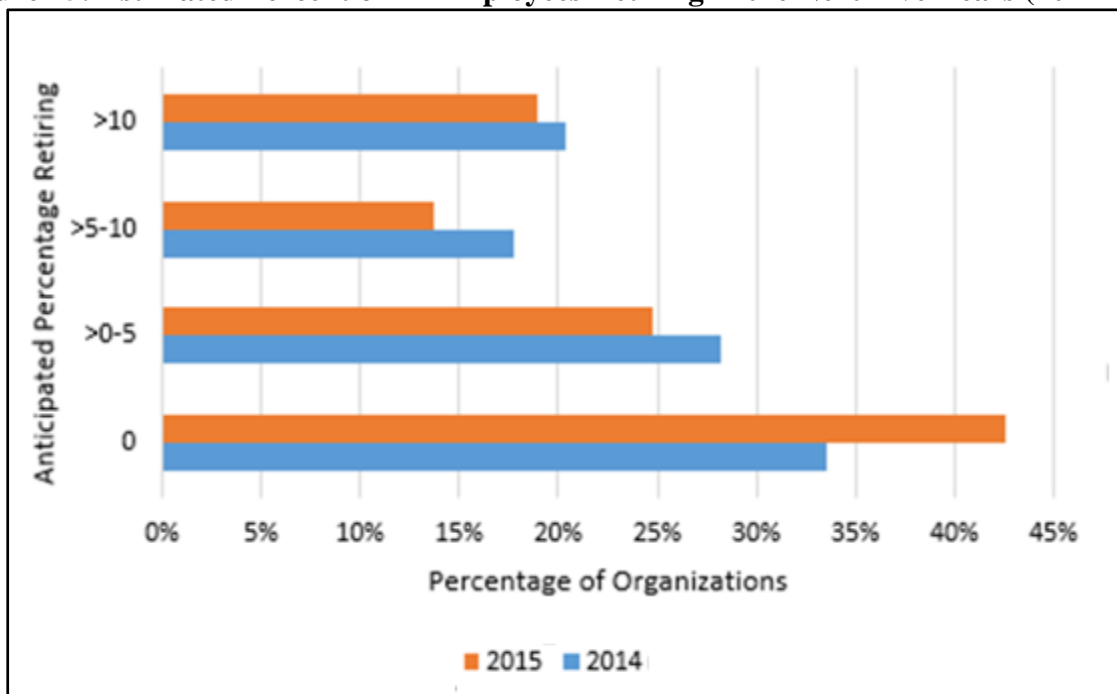
### iii. Turnover and Retirements, Education and Training

There was a sharp increase in turnover rate from 5.23% in 2012 to 8.97% last year. This year, with 543 unique organizations reporting, the level decreased slightly to 8.59%. As indicated in Figure 14, this is the third year in a row above the ten year average, now at 6.49%. However, nearly a quarter (23.4%) of the 543 reported a 0% turnover rate, a total of 74.8% reported a turnover rate of 10% or less, and 92.1% a rate of 20% or less.

Average turnover rates that are increasing are often seen as an indication of an improving job market, with more job opportunities inducing employees to consider switching employers; although retirements and other factors could also be at play. In order to better understand this, respondents were also asked what percentage of their turnover rate was “involuntary (i.e., the result of downsizing, layoffs, terminations, etc.)” or “voluntary (i.e., quitting, retirements, etc.)” For the 413 organizations reporting more than zero turnover, their average voluntary turnover accounted for nearly twice the involuntary turnover rate, 68.6% versus 31.4%. Using this ratio, we estimate that this year about 5.9% of turnover is voluntary and 2.7% is involuntary. This further supports the premise that turnover is being heavily driven by voluntary movements in the job market or retirements.

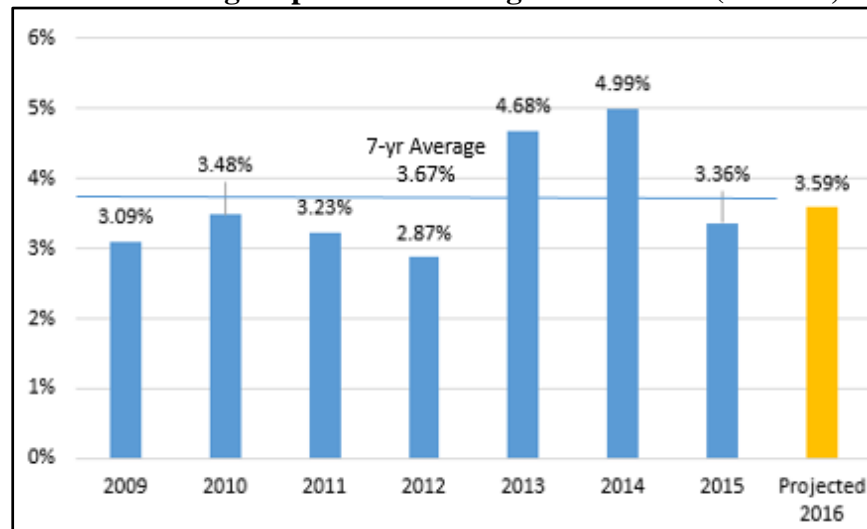
**Figure 14: Full-Time IT Employee Actual Turnover Rate 2006-2015 (2015 n=543)**

The average five-year IT retirement estimate this year is down slightly to 6.72% as compared to 6.91% last year. As shown in Figure 15, the big shift this year occurred with a large increase in the percent of organizations anticipating no retirements over the next five years, up from 33.6% to 42.5%. Assuming the five-year average is equally distributed each year, then 4.6% of this year's 8.6% turnover is voluntary job changes, 1.3% is retirements, and 2.7% is involuntary.

**Figure 15: Estimated Percent of IT Employees Retiring in the Next Five Years (2014-2015)**

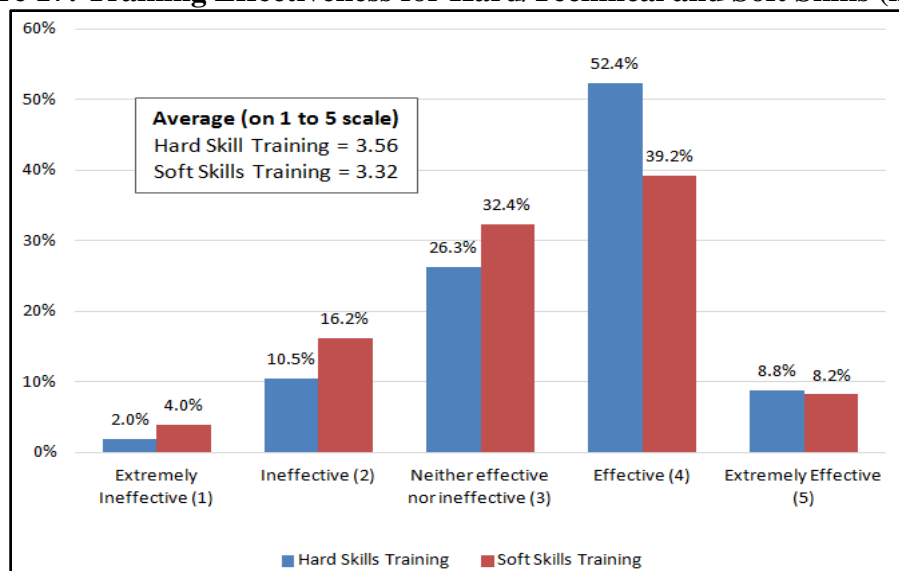
Investments in IT employee education and training are believed to be an effective way to increase the retention of IT workers. Increasing investment in IT training historically has been seen as an indicator of an improving IT employment picture. Figure 16 indicates a significant jump of more than 50% in spending on IT employee education and training two years ago, with a small increase last year of 6.6%. However, this year spending on training fell below the seven-year average of 3.67% of IT budget in the 404 organizations reporting, an increase of 6.8% next year is forecast.

**Figure 16: Percent of IT Budget Spent on Training & Education (2009-15, 2016 projected)**



This year we also asked respondents for the first time to rate the effectiveness of the training and education programs with respect to both hard skills and soft skills. The results are shown in Figure 17. Training effectiveness with respect to hard skills ranked much higher than that for soft skills, with 61.2% (52.4% + 8.8%) ranking hard skills training as either effective or extremely effective while only 47.4% (39.2% + 8.2%) ranked soft skills training that high.

**Figure 17: Training Effectiveness for Hard/Technical and Soft Skills (n=353)**



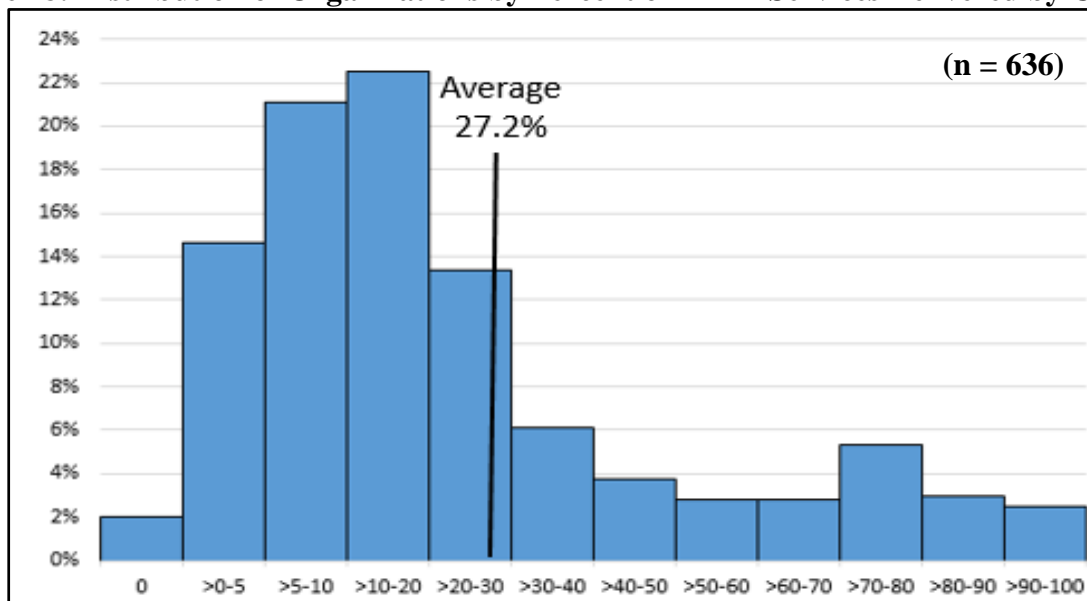
## G. Use of Cloud and Shared Services

### i. Cloud-Based IT Services and Solutions

When describing their IT budget allocations as described above, IT leaders reported spending an average of 7.7% of their total IT budget on “cloud services” this year (see Table 13 and Figure 6). However, when asked to estimate their 2016 spending, respondents predicted 9.3% of their IT budget will be allocated, on average, to the cloud, a 20.8% year-over-year projected increase.

In this year’s IT Trends Study, organizations delivered 27.2%, on average, of all of their IT services via the cloud, which is down from 31.1% last year, but closer to the 26.5% seen in 2013<sup>3</sup>. The distribution is somewhat skewed to the left (as indicated in Figure 18), with a median of 20% (up from 19% last year) and a standard deviation 25.4%. Of the 636 organizations responding to this use-of-cloud question, 98% indicate that they utilize the cloud to some extent, which is up from 90.5% last year and up from 81% in 2013. More than one-quarter (26.4%) obtained more than 30% of all IT services via the cloud, down from 34% last year; nearly one-fourth (23.5%) obtained more than 50%, while almost 38% (37.7%) obtained 10% or less of all IT services via the cloud.

**Figure 18: Distribution of Organizations by Percent of All IT Services Delivered by Cloud**



The 623 respondents who indicated that they utilized cloud-based services to at least some extent were then asked “What percentage of your cloud-based IT services are provided in each of the

<sup>3</sup> It is plausible that this decrease is an accurate reflection of the variation in aggregate cloud utilization; however, other factors could be at play. To some extent the measured decrease could be due to low cloud utilization levels among the organizations that adopted cloud since last year’s study, given that there was an 8.3% year-over-year increase in organizations utilizing cloud. Sampling variations could also be a factor; although we poll the population of SIM members each year, membership rosters do change, as do those members who participate in the study in any particular year. On the other hand, the decrease is consistent with the measured decrease in cloud spending this year (see Table 12); however, that seems inconsistent with the increasing utilization of SaaS, PaaS, and IaaS, as indicated in Table 16, unless the unit cost of cloud services is also decreasing.

following cloud sourcing categories (indicated in Table 15 below).” Of the 98% of organizations that used at least some cloud-based services, 61.8% used public cloud providers while 37.2% used a private cloud. Slightly less than one-third (31.2%) reported using a combination of both private and public clouds.

**Table 15: Utilization of Various Cloud Sourcing Categories**

Cloud Sourcing Category	Percentage of Organizations Utilizing	Average Percentage of All Cloud-Based IT Services Provided by This Category	Organizations Utilizing This Category for Over 50% of Cloud-Based IT Services
Internal Private Single Tenant (n=621)	37.2%	21.8%	20.3%
External Public Multi Tenant (n=620)	55.4%	31.6%	27.3%
External Public Single Tenant (n=618)	29.0%	10.0%	5.5%

The respondents were also asked to indicate “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.” As shown in Table 16, responses indicated that cloud usage was up in all categories, with the exception of Process as a Service, which dropped slightly. However, average utilization by those using a category was up across the board. Also, calculating the average of all IT delivered by each of the cloud-service categories, using the average of 27.2% of all IT that was delivered via the cloud (from Figure 18), respondents indicated that the amount of IT delivered by SaaS, PaaS, and IaaS were all up significantly to 17.0%, 1.7%, and 2.9%. This is the result of greater utilization among those using the cloud, even though aggregate cloud use was somewhat lower this year.

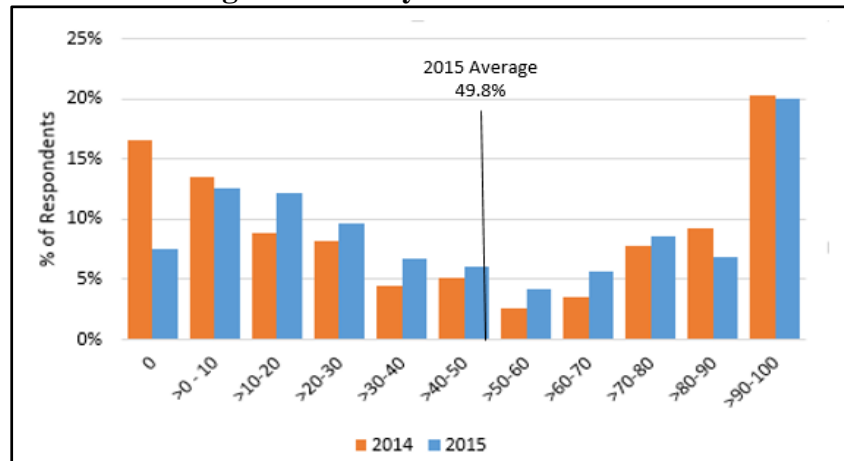
**Table 16: Percentage of External Cloud-Based IT Services Delivered in These Categories**

	SaaS		PaaS		IaaS		Pr-aaS		Other	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
% of those using the cloud at all	77.7	80.8	18.5	20.8	27.7	28.9	6.5	6.3	2.7	1.8
Average utilization, including those with no use	62.4	62.3	6.1	6.2	10.1	10.7	2.7	1.7	1.3	1.2
Average utilization of those using it	75.5	77.1	7.4	29.9	12.2	37.0	3.3	27.6	1.6	64.3
Average of all IT delivered this way	12.9	17.0	1.3	1.7	2.1	2.9	0.6	0.4	0.4	0.3
n answering the question	202	307	48	79	72	110	17	24	7	7
n = senior IT leaders in 381 (2015) and 260 (2014) unique organizations										

## ii. Shared Services for IT Delivery

Respondents were also asked “What percentage of *all* IT services are delivered as a ‘shared service’ to your organization?” With 478 senior IT leaders responding, 92.5% indicated that their organizations used at least some level of IT shared services. This is a significant increase from the 83.4% reported last year and the 70.1% reported in 2013. As indicated in Figure 19, the average amount of all IT services delivered as shared services this year was 49.8%. More strikingly, the number of people reporting no shared IT services dropped from 16.6% in 2014 to 7.5% this year.

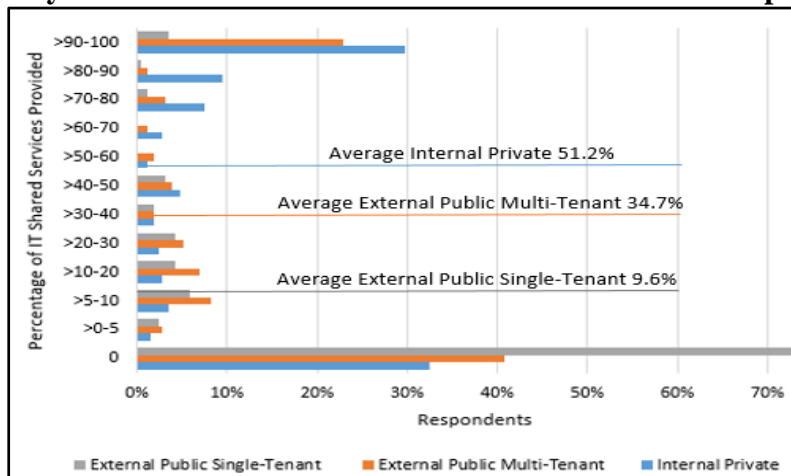
**Figure 19: Distribution of Organizations by Percent of All IT Delivered as Shared Service**



2014 n = 452, 2015 n = 478

Respondents who indicated that some of their IT is delivered as a shared service were then asked what percentage of those services were sourced as “internal private single-tenant,” “external public multi-tenant,” or an “external public single-tenant.” Responses from 247 organizations (Figure 20) indicate that on average 51.2% (down from 62.2% in 2014) of IT shared services are hosted internally and 44.3% externally. Interestingly, 22.1% don’t use internal capabilities at all and 30.7% don’t use any external capabilities for IT shared services.

**Figure 20: Delivery of IT Shared Services: Internal versus External Capabilities (n = 257)**



## V. Performance Measurement

An examination of IT performance metrics has been included in the SIM IT Trends Study each year since 2012. These questions provide a valuable insight into the manner in which organizations assess IT performance and the performance of the IT executives who are responsible for the management of the IT assets and services. This year, participants were presented with a list of 30 possible metrics (somewhat modified from last year, see Appendix B for details) and were asked to “Select up to five (5) of your organization’s most important performance measures for [the three separate categories of] internal IT, outsourced IT, and your own performance.” In prior years, only “up to three” selections were asked for.

### A. Performance Measurement for Internal and Outsourced IT

Respondents representing 785 unique organizations identified the metrics used to assess their internal IT performance, while 566 organizations (those that indicated they outsourced) provided insight into the metrics used to assess their outsourced IT. Table 17 presents the IT performance measures, ordered by the percentage of companies selecting that metric. Each metric is also labeled as to whether it is IT (I), Business (B), Strategic (S), or a combination of two or more.

**Table 17: Performance Measures for Internal and Outsourced IT**

Focus	Performance Measure	% Selecting	
		Internal IT <i>n=785 organizations</i>	Outsourced IT <i>n=566 organizations</i>
I	Availability/Up Time	1 (56.7%)	1 (48.6%)
I/B	Customer (of IT)/IT User Satisfaction	2 (32.1%)	7 (19.8%)
B	Customer (of the Business) Satisfaction	3 (29.2%)	6 (20.0%)
I/B	Cost Control/Reduction (IT)	4 (28.5%)	3 (27.0%)
I	Help Desk Performance	5 (27.6%)	8 (19.4%)
I	Projects Delivered (on Time)	6 (24.1%)	5 (22.1%)
I	Projects Delivered (on Budget)	7 (20.9%)	4 (23.0%)
S	Value of IT to the Business	8 (19.2%)	14 (8.1%)
S	IT’s Contribution to Strategy	9 (17.1%)	21 (4.4%)
I/B	IT Spending (as % of Revenue)	10 (16.9%)	15 (7.8%)
B	Productivity Improvement (Business)	11 (12.2%)	13 (8.5%)
B/S	Innovative New Ideas	12 (12.0%)	20 (5.8%)
I	SLA Target Compliance	13 (11.1%)	2 (27.6%)
B	Cost Control/Reduction (Business)	14 (10.4%)	12 (9.4%)
I/B	Productivity Improvement (IT)	15 (10.3%)	9 (13.3%)
B	Project Return on Investment	16 (10.1%)	19 (6.2%)
I	IT Employee Retention	17 (9.4%)	25 (2.7%)
B	Total Cost of Ownership	18 (8.9%)	11 (11.0%)
I	Time to Market (IT)	19 (7.0%)	16 (7.4%)
S	Profit Growth	20 (6.2%)	28 (1.4%)
B	Improved Decision Making	21 (6.1%)	28 (1.4%)
S	Revenue Growth	22 (6.0%)	27 (1.9%)
I/B	Headcount Reduction (IT)	23 (5.7%)	17 (7.2%)
S	Increases in New Products/Services	24 (5.5%)	18 (6.5%)
I	Quality/Defect Rates in Software	25 (5.1%)	10 (11.8%)

<b>B</b>	<b>Time to Market (Business)</b>	<b>26 (3.8%)</b>	<b>23 (3.2%)</b>
<b>I/B</b>	<b>IT Spending (per Employee)</b>	<b>27 (2.9%)</b>	<b>24 (2.7%)</b>
–	<b>NONE – No Measures are Used</b>	<b>28 (2.7%)</b>	<b>22 (3.9%)</b>
<b>B</b>	<b>Headcount Reduction (Business)</b>	<b>29 (1.8%)</b>	<b>26 (2.3%)</b>
<b>S</b>	<b>Return on Equity</b>	<b>30 (1.7%)</b>	<b>30 (1.4%)</b>
–	<b>Other</b>	<b>31 (0.3%)</b>	<b>31 (0.2%)</b>
<b>FOCUS: I=IT, B=Business Operations, S=Strategic</b>			

The performance measures for internal IT point to three important objectives of the IT function. First, IT must effectively and efficiently “keep the IT lights on” and deliver IT services for the business. This objective is evident in metrics such as Availability/Up Time (ranked first for both internal and outsourced IT, and the only measure selected by more than a third of respondents in either category), IT Cost Controls (ranked fourth for internal and third for external), Help Desk Performance (fifth internal and eighth external), and Projects Delivered On Time & On Budget (ranked sixth and seventh internal, and fifth and fourth external).

Second, IT leaders recognize the importance of improving business operations. These senior-most IT leaders identified Customer Satisfaction, of both IT Customers (second internal and third external) and Business Customers (ranked third internal, and sixth external), as critical business-oriented metrics for IT.

Third, IT continues to play a growing role in enabling the strategic goals of the organization. Respondents indicated the Value of IT to the Business and IT’s Contribution to Strategy as important strategic metrics for internal IT at eighth and ninth, respectively; however, because outsourced IT is more often operational rather than strategic, these strategic metrics were only 14th and 21<sup>st</sup> for outsourced IT, respectively.

Not surprisingly, outsourced IT appears to be measured differently than internal IT. The most obvious difference is the lack of metrics with a strategic focus in the top-ten outsourced rankings. Looking at the rankings, outsourced IT appears to be measured primarily in terms of the efficiency and effectiveness in their delivery of IT services, while in-house IT metrics, in addition to these operational concerns, also addresses a broader set of business and strategic objectives.

## B. Performance Measurement for CIOs

Last year, for the first time, the IT Trends Study included a question designed to provide some insight into the measures used to evaluate the performance of CIOs and other top IT leaders themselves. This year, we continued that investigation by asking respondents to “select up to five” performance measures used to assess their personal performance. In the analysis that follows, we shift our focus to the 485 respondents in the CIO-only dataset.

Table 18 presents the metrics that CIOs selected as the most important in assessing their own personal performance. As before, each measure is categorized according to its focus (IT, Business, or Strategic). The table is sorted by the rankings of the CIOs’ reported job performance measures; and their selections for internal and outsourced IT are also provided for comparison. No trends can be discerned, since this is only the second time these CIO performance measures were asked; nevertheless, some important findings are evident.

This year's top five performance measures selected by these CIOs are consistent with last year's top five, with the exception of Innovative New Ideas which fell to seventh. Two of these top five are directly related to IT's strategic contribution to the business (i.e., IT's Contribution to Strategy in first place and the Value of IT to the Business in fifth). The other three are more business-focused, but more operational in nature (i.e., Availability, IT User Satisfaction, and Customer of the Business Satisfaction, at second, third, and fourth, respectively).

**Table 18: Performance Measures for CIOs (2014-2015) & Internal & Outsourced IT (2015)**

Focus	Performance Measures	My Personal Performance (n=485 CIOs)			Internal IT (n=485 CIOs)		Outsourced IT (n=333 CIOs)	
		% selecting	2014 Rank	2015 Rank	% selecting	Rank	% selecting	Rank
S	IT's Contribution to Strategy	35.5%	3	1	17.9%	9	3.1%	21
I	Availability/Up Time	34.0%	5	2	57.8%	1	34.8%	1
I/B	IT User/Customer Satisfaction	31.9%	2*	3	38.3%	2	15.4%	5
B	Customer of the Business Satisfaction	30.3%	2*	4	29.4%	4	16.1%	4
S	Value of IT to Business	29.6%	1	5	18.7%	8	6.8%	11
I/B	Cost Control/Reduction (IT)	27.8%	7	6	25.1%	5	16.5%	3
B/S	Innovative New Ideas	22.6%	4	7	12.1%	12	4.9%	15
I/B	IT Spending as % of Revenue	18.7%	15	8	15.4%	10	4.5%	18
I	Projects Delivered on Time	18.1%	6	9	24.9%	6	14.0%	7
B	Productivity Improvement (Business)	16.9%	8**	10	14.0%	11	6.4%	12
I	Projects Delivered on Budget	15.8%	11	11	20.0%	7	15.2%	6
I	IT Employee Retention	13.4%	18****	12	10.1%	13	2.1%	23
B	Cost Control Reduction (Business)	13.0%	9	13	10.1%	13	7.6%	10
I	Help Desk Performance	11.9%	20	14	34.0%	3	12.4%	8
B	Improved Decision Making	11.5%	13	15	4.9%	22	0.8%	29
I/B	Productivity Improvement (IT)	11.1%	8**	16	8.6%	17	6.4%	12
B	Project Return on Investment	10.5%	12	17	10.1%	13	4.5%	18
S	Profit Growth	9.3%	16	18	6.0%	19	1.0%	28
S	Revenue Growth	8.9%	9	19	6.0%	19	1.9%	25
I	SLA Target Compliance	7.4%	19	20	9.7%	16	16.7%	2
B	Total Cost of Ownership	7.2%	14	21	7.4%	18	8.9%	9
S	Increases in New Products	5.6%	20	22	4.5%	24	4.7%	16
I/B	Headcount Reduction (IT)	5.1%	20*****	23	4.9%	22	4.7%	16
I	Time to Market (IT)	4.5%	16****	24	5.4%	21	3.5%	20
I/B	IT Spending per Employee	3.5%	28	25	3.1%	27	1.7%	27
S	Return on Equity	3.1%	24	26	1.7%	30	0.6%	30
B	Time to Market (Business)	3.1%	16****	26	3.7%	26	2.1%	23

<b>I</b>	<b>Quality Defect Rates in Software</b>	<b>2.5%</b>	23	<b>28</b>	4.5%	24	6.4%	12
–	<b>NONE - No measures are used</b>	<b>2.1%</b>	25	<b>29</b>	2.3%	28	2.5%	22
–	<b>OTHER</b>	<b>1.2%</b>	NR	<b>30</b>	1.4%	31	0.6%	30
<b>B</b>	<b>Headcount Reduction (Business)</b>	<b>0.8%</b>	30*****	<b>31</b>	2.3%	28	1.9%	25

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

Duplicate RANK numbers (unless noted below) indicate a tie

\* 2014 item was “User Satisfaction” – 2015 split into two items

\*\* 2014 item was “Productivity Improvement” – 2015 split into two items

\*\*\* 2014 item was “Time to Market” – 2015 split into two items

\*\*\*\* 2014 item was “Employee Attrition/Retention/Turnover” – 2015 changed to “IT Employee Retention”

\*\*\*\*\* 2014 items “IT Cost / Headcount Reduction” and “Workforce Reduction” – 2015 merged into “Headcount Reduction” and split into two items

IT’s Contribution to Strategy ranks as the most selected personal performance measure for CIOs, displacing last year’s top ranked Value of IT to the Business. Taking a broader perspective, three of the top ten CIO performance metrics are strategy focused, five have a business focus, and four are IT focused, suggesting that in the aggregate senior-most IT executives are evaluated relatively evenly across these three dimensions.

The fact that a strategic metric ranks first in both years is encouraging. However, considering that barely a third of this year’s 485 CIOs selected Strategic Contribution of IT as one of their five most important personal performance measures is somewhat surprising. Maybe the need to “keep the lights on” is crowding out strategic performance concerns and measures. The strategic contribution of IT is clearly an important performance measure for many CIOs, but not the majority of them.

The fact that three of the top-five CIO performance measures are shared with both internal *and* outsourced IT suggests an operational focus of many of the CIOs completing this questionnaire. Availability/Up Time was ranked second for CIOs this year (up from fifth last year), selected by 34.0% of respondents. No doubt operational concerns remain an important part of the performance measurement of top IT leaders. Nevertheless, business and strategic concerns are also an important part of the evaluation of CIOs.

Satisfaction of both IT Customers (ranked third and selected by 31.9%) and Business Customers (ranked fourth and selected by 30.3%) are both top-five performance measures that CIO share with in-house and outsourced IT. While IT customer satisfaction is expected, it is somewhat surprising that performance in all three categories is measured with respect to business customer satisfaction. However, given the degree to which IT now permeates business customer-facing services (e.g., e-commerce sales to consumers and businesses, mobile applications), it is clear that IT capabilities can have a tremendous impact on customer satisfaction and revenue. As seen in the CIO-focused section that follows, CIOs are spending more time with the customers and suppliers of the business and their IT people too.

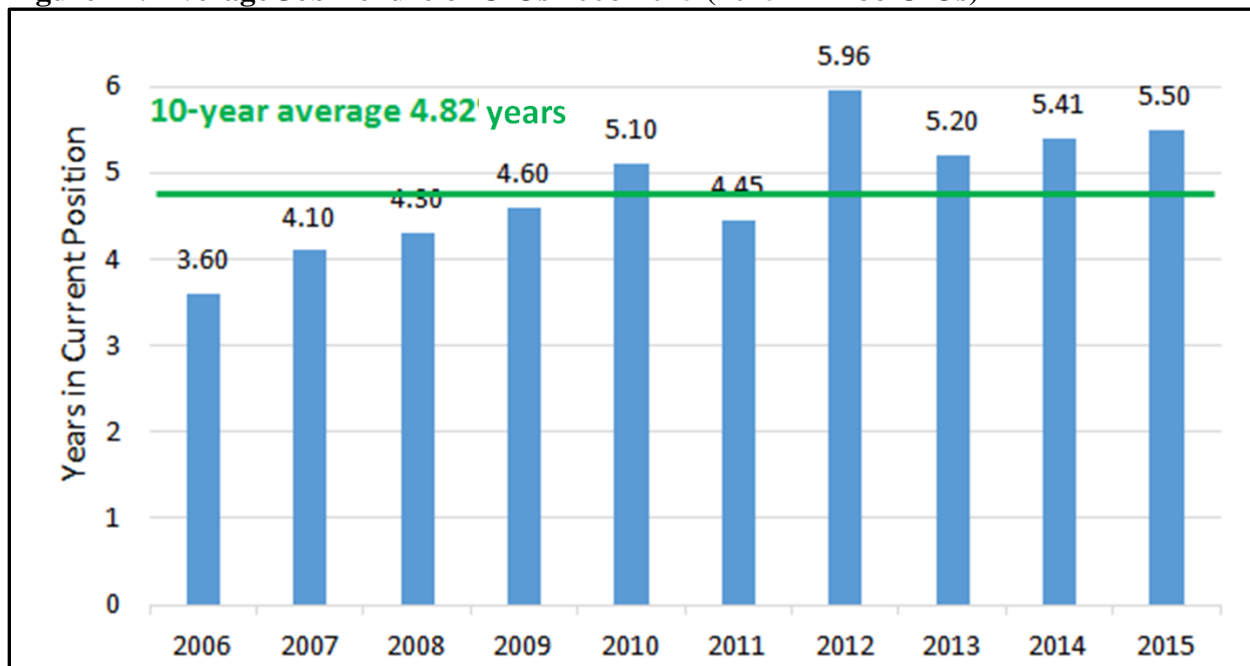
## VI. CIO Tenure, Reporting Relationships, Background, and Time Allocation

The 785 unique organizations dataset provides insights into what IT organizations are doing. To better understand the role and activities of CIOs, we turn to the CIO dataset that consists the 486 people who identified themselves as the “top IT person (e.g., the ‘CIO’)” in their organizations. For more information about how these two datasets were created from the total sample of 1218 respondents, please see Appendix B. Thanks to two new questions added this year, we see that the average age of the 480 CIOs providing answers is 50.6 years with a median of 51, and most of the 486 are male (88.9%).

### A. CIO Tenure

The average time these 486 CIOs have been in their current position increased this year to 5.5 years (see Figure 21). The average CIO job tenure since 2006 is 4.82 years, up from last year’s average of 4.75 years. The media job tenure of these CIOs is 4.0. Overall, CIO tenure appears to be on an upward trend over the last decade.

**Figure 21: Average Job Tenure of CIOs 2006-2015 (2015 n = 486 CIOs)**



In terms of distribution, it is worth noting that more than half (52.3%) of the CIOs have been in their current position for less than four years, 43.0% for less than three, and more than one fourth (28.8%) for less than two. On the other hand, 32.9% have been in their current position for six years or more, nearly one sixth (15.8%) for ten years or more, and 7.4% for 15 years or more.

### B. CIO Reporting Relationships

It has been suggested that the role of the CIO is defined by whom he or she reports to; although the evidence is mixed as to the extent, and in the way, formal reporting relationships are related to

CIO focus and job activities<sup>4</sup>. As indicated in Table 19, 42.9% of the responding IT executives reported directly to their CEO. This is down from 44.2% last year and below the ten-year average of 43.3%. Just over 29% report to their CFO, up from 25.7% last year and above the ten-year average of 27.8%. CIOs reporting to the COO or Chief Administrative Officer is also up over last year at 16.8% and above the ten-year average of 15.4%. Moreover, 88.7% report to a C-level executive (i.e., CEO, CFO, COO), up from the 84.9% last year, and 89.7% report at the C-level or above this year when those who report to their Board of Directors are included. CIOs reporting to a “business unit, function, or department executive” is down quite a bit this year from 9.4% to 4.8%, and is also below the ten-year average of 7.0%.

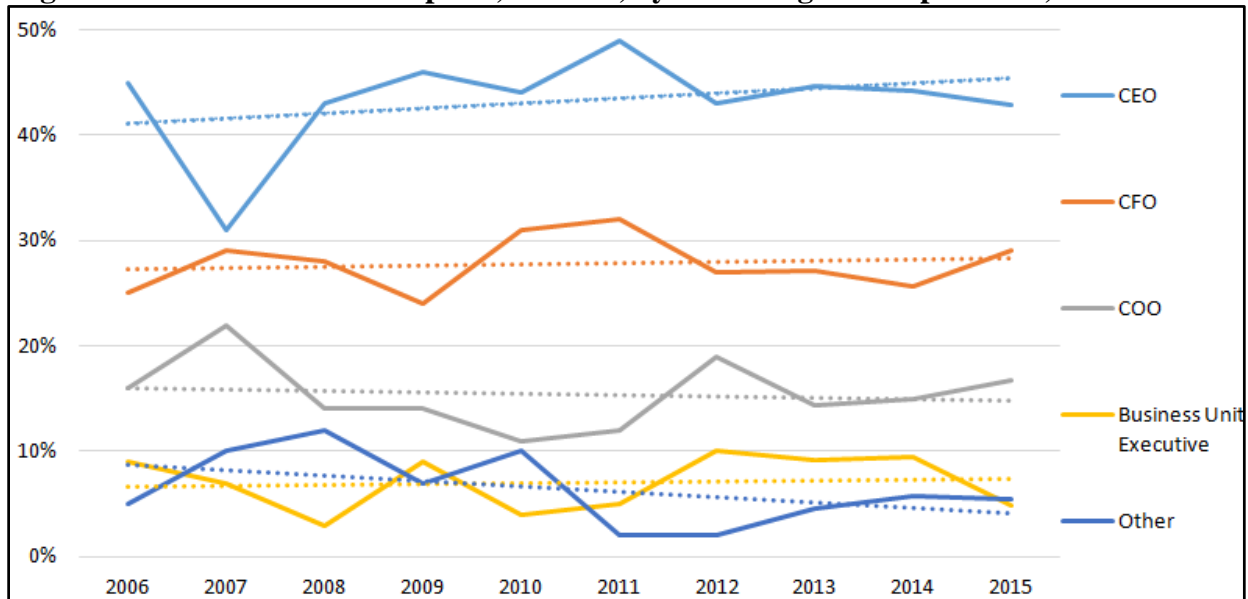
**Table 19: To Whom the CIO Reports, 2006-2015 by Percentage of Respondents**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg.
<b>CEO</b>	45%	31%	43%	46%	44%	49%	43%	44.7%	44.2%	42.93%	43.28%
<b>CFO</b>	25%	29%	28%	24%	31%	32%	27%	27.1%	25.7%	29.02%	27.78%
<b>COO/CAO</b>	16%	22%	14%	14%	11%	12%	19%	14.4%	15.0%	16.79%	15.42%
<b>Board of Directors</b>	New question									0.96%	0.96%
<b>Business Unit Executive</b>	9%	7%	3%	9%	4%	5%	10%	9.2%	9.4%	4.80%	7.04%
<b>Other</b>	5%	10%	12%	7%	10%	2%	2%	4.6%	5.8%	5.52%	6.39%
<b>n = # of responding CIOs</b>								284	448	417	

Graphing the data in Table 19 and including a trendline, shown in Figure 22, which suggests that there is a slow moving trend of an increasing percentage of CIOs reporting to CEOs, CFOs, and business unit executives, and a decreasing percentage reporting to COOs and others. Other studies confirm these increases for CIOs reporting to CEOs<sup>5</sup>; but these trends do not appear particularly strong. Moreover, this year’s data suggest that the upward CEO and business unit trend may be turning down, while the upward CFO and COO trends are gaining strength. Time will tell which trend will prevail.

<sup>4</sup> Laplante & Bain (2005), “The Changing Role of the CIO: Why IT Still Matters,” *IT Professional*, 7(3), 45-49 and Smaltz, Sambamurthy, & Agarwal (2006), “The Antecedents of CIO Role Effectiveness in Organizations: An Empirical Study in the Healthcare Sector,” *IEEE Transactions on Engineering Management*, 53(2), 207-222 found CIO reporting relationships to be unrelated to CIO job activities; however, Carter, Grover, & Bennett (2011), “The Emerging CIO Role of Business Technology Strategist,” *MIS Quarterly Executive*, 10(1), 19-29 did find a relationship between to whom CIOs report and the focus and activities of CIOs.

<sup>5</sup> In *CIO* magazine’s “State of the CIO 2014,” Kim Nash reports that “44 percent of CIOs report to the CEO, up from 39 percent last year” <http://www.cio.com/article/2380234/cio-role/state-of-the-cio-2014-the-great-schism.html>.

**Figure 22: To Whom CIOs Reports, 2005-15, by Percentage of Respondents, w/Trendlines**

### C. CIO Previous Employment

With regards to previous employment, 486 CIOs responded to this question regarding their prior position before becoming the top IT executive in their current organizations. Overwhelmingly, CIOs still come from a prior IT position (91.6%); this is a little above the six-year average of 91.2% (see Table 20). Also, 70.6% of CIOs come from outside the organization, the highest number since these data were first collected in 2010.

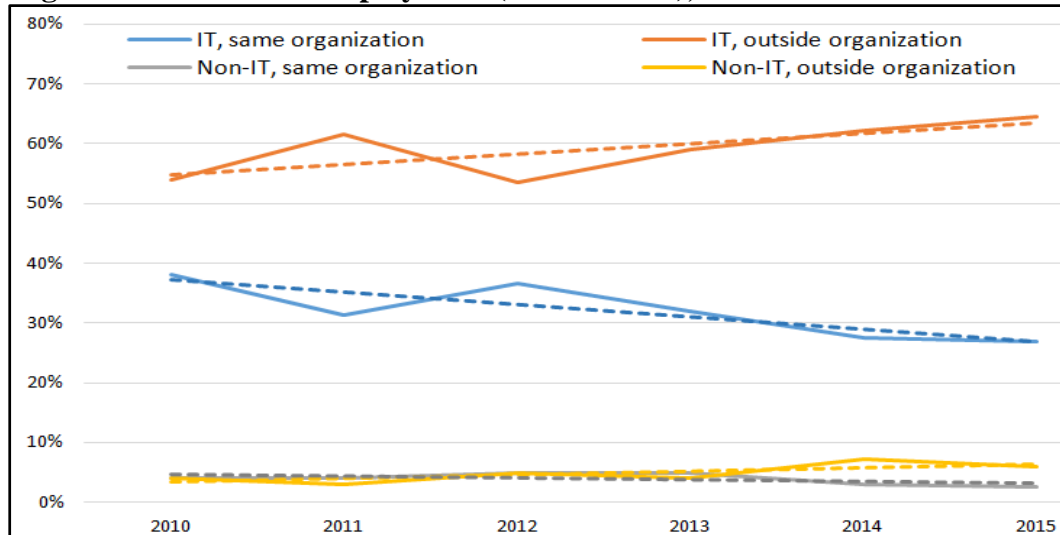
**Table 20: CIO Prior Employment (2010 to 2015) with Subtotals (2015 n = 486 CIOs)**

	2010	2011	2012	2013	2014	2015	6-year Average
IT, same organization	38.0%	31.3%	36.6%	32.0%	27.5%	27.0%	32.1%
IT, outside organization	54.0%	61.6%	53.5%	59.0%	62.3%	64.6%	59.2%
Non-IT, same organization	4.0%	4.0%	5.0%	5.0%	2.9%	2.5%	3.9%
Non-IT, outside organization	4.0%	3.0%	5.0%	4.0%	7.3%	6.0%	4.9%
Outside organization	58.0%	64.6%	58.4%	63.0%	69.6%	70.6%	64.0%
Same organization	42.0%	35.4%	41.6%	37.0%	30.4%	29.4%	36.0%
Prior IT position	92.0%	92.9%	90.1%	91.0%	89.8%	91.6%	91.2%
Prior non-IT position	8.0%	7.1%	9.9%	9.0%	10.2%	8.4%	8.8%

Considering the 2010 to 2015 data shown in Table 20, it seems clear that the percentage of CIOs coming from outside of the organization is steadily increasing. This is also evident in Figure 23, which is based on the Table 20 data. The percentage of CIOs coming from IT in an outside organization is at a six-year high of 64.6% and those coming from within the IT organization is at a six-year low of 27.0%. Similarly, for CIOs coming from a prior, non-IT position, we again see more than twice as many (6.0%) coming from another organization as those coming from the same

organization (2.5%). It is as if senior management is saying, “We don’t like the IT leadership we have and we don’t see the bench strength here either.” It is findings like these that suggest an increasing demand for a new kind of CIO, one that is different from what was needed in the past.

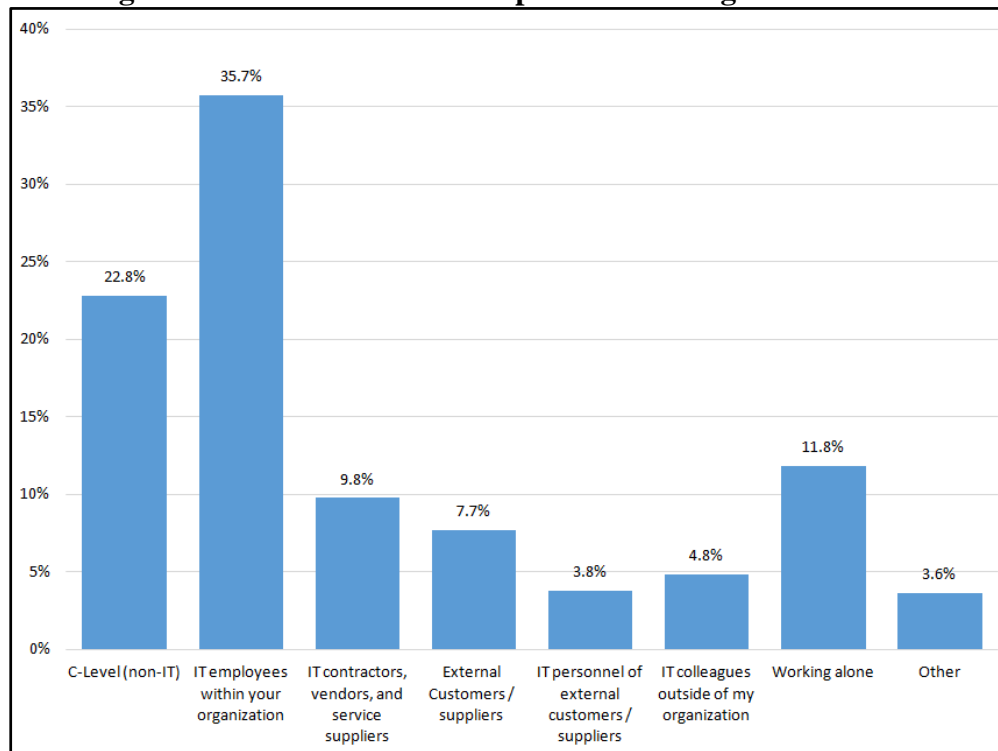
**Figure 23: CIO Prior Employment (2010 to 2015), with Trendlines**



#### **D. Who Do CIOs Spend Their Time with and How Do They See Those Relationships**

The job of the CIO is complex and evolving. Each year, the SIM IT Trends Study has included questions regarding how CIOs spend their time; in particular, how much of their time they spend with whom, and on what activities? Figure 24 shows the average percent of a CIOs time spent with different group of other people. More than twice as much of the average CIO’s time is spent with other employees in their organization than with those from other organizations (58.5% versus 26.1%) and about 54% is spent with other IT people, including the IT personnel of customers and suppliers of their organization. The 11.5% of their time spent with their organization’s customers and suppliers and their IT people is consistent with other research<sup>6</sup>.

<sup>6</sup> Peter Weill and Stephanie L. Woerner (2013). “The Future of the CIO in a Digital Economy,” *MIS Quarterly Executive*, 12(2), 65-75.

**Figure 24: Average Percent of a CIO's Time Spent Interacting with Others in 2015 (n =436)**

Digging deeper into this “with whom” dimension, those respondents who indicated that they spent any time at all with “C-level (non-IT) personnel” were asked about the frequency of their interactions with their organization’s C-level executives and board members. Specifically, respondents were asked if they met daily, weekly, monthly, quarterly, annually, or not at all with their CEO, COO, CFO, CMO (Marketing), CLO (Legal), Board or Directors (BOD), or (new for this year) an individual BOD member. These “how often” responses are summarized in Table 21. The percentage of CIOs reporting at least weekly interactions (i.e., the total of daily and weekly interactions) is highlighted for both this year and last, which was the first time these data were collected.

**Table 21: Frequency of CIO Interactions with Other C-level Executives (2014-2015)**

	CEO		COO		CFO		CMO		CLO		BOD		Individual BOD Member
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2015
<b>Daily</b>	16.6	20.1	30.5	22	30.7	31	14.1	13.5	5.2	3.8	1.1	1.9	3.1
<b>Weekly</b>	46.4	43.5	36.5	35.7	51.9	52.2	37.4	30	30.9	25.5	5.7	3.8	7.6
<b>At least weekly</b>	63.0	63.6	67.0	57.7	83.6	83.2	51.5	43.5	36.1	29.3	6.8	5.7	10.7
<b>Monthly</b>	24.9	24.6	10.2	12.5	11.3	9.9	19.6	19.4	25.3	25.5	14.3	14.7	13
<b>Quarterly</b>	6.9	7.3	2.3	2.4	2.1	2.8	3.7	6.4	12.3	9.7	28.3	31.9	18.2
<b>Annually</b>	3.1	1.2	1.1	0.5	1.4	0.2	2.2	1.2	4.5	5.9	16.8	17.5	13.5
<b>None</b>	2.1	3.3	19.5	27	2.5	3.8	23	29.6	21.9	29.6	33.7	30.3	44.7
<b>n =</b>	289	423	266	423	283	423	270	423	269	423	279	423	423

On average, CIOs interact most frequently with their CFOs, with 83.2% of CIOs reporting that they meet with their CFOs at least on a weekly basis. Additionally, 63.6% meet with their CEOs at least weekly, 57.7% meet with their COOs at least weekly, and with a mere 5.7% meet with their Boards of Directors, again at least weekly. However, 10.7% report at least weekly meetings with individual board members.

Comparing the frequency of CIOs' weekly interactions with CEOs and CFOs this year with last year's, both are relatively flat. On the other hand, the frequency of CIO interactions with COOs, CMOs, CLOs, and BODs are all down significantly; in fact, down by 13%, 14%, 19%, and 14%, respectively, as seen in Table 22. However, when looked at in the context of the entire three years in which these data were collected, these interactions are all up significantly, between 31% and 200%. The question is, what would account for these wide swings or are they merely year-to-year sample variations? Next year's data collection may help to answer this question.

**Table 22: Frequency and Value of CIO Interactions with Other Executives (2013-15)**

	Interact w/ at Least Once a Week					Interact w/ Monthly			Value/Quality of Interactions						Number of CIOs Responding		
									Very Positive/Positive			Neutral					
	% change 2013-2015	% change 2014-2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
CEO	31%	2%	49%	63%	64%	21%	25%	25%	83%	82%	80%	14%	14%	18%	139	289	390
COO	45%	-13%	40%	67%	58%	8%	10%	13%	78%	82%	84%	16%	15%	13%	92	266	291
CFO	41%	0%	59%	83%	83%	13%	11%	10%	75%	77%	78%	19%	20%	20%	136	283	384
CMO	52%	-14%	29%	51%	44%	15%	20%	19%	68%	68%	71%	29%	25%	25%	78	270	282
CLO	53%	-19%	19%	36%	29%	27%	25%	26%	47%	46%	51%	51%	44%	44%	81	269	282
BOD	200%	-14%	2%	7%	6%	16%	14%	15%	61%	65%	62%	39%	29%	36%	72	279	279
BOD Member	-	-	-	-	11%	-	-	13%	-	-	68%	-	-	30%	-	-	220

Those CIOs who indicated that they spent time interacting with other C-level executive were then asked about the "quality/value of this interaction to increasing the contribution and value of IT in your organization." Their responses with respect to the value and quality of these interactions are also shown in Table 22. There is little change in the percentage of CIOs rating their interactions as very positive or positive over the last three years; and in general, the numbers are quite positive. Of course, it must be noted that these are the *respondents'* opinions of the interactions, not the opinions of the *C-level executives* themselves.

## E. What CIOs Do with Their Time

Respondents were provided with a list of 17 different business and IT activities and asked to identify what percentage of their time they spend on each of them. Their responses are summarized in Table 23. Interestingly, if we look at the categories totals for IT and Business activities, it appears that time spent on these activities is very similar to what was reported last year. On

average, CIOs spend 53.6% of their time on IT activities (a 3.7% increase over 51.7% last year) and 43.4% on business activities (a 1.2% increase over 42.9% last year). It appears that the additional time came from the significant reduction (46%) in spent managing their own personal networks, although there were large changes in other activities as well. It is noteworthy that time spent on Business Priorities, Strategy, and Architecture activities doubled over last year, 16.2% versus 8.1%. These findings indicate that the CIOs are spending much more of their time (16.2% + 11.9% = 28.1%) on business and IT strategy this year than they did last year (8.1% + 8.0% = 16.1%). However, since these data have only been collected for two years, it is too early to claim that this is a trend.

**Table 23: How CIOs Spend Their Time 2014-2015 (2015 n=427)**

Activities Performed by CIOs: What CIOs Do with Their Time	2014		2015		% change 2014 to 2015	
	Average % of time spent on activity		Average % of time spent on activity			
	IT	Business	IT	Business	IT	Business
Business priorities, strategy, architecture		8.1%		16.2%		100%
IT priorities/strategy	8.0%		11.9%		49%	
Managing organizational change		6.8%		4.8%		-29%
Non-IT-related activities		5.1%		4.3%		-16%
Evangelist for the business		4.8%		3.0%		-38%
Business research		5.1%		4.0%		-22%
IT Evangelist	5.9%		4.9%		-17%	
IT Governance	5.4%		6.3%		17%	
IT human resources and talent management	4.7%		6.0%		28%	
IT operations/facilities management	5.1%		8.0%		57%	
Knowing the needs of IT customers		6.6%		6.4%		-3%
Knowing the needs of customers of the business		6.5%		4.7%		-28%
Project management	6.7%		7.0%		4%	
Software development	4.1%		1.8%		-56%	
Technical research	5.9%		3.0%		-49%	
Resource allocation/budgeting	6.0%		4.7%		-22%	
SUB TOTALS	51.7%	42.9%	53.6%	43.4%	3.7%	1.2%
Managing my personal network	5.4%		2.9%		-46%	
TOTAL	100.0%		100.0%			

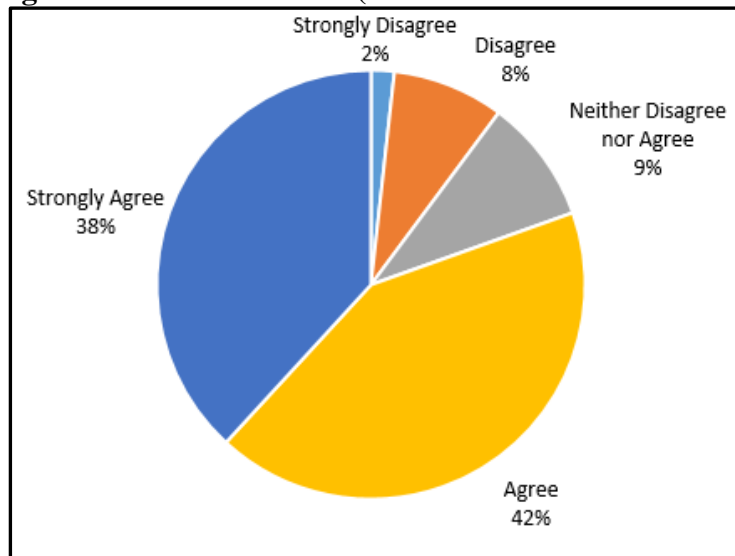
## VII. The Role of IT in Strategy and Innovation

Respondents were provided with several statements and asked to identify the degree to which they agreed or disagreed on a five-point Likert scale as indicated at the top of Table 24, which summarizes the responses of the most-senior IT leader in the data set of 785 organizations. The average scores for all the questions, as in last year's study, are positive (being greater than 3.0), with a range of 3.47 to 4.09 out of a possible 5.0. As seen in Table 24, questions about IT's role in helping to shape business strategy and enabling business strategy had average scores of 3.47 and 4.09 respectively; however, these are somewhat below last year's averages. Still, over half of the respondents (53.4%) either Strongly Agree or Agree that IT helps shape the business strategy, while only 22.8% either Strongly Disagree or Disagree. Not surprisingly, IT's role as an enabler of business strategy is perceived to be much stronger than its role in shaping business strategy. More than three out of four respondents (78.7%) either Strongly Agree or Agree that IT enables business strategy, while only 7.3% Strongly Disagree or Disagree.

**Table 24: IT Alignment, Credibility, and Role in Strategy and Innovation**

In my organization ...	N	Strongly - Disagree - Neither - Agree - Strongly Disagree					Average Score (out of 5)	
		1	2	3	4	5	2015	2014
IT helps shape business strategy.	631	3.8%	19.0%	22.3%	34.2%	19.2%	3.47	3.67
IT enables business strategy.	629	1.6%	5.7%	12.7%	41.0%	37.7%	4.09	4.20
IT provides valuable innovation to the business.	631	2.5%	10.5%	18.4%	39.6%	27.9%	3.81	4.00
IT has high credibility with executive leadership.	632	2.5%	9.3%	12.5%	38.8%	36.1%	3.97	3.89
Senior management is very aware of IT management issues.	629	4.5%	13.7%	16.5%	39.9%	27.2%	3.70	N/A
BOD is very aware of IT management issues.	632	10.1%	21.5%	22.9%	24.5%	13.0%	3.09	N/A
IT is aligned with the business.	634	1.7%	8.4%	9.3%	42.0%	37.9%	4.07	4.07

IT's role as an enabler is also seen in their ability to provide innovation to the rest of the organization. When asked if IT was involved in providing valuable business innovation, 67.5% Strongly Agree or Agree, while only 13.0% responded negatively. Responding IT leaders also indicate that in 67.1% of their organizations, the C-suite is very aware of IT issues (average score 3.7), but Boards are very aware in only 37.5% (average score 3.1). Nevertheless, 74.9% of respondents believe that IT has high credibility with executive leadership. With respect to IT's alignment with the business, responses were very similar to last year, when these questions were asked for the first time. As indicated in Table 24 and Figure 25, nearly 80% of the 634 responding senior IT leaders either Strongly Agree or Agree that IT is aligned, with only 10.1% responding negatively.

**Figure 25: Is IT Aligned with the Business? (Senior IT leaders in 634 unique organizations)**

We also explored differences between CIOs and non-CIOs in the unique organizations dataset. Adding a new twist for the first time this year, the CIOs were also asked to answer the questions in Table 24, not only for themselves, but also for how they thought their CEOs would answer. Similarly, the non-CIO IT leaders were asked to respond for themselves and their CIOs. The results are presented in Table 25, higher values indicating a more positive response.

**Table 25: Perspectives on Alignment, Credibility, and Role in Strategy and Innovation**

In my organization ...	Senior IT Leader, not CIOs			CIOs		
	IT Leader not CIO	IT Leader view of CIO	Diff	CIO	CIO view of CEO	Diff
IT helps to shape the business strategy.	3.36 269	3.5 238	-4.2%	3.62 421	3.49 405	3.6%
IT enables the business strategy.	3.94 268	3.86 240	2.0%	4.22 422	4.00 408	5.2%
IT provides valuable innovation to the business.	3.63 270	3.65 241	-0.6%	3.97 422	3.79 408	4.5%
IT has high credibility with executive leadership.	3.67 270	3.79 242	-3.3%	4.19 424	4.17 412	0.5%
Senior management is very aware of IT management issues.	3.55 269	3.89 237	-9.6%	3.86 420	3.96 408	-2.6%
BOD is very aware of IT management issues.	3.06 248	3.53 224	-15.4%	3.12 398	3.43 387	-9.9%
IT is aligned with the business.	3.81 271	3.9 244	-2.4%	4.24 372	4.14 413	2.4%
CIO is on the top management team.				3.79 422	3.84 410	-1.3%
Numbers in italics are the number of CIOs responding to that question.						



Interestingly, among the non-CIO IT leaders, the perception seems to be that CIOs have a slightly more positive view of IT's role in the organization than they do. This is especially true with respect to perceptions regarding C-suite and Board awareness of IT issues. However, the opposite is true when comparing the CIO perceptions and their perceived perceptions of their CEO. Here the CIO has, on average, a more positive view of IT's impact within the organization than that of the CEO. This is true except when considering senior management and BOD awareness of IT issues. This seems to suggest that many CIOs think that their CEO thinks that both he or she and the BOD are more aware of IT issues than the CIO believes to be the case.

Another interesting contrast can be seen in Table 25 when comparing the responses of CIOs to the non-CIO IT leaders. On every item, CIOs are more positive about how IT is perceived within their organization than are non-CIO IT leaders. This could be since CIOs, as part of the C-level team, have a much closer view of the business than those who may not have visibility into the role of IT in strategy and innovation. Nearly two-thirds of CIOs report that they are on the top management team that makes strategic business decisions: 66.1% answered Strongly Agree (44.3%) or Agree to the question, while only 23.7% answered Strongly Disagree or Disagree.

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

Since its founding in 1968, the Society for Information Management (SIM) has inspired the minds of IT leaders. Highly regarded as the premier network for IT leadership, SIM is a community of senior IT professionals who share their experiences and rich intellectual capital. SIM is the United States' oldest and largest not-for-profit professional organization for CIOs, senior IT executives, prominent academicians, advisors, and other IT leaders.

**SIM is built on a foundation of strong local chapters** whose members come together regularly to share, learn, and network to create a rewarding membership experience for SIM's members, their organizations, and their communities. SIM members are the new breed of C-suite IT leaders, perfectly positioned to leverage new technologies to create value and competitive gain. Visit <http://www.simnet.org/> for more information about SIM, its 38 chapters, and the many networking and learning opportunities SIM offers its members.

**SIM's mission is to bring together IT leaders to share, network and give back** to their communities through the collaboration of local chapters. SIM members strongly believe in and champion:

- The alignment of IT and business as a valued partnership;
- The creation and sharing of best practices;
- The effective, efficient and innovative business use of information technology to continuously bring to market valuable products and services;
- IT management and leadership skills development that enables our members growth at each stage of their career;
- The replenishment and education of future IT leaders including a strong role in influencing university curriculums and continuing education;
- Working with the IT industry to shape its direction;
- Policies and legislation that stimulate innovation, economic development, healthy competition and IT job creation;
- Serving our communities and the industry through giving and outreach

**SIM offers national programs** in addition to the many activities and opportunities provided by its chapters, including:

- **Advanced Practices Council:** An elite forum of senior IT executives who direct customized, independent research on subjects chosen by its members. This intimate, trusted network of cross-industry senior executive peers stay far ahead of trends and practices, bringing transformational solutions to their firms.
- **Enterprise Architecture Working Group:** Dedicated to helping IT professionals and their organizations capitalize on the opportunities of EA. This group of 60 EA practitioners, academics, and thought leaders from more than 20 industry, government, and academic organizations collaborate to improve EA practices.



- **IT Procurement Working Group:** Through shared best practices and strategies, this group helps their member companies (i) improve IT acquisition management; (ii) enhance competitiveness through informed procurement management; (iii) influence legislation affecting acquisitions; and (iv) foster collaboration between the various professions participating in the IT procurement process.
- **IT Trends Study:** This high-profile study is conducted every year to help benchmark various areas within the IT industry such as major issues, technologies, sourcing, CIO roles, staffing, spending, and salaries. The results allow SIM to speak for our members with a unified voice.
- **Members-In-Transition Program:** This unique program was developed to assist SIM members by providing a forum to share leads, opportunities and advice. Benefits include a career portal, an online collaboration group, weekly conference calls, Helping Hands program, and more.
- **Regional Leadership Forum:** An intensive, ten-month leadership development program focused on creating authentic leaders. Originally focused on IT leadership, RLF quickly expanded to include all disciplines and has graduated over 3500 leaders from over 300 sponsor companies.
- **SIM Women:** Designed to promote communication, mentorship, leadership and career development amongst the female members of SIM.
- **SIMposium:** The premier annual conference for technology executives, practitioners and business leaders.
- **STEM Outreach:** SIM chapters provide many opportunities for their members to give back to their local communities. The Outreach program supports initiatives focused on contributing to the vitality and continuation of the Information Technology profession.

For more information about the benefits of SIM membership and how to become a SIM member, please visit [http://www.simnet.org/?page=Mem\\_Benefits](http://www.simnet.org/?page=Mem_Benefits).

## Appendix B: Research Method, Design, and Data Collection for SIM's 36th Anniversary IT Trends Study

In 1980 SIM began a collaboration with IT scholars to solicit input from its members about the most important IT management issues. Over the years, the SIM IT Trends Study expanded to become one of the most insightful, comprehensive, and imitated investigations of IT leaders and the most important IT issues and technologies. This year marks the 36th anniversary of this valuable SIM program.

### A. The Organization and CIO Datasets Used in this Analysis

The IT Trends Study solicits input from the SIM's membership, and thus employs a convenience sampling technique. The overall response rate of 24.7% and 1,218 completed questionnaires is quite good for a population of senior managers like SIM's. As has been the practice since 2013, two distinct but somewhat overlapping datasets were derived from the 1218:

- The first dataset consists of the 486 respondents who identified themselves as the CIO or highest-ranking IT executive in their organization. It is referred to as the "CIO dataset" or sample, and is used primarily to better understand what IT leaders do, with whom they do it, and how their performance is measured.
- The second dataset is referred to as the "organization dataset" and consists of 785 unique organizations each represented by its highest-ranking IT leader who responded. All but the 14 in the CIO sample for whom organization affiliation was not provided are included in the Organization dataset. The organization sample is 94.75% U.S.-based, but as detailed in Table 26 below, the industry representation is quite diverse.

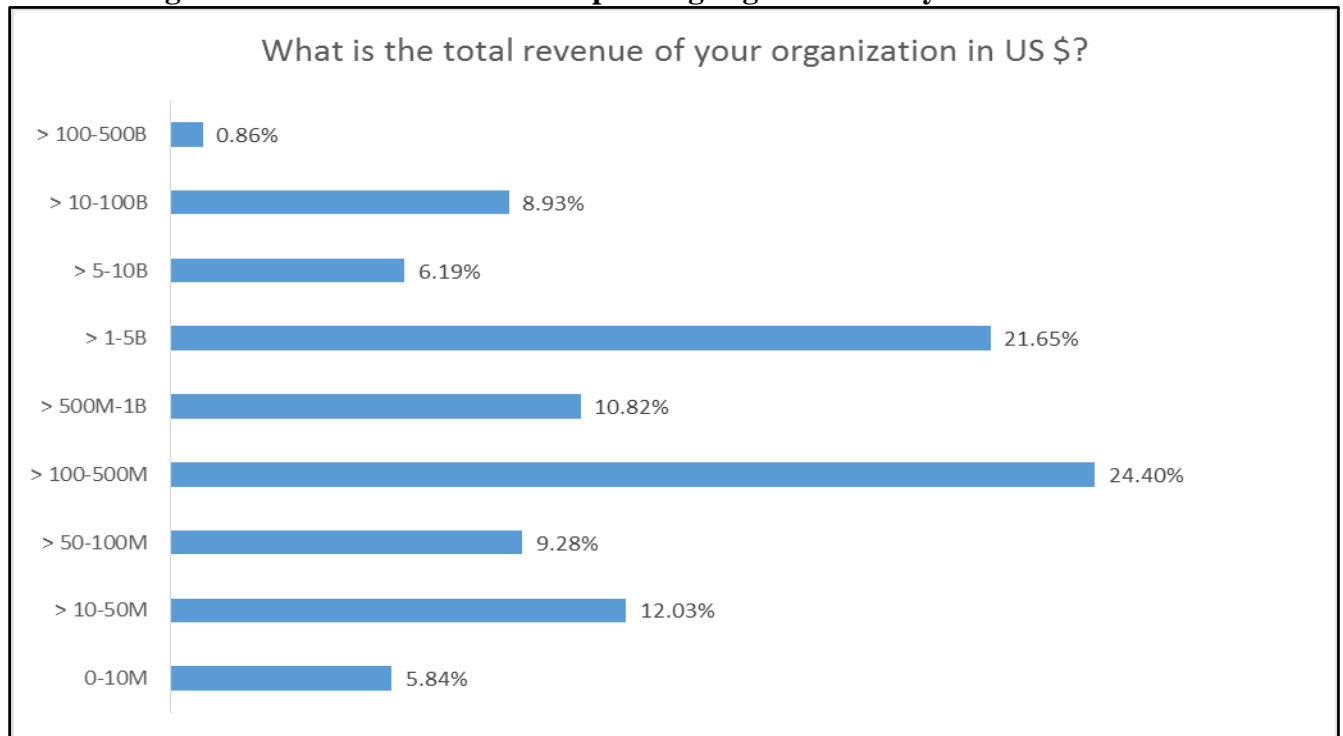
**Table 26: Response by Industry (IT leader in 781 unique organizations responding)**

Financial Services/Insurance	13.3%	Food Services/Hospitality/Leisure/Tourism	2.1%
Manufacturing	10.4%	Automotive	1.7%
Healthcare/Medical/MedTech/BioTech	9.9%	Media/Entertainment	1.5%
Education	8.5%	Utilities	1.4%
Government	5.8%	Telecommunications	1.2%
IT Services/Consulting	5.8%	Chemical Industry	1.0%
Non-Profit	5.3%	Law/Legal	1.0%
Retail/Wholesale	4.9%	Aerospace/Defense	0.9%
Business/Professional Services	4.1%	Sales/Marketing/Advertising	0.8%
Energy	3.7%	Other	0.8%
Consumer Goods/Services	3.3%	Mining/Minerals	0.5%
IT Hardware/Software	3.3%	Printing/Publishing	0.5%
Transportation/Distribution/Logistics	2.9%	Electronics/Semiconductor	0.4%
Real Estate	2.8%	Agriculture	0.3%
Construction/Architecture/Engineering	2.2%		

The diversity of the organization sample is also evident in Figure 26 which indicates the distribution of responding organizations by revenue. For the 582 organizations that provided revenue data, the average annual revenue is \$6.23 billion. However, the median is \$500 million,

27.2% of the organizations report revenue of \$100 million or less, 35.2% report revenues greater than \$100 million to \$1 billion, 27.8% from \$1 billion to \$10 billion, and 9.8% report revenues above \$10 billion. In other words, the organizations participating in this study vary significantly by revenue, much like those in the rest of the U.S. economy.

**Figure 26: Distribution of 582 responding organizations by total revenue**



Despite the fact that respondents are not randomly selected from the universe of IT leadership, the size of the samples, the high response rate, and the diversity of the sample by economic sector and revenue suggests the samples are representative of the state of IT and its leadership in the United States and potentially beyond. Furthermore, since SIM is an independent, not-for-profit professional organization, neither SIM nor its members on the whole have any marketing or political motivations. This, combined with the fact that the research is conducted by a team of academicians, suggests the findings of this report are relatively unbiased.

## B. Questionnaire Development

For consistency and the ability to identify trends over time, the questionnaire for this year's study was largely based on the previous year's questions. However, in order to ensure the questionnaire closely aligns with the changing technology and IT management landscape, some questions were added, deleted, or modified. Additions and modifications were based on the suggestions of participants in last year's study, members of the SIM Enterprise Architecture Working Group (SIMEAWG) which serves as the Delphi expert panel for the study, and the members of IT Trends Study Research Team which includes the authors and SIM practitioner members Bill Peterson, Mark Snyder, and Barbara Stewart.

The questionnaire consists of the main sections:

- Section A largely asks about the respondents, their professional role, their position in their organizations, and their background.
- Section B contains questions about (1) the most important and worrisome IT management issues; (2) the information technologies getting the largest investment and those that are most important to the organization and most worrisome to IT leadership; (3) the metrics used to assess the performance of in-house IT, outsourced IT, and IT leadership; and (4) the IT skills that are most difficult to find and most important to the organization. The latter questions appearing for the first time in the SIM IT Trends Study.
- Section C is the largest part of the questionnaire. It has questions about both the (1) organization's IT management practices, including budget, staffing, delivery, structure, and more; and (2) the role, activities, and interactions of IT leaders themselves.

#### **i. Changes to Questionnaire Section A: Questions about the Respondents**

Section A was designed to capture information about the individual respondents, in order to customize the questionnaire to them. The most significant change to Section A was how it was altered to improve its applicability for individuals in the academic, retired, and member-in-transition categories. While in previous years, these groups could participate, some questions were not well suited to these individuals, and they often did not participate. However, because the chapters compete by percent of chapter members participating in the study (for cash prizes for their philanthropic activities), it was important to make participation meaningful to all categories of SIM members.

In order to accommodate this situation the questions “Are you the top person responsible for IT (e.g., the CIO) within the organization?” and “I will be answering the questions in the rest of the questionnaire as a(n) \_\_\_\_\_.” were moved to the beginning of the section. Using the answers to these two questions, separate paths through the questionnaire were established for a CIO, IT employee, non-IT CIO, non-IT management, academic, retired, in-transition, or user. All respondents answered similar questions, but alternative wordings were provided, particularly to academics, retirees, and members-in-transition. These and other individuals with no current role in the management of an organization's IT did not get Section C either.

Two additional changes were made to Section A. First, Board/Board Member was added as an option for the question “To whom do you report in the organization?” Second, questions were added to capture the age and gender of the respondent.

#### **ii. Changes to Questionnaire Section B: Questions Concerning Issues, Technologies, Metrics, and Skills**

Section B is concerned with four main categories of questions: management issues, technologies, performance measures, and skills. All the potential answers are provided as a list from which respondents select their answers. Four general improvements were made to Section B that may have some effect on prior year comparisons. Specifically, asking respondents to select “up to five” issues, whereas in the past they selected “up to three.” We believe this change improves the quality

and granularity of the data, but having five “votes” instead of three increases the percentage of respondents that might select a particular item and this makes prior-year “percentage selecting an item” comparison problematic. It is not clear to what extent if any this affects the rankings. Second, the items in the list were presented alphabetically; so in order to reduce possible list-order bias, some items were reworded and/or combined (for example see notes (a), (b), and (c) in Table 1). This may have had some effect on the rankings of some reworded items. Third, and also to help mitigate list-order bias, especially in the questions with longer lists, a trigger phrase was presented before the list was shown (for example, “Before answering the following question, please consider the top five (5) IT Management Issues or Concerns that are most important to your organization and most important to you. Keep these items in mind when answering the question.”). By priming the respondents in this manner, we believe the respondents were more likely to scan each list looking for the answers they envisioned rather than selecting answers which were conveniently located at the top of bottom of the list. The data appears to support this contention, but a more thorough analysis and comparison to prior year’s data is planned. Fourth, the questions about the technical and soft skills that are hardest to find and most important to the organization were added and are entirely new to the study this year.

Beyond these global changes, a number of specific questions were modified in Section B based on the suggestions of last year’s respondents, the Delphi panel, or members of the research team. As is prior years, list items were also deleted if not selected by at least 2% of respondents in the previous year of the study. In another technique to reduce list order bias, some items were modified to provide business and IT subcategories in order to put them together alphabetically in the list. Table 27 describes the modifications made to the list of “IT Management Concerns / Issues” this year.

**Table 27: Modifications to the List of IT Management Concerns and Issues**

<b>Added</b>
None
<b>Removed</b>
“Insourcing (of IT previously outsourced)”
<b>Changed</b>
“Business Agility / Flexibility” was changed to “Agility / Flexibility” with business and IT subcategories.
“Business Cost Reduction / Controls” and “IT Cost Reduction / Controls” were merged into “Cost Reduction / Controls” with business and IT subcategories.
“IT Change Management” was changed to “Change Management / Version Control (IT)”
“IT Credibility” was changed to “Credibility (IT)”
“IT Disaster Recovery” was changed to “Disaster Recovery (IT)”
“IT Governance” was changed to “Governance (IT)”
“IT Operations / ITIL / IT Service Delivery / ‘Keeping the lights on’” was changed to “Operations / ITIL / Service Delivery / ‘Keeping the lights on’”
“IT Organization Design / Structure” was changed to “Organization Design / Structure (IT)”
“IT Performance Measures / Incentives” was changed to “Performance Measures / Incentives (IT)”
“Business Productivity” and “IT Efficiency” were merged into “Productivity / Efficiency” with business and IT subcategories.

“IT Reliability / Quality / Availability” was changed to “Reliability / Quality / Availability”
“IT Strategic Planning” was changed to “Strategic Planning” with business and IT subcategories.
“IT Talent / Skill Shortage / Human Resources (Training, Retention, Development)” was split into “IT Talent / Skill Shortage” and “Human Resources (Training, Retention, Development)”
“IT Time-to-Market / Speed of IT Delivery” was changed to “Speed of IT Delivery / IT Time-to-Market”
“Velocity of Change in Business” and “Velocity of Change in Information Technology” were merged into “Velocity of Change” with business and IT subcategories.

Modifications were also made to the question in Section B concerning IT Investment Priorities / Concerns. Last year this question asked respondents to identify up to three investment priorities in each of the following categories: Organization’s Largest / Most Significant Current or Near-term IT Investments, Organization’s Most Important Information Technologies, and Technologies of Greatest Concern to Me Personally (i.e., things that keep you up at night). In this year’s questionnaire, the categories for this question were Organization’s Largest Current or Near-term IT Investments, Technologies that SHOULD get more investment, and Technologies of Greatest Concern to Me Personally (i.e., things that keep you up at night). In addition to this modification, a number of changes were made to the list of investment priorities. These changes are detailed in Table 28.

**Table 28: Modifications to the List of IT Priorities and Concerns**

Added		
Cyber Insurance		IOT (Internet of Things)
Removed		
“Asset Management”		“Employee Portals”
“Consumer-Oriented Devices”		“Enterprise Application Integration” (There was already an “Integration” item.)
“Data Synchronization”		“Insourcing (of IT previously outsourced)”
Changed		
“Analytics / Business Intelligence,” “Data Mining,” and “Forecasting” were merged into “Analytics / Business Intelligence / Data Mining / Forecasting”		
“Business Process Management” was changed to “BPM (Business Process Management Systems)”		
“Disaster Recovery” and “Continuity Planning” were merged into “Disaster Recovery and IT Continuity Planning”		
“Customer Relationship Management” was changed to “CRM (Customer Relationship Management)”		
“Enterprise” was changed to “Enterprise/IT Architecture” (to correct an error last year)		
“Enterprise Resource Planning” was changed to “ERP (Enterprise Resource Planning)”		

Section B also addressed IT performance measures and a number of changes were made to this question as well. Since the question asked to select up to five performance measures in three separate categories – in-house IT, outsourced IT, and your personal performance – before getting

the questions, respondents were asked if they outsource at all. If the answered no to that questions, they did not see the outsourced IT question. The item modifications are listed in Table 29.

**Table 29: Modifications to the List of IT Performance Measures**

<b>Added</b>	
“Customer (of the Business) Satisfaction”	
<b>Removed</b>	
“Compound Annual Growth Rate (CAGR)”	“Lower Error Rates by Users / Customers”
“Earnings Per Share”	“Stock Price”
“Industry-Specific Measurements”	
<b>Changed</b>	
“Availability (Up Time)” was changed to “Availability / Up Time”	
“Business Cost Reduction / Control” and “IT Cost Control” were merged into “Cost Control / Reduction” with business and IT subcategories.	
“Customer Satisfaction (Internal IT Customers)” and “Satisfaction of Internal IT Customers (e.g., portals, social, mobile)” were merged into “Customer (of IT) / IT User Satisfaction”	
“Employee Attrition / Retention / Turnover” was changed to “IT Employee Retention”	
“Innovative / New Ideas” was changed to “Innovative New Ideas”	
“IT Cost / Headcount Reduction” and “Workforce Reduction” were merged into “Headcount Reduction” with business and IT subcategories.	
“Productivity Improvement” was split into “Productivity Improvement (Business)” and “Productivity Improvement (IT)”	
“Profit Growth / Profit / PE / PEG / EPS” was changed to “Profit Growth”	
“Project Return on Investment (ROI)” was changed to “Project Return on Investment”	
“Quality / Defect Rates in Software” was changed to “Quality / Defect Rates in SW”	
“Return on Equity (ROE)” was changed to “Return on Equity”	
“Time to Market” was changed to include business and IT subcategories	
“NONE – No Measures” was changed to “NONE / No Measures are Used”	

In addition to the modifications to the questions described above, two new questions were added to Section B. The first asked respondents to identify the top five technical skills or capabilities that are 1) most difficult to find, and 2) most important for the organization. The second was assessed using the same categories but inquired about the soft skills. Those lists, along with the results, are provide in the performance measurement (see Section V).

### iii. Changes to Questionnaire Section C: Questions about IT Budgets, Practices, and Leadership

Section C collected information about the organization and its IT leader. Several new questions were added regarding organizations. First, a question was added to determine if the responding organization is private or publicly traded. Second, in an effort to gain insight into organizational IT governance and IT-related decision processes, a question was included to capture who within the organization is responsible for making decisions regarding (a) IT architecture, policy, and standards, and (b) IT purchasing and procurement. Third, in order to correct an oversight in last

year's questionnaire, a question to ascertain the total number of full-time employees within the organization was added. Finally, a new question asked participants to rate the effectiveness of their training and education programs for the development of both hard and soft skills.

In addition to these additions, several questions within Section C were modified from last year's questionnaire. The first of these involved the list options associated with the primary industry or economic sector of the responding organization. These list option modifications are summarized in Table 30.

**Table 30: Modifications to the List of Industries and Economic Sectors**

<b>Added</b>
None
<b>Removed</b>
None
<b>Changed</b>
"Business Professional Services" was changed to "Business / Professional Services"
"Consumer Goods" was changed to "Consumer Goods / Services"
"Construction" was changed to "Construction / Architecture / Engineering"
"Food Services" and "Hospitality / Travel / Leisure / Tourism" were merged into "Food Services / Hospitality / Leisure / Tourism"
"Healthcare / Medical" and "Medical Technology / Biomedical" were merged into "Healthcare / Medical / Medical Technology / Biomedical"
"Not-For-Profit" was changed to "Non-Profit"
"Transportation / Distribution" was changed to "Transportation / Distribution / Logistics"

Second, in an effort to better understand the structure and governance of IT, the question "How is IT organized in your organization?" was greatly expanded. The question originally offered the options "Centralized," "Decentralized," "Federated / Hybrid / Matrix / Composite," and "Other". Instead, this year's questionnaire broke this question down further, asking participants to rate the level of centralization/decentralization on a five-point Likert scale in four separate categories: "IT Infrastructure / Operations / Services / Support," "Business Applications," "Purchasing," and "Overall."

Third, several minor modifications were made to the questions associated with IT budgeting. The first of these modifications was the alteration of "Services (SaaS, PaaS, IaaS, cloud, processes, etc.)" to "Cloud Services (SaaS, PaaS, IaaS, processes, etc.)." Additionally, a new "Other" category was added to capture IT budget allocated in areas not previously addressed by the question. Further, new questions were added to determine IT spending levels in the following individual categories: cybersecurity, keeping the IT lights on, software development, offshore, IT R&D, IT capital investment, and training, development, and/or education of IT employees. Finally, there was a minor change to the question stems for year-to-year changes in total IT budget, total salaries for IT employees, average salary of IT employees, total number of internal IT employees, and total number of IT contractors.

The final modification of existing organizational questions involved the questions on alignment, innovation, and IT's role in strategy. This was done in order to gain a deeper insight into these

important matters. This portion of the questionnaire was split such that non-CIOs were asked to what extent both they and their CIO would agree with several statements, while CIOs were asked to what degree they and their CEO would agree with those statements. Further, the list of statements was increased from last year's study. Table 31 presents these changes.

**Table 31: Modifications to Questions on Alignment**

<b>Added</b>
"Senior Management is very aware of IT Management issues."
"The Board of Directors (or equivalent) is very aware of IT Management issues."
"The CIO is on the Top Management team that makes strategic business decisions." This question only went to non-CIO respondents since there was already a question asking CIOs if they were on this team.
<b>Removed</b>
"IT leadership is involved in strategic business planning."
<b>Changed</b>
"IT is involved in providing innovations" was changed to "IT provides valuable innovations to the business."

One significant structural change to the questionnaire affected Section C in particular. Last year's questionnaire was split into a main section and two optional bonus sections. This year, in order to reduce the size of the overall questionnaire and improve the response on some questions, the bonus sections were merged into the main body of the questionnaire. To accomplish this, questions related to the percentage of full-time employees, contractors, and consultants personally managed by the respondents were removed. In addition, the success skills questions were replaced by questions about the skills that are hardest to find and most important to the organization and moved into Section B; and questions related to turnover, retirement, and IT contractors and consultants, cloud computing and shared services, and how the CIO spends their time and with whom they spend it were moved from the previous year's bonus sections into Section C.

Several minor changes were made to these newly incorporated questions. First, references to internal and external cloud were further subdivided into "Internal – Private Single Tenant," "External – Public Multi-Tenant," "External – Public Single Tenant," and "Other." Second, a new category "Individual Board Members" was added to the question that addressed how often the respondent interacts with others in the organization. This category was also added to the question that addressed the quality/value of these interactions. Finally, rather than trying to assess which work activities were performed with which individuals in the organization as in last year's questionnaire, the respondent was simply asked to provide the percentage of their time that they spend doing various work activities.

Upon completion of these changes to the questionnaire and implementing them into the Qualtrics on-line survey tool, members of the SIMEAWG served as a Delphi review panel and provided additional feedback on wording, structure, and performance. After these items were addressed, members of the SIMEAWG and the research team pilot tested the on-line questionnaire prior to its launch.

### **C. Recruitment of Respondents and Incentives**

SIM members were invited to participate via an email message which contained a unique personalized link which took them directly to the online questionnaire. Only SIM members were permitted to participate and each could do so only once. In addition, a banner advertisement on the top of the SIM homepage at <http://simnet.org> invited participation. Individuals who clicked on the banner were required to log in to SIM in order to verify their membership and then were automatically taken to the questionnaire. A small banner that worked the same way was also placed on the bottom of all the other pages of SIM's website.

Participation in the study was encouraged in several ways. First, during the nine weeks of data collection, seven reminder emails were sent to SIM members who had not completed the questionnaire, encouraging them to participate. Second, articles were included each month in the SIM's internal e-publications *SIM News Extra*, *SIM Connect*, and *SIM Chapter Chatter*. Third, in celebration of the 36th anniversary of the SIM IT Trends Study, 36 winners of \$250 gift cards were randomly selected from those who completed the questionnaire. Fourth, building upon its successful introduction last year, the Chapter Challenge Contest was expanded with much larger prizes for this year's study. The Challenge awards the SIM chapters with the highest participation rates with money for their STEM and scholarship programs. This year, chapters were divided into two groups based on size: those with ten to 100 members and those with more than 100. Awards totaled \$4,000, \$2,000, and \$1,000 for first, second, and third place in each division. In addition, the chapter with the highest overall participation rate was awarded a \$2,000 grand prize bonus. These monetary prizes were provided thanks to the generous support of the study's sponsors: Computer Aid (CAI), IDC, Paladin Consulting, and Pariveda Solutions. Thanks to these efforts, a record overall response rate of nearly 25% was obtained, quite respectable for a population of executives and senior managers, with three chapters exceeding a 50% response rate.

#### **D. Data Collection and Validation**

Development and testing of the questionnaire concluded on April 3, 2015 and the survey was launched by personal email on April 12<sup>th</sup>. The initial panel consisted of 5,166 SIM members but was updated to reflect new members seven times during the course of the study. In total, 5,379 SIM members were asked to participate, however 417 email messages bounced and 24 automatic replies indicated the member had left their organization. Thus, the research population for the study consisted of 4,938 SIM members with whom we were able to establish contact.

The online survey software recorded 1,868 arriving at the questionnaire and 1544 actually starting it. These responses were validated to ensure that each was complete and unique for further analysis. Table 32 below provides the rules and details of this validation process.

**Table 32: Validation Rules and Outcomes for Unique and Complete Responses**

<b>Decision Rules</b>	<b>Responses Removed</b>	<b>Remaining Responses</b>
Remove responses of individuals who did not view or respond to the informed consent.	306	1,562
Remove responses of individuals who declined to participate after viewing the informed consent.	18	1,544
Remove incomplete responses.	288	1,256
Remove duplicate responses. Retain the most complete response and if two responses are equally complete retain the first response. Duplicates were present because those who entered via SIM's website, rather than their unique personal emailed link, were not automatically checked for prior participation by the Qualtrics software.	38	1,218

After validation, the dataset consisted of 1,218 unique responses and thus the overall response rate was 24.67%. These 1,218 validated responses served as the basis for the creation of the two distinct datasets described above. The Organization Dataset consisted of the 785 unique organizations represented in the sample of 1218. Identification of unique organizations was accomplished using the rules outlined in Table 33.

**Table 33: Rules for Identification of Unique Organizations**

<b>Decision Rules</b>	<b>Responses Removed</b>	<b>Remaining Responses</b>
Remove all responses associated with non-IT personnel except those who identified themselves as the top IT person in the organization.	217	1,001
Remove all responses for which organization was not provided.	50	951
If multiple responses exist for the same organization:		
Retain the response that answered questions in the broadest organizational context (e.g., whole organization versus a division).	93	858
Retain the response of the highest ranking IT person.	53	805
Retain the response of the individual with the longest tenure in the organization.	20	785

The CIO Dataset contained the 486 responses of those who identified themselves as the CIO or highest-ranking IT person in their organization. Table 34 describes the rules used to identify these CIO respondents from the 1218.

**Table 34: Rules for Identification of CIOs**

<b>Decision Rules</b>	<b>Responses Removed</b>	<b>Remaining Responses</b>
Remove all responses associated with non-IT personnel except those who identify themselves as the top IT person in their organization.	217	1,001
Remove all responses in which the answer for organization indicated the respondent was not actively working as a CIO (e.g., in transition, retired, N/A, etc.)	14	987
Remove all responses associated with individuals who did not identify themselves as the top IT person in their organization.	501	486

**E. Data Analysis and Reporting**

Upon completion of the data collection and validation, the research team analyzed the data using Microsoft Excel for both quantitative analysis and for the generation of charts and graphs to aid the interpretation and presentation of the data. Beyond their presentation in this report, the findings are presented in a number of additional ways. First, each participant receives a personalized benchmark report comparing their responses to the aggregate responses of other participants. Second, the findings of this study are presented during SIM's annual SIMposium conference (to be held this year in Charlotte, North Carolina on November 1-3, 2015). Third, the slides from SIMposium along with this report are made available to all SIM members following the conference. Fourth, the slides are made available to the general public approximately one month following their release to SIM members. Fifth, starting shortly after data collection closes in June, specific findings are released monthly through *SIM News Extra* and *SIM Connect*. Sixth, two articles about the study and its findings will appear in *MIS Quarterly Executive*: A brief highlights article in the December issue and an in-depth, complete one in March. And finally, members of the research team may also collaborate among themselves and with other colleagues to conduct focused analysis of specific topics and report their findings in academic journals and conferences.