SHRM Survey Findings

Jobs of the Future: Data Analysis Skills

Sponsored by

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About SHRM

Founded in 1948, the Society for Human Resource Management (SHRM) is the world's largest HR membership organization devoted to human resource management. Representing more than 275,000 members in over 160 countries, the Society is the leading provider of resources to serve the needs of HR professionals and advance the professional practice of human resource management. SHRM has more than 575 affiliated chapters within the United States and subsidiary offices in China, India and United Arab Emirates. Visit us at shrm.org.

Introduction

The purpose of this research is to inform workforce planning efforts for jobs of the future—occupations that are predicted to grow over the next 5-10 years. The report covers the supply and demand for data analysis skills, the function and types of employees needed for these jobs, and skill and education requirements at different levels.

For this study, data analysis skills were defined as the ability to gather, analyze and draw practical conclusions from data, as well as communicate data findings to others. Some examples of jobs that require data analysis skills are data analyst, data scientist, statistician, market research analyst, financial analyst and research manager.

This research aimed to be comprehensive in scope, covering entry-level to executive-level positions. It included jobs that required the ability to conduct advanced data analysis as well as jobs that solely required the ability to understand, interpret and communicate data findings to others.

Key Findings

59%

of organizations expect to increase the number of positions requiring data analysis skills over the next five years.

- The majority of organizations (82%) currently have or expect to have positions that require data analysis skills in 2016. Demand has been increasing and is expected to continue growing over the next five years. In the last 12 months, more than three-quarters of organizations (78%) reported difficulty recruiting for data analysis positions.

- The most common functional areas for data analysis positions are accounting and finance (71%), human resources (54%) and business administration (50%). Usually these are full-time positions at mid-level management (79%) and individual contributor (73%) levels. However, 60% of organizations require senior management or executives to have data analysis skills.

- At the basic skill level, organizations typically require a high school diploma (35%) or a bachelor's degree (35%), whereas 14% require an associate's degree. Often job announcements do not specify or require a particular field of study (61%).

- The need for moderate skill levels is most prevalent (83%), and organizations typically require a bachelor's degree for these skill levels. At least one-third of organizations prefer a degree in analytics, computer science or statistics.

- For advanced skills, most organizations require either a bachelor's (57%) or a master's (25%) degree. Although statistics and analytics are the most commonly preferred fields, some organizations have a need for degrees in engineering (35%) and data science (27%).

Implications of This Research

Most organizations already have a number of jobs that involve data analysis. Economists and labor market forecasters project that these types of occupations will grow faster than average in the coming decade (see the Bureau of Labor Statistics Occupational Outlook Handbook for detailed projections). Many HR and staffing professionals will be seeking out talent for these types of roles in the years ahead, and many are likely to find it challenging for a number of reasons. First, the skills needed for these types of roles can often be high, necessitating specific educational qualifications or certifications. In addition, the fast pace of technological development means that the types of technologies and applications workers in this field will need to be familiar with will turn over rapidly. This is likely to necessitate near-constant learning and training among data analysts to stay up to date. However, concerns that investments in training will be lost as employees with in-demand skills find new opportunities could make it challenging for HR to make a case for more investments in employee learning and skills.

The following research underscores HR professionals' awareness of the growing demand for talent with data analysis skills and the difficulties they are already experiencing when securing the talent they need for these roles. Although these types of jobs flourish in a number of functional areas, many are concentrated in accounting and finance, and this is likely to continue to be an area where filling open positions is difficult. The financial industry tends to have higher than average wage rates; compensation is therefore likely to be a central part of strategies to recruit and retain data analytics workers in both the finance function and the financial industry.

Growing complexity in the practice of data analytics could push many organizations to seek out talent with skills beyond the moderate level. In this type of environment, HR will experience even more difficulty with skills shortages, recruiting and retention. HR will need to prepare through rigorous workforce planning to deal with these challenges.

Demand for Data Analysis Skills

Prevalence of Positions Requiring Data Analysis Skills

Four out of five organizations (80%) currently had positions that required data analysis skills, and another 2% expected to create such positions in 2016. Publicly owned for-profit organizations were more likely than privately owned for-profit organizations to have data analysis positions.
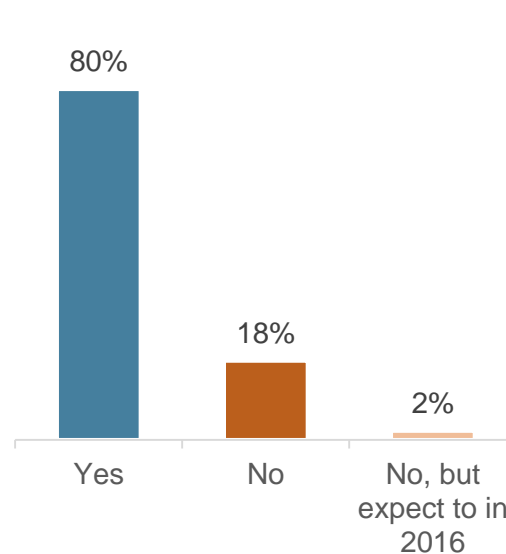
Require Data Analysis Skills

80% Yes
18% No
2% No, but expect to in 2016

n = 398

Comparisons by Sector
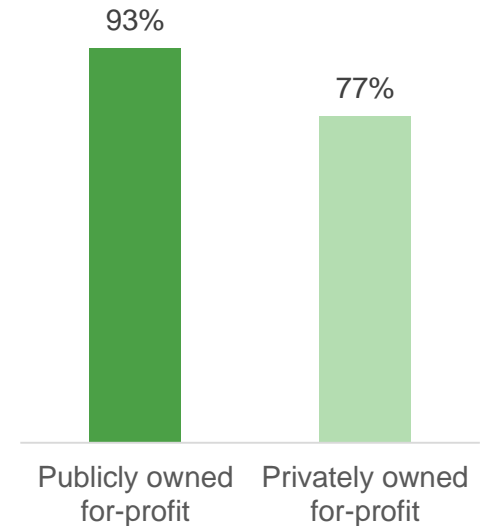
93% Publicly owned for-profit
77% Privately owned for-profit

Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars.

Demand for Positions Requiring Data Analysis Skills

U.S. Bureau of Labor Statistics Employment Projections 2014-2024

Statisticians

- 33.8% growth
- 10,000 new jobs
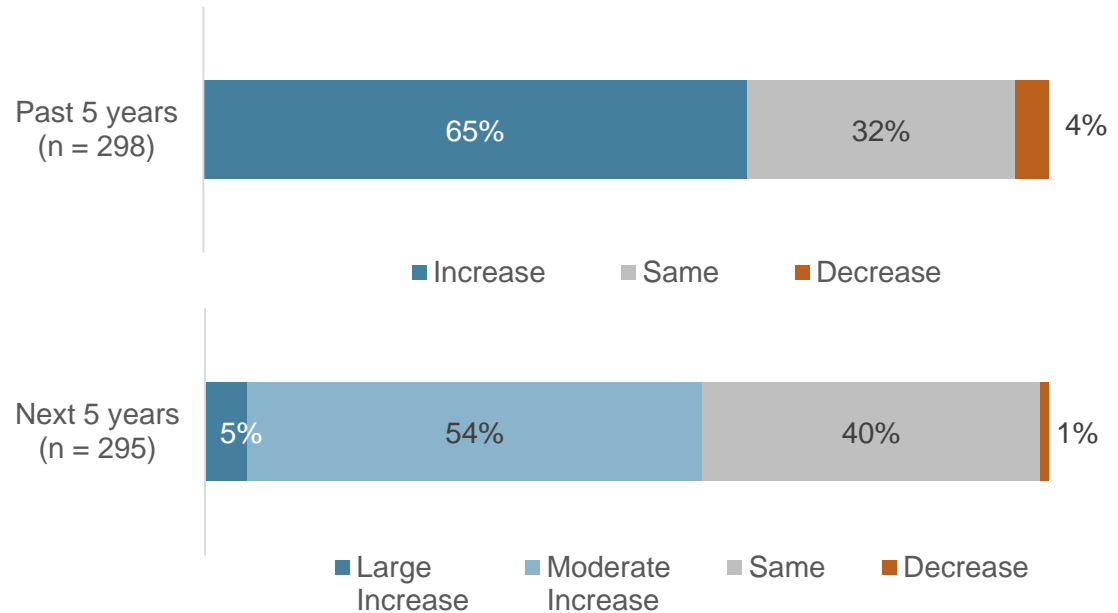
Operations research analysts

- 30.2% growth
- 27,600 new jobs

Market research analysts and marketing specialists

- 18.6% growth
- 92,300 new jobs

Over the past five years, nearly two-thirds of organizations (65%) had increased the number of positions requiring data analysis skills, and 59% expect to increase the number of positions at their organizations over the next five years.

	Increase	Same	Decrease
Past 5 years (n = 298)	65%	32%	4%

	Large Increase	Moderate Increase	Same	Decrease
Next 5 years (n = 295)	5%	54%	40%	1%

Note: Percentages may not total 100% due to rounding.

Recruiting Difficulty

- Scientists and mathematicians were the second most difficult job category to recruit for (behind high-skilled medical positions).

Top Recruiting Strategies

- 70% social media
- 58% collaborating with educational institutions
- 49% expanding advertising efforts

Hiring Data Analysis Positions in the Last 12 Months

Just under three-quarters of organizations (72%) had hired data analysis positions in the last 12 months. Of those, 78% reported difficulty recruiting for these positions.

Hired Data Analysis Positions

Yes	72%
No	28%

Recruiting Difficulty

Very difficult	10%
Somewhat difficult	68%
Somewhat easy	19%
Very easy	3%
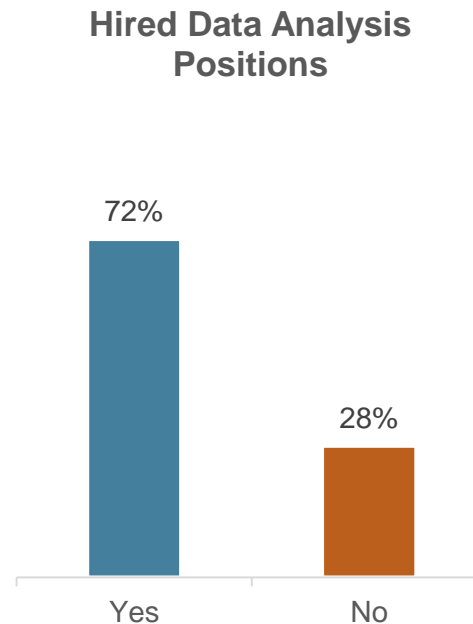
Note: n = 268. Respondents who said "don't know" were excluded from this analysis.
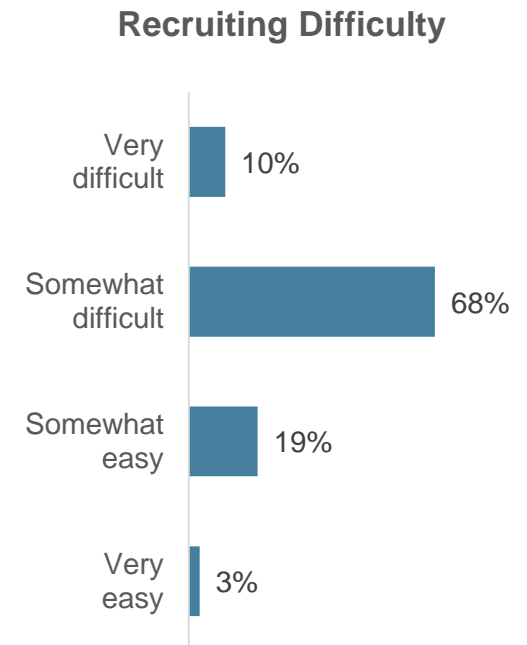
Note: n = 193. Respondents who said "don't know" were excluded from this analysis.
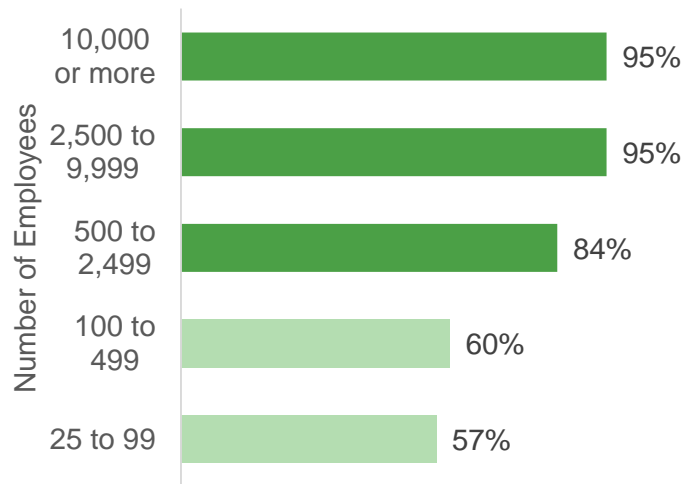
Hiring Data Analysis Positions in the Last 12 Months

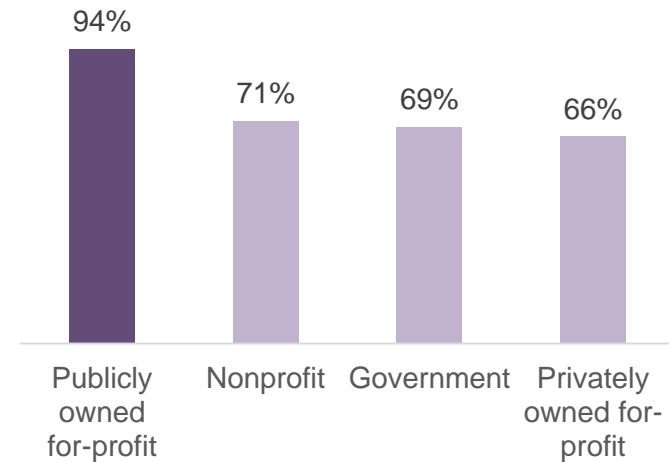**Comparisons by Organization Staff Size and Sector**

Organizations with 500 or more employees were more likely than organizations with 25 to 499 employees to have hired data analysis positions in the last 12 months.

Publicly owned for-profit organizations were more likely than all other sectors to have hired for positions requiring data analysis skills in the last 12 months.

By Organization Staff Size

Number of Employees	
10,000 or more	95%
2,500 to 9,999	95%
500 to 2,499	84%
100 to 499	60%
25 to 99	57%

By Organization Sector

Sector	%
Publicly owned for-profit	94%
Nonprofit	71%
Government	69%
Privately owned for-profit	66%

Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars.

Function and Level of Positions

Functional Areas for Positions Requiring Data Analysis Skills

The majority of organizations (71%) had data analysis positions within the accounting and finance department. At least one-half of organizations required data analysis skills for positions within human resources (54%) or business and administration (50%) units.

Functional Area	Percentage
Accounting & Finance	71%
Human Resources	54%
Business & Administration	50%
Information Technology	43%
Marketing, Advertising & Sales	40%
Supply Chain & Operations	28%
Research & Development	27%
Customer Service	18%
Other	9%
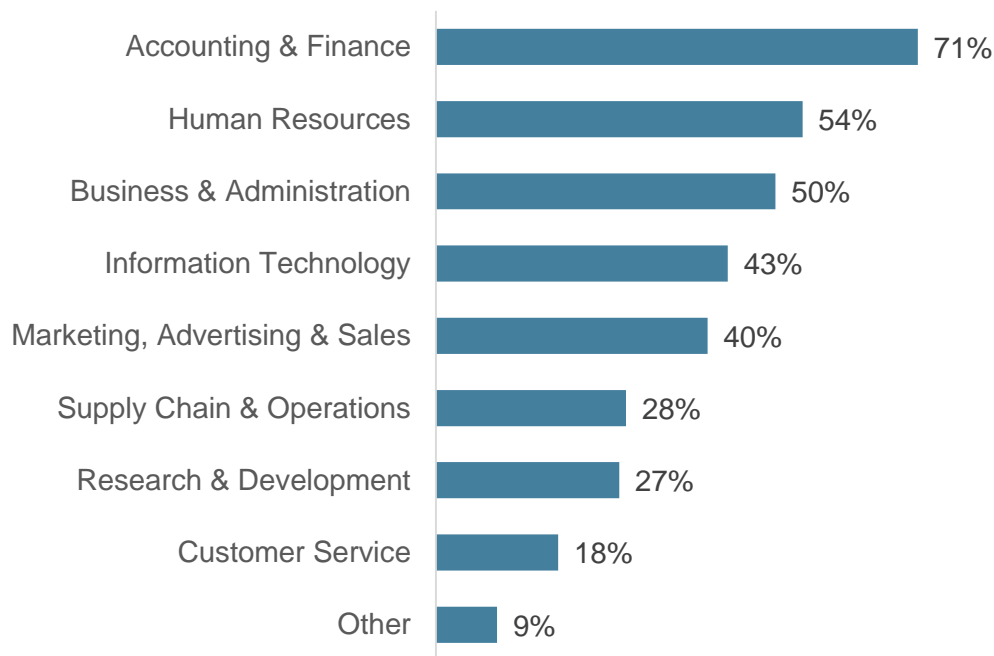
Note: n = 300. Percentages do not total 100% due to multiple response options.
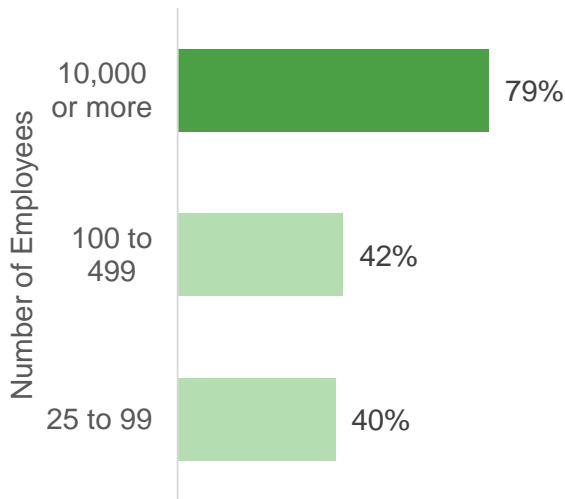
Functional Areas for Positions Requiring Data Analysis Skills
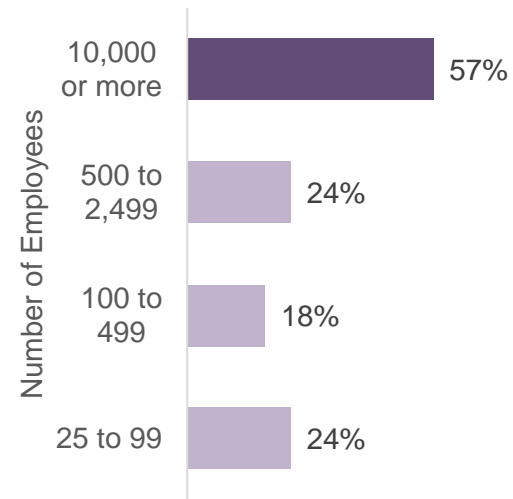
Comparisons by Organization Staff Size

Organizations with 10,000 or more employees were more likely than organizations with 25 to 499 employees to have data analysis positions in the *human resource* function.

Organizations with 10,000 or more employees were more likely than organizations with 25 to 2,499 employees to have positions requiring data analysis skills in the *supply chain and operations* function.

Human Resources

Number of Employees	
10,000 or more	79%
100 to 499	42%
25 to 99	40%

Supply Chain & Operations

Number of Employees	
10,000 or more	57%
500 to 2,499	24%
100 to 499	18%
25 to 99	24%

Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars within the same functional area.

Functional Areas for Positions Requiring Data Analysis Skills

Comparisons by Organization Sector

<table>
<tr>
<td>Publicly and privately owned for-profit organizations were more likely than government organizations to have data analysis positions in the *marketing, advertising and sales* function.</td>
<td>Publicly owned for-profit organizations were more likely than nonprofit and government organizations to have positions requiring data analysis skills in the *supply chain and operations* function.</td>
</tr>
</table>

Marketing, Advertising & Sales

55%	44%	14%
Publicly owned for-profit	Privately owned for-profit	Government

Supply Chain & Operations

44%	19%	11%
Publicly owned for-profit	Nonprofit	Government

Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars within the same functional area.
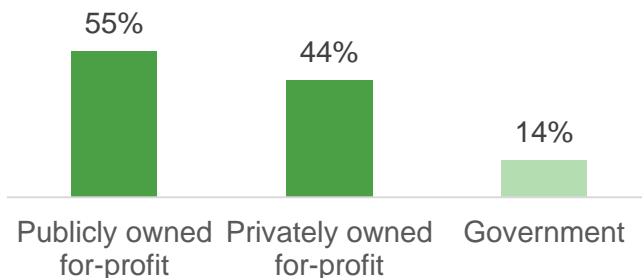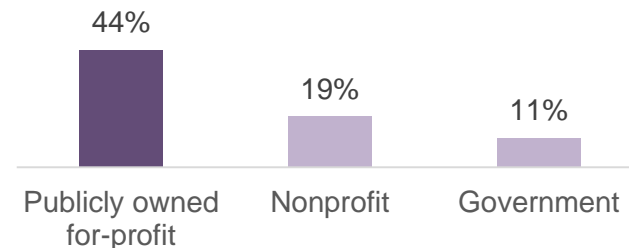
Employment Type for Positions Requiring Data Analysis Skills

The vast majority of organizations (98%) that required data analysis skills had full-time positions. Few organizations had part-time, contract/temporary and internship positions.
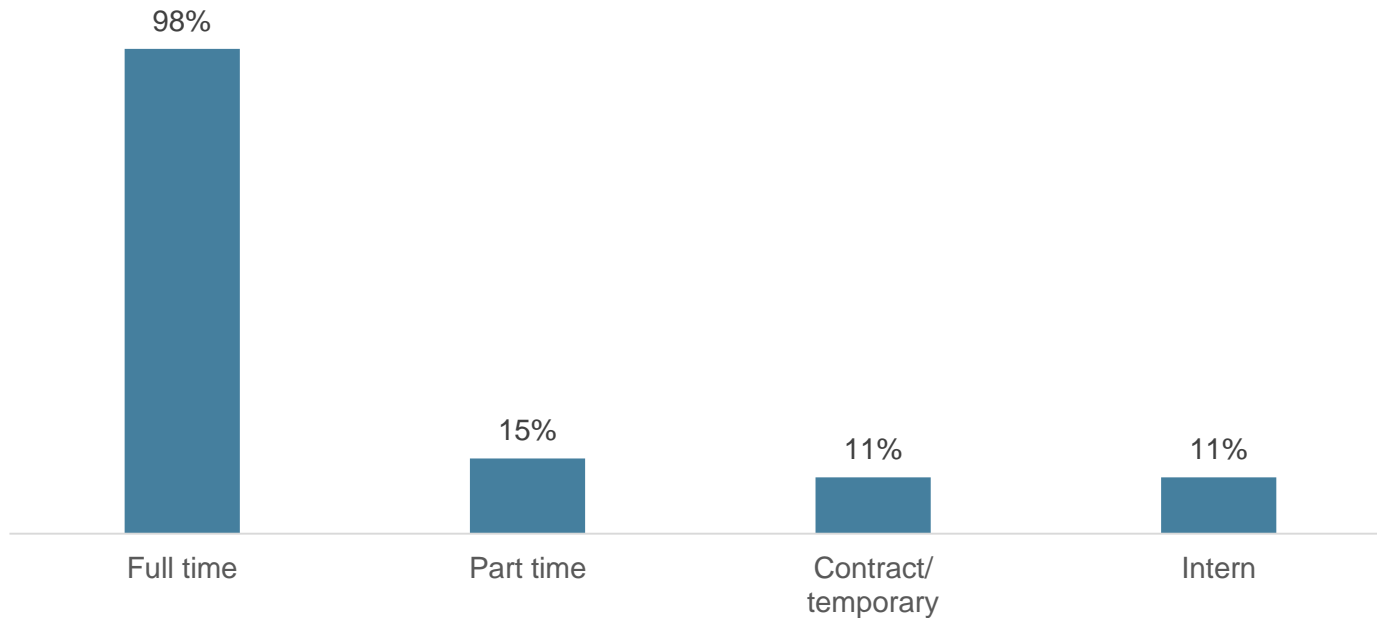
Note: n = 298. Percentages do not total 100% due to multiple response options.

Employment Levels Requiring Data Analysis Skills

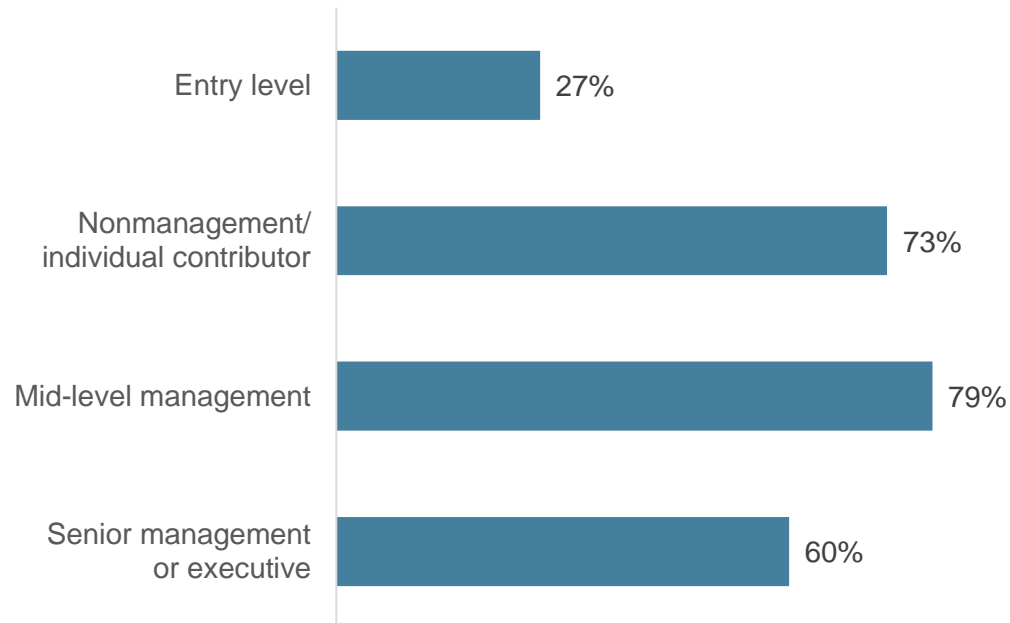The majority of organizations required data analysis skills for mid-level management (79%) or individual contributors (73%). Three out of five organizations (60%) had a need for data analysis skills at the senior management or executive level.

Level	Percentage
Entry level	27%
Nonmanagement/individual contributor	73%
Mid-level management	79%
Senior management or executive	60%

Note: n = 323. Percentages do not total 100% due to multiple response options.

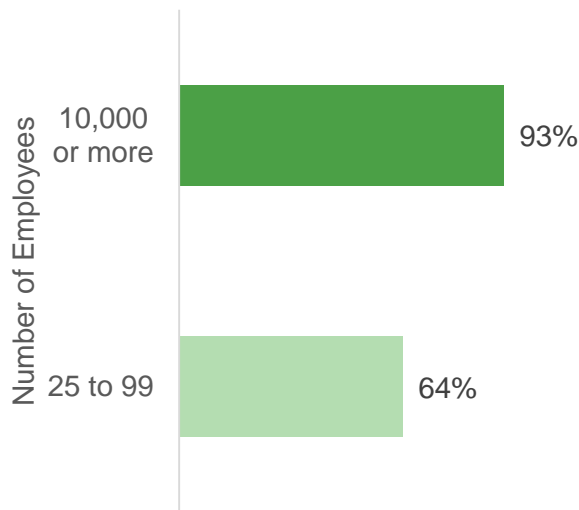# Employment Levels Requiring Data Analysis Skills

Comparisons by Organization Staff Size and Sector

Organizations with 10,000 or more employees were more likely than organizations with 25 to 99 employees to have individual contributor positions.

Organizations with 10,000 or more employees were more likely than those with 2,500 to 9,999 employees to have mid-level management positions.

Publicly owned for-profit organizations were more likely than privately owned for-profit and nonprofit organizations to have individual contributor positions.

Nonmanagement/ Individual Contributor
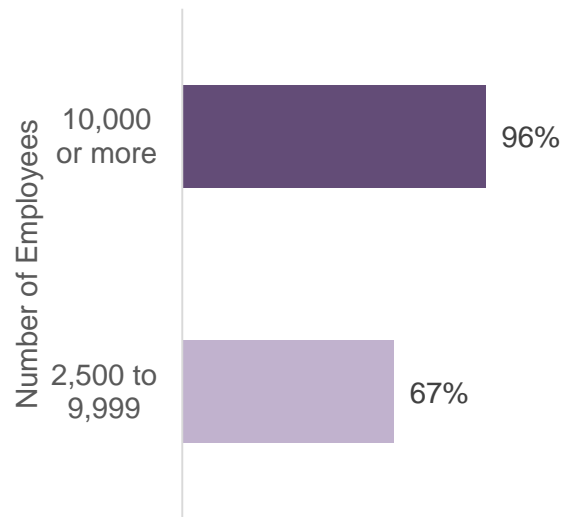
Number of Employees

- 10,000 or more — 93%
- 25 to 99 — 64%

Mid-Level Management

Number of Employees

- 10,000 or more — 96%
- 2,500 to 9,999 — 67%

Nonmanagement/ Individual Contributor

- Publicly owned for-profit — 91%
- Privately owned for-profit — 72%
- Nonprofit — 67%
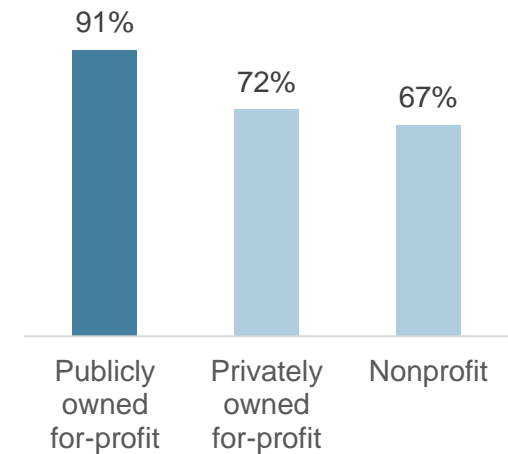
Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars within the same job title.

Job Titles Used to Advertise for Data Analysis Positions

Three-quarters of organizations had analyst-based (76%) and management (74%) job titles for positions requiring data analysis skills. Many organizations (71%) also used nonmanagement titles based on level, such as senior, coordinator or associate. Thirteen percent said they used scientist in job titles, and 18% had other descriptive titles like researcher or statistician.

Descriptive Titles

Title	Percent
Analyst-Based Titles	76%
Analyst	54%
Data analyst	42%
Research analyst	18%
Market research analyst	14%
Scientist-Based Titles	13%
Data scientist	9%
Research scientist	6%
Scientist	5%
Other Descriptive Titles	18%
Researcher	11%
Statistician	10%
Mathematician	3%
Other	8%

Level-Based Titles

Title	Percent
Nonmanagement Titles	71%
Senior	31%
Coordinator	31%
Associate	29%
Assistant	21%
Chief	6%
Management Titles	74%
Manager	56%
Director	51%
Supervisor	29%
Vice president	27%
Senior vice president	15%

n = 293. Percentages do not total 100% due to multiple response options.

Job Titles Used to Advertise for Data Analysis Positions

Comparisons by Organization Staff Size

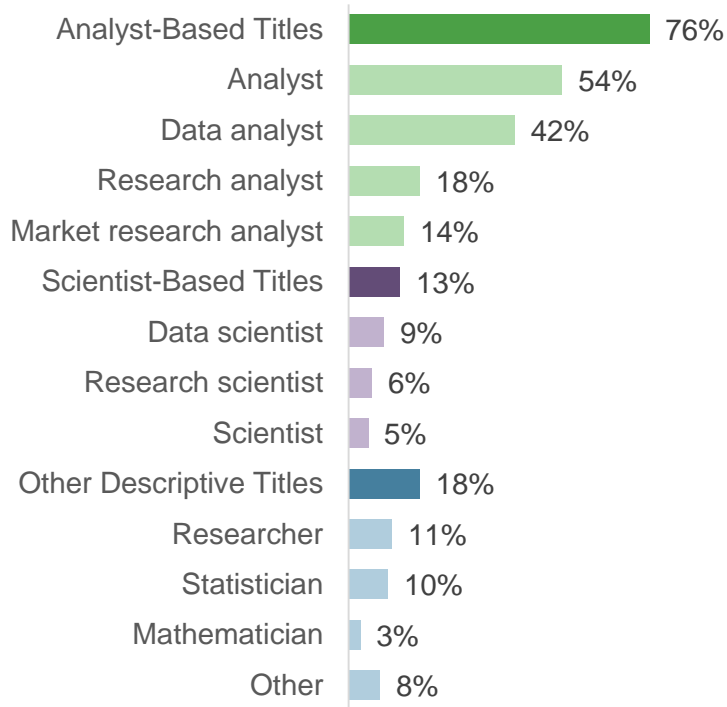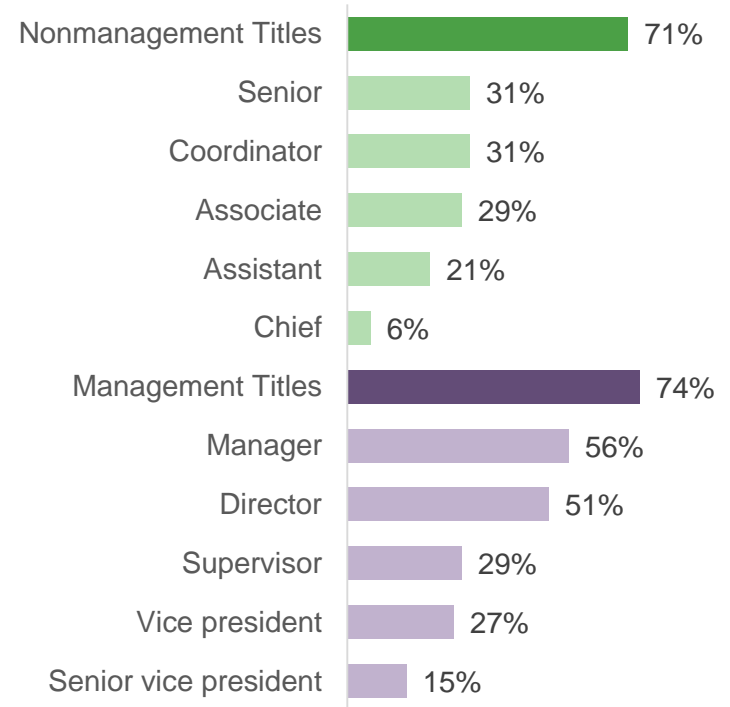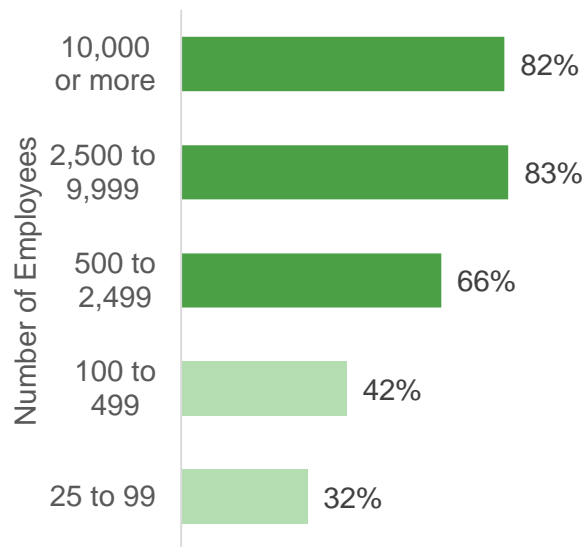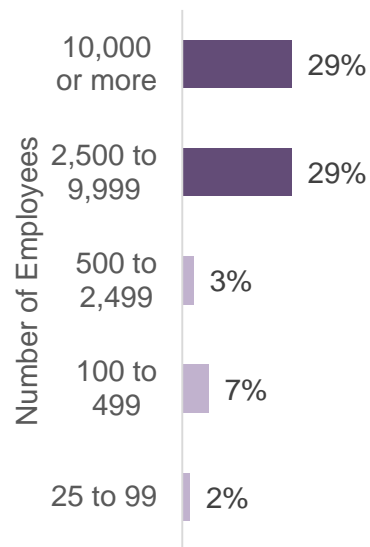|		
Organizations with 500 or more employees were more likely than organizations with 25 to 499 employees to use analyst as the title.	Organizations with 2,500 or more employees were more likely than organizations with 25 to 2,499 employees to use data scientist as the title.	Organizations with 10,000 or more employees were more likely than organizations with 25 to 2,499 employees to use statistician as the title.

Analyst

Number of Employees

- 10,000 or more: 82%
- 2,500 to 9,999: 83%
- 500 to 2,499: 66%
- 100 to 499: 42%
- 25 to 99: 32%

Data Scientist

Number of Employees

- 10,000 or more: 29%
- 2,500 to 9,999: 29%
- 500 to 2,499: 3%
- 100 to 499: 7%
- 25 to 99: 2%

Statistician

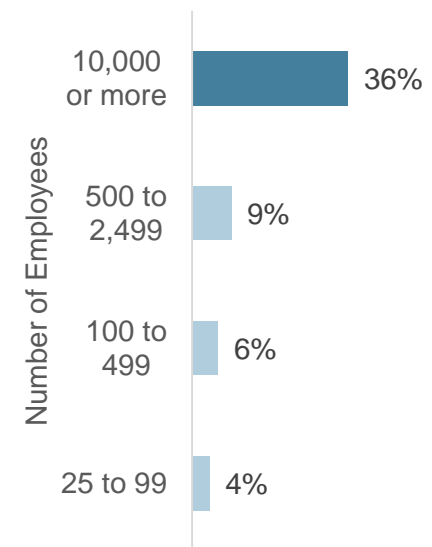Number of Employees

- 10,000 or more: 36%
- 500 to 2,499: 9%
- 100 to 499: 6%
- 25 to 99: 4%

Note: Only statistically significant differences are shown. Dark bars are statistically larger than light bars within the same job title.

Required Technical Skills and Education

Skill Levels Required for Data Analysis Positions

The majority of organizations (83%) required a moderate skill level for data analysis positions, and more than one-half had a need for either basic (59%) or advanced (58%) skills.
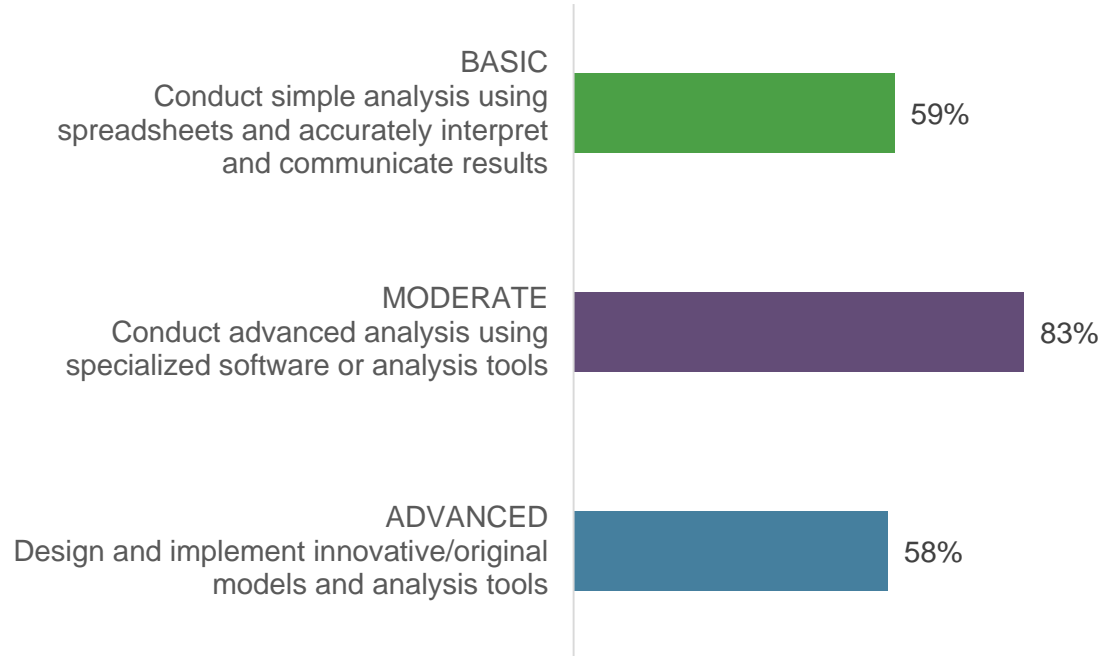
BASIC
Conduct simple analysis using spreadsheets and accurately interpret and communicate results — 59%

MODERATE
Conduct advanced analysis using specialized software or analysis tools — 83%

ADVANCED
Design and implement innovative/original models and analysis tools — 58%

Note: n = 323. Percentages do not total 100% due to multiple response options.

Technical Skills Required or Preferred at Each Skill Level

60%

of organizations had positions that require the ability to interpret and communicate data analysis results, *but did not require gathering or analyzing data.*

Interpret and communicate data analysis results to others
- 67%
- 86%
- 78%

Spreadsheets or simple analysis tools
- 83%
- 81%
- 74%

Statistical software (R, SAS, SPSS, JMP, Minitab, etc.)
- 23%
- 48%
- 57%

Big data computing/coding (Python, Hadoop, SQL, etc.)
- 14%
- 30%
- 48%

Data mining/machine learning
- 20%
- 41%
- 43%

Other technical skills
- 1%
- 2%
- 2%

■ Basic (n = 149)
■ Moderate (n = 232)
■ Advanced (n = 162)

Note: Percentages do not total 100% due to multiple response options.

Minimum Education Requirement, by Skill Level

At the basic skill level, about one-third of organizations required a high school diploma or equivalent or a bachelor's degree. Moderate and advanced level skilled positions were most likely to require a bachelor's degree, but one-quarter required a master's at the advanced level.
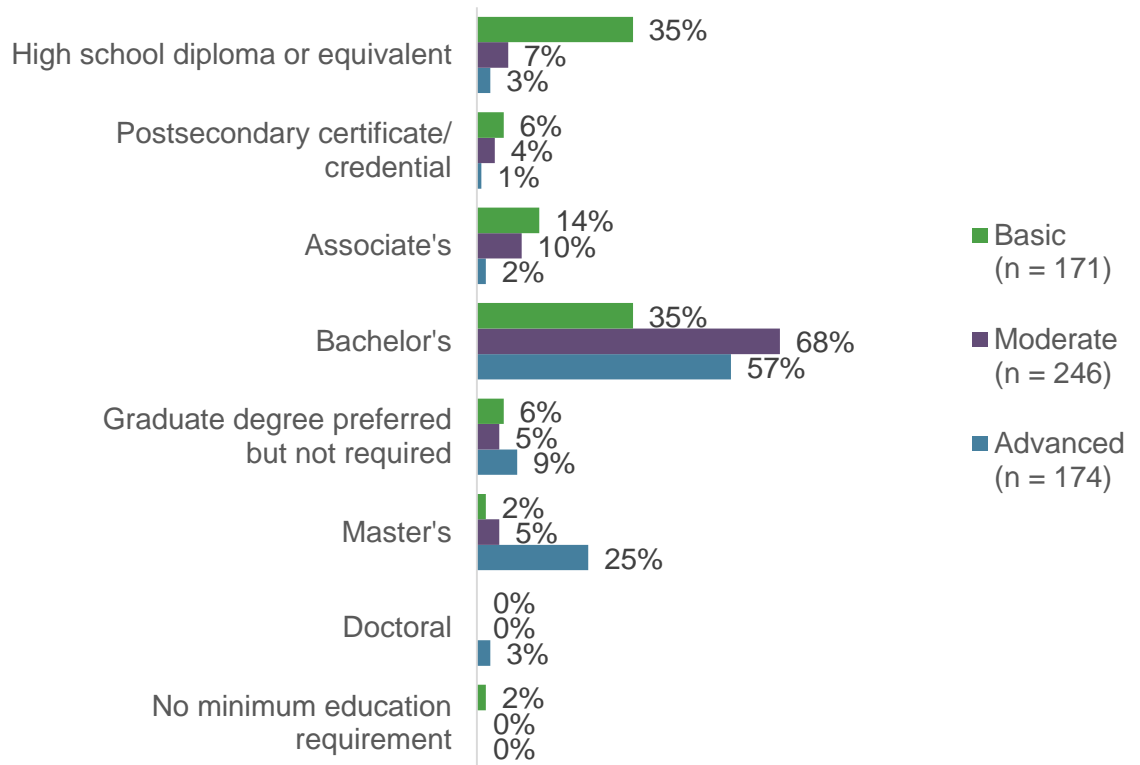
High school diploma or equivalent
- 35%
- 7%
- 3%

Postsecondary certificate/credential
- 6%
- 4%
- 1%

Associate's
- 14%
- 10%
- 2%

Bachelor's
- 35%
- 68%
- 57%

Graduate degree preferred but not required
- 6%
- 5%
- 9%

Master's
- 2%
- 5%
- 25%

Doctoral
- 0%
- 0%
- 3%

No minimum education requirement
- 2%
- 0%
- 0%

Legend:
- Basic (n = 171)
- Moderate (n = 246)
- Advanced (n = 174)

Note: Percentages do not total 100% due to multiple response options.

Fields of Study Required or Preferred, by Skill Level

At the basic skill level, three out of five organizations (61%) did not require or prefer a particular field of study. For moderate level skilled jobs, many organizations were looking for a degree in analytics, computer science or statistics. Advanced level skilled positions required similar fields, but more organizations needed candidates who studied engineering, data science and physics.

Field	Basic (n = 141)	Moderate (n = 226)	Advanced (n = 139)
No field required or preferred	61%	33%	21%
Analytics	26%	46%	43%
Statistics	19%	34%	49%
Computer science	16%	40%	37%
Mathematics	18%	30%	32%
Engineering	12%	24%	35%
Data science	11%	19%	27%
Physics	6%	8%	13%
Other field	6%	9%	9%
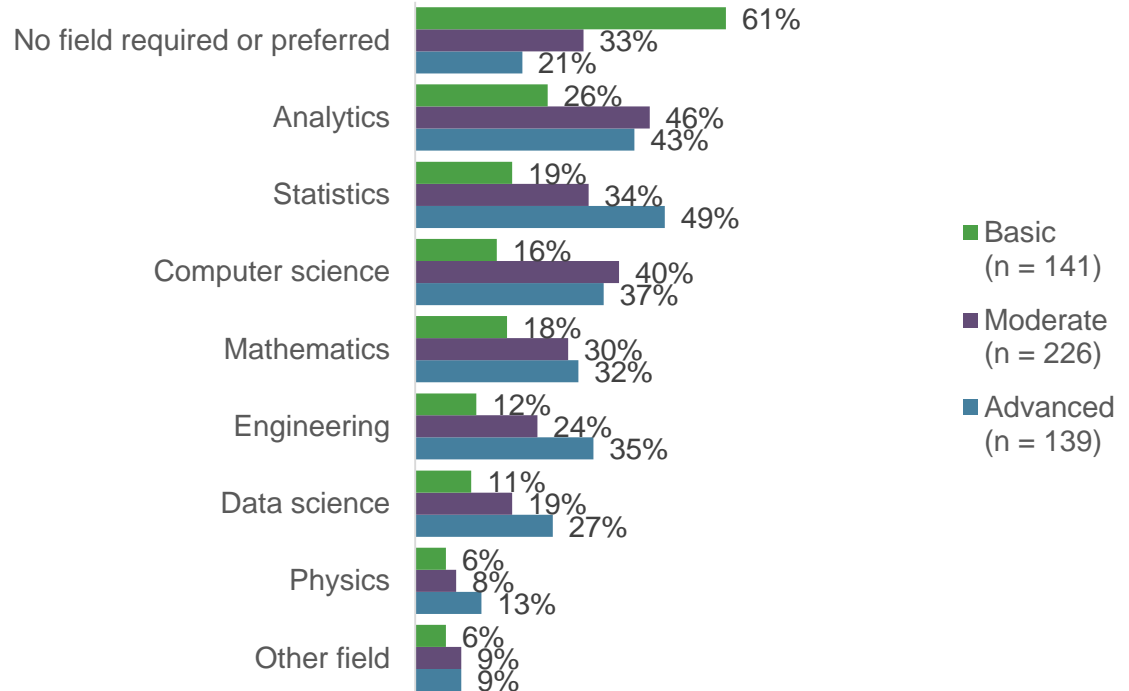
Note: Percentages do not total 100% due to multiple response options.

Conclusion and Resources

Conclusion

Organizations are experiencing recruiting difficulty for positions that require data analysis skills, and it is expected that the demand for these positions will continue to increase over the next 5-10 years. Therefore, it will be important for organizations to engage in workforce planning to define future business needs, identify skills/knowledge gaps between the existing and future workforce, and develop strategies to meet these needs, especially for in-demand skills. Below is an overview of the workforce planning process, with additional resources provided on the next page.

Workforce Planning
- Set strategic direction: composition and content of workforce needed for future business objectives
- Analyze workforce: supply analysis, demand analysis and gap analysis
- Develop action plan: recruiting and training plans to deal with gaps
- Implement action plan
- Monitor, evaluate and revise plan

Keys for Success
- Involve key stakeholders in the process, including a high-level executive who will support the plan
- Align with organization's strategic business plan
- Coordinate with succession planning and career development initiatives
- Make workforce planning an ongoing activity

Challenges
- Technology requirements: the use of advanced technology solutions to integrate disparate planning sources
- Data availability and format: access to and understanding of the organization's data and analytics
- Developing a business case to gain support from senior management
- Collaboration among HR staff, managers and executives

Resources

Other SHRM Research

- The New Talent Landscape: Recruiting Difficulty and Skills Shortages
- shrm.org/research

SHRM Member Resources (SHRM member login required)

- Toolkits: Practicing the Discipline of Workforce Planning
- Presentations: Workforce Planning Training for Supervisors
- Q&A's: Staffing: Planning: How do we develop a staffing plan?
- Additional member resources: HR Help

SHRM Foundation Resources

Shaping the Future: Research on critical trends likely to affect the workplace in the next 5-10 years

1. Evolution of Work and the Worker
2. Engaging and Integrating a Global Workforce
3. Use of Workforce Analytics for Competitive Advantage

Other Resources

- Bureau of Labor Statistics Occupational Outlook Handbook
- National Science Foundation: National Center for Science and Engineering Statistics
- Bechet, T. P. (2008). *Strategic Staffing*. SHRM/AMACOM. Available from the SHRMStore.
- Ward, D. L., & Tripp, R. (2013). *Positioned: Strategic Workforce Planning That Gets the Right Person in the Right Job*. AMACOM.
- Young, M. B. (2009). *Implementing Strategic Workforce Planning* [report R-1444-09-RR]. The Conference Board.

Demographics

Demographics: Organization Industry

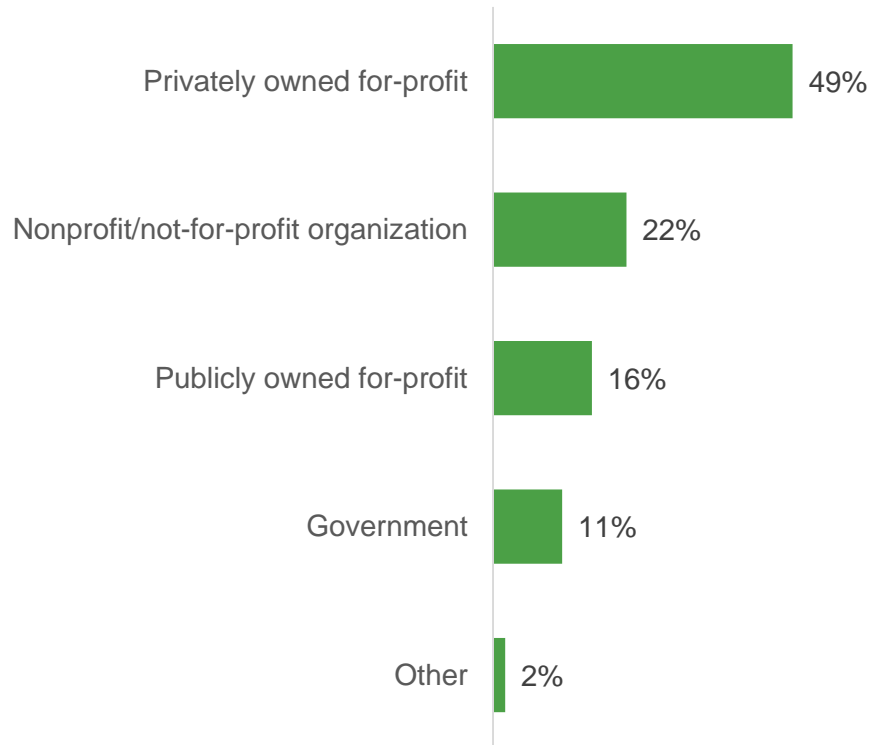|	Percentage
Manufacturing	23%
Health care and social assistance	15%
Professional, scientific and technical services	15%
Finance and insurance	11%
Educational services	11%
Government agencies	10%
Retail trade	7%
Transportation and warehousing	7%
Construction	6%
Utilities	5%
Accommodation and food services	4%

Note: n = 364. Percentages do not total 100% due to multiple response options.

Demographics: Organization Industry (continued)

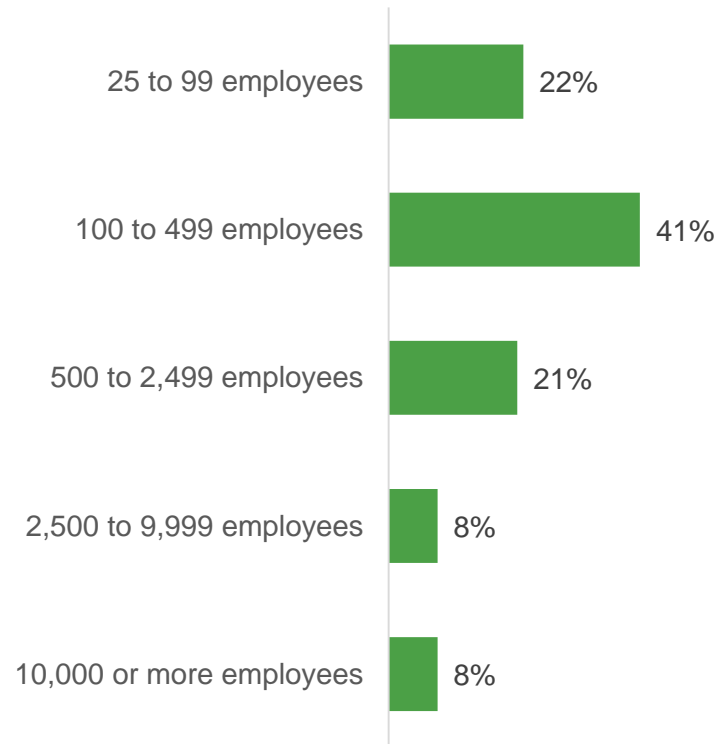|	Percentage
Administrative and support and waste management and remediation services	4%
Religious, grant-making, civic, professional and similar organizations	4%
Arts, entertainment, and recreation	4%
Real estate and rental and leasing	2%
Repair and maintenance	2%
Wholesale trade	2%
Mining, quarrying, and oil and gas extraction	2%
Information	2%
Agriculture, forestry, fishing and hunting	2%
Personal and laundry services	0%
Other industry	12%

Note: n = 364. Percentages do not total 100% due to multiple response options.

Demographics: Organization Sector

Privately owned for-profit — 49%
Nonprofit/not-for-profit organization — 22%
Publicly owned for-profit — 16%
Government — 11%
Other — 2%

Note: n = 372. Percentages do not total 100% due to rounding.

Demographics: Organization Staff Size

Category	Percentage
25 to 99 employees	22%
100 to 499 employees	41%
500 to 2,499 employees	21%
2,500 to 9,999 employees	8%
10,000 or more employees	8%

Note: n = 346. Percentages do not total 100% due to rounding.

Demographics: Region

Region	Percentage
South	36%
Midwest	24%
West	21%
Northeast	19%
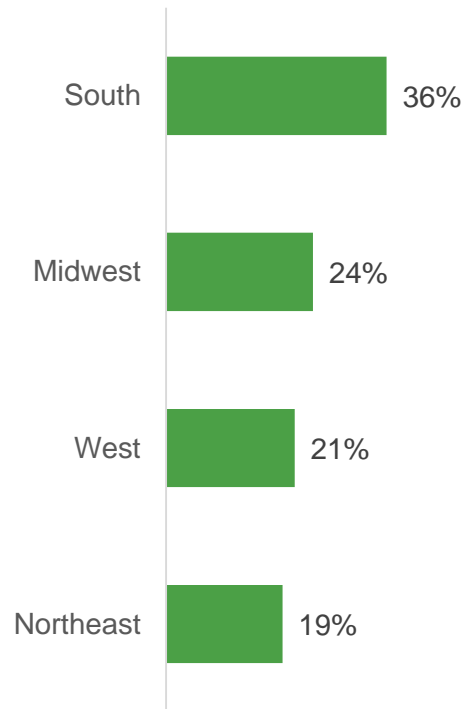
n = 366

Demographics: Other

Does your organization have U.S.-based operations (business units) only, or does it operate multinationally?

U.S.-based operations only	75%
Multinational operations	25%

n = 371

What is the HR department/function for which you responded throughout this survey?

Corporate (all locations in the U.S.)	74%
Some locations in the U.S.	3%
Facility/location	23%

n = 259

Is your organization a single-unit organization or a multi-unit organization?

Single-unit organization: An organization in which the location and the organization are one and the same.	33%
Multi-unit organization: An organization that has more than one location.	67%

n = 374

For multi-unit organizations, are HR policies and practices determined by the multi-unit headquarters, by each work location or by both?

Multi-unit headquarters determines HR policies and practices.	49%
Each work location determines HR policies and practices.	5%
A combination of both the work location and the multi-unit headquarters determines HR policies and practices.	46%

n = 259

Jobs of the Future: Data Analysis Skills

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Survey Methodology

- Response rate = 11%
- 398 HR professionals from a randomly selected sample of SHRM's membership with an organization staff size of 25 or more employees participated in this survey.
- Margin of error +/-5%
- Survey fielded August 15-September 14, 2016

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