

# Digital Transformation of Talent Acquisition

Equity Research  
Global Services  
Technology, Media, and Communications

May 15, 2019  
Industry Report

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Technology is fundamentally changing the way many industries and functions work. The human resources department can be slower to adopt new trends than other corporate departments, but it is not immune to the “digital transformation” trend. There is great deal of research about the adoption of cloud technologies as it relates to the core HRIS, payroll, and benefits portions of the HR department. This report focuses on a different part of the sector, specifically talent acquisition.

To be clear, we believe that these functions will remain highly dependent on human labor. There are some aspects of this process that are hard, if not impossible, to replace with technology. Still, corporate HR departments and staffing companies are increasingly embracing technologies and new business models to improve the efficiency and effectiveness of talent acquisition. At the same time, the labor market is increasingly tight and there is a shortage of specialized workers, so human capital management is critically important for corporations. Given demographic trends in many developed economies, the shortage of specialized workers is likely to intensify, making this an even bigger focus for corporations. With those trends in mind, we look more closely at some of the biggest changes that we see occurring in talent acquisition. The trends/topics discussed in this report are as follows.

1. Sourcing Talent Is Evolving
2. ATSs Are Becoming Much More Than Just Résumé Databases
3. Assessment Tools Are Getting Integrated Into Other Solutions
4. Background Screening Is Changing Because of Consolidation, New Information Sources, and Automation
5. Freelance Marketplaces Are Capitalizing on a Large and Growing Part of the Economy
6. Recruitment Process Outsourcing Is Growing Quickly
7. Staffing Companies Are Embracing Digital Transformation
8. VMS/MSP Programs Continue to Grow

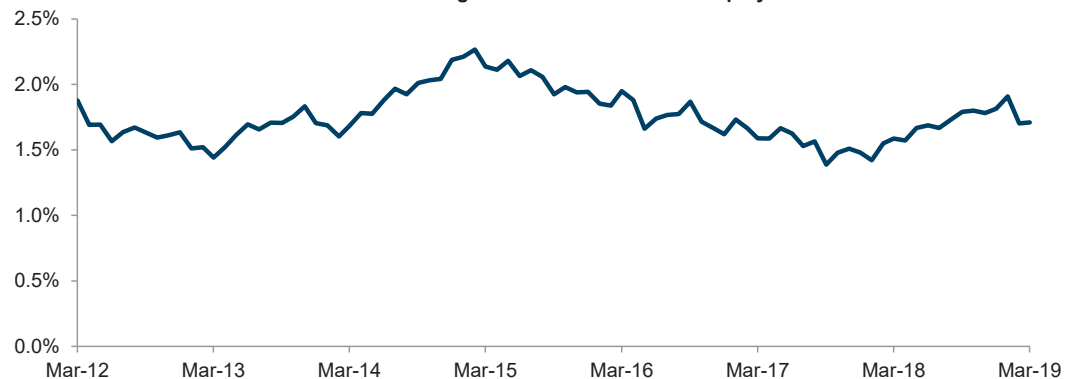
We believe that these trends are relevant for investors. While talent acquisition is inherently somewhat cyclical, the digital transformation of this sector is creating secular and market-share-driven growth opportunities for numerous companies. Several of the sectors discussed in this report (RPO, applicant tracking systems, background screening, assessment testing) are out of public shareholders’ views, but the changes in those markets impact the overall ecosystems; we also believe that companies in this sector will continue to receive a large amount of private capital funding (nearly \$6 billion of venture funding has flowed into HR technology companies since 2014) or eventually go public (i.e., freelance marketplaces represent a relatively new sector for public equity investors). We also believe that talent acquisition tools will become more tightly integrated into the HCM technology suite over time. Lastly, staffing companies that effectively transform their business in response to these trends should gain market share and improve their efficiency. We thus believe that this is a key shift to watch over the next few years.

### **Human Capital Management Is a Critical but Changing Function**

Human capital remains one of the most important assets for every company. While technology is automating some tasks, the success or failure of most companies remains highly dependent on the quality of their people. Most developed economies have low unemployment rates, so competition for talent is high. We note, too, that most developed economies have slowly growing populations and generally older populations. For example, U.S. population growth of 0.6% in 2018 was the slowest

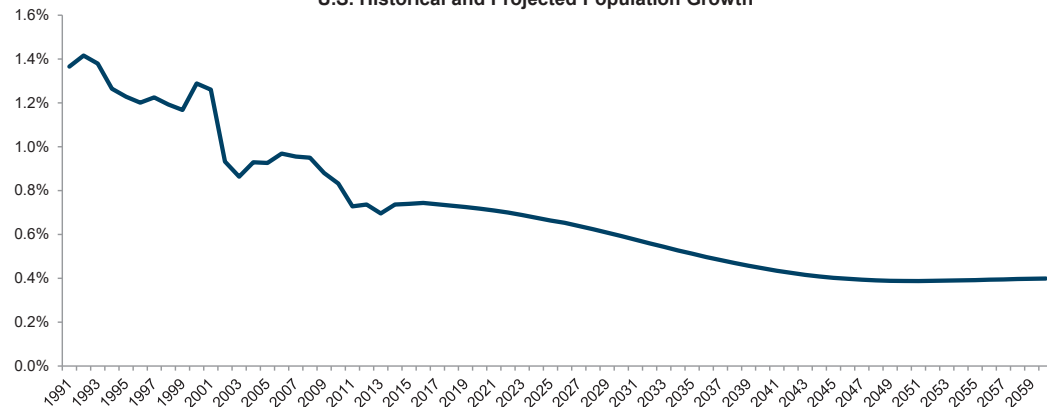
growth rate in 80 years; in comparison, the U.S. population growth rate was 1.0%-1.5% throughout 1990-2000. U.S. population growth is projected to remain near 0.6%-0.7% during the next decade, before slowing further to 0.4% after 2035. In comparison, the number of people employed in the United States has consistently been growing 1.5%-2.0%. This means that competition for human capital will continue to intensify.

**Exhibit 1**  
**Year-Over-Year Change in U.S. Total Nonfarm Employment**



Source: BLS

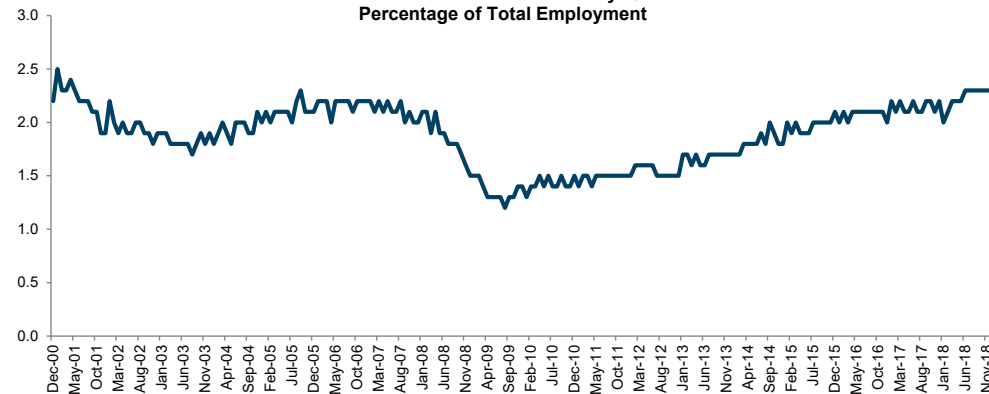
**Exhibit 2**  
**U.S. Historical and Projected Population Growth**



Source: U.S. Census Bureau

At the same time, the retention of employees is changing. Growth of flexible labor arrangements and the gig economy is driving more frequent churn in employment arrangements. Younger generations also tend to change their jobs more frequently than older generations. Reflective of those trends, exhibit 3 shows that the percentage of workers who quit their job is toward the high end of what we have seen during the last 20 years. We believe that growth of the gig economy and the demographic changes in the workforce will continue to make the retention of talent harder.

**Exhibit 3**  
**United States Labor Market Monthly Quit Rate**  
**Percentage of Total Employment**



Source: Bureau of Labor Statistics

The importance of making good hiring decisions remains high. The Department of Labor has estimated that the direct cost of a bad hire averages 30% of the worker's annual salary. When broader costs such as the impact on the productivity of other workers is included, the Society for Human Resources Management (SHRM) has estimated that the cost of hiring, training, and replacing a bad hire is 90%-200% of his or her annual salary.

**Exhibit 4**  
**Talent Acquisition and Human Capital Management Industry**  
**Employee Hiring Metrics From SHRM Benchmarking Surveys**

	2009	2014	2016	2017
Annual Salary Increase	3.5%	3.0%	3.0%	3.0%
Salaries as % of Operating Expenses	47.5%	40.0%	43.0%	45.0%
Time to Fill (days)	30	30	30	30
Cost Per Hire	\$1,414	\$1,750	\$2,000	\$1,633
Average Employee Tenure (years)	n/a	7	7	8
Annual Overall Turnover Rate	16%	14%	15%	14%
Voluntary Turnover Rate	10%	8%	9%	9%
Involuntary Turnover Rate	4%	3%	3%	3%

Note: Figures represent median values from survey results.  
Source: Society for Human Resource Management (SHRM)

Overall, we believe that demand for human capital will continue to grow faster than the supply, the retention of human capital will be challenging, and the impact of bad hiring practices is significant. Those factors make human capital management a critical function for corporations. As shown in exhibit 5, human capital management includes HRIS and payroll technology, training programs, performance management, and benefits, which all affect the ability to retain and develop talent. The focus of this report, however, is on the front end of the process: talent acquisition. Exhibit 6 provides a summary of the technology and services providers involved in this process.

**Exhibit 5**  
**Overview of Human Capital Solutions**

Talent Acquisition	Talent Management	Core HR and Benefits
<ul style="list-style-type: none"> <li>Screening/Assessment</li> <li>Contract Staffing</li> <li>Executive Search</li> <li>VMS</li> <li>Recruitment Marketing</li> <li>Social Recruiting</li> <li>Applicant Tracking/CRM</li> <li>RPO</li> <li>Contingent Workforce/MSP</li> </ul>	<ul style="list-style-type: none"> <li>Employee Engagement</li> <li>Performance Management</li> <li>Training and Development/LMS</li> <li>HR Advisory and Implementation</li> <li>Compensation/Benchmarking</li> <li>Workforce Management and Analytics</li> <li>Relocation</li> </ul>	<ul style="list-style-type: none"> <li>Payroll/HRMS</li> <li>PEO</li> <li>Benefits Management</li> <li>Wellness</li> <li>HR Communications</li> </ul>

Source: William Blair

**Exhibit 6**  
**Talent Acquisition**  
**Market Landscape**

Subsector	Estimated Market Size (\$b)	Companies		
Candidate Sourcing	\$8	<ul style="list-style-type: none"> <li>▪ Monster (Randstad)</li> <li>▪ Seek</li> <li>▪ Axel Springer</li> <li>▪ Ziprecruiter</li> <li>▪ Kununu (Xing)</li> </ul>	<ul style="list-style-type: none"> <li>▪ CareerBuilder</li> <li>▪ LinkedIn (Microsoft)</li> <li>▪ Naukri</li> <li>▪ Talroo</li> <li>▪ Handshake</li> </ul>	<ul style="list-style-type: none"> <li>▪ 51Job</li> <li>▪ Indeed (Recruit Holdings)</li> <li>▪ Xing</li> <li>▪ Glassdoor (Recruit Holdings)</li> </ul>
Temporary Staffing	\$60	<ul style="list-style-type: none"> <li>▪ Manpower</li> <li>▪ AMN Healthcare</li> <li>▪ Cross Country Healthcare</li> <li>▪ TrueBlue</li> <li>▪ Insight Global</li> </ul>	<ul style="list-style-type: none"> <li>▪ Robert Half</li> <li>▪ ASGN Inc.</li> <li>▪ Randstad</li> <li>▪ Robert Walters</li> <li>▪ Allegis Group</li> </ul>	<ul style="list-style-type: none"> <li>▪ Kforce</li> <li>▪ Resources Connection</li> <li>▪ Adecco</li> <li>▪ PageGroup</li> <li>▪ CHG Healthcare</li> </ul>
Permanent Placement	\$46	<ul style="list-style-type: none"> <li>▪ Manpower</li> <li>▪ AMN Healthcare</li> <li>▪ Cross Country Healthcare</li> <li>▪ Korn Ferry</li> <li>▪ Russell Reynolds</li> </ul>	<ul style="list-style-type: none"> <li>▪ Robert Half</li> <li>▪ ASGN Inc.</li> <li>▪ Randstad</li> <li>▪ Heidrick &amp; Struggles</li> <li>▪ Egon Zehnder</li> </ul>	<ul style="list-style-type: none"> <li>▪ Kforce</li> <li>▪ Resources Connection</li> <li>▪ Adecco</li> <li>▪ Spencer Stuart</li> </ul>
Recruitment Process Outsourcing	\$14	<ul style="list-style-type: none"> <li>▪ Korn Ferry</li> <li>▪ Kenexa (IBM)</li> <li>▪ Randstad</li> <li>▪ Yoh</li> <li>▪ The RightThing</li> </ul>	<ul style="list-style-type: none"> <li>▪ PeopleScout (TrueBlue)</li> <li>▪ Cielo</li> <li>▪ Hudson RPO</li> <li>▪ Adecco RPO</li> <li>▪ WilsonHCG</li> </ul>	<ul style="list-style-type: none"> <li>▪ Alexander Mann</li> <li>▪ Allegis Global</li> <li>▪ KellyOCG</li> <li>▪ Sevenstep RPO</li> <li>▪ Pontoon (Adecco)</li> </ul>
Application Tracking Systems	\$5	<ul style="list-style-type: none"> <li>▪ SuccessFactors</li> <li>▪ iCIMS</li> <li>▪ Jobvite</li> <li>▪ Ultimate Software</li> <li>▪ Peoplefluent (LMS)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Taleo (Oracle)</li> <li>▪ Workday</li> <li>▪ SmartRecruiters</li> <li>▪ SilkRoad</li> <li>▪ CareerBuilder</li> </ul>	<ul style="list-style-type: none"> <li>▪ Kenexa (IBM)</li> <li>▪ Greenhouse Software</li> <li>▪ Lever</li> <li>▪ BreezyHR</li> <li>▪ Cornerstone</li> </ul>
Vendor Management Systems	\$138	<ul style="list-style-type: none"> <li>▪ AMN Healthcare</li> <li>▪ Pixid</li> <li>▪ Agile-1</li> </ul>	<ul style="list-style-type: none"> <li>▪ SAP Fieldglass</li> <li>▪ Peoplefluent (LMS)</li> <li>▪ Brightfield Strategies</li> </ul>	<ul style="list-style-type: none"> <li>▪ Beeline</li> <li>▪ DCR (Coupa)</li> </ul>
Managed Service Providers	\$117	<ul style="list-style-type: none"> <li>▪ AMN Healthcare</li> <li>▪ Kelly</li> <li>▪ Workforce Logiq</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manpower</li> <li>▪ Pontoon (Adecco)</li> <li>▪ PRO Unlimited</li> </ul>	<ul style="list-style-type: none"> <li>▪ Allegis Global</li> <li>▪ Randstad</li> </ul>
Freelance Marketplaces	\$112	<ul style="list-style-type: none"> <li>▪ Upwork</li> <li>▪ TaskRabbit</li> <li>▪ Gigster</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fiverr</li> <li>▪ Broxer</li> <li>▪ Yoss</li> </ul>	<ul style="list-style-type: none"> <li>▪ Freelancer</li> <li>▪ Hubstaff</li> <li>▪ twago</li> </ul>
Talent Assessment	\$3	<ul style="list-style-type: none"> <li>▪ SHL</li> <li>▪ Hirevue</li> <li>▪ Codesignal</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pluralsight</li> <li>▪ Korn Ferry</li> <li>▪ Pymetrics</li> </ul>	<ul style="list-style-type: none"> <li>▪ PSI Services</li> <li>▪ Russell Reynolds</li> <li>▪ Predictive Index</li> </ul>
Background Screening	\$4	<ul style="list-style-type: none"> <li>▪ Hireright</li> <li>▪ Universal Background Screening</li> <li>▪ DISA Global Solutions</li> </ul>	<ul style="list-style-type: none"> <li>▪ First Advantage</li> <li>▪ Checkr</li> <li>▪ Accurate Background</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sterling Talent Solutions</li> <li>▪ Cision</li> <li>▪ Asurint</li> </ul>
Recruitment Marketing	Included in Other Sectors	<ul style="list-style-type: none"> <li>▪ Phenom People</li> <li>▪ Talemetry</li> </ul>	<ul style="list-style-type: none"> <li>▪ Beamery</li> </ul>	<ul style="list-style-type: none"> <li>▪ Smashfly</li> </ul>

Note: Estimated market sizes for Vendor Management Systems and Managed Service Providers reflect total spending under management rather than vendor revenue.

Note: Estimated market sizes for Freelance Marketplaces assumes a 20% take rate applied against \$560 billion of estimated total spending on freelance workers.

Sources: IDC, Staffing Industry Analysts, company documents, and William Blair research

While talent acquisition was historically driven by manual processes, technology is changing multiple aspects of this process. Vendor management systems, job boards, LinkedIn, and applicant tracking systems have been driving changes in talent acquisition for a long time. We believe, though, that the pace of change is accelerating.

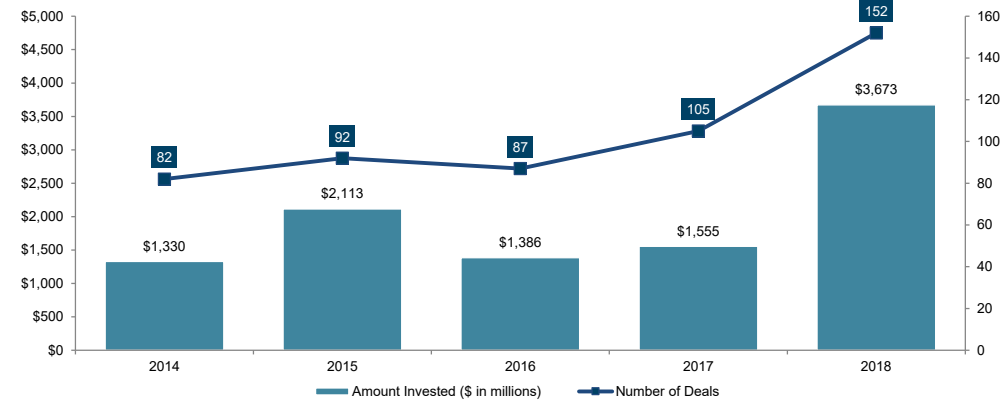
**Exhibit 7**  
**Staffing Industry**  
**Timeline of Events and Changes in Talent Acquisition Process**

1980s	1990s	2000s	2010s	2020s
Newspaper help wanted industry dominates recruitment advertising	Monster and CareerBuilder start to grow online recruitment advertising industry	Early versions of applicant tracking systems gain adoption	LinkedIn and aggregation sites take market share in recruitment advertising	Recruiting talent becomes increasingly more challenging
Job fairs are common	Secular growth of temporary staffing gains momentum	Assessment testing gains adoption for specific use-cases	Background screening industry consolidates	Background screening companies automate processes and leverage internal data
		VMS and MSP solutions start to gain traction	HCM technology product suite consolidates	Staffing companies embrace new business models and ways to engage with clients and candidates
		Niche online recruitment sites gain market share from generalist sites	Staffing companies invest in automation tools	Talent acquisition tools become more tightly integrated into HCM product suite
			Gig economy and secular growth of temporary staffing drive growth in contingent labor	RPO and freelance exchanges continue to grow
			Freelance labor exchanges start to grow	Use of VMS/MSP solutions expands to more forms of contingent labor and professional services
			Statement of Work (SoW) becomes a more common way to complete projects	Predictive analytics become increasingly important to all parts of talent acquisition process
			Assessment tests become integrated into other solutions	
			Mobile tools become important for all parts of talent acquisition	
			VMS solutions broaden their capabilities, global reach, and types of labor that they serve	

Source: William Blair research

We believe this is creating both opportunities for growth in new areas and risks for companies that cannot effectively drive digital transformation in their businesses. As shown in exhibit 8, venture capital firms have increased the amount of investment in employment-related technology companies recently. This financing is helping create a variety of new entrants with innovative and disruptive approaches to talent acquisition. In the remainder of this report, we look more closely at how the talent acquisition process is changing.

**Exhibit 8**  
Venture Capital Investment in "WorkTech" Industry

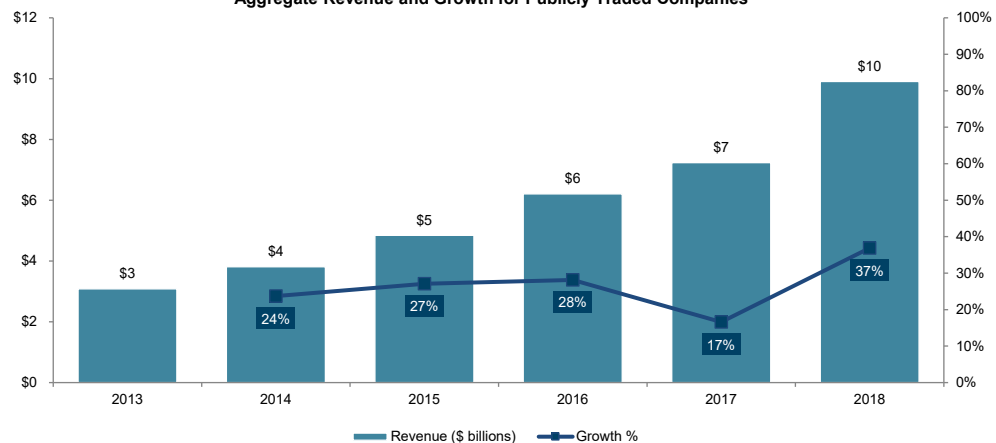


Source: Acadian Insights

## Sourcing Talent Is Evolving

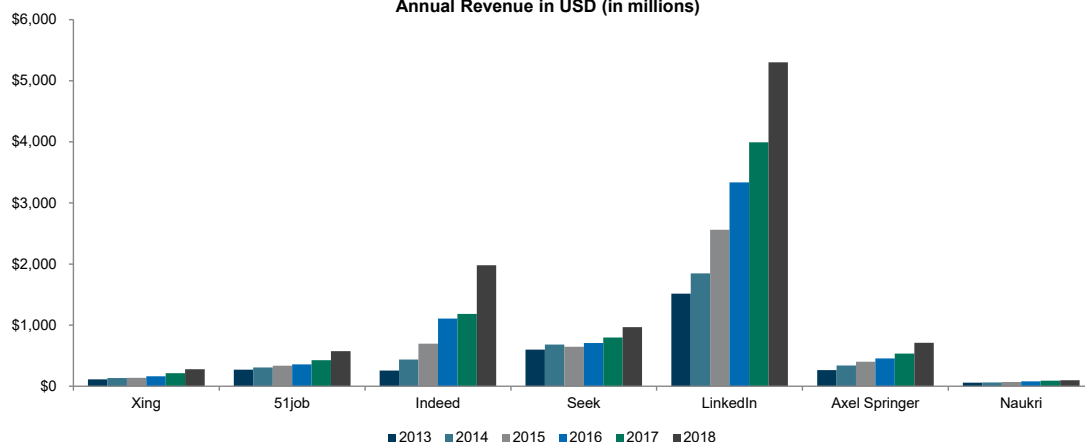
The process of sourcing job candidates has gone through several changes during the last few decades. During the late 1990s and 2000s, newspaper help-wanted advertisements were gradually replaced by large online job boards such as Monster and Careerbuilder in the United States (51job [JOBS \$72.01] in China and Seek [SEK-ASX A\$20.14] in Australia are two other examples). Yet those businesses eventually faced competition from niche job boards (e.g., Dice.com, iHire), professional social media networks (LinkedIn, Xing [O1BC-ETR €328.50], and job board aggregators (Indeed, LinkUp). The following exhibits show our estimates for revenue at most of these companies over time. Growth in the United States is strongest at LinkedIn and Indeed right now, while job boards in other countries continue to grow very well.

**Exhibit 9**  
Online Recruitment/Job Sourcing Industry  
Aggregate Revenue and Growth for Publicly Traded Companies



Note: Includes Xing, 51job, Indeed, Seek, LinkedIn, Axel Springer, and Naukri.  
Source: Company documents

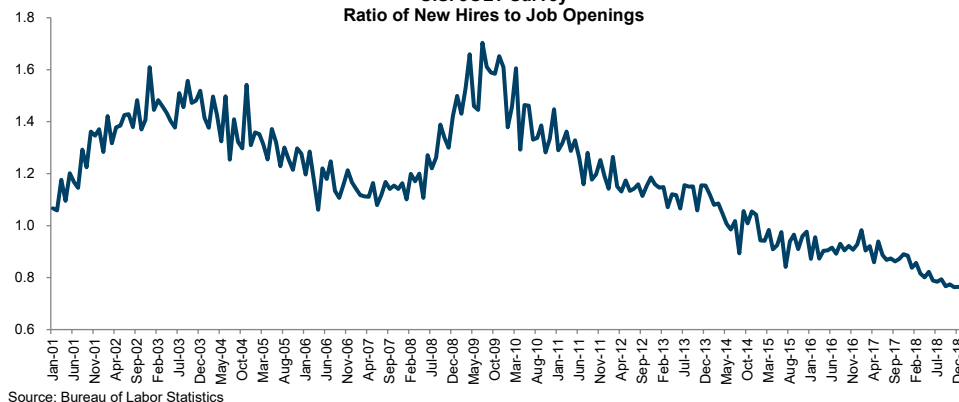
**Exhibit 10**  
Online Recruitment/Job Sourcing Industry  
Annual Revenue in USD (in millions)



Source: Company documents

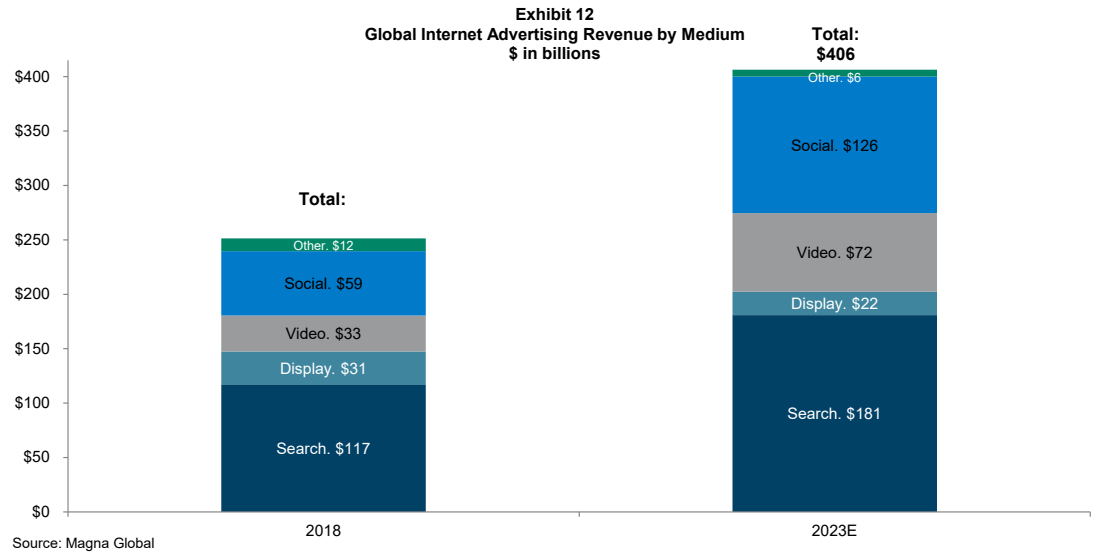
We believe that the process of sourcing candidates continues to evolve. Publicly available information about job candidates is richer than ever before because of social media. The abundance of information about job candidates makes it easier to identify the names of potential job candidates and access information about those candidates. The launch of Google for Jobs in mid-2018 and other aggregation sites such as Indeed and Neuvo (Montreal-based start-up company; \$5 million-\$10 million of revenue in 2017, according to Canada Business) also means that job postings are increasingly pushed to a broad set of potential workers. Despite better access to information about workers and broader distribution of job postings, sourcing talent remains a challenge for many organizations. According to the U.S. JOLT survey, the number of job postings is growing faster than the number of new hires, suggesting declining effectiveness from traditional job postings. We attribute this to two main factors. First, getting the attention of highly qualified, passive job seekers is challenging. Job postings are an effective way to engage with people who are actively seeking a job, but the most attractive candidates for a job are often passive candidates (i.e., people who are not looking for a job). Job postings are essentially display advertisements, which have declined in effectiveness for most advertisers over time, as shown in exhibit 12. Fragmentation in media consumption means that individuals are harder to engage with through advertisements. We note that while LinkedIn provides a great database of information for recruiters, almost every recruiter is using that database, so competition for the attention of job candidates is high.

**Exhibit 11**  
U.S. JOLT Survey  
Ratio of New Hires to Job Openings



Source: Bureau of Labor Statistics

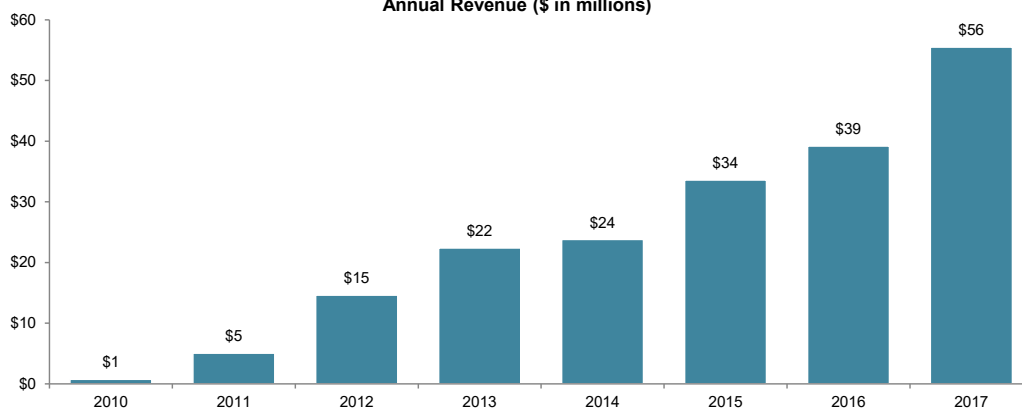




Second, despite the increased amount of information, effectively identifying the right candidates is still hard. Social media provides a large amount of information about individuals, but some companies are cautious about how this information is used because of equal employment opportunity laws. The accuracy of data from some sources also is questionable. Lastly, semantic differences across industries often hamper the effectiveness of tools that are used to search through résumés and other employment information. For example, the term “modeling” means something quite different for a financial worker than it does for an engineer. Various companies have been trying to develop better semantic search tools for years (Monster aggressively marketed a tool in 2012 for this purpose), but we believe semantic search remains a challenge.

Given the factors mentioned above, there are additional changes taking place in the recruitment advertising sector. We identify three main trends. First, corporations and staffing companies are embracing advanced analytical tools. For example, ZipRecruiter has grown quickly by providing a tool that distributes job postings across multiple job boards (as well as through its own site), aggregates interested candidates, and then uses analytics to match candidates and job opportunities. ZipRecruiter uses artificial intelligence so that the accuracy of its matching tool improves over time based on the feedback from employers. ZipRecruiter raised \$156 million in a series B funding round in October 2018 at a valuation of about \$1.5 billion. Media articles have reported that ZipRecruiter had \$100 million of revenue in 2015 and \$160 million in 2016. While it is smaller, Talroo (formerly called Jobs2Careers) has grown well during the last few years by providing machine learning technology that automatically adjusts the placement of job advertisements based on the effectiveness of each site and the type of job.

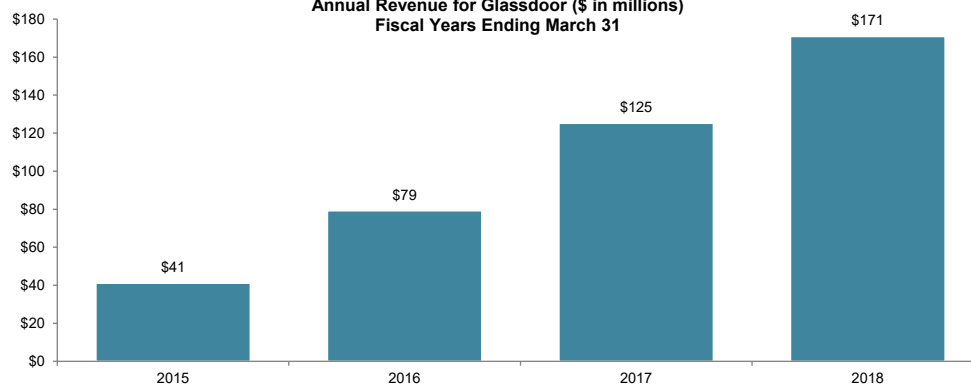
**Exhibit 13**  
Talroo, Inc.  
Annual Revenue (\$ in millions)



Source: Inc. 5000

Second, online recruiting tools are using data, new business models, and thought leadership to engage with candidates. Given declining effectiveness from traditional recruitment advertising, companies are trying to engage with job candidates in new ways. For example, Glassdoor has grown quickly by providing additional information about salaries and employee reviews, drawing job candidates to its sites. Kununu, owned by Xing, has a similar business model to Glassdoor. Exhibit 14 shows historical revenue for Glassdoor, which was acquired by Recruit Holdings for \$1.2 billion in mid-2018. LinkedIn also continues to gain market share because the content in its social network draws people to its site. Lastly, Hired, which has raised \$130 million of capital thus far and reportedly had \$100 million of revenue in 2016, uses a different business model. Hired allows engineers and other workers to create a profile on its site. Recruiters are allowed to search the Hired profiles and send interview requests to those candidates that they would like to talk to, but it is up to job candidates to decide which interview requests that they want to respond to.

**Exhibit 14**  
Recruit Holdings Co., Ltd.  
Annual Revenue for Glassdoor (\$ in millions)  
Fiscal Years Ending March 31



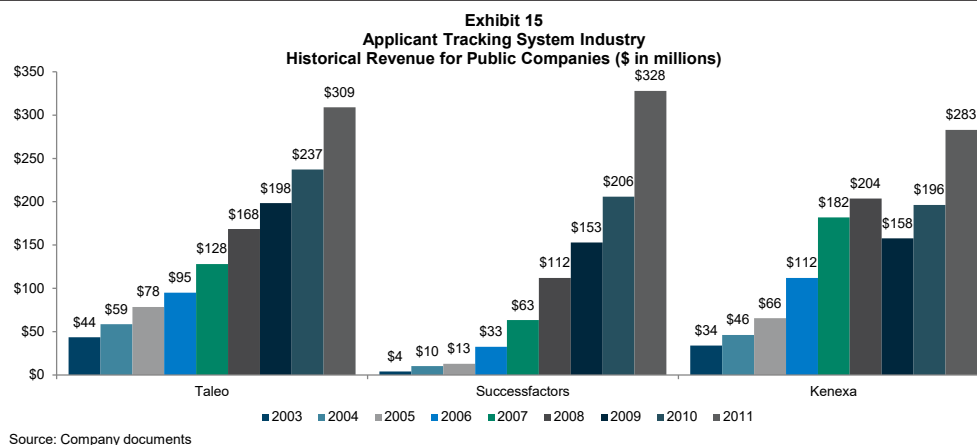
Source: Company documents

Third, corporations and staffing/executive search companies are investing in their own database and search capabilities. In the case of corporations, applicant tracking systems (which we discuss in more detail in the next section of this report) continue to improve their tools that leverage structured and unstructured information about prior job candidates and workers. In the case of staffing firms, companies are investing in mobile apps that help sustain engagement with workers and databases

that better capture data about workers. We note that Randstad (RAND-AMS €47.70) purchased Monster Worldwide in mid-2016, with a focus on leveraging Monster's data about workers and semantic search tools. While Monster's revenue and profits have been weak, Randstad's management still touts the acquisition as a success because it has been able to directly link Monster's candidate database with Randstad's staffing database and the database from its Sourceright business.

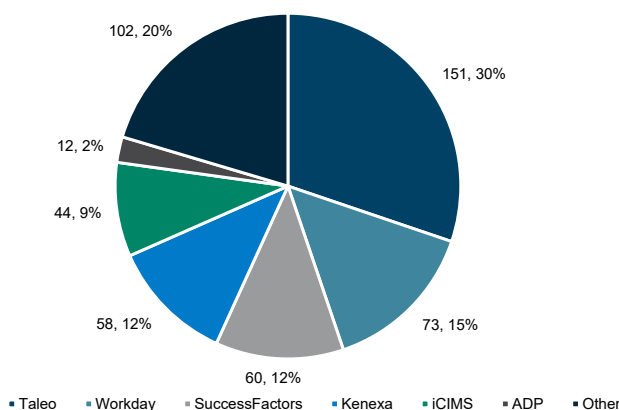
## ATSs Are Becoming Much More Than Just Résumé Databases

The initial growth of applicant tracking systems (ATSs) in the 1990s and early 2000s was driven by the replacement of manual processes (Excel sheets, file cabinets) in the HR departments of large corporations. These systems were known mainly for their résumé database systems at that time. Revenue growth for these companies was strong from 2003 to 2011. This market fell out of the view of public equity investors after Taleo was acquired by Oracle (ORCL \$53.43; Market Perform) in 2012 and Kenexa was acquired by IBM (IBM \$131.42) in 2012.



Today, IDC estimates that the addressable market for ATSs is \$4.6 billion. There are a few different estimates for market share in this sector. Jobscan published a study last year that estimates the market share of ATS products among *Fortune* 500 firms based on the web address of their career sites. As shown in exhibit 16, based on the number of *Fortune* 500 customers, Taleo, SuccessFactors, and Kenexa remain some of the large providers of ATSs, but iCIMS and Workday (WDAY \$194.08; Outperform) have gained market share.

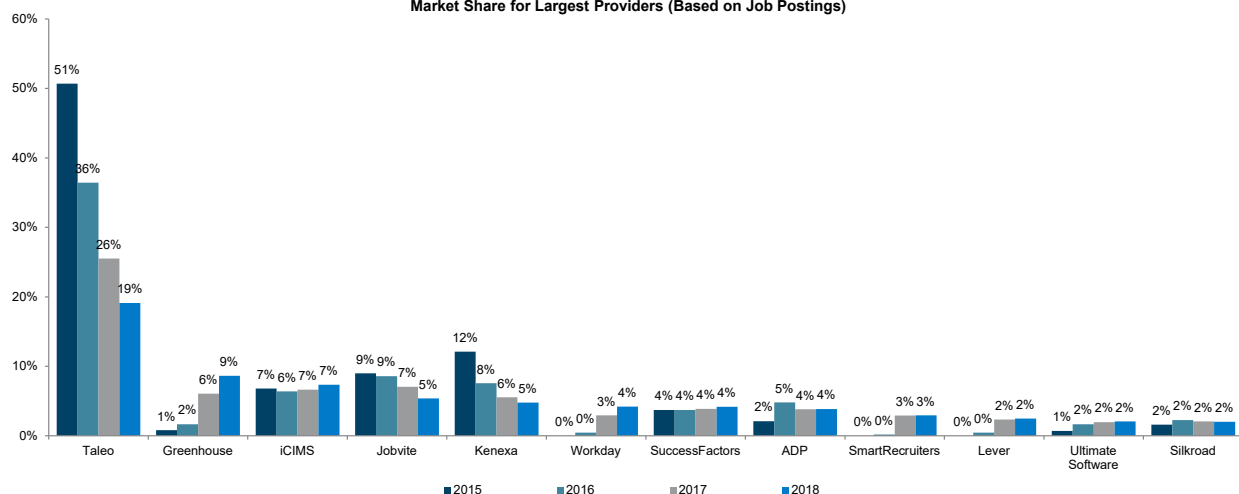
**Exhibit 16**  
**Applicant Tracking System Industry**  
**Number of Fortune 500 Companies Using Various Providers**



Source: Jobscan

Ongig also publishes an annual estimate of market share based on a sample of job postings from roughly 4,000 companies. Its rankings of market share are based the number of job postings, rather than the number of customers. Taleo still has the highest market share based on this methodology, but Greenhouse Software and Jobvite are higher on this list. Greenhouse, Workday, and iCIMS are gaining the most market share based on this methodology.

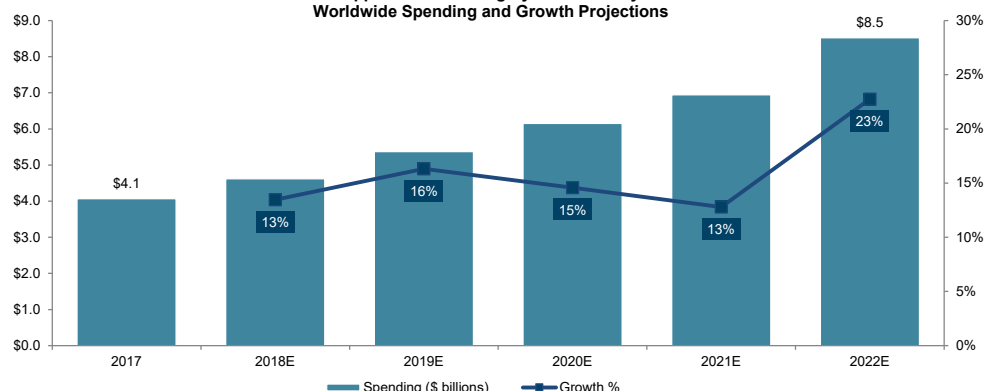
**Exhibit 17**  
**Applicant Tracking Systems**  
**Market Share for Largest Providers (Based on Job Postings)**



Source: Ongig

ATSs are used by most large companies at this point; the Jobscan study identified an ATS for 98% of the *Fortune* 500. Despite the relatively high penetration at large corporate clients, IDC projects that this market will grow at a double-digit pace during the next five years. We note, too, that financial sponsors are devoting capital to this sector; and a variety of HR technology companies have expanded into this sector. This has driven significant growth in the number of ATS providers.

**Exhibit 18**  
**Application Tracking System Industry**  
**Worldwide Spending and Growth Projections**



Source: IDC, Worldwide Talent Acquisition Technologies and Services Forecast, Doc #US43522918, August 2018

**Exhibit 19**  
**Application Tracking System Industry**  
**Summary of Private Equity and Venture Capital Investments**

<u>Company</u>	<u>Lead Investors</u>	<u>Total Funding Amount (\$m)</u>
Jobvite	K1 Investment Management, Catalyst Investors, Trident Capital, ATA Ventures, CMEA Capital	\$256
Greenhouse Software	Riverwood Capital, Thrive Capital, Benchmark, Social Capital, Resolute Ventures	\$110
iCIMS	Vista Equity Partners, Susquehanna Growth Equity	\$93
Lever	Adams Street Partners, Scale Venture Partners, Matrix Partners	\$73
SmartRecruiters	Insight Partners, Rembrandt Venture Partners, Mayfield Fund	\$55
BreezyHR	Symphony Technology Group, Real Ventures	\$2

Sources: Company documents, Crunchbase, PitchBook

We believe that growth in this sector is being driven by four main factors. First, ATSs are improving their functionality. As we noted earlier, initial versions of ATS systems were known mainly as a résumé database tool. These tools often were complicated to use, particularly for people outside the HR department and for job candidates, because the initial ATS systems were developed to focus on the recruiter experience. This is changing. One of the best practices in hiring is for collaboration across business units and HR, so best-in-class ATSs increasingly include collaboration tools and are more intuitive to use. Modern systems also make it easier for candidates to apply to an open position; studies from Careerbuilder suggest that 60% of job seekers quit while filling out online job applications. The sourcing of candidates comes today from an increasingly broad set of sources, so tools that easily distribute jobs to multiple sources (including social media) and ingest résumés and data from those sources are in demand. In a tight labor market, corporations are mindful of managing their relationships with candidates and their brand as an employer, so corporations are looking for tools that develop/manage career web pages, mobile applications, and candidate relationship management. This additional functionality is improving the value proposition and importance of ATSs, which is helping drive growth across the market. For example, we have heard positive comments about Jobvite's social recruiting tools, Greenhouse's candidate scorecards, Yello's career pages, and Bamboo's integration of ATS tools and benefits tracking tools.

Second, ATSs are starting to leverage automation, artificial intelligence, and machine learning. While ATSs have eliminated some of the manual tasks involved in hiring, there is still a lot of bespoke activity that bogs down the hiring process. ATSs are gradually making use of automation tools that reduce the time spent on thank you letters, feedback requests, calendar integration, and scheduling, among other tasks. ATSs also include a large set of data that could be used to match candidates with job opportunities. We believe that integration of ATSs and performance management systems is unfortunately still relatively limited, so most systems do not allow corporations to use prior job

performance data to predict the performance of job candidates. Still, ATSs are increasingly providing better search functionality and some analytical scoring mechanisms that prioritize candidates. The tools that track performance data at clients (i.e., success rate at filling jobs, average time to fill positions) also have improved.

Third, ATSs are being more integrated into other parts of the hiring process and other parts of the HR technology stack. Many aspects of the HCM technology stack are increasingly being integrated and bundled together because of the efficiency and improved functionality that comes from doing so. This is a core part of the growth strategy for core HR and benefits technology companies. While parts of the hiring process still operate separately from the rest of the HCM technology stack, it is becoming more important for these products to be integrated with other parts of the HR technology stack (i.e., onboarding) and the hiring process (background screening, video interviewing, assessments). We believe that technology companies that do this well will gain market share. ICIMS is well regarded for having a broad set of integrated partners, so this is perhaps part of its success. We note too that payroll vendors including Paychex (PAYX \$83.56; Market Perform) (2013 acquisition of myStaffingPro), Paycor (acquisition of Newton in December 2015), Paylocity (PCTY \$93.39; Outperform), Ceridian (CDAY \$47.61; Outperform) and ADP (ADP \$157.26; Market Perform) have all expanded into the ATS sector.

Fourth, SaaS technology, improved integration, and improved functionality are driving growth at smaller clients and in specific niches. ATSs historically were used mostly by large corporations, but the factors mentioned above have made it much easier for small and midsize clients to leverage these tools. Several of the new entrants to the ATS market over the last 5-10 years have seen significant success growing at smaller clients. While Taleo, Kenexa, and SuccessFactors collectively have almost 60% of the market share for larger employers (based on the Ongig study), we see a different and more fragmented list of competitors at smaller employers. Greenhouse, Jobvite, SmartRecruiters, ClearCompany, Lever, Breezy, and Bamboo are growing competitors in this part of the market. Some of these companies, such as SmartRecruiters and Zoho, provide free solutions with volume limits to help attract small employers. The payroll vendors are also driving nice attach rates in this segment.

**Exhibit 20**  
**Applicant Tracking System Industry**  
**Market Share for Largest Providers by Client Size (Number of Employees)**

	<u>&lt;1,000</u>	<u>500-999</u>	<u>100-499</u>	<u>25-99</u>	<u>&gt;25</u>
Taleo	38%	30%	28%	17%	8%
Kenexa	14%	10%	7%	3%	
iCIMS	9%	8%	10%	8%	4%
Workday	9%	10%	6%	4%	
SuccessFactors	6%	6%	6%	4%	
CareerBuilder	4%	2%			
Symphony Talent	3%	2%			
ADP	3%	6%	4%	5%	3%
Peoplefluent	2%	3%			
Other Oracle	2%	3%	2%		
Avature		2%			
Jobvite			3%	10%	5%
Silkroad			3%	3%	
Greenhouse				10%	17%
SmartRecruiters					6%
Lever					5%
BreezyHR					3%
Google Hire					3%
No Provider (In-House)	6%	6%	5%	7%	13%

Source: Ongig

## Assessment Tools Are Getting Incorporated Into Other Solutions

One of the critical steps in talent acquisition is effectively matching candidates with job opportunities. As we discuss throughout this report, we believe that matching technology and search tools focused on human capital are improving. One of the challenges in the human capital market, however, is that the capabilities, skills, and cultural fit for a job candidate are often not defined well by the information provided to employers. Assessment tests create an additional source of data that can solve part of the data challenge in this market.

Over the last half century, psychologists and consultants have created numerous types of assessments, including personality tests, pre-employment tests, intelligence tests, skills tests, leadership tests, and behavioral tests. The most basic type of talent assessment, personality tests, has been around for a long time. These tests were first developed in the late 1910s for use in the armed forces. Since then, many corporations have adopted the use of assessments for both pre-employment screening and post-employment performance reviews.

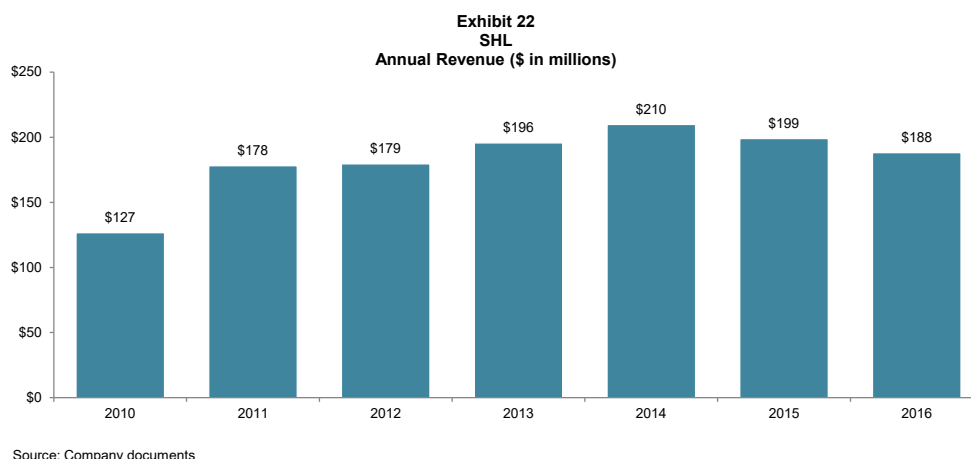
Assessment tests have proved quite helpful for some hiring decisions. For example, in a September 2012 article titled “Meet the New Boss: Big Data,” *The Wall Street Journal* highlighted the impact that talent assessment solutions had on Xerox’s (XRX \$33.32) call centers. Before it used assessments, Xerox relied heavily on its job candidates’ work history. But the company soon realized that personality was more often the key component to success, as people with creative tendencies performed much better than people with inquisitive tendencies. The company then switched to using personality assessments and situational profiling to conduct most of its call center hiring. As a result, the company’s attrition rate dropped by 20%. The article also highlighted a 200-employee waste-disposal firm that relied heavily on assessments in its hiring process. The company was mostly concerned about employees who were likely to get hurt and then drive up the cost of the workers’ compensation plan. Using personality assessments and scenario screening, the company pared its workers’ compensation claims by about 68%. Lastly, we note that the use of assessment tests for graduate hiring is more common in the United Kingdom than in the United States. Many employers in the United States rely heavily on the brand of educational institutions to narrow their search for recent college graduates. For example, many U.S. companies will select a handful of schools that they focus on for college recruitment. In a survey released in May 2012, SHL and the National Association of Colleges and Employers found that only 29% of HR professionals used some form of assessment in their organization’s college recruiting. U.K.-based employers tend to search more broadly for talent among college graduates. Assessment tools enable them to normalize for what a grade-point average at one school might mean compared with that at another school.

**Exhibit 21**  
**Talent Assessment Industry**  
**Percentage of Companies Using Various Assessment Types Throughout the Hiring Process**

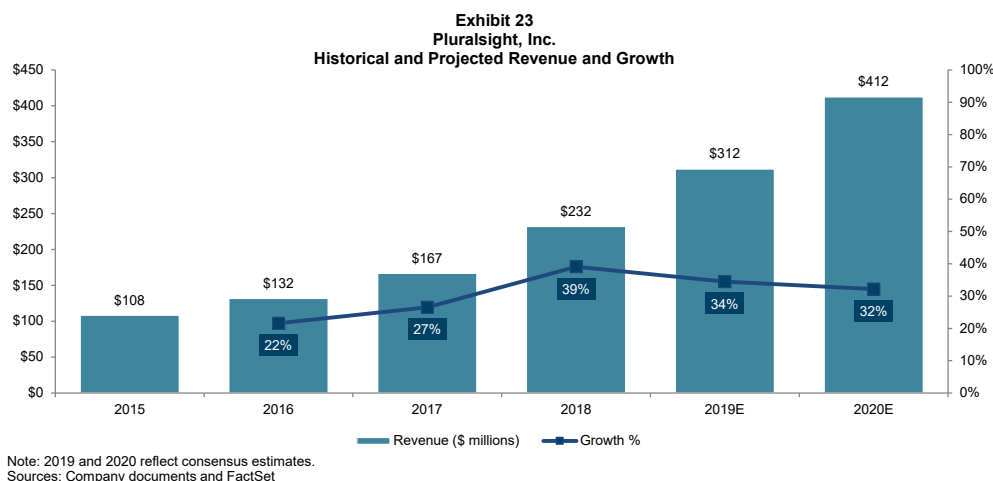
<b>Assessment Type</b>	<b>Step in Hiring Process</b>			
	<b>Candidate Filtering</b>	<b>Interview Selection</b>	<b>Interview Guidance</b>	<b>Final Hiring Decision</b>
Skills/Knowledge	29%	32%	13%	13%
Personality	17%	23%	27%	20%
Cultural Fit	14%	25%	24%	15%
Job Fit	20%	25%	23%	16%
Cognitive Ability/Critical Thinking	18%	23%	23%	17%
Situational Judgments	15%	14%	26%	15%
Job Simulations	9%	12%	17%	19%
Assessment Centers	9%	12%	13%	15%

Source: Aberdeen Group

While assessment tests have proved valuable for specific use-cases, assessment tests are not part of most hiring processes. Most assessment solutions are customized to each company and are fairly basic (mostly based on skills assessments and psychology), and assessment providers historically did not incorporate robust analytical solutions into their offerings. The assessment industry also is highly fragmented. SHL is a relatively large company focused on this market, but most other providers are small. Many of the leading assessment providers (i.e., Wonderlic, Hogan, Talent Genius) were founded by industrial psychologists who are more focused on the science behind their assessment than in developing robust analytical tools and technology that leverage the information and data created by these assessments.



We believe that this is gradually beginning to change. We highlight three trends from this sector. First, assessment tools are being married with training programs. Pluralsight is the best-known example of this trend. Its product leverages skills-based assessment tests to identify skills gaps within the technology sector and then provides relevant training to workers. PSI Services, which provides a variety of training and certification services, also has built up its assessment capabilities during the last few years, and Adecco's (ADEN-SWX CHF 55.56) General Assembly ties its training programs to assessment tests.





Second, companies are increasingly leveraging machine learning and AI to help automate the assessment process at scale. Privately held HireVue has incorporated assessment technology into its video interviewing platform. The company leverages machine learning technology to capture a large number of data points from video interviews. Customers such as Unilever and Hilton have leveraged HireVue's AI technology to filter as much as 80% of the candidate pool using data points such as facial expressions, body language, and keywords. HireVue also acquired MindX in May 2018 to expand the game-based assessments on its platform, and the company launched a set of prebuilt assessment tests in October 2018 that are designed to measure cognitive abilities and job-related competencies for particular job types (i.e., call center, sales representative). HireVue disclosed in May 2018 that sales for its assessment products were growing 140% year-over-year.

Although there have been successful use cases of AI in the recruiting process, we believe these technologies still require maturing, and have the potential to introduce their own sets of biases into the candidate selection process. Amazon (AMZN \$1,822.68; Outperform) made headlines last fall, when Reuters reported that the company had built its own AI recruiting tool that leveraged its massive database of employees to help automate the recruiting process. The problem, however, was that the AI was trained to identify patterns in historical resumes that had been submitted over the prior decade, and given that such a large percentage of the company's workforce was (and remains) male, the AI had gender bias, and Amazon has reportedly shut down the effort.

Third, executive search companies are investing in their own assessment tools. Executive search firms are increasingly embracing the use of assessment tests and data. Korn Ferry (KFY \$44.76; Outperform) now generates roughly half of its revenue from leadership consulting and assessment solutions, with about \$100 million coming from assessment products. In addition to directly generating revenue, these capabilities helped Korn Ferry differentiate itself in the executive search sector. Other leading executive search companies also have launched their own assessment tools. For example, Russell Reynolds launched an executive assessment tool (which was developed with the help of Hogan Assessments) in October 2017 called Leadership Span, and Heidrick & Struggles (HSII \$34.44; Market Perform) launched its own tool in 2014 called Leadership Signature.

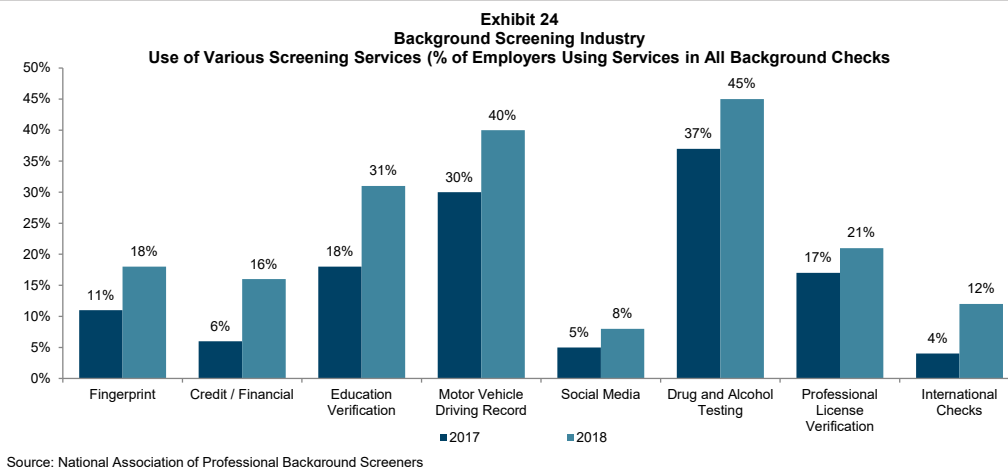
## Background Screening Is Changing Because of Consolidation, New Information Sources, and Automation

Employment background screening is an important step in the hiring process. These services confirm that potential employees have accomplished what they claim, which helps prevent bad hiring decisions. This market includes background screens (e.g., criminal searches and employment/education verification), drug screens, and international screens (foreign education/employment verification). As we noted earlier, poor hiring decisions can be costly. Similar to some of the other factors described in this report, the background screening industry is changing. We highlight six changes.

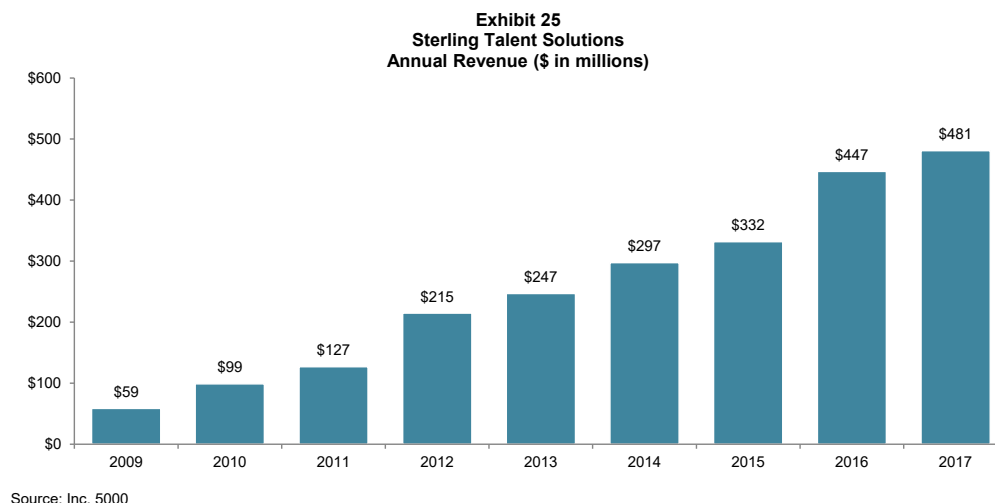
First, background screening is becoming more automated. Background screening historically included a lot of manual labor to reconcile different information sources, check references, and verify information. Background screening companies focused in the past on leveraging large offshore delivery centers so that these manual processes could be done as efficiently as possible. Today, the leading background screening companies are investing aggressively in robotic process automation. We believe that this investment is driving solid margin improvement for most background screening companies.

Second, the amount of information and the sources of information that could be considered in a background check are expanding. A basic criminal background check could be performed by looking at the FBI's criminal database, but corporations have turned to background screening companies in

the past because the FBI database (which is actually an aggregation of a few government databases) is not exhaustive and a full background check covers much more than just criminal history. The growth of social media and general proliferation of data that is publicly available have both increased and dispersed the potential sources of data that could be used for background screening (depending on various regulations). For example, according to SHRM, more than 35% of employers use social media or internet searches to disqualify candidates. As shown in exhibit 24, alternative sources of background information such as credit reports and motor vehicle driving records are becoming more widely used. Some of the leading background screening companies are also investing in leveraging the data that flows through their platform (which can be used in some cases for verifications).



Third, the industry is consolidating. HireRight, First Advantage, and Sterling have become the three dominant companies in this sector. We believe these three companies collectively generate \$1.5 billion of revenue and probably account for 35%-40% of the industry's revenue. Universal Background Screening also has grown a fair amount during the last few years (partly through acquisitions), and Checkr has gained attention for its role in supporting Uber and other gig economy companies. As technology investments in automation and data become increasingly important for this industry, we believe there is an advantage to scale. We thus believe that the leading companies in this sector will gain additional market share.



Fourth, growth of freelance employment models and the gig economy creates a higher amount of churn in employment and therefore an increased need for background screening services. The speed of background screening services historically is something of an impediment to some employment arrangements that require immediate answers, but background-screening companies are gradually reducing their amount of time needed to complete a background screen.

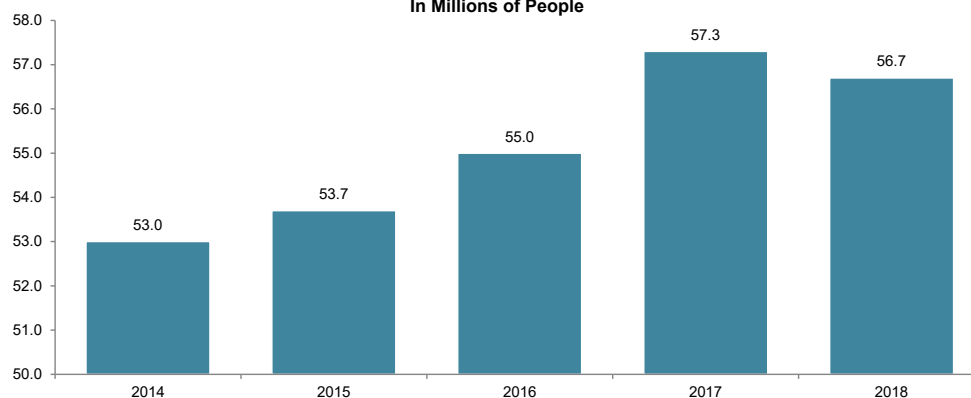
Fifth, background-screening companies are starting to grow post-employment criminal monitoring services and other forms of post-employment screening. Some of these services are provided on a subscription basis, so they provide some recurring revenue. The use of post-employment screening is low right now, but we believe this is a growth area for background-screening companies.

Sixth, regulations about how companies can leverage background checks continue to change and can vary from state to state. Some local governments have adopted “ban the box” regulations that limit or prohibit questions on hiring forms about criminal history, but this is not true in all states. The legalization of marijuana in certain cities also creates complications for the drug screening policies of corporations. Lastly, privacy-related concerns and regulations around the world continue to change. These complexities support the value proposition of background screening services for corporations, which struggle to stay up to speed on all of these regulations.

## Freelance Marketplaces Are Capitalizing on a Large and Growing Part of the Economy

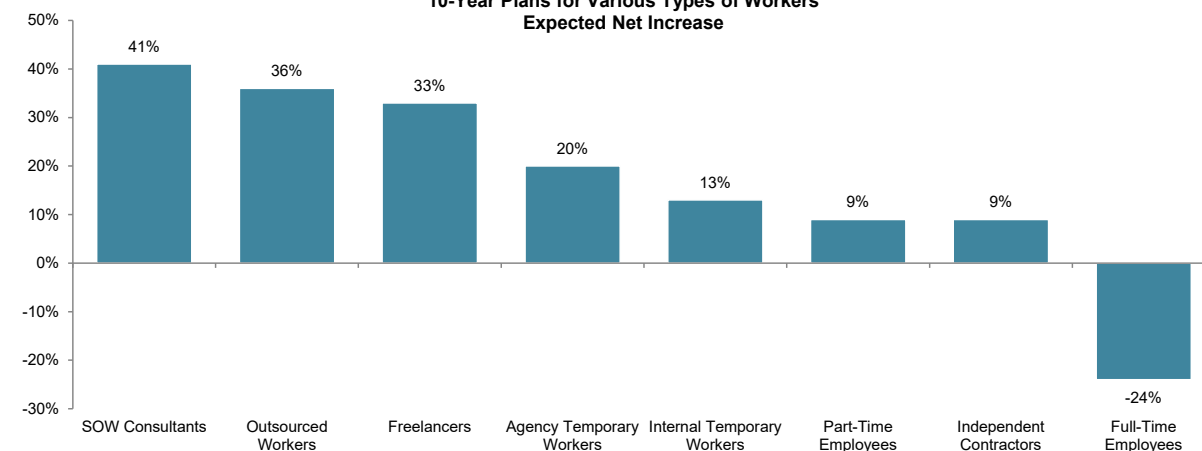
Freelance workers represent a large and growing part of the global economy. U.S. companies spend \$1.4 trillion annually on freelance workers. The Freelancer Union estimated that 36% of the U.S. workforce did some freelance work in 2018. We believe that the growth in freelance jobs is being driven by technology advancements, the preferences of job candidates, improved opportunities for freelance work, and increased comfort at corporations with freelance workers. Workers, particularly those from younger generations, value the flexibility and supplemental income provided by freelance work. Advancements in technology also are breaking projects into smaller pieces, creating ever more specialized skills in workers, and making it easier for freelance workers and employers to find each other. Lastly, significant growth of gig economy companies such as Uber and Lyft is driving increased opportunities for freelance work. We thus expect the use of freelance workers to continue to grow. Some projections estimate that more than half of the workforce will perform some freelance work by 2027.

**Exhibit 26**  
Number of American Workers Who Freelance  
In Millions of People



Source: Upwork

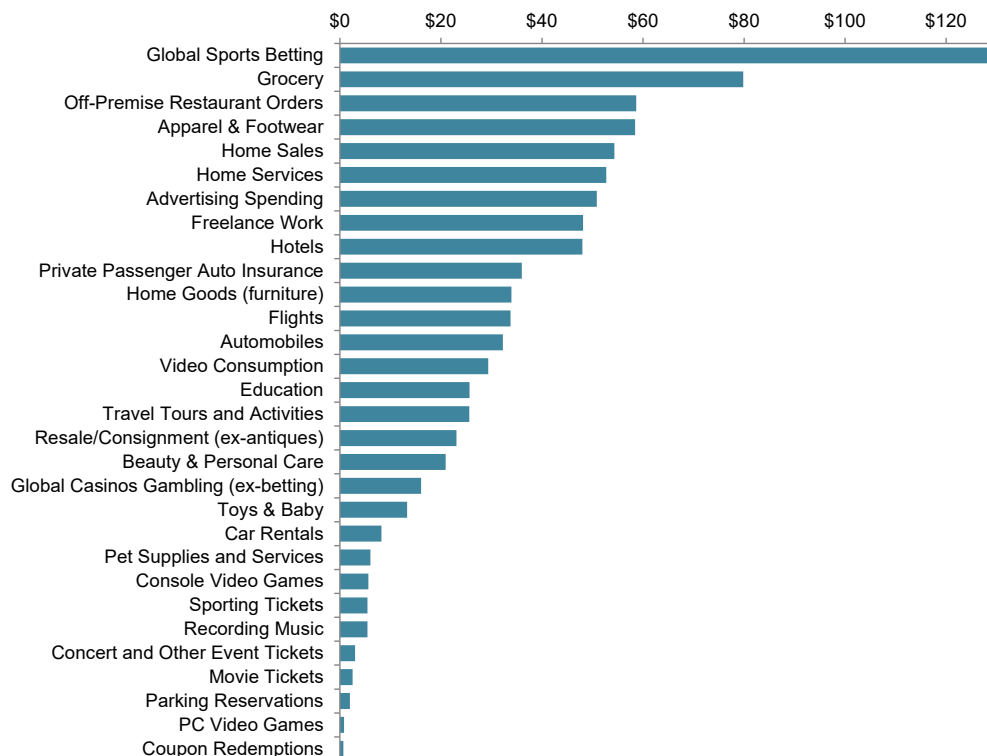
**Exhibit 27**  
**Workforce Solutions Buyers Survey**  
**10-Year Plans for Various Types of Workers**  
**Expected Net Increase**



Source: Staffing Industry Analysts

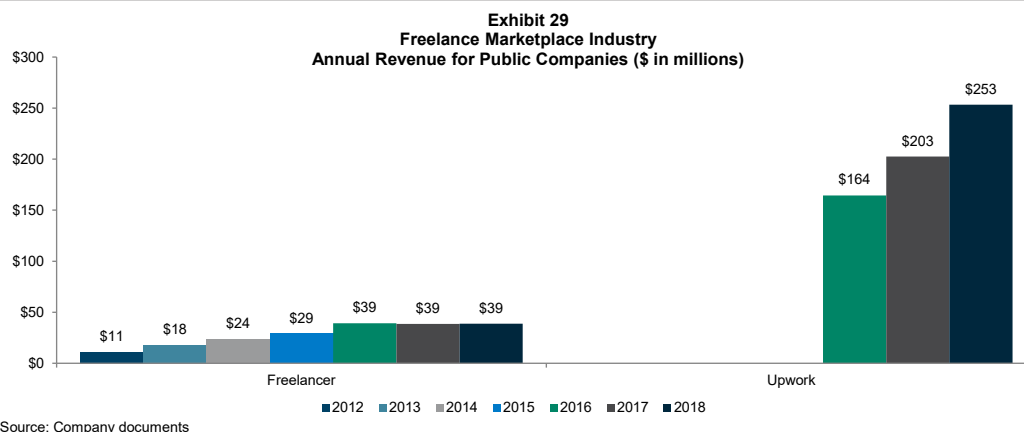
Like many other industries, the freelance industry is gradually transitioning to online marketplaces as a means of transacting. Freelance marketplaces make it easier for employers and freelance workers to find each other, which in turn should drive continued growth in both employers' and workers' comfort with freelance work.

**Exhibit 28**  
**Estimated Domestic Bookings Shifting Online by Category in Billions - 2017 to 2022E**



Source: William Blair

We believe that there are inherent scale advantages and network effects associated with operating a freelance marketplace, but we also note that these marketplaces have low penetration rates right now, so there could be several marketplace platforms that grow during the next 5-10 years. Upwork (UPWK \$16.51), Fiverr, and Freelancer (FLN-ASX A\$0.84) are some of the leading freelance marketplaces right now. There also are a variety of smaller sites such as TaskRabbit, Broxer, Hubstaff, and Gigster. Lastly, staffing companies have branched into this market, with Adecco launching a business called Yoss in France in early 2018 and Randstad acquiring twago in 2016.



Up to this point, the bulk of the growth in these freelance marketplaces has come from smaller employers, nondomestic workers, and workers with IT skills. Upwork has disclosed that freelance workers located in the United States accounted for 23% of its revenue in 2018 and 19% in 2017. In 2018, 16% of Upwork's revenue came from freelance workers in India and 10% from the Philippines, with the rest spread among about 180 countries. We note that 80%-85% of Upwork's revenue has historically come from companies with fewer than 100 employees.

**Exhibit 30**  
**Upwork, Inc.**  
**Fastest-Growing Skills for Freelancers**

	<b>4Q17</b>	<b>1Q18</b>	<b>2Q18</b>	<b>3Q18</b>	<b>4Q18</b>
1)	Bitcoin	Blockchain	Blockchain	Dropbox API	Hadoop
2)	Amazon DynamoDB	Tensorflow	Google Cloud Platform	Equity Research	Dropbox API
3)	React Native	Amazon DynamoDB	Volusion	Molecular Biology	Genetic Algorithms
4)	Robotics	Voice Over	Risk Management	iPhone UI Design	Microbiology
5)	Go Development	Subtitling	Product Photography	Salesforce Marketing Cloud	Computational Linguistics

Source: Company documents

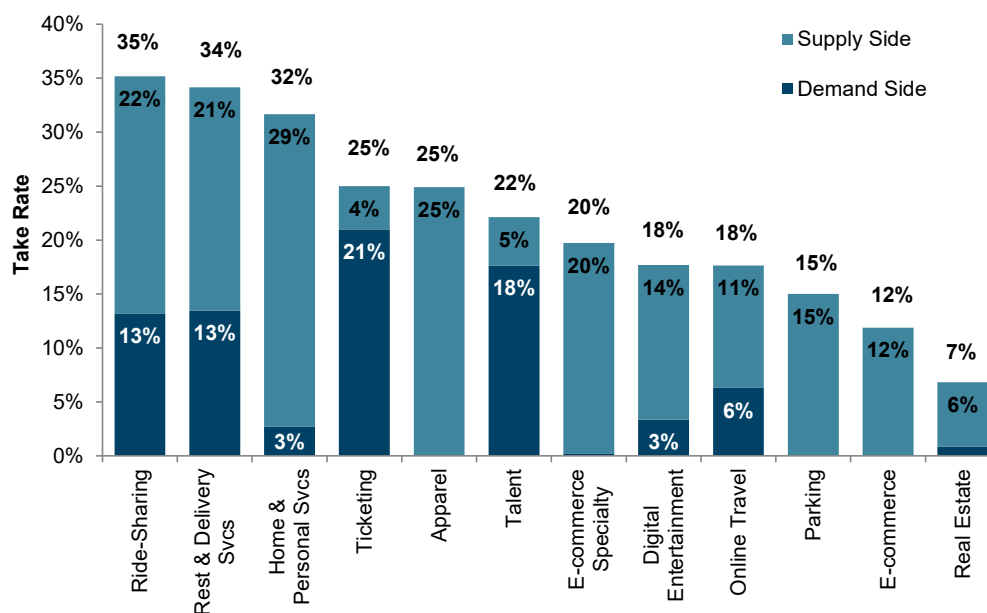
We believe that large corporations have been slow to adopt these services because of concerns about the compliance implications of using freelance workers. Clients of these marketplaces are responsible for properly classifying the freelancers as independent contractors or employees. Given the complexity and subjectivity of the labor laws involved in these classifications, as well as the Department of Labor's efforts to crack down on misclassifications, large employers are careful about how they use independent contracts. The global nature of the workforce on these platforms also introduces some compliance (know your supplier and anti-money-laundering rules) and IT security risks.

Freelance marketplaces have launched a variety of initiatives to try to address some of these concerns. Upwork and Freelancer have launched "enterprise" versions of their products, are adding better reporting tools for enterprises that want to monitor their spending, and are growing a salesforce

focused on enterprise customers. Some of these marketplaces are launching location services so that clients can track where the worker is performing the work, and Upwork introduced a domestic-only version of its marketplace last year for workers and clients. Upwork also provides a compliance program (for an additional fee) that takes responsibility/risk for properly classifying workers, and Upwork will partner with staffing firms to provide payroll services for clients that want to classify the worker as an employee. Lastly, Upwork will provide managed services, whereby it takes responsibility for finding the freelance workers. Managed services revenue totaled \$30 million in 2018, up from \$25 million in 2017 and 2016.

It is difficult to predict how quickly freelance marketplaces will penetrate larger enterprises, but we believe growth in the overall freelance market will be strong over the long term. Freelance workers represent a large part of the economy and likely will grow in importance over time. There are some challenges associated with purchasing these services through an online marketplace, particularly for larger clients concerned about compliance and IT security, but growth in freelance marketplaces will be significant if these marketplaces garner even a small percentage of the overall work performed through freelance arrangements. We also see room for take-rates to gradually move up over time. As shown in the exhibit 31, take-rates for talent marketplaces are currently lower than many other online marketplace models.

**Exhibit 31**  
**Online Marketplaces**  
**Average Take-Rate by Vertical**



Source: William Blair

## Recruitment Process Outsourcing Is Growing Quickly

The pace of hiring at corporations is inherently volatile, cyclical, and lumpy. Hiring practices at corporations also vary significantly based on the hiring manager, which can create challenges for corporations. At the same time, the volume of hiring at small companies does not allow for robust investments in best-in-class technology tools and experienced recruiters. A tightening labor market makes it challenging for recruiters to hire workers. HR departments are slower to change, but the dynamics mentioned above have driven corporations to outsource many other functions during the last few decades. The permanent-placement staffing industry is well developed and reflects the bespoke use of third parties to complete the hiring process. Permanent-placement services are conducted on a project-by-project basis though, so they do not provide the consistency that a broader outsourcing arrangement can provide.

One of the fastest-growing parts of the recruitment market is recruitment process outsourcing (RPO). A Staffing Industry Analysts survey in 2017 found that “improving recruitment efficiency,” “reducing costs,” “making hiring more scalable,” and “accommodating spikes in demand” were the most common reasons that clients selected an RPO. Market size estimates for RPO range between \$5 billion (Staffing Industry Analysts) and \$14 billion (IDC). We highlight five factors about this market.

First, the industry is highly fragmented. There are a few sources of third-party research that assess the strength and weaknesses of RPO providers, including Everest, NelsonHall, and IDC. While the evaluations for each company vary across the reports, most of the reports identify Cielo, Korn Ferry, Alexander Mann Solutions, TrueBlue’s (TBI \$23.34) PeopleScout, Manpower Group Solutions (MAN \$89.65; Market Perform), Randstad Sourceright, and Hudson Highland as some of the top providers.

**Exhibit 32**  
**Recruitment Process Outsourcing Industry**  
**HRO Today's Baker's Dozen Rankings for Customer Satisfaction From 2006 to 2018**  
**Companies With Multiple Appearances**

<b><u>Company</u></b>	<b><u>Number of Appearances</u></b>
Korn Ferry Futurestep	12
PeopleScout	12
Alexander Mann Solutions	11
Kenexa, an IBM Company	11
Cielo (fka Pinstripe/Ochre House)	11
Allegis Global Solutions	10
Randstad Sourceright	10
Hudson RPO	9
KellyOCG	8
Yoh	7
Adecco RPO	7
Sevenstep RPO	6
The RightThing	6
WilsonHCG	6
Pontoon	5
Advantage xPO	3
AgileOne	3
Manpower Business Solutions	3
Spherion Recruitment	3
Hyrian	2
Straightsource	2
Resource Solutions	2

Source: HRO Today

Exhibit 33 shows the annual revenue for five of the leading RPO companies. Those five companies generate aggregate revenue close to \$1 billion, which is small compared with the estimates for the size of the RPO market. We believe this reflects the fragmented nature of the industry. Similar to other outsourcing solutions, there are scale benefits to this business, so we expect that market share will consolidate over time.

**Exhibit 33**  
**Recruitment Process Outsourcing Industry**  
**Last Fiscal Year Revenue for Largest Companies (\$ in millions)**

	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Korn Ferry Futurestep	\$122	\$137	\$164	\$198	\$224	\$273
Revenue Growth %		12%	20%	21%	13%	22%
Alexander Mann Solutions		\$190	\$181	\$167	\$175	
Revenue Growth %			-5%	-8%	4%	
PeopleScout			\$105	\$181	\$190	\$249
Revenue Growth %				73%	5%	31%
Hudson Highland					\$60	\$67
Revenue Growth %						12%
Cielo	\$104			\$189	\$228	
Revenue Growth %					20%	

Sources: Company documents, U.K. Companies House, NelsonHall, and Inc.

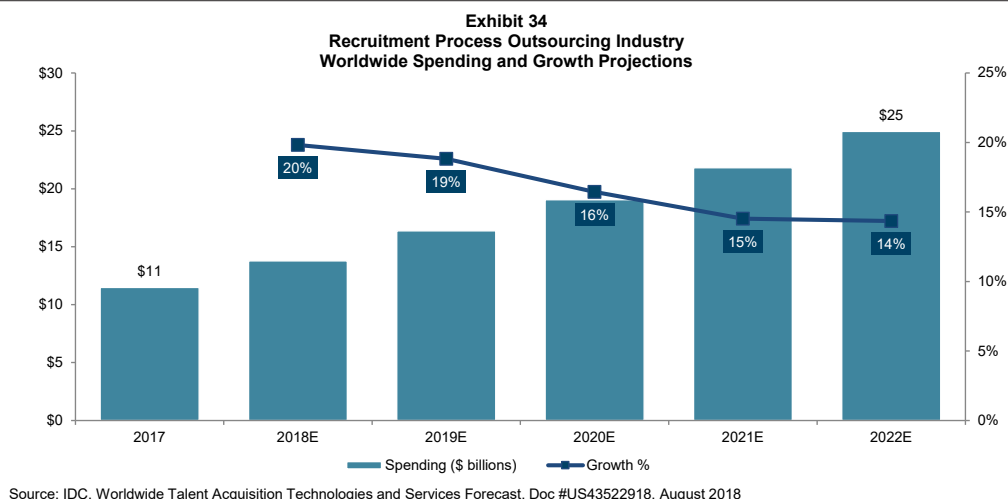
Second, client contracts are large. Everest Group estimates that in 2017, Korn Ferry's Futurestep business had 135 clients and managed 64,938 hires for those clients. This implies that Korn Ferry's RPO generated average revenue per customer of about \$1 million and hires per client of almost 500. A NelsonHall blog posting last year estimated that Cielo served 154 clients and handled 157,000 hires annually. Based on Cielo's 2017 revenue, this implies average revenue per client of \$1.5 million, hires per client of almost 1,000, and fees per hire of a little less than \$1,500. Manpower has had a long-running contract with the Australian Defense Force that reportedly is worth up to \$80 million annually and through which the company annually hires 6,000-10,000 people. Lastly, we note that TrueBlue's PeopleScout RPO business is facing a \$15 million headwind in 2019 from one client loss (the client insourced the hiring process after merging with another company) and the repricing of its contract at one client (part of a longer-term extension). We believe these data points demonstrate that each new client win is typically fairly large.

Third, while client contracts are large, most contracts are limited in scope at this point. A survey published by Staffing Industry Analysts in December 2017 found that only 40% of RPO contracts covered an entire enterprise and 60% of contracts only covered a single country. Many RPO engagements start with project-driven hiring (i.e., ramping up a new R&D facility or growing a salesforce in a new region), before they then evolve into a longer-term outsourcing arrangement. We thus believe that scope expansion at existing clients can remain a significant source of growth for RPO companies during the next 5-10 years.

Fourth, RPO solutions cover only a fraction of hiring decisions. According to the Department of Labor's Job Openings and Labor Force Turnover (JOLT) survey, there were 68.9 million hires in the United States in 2018. We believe that PeopleScout is the largest RPO provider based on the number of people hired, with about 300,000-350,000 hires (which implies fees per hire in the range of \$700-\$800). As we noted earlier, we believe Cielo handled about 157,000 hires globally in 2017 and Korn Ferry handled 65,000 globally. These three firms collectively hired 0.5 million people globally. If we assumed that 75% of those hires were in the United States, three of the top RPO firms collectively



represent only 0.6% of the hiring in the United States. We thus believe that there is a long runway for growth. Consistent with that, we note that NelsonHall projects a 12% CAGR for the industry and IDC projects 17% annual growth from 2017 to 2022.

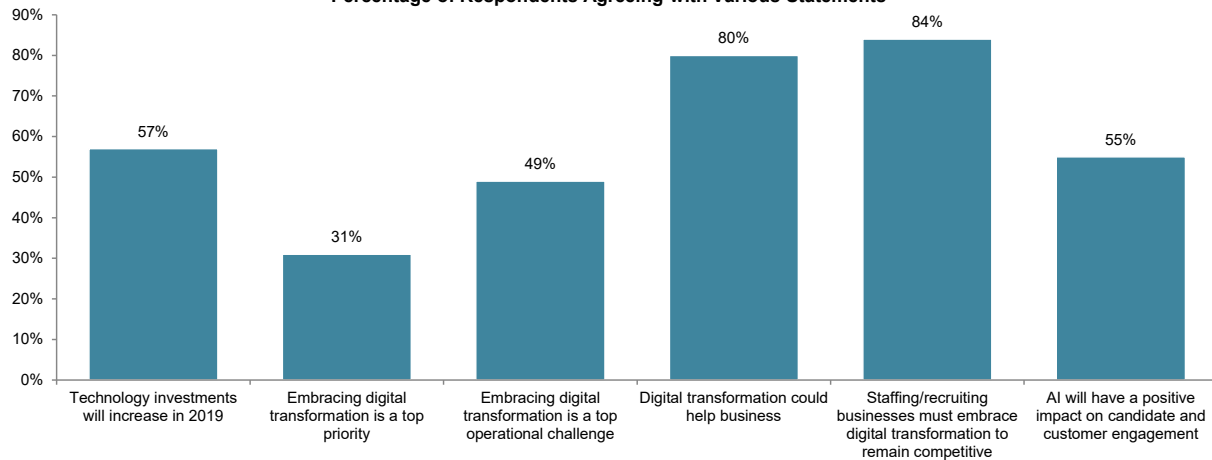


Fifth, while we believe that many RPO providers initially gained market share based on a service-intensive approach to outsourcing, RPO providers are increasingly competing based on the technology and assessment platforms that they use as part of their solutions. For example, TrueBlue's PeopleScout business launched its Affinix platform last year. TrueBlue's management has commented that "before Affinix, we posted a job and it could take up to five days to compile the first slate of candidates. With Affinix, we're using artificial intelligence and machine learning to crawl the web to source candidates and creating a slate of candidates within minutes. We're already seeing evidence of higher candidate conversion rates, reduced time to fill positions, and increased client satisfaction. ... We brought [one] client onto Affinix ... their application process used to take 30 minutes just in terms of the initial application. Today that takes 8 minutes. The time to fill on these particular positions has been cut by eight days. They had a dropout rate of 70%-75%. Today that dropout rate is down to less than 20%." Cielo also has touted the use of chatbots and mobile tools to more quickly and efficiently qualify job candidates. Korn Ferry is trying to differentiate in this market through the salary database that is part of its advisory business and the company's assessment tools. We believe that technology platforms (including both proprietary and third-party tools) at RPO providers will become an increasingly important part of the value proposition.

## Staffing Companies Are Embracing Digital Transformation

The staffing industry historically was a locally delivered, service-intensive solution. But we believe that this industry is increasingly leveraging technology to provide a better candidate and client experience, more quickly and accurately match candidates with opportunities, and drive efficiency in internal operations. A recent survey by Bullhorn, which provides ATSs and analytics to staffing companies, said that nearly 85% of global recruitment firms "feel the need to embrace digital transformation." According to that same survey, 31% of respondents ranked digital transformation as a top priority.

**Exhibit 35**  
**Bullhorn Global Recruitment Insights & Data Survey**  
**Percentage of Respondents Agreeing with Various Statements**



Source: Bullhorn

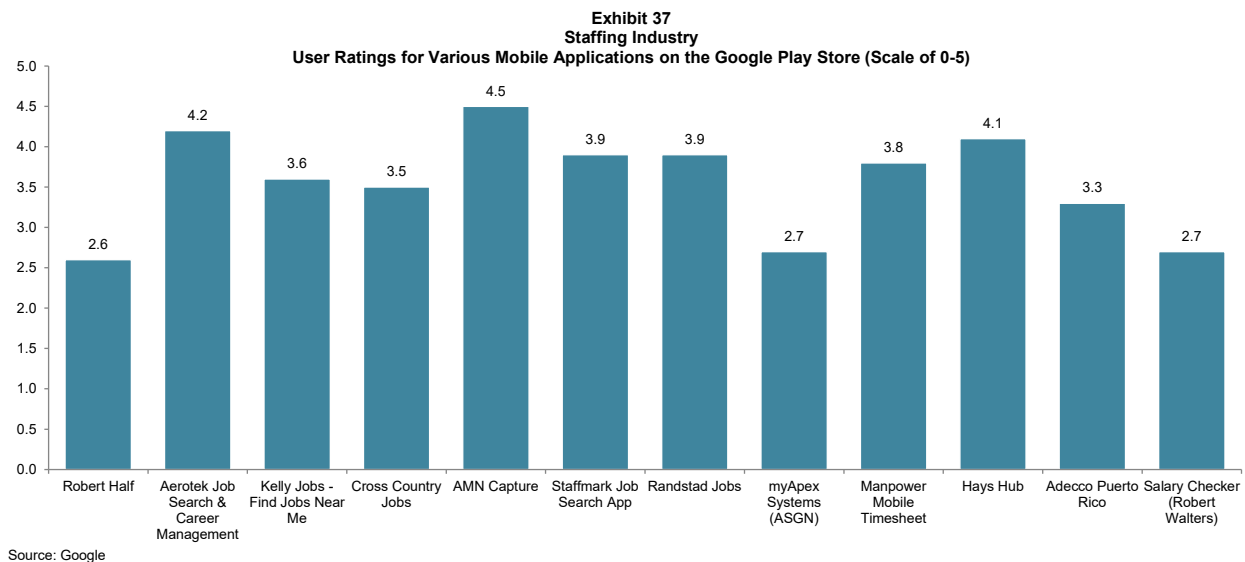
As shown in exhibit 36, digital transformation has become a big focus of discussion on recent earnings calls. Investor days at Adecco and Randstad last year focused heavily on how they are leveraging technology to change their business. While nearly every staffing company that we meet with is focused on “digitizing” its business, each company is doing so in a slightly different way. As we discussed earlier in this report, sourcing talent is one way that staffing companies are changing their business. We identify seven additional areas in this section where we see staffing companies digitizing their business.

**Exhibit 36**  
**Staffing Industry**  
**Commentary From Earnings Calls Regarding Technology Investments**

<b>Manpower</b>	<b>Robert Half</b>	<b>AMN Healthcare</b>	<b>Kforce</b>
We are accelerating the implementation of world-class front-office systems and cloud-based and mobile applications. We are leveraging AI-powered chatbots for candidate and associate interactions and digitizing our workforce solutions offerings to achieve a better user experience and lower transaction costs.	Skill shortages are global, and we are confident we can be a valuable resource to companies as they navigate this tight market. It is one of the reasons we have invested heavily in developing our proprietary matching technology and laying the foundation for a world-class client and candidate experience online.	Technology is more important than ever in the way we deliver our services. We think early in developing more recruiting capabilities, digital recruiting capabilities, and we are also investing in technology to drive more efficiency into the business as well.	We have also continued to invest in tools that should further strengthen our capabilities and generate additional productivity from our associates. These investments included continued enhancements to our CRM and our business intelligence platform. A key technology initiative in 2019 will be the initial rollout of our talent relationship management system, which we expect to go live late in the year.
Our innovation initiatives also involve leading technology. Examples include our Global Assessment Center of Excellence, our IntelliReach workforce analytics platform, and our successful MyPath program upskilling associates to meet client demands for today and tomorrow.	We use it in recruiting, for candidate discovery. We use it when we fill jobs with matching engines. We use it in marketing where we micro target candidates and clients, where we individualize the message by candidate and by client. We use it in sales where we prioritize for our field staff the leads using our scoring engines. Remember that our algorithms are driven by proprietary data, which is based on post-placement performance.	Digital engagements, mobile, obviously everything is moving to phone, you want to be able to engage with your clients and your candidates whenever and wherever it is convenient for them. And then data and analytics, we have a lot of very important rich data. We want to be able to not only use internally but share back to our clients as well.	We believe that technology will facilitate enhanced productivity and improved customer service in the sophisticated and complex world of professional and technical staffing.

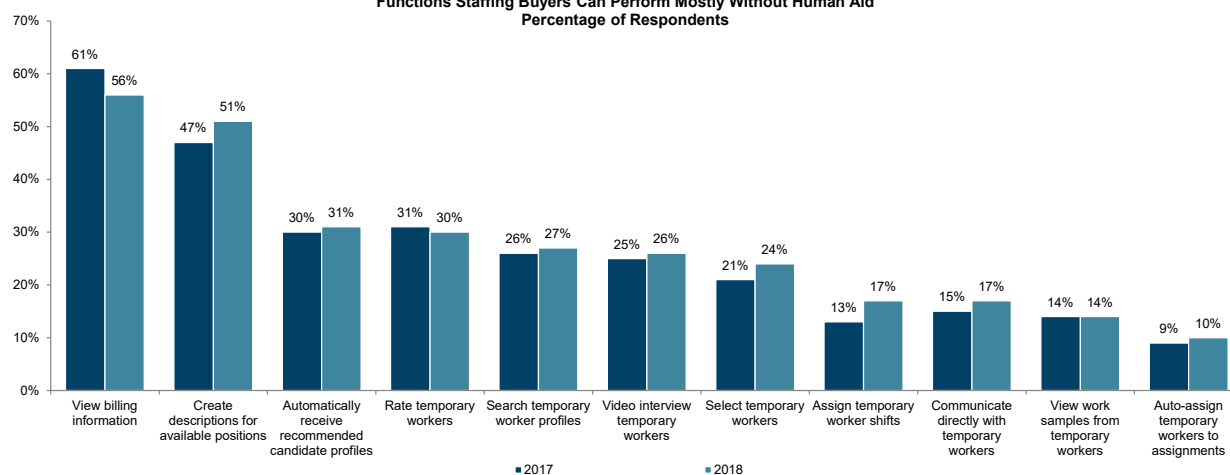
Source: Company documents

First, staffing companies are investing in their mobile applications for job candidates and workers. Both the quality and capabilities of these applications vary quite a bit, but many of them allow job candidates and workers to enter time sheet and expense information, enter/update credentials, receive notices about job opportunities, and receive reminders about jobs. Chatbots are increasingly being used as part of the hiring process to collect information from candidates. Some staffing companies also are providing self-selection tools for candidates. For example, if a candidate's credentials and information have already been verified, job candidates can accept new job opportunities through the application. We have seen these applications mostly in blue-collar employment and to a lesser degree in per diem healthcare staffing. The positive aspect of these tools is that they help maintain engagement with job candidates as they complete a job. Self-selection by job candidates also obviously boosts the productivity of internal recruiters at staffing agencies, and some staffing companies have noted to us that workers who choose their own shift/job are more likely to show up for the job. We are a little cautious about how many of these applications job candidates will maintain on their phone over the long term, but these applications are a new way that staffing companies are engaging with candidates.



Second, staffing companies are providing self-selection tools for corporations. For example, Robert Half (RHI \$55.65; Market Perform) now makes its candidate database available for employers to search through. Robert Half hides some of the candidates' information so that clients cannot go around it to hire the workers, but it provides enough information for employers to self-select workers that they view as a good fit for a specific role. Adecco also launched a self-scheduling tool for clients in mid-2018, and Randstad launched a tool called Youplan, which provides employers access to pre-vetted workers and text notification to those workers when there is an opportunity, such that the entire process is automated. While there is no guarantee that the identified job candidates are interested in the job, this approach gives staffing companies a targeted list of job candidates to start with and provides staffing companies with a better view of the type of candidate that the client is interested in.

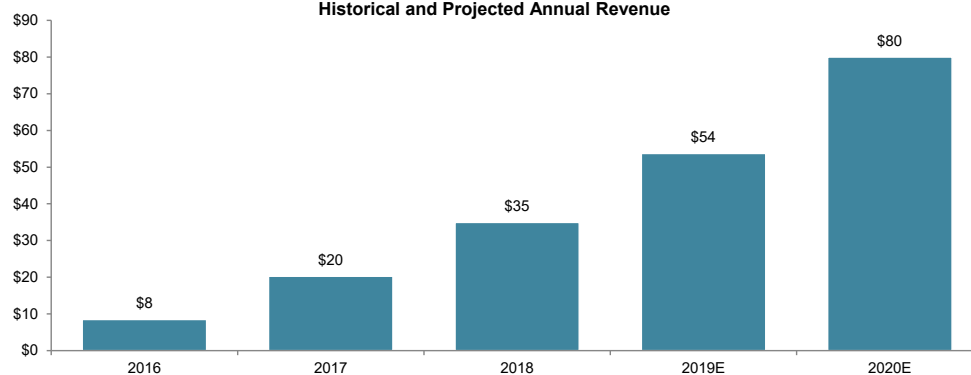
**Exhibit 38**  
**SIA North America Staffing Company Survey**  
**Functions Staffing Buyers Can Perform Mostly Without Human Aid**  
**Percentage of Respondents**



Source: Staffing Industry Analysts

Third, staffing companies and new entrants are starting to provide fully online staffing business models that bring together some of the previously mentioned self-selection and self-scheduling capabilities. These solutions have mostly focused at this point on roles where there is a high frequency of labor force turnover, limited or easily identifiable technical skills, and shift-based schedules. For example, Adecco launched its Adia business in France to focus on hospitality, events, retail, and logistics. We believe that AMN Healthcare (AMN \$50.68; Outperform) is starting to use an online staffing model in parts of its per diem staffing business. New entrants such as ShiftPixy, Shiftgig, and Nomad Healthcare also provide online staffing solutions. We believe that it will take a while before these models are adopted within some verticals and skill specialties, but the use of these models is growing.

**Exhibit 39**  
**ShiftPixy, Inc.**  
**Historical and Projected Annual Revenue**



Note: Fiscal year ends August 31. 2019 and 2020 revenue figures reflect consensus estimates.  
 Sources: Company documents and FactSet

Fourth, staffing companies are embracing analytical tools that help prioritize which candidates are good fits for each job. These analytics are sometimes informed by historical performance review data for each job candidate and employer satisfaction surveys. Robert Half has implemented this capability. Adecco also launched a “Hiring Bot” in second quarter 2018. We believe that these capabilities can be powerful since staffing companies may have unique data about job candidates,

but many staffing companies struggle with the fact that performance data is often unstructured. Some staffing companies also lack the internal technology skills to implement these solutions, and recruiters are sometimes resistant to use these tools.

Fifth, staffing companies are using robotics process automation and other technology tools to automate administrative tasks. Exhibit 40 shows the results of a Staffing Industry Analysts survey of people who worked in a staffing agency. The focus of the survey was on which administrative tasks could be automated. The most common answers were credentialing/uploading background checks, formatting résumés for each client, writing job postings, timesheet entry, helping candidates select benefits, and setting up direct deposit for candidates. The automation of these tasks can reduce costs and improve the efficiency of internal recruiters. Adecco noted at its 2018 investor day that it had reduced the time to onboard workers in the United States to 3 minutes from 30 minutes, with 95% of the tasks now automated.

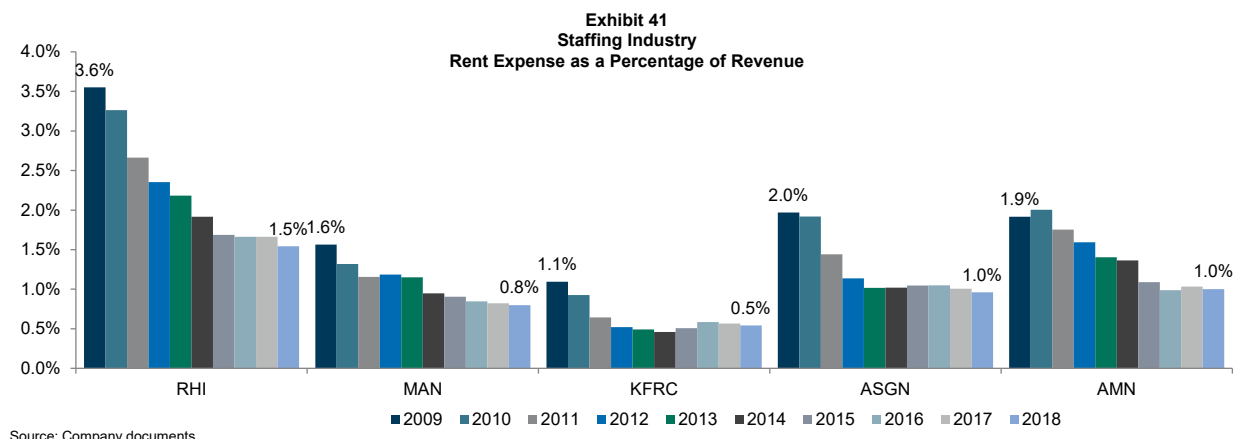
**Exhibit 40**  
**SIA North America Internal Staff Survey**  
**Summary of Administrative Tasks That Could Be Automated or Outsourced**

<b><u>Category</u></b>	<b><u>Example Responses</u></b>
Sourcing/screening recruiting prospects	<ul style="list-style-type: none"> <li>▪ Sort good resumes and weed out bad resumes</li> <li>▪ Update call lists</li> </ul>
Editing/reformatting resumes	<ul style="list-style-type: none"> <li>▪ Auto-populate profiles</li> <li>▪ Outsource/standardize formatting</li> </ul>
Credentialing/references/background checks	<ul style="list-style-type: none"> <li>▪ Move credentialing forms online</li> <li>▪ Auto-upload reports into compliance programs</li> </ul>
Financial reporting/invoicing/expenses	<ul style="list-style-type: none"> <li>▪ Sync corporate expense cards with Concur</li> </ul>
Marketing/social media	<ul style="list-style-type: none"> <li>▪ Automate email marketing process</li> </ul>
Candidate care/job notifications/interview scheduling	<ul style="list-style-type: none"> <li>▪ Send reminder texts to candidates for interviews</li> <li>▪ Create an app for temporary workers</li> </ul>
Job posting/writing job descriptions	<ul style="list-style-type: none"> <li>▪ Write job descriptions and requirements</li> </ul>
Onboarding	<ul style="list-style-type: none"> <li>▪ Move onboarding paperwork online</li> <li>▪ Connect onboarding systems electronically</li> </ul>
Organizing target lists of sales prospects	<ul style="list-style-type: none"> <li>▪ Build sales call lists</li> </ul>
Payroll/timesheets	<ul style="list-style-type: none"> <li>▪ Automate timesheet entry</li> <li>▪ Move payroll processing online</li> </ul>
System integration/data processing	<ul style="list-style-type: none"> <li>▪ Integrate emails and spreadsheets into CRM systems</li> <li>▪ Integrate internal systems with client's systems</li> </ul>
General administrative	<ul style="list-style-type: none"> <li>▪ Automate tedious administrative tasks</li> <li>▪ Take notes and handle mail</li> </ul>

Source: Staffing Industry Analysts

Sixth, while the local nature of staffing once meant that staffing companies needed to have a large number of offices to compete, this is no longer the case. Staffing companies therefore are gradually reducing their number of offices. Most large staffing companies maintain a large office footprint

because there is still some value to a local market presence. The number of office locations for most staffing companies is not growing much, however, and rent expense as a percentage of revenue is declining (see exhibit 41).



Seventh, many staffing companies are investing in modernizing their CRM and back-office systems. The internal systems at many staffing firms are dated and do not effectively capture and leverage information about customers and job candidates. We thus have seen a broad increase in staffing companies that are adopting salesforce.com (CRM \$153.15; Outperform) and replacing other legacy systems.

## VMS/MSP Programs Continue to Grow

Vendor management systems (VMSs) and managed service providers (MSPs) have grown significantly during the last 10-15 years. Today, we believe that a majority of large companies have a VMS and/or MSP program in place to manage their contingent labor. Adoption of these solutions has been driven by compliance pressure (i.e., vendor security audits), cost savings from suppliers, and improved insights into the effectiveness and cost of external staffing providers. According to Staffing Industry Analysts, VMSs handled \$138 billion of spending under management and MSPs handled \$117 billion of spending under management in 2016. Allegis, Kelly (KELYA \$24.25), Adecco Pontoon, Randstad Sourceright, Manpower Group Solutions, AMN Healthcare, and Workforce Logiq (formerly called Zerochaos) are the biggest providers of MSP programs, but the market is highly fragmented. For VMS solutions, the two largest companies are SAP (SAP-ETR €123.24; Market Perform) Fieldglass and Beeline, with probably close to 70%-75% aggregate market share. PRO Unlimited, Peoplefluent, DCR, and Agile-1 also are noteworthy competitors in the VMS sector.

The most recent market size data that we could find showed that VMS and MSP solutions were growing at a low-double-digit pace in 2016. We believe that these solutions will continue to grow at a strong pace during the next 5-10 years. We cite four main reasons for this outlook. First, we believe that these tools will be used to manage an increasingly broader set of labor. According to Staffing Industry Analysts, roughly 30% of the spending under management in VMS and MSP programs comes from the technology staffing sector, which is disproportionate to the size of IT staffing sector. While some aspects of IT staffing lend themselves to these programs, we believe that VMS and MSP programs will be used in the future for most types of temporary staffing. We note, too, that VMS software providers are starting to add capabilities to manage SoW projects, freelance workers, and

permanent hiring through their software. For example, SAP Fieldglass launched its Digital Network product in early 2018 to address SoW and freelance workers. Some VMS programs also are adding capabilities to manage the self-sourcing of freelance workers at corporations.

Second, VMS and MSP providers are making their solutions easier to use at middle-market companies. According to SIA, two-thirds of the clients for MSP programs spend more than \$50 million annually on contingent labor and 75% of the clients have more than 10,000 employees. VMS solutions are unlikely to be used by small employers, but we believe the average customer size will trend down as these tools become easier to implement and use (including enhanced mobile tools).

Third, the use of these solutions should continue to grow outside the United States. The use of VMS and MSP programs originated in the United States. While VMS and MSP providers have expanded their global operations over time, roughly 50% of the spending under management for these programs is still in the United States. We expect these programs to grow internationally over time.

Fourth, the product functionality of VMS programs is improving. Early versions of VMS products mostly provided supplier scorecards, rate cards for vendors, and preferred supplier lists. These tools were effective in helping clients manage their spending with staffing companies, which was the initial focus of these programs. VMS software providers are now going beyond that initial functionality. The use of APIs to integrate into other parts of the talent acquisition process and the broader HCM technology stack is improving. VMSs also are introducing more sophisticated executive dashboards, benchmarking, and analytics. For example, Beeline's Automated Talent Ontology Machine (ATOM) uses machine learning to predict the supply of talent on a geographic basis. While it is nascent today (partly because of some limitations on the use of client data), some of the VMS tools (as well as tools from third parties) are starting to incorporate broader industry data (not just the client's own data) to drive their analytics. For example, Brightfield Strategies aggregates contingent labor spending from corporations and uses that larger data set to drive a variety of analytical and benchmarking solutions.

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