

Cloud-based Data Analytics for Employee Staffing: Integrated Full Circle Staffing Systems

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ABSTRACT

This manuscript explains how cloud-based data analytics can be successfully integrated with online employee recruiting and selection procedures. Fundamentals of how the combination of different types of selection procedures with varying validity coefficients will result in predictable success rates for employees who are hired. These fundamental principles can be the core foundation that makes cloud-based recruiting and selection procedures more effective in organizations.

CLOUD-BASED RECRUITMENT

Cloud-based recruiting uses efficient online methods to enable employers to seek job applicants online. Many vendors offer online recruiting systems that support posting job details, the nature of the work, and required qualifications (e.g., BambooHR, Indeed, Paycor, Workday Recruiting, and ZipRecruiter). Job applicants search online through job postings, provide their contact information, describe their qualifications, and upload their resumes. Employers subsequently view and analyze the data uploaded by applicants. As a result, cloud-based recruiting is very efficient in processing large volumes of applications. A key advantage of recruiting using cloud-based systems is that data uploaded by applicants can be used in a preliminary screen to determine job fit and quickly link applicants to online selection procedures for further and more in-depth screening.

CLOUD-BASED SELECTION

Many vendors offer efficient cloud-based screening and testing of job applicants; examples include platforms like www.testpublishers.org and https://hr-software.net/Testing_Hiring.htm. They provide assessments of employee background, job interests, job-related ability, and personality (e.g., Hogan Assessment Systems, Personnel Selection Inventory, and WonScore). These systems are much more effective when there are many applicants. The greater the number of applicants, the more precisely and accurately selection procedures identify the best candidates. Better selection leads to better employee performance. Thus, even though online recruiting systems often generate many more

applicants than employers need to hire, this is a good result because it enhances the effectiveness of employee selection procedures.

For decades, scientists have known that the validity of employee selection procedures and the selection ratio interact to influence employee selection outcomes. Validity is the relationship between a selection test score and an employee's job performance. The more valid the test, the higher the validity, and the better it predicts future employee job performance. Validity numbers typically vary from .10 to .50 and are expressed as correlation coefficients.

The selection ratio refers to the number of people hired divided by the number who applied. A lower selection ratio means the employer hired fewer applicants compared to the number applying. Lower selection ratios are better than higher selection ratios as it shows the employer is more selective in whom they hire.

The left column of Table I shows a list of selection procedures. Next to these are typical levels of validity for each procedure. For example, along the top row are possible selection ratios ranging from a low of .10, meaning that the employer hired 1 out of 10 applicants, to a high of .90, meaning the employer hired 9 out of 10 applicants. Finally, the numbers within Table I show the percentage likelihood that each person hired using that selection procedure will perform successfully. For example, 50% means that 1 out of two people hired will perform effectively, while 75% means three out of four hires will perform effectively.

Suppose that an employer is recruiting people from a pool of job candidates. The data in Table I assume that 50% of applicants would be successful even if picked at random, giving a baseline success rate. Thus, 50% of those hired would be successful regardless of the selection ratio (see the top row).

However, the situation changes if the employer uses a valid selection procedure like a structured interview to decide whom to hire. Structured interviews often have high validity, about .40. When we look at the top row of Table I, it becomes apparent that a low selection ratio enhances the value of using structured interviews. For example, if the employer hires 90% of those who apply, the percentage of applicants who turn out to be successful from using a structured interview (54%) is not much better than selecting them at random. However, if the employer only hires 10% of those interviewed, the chances of the person hired turning out to be successful increase to 78%. Thus, a structured interview combined with a low selection ratio significantly improves the success rate and probability of hiring strong performing staff.

In the past, the cost of recruitment procedures and processing many more applicants than needed discouraged the use of costly methods that generated large numbers of applicants (e.g., radio, TV, newspaper advertisements). However, with the efficiency of online recruiting, the cost of recruiting large applicant pools is much lower and no longer a barrier.

Three important implications follow from these observations. First, recruiting more applicants enhances the usefulness of valid selection procedures. Second, the chances of hiring someone who will be successful when using a procedure with low validity are not much better than picking people at random. Third, a valid test does not improve the probability of making a

successful hire at high selection ratios. Fourth, at low selection ratios, valid tests can improve the chances of making a successful hire.

Thus, online cloud-based staffing that integrates efficient recruiting with valid selection procedures significantly increases the effectiveness of staffing systems. For example, the area shaded in green in Table I shows a combination of selection procedures and selection ratios that substantially increases the effectiveness of an integrated human resource (HR) staffing system.

Thus, it is essential that employee selection procedures are valid and that employers use low selection ratios. Efficient online recruiting can enable this to happen. In addition, employers using valid selection procedures and hiring a small percentage of applicants have a much greater chance of hiring employees who will be strong performers. Managers can use cloud-based systems to support the combining of valid selection procedures and low selection ratios

Table I: Percentages of successful hires by combining selection procedures and selection ratios: High validity combined with low selection ratio is best.

Selection Procedures	Validity (Correlations)	Selection Ratio (Percentage of those applying who are hired)								
		Low .10	.20	.30	.40	.50	.60	.70	.80	High .90
Random Selection	Low .00	50%	50%	50%	50%	50%	50%	50%	50%	50%
Unstructured Interviews	.10	54%	53%	52%	52%	51%	51%	51%	51%	50%
Background Checks	.20	64%	61%	59%	58%	56%	55%	53%	53%	52%
Ability Tests	.30	71%	67%	64%	62%	60%	58%	56%	54%	52%
Structured Interviews	.40	78%	73%	69%	66%	63%	61%	58%	56%	53%
Combined Procedures	High. 50	84%	78%	74%	70%	67%	63%	60%	57%	54%

Notes: Selection Ratio = Number of hires divided by the number of applicants; the proportion of applicants hired.
Validity = Typical correlations between selection procedure score and job performance. Adapted from Schmidt and Hunter (1998) and Taylor and Russell (1939).

CLOUD-BASED PERFORMANCE MEASURES

Companies use efficient online employee performance appraisal systems to measure employee performance. Many vendors offer human capital management systems that monitor and measure employee performance (for instance, Oracle Cloud Human Capital Management, SAP Success Factors, and ADP Workforce Now). In addition, these vendors enable staff to rate each other's performance. For example, employees can self-evaluate their performance and rate peers' performance; supervisors can rate employee performance. HR staff and line managers can review and approve these ratings.

Online performance evaluation data can identify the most cost-effective recruiting and selection methods. This critical feedback loop enables HR managers to decide which procedures should be retained, improved, replaced, or abandoned. Thus, cloud-based performance measures can increase the effectiveness of recruiting and selection procedures. An integrated full-circle system continues to improve and refine results over multiple recruitment, selection, and performance measurement cycles (Figure 1).

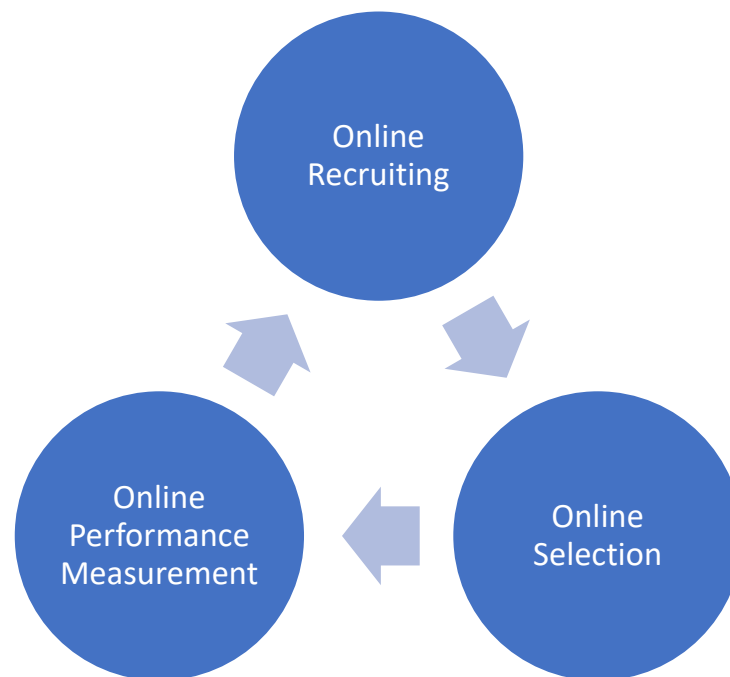


Figure 1: An integrated full-circle system continues to refine and improve results

INTEGRATION OF RECRUITING, SELECTION, AND PERFORMANCE MEASUREMENT

Cloud-based HR systems are becoming increasingly prevalent (Menant, Gilibert, and Sauvezon, 2021). While these systems can be very efficient, many focus on just a single part of the HR processes, such as recruitment, training, benefits management, or safety management. However, integrating different forms of data collected during the recruitment, selection, and performance evaluation processes within a database enables employers to access and analyze these data and creates several advantages (Ziebell *et al.*, 2019). These systems make employment and staffing processes more effective and enable HR to value their firms (DiClaudio, 2019).

References

- DiClaudio, M. (2019), "People analytics and the rise of HR: how data, analytics and emerging technology can transform human resources (HR) into a profit center", *Strategic HR Review*, Vol. 18 No. 2, pp. 42-46.
- Menant, L., Gilibert, D. and Sauvezon, C. (2021), "The application of acceptance models to human resource information systems: a literature review", *Frontiers in Psychology*, Vol. 12, 659421.
- Schmidt, F.L. and Hunter, J.E. (1998), "The validity and utility of selection methods in personnel psychology: practical and theoretical implications of 85 years of research findings", *Psychological Bulletin*, Vol. 124 No. 2, pp. 262-274.
- Taylor, H.C. and Russell, J.T. (1939), "The relationship of validity coefficients to the practical effectiveness of tests in selection: discussion and tables", *Journal of Applied Psychology*, Vol. 23 No. 5, pp. 565-578.
- Ziebell, R.C., Albors-Garrigos, J., Schoeneberg, K.P. and Marin, M.R.P. (2019), "Adoption and success of e-HRM in a cloud computing environment: a field study", *International Journal of Cloud Applications and Computing*, Vol. 9 No. 2, pp. 1-27.