The Big Data Resume

Hiring Analytics in the Age of Hyperconnectivity

Chris White
April 3rd, 2015
INTRODUCTION

When surveyed on the challenges they are likely to face, C-level and senior executives agree that managing human capital is a critical concern. Based on a 2013 Economist Intelligence Unit study, people management was noted by 50% of surveyed C-level and senior executives as a top challenge today.\(^1\) Furthermore, while talent analytics and the use of Big Data are an increasingly hot topic, only 4% of HR departments are using any form of predictive analytics\(^2\). The continued growth and development the talent analytics industry will have a dramatic and lasting impact on how firms search for, recruit, and develop talent in the near term. Understanding the benefits of talent analytics, and the limitations and risks that come with it, is critical for future managers.

INDUSTRY DYNAMICS / VALUE CHAIN

At the most basic level, the process of hiring involves filtering and assessing candidates for a given role or function. At the same time, candidates themselves must filter and assess available roles to determine where they will best fit and gain the most for their skills. The traditional hiring process is a two-sided negotiation in which both the hiring institution and the hired party are seeking to put their best foot forward while simultaneously controlling the information which they present.

---


Often present in the value chain are information brokers, which assist both career seekers and hiring companies in collecting and disseminating information. Brokers can be either one-sided or two-sided in nature. One-sided brokers focus on providing information to a specific player (examples being companies providing background checks for employers, or providing interview guides or insider tips for career seekers). Two-sided brokers seek to facilitate information exchange between both sides of the market, often by aggregating job postings for career seekers or aggregating talent for companies. Historically, this role has been filled by headhunters or formats such as the classified pages; today the most recognizable player in this space is LinkedIn.

HOW HYPERCONNECTIVITY IS DRIVING TALENT ANALYTICS

Hyperconnectivity promises to accelerate the importance of talent analytics in three major ways. First, hyperconnectivity will allow for access to new forms of data and analysis which employers can use in assessing candidates. Through these new forms of analysis, hyperconnectivity will allow for a greater use of data as a management tool. As talent analytics grows and develops as a field, worker mobility is likely to increase as the market for human capital becomes more efficient.

IMPACT #1: ACCESS TO NEW DATA AND ANALYSIS

Hyperconnectivity has begun to transform talent analytics by affording access to new forms of data and analysis. Efforts to use quantitative tests to measure the potential of candidates have existed since the advent of IQ tests in the early 20th century. One of the first applications of such tests was by the U.S. Army to evaluate recruits and determine their likely effectiveness. Quantitative testing methods are used to reduce the subjective bias inherent in the hiring process and to provide predictive insight into how well a candidate will perform the desired job. Despite the potential, there are significant challenges to properly employing tests.
The first persistent challenge with testing is ensuring that the testing methodology is both rigorous and predictive. The still-popular Myers-Briggs test was designed during World War 2 to simplify the process of connecting women entering the workforce with a profession that was suitable to them. The test remains popular to this day with nearly 2 million individuals taking it in a given year, yet there is little scientific proof that Myers-Briggs accurately measures personality (nearly 50% of those who re-take the test end up with a different result) or that it is predictive of success (although many companies employ the test, few tie personality types to performance).

A secondary challenge is developing tests that cannot be “gamed”. In fields where testing is an important factor in hiring decisions, test preparation industries emerge to help candidates prepare. The test preparation industry for college entry exams in the U.S. is estimated at $9B per year. The emergence of test preparation industries poses a constant challenge for test administrators; as candidates get better at practicing for a test, the predictive value of the test itself can be diminished. An example of these pattern can be seen with the development of the NFL combine, an annual testing process for those hoping to become professional football players. The combine was originally developed in 1982 as a means of providing coaches and scouts with an objective test of a prospect’s athletic ability. Since that time, a cottage industry of athletic trainers has emerged to prep NFL hopefuls specifically for the combine events, with the cost of such training running as high as $25,000 per player.

---

3 http://www.theguardian.com/science/brain-flapping/2013/mar/19/myers-briggs-test-unscientific
5 https://www.linkedin.com/pulse/20130929143117-38251380-personality-tests-modern-day-phrenology
6 http://www.ibisworld.com/industry/default.aspx?indid=1544
7 http://pqasb.pqarchiver.com/chicagotribune/doc/282858646.html
While combine performance has some predictive power, it is far less predictive than collegiate performance, as a 2011 University of Georgia study demonstrates.\(^9\)

NFL teams have the benefit of being able to rely on collegiate game tape, in addition to the combine, to provide insight into a player’s potential. A potential area where hyperconnectivity could change the way talent analytics occurs today is by unlocking the “game tape” for the average job seeker, providing employers with a greater level of insight into how candidates perform the long-term rather than during the course of a 2-hour interview. Gild, a hiring platform for software engineers, already utilizes such an approach. Rather than directly interview candidates, the platform searches the web for examples of open-source code written by individuals, phrases and keywords used in their LinkedIn profiles, and their answers to coding questions on sites such as LinkedIn.\(^10\) The company is able to provide an assessment of a candidate’s experience level that incorporates their everyday performance, their “game tape”.

At the moment Gild is a unique player. The software development industry is one of the most open and transparent fields in the world, with public repositories such as github, public forums such Stack Overflow, daily workflow that is already digitized, and a culture that encourages sharing. At the moment, Gild’s algorithm-based approach would be much more difficult to implement in other fields, ranging from corporate law to automobile manufacturing. However, the barriers to algorithmic approaches in assessing candidates are likely to decline thanks to the second major trend, the increasing use of data as a management tool.

**IMPACT #2: DATA AS A MANAGEMENT TOOL**


With big data and hyperconnectivity unlocking a greater variety of data, managers are now able to rely on quantitative measurements in assessing worker efficiency and performance. Use of data in management is not a new phenomenon. Corporations since the 1950s have used aptitude and personality tests to assess candidates and workers. What differentiates the latest wave of data usage is a move away from testing and metrics and toward analytics, which are, “superior because they analyze past and current data and reveal patterns and trends.”

Big data-based hiring only works when companies are able to accurately measure employee performance. In simple terms, companies need to define what constitutes a “good” employee before they can search for them. As the Korn Ferry Institute suggests, “Many companies...are attempting to use predictive analytics without having the depth and breadth of data that comes with effective assessments.” Defining what constitutes a “good” employee has been a management challenge for decades, especially in fields where performance is not easily quantified. The struggles of the U.S. educational system to untangle teacher performance has been one of the driving factors in the increase in standardized testing over the past decade. The potential for hyperconnectivity is to allow for performance measurement that is less intrusive but more valuable than traditional methods such as performance reviews.

IMPACT #3: LOWER BARRIERS TO WORKFORCE MOBILITY

Compared to prior generations, today’s young workers are increasingly eager to move from job to job. In 1980, 51% of employed adults aged 35 to 64 had been in their current career for over 10 years.
By 2005, that figure declined to 39%.\textsuperscript{15} The expectation of switching careers is especially pronounced among young workers; 91% of those born after 1997 expect to stay in a job for less than 3 years (the current median job length in the US is 4.4 years).\textsuperscript{16}

While job hopping declined significantly during the recession, it has crept higher in the following years (from 22.6% first-year turnover in 2011 to 24.1% in 2012). There is a still a gap between pre and post-recession mobility since 2008 (the median tenure for workers 25-34 increased to 3.2 years in 2012 versus 2.7 years in 2008).\textsuperscript{17} However, the pattern is likely to reverse as the economy improves since job switching can unlock significant value for career seekers. Moving from career to career is an important tool for improving compensation and accelerating career advancement.\textsuperscript{18}

As young workers turn to job switching in order to improve their career prospects, they will benefit from the influence of hyperconnectivity. Today, young workers benefit increased access to information regarding job postings and employers. Monster.com and similar sites have increased the scale of career seekers that a given job posting is able to reach. Sites such as LinkedIn have enabled job seekers to learn more about potential employers, while Glassdoor provides reviews and details of the interview process at thousands of different potential employers (Glassdoor has an Alexa rank of 196 as of December 2014)\textsuperscript{19}. Even non-job oriented sites such as Quora enable users to ask detailed questions about the day-to-day experience of individuals working for a given company (176 thousand users on Quora follow the subject ‘jobs and careers’)\textsuperscript{20}. With greater access to information about potential

\textsuperscript{15}http://www.fastcompany.com/1802731/four-year-career  
\textsuperscript{17}http://www.wsj.com/articles/lower-job-churn-hurts-young-workers-1405295773  
\textsuperscript{19}Alexa.com  
\textsuperscript{20}Quora.com
employers, job-seekers have the opportunity to more easily seek new employment and to better assess employment opportunities.

BEST PRACTICES

While there are benefits to leveraging talent analytics in hiring, implementation remains a challenge for many organizations. Observing best practices can lessen the risks involved in the implementation process.

Best Practice #1: Link Rewards, analytics, and infrastructure

Companies should ensure that they are able to connect analytics, rewards, and IT infrastructure to reap the full benefit of talent analytics. The return generated by these different organizational features is multiplicative rather than cumulative, and the performance premium is higher when all three features are present versus pairwise interactions. This finding suggests that approaches in which analytics are simply “bolted-on” to existing practices will generate less than their full potential benefit.

Best Practice #2: Do not view analytics within a vacuum

Although analytics are a powerful tool, even firms which use them extensively in the hiring process still view them as part of a spectrum of tools rather than an end-all solution. Tina Malm, a people analytics manager at Google, sums up the tech giants approach talent analytics, “We take data and analytics very seriously...But data is not everything. It can’t be viewed in a vacuum. We all bring unique flavors and personalities into the mix, and we have to ensure that our programs, processes and

---

interviews stay human.”

So long as positions involve human interaction, allowing for human interaction and intuition will continue to provide value.

Best Practice #3: Weight factors that are predictive, discard those that are not

Part of a well-designed analytics process should be to ensure that the factors being used to assess candidates or train algorithms are truly predictive of future success. Many companies may find that traditional measures such as GPA, standardized test scores, or performance on interview brainteasers have little to no predictive value. Such was the case with Google, which ditched the use of brainteasers in interviews and places less value on GPA and test scores based on their finding that these figures do not correlate with employee performance.

Best Practice #4: Employ systems which benefit all parties in the value chain

Ultimately, the value of talent analytics will be dependent not only on the predictive power and accuracy of these systems, but also on the willingness of employees and job seekers to share their personal data with employers and information brokers. Many young Facebook users change their profile name and attempt to hide online information while they search for jobs, and for good reason. Nearly a third of U.S. businesses examine candidates on social media and researchers have found evidence of discrimination effects related to factors such as political affiliation. A trend toward disqualification based on online information could push candidates in the future toward greater control of their online activities, or to turn to companies or services which specialize in tailoring online profiles

23 http://www.nytimes.com/2013/06/20/business/in-head-hunting-big-data-may-not-be-such-a-big-deal.html?_r=0
such as ResumeDeli or PageModo. A better approach for information brokers is to offer benefits to both sides of the platform. Pymetrics, a neuroscience-based online assessment tool, offers employers access to a pool of candidates while enticing said candidates with access to highly-sought after employers such as ABInBev and Fidelity\(^26\). Analytics approaches which benefit both companies and job seekers are more likely to have lasting success.

Best Practice #5: Guard personal data closely and be careful how it is used

While big data and hyperconnectivity have increased the range of tools available to recruiters and job seekers, they also open the door for potential abuse and misuse. As John Ross of Netwirx points out, certain uses of data might lead to ethical and legal ramifications, “What if your medical records were included? Would they not hire you knowing that you have a high risk of a heart attack at an early age? And what about this data that is has already been breached and is now public?”\(^27\) Ross notes that a company he has worked with which consumed and tracked data for new employees and used this data for compensation and promotions but, “they also have hit a legal challenge over this”\(^28\).

In other situations, companies need to be wary of algorithms which systematically bias hiring processes against certain groups and could be construed as discriminatory. For example, a San Francisco based start-up called Evolv uses big data techniques to advise Xerox on likely worker retention. Although the Evolv model suggests that distance from work decreases the likelihood of retention, Xerox chooses to ignore this factor since it is also linked to candidate’s race.\(^29\)

CASE STUDY – CEASAR’S ENTERTAINMENT

\(^{26}\) https://www.pymetrics.com/

\(^{27}\) Interview

\(^{28}\) Interview

\(^{29}\) “Meet the New Boss: Big Data – Companies Trade In Hunch-Based Hiring For Computer Modeling” Wall Street Journal, September 20\(^{th}\), 2012
An example of a company on the cutting edge of talent analytics is Caesar’s Entertainment, the Las Vegas-based entertainment operator currently undergoing restructuring. Caesar’s employs an enterprise analytics team of over 160 professionals with a wide range of technical backgrounds (BA, MA, MS, MBA, and PHD) in fields ranging from applied mathematics to computer science. Critically, Caesar’s implements analytics throughout the value chain to measure almost every interaction between customers and employees and then use those insights to drive performance.

Caesar’s measures service metrics from the delivery time of a drink ordered in one of their casinos to the number of times a blackjack dealer smiles in a shift and uses that data to improve service levels. Caesar’s is able to leverage hyperconnectivity to collect a more varied range of data from a greater variety of sources than ever before. When guests arrive at the casino, Caesar’s is able to track them from the moment of entry using cameras, access cards, and credit card transactions, allowing them to actively track over 85% of the cost per customer. In addition to improving the customer experience, this data is also used to track behavior of employees to ensure that they are engaging in behavior that maximizes value from customers. Following the best practice’s examined above, Caesar’s integrates analytics throughout their business, and uses that data to inform both employee retention and employee selection.

---

31 Caesar’s recruiting presentation
33 https://datafloq.com/read/for-caesars-entertainment-big-data-is-more-important/506
By integrating analytics throughout their service offerings, Caesar’s is able to leverage a much richer pool of data to inform hiring and retention activities, with the potential to save the company millions of dollars.

CASE STUDY – GOOGLE

Another company which leads the field in the use of talent analytics is Google. Through the much-publicized Project Oxygen, Google is seeking to measure and isolate the behaviors and characteristics of successful managers. The data analytics which formed the cornerstone of the Project Oxygen study included data-mining a year’s worth of employee feedback surveys, nominations for top manager awards, and other team performance indicators.\(^{35}\) The project allowed Google to not only isolate a set of top manager behaviors, but also helped shift the culture at Google by demonstrating to skeptical engineers the statistical benefit of having managers in the first place.\(^ {36}\)

\(^{35}\) http://www.thestreet.com/story/12328981/1/googles-project-oxygen-pumps-fresh-air-into-management.html
\(^{36}\) https://hbr.org/2013/12/how-google-sold-its-engineers-on-management
Laszlo Bock, Google’s director of people analytics, spearheaded Project Oxygen. He has also focused attention on refining and developing Google’s hiring process through data-driven methodologies. Part of the value of hiring analytics at Google is simply dealing with the massive volume of applicants that the company receives every year, of roughly 3 million annual applicants Google accepts only around 7,000.\textsuperscript{37}

To cope with the massive volume of applicants, and to ensure that Google was able to maintain quality while growing rapidly, Bock changed the hiring process in several ways. For interviews themselves, Bock’s employs an algorithm called qDroid to create questions tailored to tease out specific aspects of a candidate, and defines a clear rubric to distinguish excellent, good, and mediocre results.\textsuperscript{38} The benefit of such an approach was to both standardize data generated from interviews and to reduce interviewer bias (a goal driven by analysis by Bock which found that almost no managers at Google were any better than the average at hiring).\textsuperscript{39} Bock has also shifted emphasis away from brainteasers, GPA, and standardized test scores based on analysis suggesting that these measures were not predictive of success at Google.\textsuperscript{40}

Bock also uses analytics to improve the performance of his own teams. The Google people operations group has improved its own productivity 6 percent a year for the past 5 years without the use of outsourcing or external services.\textsuperscript{41} Given the importance of attracting and retaining top talent, Google and Bock are likely to continue to push the envelope when it comes to talent analytics.

\begin{itemize}
\item \textsuperscript{37} http://qz.com/285001/heres-why-you-only-have-a-0-2-chance-of-getting-hired-at-google/
\item \textsuperscript{38} http://www.bloomberg.com/news/articles/2015-04-02/book-review-work-rules-by-google-s-laszlo-bock
\item \textsuperscript{39} http://www.nytimes.com/2013/06/20/business/in-head-hunting-big-data-may-not-be-such-a-big-deal.html?_r=0
\item \textsuperscript{40} http://www.forbes.com/sites/georgeanders/2014/10/21/googles-people-chief-laszlo-bock-explains-how-to-hire-right/
\item \textsuperscript{41} http://www.workforce.com/articles/21149-googles-laszlo-bock-has-serious-people-skills
\end{itemize}
CASE STUDY – New Platforms – Evolv and Sociometric Solutions

While Google and Caesar’s Entertainment are examples of firms which have kept talent analytics in-house. There are a number of companies emerging that hope to represent the next generation of information brokers for both job candidates and firms. In addition to Gild, mentioned earlier, these companies include Evolv (purchased by Cornerstone OnDemand), Pymetrics, and Sociometric Solutions.

Evolv, based in San Francisco and acquired by Cornerstone OnDemand in October of 2014, provides a range of talent analytics services to 20 of the top Fortune 100 companies. On average, Evolv has managed to drive cost savings of $10M per client by applying analytics-based approaches. The company’s core product, Evolv Selection, is a cloud-based Hadoop-MapReduce application that analyzes millions of data points to identify patterns which signal high-performing employees and high-potential candidates.

Evolv uses not only structured, company-specific data, but also a variety of public data sources (for example Bureau of Labor Statistics data) and unstructured data from sources such as social media. By working with Evolv, Xerox has managed to increase call center employee retention and also increase these workers’ performance by 3-4 percentage points (as measured by metrics such as time to resolve a call and number of calls handled).

As talent analytics grows as a field, the variety of data sources available to vendors such as Evolv will continue to expand, offering firms greater insight into job applicants. The company Sociometric Solutions, based in Boston, offers a glimpse of the type of data that might be available to inform future

---

44 http://www.datanami.com/2014/01/28/hiring_with_hadoop_how_big_data_is_helping_hr/
45 ibid
hiring decisions. Sociometric Solutions offers a range of solutions for clients, one of which is a wearable, Bluetooth-enabled sensor identification badge that can track location, direction, certain body positions (such as leaning forward), movement, and the volume, tone, and frequency of speech\textsuperscript{47}. Using this data, Sociometric Solutions has been able to advise clients on everything from communication policy to office design. For example, with one client Sociometric Solutions found that employees who sat at longer lunch tables were 36 percent more productive and 30 percent less stressed than those who sat at a smaller table\textsuperscript{48}.

It’s not hard to envision how data collected on workplace interaction and behavior could also be applied to hiring processes and behaviors. The concept of a wearable device which measures such interactions also seems closer to reality today than at any point in the past 10 years thanks to the explosion of wearable technology (including the imminent release of the Apple Watch). The hiring analytics platforms of the future will have access to more varied sources of data than ever before.

CONCLUSION

The ability to efficiently deploy capital and to make investments with positive return is a key measure of any business organization’s success. Of all a firm’s assets, human capital is arguably one of the most difficult to measure and optimize, but also the most critical success factor for the organization as a whole. The continued expansion of hyperconnectivity will unlock new capabilities to assess both job applicants and workers.

However, there are significant challenges connected to successfully implementing talent analytics for hiring. Organizations will be unable to enjoy the maximum benefit of talent analytics until they are able to integrate analytics into their existing business processes and structures. Only by

\textsuperscript{47} http://newsoffice.mit.edu/2014/behavioral-analytics-moneyball-for-business-1114

\textsuperscript{48} ibid
tracking the performance of existing workers can companies ensure that their hiring analytics are truly predictive. Furthermore, companies must also ensure that analytics are used appropriately and as a complement rather than a substitute for human interaction which is critical not only for the hiring firm, but for the job applicant themselves. Firms must avoid the pitfalls that may arise with data-based methods such as the unintended disqualification of certain workers. If hiring algorithms are employed carelessly, they could simply result in trading one form of bias for another. In addition, there may be legal ramifications if data is used inappropriately.

Finally, the successful continued development of the talent analytics market will also be dependent on ensuring that all parties, job applicants and employers, are willing to buy in. If applicants feel exploited, they may curtail their participation in online platforms or seek greater control over their online footprint, weakening the potential for use of unstructured data. The potential for talent analytics to create a more efficient and effective market for talent will be dependent on the whether the firms and brokers which employ such solutions are able to effectively manage the challenge of operating in a hyperconnected world. For those that are able to do so, the returns will be substantial.