



The Science Behind Matchpoint Careers

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The theory of recruitment is simple: learn what you need to about each candidate, then pick the best one for the job.

The practice is more complicated. Exactly what do we need to know about candidates? How can we find it out? What criteria are we evaluating candidates against? At what stage of the process? How do we apply them? How do we know we are testing what matters for job performance? What is a fair, legal, efficient and cost-effective way of running the process and making the final selection?

These are serious issues that need serious solutions. This paper addresses them by setting out the science behind performance-predicting recruitment, as practiced by Matchpoint Careers, Inc.

Know thy candidate

Recruitment is about understanding people, understanding jobs and putting this information together to reach a decision. We'll deal later in this paper with understanding jobs. Now let's look at people.

We spend our lives figuring out other people. Mostly, we gather information over time and in idiosyncratic, haphazard ways. Rarely are we unbiased, even more rarely are we systematic. In getting to know people we focus on those characteristics that we value most or that we think are most immediately relevant. We rate different people in different ways, and the inherent inequality of our approaches does not trouble us when we come to make comparisons or give judgments.

All this is fine in the personal arena, but not when it comes to recruitment. Laws enforce candidates' rights to be treated and evaluated fairly and successful outcomes in business increasingly depend on leveraging the human potential of the organization. So in recruitment, we still want to get to know candidates, but we need to do so in very specific ways.

- Consistently. We need to evaluate every candidate in the same way, using systematic, efficient and clearly articulated frameworks within set time limits.
- Objectively. We need to remove bias from the information gathering. Assessments should not reflect personal interpretations or the specific assessment context. Multiple assessors should reach consistent judgments about a single candidate.
- Fit-for-purpose. We must measure what matters, not just what is easy to measure or what we have always measured. Assessment should focus on a specific outcome: on better understanding a candidate's likely performance in a job.

There has now been almost 100 years of research on the science of candidate selection¹. Much of it has focused on assessment validity.



Assessment validity

Fundamental to any assessment approach is its validity – its suitability or effectiveness in evaluating candidates for a job. This is determined by *criterion validity* – the degree to which an approach typically predicts aspects of job performance.

Criterion validity is most often demonstrated by correlation or other statistical associations between candidates' characteristics and their subsequent performance on the job (performance measures may include length of tenure, success on job-related training courses, managers' appraisals, etc as well as direct job outcome data). Correlation coefficients vary from 0 – showing no correlation – and 1 – indicating a perfect correlation, and can be interpreted in terms of their *effect size*².

Effect size, in recruitment, is usually interpreted as the return on investment (ROI) for a particular assessment approach. Models to establish recruitment ROI date back over 60 years^{3,4}.

Cohen (1988) offers the following guidelines for interpreting correlation coefficients:

- 0.1 = a small effect size, benefits from using the test are unlikely to be seen
- 0.3 = a medium effect size, benefits will probably be seen from using the test
- 0.5 = a large effect size, substantial benefits from using the test will be seen

Validity matters in recruitment because it demonstrates the approach of an assessment to:

- Effectiveness. Does it identify the best candidates for a job?
- Reliability. Does it show that assessments are consistent?
- Defensibility. Do these assessments provide meaningful and fair information, on which selection decisions can be taken with confidence?
- ROI. Do the benefits from investing in this assessment method outweigh the costs?

Put simply, validation tells us what characteristics of candidates we should measure to inform our recruitment decisions: the predictors of work success.

The predictors of success

We know—with a high degree of confidence—what predicts success in a job.

This confidence comes primarily from meta-analysis⁵, a statistical technique that combines the results from many individual research studies to reach more robust conclusions. Meta-analysis has shown the predictive power of individual assessments and of specific combinations of assessments.

Matchpoint Careers assesses candidates on two psychometric areas:

- Competencies – what a candidate can do
- Fit – what a candidate will do

Competencies – “can do”

Competencies describe candidates' knowledge, abilities, skills and other characteristics (KASOs). Often, they are organized in *competency frameworks* – structured descriptions of competencies that have been shown to relate to job performance.

Matchpoint Careers defines a personal profile for each candidate based on a competency framework that includes general mental ability and personality assessment. Meta-analysis of scientific research studies



has shown the effectiveness of these approaches both when used independently and as components of a competency framework.

Let's look at the science behind the GMA and personality assessments, and the overall competency framework:

General Mental Ability (GMA)

Tests of general mental ability (GMA) are some of the best predictors of job success. The more complex the job, the stronger GMA's predictive power.

An extensive meta-analysis estimated to cover over 60% of all US jobs found GMA correlated 0.51 against job performance and 0.56 against success on job-related training courses¹. A more recent meta-analysis⁶ of the predictive validity of GMA tests from UK studies covering over 13,000 employees found validity of 0.74 for professional roles and 0.32 for clerical roles (0.48 across all jobs). This study also confirmed the validity of GMA tests for job-related training success, obtaining a validity coefficient of 0.50 on a combined sample of almost 18,000 employees. As confidence in the predictive value of GMA tests has grown, use in recruitment has increased, as evidenced by several recent surveys^{7,8}.

Matchpoint Careers uses verbal and numerical ability tests to assess GMA. Meta-analyses of the research on the predictive validity of our tests obtained validities of 0.39 for numerical ability and 0.50 for verbal ability, well within the validity ranges reported in peer-reviewed academic literature⁹. Since these meta-analyses assessed the validity of the verbal and numerical tests independently, unlike much other research where GMA is a combination of results from multiple tests, the overall Matchpoint Careers GMA test validity is likely to exceed 0.50.

GMA is clearly an effective predictor of job performance, but another selection method – personality assessment – has *incremental validity*, predicting job performance once results of GMA tests have been taken into account¹⁰.

Personality assessment

A number of independent studies and meta-analyses have shown that personality factors have incremental validity, adding in the range of 0.07 to 0.16 to overall predictions of job performance^{11,12}. This raises the validity of the combined GMA and personality assessment to 0.60 to 0.70 – among the highest effect sizes seen in any area of psychological research¹³.

While there are many personality models – each describing the persistent ways in which people interact, process information, make decisions and deal with challenges – there is increasing consensus that the *Big Five* model represents a fundamental description of personality¹⁴ that is stable across cultures and groups in terms of ethnicity, age and gender^{15,16,17}. This common structure for personality has made it easier to integrate research on different tools and assessment approaches¹⁸.

Personality measures are now established as providing incremental validity over tests of GMA: the combined validity of these assessments is among the highest effect sizes seen in psychological research.

A recent comprehensive review and meta-analysis explored the predictive validity of personality in organizations. It showed that personality assessments predicted objective (i.e. output-measured) job performance at a level of 0.23¹⁹. For more specific performance criteria, personality had even greater predictive validity: Validity levels of 0.44, 0.31 and 0.37 were observed for counterproductive behaviors, organizational citizenship and getting along with others; and notable validity coefficients were seen for outcomes such as leadership and training performance.

Matchpoint Careers uses the latest version of SHL's Occupational Personality Questionnaire, OPQ32r, to assess personality. The OPQ maps onto the Big Five model, enabling its findings to be integrated with other research, and its validity has been extensively tested over 20 years²⁰.



Matchpoint Careers' competency framework

Matchpoint Careers uses the GMA and personality assessment above to produce a profile for each candidate on SHL's Universal Competency Framework 20 (UCF20). The UCF20 is a hierarchical model of 20 competencies that can be organized into eight higher level competencies (the *Great Eight*). The UCF20 is used to not only to profile candidates and jobs, but also to evaluate employee performance and determine development needs, making it highly *criterion-centric* – focused on what matters in job performance.

The UCF20 is grounded in rigorous psychometric assessment and subject to ongoing validation. A meta-analysis involving almost 5,000 respondents, assessing GMA and personality assessment validity both independently and in conjunction, showed²¹:

- The UCF20 ability tests had corrected correlations with supervisor ratings across the Great Eight competencies from 0.02 to 0.40. This wide variation was anticipated, as mental ability is much more strongly related to certain competencies (e.g. Analyzing and Interpreting) than others (e.g. Supporting and Cooperating).
- The UCF20 personality self-reports had corrected correlations with supervisor ratings across the Great Eight competencies from 0.16 to 0.28, indicating likely incremental benefit from using personality tests.
- The prediction of job performance obtained from aggregating this information, as in the Matchpoint Careers competency framework, was estimated as 0.53.

This research indicates that the Matchpoint Careers competency framework, with its combination of GMA and personality tests, is a highly valid predictor of performance potential at work.

Fit – will do

Potential, by itself, is not enough to drive performance. Interactional psychology proposes that any observed behavior is an interaction between aspects of the individual and the environment²². When there is a good fit between an individual and the environment, the individual will leverage his or her potential to perform. When the fit is poor, an individual may subconsciously or consciously choose to underperform.

Environmental fit has been described as “the compatibility between people and organizations that occurs when: (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both”²³. It is associated with valued work outcomes such as engagement – the emotive attitude of an individual towards an organization that drives extra effort, advocacy and length of tenure. Its impact has been hypothesized by HR professionals²⁴ and established through meta-analytic research²⁵. It is increasingly used as a factor in selection²⁶.

Matchpoint Careers determines environmental fit by profiling candidates and jobs using SHL's work-environment survey (WES). The WES is based on 38 factors that represent features of the work environment. These factors are largely independent of specific jobs and industry sectors and vary according to organizations and work groups. Matchpoint Careers has further developed SHL's methodology to produce a streamlined system for both employers and candidates: Candidates complete a short survey to rate the importance of each specific environmental feature; employers use a similar process to describe the actual work environment.

Evidence for the validity of the WES approach comes from a number of SHL studies and is summarized below:

- **Study 1**²⁷ involved 840 employees from a range of organizations and assessed the effect of an employee's degree of fit with their job and the relationship of this to engagement (assessed by “energy” – an emotional component – and “absorption” – a cognitive component) and overall job satisfaction. The median correlation between the WES and job engagement was 0.34 and between the WES and overall job satisfaction was 0.39.



- **Study 2²⁸** examined fit in two samples of graduate trainees, one from the UK (n=78) and the other from Europe (n=45). It showed that fit was significantly related to a number of key dimensions of performance, as evidenced by line manager evaluations. Level of fit significantly predicted line manager ratings in the UK sample for: Total engagement ($R^2=0.26^1$), General performance ($R^2=0.12$), Branch Manager potential ($R^2=0.26$) and Senior Management potential ($R^2=0.08$) and in the European sample for: Total engagement ($R^2=0.20$), Identification ($R^2=0.20$) and Absorption ($R^2=0.24$).
- **Study 3²⁹** addressed the relationship between fit and retention in a financial services company in South Africa. This case study of financial advisors found that those who had a higher level of fit tended to be rated as better performers by their managers. They also intended to stay longer with the organization and were more satisfied with the job and organization than those who had lower levels of fit.

Assessing fit and competency therefore meets the first part of our general theory of recruitment – learning what you need to about each candidate. The next step is to assess the job.

Know the job

Jobs seem to be changing fast. Look back 10 years, even 3-5 years, and the everyday activities of most jobs – the specific responsibilities, tasks and skillsets – are likely to be different from today.

But fundamental job demands remain relatively constant – as evidenced by the consistent predictive power of GMA and personality assessments. These factors measure the deeper drivers of performance, the behaviors, attitudes and abilities that drive the skillsets and micro-behaviors that are used to perform specific tasks. These factors – the fundamental demands of a job – have not been observed to vary over time.

They do, however, vary according to role. Different jobs make different demands on the job holder – we can all think of a star performer in one job who failed in another – and therefore match more naturally to specific kinds of candidate profile. *Job analyses* – some more systematic and robust than others – have aimed to map job requirements through job-holder interviews, structured questionnaires, and competency analysis. The academic literature has been relatively quiet on evaluating the results of these mappings, though most work has focused on the knowledge, skills and attributes (i.e. competencies) candidates need to be successful³⁰.

The Matchpoint Careers' job profiles are based on the same UCF20 that we use to profile candidates. Our database holds several thousand profiles of individual jobs developed by trained job analysts who, supported by a rigorously developed database of human attributes and job tasks, worked directly with organizations to define the key competencies for successful job performance in specific roles. Using the job parameters an employer provides, we interrogate the profile database to create a preliminary job profile, which the employer can then adapt to fit the specific requirements of the job to be filled.

Using the UCF20 in this way is not new. Between 2001 and 2006 the framework and associated databases were used to create 403 new competency models for 117 client organizations in 24 countries³¹.

As mentioned above, we refine our knowledge of the demands a job makes by adding an assessment of the work environment to the data we collect about the competency drivers of performance in each role.

¹ R^2 is a measure of the proportion of the outcome variable accounted for by the predictor. For example an R^2 of 0.26 would indicate that 26% of the variation in the predictor variable has been accounted for.

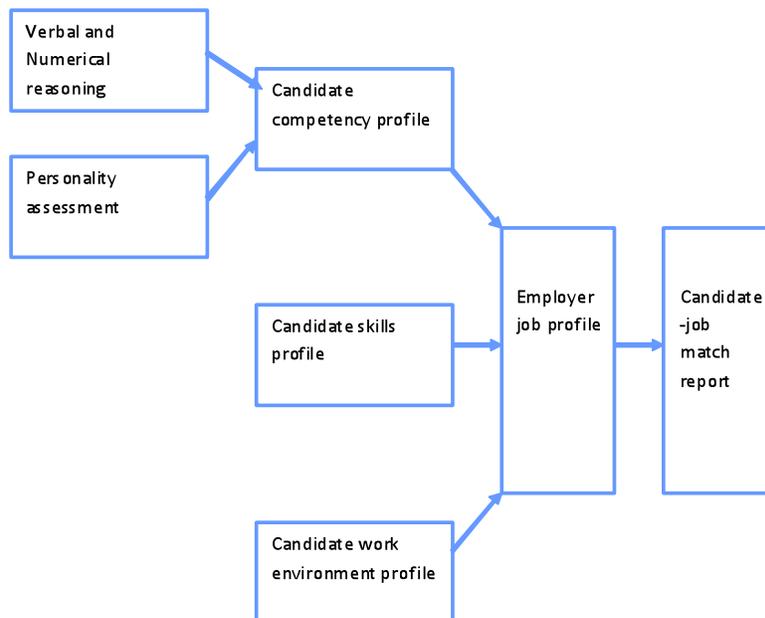


Matching jobs and candidates

Important as assessment is, effective recruitment requires more. Once we have learned what we need to about the candidates and the job, we need to combine that information and use it in effective selection.

Selection effectiveness, surprisingly, has been studied far less than assessment validity, and any survey of recruitment practice will reveal that imprecise, subjective and inconsistent judgments are often made, even when objective assessments of candidates and the job are available to inform the selection process.

Matchpoint Careers makes an explicit and tight comparison between job requirements and candidate profiles. We can do this easily because we use the same factors and scales to describe both. Our proprietary algorithm statistically matches each eligible candidate in our database against the employer's unique job profile, as illustrated below:



The advantages of Matchpoint Careers' job matching approach include:

- Consistency. Each candidate is evaluated in exactly the same way, with no opportunity for bias or subjective input.
- Objectivity. The matching criteria are objective – the exact profile for each job is based on similar researched jobs and is transparent; candidate evaluation against this profile is statistically driven
- Reduced bias. Candidates complete their profile without knowing about any specific jobs they may be matched to, minimizing the potential for tailoring responses (particularly on personality questionnaires) to perceived job requirements. Much has been written on the effects of such conscious and unconscious bias on assessment results³².
- Precision. The relative fit of each candidate to the job is evaluated. A shortlist of ranked best-match candidates is presented in a Summary Match Report with Full Match Reports on each shortlist candidate giving a detailed comparison between the job and the candidate profile.
- Utility. The Full Match Reports on the shortlist candidates provide information and analyses that facilitate further assessment, final candidate selection and ultimate performance management of the successful candidate.



Assessing predictive factors first, not last

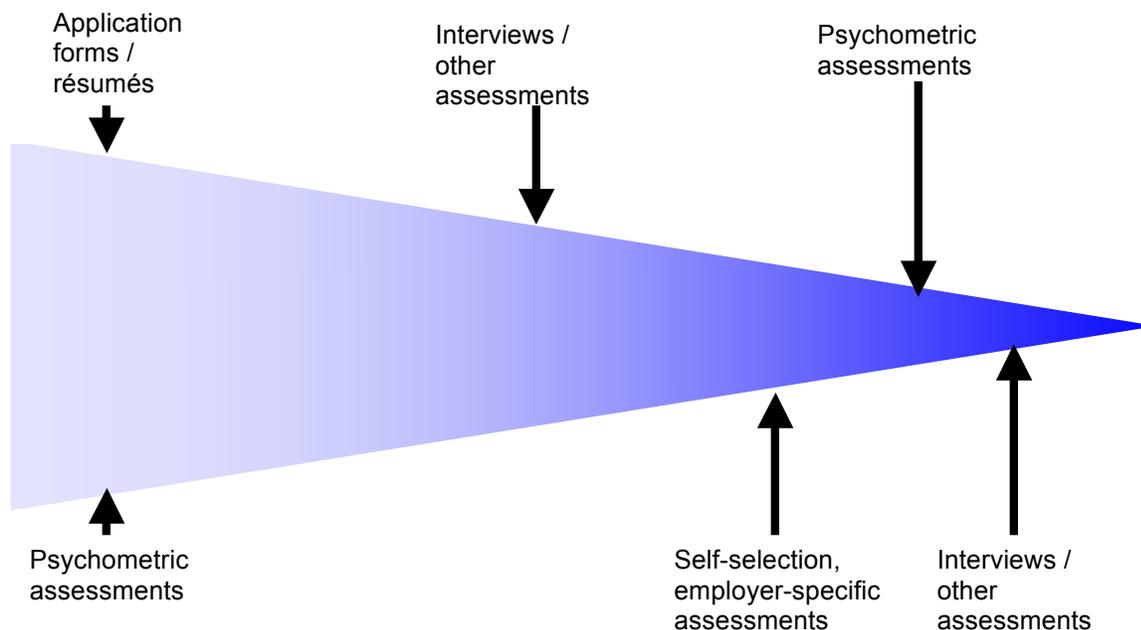
Almost all statistical models used for validation ignore the timing of assessment within the recruitment process. They look at assessments taken at one point in time and use the data from these to predict future outcomes. But recruitment is a three-dimensional process that unfolds over time. It involves multiple assessments or other information-gathering exercises and multiple selection points at which candidates are rejected or proceed to the next stage of recruitment. The order in which these assessments and selection points take place can have a dramatic effect on recruitment outcomes.

Typically, psychometric assessments are used late in the recruitment process, after a large proportion of the candidates have been screened out using methods such as application forms, résumés and/or interviews of various kinds – evaluation methods which are often unsystematic and poorly predict job performance³³.

Matchpoint Careers takes a different approach. We use technology to profile potential candidates against the best predictors of performance – GMA, personality and fit – as soon as they enter our system. This minimizes the risk of screening out candidates with potential for high performance in the job ('false negatives'), and provides a rich mine of data to inform later interviews, additional assessments etc. Where appropriate, we can further refine the match by using additional employer-specific assessments. We minimize including candidates who do not have sufficient potential ('false positives') by rigorously matching candidates to the requirements of the specific job. The result is a shortlist of candidates exceptionally matched to each unique job.

The difference between traditional recruitment and Matchpoint Careers' system is shown below:

Example of a traditional recruitment pipeline



Matchpoint Careers recruitment pipeline



No clear evidence yet exists on the effect of changing the order of selection methods in recruitment. Although technology has made it possible to assess earlier^{34,35} and the use of online tests is increasing³⁶, adoption is not yet widespread enough for thorough evaluation. However, preliminary research and our experience at Matchpoint Careers suggest:

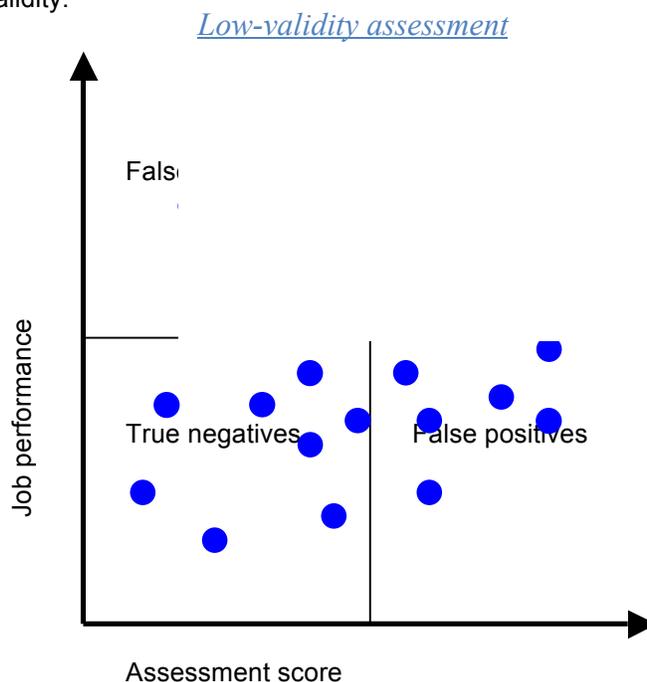
- Too many good candidates are screened out when early assessment is based on weakly predictive selection methods such as application forms, résumés and unstructured interviews
- Psychometric assessment of all eligible candidates and matching to a tailored job profile identifies high potential candidates who would have been selected out by traditional early-stage screening
- Data from psychometric assessments is likely to increase the validity of subsequent structured interviewing, and may have a positive effect on performance by informing employee development
- Early-stage psychometric matching substantially reduces time to hire – Matchpoint Careers presents a shortlist of qualified candidates to employers within 7 days of job profile submission.

As evidence continues to accumulate on the effectiveness of psychometric assessments for selection, and psychometric assessments are used earlier in the process and on larger numbers of candidates, our ability to calculate ROI accurately will increase.

Validity and return on investment

Getting the right people in the right jobs matters more than any other factor in driving superior business performance³⁷. Increasingly evaluations of employee success – and investigations into how better hiring decisions lead to key organizational outcomes – have been framed in terms of return on investment (ROI).

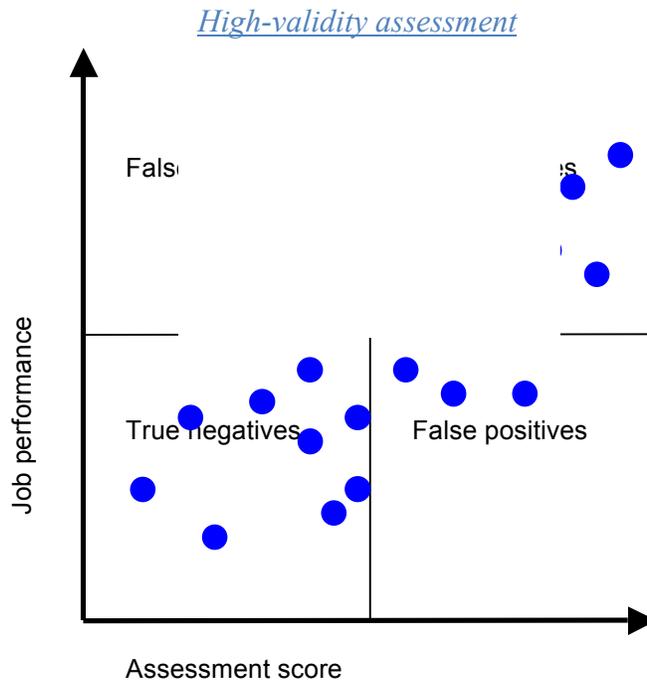
Validity is key to determining recruitment ROI. For a recruitment process to be effective, assessments need to distinguish accurately between those candidates who will go on to perform well in the job – *true positives* – and those who will not – *true negatives*. Assessments that suggest a candidate will perform well who in practice performs poorly give rise to *false positives*, just as assessments that screen out candidates who would have performed well in the job give rise to *false negatives*. The illustration below shows a typical distribution of candidates across these four outcomes for an assessment process that has a low level of validity.





Low validity assessment results in many false positives and false negatives among the true positives and true negatives: It is not assessing the factors that predict performance.

Contrast the results obtained from using an assessment with a much higher level of validity.



With high-validity assessment, the number of false negatives and false positives is greatly reduced and candidates are clustered more tightly together. This assessment process is evaluating factors that correlate closely with job performance.

Using valid assessments increases ROI because of the unequal distribution of output between apparently similar people doing the same work. Price's law³⁸ states that the square root of the number of people in a group will produce 50% of the output: the 10 most productive employees in a group of 100 will produce the same amount as the remaining 90 combined. While Price's law was originally applied to creative output, similarly unequal distribution of productivity has been observed in organizational contexts.

Variation in employee productivity is commonly defined as the standard deviation in dollar output of employees. This has – very conservatively – been estimated at 40% of annual salary per annum, per hire³⁹: For a role with a \$60,000 salary, the standard deviation of performance is at least \$24,000. Assuming performance is approximately normally distributed among the workforce, hiring someone 1 SD above the mean would result in at least \$24,000 more value delivered compared a hire at the mean, and \$48,000 more compared to a hire 1 SD below the mean.

In practice, the financial impact of weakly validated assessments is likely to be substantially greater, given the costs associated with replacing poorly performing hires, their potential to disrupt the productivity of other employees and the impact of unproductive hires on the organization's talent streams and future success.

In a recent book 'Million Dollar Hire' David Jones⁴⁰ extends the more academic concept of utility equations, which underpins much ROI research, to look broadly at the effects of using scientific



approaches to identify the right candidates for the job. To quote Jones: “With recruiting costs, salary, benefits, bonus, and training costs, along with overhead, regular pay increases, and normal tenure expectations, it’s not hard to view any six-figure hire as a million-dollar investment.” For jobs such as those in the public sector where tenure is on average longer, even mid five-figure salaries can represent million-dollar hires.

Other research bears out Jones’ findings. A recent survey by SHLPrevisor, the world’s largest supplier of employment tests, demonstrates the impact of scientific assessment on a wide range of enterprise-critical outcomes⁴¹. In 83% of 47 business outcomes studies conducted during 2010, a favorable or very favorable outcome was reported, i.e. the assessment solution had a strong and measurable impact on most or all of the firms’ performance metrics. Examples included:

- a retailer increasing sales by 15% in six months, adding \$1.9 million to the bottom line
- a telecommunications company reducing turnover by 18% in six months, saving \$1.1 million
- contact centre agents in the healthcare sector making 17% fewer errors and completing calls 10% faster.

Conclusion

The impact of using scientific recruitment methods is now well documented. Matchpoint Careers draws on this research and practice to provide a flexible, scalable solution that effectively addresses the recruitment challenge through validated assessment that forms the basis for a candidate-job matching process. For most organizations, adopting our approach to recruitment is the single most effective way to increase productivity and reduce costs.



About Matchpoint Careers

Founded in 2010, Matchpoint Careers matches people and jobs based on the proven predictors of performance. We offer employers a richly-documented shortlist of candidates who possess the qualities that drive performance in the specific job. We offer jobseekers industry-standard psychometric feedback and the opportunity to be matched with jobs that ideally fit their particular talents and preferences.

We match based on an assessment of both the candidate and the job. Candidates take psychometric and skills tests, answer work preference questionnaires and submit bio data. Hirers are guided through a job profiling process that allows them to validate their impressions of the job against the thousands of profiles in our database. Every job has different requirements, every candidate has different strengths. We optimize the match using our proprietary matching algorithm.

Matchpoint Careers is based on serious science and powered by SHL, the premier global people assessment company.

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