

# IT SPENDING & STAFFING BENCHMARKS

2017/2018

## Chapter 1

### Executive Summary



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# IT Spending and Staffing Benchmarks 2017/2018

Computer Economics provides research and advisory services on the strategic and financial management of information technology. Our clients include large IT organizations and major IT consulting firms. Our *IT Spending and Staffing Benchmarks* study, published annually since 1990, is the definitive source of IT benchmarking data.

Other annual studies include *Technology Trends*, an assessment of technology adoption, spending, and economic experience; *IT Outsourcing Statistics*, which provides data on the use of and experience with IT outsourcing; *IT Management Best Practices*, which measure adoption trends of strategic IT practices; and *IT Staffing Ratios*, a series of benchmarking studies with metrics for 15 IT job functions.

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# CHAPTER 1: Executive Summary

## Introduction

The Computer Economics *IT Spending and Staffing Benchmarks* study, now in its 28th year of publication, provides key metrics to assist organizations in the financial and strategic management of information technology. The information presented in this 28-chapter study also helps consulting firms as well as IT product and service providers better understand current trends in end-user organization IT spending and staffing.

Each year, we conduct an in-depth survey of IT organizations in the U.S. and Canada to gather detailed data concerning their IT spending and staffing. The respondents include executives in both public and private sectors. By repeating this survey each year, Computer Economics is in a unique position to identify long-term trends and produce reliable and consistent benchmarks.

The study is based on a survey of more than 200 IT organizations conducted in the first half of 2017. It provides composite statistics of IT spending and staffing data, a segmentation of the same statistics by organization size, and benchmarks for organizations in 25 sectors and subsectors. A description of the study's content, design, and methodology is included in this chapter.

## Major Findings

Our top-line 13 findings show that, for the most part, IT organizations continue on a path of steady but modest growth in operational budgets while capital budgets and hiring are essentially flat. In last year's study, we saw these same trends as tangible evidence of the effects of cloud computing on corporate IT budgets. This year continues that trend.

The greatest sign is in IT capital spending, which now accounts for only 18% of total IT spending, compared to 24% in 2013. IT organizations continue to shift from IT capital investments to operational expenses, as they look first to the cloud to satisfy new requirements for infrastructure and applications rather than increasing data center capacity or investing in new on-premises applications. Although this shift has been bad news for IT equipment manufacturers over the past several years, it should mean less of a boom-and-bust cycle for IT spending going forward.

The current environment of moderate growth in IT operational budgets with slow-to-no growth in IT staffing levels and IT capital budgets is not a reason to be pessimistic. In fact, it is good news for the long-term success of IT departments in that more of the IT budget will be in variable costs, increasing flexibility and making it easier to manage. Increases in IT headcount are becoming more modest in good times, with, hopefully, less severe cutbacks in bad times. While cloud computing and greater levels of automation are reducing the demand for lower level IT positions, the demand is increasing for skills at higher levels, such as business analysis, data analytics, project management, IT security, and vendor management.

This year, total IT spending is down slightly from 2.5% of revenue to 2.3%. But this does not mean that IT spending levels are falling. Revenue is increasing for most companies in a reasonably good economy, and operational budgets are expected to increase at a modest 3.0% pace. Nearly two thirds (65%) of organizations are increasing operating budgets. This is broad if not spectacular growth, and as mentioned above, it shows the continued shift away from capital spending. IT budgets are increasing, but at a slightly slower rate than revenue, which leads to the slight drop in IT spending as a percentage of revenue.

While the top-line findings look similar to the last few years in terms of operational spending vs. capital spending and hiring, there are some positive signs that this “new normal” is working out well for IT departments. IT executives are finding ways to work within their new budget constraints. The number of respondents reporting that their budgets are inadequate dropped from 60% to only 52%. While this is still more than half, the fact remains that CIOs are getting used to the budgets that they are asked to work under. This is most likely due to the fact that new technologies, including cloud applications and cloud infrastructure, are allowing CIOs to more quickly and cheaply roll out new IT capabilities.

There is also evidence that IT is truly delivering more for less. Spending per user is at a new low when adjusted for inflation. The percentage of the IT budget being put toward new initiatives this year is still better than the accepted 20-80 split (though it is slightly lower than last year). We also ask if CIOs are feeling more pressure to lower costs or increase services. Only 19% report that their priority is to cut costs, compared to 22% last year. Forty-eight percent say that increasing service levels is more important than cutting costs, compared to 41% last year. If increased service is the priority, and budgets are rising only modestly, CIOs must be improving service levels without major budget increases.

The shift to the cloud has only just begun. IT departments still report fairly large dependence on on-premises systems. However, even the small percentage of the shift to the cloud thus far is enough to produce positive effects on IT budgets. If the shift continues—and with the positive results thus far, there is no reason that it should not—we expect additional benefits to be seen in the coming years.

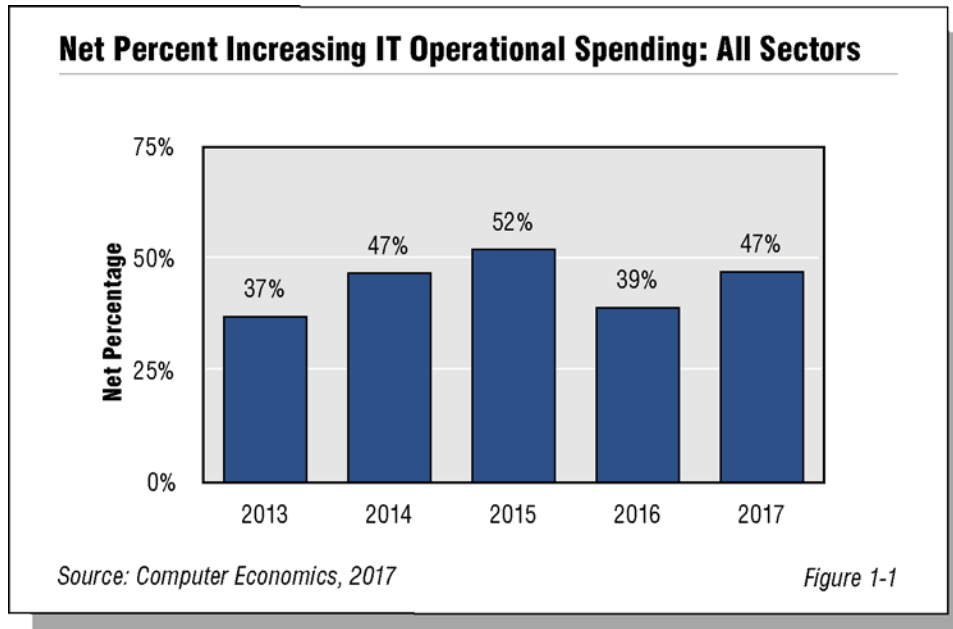
Cloud computing and increased virtualization for what remains on-premises are making robust capital expenditures on hardware less likely. Instead, we are seeing organizations investing more of their budgets in business applications, networking, and end-user devices. More evidence of this is the finding that data center spending is not much of a priority at all, as IT departments shift some of their workload off-premises and increase efficiency for what remains in the data center with virtualization and automation.

The bottom line is that the economy is fairly good and yet IT departments are not increasing budgets to match. In years past we would have taken this as a warning sign that IT leaders were worried about the future. But with the shift to cloud computing, even at this early stage, and the increasing use of virtualization and automation for routine operations, we take it as a sign that IT organizations are enjoying productivity gains that allow them to moderate their need for large increases in IT spending.

In the rest of this section, we outline our key findings in more detail.

## Finding 1: IT Operational Spending Growth Is Broad

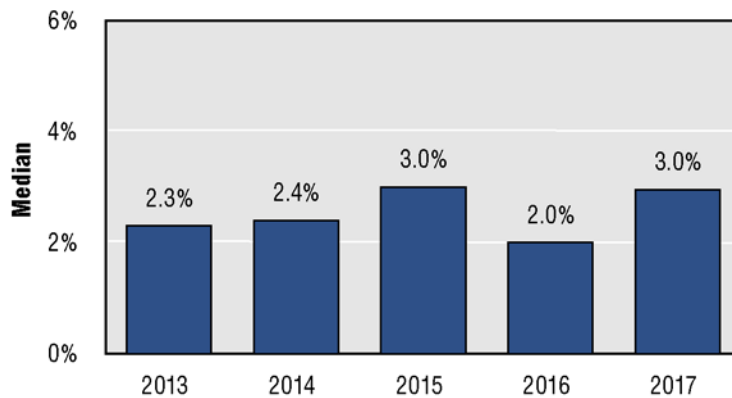
The net percentage of companies increasing their IT operational spending has rebounded. While 65% of organizations are increasing IT spending, that is offset by budget cutting at 18% of organizations, for a net increase of 47%, as shown in Figure 1-1. We reported last year that economic uncertainty early in 2016 may have played a part in the more cautious outlook. For whatever reason, those fears appear to have been allayed. This year, growth is more widespread.



## Finding 2: IT Operational Spending Notches Up

IT operational spending growth is increasing at a modest rate this year, but at a greater pace than last year. The 3.0% growth at the median, as shown in Figure 1-2, makes up for the sudden drop last year and continues the trend of increasing spending in operational budgets. Most new spending is going into business applications and networks this year, a trend bolstered by the transition to cloud computing.

**IT Operational Budget Change from Prior Year: All Sectors**

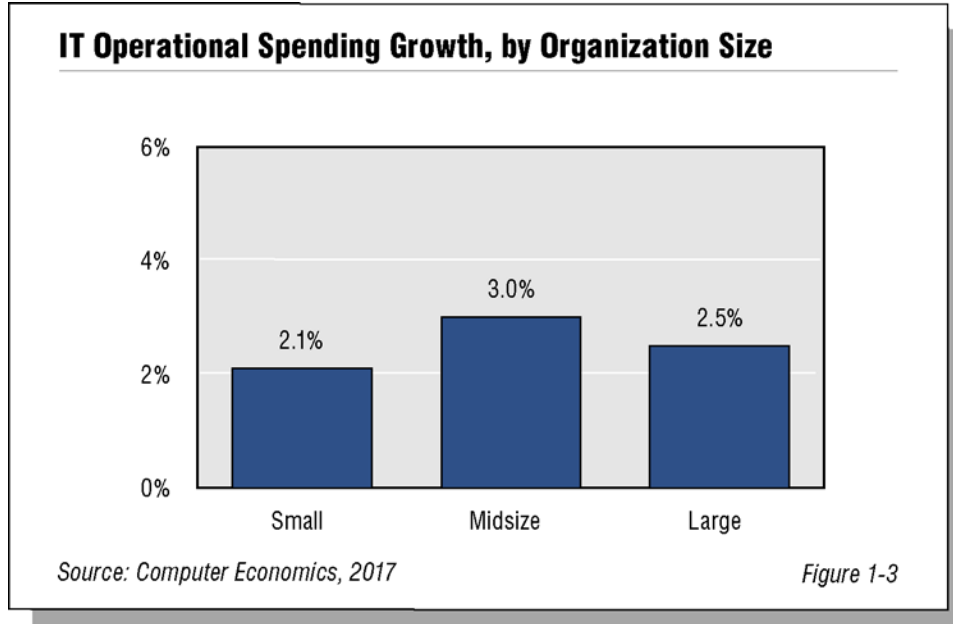


Source: Computer Economics, 2017

Figure 1-2

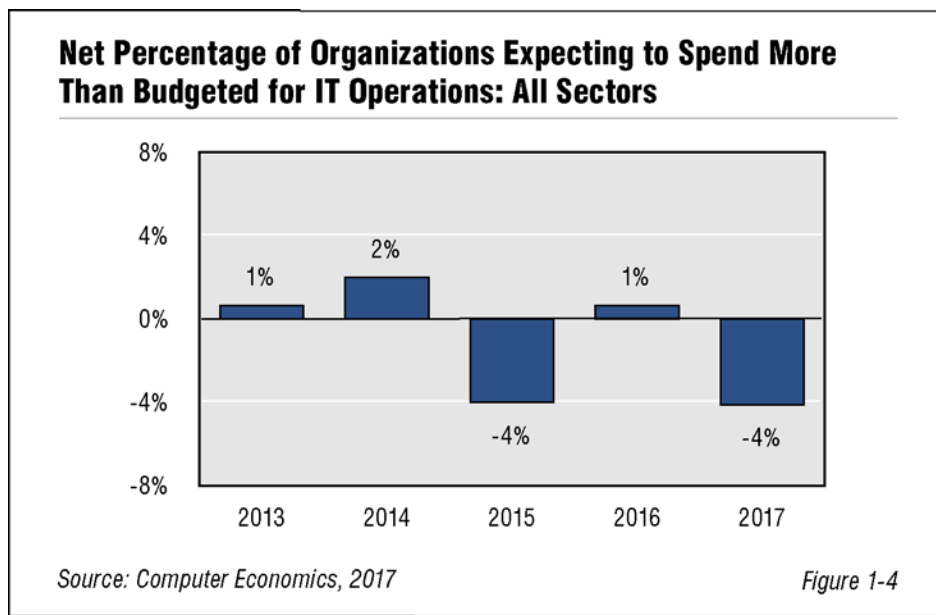
### Finding 3: Small Organizations Lagging a Bit

For the second-straight year, smaller organizations are the laggards in IT spending growth. At the median, large and midsize organizations are increasing IT operational budgets by 3.0% and 2.5%, respectively, Figure 1-3 shows. Small IT organizations, those with IT budgets of less than \$5 million, are still growing but at a slightly more modest median of 2.1%. This is still an improvement from last year's 1.7% increase. Larger organizations may be in a stronger economic position, but the difference is not great and may not be significant this year.



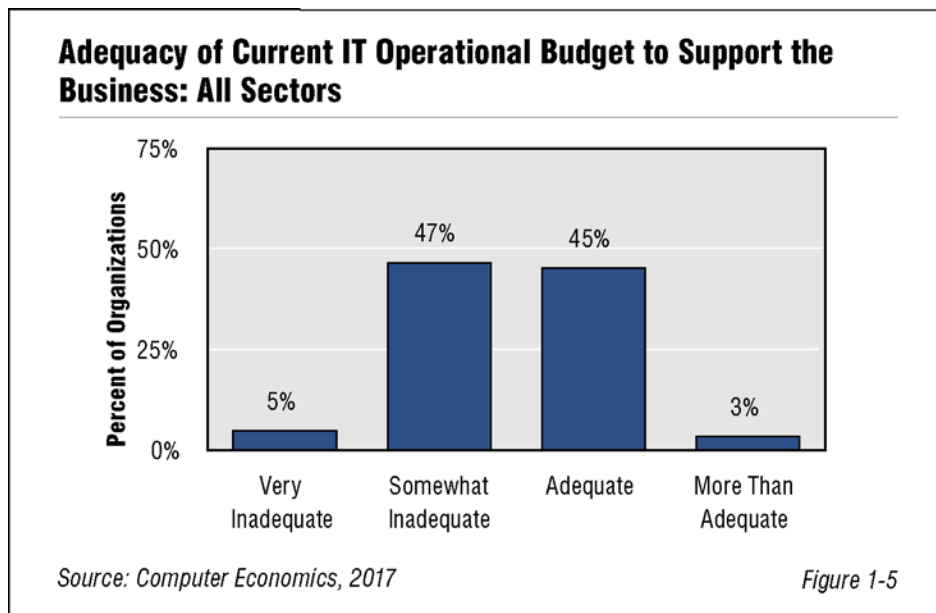
### Finding 4: Confidence Down, Certainty Up

IT executives are not expecting to get to spend more money than their current budgets. Figure 1-4 shows a net -4% of IT organizations are expecting to spend more than their operational spending plan. In other words, the number of IT executives hoping to get a green light to exceed their budgets is slightly lower than the number anticipating a reduction as the year progresses. On balance, this indicator looks worse than last year where slightly more companies expected to see an increase than a decrease. However, it may not be a sign of shaky confidence. The net loss does not come from a major increase in the number of companies expecting cuts through the year. It comes from executives not expecting increases. This is consistent with our view that IT organizations are becoming more certain in their outlook for IT spending. This may simply be a growing indication that organizations can more easily anticipate spending needs in a given year.



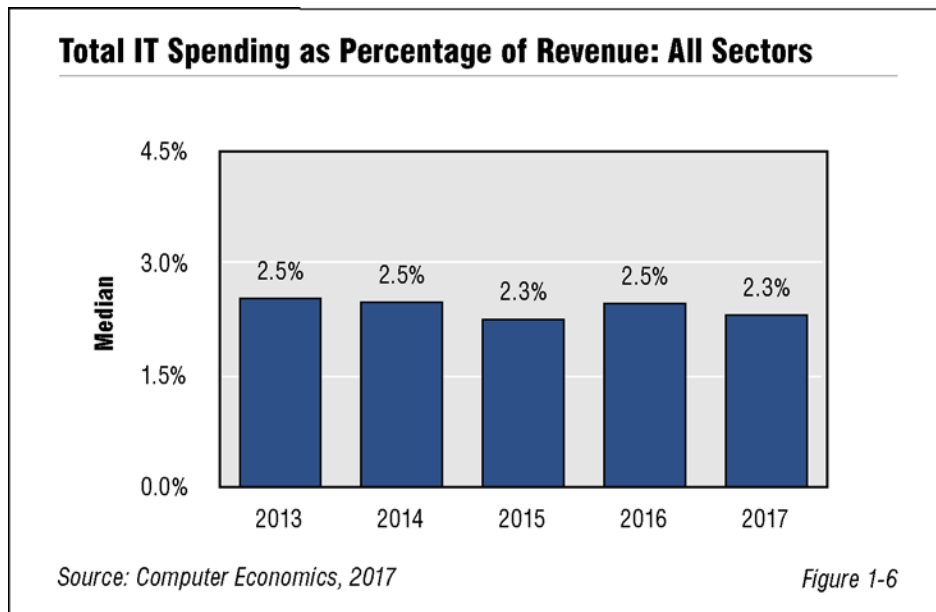
### Finding 5: More CIOs Making Due with What They Have

Another indicator of outlook is the degree to which IT executives find that their spending plans are adequate to support the business. As shown in Figure 1-5, 52% of IT executives feel that their IT budgets are somewhat or very inadequate to meet the needs of the business. While this is still more than half of respondents, this is a fairly large decrease from last year's 60%. A larger percentage of CIOs this year seem to be finding a way to live within their means and meet the needs of the business. Typically, we view a large number of respondents reporting their budgets as inadequate as a sign of pressure for more spending. However, in recent years, these feelings that budgets were tight have not lead to large budget increases, despite the relatively strong economy. For now, refreshing technology, getting rid of legacy systems, strategic outsourcing, and the use of cloud infrastructure and applications are an easier way to make room in the budget than going to the CFO and asking for a large increase.



**Finding 6: IT Spending as Percentage of Revenue Essentially Flat**

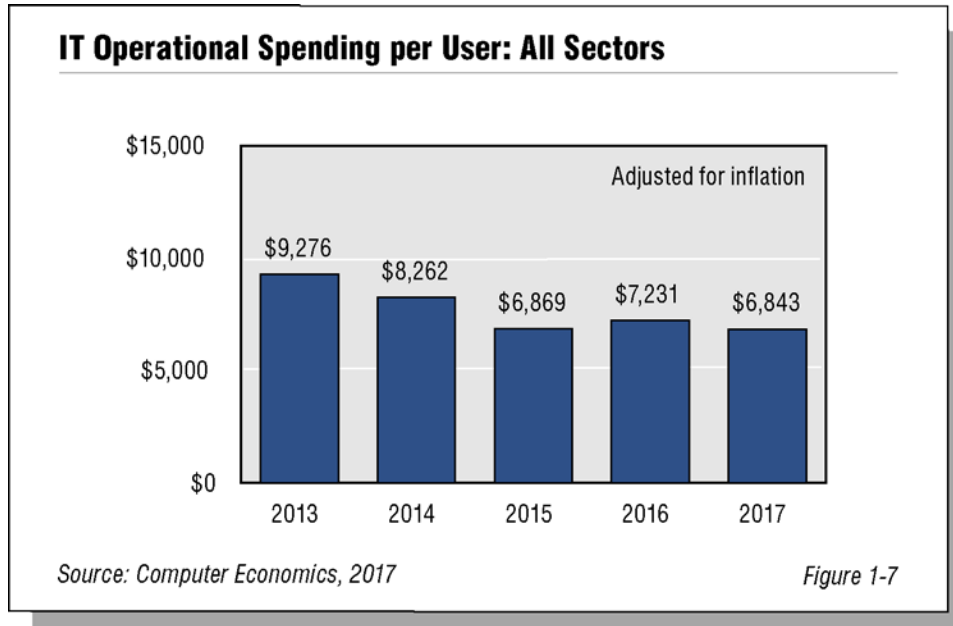
Total IT spending includes both operational and capital spending, as well as IT spending outside the IT budget. It is the broadest measure of IT spending on a cash basis. As a percentage of revenue, we are seeing a small decrease this year for the composite sample, across all industry sectors and all size companies, as shown in Figure 1-6. However, this metric has hovered within a very tight window for the last five years and is essentially flat. For the most part, this is simply due to IT spending rising at about the same pace as corporate revenues. CIOs have not been getting a larger slice of the corporate pie and should probably not expect to in the future.



*Please note that IT spending as a percentage of revenue varies significantly by industry sector. Therefore, the statistics presented here should only be used as an indication of overall trends, not for benchmarking specific organizations. To provide a fair comparison for your organization, please refer to the industry sector chapter of this study that best corresponds to your organization. Chapters 3A-C, which show these metrics by organization size, are also useful in benchmarking specific IT organization performance.*

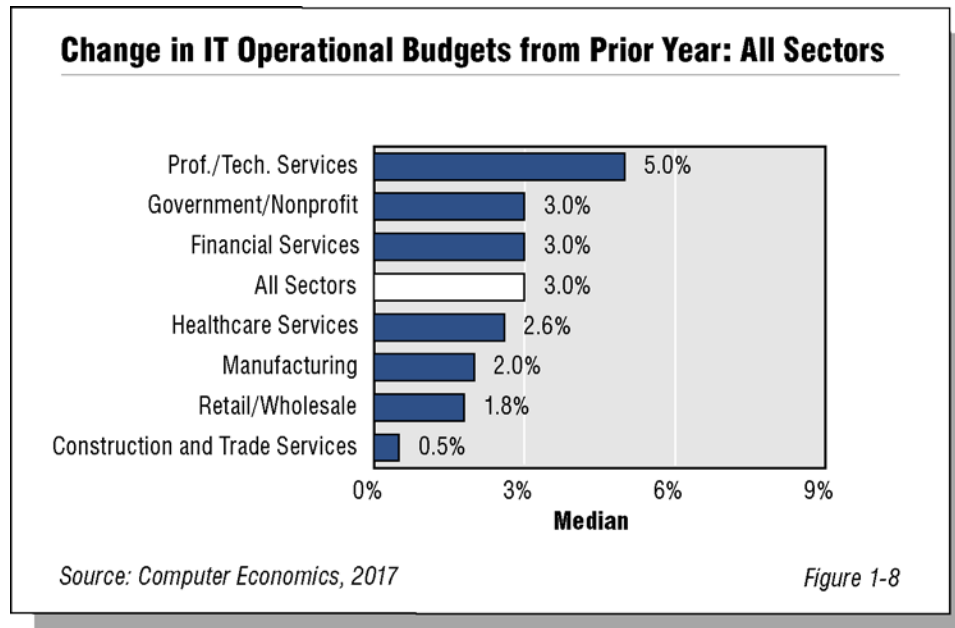
## Finding 7: Per-User Spending Hits New Low

When it comes to IT spending per user, IT departments continue to do more with less. Figure 1-7 shows that IT spending per user is at a 5-year low, dropping from \$7,231 to \$6,843 since last year. One reason is that IT organizations are becoming more efficient and productive due to the ongoing transition to the cloud and increased use of virtualization and automation of what remains on-premises. Another is that as companies continue to hire more employees, they are able to support those new employees without expanding IT headcount at the same rate.



### Finding 8: Professional Services Leads in IT Spending Growth

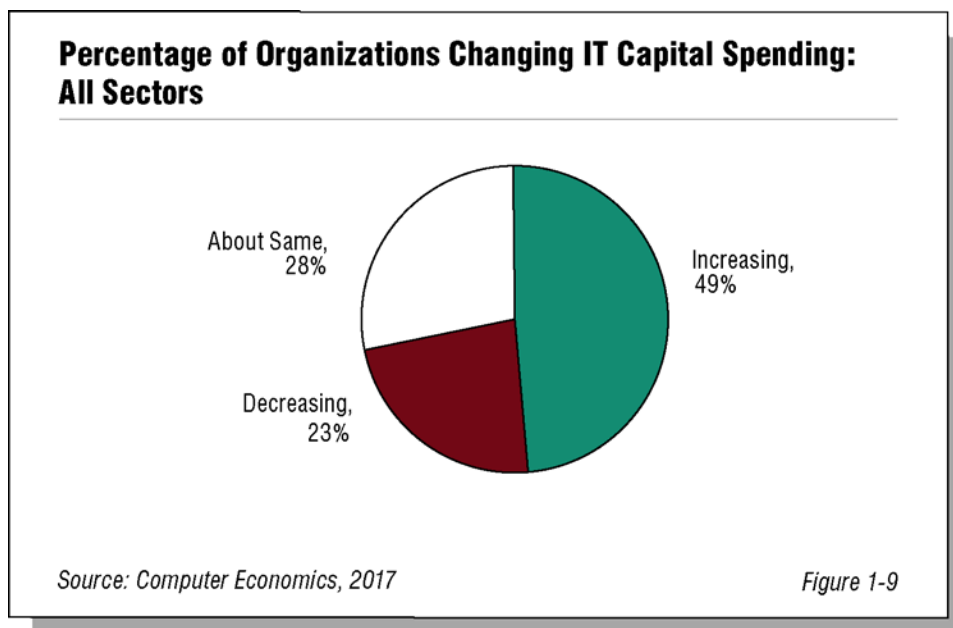
IT operational budgets are rising across all sectors this year, but some sectors are faring better than others. In IT operational budget growth, the professional/technical services sector is enjoying growth above the composite median, Figure 1-8 shows. These services have been at the forefront of IT staff increases as well. The weakness remains in the construction/trade services sector, where IT spending is barely growing.



*These results indicate that economic conditions, which strongly influence IT spending and staffing levels, vary by industry sector. Benchmarking of IT metrics, therefore, should include sector-specific metrics as provided in later chapters of this study.*

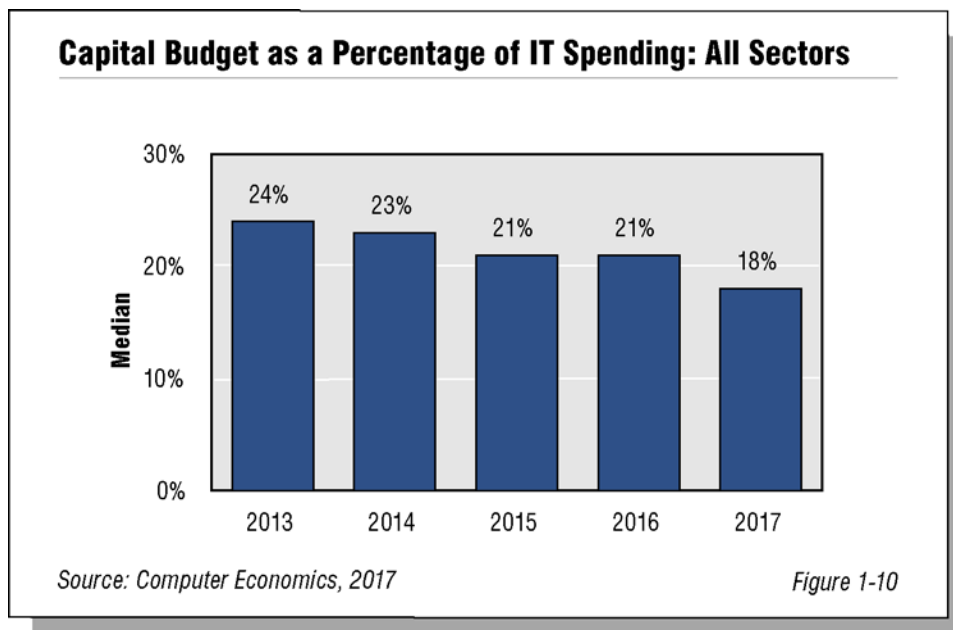
**Finding 9: IT Capital Spending Growth Refuses to Budge**

In addition to IT operational budgets, most organizations maintain IT capital budgets to fund long-term investments in IT infrastructure, equipment, or major system development and implementation. As previously discussed, despite the relatively strong economy, companies at the median are simply not increasing their IT capital spending levels: While 49% of IT organizations are increasing IT capital budgets, 23% are reducing capital spending, Figure 1-9 shows. While this is the best outlook for capital spending in several years, it is not enough to tip the scale to capital spending growth. For the most part, organizations appear to be spending just enough to maintain normal equipment refresh cycles, not growing their on-premises infrastructure.



### Finding 10: The Shift from Capex to Opex Accelerates

In contrast to the modest but relatively broad-based rise in IT operational spending, IT capital spending as percentage of total IT spending continues its steady decline, Figure 1-10 shows. Capital spending as percentage of IT spending is at a five-year low of 18% dropping from 24% in 2013. The fall off in capital spending is especially sharp this year, falling three percentage points from last year. The cycle of capital spending going up in a strong economy and down in a poor economy is likely no longer true. Virtualization, the cloud, and other technologies are lessening the need for capital expenditure growth even when times are good. While existing equipment must still be refreshed, the years of large capital expenditures in order to handle growth are likely gone, due to the elasticity and efficiencies of newer technologies.



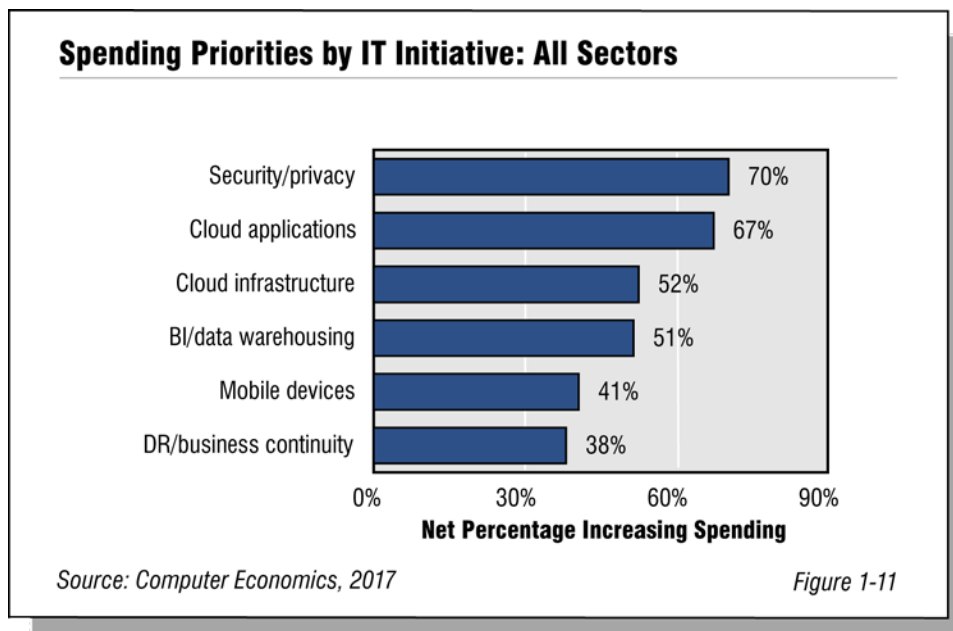
## Finding 11: Security and Cloud Top Spending Priorities

Continuing the trend from recent years, security/privacy is the major spending priority. A net 70% of respondents are increasing their spending in this area, as shown in Figure 1-11. Although security/privacy has occupied first place for the past several years, the news continues to be full of stories of breaches, malware attacks, and widespread infections of ransomware. Because of this, we expect security to rank first again next year.

Cloud applications take the second spot, with a net 67% of IT organizations increasing their spending in this area. The transition from on-premises to cloud applications has been going in earnest for some time. Nevertheless, according to our research, cloud applications still account for less than 25% of applications spending in most organizations. There is plenty of room for cloud apps to grow.

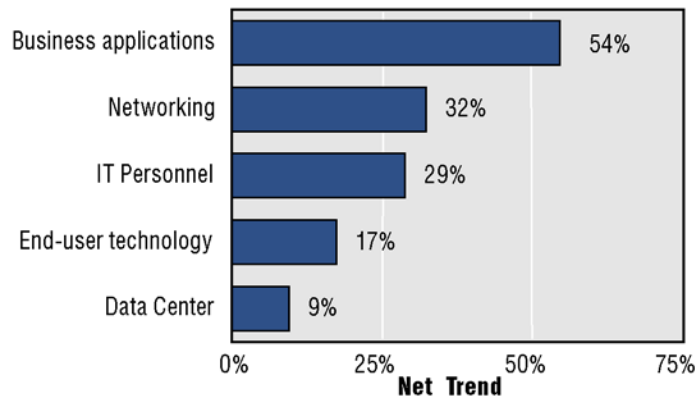
Cloud infrastructure (52%), although a much lower priority than cloud applications, is gaining ground over last year, and we expect this trend to continue as the economic and strategic advantages of an elastic and scalable approach become more and more evident.

Business intelligence/data warehousing (51%) follows close behind in fourth place, with mobile devices (41%), and disaster recovery/business continuity (38%) rounding out the list.



**Finding 12: Data Centers Now Lowest Priority for New Spending**

Developing new business applications has been among the top priorities for IT organizations for quite some time, and business applications will continue to rise as a percentage of the IT budget. A net 54% of all IT organizations plan increased spending in this area after subtracting the percentage that plan to reduce spending on applications, Figure 1-12 shows. We also see improved spending on network infrastructure. But, it is clear that data center infrastructure is simply not a priority. As cloud infrastructure, cloud storage, and SaaS take over for on-premises software and storage, data centers are no longer a priority for new spending. Only 9% plan to increase spending in this area. As a sign of the data center's demise as a priority, end-user technology, including PCs and printers, has passed the data center, and for the first time data center is the spending category with the lowest priority.

**Net Percentage of Organizations Increasing Spending:  
All Sectors**

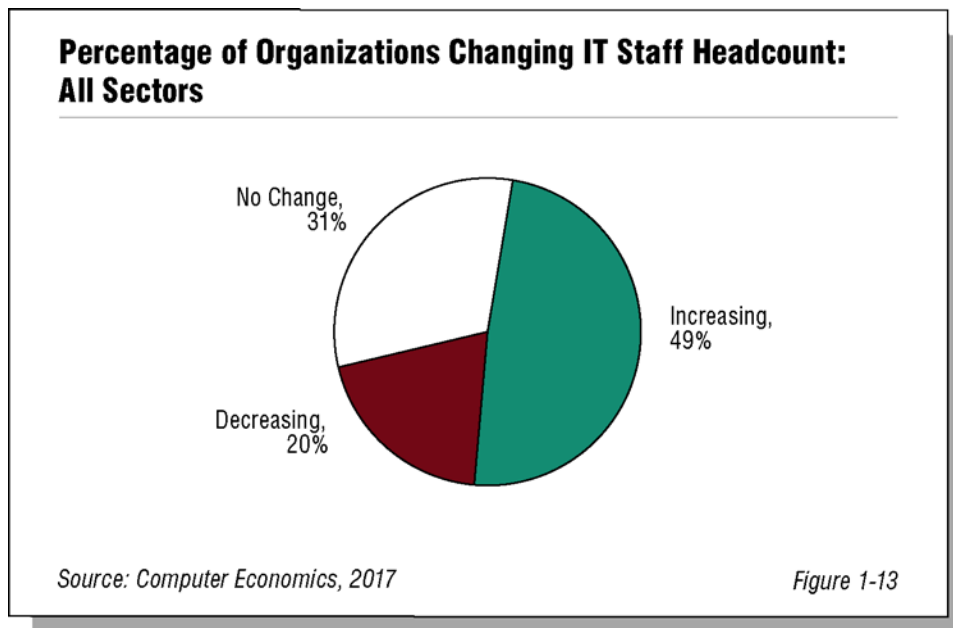
Source: Computer Economics, 2017

Figure 1-12

### Finding 13: Improved Productivity Depresses Growth in IT Staffing Levels

The shift to the cloud and increased automation of routine IT activities discussed in the previous findings are having an effect on IT staffing levels. Less than half of IT organizations plan to increase IT staff headcount this year, as shown in Figure 1-13. Still, with only 20% of IT organizations planning to reduce headcount, we do not see widespread layoffs of IT personnel on the horizon. For the composite sample, IT organizations are holding IT headcount at last year's level.

Although IT staffing levels are flat at the median, it does not mean that IT organizations are not adding staff for some positions. While hiring is slowing for lower level skills such as computer operations, scheduling, and lower-level tech support positions, higher-level skills show increasing demand. Examples include business analysts, project managers, data analysts, and IT security professionals. As cloud applications and cloud infrastructure take up a larger percentage of IT spending, there is also a need for IT staff with skills in procurement and vendor management.



## **Additional Findings**

The Computer Economics *IT Spending and Staffing Benchmarks* study provides a comprehensive statistical view of the state of IT budgets in U.S. and Canadian organizations. These results are described in full in subsequent chapters.

In addition, throughout the next 12 months, we will conduct further analysis of the data provided in this study and publish the findings on our website. Computer Economics research is available to clients at no charge. Our research reports also may be purchased on an individual basis by non-clients. For information on becoming a client of Computer Economics, please visit our website at [www.computereconomics.com](http://www.computereconomics.com).

## Chapter and Sample Descriptions

This study is organized into 28 chapters. Each chapter includes a similar set of benchmarks for a different sample. The chapters are as follows:

### Chapter 1: Executive Summary

This chapter provides an overview of the key findings from the full study and describes the contents of the subsequent chapters. It also includes information on the study participants and the survey methodology.

### Chapter 2: Composite Benchmarks

This chapter provides composite metrics for all survey respondents across all sectors and organization sizes. The sample includes 202 organizations and is stratified by size and sector as described in the section on survey methodology. Respondents must have at least \$50 million in annual revenue or IT spending in excess of \$1 million and maintain at least some operations in the U.S. or Canada. There is no upper limit on the size of survey respondents.

For a list of benchmarks for this sample, consult the section on “Metrics in the Composite and Organization Size Chapters.”

### Chapters 3A, 3B, and 3C: Benchmarks by Organization Size

In these chapters, we provide a complete set of benchmarks for organizations within the specified size classification. Benchmarks for small organizations are in Chapter 3A, for midsize organizations in Chapter 3B, and for large organizations in Chapter 3C. There are 76 respondents in the small-organization sample, 61 in the midsize sample, and 65 in the large sample. We define the size categories as follows:

- Small organizations have IT operational budgets of less than \$5 million.
- Midsize organizations have IT operational budgets of \$5 million to less than \$20 million.
- Large organizations have IT operational budgets of \$20 million or greater.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### Chapter 4: Process Manufacturing Sector Benchmarks

Chapter 4 provides benchmarks for process manufacturers. Process manufacturers are defined as those where the production process adds value by mixing, separating, forming, or chemical reaction. The sector includes manufacturers of chemicals, semiconductors, pharmaceuticals, food, building materials, packaging materials, steel, glass, and paper products, and other process-manufactured

goods. The 42 respondents in the sample range in size from a minimum of \$50 million to a maximum \$32.7 billion in annual revenue.

Process manufacturers are characterized by a comparatively low level of IT spending, focused primarily on back-office, manufacturing, and supply chain functions. These firms lead in adoption of enterprise business applications such as ERP, but they have lagged somewhat in adoption of customer-facing systems when compared with other sectors. In addition, they tend to be asset-intensive organizations, leading to additional requirements for applications that optimize performance of plants and equipment. These firms tend to be conservative in their use of leading-edge technologies, preferring practical solutions that are well supported and have clear benefits in productivity or cost reduction. They tend to spend less on IT as a percentage of revenue than most other sectors.

In addition to appearing in this chapter, some process manufacturers also appear in the samples for the high-tech subsector in Chapter 19 and the food and beverage subsector in Chapter 20 if they meet the definitions for those sectors/subsectors.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 5: Discrete Manufacturing Sector Benchmarks**

Chapter 5 provides benchmarks for discrete manufacturing organizations. Discrete manufacturers are defined as those where the production process adds value by fabricating or assembling individual (discrete) unit production. The category includes manufacturers of consumer products, industrial equipment, aerospace products, auto parts, building products, electrical parts, medical devices, and electronic devices, among other products. The 45 respondents in this sample range in size from about \$24.6 million to \$96.3 billion in annual revenue.

Discrete manufacturers are characterized by a comparatively low level of IT spending, focused primarily on back-office, manufacturing, and supply chain functions. These firms are leaders in adoption of enterprise business applications such as ERP but lag in adoption of customer-facing systems. These firms also tend to be conservative in their use of emerging technologies, preferring practical solutions that are well supported and have clear productivity or cost-reduction benefits.

In addition to appearing in this chapter, some discrete manufacturers also appear in the samples for high-tech organizations in Chapter 19 and industrial and automotive manufacturers in Chapter 21 if they meet the definitions for those sectors/subsectors.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 6: Banking and Finance Sector Benchmarks**

Chapter 6 provides benchmarks for banking and finance companies. The firms in this sector include commercial banks, investment banks, credit unions, real estate investment firms, mortgage lenders, consumer finance lenders, and other types of lenders. The 27 respondents in this sector range in size from \$22 million to a maximum of \$34.1 billion in annual sales.

Banking and finance companies are information-intensive organizations with a high percentage of knowledge workers. They are leading adopters of data analytics, including big data. Many of them also have major investments in consumer-facing website applications. These businesses are highly regulated, and they have significant requirements for information security, privacy, and disaster recovery. They are among the highest in IT intensity of any sector in our study.

In addition to appearing in this chapter, some banking and finance respondents also appear in the sample for the commercial banking subsector in Chapter 22 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 7: Insurance Sector Benchmarks**

Chapter 7 provides benchmarks for insurance companies. The firms in this sector include companies that sell medical and dental insurance, life insurance, property and casualty insurance, auto insurance, disability insurance, and other types of insurance. The 19 respondents in this sector range in size from \$48 million to \$10.7 billion in annual revenue.

Insurance organizations are information-intensive businesses, and they rely upon information technology for nearly every aspect of their business. Many of them have major investments in consumer-facing websites. Most, if not all, employees of these organizations use computers in their daily work, and insurance companies often have high rates of computers per employee as well as higher investments in mobile technology. Insurance companies spend more per user on IT than any other subsector in our study.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 8: Retail Sector Benchmarks**

Chapter 8 provides benchmarks for retailers. This sector includes retailers of clothing, jewelry, hardware, electronics, groceries, office supplies, and general merchandise. They include department stores, specialty retailers, and big-box retailers. We also include hospitality and consumer services in this sector. The 25 respondents in the sample range in size from \$125 million to \$19 billion in annual revenue.

The retail sector is characterized by moderate to high levels of IT spending. Most retailers have data networks that support multiple selling locations for point-of-sale and inventory management. Application portfolios range from high-volume, transaction-processing systems to sophisticated systems for business intelligence and data analytics. Some retailers have major investments in business-to-consumer web commerce systems, and most do at least some selling online. Retailers have a mix of full-time and temporary employees, not all of whom use computers. The automation of credit transactions and storing of customer information make information security and privacy an important requirement in retail.

In addition to appearing in this chapter, many of our retail respondents also appear in the sample for the brick-and-mortar retail sector in Chapter 23 if they meet the definition of that subsector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 9: Wholesale Distribution Sector Benchmarks**

Chapter 9 provides benchmarks for wholesale distributors. The category includes wholesale distributors of building products, home furnishings, home improvement products, industrial components, electronics, agricultural products, food and beverage, and other products. The 20 respondents in the sample range in size from \$67 million to \$25 billion in revenue.

Wholesale distributors serve as middlemen between manufacturers and other businesses, providing value-added services such as testing, packaging, bundling, warehousing, shipping, marketing, and inventory management. They serve a vital function in the supply chain of many industries, aggregating the demand of small-order customers and stocking products from a variety of suppliers to provide one-stop shopping. Information concerning supply and demand is essential for wholesale distributors. Inventory and warehouse management systems are also central to the application portfolio of these organizations. There also is significant investment in data warehousing and business intelligence systems.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 10: Energy and Utilities Sector Benchmarks**

Chapter 10 provides benchmarks for public utilities, oil and gas producers, service companies, and midstream distributors across all organization sizes. The 27 respondents in this sector include public utilities, water, gas, and electric utilities, integrated energy companies, upstream exploration and production companies, onshore and offshore field services companies, pipeline operators, and other

energy and utilities companies. The companies in our sample range in size from \$87.9 million to more than \$26.8 billion in annual revenue.

These companies generate high revenue per employee and support extensive field operations, and as such are characterized by moderately high spending on IT on a per-user basis and relatively low IT spending as a percentage of revenue. They invest in mobile communications and technology to a higher degree than most organizations. Utilities are capital- and IT-intensive concerns and have a high level of IT spending on a per-user basis and especially high spending on applications for physical plant and customer relationship functions. They are also leaders in big data applications, including the Internet of Things, powered by sensor data and geographical information systems. Energy utilities are undergoing a significant amount of modernization, much of it driven by state and federal mandates for smart meters, smart networks, smart grids, and other efficiencies geared toward significantly reducing energy use, especially during times of peak demand. As such, utility companies are increasingly supporting new technology initiatives that enable them to improve service delivery, increase efficiency, and reduce overall power demand.

In addition to appearing in this chapter, some energy and utilities respondents also appear in the sample for the utilities subsector in Chapter 24 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 11: Healthcare Services Sector Benchmarks**

Chapter 11 provides benchmarks for healthcare services companies. The 43 respondents in this sector include community hospital groups, multiregional hospital systems, healthcare systems, dental service organizations, and university hospitals. These organizations range in size from \$45 million to \$34 billion in annual revenue.

These organizations share complex payment and reimbursement arrangements and strict IT security and privacy requirements. The sector requires IT staff with sector-specific skills, large patient medical records systems, mobile platforms, and imaging and other systems with large data storage and networking requirements. Hospitals also support many users who are not employees and have relatively high and growing levels of spending on IT.

In addition to appearing in this chapter, many healthcare services providers also appear in the sample for the hospital subsector in Chapter 25 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 12: Professional and Technical Services Sector Benchmarks**

Chapter 12 provides benchmarks for professional and technical services organizations. The 27 respondents in the sample range in size from \$1 million to \$5.5 billion in annual revenue. The sector includes firms that provide professional and technical services, including engineering, legal, accounting, consulting, marketing, research, and other services.

These organizations are characterized by a high percentage of knowledge workers who make extensive use of technology. CRM, resource management, project management, and knowledge management are important applications in this sector. These organizations are often leaders in the adoption of new technologies such as software as a service and mobile applications. Spending on IT in this sector is on the high side of moderate.

Please note that IT services providers, software companies, and value-added resellers are not included in the sample for this sector, even though they often have professional services groups. Rather, we include such organizations in the IT services and solutions sector in Chapter 15.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 13: Transportation and Logistics Sector Benchmarks**

Chapter 13 provides benchmarks for the transportation and logistics sector. The 23 respondents in this sample range in size from \$52 million to nearly \$21.9 billion. The category includes organizations

that operate buses, trucks, railways, airlines, barges, and ships. The sector includes logistics companies that transport goods and transportation companies and agencies that move people.

These organizations require systems to track moving stock, manage inventory, and maintain flexible communications systems. Some of them are leaders in collection of sensor-based data for tracking assets and have extensive networks to support these requirements. In some cases, only a portion of the employees in this sector use IT systems, and these capital-intensive organizations spend only a moderate amount on IT as a percentage of revenue.

In addition to appearing in this chapter, some transportation and logistics companies also appear in the sample for the logistics subsector in Chapter 28 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 14: Construction and Trade Services Sector Benchmarks**

Chapter 14 provides benchmarks for construction and trade services companies. The 26 respondents in the sample range in size from \$50 million to \$9.9 billion in annual revenue. The category includes engineering and construction companies, commercial, residential and industrial construction contractors, oil service firms, and firms that specialize in the cleanup, treatment, and disposal of wastewater and hazardous materials.

For companies in this sector, only a portion of employees use IT systems. They require systems to support engineering, back-office, and project management activities. These organizations support a high number of smartphone users, but they tend to have small IT budgets in proportion to revenue and employee headcount.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 15: IT Services and Solutions Sector Benchmarks**

Chapter 15 provides IT spending and staffing statistics for the IT services and solutions sector. The category includes software companies, software-as-a-service providers, systems integrators, solution providers, business process outsourcing firms, and other providers of technology services and solutions. There are 25 organizations in the sample, ranging in size from \$50 million to \$6.6 billion in annual revenue.

Companies in this sector leverage IT as part of their core competency and tend to invest in emerging technologies. They often have a large customer service component in their businesses and make use of sophisticated CRM systems. One important note: Our metrics for this sector are for internal IT support only and not for IT products or services sold or delivered to customers.

In addition to appearing in this chapter, some of the respondents in this chapter also appear in the sample for the high-tech subsector in Chapter 19 if they meet the definition for that sector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 16: Government Sector Benchmarks**

Chapter 16 provides benchmarks for government organizations. The 55 respondents in the sample range in size from about \$53 million to \$68 billion in annual revenue. The category includes city and county governments, federal and state agencies, law enforcement agencies, and other government organizations.

In addition to appearing in this chapter, our government respondents also appear in the samples for city and county governments in Chapter 26 and government agencies in Chapter 27, depending on how they meet the definitions for those subsectors.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-

over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 17: Nonprofits and Charitable Organizations Sector Benchmarks**

Chapter 17 provides benchmarks for nonprofits and charitable organizations. The sector includes local and national charity organizations, conservation groups, organizing bodies, sports associations, and other nonprofit organizations. The 17 respondents in the sample range in size from about \$45 million to \$430 million in annual revenue.

Nonprofits and charitable organizations report high spending on IT in relation to revenue. They tend to lag for-profit organizations in adopting new technologies, and spending on new initiatives is constrained. Their unique requirements for information systems tend to be in financial applications, which often need to support grant management and fund accounting. They frequently need specialized CRM systems to support fundraising campaigns and donor relationship management.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 18: Education Sector Benchmarks**

Chapter 18 provides benchmarks for the education sector. The sector includes public and private colleges and universities, for-profit institutions, and school districts. The 22 respondents in the sample have operating budgets ranging in size from \$66 million to \$6.7 billion.

Most educational institutions have large campuses and need to network multiple sites, resulting in extensive investment in network infrastructure. They also have high desktop support requirements. Back-office systems for accounting, human resources, billing, and other administrative functions are typical, but they may have specialized applications to handle enrollment and student records.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-

over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 19: High-Tech Subsector Benchmarks**

Chapter 19 provides benchmarks for high-tech companies. The category includes software developers, software-as-a-service providers, computer products manufacturers, semiconductor manufacturers, aerospace and defense manufacturers, pharmaceutical makers, and other companies. The 40 respondents in this sample range in size from \$1 million to \$80 billion in revenue.

Organizations in the high-tech subsector are characterized by having complex team-based sales processes, large customer service and support efforts, and significant investment in research and development. They tend to spend a higher amount on IT than typical manufacturing companies.

In addition to appearing in this chapter, the high-tech subsector respondents often appear in the samples for other sectors, specifically process manufacturing (Chapter 4), discrete manufacturing (Chapter 5), and IT services and solutions (Chapter 15) if they meet the definitions for those sectors.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 20: Food and Beverage Subsector Benchmarks**

Chapter 20 provides benchmarks for food and beverage manufacturers. The 16 respondents in the sample range in size from \$40 million to \$2.2 billion in annual revenue. Food and beverage companies produce beverages, snack foods, meat products, dairy products, dietary supplements, spices, and other consumable food products. Some also distribute products to retail outlets.

Food and beverage companies have lower levels of IT spending, focused primarily on back-office, manufacturing, and supply chain functions. These firms invest in ERP and supply chain applications, but have lower investment in customer-facing systems than other subsectors. Like most process manufacturers, they often have sophisticated systems for factory plant and equipment maintenance, including real-time monitoring. Food and beverage firms also tend to be conservative in their use of

leading-edge technologies, preferring practical solutions that are well supported and have clear benefits.

In addition to appearing in this chapter, food and beverage respondents also appear in the sample for process manufacturers (Chapter 4), since all food and beverage companies are, by definition, process manufacturers.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 21: Industrial and Automotive Subsector Benchmarks**

Chapter 21 provides benchmarks for industrial and automotive manufacturers. The 20 respondents in this subsector make auto parts, material handling equipment, engines, machinery, and similar capital goods. The manufacturers in the sample range in size from \$45 million to \$96.3 billion in annual revenue.

Industrial and automotive companies have moderate levels of IT spending, focused primarily on back-office, manufacturing, and supply chain functions. These firms invest in ERP and supply chain applications, but have lower investment in customer-facing systems than other subsectors. On the other hand, they are increasingly making investments in factory data collection, real-time machine network connectivity, and sensor data from smart products and smart manufacturing processes. IT spending tends to be moderate compared with all organizations.

In addition to appearing in this chapter, most of the industrial and automotive respondents also appear in the sample for discrete manufacturers in Chapter 5 if they meet the definition for that sector.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 22: Commercial Banking Subsector Benchmarks**

Chapter 22 provides benchmarks for commercial banks. This subsector includes credit unions and community, regional, and national banks. The 18 respondents in this sample have annual revenue ranging from \$22 million to \$34.1 billion.

As with other types of financial services firms, commercial banks are information-intensive businesses with a high percentage of knowledge workers. These businesses are highly regulated, and they have significant requirements for information security, disaster recovery, and real-time transaction processing. Many of them also have major investments in consumer-facing website applications. Banking organizations are IT-intensive and spend a higher percentage of revenue on IT than companies in most other sectors.

In addition to appearing in this chapter, all of the respondents for the commercial banking subsector appear in the sample for the banking and finance sector in Chapter 6.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## **Chapter 23: Brick-and-Mortar Retail Subsector Benchmarks**

Chapter 23 provides benchmarks for brick-and-mortar retailers. This subsector includes department stores, sporting goods stores, clothing stores, convenience stores, agricultural retailers, and other retailers. The 16 respondents in this sample have annual revenue ranging from \$80 million to \$19 billion.

Brick-and-mortar retailers are characterized by moderate to high levels of IT spending. Most have data networks that support multiple selling locations for point-of-sale and inventory management. Application portfolios range from high-volume transaction-processing systems to sophisticated systems for business intelligence and data analytics. Most brick-and-mortar retailers have at least some capabilities for business-to-consumer web commerce, and some have major investments in consumer-facing systems. Brick-and-mortar retailers have a mix of full-time and temporary employees, not all of whom use computers. The automation of credit transactions and storing of

customer information make information security and privacy an important requirement in this subsector.

In addition to appearing in this chapter, all of the brick and mortar retailers also appear in the sample for the retail sector in Chapter 8. However, in this chapter we exclude hospitality organizations, consumer services providers, and other organizations selling to consumers that do not have retail storefront operations.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 24: Utilities Subsector Benchmarks**

Chapter 24 provides benchmarks for utilities. The 17 respondents in this subsector range in size from about \$88 million to \$26.8 billion in annual revenue. This category includes gas and electric utilities, power transmission distributors, pipeline operators, water and power utilities, and telecommunications service providers.

Utilities are capital- and IT-intensive concerns and have a high level of IT spending on a per-user basis and especially high spending on applications for physical plant and customer relationship functions. Energy utilities are undergoing a significant amount of modernization, much of it driven by state and federal mandates for smart meters, smart networks, smart grids, and other efficiencies geared toward significantly reducing energy use, especially during times of peak demand. As such, utility companies are increasingly supporting new technology initiatives that enable them to improve service delivery, increase efficiency, and reduce overall power demand.

In addition to appearing in this chapter, all of the utilities respondents in this chapter also appear in the sample for the energy and utilities sector in Chapter 10.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 25: Hospital Subsector Benchmarks**

Chapter 25 provides benchmarks for hospitals. The 31 respondents in this subsector range in size from \$109 million to \$34 billion in annual revenue. This category includes community hospitals, university hospitals, health clinics, healthcare systems, and regional healthcare providers.

Hospitals share complex payment and reimbursement arrangements and strict IT security and privacy requirements. The sector requires IT staff with sector-specific skills, large patient medical records systems, mobile platforms, and imaging and other systems with large data storage requirements. Hospitals also support many users who are not employees and have relatively high and growing levels of spending on IT.

In addition to appearing in this chapter, all of the hospital respondents in this chapter also appear in the sample for the healthcare services sector in Chapter 10.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 26: City and County Government Subsector Benchmarks**

Chapter 26 provides benchmarks for city and county governments. This chapter is concerned with the IT workings of city or county governments and not individual agencies within larger governments (which can be found in Chapter 27). The 34 respondents in this subsector have annual operating budgets ranging from \$55.3 million to \$7.2 billion.

City and county governments require information systems for nearly every aspect of their day-to-day operations and services. Yet they often lag other sectors in adopting new systems and technologies and upgrading existing systems. Asset management, geographic information systems, e-government applications, and specialized accounting systems can be important applications in this sector. Information security, privacy, and disaster recovery also are important concerns.

In addition to appearing in this chapter, all of the city and county government respondents in this chapter also appear in the sample for government organizations in Chapter 16.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 27: Government Agency Subsector Benchmarks**

Chapter 27 provides benchmarks for federal, state, and regional government agencies. The category includes public health agencies, courts and law enforcement agencies, social service agencies, state parks, lotteries, and other federal, state, and regional government units. The 20 respondents in the sample have operating budgets that range in size from \$52.6 million to about \$40 billion.

Most government agencies rely heavily on IT to maintain information and deliver services. Nearly all employees use IT, and spending on IT can be considerably higher than spending by local government. Asset management, geographic information systems, e-government applications, and specialized accounting systems can be important applications in this subsector. Information security, privacy, and disaster recovery also are important concerns.

In addition to appearing in this chapter, the respondents in this subsector also appear in the sample for government organizations in Chapter 16.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

### **Chapter 28: Logistics Subsector Benchmarks**

Chapter 28 provides benchmarks for logistics providers. The 18 respondents in this sample range in size from \$52 million to nearly \$21.9 billion. The sector is comprised of logistics companies that transport goods, including refined petroleum distributors, national moving companies, freight transportation companies, supply chain logistics providers, and other logistics companies.

These organizations require systems to track moving stock, manage inventory, and maintain flexible communications systems. Only a portion of the employees in this sector use IT systems, and these capital-intensive organizations spend only a moderate amount on IT as a percentage of revenue.

In addition to appearing in this chapter, all of the logistics providers in this chapter also appear in the sample for transportation and logistics organizations in Chapter 13.

Our sector and subsector benchmarks are based on three years of survey data. For benchmarking purposes, these statistics should be used in conjunction with our benchmarks by organization size in Chapters 3A, 3B, and 3C. These chapters provide a broader set of metrics for small, midsize, and large organizations based on data from the current-year survey. We also provide an analysis of year-over-year trend data by sector in the Executive Summary in Chapter 1 and for the composite sample in Chapter 2.

For a list of benchmarks in this chapter, consult the section on “Metrics in Sector and Subsector Chapters.”

## Metrics in Composite and Organization Size Chapters

This section lists the metrics provided in Chapter 2 for the composite sample and in Chapters 3A, 3B, and 3C for small, midsize, and large organizations. These chapters include 53 figures or tables, presented in 13 sections.

In Section 1, we describe the key characteristics of the sample to establish a basis for comparison with other IT operations. These metrics are as follows:

- Organization size demographics, including revenue, employees, and revenue per employee
- IT spending demographics, including total IT spending, IT capital spending, and IT outsourcing budget
- IT infrastructure demographics, including number of data centers, network sites, and business applications
- Key metrics of IT intensity, including users per employee, PCs per user, percentage of users with tablets, percentage of users with smartphones, users per network site, and percentage of application functionality from custom systems

In Section 2, we describe IT spending by type of spending. These metrics not only provide additional demographic information, but also identify IT trends. They include:

- Percentage of IT spending devoted to ongoing support
- Outsourcing as percentage of IT budget
- Percentage of IT spending outside IT budget
- Cloud software subscriptions as percentage of application spending

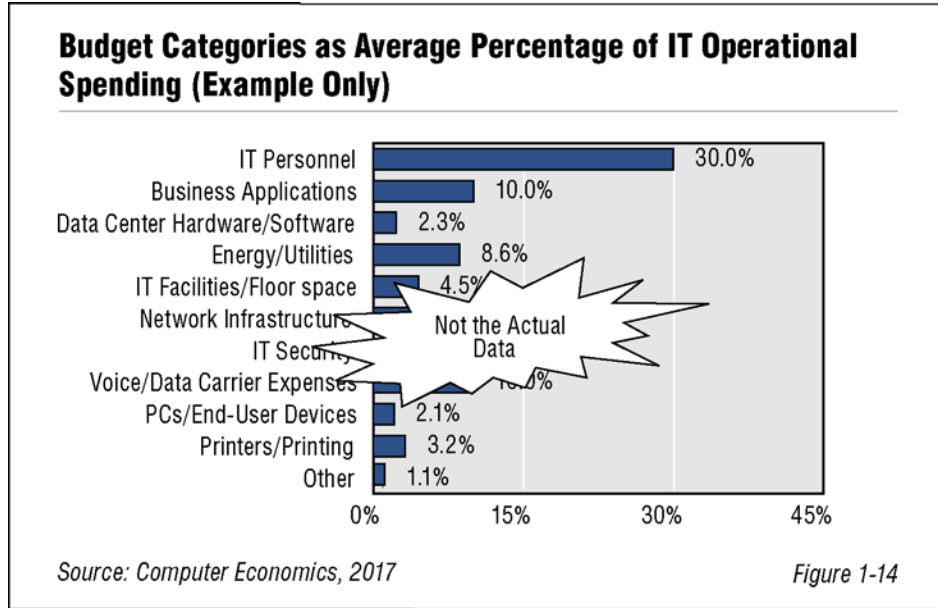
In Section 3, we examine key budget priorities for IT organizations. These metrics include:

- Spending priorities by budget area, showing the net percentage of organizations planning to increase spending on IT personnel, business applications, data center, networking, and end-user technology
- Plans for IT outsourcing, showing the percentage of companies planning to increase, decrease, and maintain spending at about the same level

- Spending priorities by IT initiative, showing the net percentage of organizations planning to increase spending on security/privacy, cloud applications, business intelligence and data warehousing solutions, cloud infrastructure, mobile devices, and disaster recovery/business continuity
- The importance of lower costs vs. improving service levels in the coming year

Section 4 presents metrics on total IT spending, which includes current-year IT capital and operational spending, but excludes depreciation. These metrics include:

- Total IT spending as percentage of revenue
- Total IT spending per user
- Total IT spending per PC
- Budget categories as average percentage of total IT spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT facilities/floor space, network infrastructure, security, voice/data carrier expenses, PCs/end-user devices, printers/printing, and other expenses



Section 5 presents metrics for IT operational spending. These metrics are as follows:

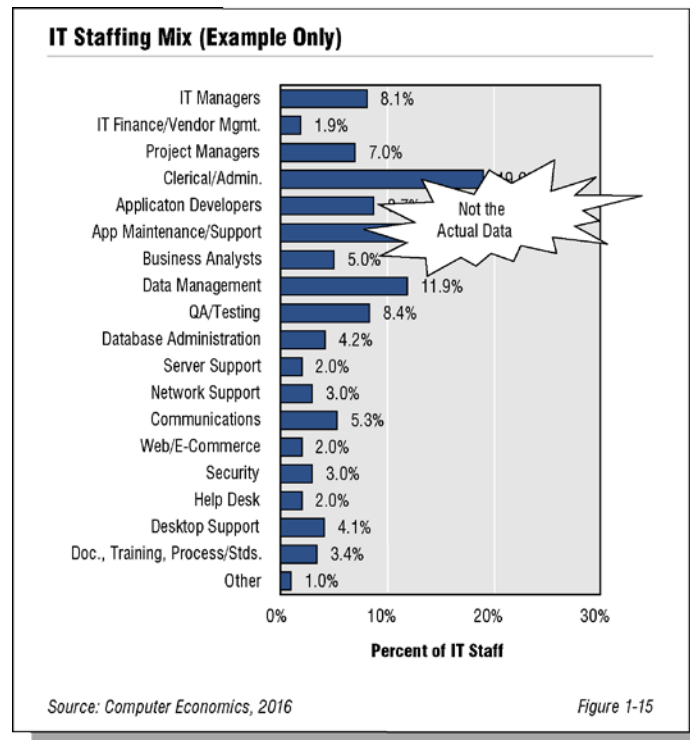
- Percentage of organizations decreasing, maintaining, or increasing IT operational spending year over year
- IT operational budget percentage change from prior year
- Expectations for how actual IT operational spending will compare with budget
- Adequacy of current IT operational budget to support the business
- IT operational spending as percentage of revenue
- IT operational spending per user
- IT operational spending per PC
- Percentage of IT operational budget charged back to users
- Budget categories as average percentage of IT operational spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT facilities/floor space, network infrastructure, security, voice/data carrier fees, PCs/end-user devices, printers/printing, and other expenses
- Personnel as percentage of IT operational spending at the 25th percentile, median, and 75th percentile
- Depreciation as percentage of IT operational budget

Section 6 provides an analysis of IT capital budgets, including:

- Percentage of organizations decreasing, maintaining, and increasing IT capital spending
- IT capital budget change from prior year
- Expectations for how actual IT capital spending will compare with budget
- IT capital budget as percentage of total IT budget
- Budget categories as average percentage of IT capital spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT facilities/floor space, network infrastructure, security, voice/data carrier fees, PCs/end-user devices, printers/printing, and other expenses

In Section 7, we provide key metrics and trend data on IT staffing, including:

- Users per IT staff member
- Percentage of organizations increasing, maintaining, and decreasing IT staff levels from previous year
- IT staff headcount change from previous year
- IT staff turnover
- Annual training allocation per IT employee
- Contingency workers as percentage of IT staff
- IT staff functions as average percentage of IT staff, including IT managers, IT finance/vendor management/procurement, project management, clerical support, application developers, application maintenance/support, data management, quality assurance/testing, database administration, server support, network support, communications support, web/e-commerce, IT security, help desk, desktop support, documentation/training/process and standards, and other functions



In Section 8, we provide key benchmarks for six job functions:

- IT managers as percentage of IT staff
- OS instances per server support staff member
- Network devices per network support staff member
- Applications per application developer
- Applications per application maintenance and support staff member
- PCs per desktop support staff member
- Users per help desk staff member
- Help desk first-call resolution rate

Section 9 shows IT spending by service area as a percentage of total IT spending. The service areas are IT management, business applications, data center, network, and end-user computing.

Section 10 provides business application metrics, including:

- Business application spending as percentage of IT spending
- Business application spending per user

Section 11 covers these data center metrics:

- Processing workload by operating system, including IBM mainframe, Unix, Linux, IBM i (formerly AS/400), Windows Server, and other
- Consolidated data center spending per user
- Consolidated data center spending per server
- Data center hardware/software spending as percentage of IT spending
- Data center hardware/software spending per user
- Energy/utilities as percentage of IT spending

- Energy/utilities spending per user
- OS instances per physical server
- Users per physical server

Section 12 covers the following networking metrics:

- Consolidated network spending per user
- Network infrastructure as percentage of IT spending
- Network infrastructure spending per user
- IT security as percentage of IT spending
- IT security spending per user
- Data/voice carrier fees as percentage of IT spending
- Data/voice carrier spending per user

Section 13 covers the following end-user computing metrics:

- Consolidated end-user technology spending per user
- PCs/end-user devices as percentage of IT spending
- PCs/end-user device spending per user
- PC refresh rate in years
- Printer/printing as percentage of IT spending
- Printer/printing spending per user
- Users per printer

The study reports the benchmarks in this chapter by organization size in Chapters 3A, 3B, and 3C.

A discussion of the methods used in this study is at the end of this chapter.

## Metrics in Sector and Subsector Chapters

The sector chapters, Chapters 4-18, and the subsector chapters, Chapters 19-28, have 30 figures, including five tables.

In Section 1, we describe the key characteristics of the respondents in this sector to establish a basis for comparison with other IT operations. These metrics are as follows:

- Organization-size demographics, including revenue, employees, and revenue per employee
- IT spending demographics, including total IT spending, IT capital budget, and IT outsourcing spending
- IT infrastructure demographics, including number of data centers, network sites, and business applications
- Key metrics of IT intensity, including users per employee, PCs per user, percentage of users with tablets, percentage of users with smartphones, users per network site, and percentage of application functionality from custom systems

In Section 2, we describe IT spending by type of spending. These metrics not only provide additional demographic information, but also identify IT trends. They include:

- Percentage of IT spending devoted to ongoing support
- Outsourcing as percentage of IT budget
- Percentage of IT spending outside IT budget

Section 3 presents metrics on IT spending, which includes current-year IT operational and capital spending but excludes depreciation. These metrics include:

- Total IT spending as percentage of revenue
- Total IT spending per user
- Total IT spending per PC
- Budget categories as average percentage of total IT spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT

facilities/floor space, network infrastructure, security, voice/data carrier expenses, PCs/end-user devices, printers/printing, and other expenses

Section 4 presents metrics for IT operational spending, which includes depreciation. These metrics are as follows:

- IT operational spending as percentage of revenue
- IT operational spending per user
- IT operational spending per PC
- Percentage of IT operational budget charged back to users
- Budget categories as average percentage of IT operational spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT facilities/floor space, network infrastructure, security, voice/data carrier fees, PCs/end-user devices, printers/printing, and other expenses
- Personnel as percentage of IT operational spending at the 25th percentile, median, and 75th percentile
- Depreciation as percentage of IT operational budget

Section 5 provides an analysis of IT capital budgets, including:

- IT capital budget as percentage of total IT budget
- Budget categories as average percentage of IT capital spending, including spending on personnel, business applications, data center hardware/software, energy/utilities, IT facilities/floor space, network infrastructure, security, voice/data carrier fees, PCs/end-user devices, printers/printing, and other expenses

In Section 6, we provide key metrics and trend data on IT staffing, including:

- Users per IT staff member
- IT staff turnover
- Annual training allocation per IT employee
- Contingency workers as percentage of IT staff

- IT staff functions as average percentage of IT staff, including IT managers, IT finance/vendor management/procurement, project management, clerical support, application developers, application maintenance/support, data management, quality assurance/testing, database administration, server support, network support, communications support, web/e-commerce, IT security, help desk, desktop support, documentation/training/process and standards, and other functions

Section 7 shows IT spending by service area as percentage of total IT spending. The service areas are IT management, business applications, data center, network, and end-user computing.

Section 8 provides business application metrics, including:

- Business application spending as percentage of IT spending
- Business application spending per user

Section 9 covers these data center metrics:

- Processing workload by operating system, including IBM mainframe, Unix, Linux, IBM i (formerly AS/400), Windows Server, and other
- Consolidated data center spending per user
- Data center hardware/software spending as percentage of IT spending
- Data center hardware/software spending per user

Section 10 covers the following networking metrics:

- Consolidated network spending per user
- Network infrastructure as percentage of IT spending
- Network infrastructure spending per user

Section 11 covers the following end-user computing metrics:

- Consolidated end-user technology spending per user
- PCs/end-user devices as percentage of IT spending
- PCs/end-user device spending per user

## IT Spending Category Definitions

The definitions in this section apply to operational, capital, and total IT spending categories. Please note the following special considerations in how we assign IT spending to categories:

- In the IT operational budget, all personnel costs go into the personnel line item.
- In the IT capital budget, capitalized labor is charged to the most appropriate category. For example, capitalized labor for application development is in application software.
- Most outsourcing costs are allocated to the IT budget as if the function were being performed in-house. Fees for services that primarily replace personnel are primarily personnel expenses.
- Fees for software as a service are in the application software category.
- Fees for public cloud infrastructure services are in the data center infrastructure category.

We make certain adjustments to the IT budget. Business units sometimes pay for engineering systems, PCs, voice/data service, software-as-a-service applications, or specialized business systems directly out of their budgets. We include these expenses within our definition of IT spending. We also include clinical systems for hospitals, point-of-sale systems for retailers, and ATM systems for banks in IT spending.

On the other hand, some expenses show up in IT budgets that we do not include within our definition of IT spending. These items include spending on industrial control systems, robotics, or materials handling systems. For benchmarking purposes, organizations should not include these expenses in their IT spending. We also exclude IT product or service costs for external customers of the business. (In other words, for IT product, services, and consulting firms, our benchmarks should be used for internal IT support only.)

The remainder of this section describes the budget categories in detail, with categories organized by group. In some cases, the category and group are one and the same, such as for the IT Personnel Expenses Group. In other cases, the group contains several categories, such as the Data Center Expenses Group.

### IT Personnel Expenses

The IT personnel category includes all personnel costs, including compensation, taxes, benefits, and recruiting and training fees. The cost of contingency IT workers is charged to this category. Also, most outsourcing expenses for services that replace the need for IT staff belong here.

### **Application Software Expenses**

The application software category includes software license and maintenance fees, acquisition costs, and development costs for business applications and associated databases and middleware. It also includes subscription costs for software as a service or hosted applications.

### **Data Center Expenses**

These categories include all expenses for data center systems, software, services, and facilities.

- **Data Center Hardware/Software:** This category includes servers, storage, mainframes, and associated operating system software. It also includes data center utilities, automation systems, storage management applications, and systems management applications. Disaster recovery, public cloud infrastructure as a service, and data center outsourcing services also belong in this category.
- **Energy/Utilities:** This category includes all data center utility costs for power and cooling.
- **IT Facilities/Floor Space:** This category includes the cost of buildings, rent, property taxes and insurance, and corporate facilities charges.

### **Network Expenses**

These categories include all expenses for network and communications services, software, and hardware, as well as expenses related to securing IT networks.

- **Network Infrastructure:** This category includes all network and communications systems hardware and software. Communications systems include telephone, email, messaging, unified communications, videoconferencing, mobile device management systems, and related hardware and software.
- **IT Security:** This category includes acquisition and maintenance costs for security hardware, software, and services such as security audits, assessments, testing, and managed security services.
- **Voice/Data Carrier Expenses:** This category includes telecom and data communications carrier service fees for all types of service, including long-distance and wireless service for all business units. It also includes charges for managed and cloud telecom and data communications services.

### **End-User Technology Expenses**

These categories include expenses for hardware, software, and systems assigned to employees or workgroups.

- **PCs/End-User Devices:** This category includes expenses for PCs and other end-user computing devices, including laptops, tablets, thin clients, smartphones, and terminals. It also includes desktop operating systems, desktop applications, and maintenance contracts or warranties. Fees for desktops as a service also go here.
- **Printers/Printing:** This category includes acquisition, leasing, and maintenance costs for all printers, copiers, scanners, plotters, and related consumables. This category also includes managed print services.

### **Other Miscellaneous Expenses**

This category includes miscellaneous expenses, travel and entertainment expenses, data services, and expenses unique to specific organizations.

## How We Define IT Staffing Categories

Our staffing ratio reports provide multiple metrics designed to assess staffing requirements for specific IT functions. In our annual survey, we divide IT staff into 19 categories. Organizations should refer to these category definitions to better understand how to categorize employees for the purpose of benchmarking. These categories are designed to cover every IT function at a broad level. The categories also are organized by group, which can be useful in determining how to categorize IT staff members.

The job functions are defined as follows:

### IT Management Group

The IT Management Group includes IT executives and managers, IT finance and vendor management personnel, project managers, and administrative support personnel.

- **IT Managers:** IT managers are individuals whose primary job function is to manage people. We group all IT management levels into a single job function, including IT executives. First-level managers who are primarily “doers” (i.e., managers in name only) are not counted as managers, but rather fall under the function that they supervise.
- **IT Finance/Vendor Management:** These are individuals whose primary job function within the IT organization is related to finance, accounting, budgeting, procurement, vendor contracts, or vendor management.
- **Project Managers:** These are individuals who are part of a formal project management office or whose primary job function is project management. It does not include individuals who manage projects in addition to their primary job responsibilities.
- **Clerical/Administrative Staff:** Clerical/administrative personnel are individuals who support managers and administrators.

### Application Group

The Application Group includes application programmers as well as other IT staff that support the development, maintenance, and use of enterprise business applications and web systems.

- **Application Developers, Systems Analysts, Architects:** These job functions include personnel involved with the development of business applications. They include application programmers, systems analysts, and solutions architects. This category also includes enterprise architects. It does not include business analysts, database administrators, or application maintenance and support personnel, who belong in their respective categories.

- **Application Maintenance and Support:** These job functions include personnel involved with the maintenance and support of business applications. They include application programmers who troubleshoot, debug, and make routine changes to applications. This category also includes application-specific support specialists. It does not include business analysts, database administrators, or application developers, who belong in their respective categories. Note: If application maintenance personnel are the same as application development personnel, organizations should estimate headcount according to the percentage of their time spent on development vs. maintenance.
- **Business Analysts:** These are individuals whose primary job function brings them directly into user business functions to gather user requirements, define or design business processes using information systems, and serve as liaisons between users and IT. This category also includes customer relationship personnel who represent the user community to the IT group and ensure IT systems are effectively used by the organization.
- **Data Management Staff:** These individuals design, develop, architect, and model data schemes and databases for the organization. They also may design the organization's data warehouse and business intelligence systems and analyze information maintained by such systems. This category does not include database administrators, who go in the database administration category.
- **Quality Assurance and Testing Staff:** These individuals are part of a dedicated quality assurance or testing function. It does not include those who perform testing as part of their other job responsibilities, such as application programmers who also perform their own unit testing.
- **Web/E-Commerce Staff:** This includes web developers, designers, administrators, and other individuals who work on the company's public websites, as well as those who maintain intranet sites. It also includes personnel who are dedicated to e-commerce activities, such as EDI specialists.

### **Data Center Group**

This group includes job functions that are accomplished by infrastructure support personnel responsible for maintaining servers, mainframes, storage, databases, and data center facilities.

- **Database Administrators:** Database administration and support personnel are responsible for maintaining, updating, modifying, and backing up database management systems.
- **Server Support Staff:** This includes all data center staff who support the server and storage infrastructure, including systems administrators, systems programmers, systems engineers, storage administrators, and facility engineers. It also includes computer operators, job schedulers, and production-control personnel, disaster recovery administrators, and other ancillary functions in the data center.

## Network and Communications Group

This group includes job functions that are accomplished by personnel responsible for maintaining data and voice networks and email, messaging, videoconferencing, and unified communications systems.

- **Network Support Staff:** This includes all network administration, engineering, architectural, and support positions for both data and voice network infrastructure.
- **Communications/Email/Messaging Support Staff:** This includes engineers, specialists, analysts, and administrators who manage email, messaging, videoconferencing, unified communications, telephony, and other communications systems.
- **Security Professionals:** These are individuals whose primary responsibilities include security policy and procedures, security compliance, and security audits.

## End-User Support Group

This group includes most end-user support functions as well as training and documentation.

- **Help Desk:** This includes help desk personnel who provide first-contact support to end users, typically by phone, email, or other forms of remote communication. It does not include desktop support personnel.
- **Desktop Support:** This includes technical support staff members who install, configure, and maintain operating systems and applications on PCs and carry out other PC support functions, such as troubleshooting and repairing network connectivity issues, migrating user data, installing peripherals, and responding to user problems that the help desk is unable to resolve. Desktop support may be handled remotely or in the field.
- **Training, Documentation, and IT Process/Standards:** This includes staff members who develop or maintain documentation and provide training. This category also includes IT staff members whose job function is to establish and improve internal IT processes, methodologies, standards, and guidelines, such as those assigned to ITIL, CMMI, Six Sigma, and other IT process improvement programs.

## Other Positions

We include IT staff in the “other” category if they perform functions not typically found in an IT organization.

## Survey Methodology

This section describes our overall process for collecting and analyzing the survey data as well as characteristics of the survey participants.

### Sample Selection and Process

The survey was conducted from January to May 2017. We identified and selected participants by making solicitations to specific organizations in the U.S. and Canada that met our criteria for organization size and industry sector. The job position of each survey respondent was evaluated to ensure that each would be knowledgeable and likely to have access to the organization's IT spending and staffing metrics. We then reviewed the applicants in terms of their industry sector and organization size to ensure that they were qualified to participate.

Qualified participants were offered two ways to respond to the survey: an online version and a PDF version. As the survey progressed, we monitored response volume by industry and organization size and adjusted our survey solicitation activities accordingly to ensure that the stratification of the survey sample was within acceptable bounds. This is an important step that allows meaningful comparisons to be done with previous years of this study.

At the end of the survey period, we reviewed all survey responses and conducted follow-up interviews with respondents in cases where answers were incomplete, inconsistent, or outside normal ranges, or where responses otherwise failed our validation tests. We corrected survey responses where appropriate. In cases where the respondent would not or could not provide meaningfully consistent information, we dropped the response from our sample to protect the integrity of our survey.

Finally, survey results were loaded into a statistical model to produce the analysis that appears in this study.

## Survey Participants

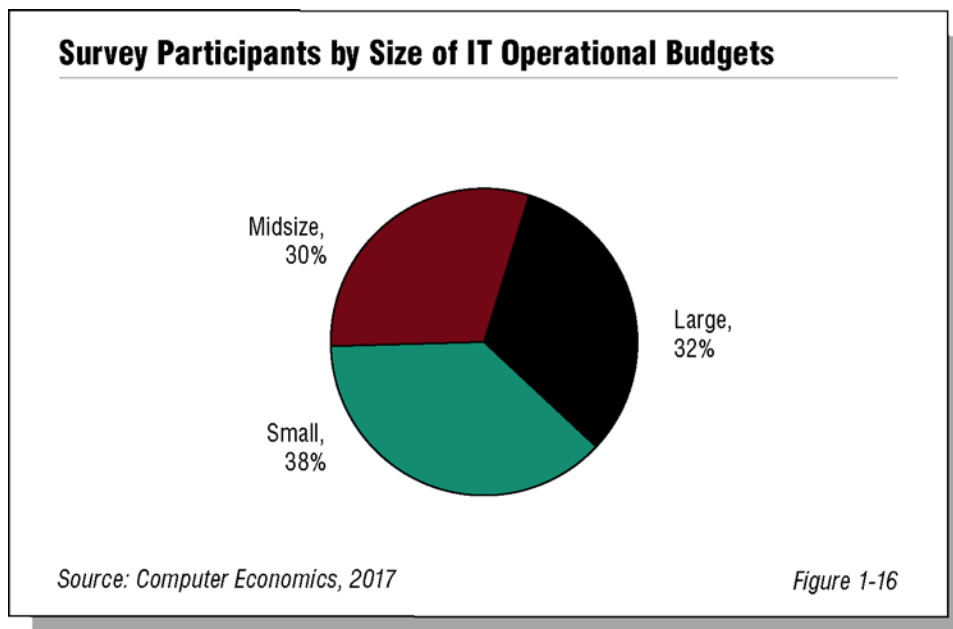
There were 202 IT organizations in the U.S. and Canada who participated in our survey this year. The sample was stratified into three categories of organization size:

- Small organizations (IT operational budgets of less than \$5 million)
- Midsize organizations (IT operational budgets of \$5 million to less than \$20 million)
- Large organizations (IT operational budgets of \$20 million or greater)

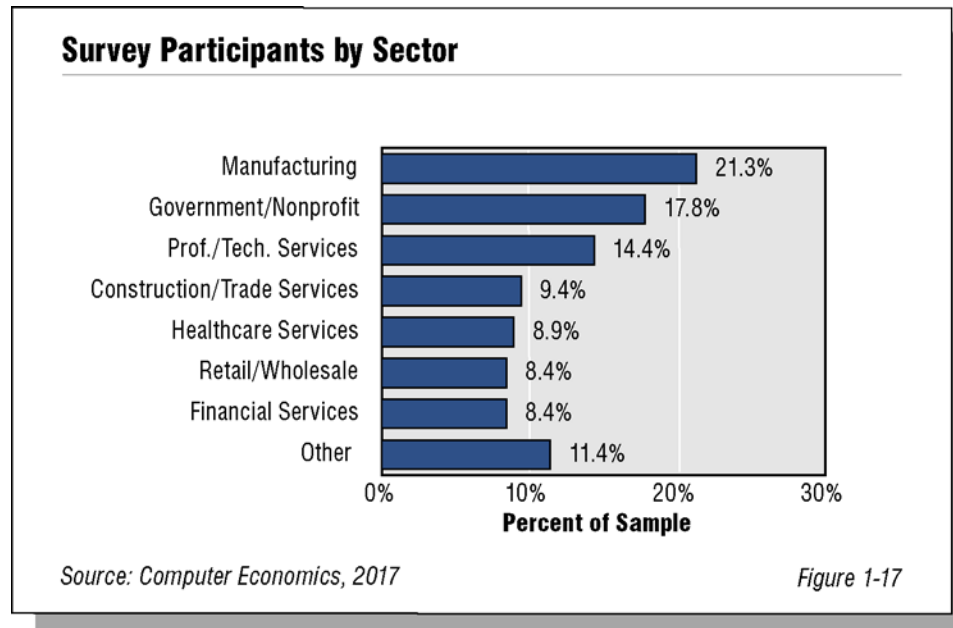
To maintain the validity of certain spending and staffing ratios, we do not allow organizations to participate unless they have at least \$50 million in annual revenue or IT operational budgets of at least \$1 million.

In the case of public sector organizations, respondents were instructed to use the total organizational operating budget in place of revenue.

As shown in Figure 1-16, large companies made up 32% of the survey respondents, followed by midsize organizations at 30%, and small organizations at 38%.



The percentage of respondents in each industry sector is shown in Figure 1-17.



Please refer to the chapter descriptions earlier in this executive summary for a description of each industry sector and subsector.

## Custom Benchmarking Services

Readers are encouraged to analyze the data within this study and use it as a basis for benchmarking their own IT spending, staffing, and technology adoption. For those organizations that would like assistance in this effort, Computer Economics offers a custom benchmarking service in which we gather metrics for the target organization and compare them against the data collected in this study.

The deliverable from a custom benchmarking exercise is a report that triangulates the metrics from the target organization against the benchmark data by industry sector and organization size, as well as against the composite sample. Preliminary observations about potential causes of variation from the benchmark and directions for further inquiry are also provided. Contact us for a sample of the final presentation that is delivered as part of this service.

Organizations request custom benchmarking services from Computer Economics for a variety of reasons:

- To take advantage of the experience and resources of Computer Economics to more quickly and accurately prepare a benchmark evaluation
- To obtain the perspective of Computer Economics as a neutral third party for evaluating the spending, staffing, and technology utilization of an organization
- To evaluate the spending and staffing ratios of a potential corporate acquisition or investment target, as part of a due diligence exercise

Computer Economics can also serve as a trusted third party to prepare a custom benchmarking study for a group of companies in a more narrow sector—even between competitors—to allow participants to benchmark their IT spending, staffing, and technology utilization without revealing the details of their own metrics to the other participants. As with all our surveys, all information gathered by Computer Economics is held in strict confidence and is only revealed in aggregate in the survey results.

For more information about our custom benchmarking services, or to obtain a price quote, please contact us. Contact information may be found on our website at [www.computereconomics.com](http://www.computereconomics.com).