IT SPENDING & STAFFING BENCHMARKS

2020/2021

Chapter 1

Executive Summary

COMPUTER ECONOMICS
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IT Spending and Staffing Benchmarks 2020/2021

Computer Economics, a service of Avasant Research, provides metrics for IT management. 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 measures adoption trends of strategic IT practices; and *IT Staffing Ratios,* a series of benchmarking studies with metrics for 15 IT job functions.

In addition to these major studies, we publish IT management advisories on various issues of concern to IT managers. These reports are made available through our website. For further information on our custom benchmarking services, website subscriptions, advisory reports, and other services, please contact our office or visit our website at www.computereconomics.com.

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CHAPTER 1: Executive Summary

Introduction

The Computer Economics *IT Spending and Staffing Benchmarks* study, now in its 31st year of publication, provides key metrics to assist organizations in the financial and strategic management of information technology. The information presented in this 31-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, and many of them have global operations. 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 233 IT organizations conducted in the first half of 2020. It provides composite statistics of IT spending and staffing data, a segmentation of the same statistics by organization size, and benchmarks for organizations in 28 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, at the beginning of 2020, companies were poised for another year of strong IT operational budget growth. Increases were set to be just a tick below last year's growth, which was the strongest since before the 2008 recession. For the fourth year in a row, IT operational budgets were set to increase at a rate higher than inflation. Organizations across nearly every sector were planning controlled-but-steady IT growth. And, for the first time since the cloud era, our composite sample of all IT organizations was even planning to increase head counts at the median, showing that hiring was finally outstripping the efficiencies gained from automation, software-as-a-service (SaaS) applications, and cloud. The outlook for the year was looking strong for IT organizations—at least until the global pandemic struck.

At the time of publishing this study, unemployment in the U.S. is in double digits for the first time in a decade. Many parts of the economy are only partially open, with a percentage of the population

being asked to stay at home, except for essential business. Some parts of the economy have re-opened, and people are returning to work. Still, the fear of a second wave of coronavirus infections looms, and a rush for a vaccine is on. IT budgets, no doubt, will be affected.

However, in supplemental research we conducted at the end of our survey period, we found that, at the time of publication, the majority of IT organizations were in wait-and-see mode. Less than a third of the companies we surveyed in April and May of 2020 said that they had cut their IT budgets, and those that did cut spending said that those cuts have been modest. Many said it was too early to say whether budget cuts would be needed. We will continue to monitor these trends through the year and report that data on our coronavirus research page.

Strangely, it is possible to both overstate and understate the impact of the pandemic on our benchmarks. It is easy to understate, because the coronavirus and the impending downturn is likely to have long-term and potentially devastating effects on the economy and on IT organizations. The length and depth of the recession may largely depend on aspects that are different from the normal economic factors that dictate a recession.

On the other hand, there is no need to "toss out" the findings of our study. As mentioned, in the latter part of the normal survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. An important thing to understand is that the key benchmarks for overall IT spending and staffing levels presented in this study remain valid because they are based on ratios, not absolute spending levels. Thus, the metrics are designed to respond to sudden economic changes. This is why we report in ratios and percentages. Take, for example, IT spending as a percentage of revenue. If corporate revenues are declining due to current economic conditions, then the benchmark amount of IT spending will decline as well. Similarly, high-level guidance for IT staffing based on the number of corporate users will self-adjust if the number of corporate employees is reduced.

In other words, though the pandemic may have rattled confidence in the U.S. economy, the only numbers likely to be strongly impacted are those showing outlook, not IT spending. Will IT operational budgets increase 3% this year? Almost certainly not, for most companies. But it is useful to understand the big picture, and the metrics can still guide readers through these turbulent times.

Prior to the pandemic, we would have predicted that companies would have continued increases in IT operational spending in order to accelerate the pace of increased cost efficiency and to access new capabilities they are missing in their legacy systems. We believe companies in the position to do so will, in fact, increase their operational budgets. At the very least, companies will look to maintain as many new projects as possible. Unlike past recessions where cuts were required to save costs, the cloud in many cases gives companies a unique opportunity to decrease costs while maintaining capabilities. For years, the cloud transformation has driven decreased costs in data center spending and personnel while driving a digital revolution.

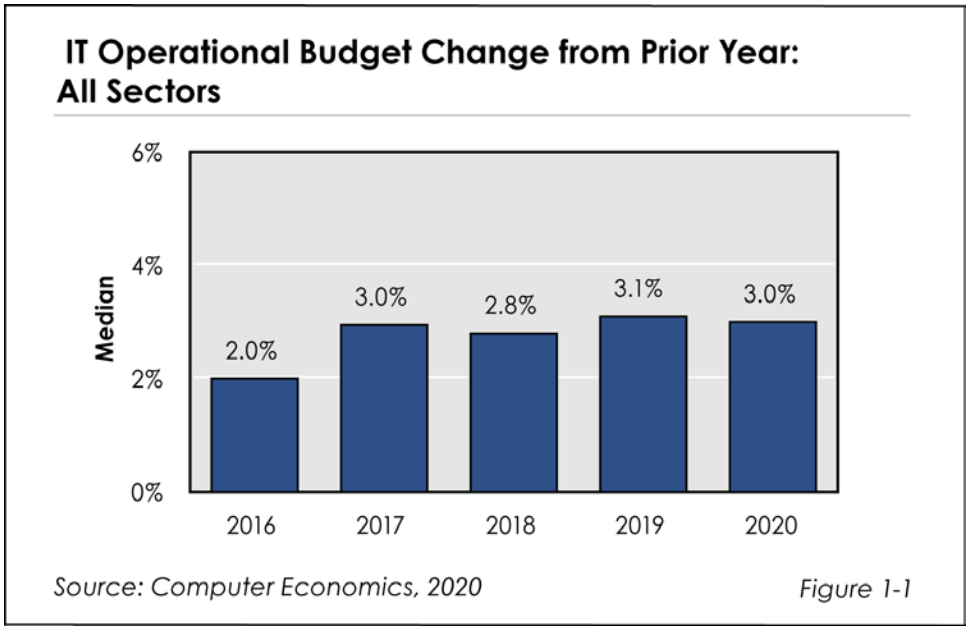
Some companies are already dialing back some new IT projects. But our supplemental survey on the effects of the pandemic indicates that companies are now accelerating projects for unified communications, remote work capabilities, business intelligence, and analytics in order to weather the storm. It is unlikely that even a deep global recession would stop the cloud migration; it may simply change its focus.

There are winners and losers in every economic circumstance. In the midst of the pandemic, some companies, especially entertainment, tourism, hospitality, and travel are being affected in a strongly negative way. Other companies—such as online retail, logistics, some types of manufacturing, and those companies born in a digital world—are less affected, and a few are even thriving. Regardless of where a company falls, our key findings and benchmarks should be helpful.

In the rest of this section, we outline our key findings in more detail, with the caveat that findings that address year over year trends will be subject to revision as the year progresses. We attempt to highlight those below.

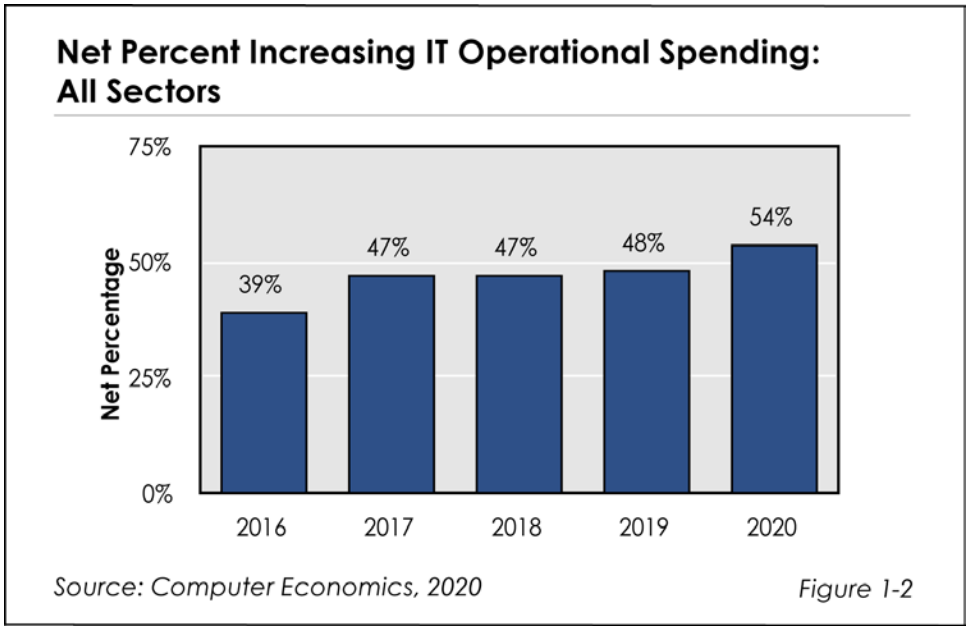
Finding 1: IT Operational Spending Growth Is Steady

At the beginning of 2020, IT operational spending growth was expected to increase at a modest rate. The 3.0% growth at the median, as shown in Figure 1-1, continued the trend of the past four years of increasing spending in operational budgets at a slightly higher rate than inflation. Prior to the pandemic, the potential need for stronger growth because of the strong economy was being held in check by efficiencies gained through the cloud, automation, and SaaS. Of all our findings, this one is most affected by the pandemic.



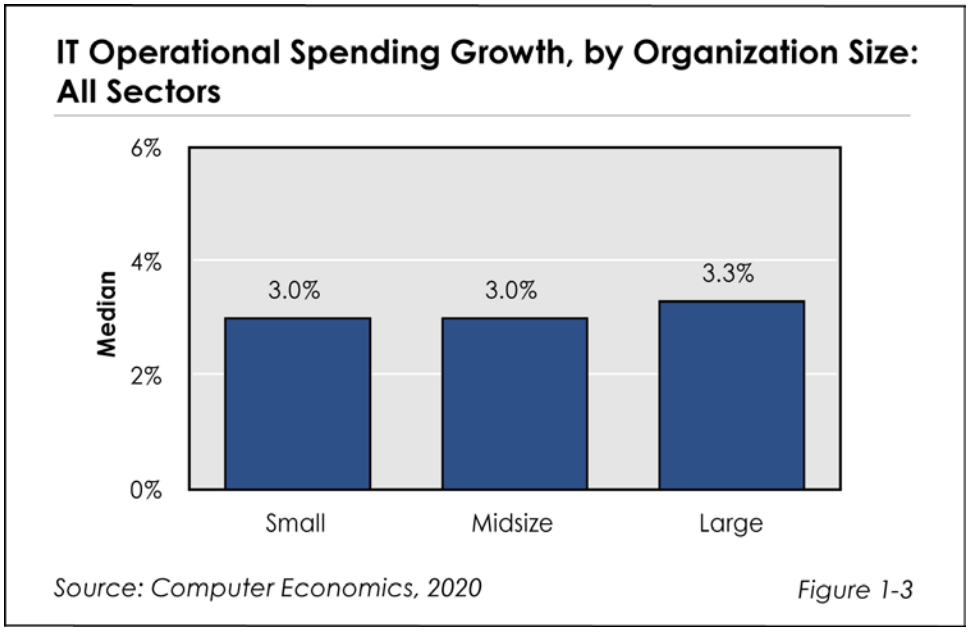
Finding 2: IT Operational Spending Growth Is Broad

At the beginning of the year, the net percentage of companies planning an increase in their IT operational spending was the highest in recent history. Sixty-nine percent of organizations planned to increase IT spending, but that was offset by budget cutting at 16% of organizations, which results in a net increase of 54%, as shown in Figure 1-2. Growth was widespread across all company sizes. Again, while our research does not show large percentages of companies cutting budgets at this time, it is highly unlikely that this number will hold.



Finding 3: Broad Growth Across All Sectors

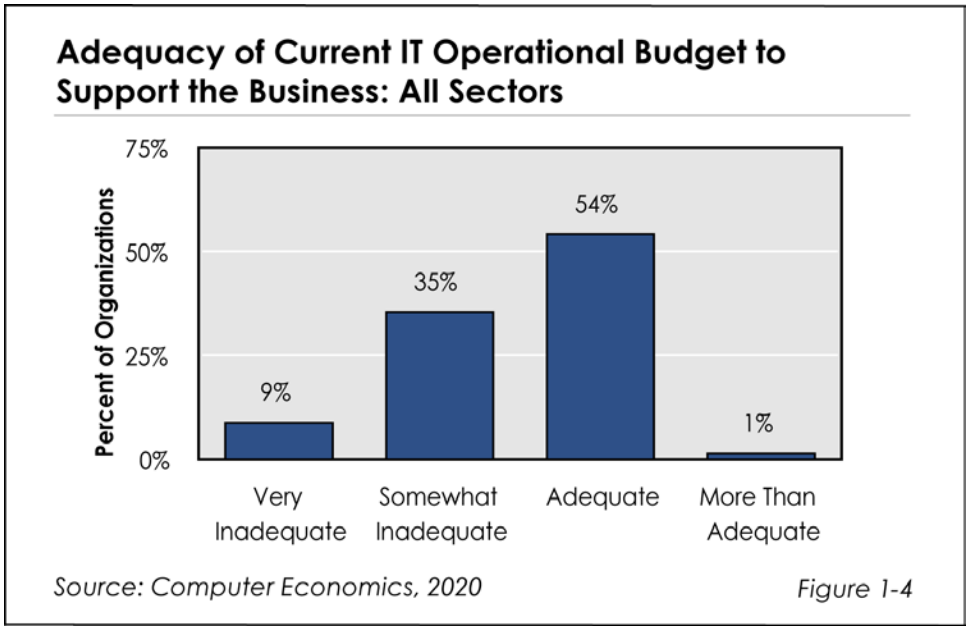
While large companies at the beginning of 2020 led the way with budget increases, growth was broad across all company sizes, Figure 1-3 shows. At the median, small and midsize organizations, those with IT operational budgets between $1 million and $20 million a year, were increasing IT operational budgets by 3.0%. Large organizations, those above $20 million in IT spending, were planning 3.3% increases. Some sectors and companies will still be in a position (or even have a need) to raise IT operational spending. Others, of course, will be forced to hold back. The biggest takeaway here might be that all sectors seemed equally poised to grow before the pandemic, so size is unlikely to be a large factor in what happens next for spending.



Finding 4: More CIOs Making Due with What They Have

Another indicator of outlook is the degree to which IT executives find that their IT budgets are adequate to support the business. As shown in Figure 1-4, at the beginning of 2020, 44% of IT executives felt that their IT budgets are either somewhat or very inadequate to meet the needs of the business. While this is just about half of respondents, it is a historic low, and the number of CIOs who find their budgets adequate continues to rise.

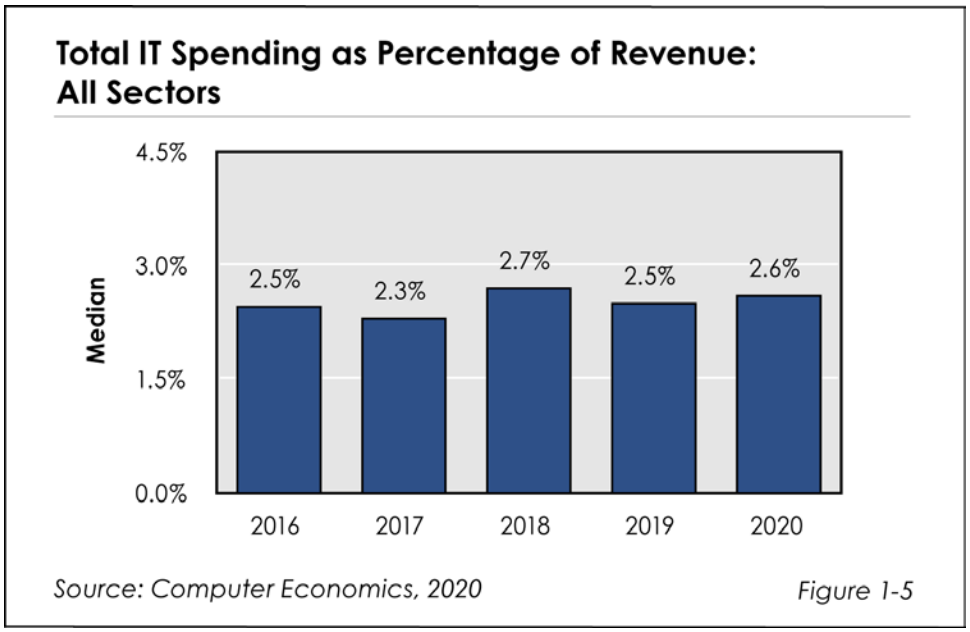
This bodes well for IT organizations in a recession. One of the reasons why IT budgets are increasingly seen as adequate is that refreshing technology, lessening dependence on legacy systems, strategic outsourcing, and the use of cloud infrastructure and applications are an easier way to make room in the budget, rather than going to the CFO and asking for a large increase. Reducing in-house infrastructure and turning toward SaaS and cloud infrastructure, which often have a "pay-for-what-you-use" model, will allow for more cost flexibility. In other words, IT organizations have already been making many of the investments that will help in the downturn.



Finding 5: IT Spending as Percentage of Revenue Increases Slightly

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 increase this year for the composite sample, at least at the beginning of the year. As shown in Figure 1-5, the percentage increased from 2.5% last year to 2.6% this year. This percentage fluctuates within a relatively tight space, and it is one of the reasons (as explained above) why our benchmarks are still helpful despite the turn in the economy.

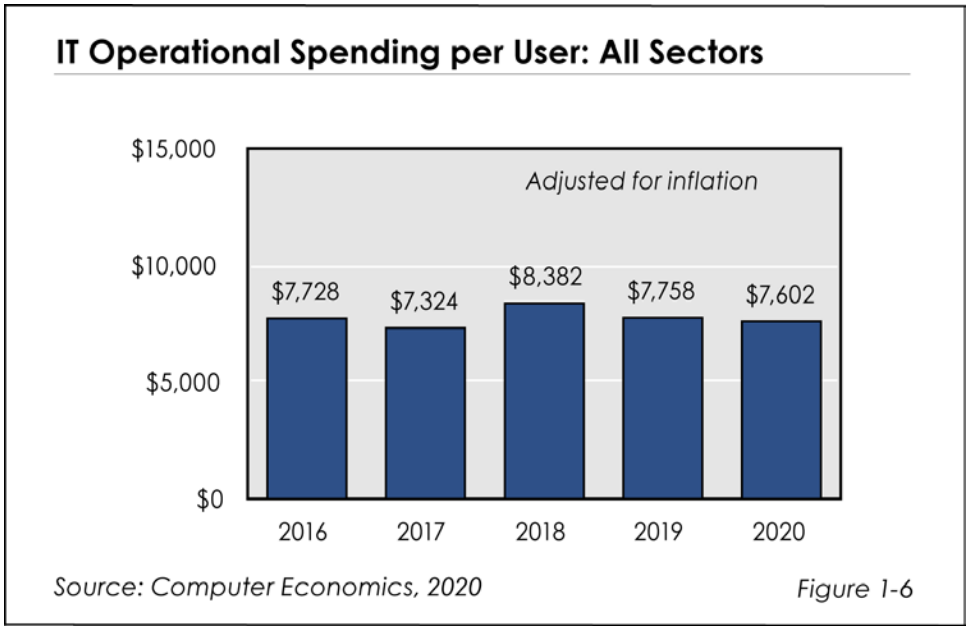
If an organization wants to maintain IT spending at roughly 2.6%, but sees a decrease in revenue because of the pandemic, the cut to IT spending to maintain 2.6% is a simple matter of determining what size IT spending cut maintains the ratio. And because most of our other metrics are presented as a percentage of IT budget, the cuts at each level of staffing and spending are easily determined. In this way, our metrics are self-adjusting.



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.

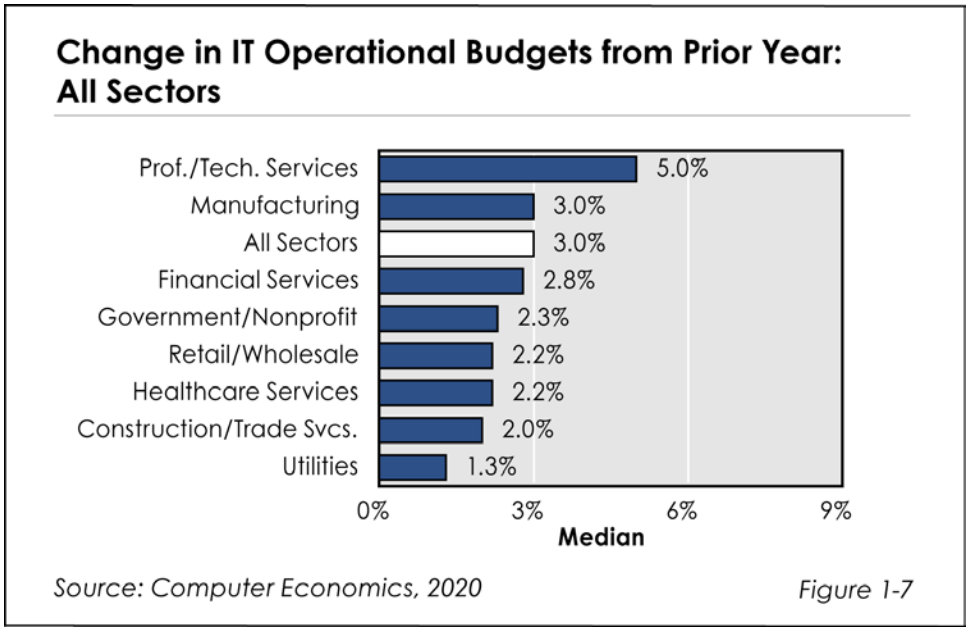
Finding 6: Per-User Spending Decreases

Consistent with the increased efficiency that we have reported, IT spending per user has declined despite the increase in IT budgets. Figure 1-6 shows that IT spending per user when adjusted for inflation was down from $7,758 in 2019 to $7,602 at the beginning of this year. Cloud efficiencies, increased use of virtualization, and automation of IT processes allow for this number to trend downward, while user counts are rising at many companies due to relatively strong trends in overall employment. In the long run, we expect this metric to continue its downward trend.



Finding 7: Professional/Technical Services Sector Leads in IT Spending Growth

All sectors were planning growth in IT operational budgets this year, but some sectors were planning for even bigger increases. In IT operational budgets, the professional/technical services sector was leading the way at 5.0% growth, Figure 1-7 shows. The weakest growth was in utilities at 1.3%. Obviously, some sectors are being hit harder than others in the pandemic economy. We know, for instance, that, despite the demand for healthcare, revenue is suffering in this sector because thousands of elective surgeries have been cancelled, and beds are sometimes being held empty to plan for coronavirus outbreaks. In other cases, sectors will be split in their impact. Retail is one example. Online retail has been surging while people have been in lockdown at home, while many brick-and-mortar retailers are suffering, with the notable exception of grocery stores.



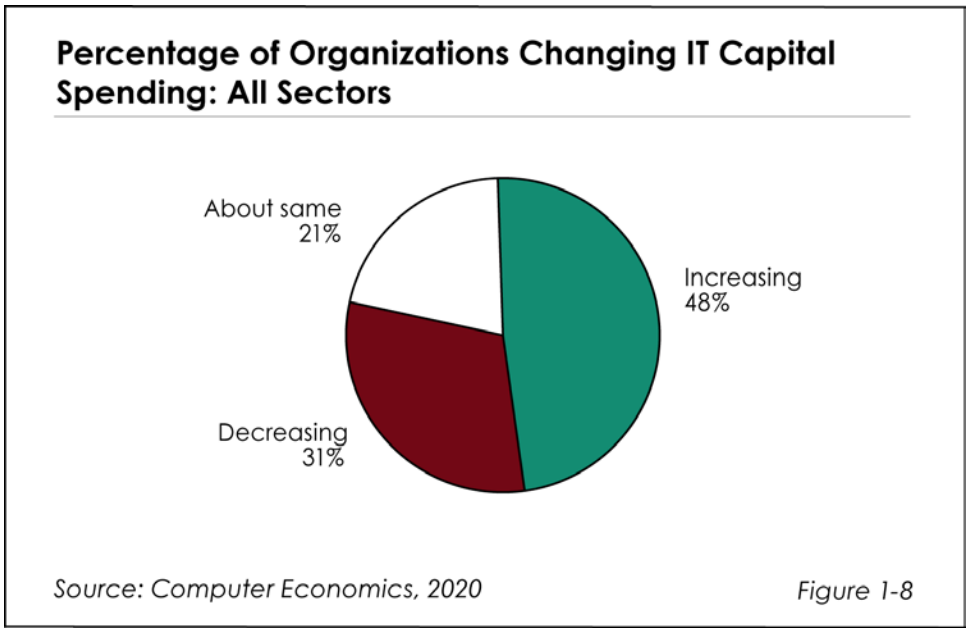
These results indicate that economic conditions, which strongly influence IT spending and staffing levels, vary by industry sector. Benchmarking of IT metrics, therefore, should include sector-specific metrics as provided in later chapters of this study.

Finding 8: IT Capital Spending Growth Continues to Decline

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. Companies at the median are simply not increasing their IT capital spending levels: While 48% of IT organizations are increasing IT capital budgets, 31% are reducing capital spending, Figure 1-8 shows.

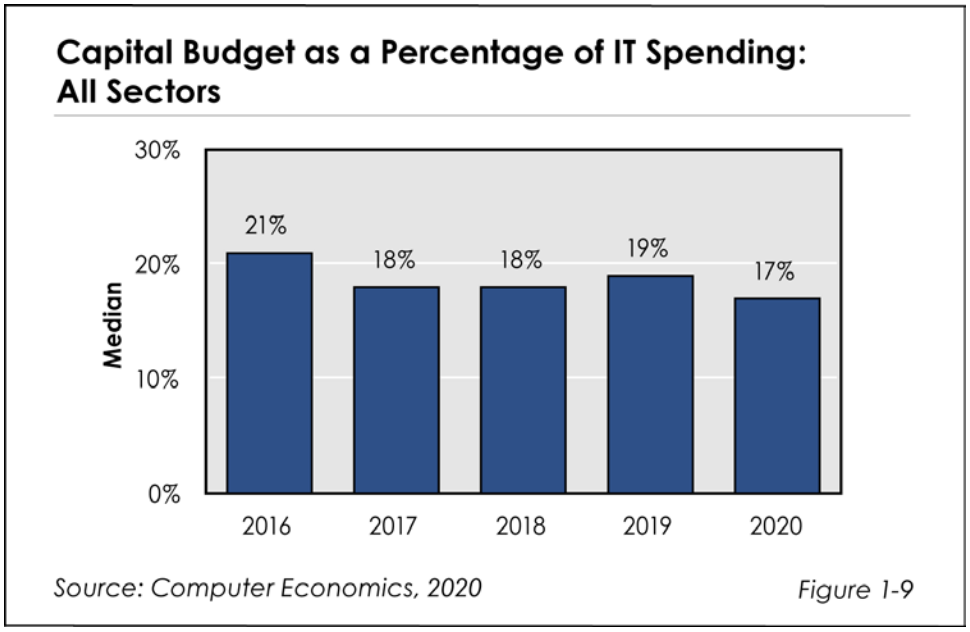
At the beginning of the year, most organizations were planning to spend just enough to maintain normal equipment-refresh cycles, not growing their on-premises infrastructure. In previous economic downturns, capital budgets were often the first target for budget cuts as organizations held off on refresh cycles. However, capital spending is now such a small part of IT budgets, and we may see fewer organizations look to cut this area, but those who do, are likely to cut deeper than in other areas.

Early indications from our supplemental survey shows IT capital budgets being cut more deeply than IT operational budgets, at this time.



Finding 9: Capital Budgets Decrease Again as a Percentage of IT Spending

In contrast to the modest but relatively broad-based rise in IT operational spending, IT capital spending as percentage of total IT spending has been trending down. Figure 1-9 shows that capital spending as percentage of IT spending decreased slightly at the beginning of this year from 19% to 17%. Virtualization, the cloud, and other technologies are lessening the need for capital expenditure growth. 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.



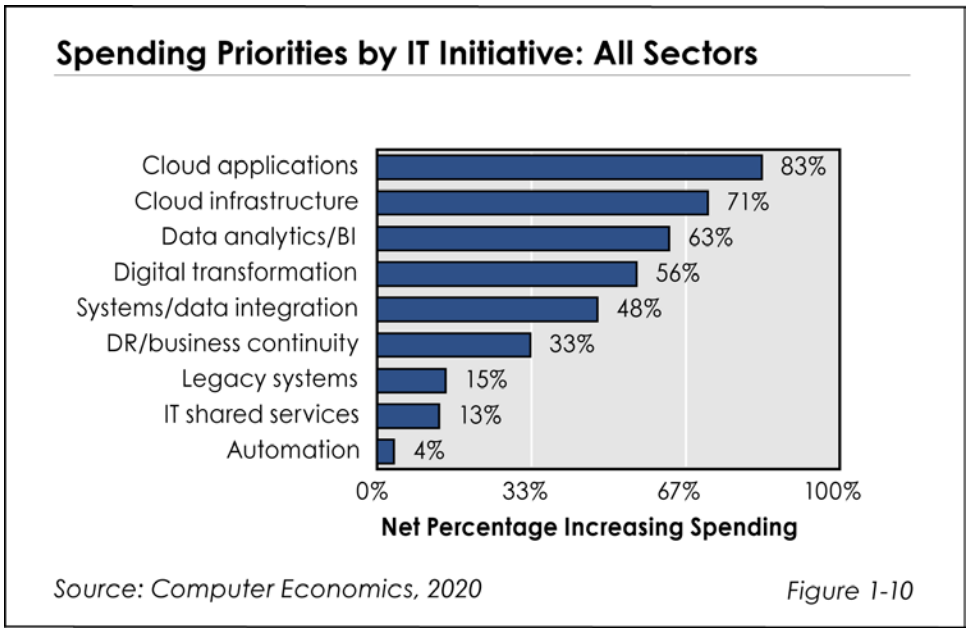
Finding 10: Cloud Tops Spending Priorities

Continuing the trend from recent years, the cloud is the top spending priority. Both cloud applications and cloud infrastructure lead the way. A net 83% of respondents are increasing their spending in cloud applications, as shown in Figure 1-10.

Cloud infrastructure, at 71%, continues to be a major priority as well. We expect this trend to continue as the economic and strategic advantages of an elastic and scalable approach become more and more evident, especially now during pandemic times, which call for agility and flexibility now more than ever.

Data analytics/business intelligence follows in third place, at 63%. Digital transformation and systems/data integration, are next at 56% and 48%, respectively. The lowest priorities with 13% and 4%, respectively, are IT shared services and automation.

While budgets for new projects may be put on hold, we do not expect these priorities to change.



Source: Computer Economics, 2020

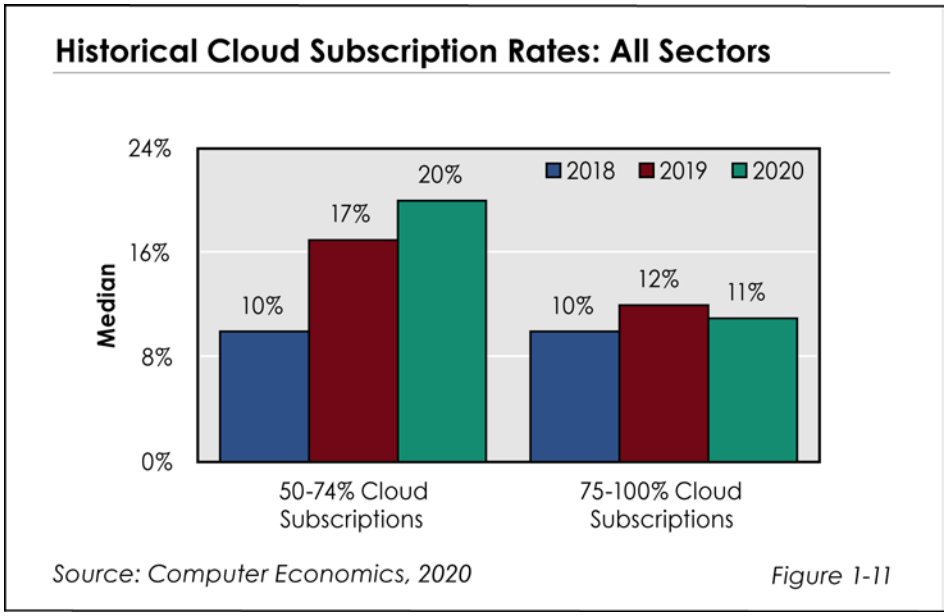
Figure 1-10

Finding 11: Companies Getting Serious About Cloud Systems

For the first time in the history of our survey, all companies have at least some cloud applications. Overall, the transition to cloud apps has been slow but steady, as buyers are increasingly adopting a "cloud first" strategy when legacy systems come up for replacement. The transition appears to be picking up steam, at least from the bottom up.

As Figure 1-11 shows, in 2018 only 20% of respondents reported that at least half of their business software spending was for cloud subscriptions. In 2019, this metric increased to 29%, and in 2020, it rose further to 31%. However, the top category (those with 75%-100% of their software spending in the cloud) is barely growing. It appears that once companies rise above 75% cloud subscriptions, they are likely to encounter applications that for whatever reason they choose to keep on-premises, or at least outsourced to a managed services provider. This may be for security or compliance reasons, or it may be that the application is perceived to be too mission-critical to risk re-architecting for true cloud deployment.

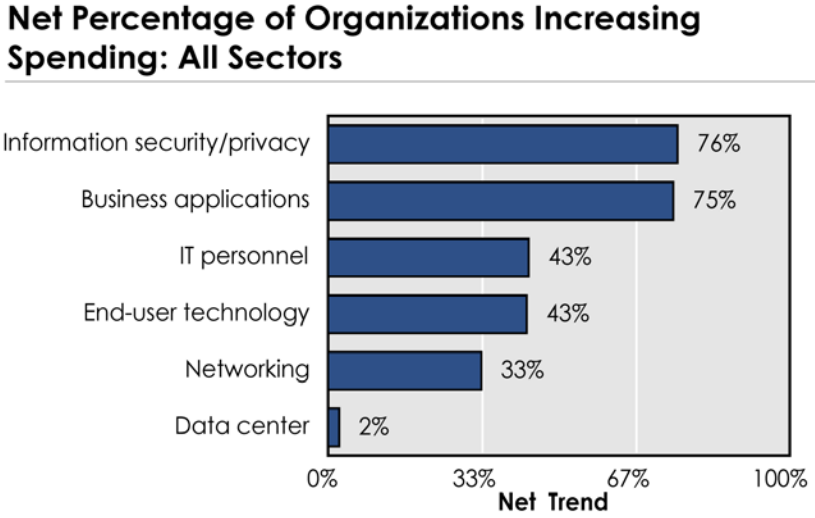
We expect this trend to continue as there are few remaining arguments against cloud applications. Security and compliance concerns have been addressed for the most part.



Finding 12: Data Centers Lowest Priority for New Spending By Far

Information security/privacy has been the top area for increased spending for some time. A net 76% of all IT organizations plan to increase spending in this area, Figure 1-12 shows. We also see improved spending on business applications, with 75% planning increases in this area. 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 a net of 2% 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 third year, data center is the lowest-priority spending category.

Again, while new projects or spending may be put on hold, we would not expect these priorities to change.



Source: Computer Economics, 2020

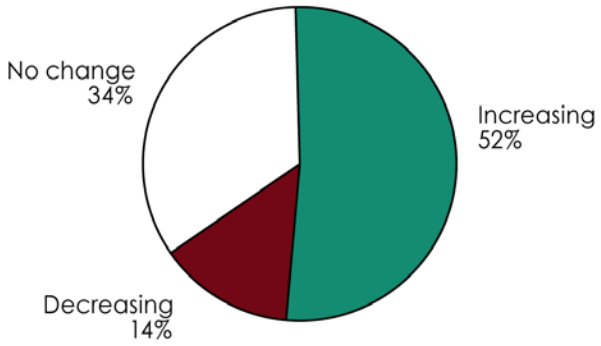
Figure 1-12

Finding 13: Small Increases in IT Head Counts Were Expected

In recent years, IT spending was generally increasing and the economy was strong, but it did not necessarily translate into good news for IT job seekers. Before the pandemic, this year was going to be the first year in some time where more than half of IT organizations (52%) planned to increase IT staff head counts, as shown in Figure 1-13.

In recent years, investments in automation, the cloud, and virtualization have allowed IT staff to be more efficient. It was not required to higher new staff to manage growth.

Percentage of Organizations Changing IT Staff Head Count: All Sectors



Source: Computer Economics, 2020

Figure 1-13

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.

Chapter and Sample Descriptions

This study is organized into 31 chapters. Each chapter includes a similar set of benchmarks for a different sample. The chapters are as follows:

Chapter 2: Composite Benchmarks

This chapter provides composite metrics for all survey respondents across all sectors and organization sizes. The sample includes 233 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

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 74 respondents in the small-organization sample, 79 in the midsize sample, and 80 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

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, petrochemicals, semiconductors, pharmaceuticals, dietary supplements, food and beverage products, building materials, packaging materials, steel, glass, paper products, and other process-manufactured goods. The 53 respondents in the sample range in size from a minimum of about $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, plant and equipment asset management, 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. These firms tend to be conservative in their use of new technologies, although they tend to be ahead of the pack in use of the Internet of Things (IoT). They tend to spend comparatively 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 20 and the food and beverage subsector in Chapter 21 if they meet the definitions for those subsectors.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

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, telecommunications equipment, aerospace products, furniture, auto parts, electrical parts,

medical devices, and electronic devices, among other products. The 52 respondents in this sample range in size from a minimum of about $50 million to $85 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. Many of these firms 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 20 and industrial and automotive manufacturers in Chapter 22 if they meet the definitions for those subsectors.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 6: Banking and Financial Services Sector Benchmarks

Chapter 6 provides benchmarks for banking and financial services companies. The firms in this sector include commercial banks, investment banks, credit unions, mortgage lenders, consumer finance lenders, and other types of lenders and financial services providers. The 24 respondents in this sector range in size from a minimum of about $50 million to a maximum of $90 billion in annual sales.

Banking and finance companies are information-intensive organizations with a high percentage of knowledge workers. They are leading adopters of business and data analytics. Many of them also have major investments in consumer-facing websites and mobile apps. 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 23 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

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 21 respondents in this sector range in size from a minimum of about $50 million to $35 billion in annual revenue.

Insurance organizations are information-intensive businesses, and they rely upon information technology for nearly every aspect of their business, from actuarial calculations to claims processing. 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. Insurance companies also tend to spend more per user on IT than any other sector.

Our sector and subsector benchmarks are based on four 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, which 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.

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our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 8: Retail Sector Benchmarks

Chapter 8 provides benchmarks for retailers. This sector includes retailers of clothing, jewelry, hardware, furniture, sports equipment, groceries, pharmaceuticals, dietary supplements and health products, and general merchandise. They include department stores, furniture stores, pharmacies, convenience stores, sporting goods stores, and specialty retailers. We also include hospitality and consumer services in this sector. The 30 respondents in the sample range in size from about $50 million to $70 billion in annual revenue.

The retail sector is characterized by moderate 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 and data analytics. Many 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, our retail respondents also appear in the sample for the brick-and-mortar retail subsector in Chapter 24 and the online retail subsector in Chapter 25, if they meet the definition of those subsectors.

Our sector and subsector benchmarks are based on four 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, which 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.

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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, auto parts, fueling solutions, industrial components, electronics, food and beverage, and other products. The 20 respondents in the sample range in size from a minimum of about $50 million to $4 billion in revenue.

Wholesale distributors serve as middlemen between manufacturers and other businesses, often providing value-added services such as testing, packaging, bundling, warehousing, shipping, marketing, master data management, 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. Transportation management and warehouse management systems are also central to the application portfolios of these organizations. Despite their reliance on information technology, wholesale distributors tend to spend less on IT as a percentage of revenue than most other sectors do, mostly as a result of their high levels of revenue per employee.

Our sector and subsector benchmarks are based on four 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, which 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.

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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 23 respondents in this sector include public utilities; water, gas, and electric utilities; integrated energy companies; upstream exploration and production companies; natural gas companies; pipeline operators; and other energy and utilities companies. The companies in our sample range in size from a minimum of about $50 million to more than $26.8 billion in annual revenue.

These companies generate high levels of revenue per employee and support extensive field operations, and as such are characterized by high spending on IT on a per-user basis and low to moderate levels of 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 the Internet of Things adoption, powered by sensor data and geographical information systems (GIS). 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, many energy and utilities respondents also appear in the sample for the utilities subsector in Chapter 26 they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 11: Healthcare Services Sector Benchmarks

Chapter 11 provides benchmarks for healthcare services companies. The 55 respondents in this sector include community hospital groups, multiregional hospital systems, healthcare systems, dental service organizations, mental and behavioral health providers, university hospitals, long-term care facilities, and other healthcare organizations. These organizations range in size from a minimum of about $50 million to $16 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 in dealing with patient medical records systems, mobile platforms, and imaging and other clinical systems with large

data storage and networking requirements. Hospitals also support many users who are not employees, and they have relatively high levels of spending on IT.

In addition to appearing in this chapter, many healthcare services providers also appear in the sample for the hospitals subsector in Chapter 27 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 12: Professional and Technical Services Sector Benchmarks

Chapter 12 provides benchmarks for professional and technical services organizations. The 49 respondents in the sample range in size from a minimum of about $50 million to about $85 billion in annual revenue. The sector includes firms that provide professional and technical services, including engineering, legal, accounting, financial advice, consulting, marketing, research, and other services.

These organizations are characterized by a high percentage of knowledge workers who make extensive use of technology. Customer relationship management (CRM), professional services automation, project management, and knowledge management are important applications in this sector. These organizations are often leaders in the adoption of software as a service and mobile applications. They tend to spend moderate amounts on IT, relative to other sectors.

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 four 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, which 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.

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Chapter 13: Transportation and Logistics Sector Benchmarks

Chapter 13 provides benchmarks for the transportation and logistics sector. The 22 respondents in this sample range in size from a minimum of $52 million to about $40.8 billion. The category includes organizations that operate buses, trucks, railways, airlines, barges, and ships. The sector also includes logistics companies that transport goods and transportation companies as well as regional transportation authorities 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 fleet 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 30 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 14: Construction and Trade Services Sector Benchmarks

Chapter 14 provides benchmarks for construction and trade services companies. The 30 respondents in the sample range in size from about $50 million to $3 billion in annual revenue. The category includes engineering and construction companies; commercial, residential, and industrial construction contractors; oil field services firms; firms that provide mining services; environmental services firms; and other construction and trade services firms.

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

Our sector and subsector benchmarks are based on four 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, which 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.

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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, IT solution providers, business process outsourcing firms, consulting firms, and other providers of technology services and solutions. There are 28 organizations in the sample, ranging in size from around $50 million to over $100 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 customer relationship management (CRM) systems. Their finance and accounting systems can have complex needs around subscription or usage-based billing and revenue recognition. They usually have the need for professional services automation and project management systems.

One important note: Our metrics for this sector are for internal IT support only and not for development or delivery of IT products or services for sale 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 20 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 16: Government Sector Benchmarks

Chapter 16 provides benchmarks for government organizations. The 41 respondents in the sample range in size from $52.6 million to $68 billion in annual revenue. The category includes city and county governments, federal and state agencies, law enforcement agencies, organizations that provide IT services to government agencies, and other government organizations.

Government organizations can have major investments in constituent-facing systems and websites, and they often are heavy users of geographic information systems. In many cases, there is a historical reliance on custom software and legacy systems.

In addition to appearing in this chapter, our government respondents also appear in the samples for city and county governments in Chapter 28 and government agencies in Chapter 29, depending on how they meet the definitions for those subsectors.

Our sector and subsector benchmarks are based on four 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, which 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.

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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, and other nonprofit organizations. We do not include organizations where the nonprofit status only reflects the entity type, such as nonprofit hospitals, where for all intents and purposes they operate from an IT perspective in a way that is not significantly different from for-profit hospitals. The 22 respondents in the sample range in size from a minimum of about $50 million to $450 million in annual revenue.

Nonprofits and charitable organizations 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, contributions accounting, and fund accounting. They frequently need specialized CRM systems to support fundraising campaigns and donor relationship management. Contrary to common belief, nonprofit organizations do not always spend less on IT as a percentage of revenue or per-user than commercial organizations do.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 18: Education Sector Benchmarks

Chapter 18 provides benchmarks for the education sector. The sector includes public and private colleges and universities, business and medical schools, for-profit educational institutions, and school districts. The 21 respondents in the sample have annual revenues ranging in size from a minimum of about $50 million to over $1.7 billion.

Many educational institutions have multi-building campuses or multiple campuses, which leads to significant investment in network infrastructure. They also tend to have high desktop support requirements for student labs and classrooms. Back-office systems for accounting, human resources, billing, and other administrative functions are typical, but they often have specialized applications to manage admissions and student records.

In addition to appearing in this chapter, some of the respondents in this chapter also appear in the sample for the higher education subsector in Chapter 31 if they meet the definition for that subsector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 19: Commercial Real Estate Subsector Benchmarks

Chapter 19 provides benchmarks for commercial real estate organizations. The 39 respondents in the sample range in size from about $51 million to over $3.3 billion in annual revenue. The sector includes retail, office, industrial, multi-family, and other property management companies; commercial real estate developers; real estate investment firms; and real estate brokers, consultants, and advisors.

Most commercial real estate firms are asset-intensive with high levels of revenue per employee. As a result, they tend to have a comparatively low level of IT spending as a percent of revenue but moderate to high levels of IT spending on a per-user basis. Their specialized needs for IT systems include asset management, property management, lease management, and other commercial real

estate applications. They are heavy investors in the Internet of Things with initiatives such as smart buildings and energy management systems. They tend to be more advanced than many other industries in their adoption of cloud applications and mobile devices.

In addition to appearing in this chapter, a few of the respondents in this chapter also appear in the sample for banking and financial services organizations in Chapter 6 if they meet the definition for that sector.

Our sector and subsector benchmarks are based on four 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, which 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.

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Chapter 20: High-Tech Subsector Benchmarks

Chapter 20 provides benchmarks for high-tech companies. The category includes computer products manufacturers, telecommunications equipment manufacturers, semiconductor manufacturers, aerospace and defense manufacturers, pharmaceutical makers, biotechnology product makers, software developers, software-as-a-service providers, and other high-tech companies. The 33 respondents in this sample range in size from a minimum of about $50 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 needs, and significant investment in research and development. They tend to spend a moderately higher amount on IT than other sectors.

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 four 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, which 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.

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Chapter 21: Food and Beverage Subsector Benchmarks

Chapter 21 provides benchmarks for food and beverage manufacturers. The 16 respondents in the sample range in size from $145 million to $2.2 billion in annual revenue. Food and beverage companies produce beverages, snack foods, meat products, seafood products, vegetables, dairy products, dietary supplements, and other consumable food products. Some are suppliers to other food manufacturers or to the food service industry, while many also distribute consumer products to retailers or direct to consumers.

Food and beverage companies have moderately low levels of IT spending, focused primarily on back-office, manufacturing, and supply chain functions. These firms invest in ERP, product life-cycle management, and supply chain applications, but usually 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 safety regulations have forced food manufacturers to increase their investment in supply chain management to allow tracking and tracing products from source to final distribution.

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 four 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, which 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.

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our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 22: Industrial and Automotive Subsector Benchmarks

Chapter 22 provides benchmarks for industrial and automotive manufacturers. The 26 respondents in this subsector make auto and truck parts, aviation products, material handling equipment, engines, machinery, valves, and similar capital goods. The manufacturers in the sample range in size from about $50 million to over $7.3 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 manufacturing execution systems, including capabilities for factory data collection, real-time machine network connectivity, and sensor data from smart manufacturing processes. Many of them also have requirements for field service and the ability to connect to installed products at customer locations.

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 four 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, which 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.

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Chapter 23: Commercial Banking Subsector Benchmarks

Chapter 23 provides benchmarks for commercial banks. This subsector includes credit unions and community, regional, and national banks. The 17 respondents in this sample have annual revenue ranging from a minimum of about $50 million to $90 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 four 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, which 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.

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Chapter 24: Brick-and-Mortar Retail Subsector Benchmarks

Chapter 24 provides benchmarks for brick-and-mortar retailers. This subsector includes department stores, clothing stores, jewelry stores, convenience stores, pharmacies, hardware stores, nonprofit retailers, furniture retailers, agricultural retailers, and other retailers. The 20 respondents in this sample have annual revenue ranging from $80 million to $63 billion.

Most brick-and-mortar 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. Most brick-and-mortar retailers have at least some capabilities for business-to-consumer web commerce. 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. Some of the retailers in this chapter also appear in the sample for online retailers in Chapter 25, if they have e-commerce capabilities.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 25: Online Retail Subsector Benchmarks

Chapter 25 provides benchmarks for online retailers. This subsector includes clothing retailers, home furnishing retailers, dietary supplements and health products retailers, sports equipment retailers, department stores, hardware stores, pharmacies, and other online retailers. The 16 respondents in this sample have annual revenue ranging from $80 million to over $60 billion.

As with other types of retailers, online retailers have portfolios that range from high-volume transaction-processing systems to sophisticated systems for business intelligence and data analytics. Online retailers, obviously, have major investments in e-commerce systems, which drives much higher levels of IT spending compared to retailers in general. 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 respondents for this subsector appear in the sample for the retail sector in Chapter 8. Many, though not all, online retailers have a brick-and-mortar presence as well. If so, they would also be found in the sample for brick-and-mortar retail in Chapter 24.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 26: Utilities Subsector Benchmarks

Chapter 26 provides benchmarks for utilities. The 15 respondents in this subsector range in size from about $100 million to $126 billion in annual revenue. This category includes gas and electric utilities, power transmission distributors, 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 four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 27: Hospital Subsector Benchmarks

Chapter 27 provides benchmarks for hospitals. The 36 respondents in this subsector range in size from $60 million to $16 billion in annual revenue. This category includes community hospitals, university hospitals, nonprofit hospitals, health clinics, healthcare systems, behavioral health providers, long-term care facilities, 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 in dealing with patient medical records systems, mobile platforms, and imaging and other clinical systems with large data storage requirements. Hospitals also support many users who are not employees and have relatively high 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 11.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 28: City and County Government Subsector Benchmarks

Chapter 28 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 29). The 27 respondents in this subsector have annual operating budgets ranging from $60 million to $68 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. Their IT spending tends to be moderate in comparison to other sectors.

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 four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 29: Government Agency Subsector Benchmarks

Chapter 29 provides benchmarks for federal, state, and regional government agencies. The category includes courts and law enforcement agencies, organizations that provide IT services to government agencies, social service agencies, economic development agencies, labor departments, fish and wildlife departments, and other federal, state, and regional government units. The 22 respondents in the sample have operating budgets that range in size from $74.2 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 four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 30: Logistics Subsector Benchmarks

Chapter 30 provides benchmarks for logistics providers. The 17 respondents in this sample range in size from $52 million to about $40.8 billion. The sector is comprised of logistics companies that transport goods, including refined petroleum distributors, national moving or courier 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 low-to-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 four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

Chapter 31: Higher Education Subsector Benchmarks

Chapter 31 provides benchmarks for higher-education institutions. The sector includes public and private colleges and universities, business and medical schools, military academies, and for-profit

institutions. The 18 respondents in the sample have annual revenues ranging in size from about $50 million to over $1.7 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 due to the presence of classroom and student lab systems. Back-office systems for accounting, human resources, billing, and other administrative functions are typical, but they may have specialized applications to manage admissions and student records. Their IT spending tends to be moderate to high as a percentage of revenue but relatively low on a per-user basis.

In addition to appearing in this chapter, all of the respondents in this chapter also appear in the sample for the education sector in Chapter 18.

Our sector and subsector benchmarks are based on four 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, which 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.

The survey period for this study was January to May 2020. In the latter part of the survey period, we also conducted supplemental research on the effects of the coronavirus pandemic to determine the impact at the time of publishing. Despite current economic conditions, it is important to note that our key benchmarks for overall IT spending levels remain valid because they are based on ratios, not absolute spending levels. However, our reporting of 2020 IT spending trends, such as year-over-year changes to IT budgets, will be significantly affected by the pandemic. For more information, please refer to our coronavirus research page.

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 50 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, revenue per employee, and revenue per user
- 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
- Percentage of IT spending devoted to new initiatives
- 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, information security/privacy, 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 cloud applications, cloud infrastructure, IT shared services, data analytics, business intelligence, disaster recovery/business continuity, legacy systems modernization, systems/data integration, data center automation, and digital transformation..

- The importance of lower costs vs. improving service levels in the coming year

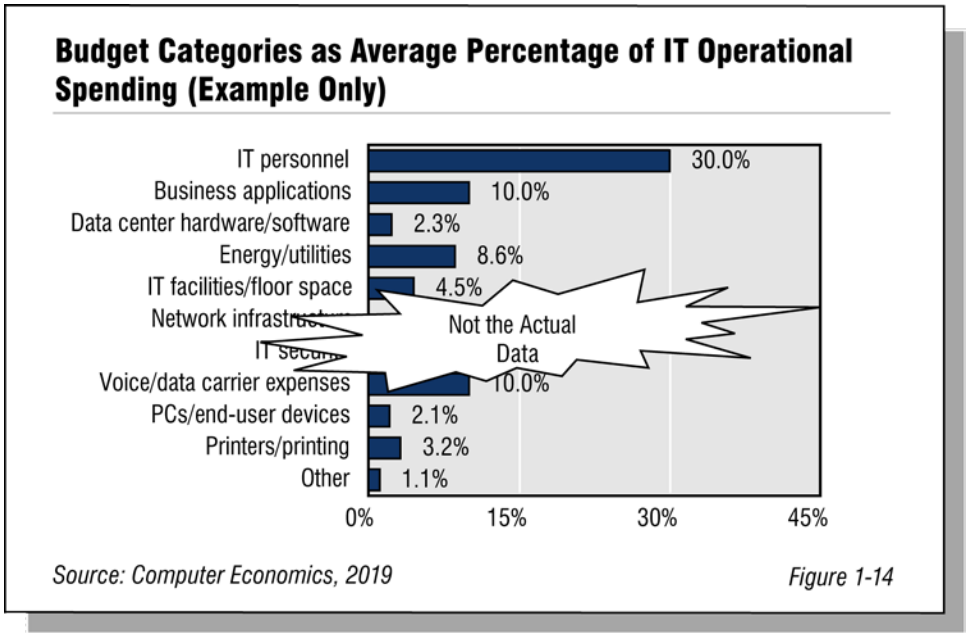
Section 4 presents metrics on total IT spending, which includes current-year IT capital and operational spending, but excludes depreciation. These metrics include:

- 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
- 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 business units
- Percentage of charged back expenses for 10 major areas of spending including: voice/data carrier charges, voice/data fixed costs, desktop/laptop hardware and software, mobile device hardware and software, data center costs, IT personnel for ongoing support, IT personnel for projects, business applications, help desk, and desktop support.
- 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, IT 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

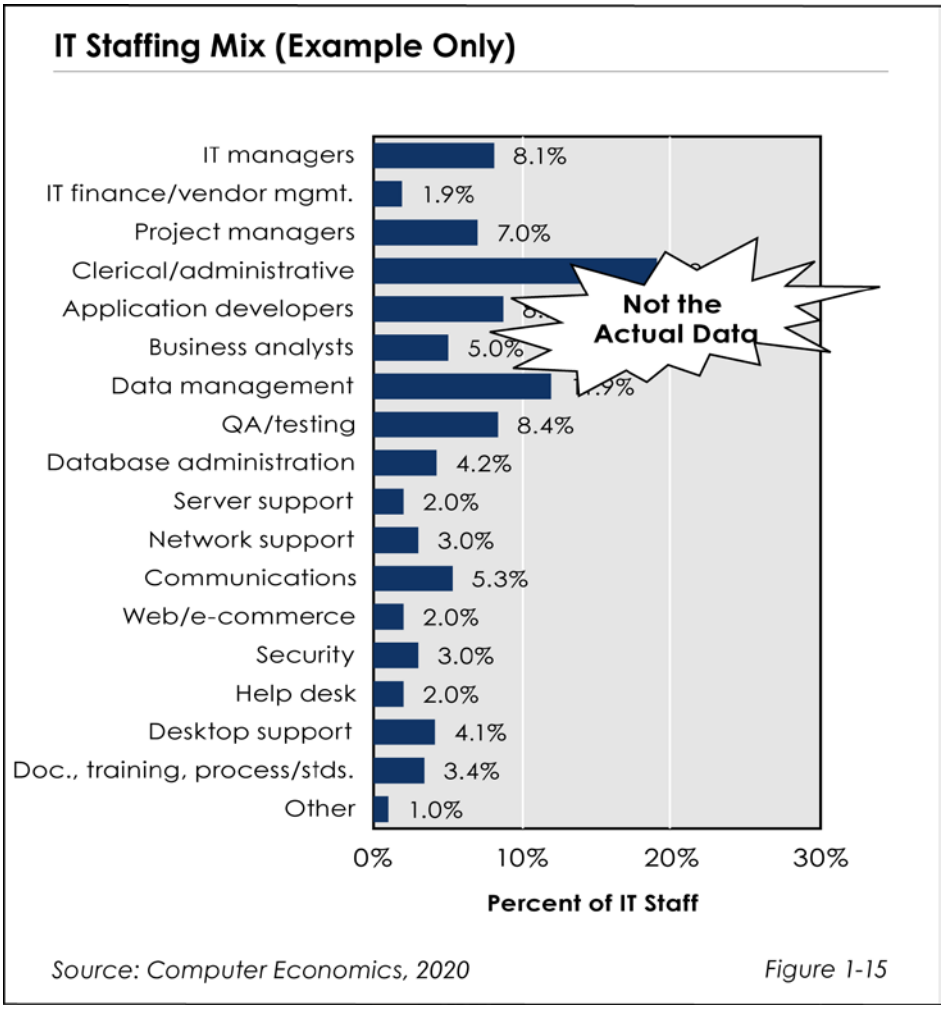
Section 6 provides an analysis of IT capital budgets, including:

- Percentage of organizations decreasing, maintaining, and increasing IT capital spending
- IT capital budget change from prior year
- 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 head count 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, 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 nine 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
- PCs per desktop support staff member
- Users per help desk staff member
- Help desk first-call resolution rate

- Help desk tickets per end-user support staff member

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
- Facilities/floor space 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

- Network spending per network site
- IT security as percentage of IT spending
- IT security spending per user
- Data/voice carrier spending 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 device spending per user
- PCs/end-user devices as percentage of IT spending
- 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 4-19, and the subsector chapters, Chapters 20-31, have 30 figures or 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, revenue per employee, and revenue per user
- 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
- Helpdesk first call resolution rate

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
- Percentage of IT spending devoted to new initiatives
- 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 business units

- 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, 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

Appendix

The Appendix includes common terms and definitions used in our annual survey and in this study. It also includes a detailed definition for all IT spending categories and staffing categories. The Appendix concludes with a brief discussion on the statistics used in this study.

Common Terms and Definitions

This section provides definitions for some important terms used in our annual survey.

Business Applications: In counting business applications, we count systems, not individual programs. We include large, multifunction suites, such as ERP, CRM, supply chain, medical records systems, and other integrated suites. We include business applications supported fully or partially by the IT organization, including SaaS applications if the IT organization provides any administrative support. For ERP, we count each major subsystem, such as finance or HR, as a separate system. Business applications do not include database management systems, applications for managing infrastructure, or application development tools. Moreover, we do not count personal productivity applications or utilities, such as Microsoft Office, Adobe Acrobat, anti-virus, or web browsers.

Custom-Developed Systems: This includes all custom-written or in-house developed systems, plus any modifications or enhancements to commercial software packages.

Data Center: A data center is a physical location where computer servers are maintained/operated by full-time operations staff, including co-location facilities. We do not count locations that only have file, print, or email servers. We also do not include disaster recovery facilities, unless they also operate as data centers during routine business.

Employees: Our definition includes full-time employees, managers, executives, part-time employees, temporary employees, and seasonal workers, whether paid as employees or as contractors. Employees are counted as full-time equivalents.

IT Spending: IT spending in our study refers to all IT expenditures incurred for the internal support of the business. It includes the following major types of IT spending.

- **IT Operational Spending** includes all IT expenses for the current fiscal year, plus depreciation. IT operational spending includes IT spending within the IT budget plus any IT spending within user department budgets. Our definition includes any corporate IT allocations or IT shared services amounts.

- **IT Capital Spending** includes all IT spending that is treated as capital expenditures in the current fiscal year. IT capital expenditures typically flow through to the IT operational budget as depreciation over several years.

- **Depreciation** includes the depreciation expense for IT investments, whether or not the depreciation is charged to the IT department. For organizations that record IT investment depreciation somewhere apart from the IT operational budget, we asked our survey respondents to put such amounts back into the IT operational budget.

- **Total IT Spending** is the sum of IT operational spending and IT capital spending on a cash basis. It does not include depreciation. It does include any IT spending that is within user department budgets.

Network Site: A network site is a physical location such as an office building, warehouse, or campus that is connected to the organization's network and supported by its IT organization. An organization housed in a single campus has one network site. We do not count individual users connecting through the internet or virtual private network (VPN) as network sites.

Network Device: A network device encompasses routers, firewalls, network appliances, and other devices that make up the network infrastructure. We do not count "edge devices" such as PCs, printers, servers, storage devices, data collection devices, ATMs, or sensors.

New Initiatives: This refers to the implementation of new systems or IT capabilities.

Physical Servers: These include all types of physical servers, from mainframes to low-end servers. We include those in on-premises and co-location data centers where a full-time operations staff maintains the servers.

Ongoing Support: This refers to activities needed to operate existing systems, including routine maintenance and support for normal growth in the business.

Operating System Instances: These are running instances of operating systems, including OS instances running natively on servers or virtual machines. We include those in on-premises and co-location data centers where a full-time operations staff maintains the servers. Where server virtualization is practiced, the number of OS instances should be greater than the number of physical servers. We do not count the virtualization software itself (e.g., VMware) as an OS instance.

Outsourcing: We define IT outsourcing as contracting with a service provider to perform a function that would otherwise be performed in-house. An IT function can be fully outsourced or partially outsourced. Outsourcing includes any work managed by the service provider under an outsourcing contract. It does not include the use of contract workers under the day-to-day supervision of the IT organization for purposes of staff augmentation.

Personal Computer (PC): The term "PC" includes all physical desktops/laptops, workstations, thin clients, kiosks, handheld data-collection devices (other than tablets and smartphones), ATMs, and point-of-sale systems. We include employee-owned desktops/laptops if the IT organization supports them and convertible tablets if they are laptop replacements. We do not include dumb terminals, tablets that do not replace laptops, or smartphones in our definition, however.

Revenue: Revenue in our survey corresponds to the revenue for the business that is being supported by the IT organization responding to our survey. If the IT organization supports only certain business units, respondents were instructed to report the revenue for those business units. Healthcare providers report operating revenue (not gross patient revenue). Government and nonprofit organizations report their organization's total operating budget.

Smartphones: Smartphones include devices that potentially give employees access to mobile applications in addition to email, voice, and text communications. Our survey counts both company-owned and employee-owned smartphones, as long as they receive support from the IT organization.

Tablet Computers: These include all tablet computers, whether employee-owned or company-owned, as long as they receive support from the IT organization.

Users: Our definition of users includes individuals who are users of the organization's IT systems. Users can be employee users, plus contractors, temporary employees, agents, partners, and other non-employee users that the IT organization supports. Our definition, however, specifically excludes website users. Not all employees need to be users, and not all users need to be employees. Therefore, the number of users may be greater than or less than the number of employees.

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 SaaS 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 so that our study can account for all IT spending. Business units sometimes pay for engineering systems, PCs, voice/data service, SaaS applications, IT security services, website infrastructure/e-commerce, 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, sometimes 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 material handling systems. When using our metrics 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 SaaS 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 desktop 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 IT staff members 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.

IT staff members include employees as well as contractors and temporary employees who work under the supervision of the IT organization. In our IT staffing metrics, we adjust the IT staff member head count to account for outsourcing.

IT 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 and Executives:** 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, Procurement:** This includes 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.

- **Administrative Support:** Clerical/administrative personnel are individuals who support IT managers and other IT staff functions.

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, Application Support, Systems Analysts, Architects:** These job functions include personnel involved with the development and support of business applications. They include application programmers and maintenance personnel, systems

analysts, and solutions architects. This category also includes enterprise architects. It does not include business analysts or database administrators, who belong in their respective categories.

- **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, Data Analytics, Business Intelligence**: These individuals design, develop, architect, and model data schemes and databases for the organization. They may also 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:** These are individuals who are part of a dedicated quality assurance or testing function. It does not include individuals 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. They also include 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 comprise 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.

- **Email/Messaging/ Communications Support Staff:** This includes engineers, specialists, and administrators who manage email, messaging, videoconferencing, unified communications, and other communication 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, IT Process and 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 or are not otherwise defined in our staffing categories.

Statistical Notes

Statistics are useful for summarizing data and analyzing trends. To evaluate the statistical findings in this study, it is useful to understand a few basic concepts and definitions.

Central Tendencies

One method frequently used to summarize how values are distributed within a sample is to identify where the "center" of all the responses falls. This center can be identified in various ways:

- The **median** is the halfway point: Half of the response values fall below this level and the other half above.
- The **mean** is the sum of all responses divided by the number of responses. The mean is also known as the **average**.
- The **mode** is the value that occurs most frequently in a collection of responses. Our study does not report the mode for any of our statistics.

Percentiles

IT benchmarks are often presented as means, or averages. In the study, most metrics are reported as percentiles. We present values at the 25th percentile, 50th percentile (median), and 75th percentile. A percentile is the value below which a given percentage of cases fall. For instance, if we report that IT staff head count is increasing 1% at the 25th percentile, this means that lowest one-quarter of respondents are increasing head count by 1% or less.

We believe percentiles are more useful as benchmarks than the mean average. In most spending and staffing categories, there are organizations that have unusually high spending or staffing. These outliers can pull up the mean average. Another way to view this is that the distribution of values is not normal, and the mean average will be higher, or in some cases lower, than the middle value, or median. The median value is often more representative of the typical organization than the mean.

More importantly, percentiles present a range within which typical spending or staffing falls for the survey population. Half of the organizations fall between the 25th percentile and 75th percentile, and IT organizations that fall within the range can determine that their spending or staffing is similar to other organizations. The difference between the 25th and 75th percentiles also reveals the amount of variation within the population. The narrower the variation, the more useful a benchmark is as a guide.

In some cases, we do present mean averages. We present averages when we want to rank responses or present responses as a portion of the total. For instance, we use averages when we rank top IT priorities or determine the percentage of organizations that are increasing or decreasing spending. We also use averages to assess IT spending mix where each line item is shown a percentage of the total.

Interpreting the Results

The data presented in this study must be considered in context. No two organizations are exactly alike, and there is no such thing as an "average company." The statistics presented in this study must be looked at as a snapshot of a dynamic and complex set of interactions within organizations that use information systems. One must view the data from as many perspectives as possible to develop a valid appreciation of its meaning.

Therefore, we strongly encourage organizations that are using this information not to make conclusions solely on the basis of industry sector statistics, especially since these statistics are based on the smallest sample sizes. It is advisable to review the same statistics for the entire sample (Chapter 2) and by organization size (Chapters 2-3C). Such an approach will provide additional perspectives on IT spending and staffing.

In addition, common sense should prevail when utilizing the statistics in this study. There are many factors that affect IT spending and staffing within an organization. One organization may conduct business with extensive support from IT, while a similar organization may have little automation. The latter will spend less on IT than the former, but that does not mean the latter is more efficient in its use of technology.

Therefore, the benchmarks presented in this study should not be taken as the final word on the "health" of an organization's IT spending and staffing. Rather, they should be used as guidelines to understand an organization's position relative to others and to gain insight into areas where further investigation may be warranted.

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 2020. 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

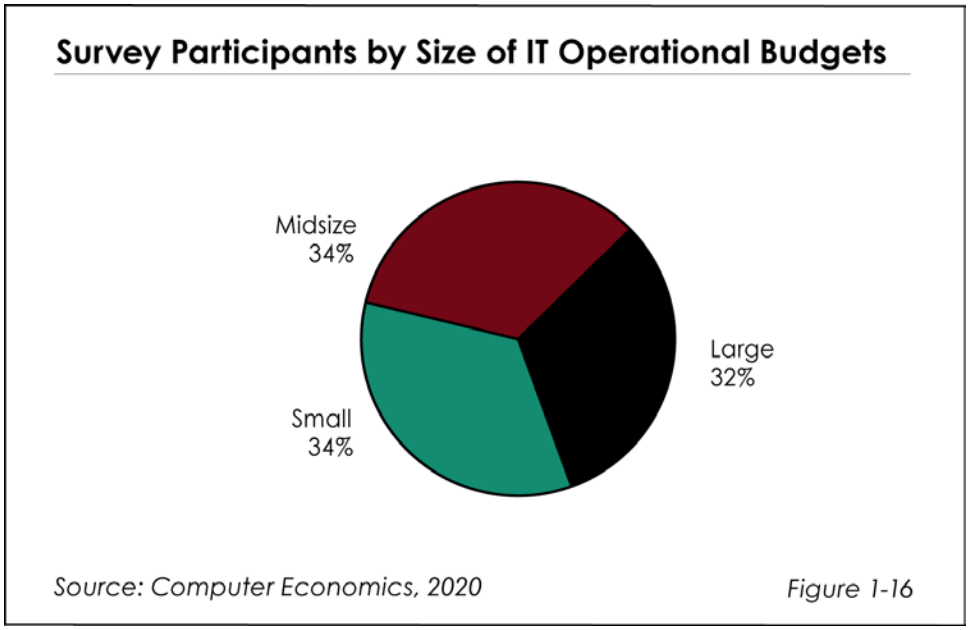
There were 233 IT organizations in the U.S. and Canada who participated in our survey this year. The sample was stratified into three categories of organization size:

- 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, midsize companies comprise 34% of the survey respondents, followed by small organizations at 34%, and large organizations at 32%.



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

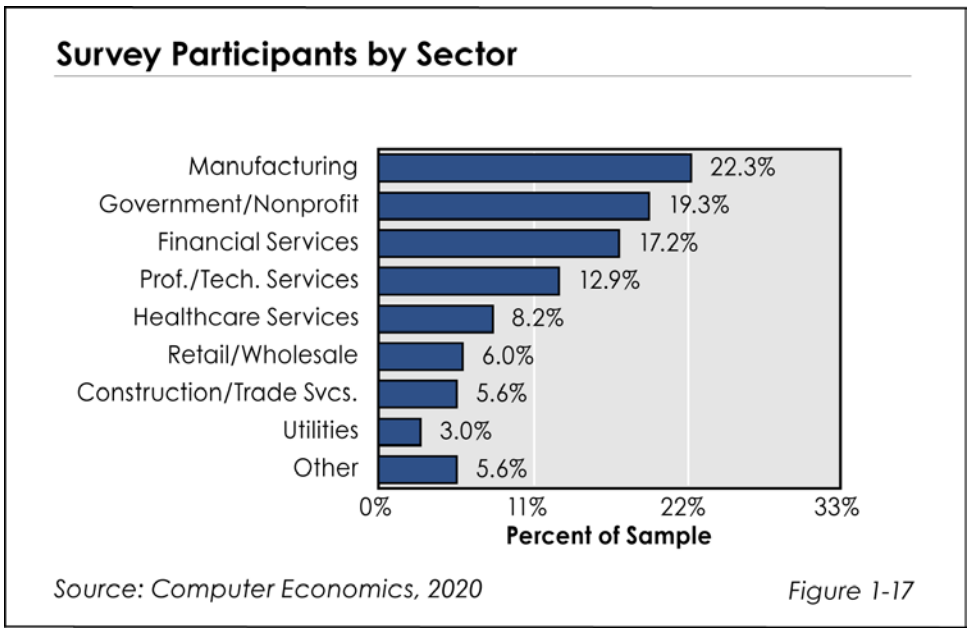


Figure 1-17

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.