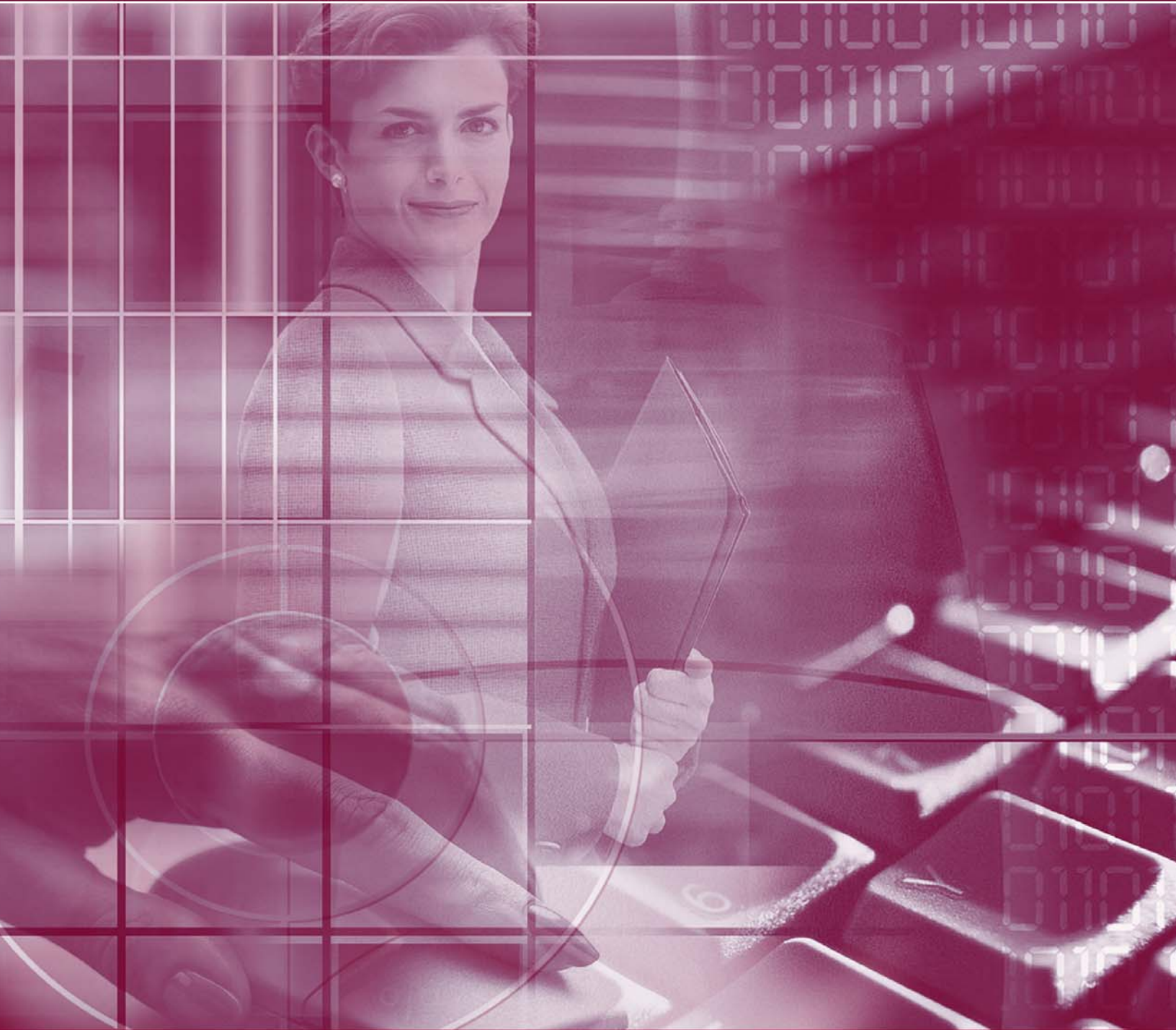


# Identifying Talent through Technology

## Automated Hiring Systems in Federal Agencies



A report to the President and the Congress of the United States  
by the U.S. Merit Systems Protection Board

# Identifying Talent through Technology Automated Hiring Systems in Federal Agencies

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LETTER FROM THE ACTING CHAIRMAN



U.S. Merit Systems Protection Board  
1615 M Street, NW  
Washington, DC 20419-0001

August 2004

The President  
President of the Senate  
Speaker of the House of Representatives

Dear Sirs:

In accordance with the requirements of 5 U.S.C. 1204(a)(3), it is my honor to submit this Merit Systems Protection Board report, "Identifying Talent Through Technology: Automated Hiring Systems in Federal Agencies."

The placement of "Strategic Human Capital Management" as the first of five Governmentwide initiatives in the President's Management Agenda clearly acknowledges the critical importance of a capable, trained, and motivated Federal workforce. One aspect of attaining such a workforce is recruiting and selecting highly qualified employees. Federal agencies are looking to information technology to help them in this endeavor and are making increasing use of automated hiring systems to announce jobs, receive applications, and identify promising candidates. Consequently, automated hiring systems change how agencies assess job applicants. Because this assessment has significant implications for the quality of the Federal workforce, MSPB conducted a study of how Federal agencies are using these systems.

We found that automated hiring systems can be beneficial to both agencies and job applicants, when used wisely. These systems can help agencies streamline the application process, assess applicants fairly and thoroughly, and reduce hiring time. However, we also found that investments in information technology alone do not guarantee these results. Agency leaders must also invest time and money in implementing an automated hiring system to ensure that selection criteria and

assessment methods are valid and effective. Federal managers and human resource professionals must also continue to identify assessment criteria, select and use appropriate assessment tools, and exercise informed judgment throughout the hiring process. The report provides recommendations to agencies on how they can use automated hiring systems most effectively and recommendations to the Office of Personnel Management on steps it can take to support such use.

I believe you will find this report useful as you consider how to shape and manage the highly qualified Federal workforce required to meet the challenges of the 21st century.

Respectfully,

Neil A. G. McPhie

# **U.S. Merit Systems Protection Board**

**Neil A. G. McPhie, Acting Chairman**

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# Executive Summary

Federal agencies are making increased use of automated hiring systems. This use reflects several factors, including the increasing power and availability of information technology, a desire to reduce time to hire, and the prospect of increased efficiencies. The automated hiring systems that agencies are using are much more than electronic filing cabinets for “virtual resumes.” These systems have materially changed how agencies recruit, receive applications, and assess and refer applicants for Federal jobs. For this reason, the U.S. Merit Systems Protection Board (MSPB or the Board) conducted a study to better understand these systems, their use in the Federal Government, and the effects of that use.

This report discusses how automated hiring systems work, their capabilities and limitations, and how Federal agencies use these systems to assess job applicants. The report is not a “report card” on specific automated hiring systems or their providers, but discusses how automated hiring systems can be used in the hiring process, particularly to help identify and select the best person for the job. Below, we provide an overview of our major findings.

## The Technology

- Automated hiring systems have a place in Federal hiring—but only if used wisely.
- Automated hiring systems can be used to identify a pool of promising candidates. However, people must still determine what attributes automated hiring systems will measure, determine how these systems will measure those attributes, monitor the operation of these systems, and make selection decisions.
- Automated hiring systems can contribute to material improvements in the hiring process.
- The use of automated hiring systems is not only desirable, but increasingly necessary. There is no realistic alternative; manual,

paper-based hiring processes are too burdensome, labor-intensive, and costly to be practical on a large scale.

## **Results Achieved**

Our interviews and site visits revealed varying results. Some Federal agencies have achieved good results with their automated hiring systems. Those agencies have increased access to job opportunities, simplified the application process, and reduced time to hire while maintaining or improving the quality of new employees. Other agencies have struggled to obtain even acceptable results. All agencies have understood—or soon learned—that it takes vision, planning, expertise, and resources to use an automated hiring system successfully.

## **Using Automated Hiring Systems Effectively**

As stated above, the key to whether automated hiring systems are beneficial is wise use. Whether automated hiring systems contribute positively to Government performance does not depend on the technology itself. It depends on how Federal agencies use that technology, and whether the leaders of Federal agencies make the investments in recruitment, assessment tools, and people needed to use the technology effectively.

Effective use begins with an accurate understanding of the importance and nature of the hiring process. It is imperative that leaders in the Federal Government recognize that:

- Hiring decisions have long-term consequences for organizational performance;
- Good hiring decisions depend on good assessment. Good recruitment and good intentions are necessary but not sufficient;
- Good assessment requires valid selection criteria and measurement tools; and



- An effective hiring process requires managers and human resources (HR) professionals who understand and are able to perform their respective roles in that process.

Table 1 summarizes our recommendations to Federal agencies and the U.S. Office of Personnel Management regarding the use of automated hiring systems and the overall hiring process. The body of the report provides the rationale for these recommendations, and the Recommendations section of this report discusses each recommendation in detail.

<b>Table 1. Summary of Recommendations</b>	
<b>Subject</b>	<b>Recommendations for Agencies</b>
<b>Leadership</b>	<ol style="list-style-type: none"> <li>1. Manage hiring as a critical business process.</li> <li>2. Manage the introduction of an automated hiring system as an organizational change initiative.</li> <li>3. Invest appropriate resources in the design, implementation, and operation of the hiring process.</li> </ol>
<b>Designing the Hiring Process</b>	<ol style="list-style-type: none"> <li>4. Use automated hiring systems to support recruitment programs, not to replace them.</li> <li>5. Design a hiring process that emphasizes selection quality over less-important outcomes such as cost and efficiency.</li> <li>6. Evaluate existing assessment tools before automating them.</li> </ol>
<b>Implementing an Automated Hiring System</b>	<ol style="list-style-type: none"> <li>7. Invest in “content”—selection criteria and methods for assessing applicants against those criteria.</li> <li>8. Communicate roles and expectations to line managers, HR professionals, and applicants.</li> <li>9. Ensure the competence of HR professionals.</li> </ol>
<b>Operating Practices</b>	<ol style="list-style-type: none"> <li>10. Adopt documentation requirements that balance applicant burden and agency risk.</li> <li>11. Adopt quality control measures to ensure accurate ratings and referrals.</li> <li>12. Use “triage” to manage volume.</li> <li>13. Systematically evaluate and improve the hiring process.</li> </ol>
<b>Subject</b>	<b>Recommendations for OPM</b>
<b>Policy</b>	<ol style="list-style-type: none"> <li>14. Establish (1) a core document that applicants can use to apply for jobs in different agencies; and (2) Governmentwide “applicant service standards.”</li> </ol>
<b>Leadership</b>	<ol style="list-style-type: none"> <li>15. Move toward competency-based qualification standards.</li> </ol>

We conclude this overview by noting that an effective hiring process is a necessity, not a luxury. As one senior Federal official recently observed, Federal agencies cannot meet their workforce needs by filling jobs as quickly as possible with “warm bodies”:

Recruiting and hiring the most qualified individuals takes time, but is

critical to the [Securities and Exchange] Commission's success. We have refused to hire employees simply to fill chairs, but rather are focused on hiring the best and most appropriate people to fill these important positions, and are keenly focused on where each staff person can do the most good.[1](#)

Nor can Federal agencies afford to abandon the "war for talent," relying solely on contractors, other levels of government, or other organizations to hire and provide the talent needed to manage Government programs and deliver public services.

# Introduction

This report describes how agencies are using information technology in the hiring process, especially to assess job applicants. Thus, when we refer to “automation,” we are referring not only to information technology and automated hiring systems, but also to Federal agencies’ use of that technology.<sup>2</sup>

## **Automation has a significant and expanding role in the Federal hiring process.**

Federal agencies were slow to introduce automation to their hiring processes,<sup>3</sup> but progress has been swift. When we began this study in February 2002, we found substantial variation in agencies’ use and understanding of automated hiring systems. The scale ranged from “interested in learning about automated systems” to “implementing an automated system” to “experienced.” Most agencies were at the lower end of the scale; very few were at the higher end. By the time we completed our initial information gathering, most large Federal agencies were actively considering or using one or more automated hiring systems.<sup>4</sup> This shift is permanent. Manual, paper-based hiring processes are rapidly losing ground and will not regain it. Moreover, the role of automated hiring systems is expanding. Agencies do not simply use them as “electronic filing cabinets,” but also use them to assess applicants—to make substantive decisions about applicants’ qualifications and to make distinctions among applicants. For these reasons, it is in agencies’ and the public’s interest to ensure that automated hiring systems are at least as effective as the paper-based hiring systems they replace.

<b>Table 2. Major Steps in the Federal Hiring Process</b>	
<b>Step</b>	<b>Action</b>
<b>1</b>	Define the job and conduct a job analysis to identify job requirements.
<b>2</b>	Select assessment tools.
<b>3</b>	Develop a rating procedure—a method for distinguishing among qualified applicants.
<b>4</b>	Recruit, publicize the job, and receive applications.
<b>5</b>	Review applications for legal requirements.
<b>6</b>	Assess minimum qualifications—determine whether applicants meet minimum requirements.
<b>7</b>	Assess relative qualifications—make distinctions among qualified candidates.
<b>8</b>	Issue a list of candidates to the selecting official.
<b>9</b>	Assess candidates.
<b>10</b>	Select a candidate (or candidates).

## **Hiring includes many steps that can be automated.**

Automated hiring systems can do many things; for example, they can distribute job information electronically, receive on-line applications, assess applicants, notify applicants of the outcome of the hiring process, and eliminate much human labor. As shown in Table 2, hiring typically involves many steps and decision rules and much complex information. We provide a fuller description of the Federal hiring process and its terminology in Appendix A.

Our primary focus in this report is assessment itself: how agencies use technology to evaluate applicants' qualifications. We emphasize the function (assessment) over the means (technology) for two reasons. First, because technology is evolving rapidly, a report that simply catalogued and rated the features of individual automated hiring systems would be obsolete by the time it was published—if not before.

Second, it makes little sense to examine automated systems apart from the underlying hiring process, particularly the key step of assessment of qualifications. Automated hiring systems are a means to an end, and only have value if they help agencies refer and select the best

applicants. As we discuss in this report, automated hiring systems clearly can help agencies do this, a significant achievement given the demands of Federal hiring processes. Yet the outcomes of automation ultimately depend very little on the technology and largely on the quality of the underlying assessment processes. Until an organization is certain that it can consistently distinguish the best candidates from good candidates, and good candidates from mediocre (or unqualified) candidates, automating the hiring process is a waste of time and other vital resources.

Accordingly, this report not only discusses how automation can be used to support assessment of applicants, but also outlines criteria for sound and fair assessment. The report also makes recommendations about assessment and related aspects of the hiring process.

## **Automated hiring systems can support forms of hiring other than competitive examining.**

When conducting this study (for example, when interviewing agency managers and HR professionals), we usually discussed automation and assessment in the context of competitive examining,<sup>5</sup> because competitive examining is the standard means of entry into the competitive civil service.<sup>6</sup> Competitive examining is also procedurally demanding, because agencies must follow rules governing the announcement of job vacancies; receipt of applications; referral, contact, and selection of candidates; and maintenance of records.<sup>7</sup> Thus, competitive examining is an excellent test of an automated system's ability to support other, less procedurally complex forms of hiring, such as merit promotion. Nevertheless, in a merit system, all forms of hiring—whether internal (such as merit promotion) or external, competitive service or excepted service—involve assessment. Therefore, our findings and recommendations have relevance for all forms of hiring and for all agencies.

## **Automated hiring systems are evolving.**

The systems we covered in this study have changed since our data gathering began, and will continue to change. Agencies may also adopt entirely new automated hiring systems, modify their systems and

processes, or use existing systems in new ways. In addition, Federal hiring rules and processes are always subject to change. For these reasons, our observations and conclusions cannot be the final word on automated hiring systems or agencies' use of those systems.

Nevertheless, this report provides a reasonably accurate description of the fundamental capabilities and characteristics of automated hiring systems with respect to their relevance for Federal agencies. This description should remain relevant and usable for at least a few years. Restated, we expect evolution, not revolution. We learned of no major technological breakthroughs on the horizon, and we anticipate that agencies will direct their efforts to implementing and effectively using existing technologies instead of pursuing new and unproven technologies.

# The Business Case for Good Assessment

## Assessment matters.

In a merit system, assessment—by which we mean evaluation of a candidate’s ability to do a job—determines who is actively considered for a job, and who is ultimately selected for a job. And, as noted below, selection decisions are critically important:

Results of wise decisions can range from the mere absence of problems to genuinely excellent outcomes promoting organizational purposes. Cumulative effects in hiring decisions can result in substantial increases in mean performance levels and productivity. Consequences of unwise decisions can range from inconvenience to disaster.[8](#)

The benefits of a good selection are not merely theoretical.[9](#) A recent study by the consulting firm Watson Wyatt Worldwide suggests that selecting highly qualified candidates is not only consistent with merit principles, but profitable. The company surveyed the human capital practices of over 400 private-sector companies and found that companies that hired workers well-equipped to perform their jobs created more value for their shareholders than did less-selective companies.[10](#)

Conversely, the costs of a poor selection are also real. As shown in Table 3, one organization estimates that a poor selection can cost a private sector company as much as three times the employee’s annual salary.



**Table 3. Estimated costs of hiring the wrong person**

Type of Employee	Estimated Costs
Entry-level full-time employee	\$5,000 to \$7,000
\$20,000/year FTE	\$40,000
\$100,000/year FTE	\$300,000

**Note:** Costs include wasted salary, benefits, severance pay, headhunter fees, training costs, and hiring time.

**Source:** Corporate Leadership Council, Literature Review, “Employee Selection Tests,” Catalog No. 070-198-213, Washington, DC, March 1998, p. 2.

Previous Board studies document additional costs borne by Federal agencies that make a poor selection decision. Federal agencies do not have the option of simply terminating a poor performer and “starting over,” unless the employee is serving a trial or probationary period, and the available alternatives are costly.<sup>11</sup> Adverse action (i.e., demotion or termination) will require substantial management attention and staff time. The remaining options—remediation or inaction—are also costly. Remediation entails a potentially lengthy period of reduced productivity: the organization must devote resources to training and counseling the employee while coworkers (or managers) fix or perform the employee’s work. Inaction means that the agency will bear the costs of a poor selection indefinitely and may also harm productivity:

\* \* inaction can create problems far beyond that of a single incompetent worker. It can turn the [work] unit’s better performers into overworked, resentful employees who, noticing the absence of penalties for inferior performance, may reduce their own efforts as a result.<sup>12</sup>

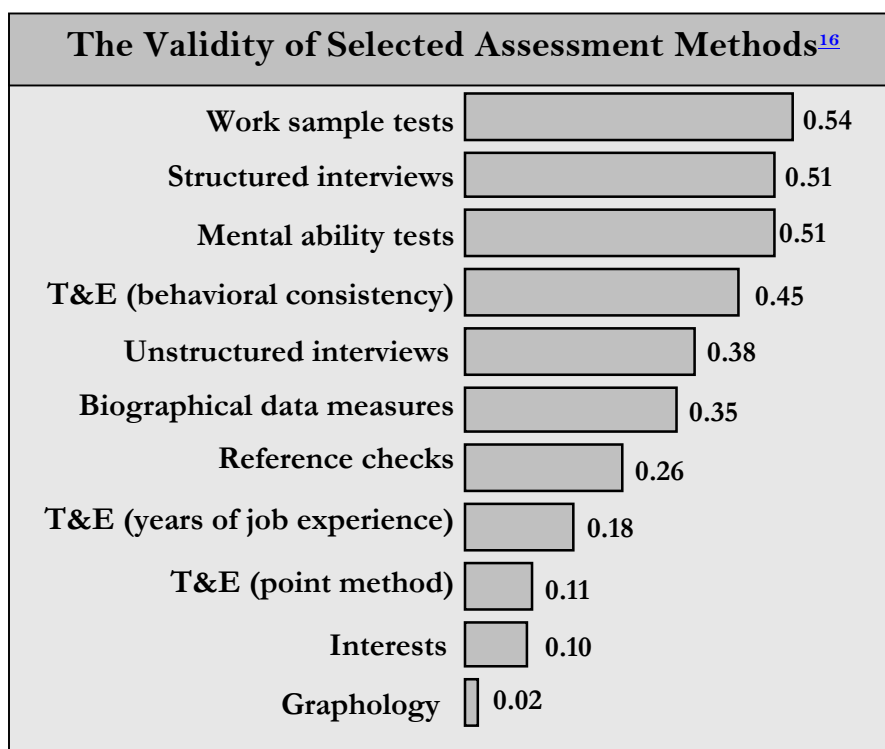
## **Good selections require good assessments.**

Agencies can significantly improve the likelihood of selecting good employees by using assessment methods with high validity. Validity is the ability of an assessment method to predict on-the-job performance.

(Appendix B provides a fuller discussion of the concept of validity.) Good assessments, used wisely, are particularly important for agencies that conduct competitive examining, a process that is notably unforgiving. Competitive examining demands precision, because an agency must be able to identify a small number of promising candidates from a pool of tens or hundreds of applicants. Such examining also demands accuracy, because an agency must not only identify the best applicants, but also provide special selection consideration to certain categories of applicant.<sup>13</sup> Failure to do so may legally compromise any appointment(s) made; there is no tolerance for error. Managers also have little tolerance for error. For example, a manager will not be pleased if the best applicant for a position cannot be selected because that applicant was not rated accurately.<sup>14</sup>

## Assessment methods are not all created equal.

As illustrated in Figure 1, some assessment methods are more valid than others.<sup>15</sup> The most valid methods, such as work sample tests and mental ability tests, make useful distinctions among applicants and provide valuable, if imperfect, predictions of on-the-job performance. The worst methods, such as cataloging applicant’s interests (“Do you like helping people?”) and graphology (handwriting analysis), are useless: they provide no insight into an applicant’s ability to perform.



## **Ratings of training and experience can be useful or useless.**

Most agencies use ratings of training and experience (T&E) to screen and refer applicants. This is understandable: most OPM qualification standards contain explicit experience requirements (and sometimes also education requirements), and the resume—the closest thing to a universal application form—is essentially an applicant’s description of his or her training and experience. And Federal supervisors, by choice or by default, rely heavily on training and experience when making hiring decisions.[17](#)

Yet Federal agencies’ reliance on T&E is not evidence of its validity. Figure 1 shows that the validity of a T&E rating depends on how that rating is done. The best method, known as behavioral consistency, has a validity of 0.45, good enough to be useful. This method is information- and labor-intensive: applicants must provide detailed descriptions of relevant behaviors and accomplishments, and the employer must evaluate those behaviors and accomplishments against preestablished benchmarks. The least valuable method, the “point method,” assigns points based on an applicant’s years of experience, years of education, educational credentials (e.g., degrees), and the like. The point method is fast, simple, and—unfortunately—pointless.

The implications are clear for any agency seeking to use automation in the hiring process. First, the referrals produced by an automated system will be only as good as the underlying assessment method(s). Second, any agency that plans to use an automated hiring system to rate training and experience must pay attention to how the system will make those ratings to ensure that they are valid and useful.

# Participants in the Hiring Process and Their Roles

This section lists the major participants<sup>18</sup> in the Federal process, with a focus on assessment, and describes their roles and responsibilities.

We do this (1) to help the reader better understand the hiring process and our findings; (2) to emphasize that effective, timely hiring is a shared responsibility; and (3) because our findings and recommendations are relevant to all these participants.

The division of labor we describe below is illustrative. Agencies may delegate responsibilities and assign tasks differently. That does not affect our main point: that the responsibility for good hiring decisions does not lie solely with HR. The hiring process, no matter how technically sound or technologically advanced, cannot succeed without the support and cooperation of all participants, including agency leadership, line managers, HR managers and staff, OPM, and applicants.

## **Agency Leadership.**

“Agency leadership” refers to high-level management (the executive layer at the top of an agency, bureau, or major installation). It is axiomatic that agency leadership is responsible for the success or failure of the agency’s programs. Agency leadership is equally responsible for the success of supporting functions such as finance, information technology, and human resources.

These individuals are rarely, if ever, directly involved in the assessment and selection of line employees other than those on their immediate staffs. Yet they are critically important to the process. They create human capital goals and plans; they set priorities and expectations for the HR function; they allocate resources to HR functions (such as recruiting and assessment); and they establish expectations for line managers. For the critical step of assessment, agency leaders decide whether assessment is important and whether to spend the time, money, and “political capital” needed to do it well.

## **Line Managers**

Line managers<sup>19</sup> are directly involved in assessment and selection. As representatives of management, line managers define jobs; identify the knowledges, skills, and abilities (KSA's) or competencies important to the job; and participate in the development of rating procedures. As supervisors, line managers conduct interviews and reference checks and recommend or select new employees. Automation does not relieve managers of these tasks, although it can support these tasks and eliminate repetitive work. In fact, automation makes these tasks more important, because automated hiring systems, unlike human beings, cannot “work around” a deficient job analysis or rating procedure. Nor can these systems identify and deal with applicants who misstate or falsify their qualifications.

## **HR Managers**

HR managers have two distinct roles in the hiring process. As functional managers, they oversee the design, development, and application of staffing policies and assessment procedures. As line managers, they select, train, and evaluate the HR professionals who will advise line managers on staffing issues, develop and use assessment tools, and interpret and apply staffing policies.

## **HR Professionals**

HR professionals are responsible for the day-to-day operation of the hiring process. They coordinate recruiting activities, conduct job analyses, prepare and post job announcements, assess and refer applicants, and respond to applicant inquiries.<sup>20</sup> In most agencies, HR professionals are also the “end users” of the automated hiring system.<sup>21</sup> The timeliness and quality of the hiring process—and consequently the quality of new employees—depends on their expertise, technological competence, and responsiveness.

# The Office of Personnel Management

OPM regulates Federal civilian employment and provides Governmentwide leadership for human resources management. First, OPM regulates employment under title 5, United States Code—the law under which most Federal civilian employees are hired, paid, and managed. For example, when agencies fill jobs through competitive examination, they must comply with OPM-issued rules and instructions.<sup>22</sup> OPM’s authority also covers internal placement (e.g., merit promotions and reassignments) and excepted service employment.<sup>23</sup> Moreover, OPM’s influence extends beyond its regulatory bounds: even when agencies are not required to follow OPM rules or use OPM systems, they may adopt them or develop comparable rules or guidelines.

Second, OPM develops qualification standards—minimum requirements that an applicant or employee must meet to be placed in a position. These standards determine which applicants agencies may consider for jobs (or, more accurately, which applicants they may not consider); they also dictate, at least in part, how agencies will assess applicants.<sup>24</sup>

Finally, OPM manages Governmentwide human resources initiatives and establishes expectations for Federal human capital management. For example, OPM is leading two hiring-related electronic government (“e-gov”) initiatives: Recruitment One-Stop, an effort to standardize and simplify the job search and application process; and e-Clearance, an effort to improve the security clearance process.<sup>25</sup> OPM can also encourage change in less formal ways. For example, in 2002 OPM and the Partnership for Public Service issued a “Pledge to Applicants” that commits OPM and Federal agencies to an open, comprehensible, and timely hiring process.

## Job Applicants

Obviously, the depth and quality of the talent pool depends on job seekers. Individual job seekers decide whether to consider Federal employment and whether to become applicants for Federal jobs. However, applicants’ influence on hiring decisions is not limited to the decision to apply. Applicants also provide most of the information that agencies use to assess and select new employees.

# Research Questions

In conducting this study, we attempted to answer four questions:

**1. How is the Federal Government using automated hiring systems, particularly to assess employees?** This question includes matters such as: why agencies are seeking to automate the application and assessment process; how automated hiring systems operate; and how agencies have modified their application and assessment processes to accommodate or take advantage of automation.

**2. What are the effects of automation?** This question includes matters such as: how automation affects (1) the quality of assessment, referrals, and new employees; (2) time to hire; and (3) the fairness and openness of the hiring process. The standards we used to evaluate the effects of automation, and on which we base our findings and recommendations, are discussed in the next section of this report.

**3. What role should automated hiring systems have in the assessment and selection of Federal employees?** As stated previously, we did not aim to provide a “buyer’s guide” to automated hiring systems but, rather, to determine what these systems can contribute to Federal hiring, particularly the assessment process and the resulting selection decisions. Restated, we wanted to know whether existing systems and technology can meet the requirements of Federal agencies and the Federal hiring process, and if so, what hiring functions they can usefully perform or support.

**4. What should OPM and Federal agencies do to use automation effectively in hiring?** Through this question, we explored approaches, policies, and practices that are essential or helpful to effective use of automated hiring systems. This question also covers broader issues, including assessment strategy, the roles of OPM and agency leadership, and change management.

Our answers to the first and second questions appear in the section titled “Automation Objectives and Initiatives”; our answers to the third and fourth questions appear in the sections titled “Results and Agency Experience” and “Summary and Conclusions.”

# Standards for Merit-Based Hiring

Below, we outline ten standards for merit-based hiring, with a focus on the assessment process. These standards provide a framework for evaluating the role and effects of automation, and for designing and evaluating hiring practices in general. We believe that a hiring process must meet all of these standards to be successful. Success on one standard does not compensate for failure on another. For example, a hiring process whose criteria are valid, but whose requirements are so burdensome that they deter most qualified applicants, is not successful. Similarly, a hiring process that is well-liked by managers, but whose criteria are not demonstrably valid, would be problematic. The standards are as follows.

**1. Make reasonable demands of applicants.** Applying for a Federal job should not be a job in itself. Applicant burden (the level of effort and documentation needed to apply for a job) is not merely a “customer service” issue; it also affects the openness of the hiring process and the quality of selections. An application process that is unduly burdensome (i.e., complex, time-consuming, or both) or restrictive (e.g., “on line application only”) raises the cost of applying and deters applicants who lack the time or resources needed to apply. Such a process is not truly open, even if the position in question was properly announced and made “open to the public.”

**2. Clearly communicate assessment criteria and methods.**

“Openness” does not end with public notice of a job vacancy and a simple application process. Employees and applicants generally distrust selection processes and decisions they do not understand. Accordingly, agencies should communicate assessment criteria (what they are looking for in an applicant) and assessment methods (how they will evaluate applicants against the criteria) to ensure that their hiring process is not viewed as a “black box.”<sup>26</sup>

Communicating assessment criteria also makes sense from an assessment standpoint, particularly when ratings of training and



experience are used. Applicants are more likely to provide useful descriptions of their experience, education, and accomplishments when they know what the employing agency wants. We note that agencies must achieve balance in this area: they must disclose enough to let applicants understand and participate constructively in the hiring process, but not disclose so much that the process is vulnerable to manipulation.

**3. Assess applicants in a manner consistent with merit principles and professional standards.** The merit system principles and related regulations require agencies to use job-related selection criteria and methods.<sup>27</sup> That is, agencies must select assessment criteria (such as knowledges, skills, and abilities) based on their importance to the job and evaluate applicants against those criteria. Job-related assessment is also critical to the perceived fairness of the hiring process.<sup>28</sup> As illustrated below in comments from a major Federal union, acceptance of—or resistance to—automated hiring systems may depend on whether their use is appropriately job-related:

NTEU looks forward to widespread automation of the hiring process. Ideally, it will enable agencies to fill positions faster, to more thoroughly analyze candidate qualifications, and to more deeply study the impact of hiring practices. However, \* \* \* we have noticed issues that concern us. First, among them is the fact that these systems create the opportunity for selecting officials to easily review irrelevant data about candidates. One agency that previewed for us [its] system \* \* \* noted a selecting official would be able to see which other jobs the candidate had not been selected for in the past and the comments that were included in the candidate's file from those other selections. We do not think that is a good thing; in fact, we oppose it. Selections should turn on your competition for the single

position in question, not on unverified observations, or similarly irrelevant information, from another selection action.[29](#)

**4. Evaluate applicants fairly.** Assessment must be even-handed. That is, similarly situated applicants should be treated similarly; assessment, consideration, and selection should not depend on non-merit factors such as ethnicity or personal friendship. However, uniform and nondiscriminatory assessment is not sufficient. Assessment should also be reasonable and reasonably thorough. An applicant's fate should not depend on trivial matters (such as the font size used for the application) or the idiosyncrasies of the rater, whether that rater is a person or a machine. Where automated hiring systems are concerned, even-handedness can be assumed. However, our discussions with agencies—and comments from applicants and Federal managers—clearly indicate that thoroughness and accuracy cannot be assumed.

**5. Consistently refer the best applicants to the hiring manager.** Earlier in this report, we discussed the importance of valid assessment methods. However, the “real world” test of an assessment process is not its theoretical soundness, but its success in practice: whether it yields good employees. If managers are satisfied (or, better yet, delighted) with the quality of the applicants referred to them, that is a positive indication that the underlying assessment process is measuring the right attributes with reasonable reliability.[30](#) If, on the other hand, managers repeatedly complain about interviewing marginal or unqualified candidates or complain that “the system” has discarded the most promising applicants, then that is a strong indication that something is wrong.

**6. Assess, refer, and select applicants in a timely manner.** Managers and applicants believe that timeliness is very important. We agree. First, timeliness affects quality. An organization that takes too long to assess applicants, make selections, or extend employment offers cannot reasonably expect to hire “the best and the brightest.” Those candidates will be lost to other, more nimble employers. Second, timeliness is an important element of fairness and due process. The axiom “justice delayed is justice denied” applies to the hiring process as

well as the judicial process. Applicants are unlikely to view an excessively long hiring process as fair, even if that process is valid and even-handed.

**7. Keep applicants informed.** Any agency that aims to have a “fair and open” hiring process should do more than simply post job opportunities, accept applications, and rate applications. Agencies should also let applicants know where they stand. Applicants should be able to find out whether their application was received, how they rated, when a hiring decision will be made, and whether the job has been filled.

**8. Comply with applicable laws, regulations, and rules.** Following the rules is essential for Federal agencies. As “model employers”—and exemplars of the rule of law—Federal agencies have a special responsibility to comply with applicable laws, regulations, rules, and public policies. Depending on the job (and the legal authority used to fill the job), agencies may have to: announce the vacancy through USAJOBS;[31](#) provide priority consideration to certain applicants; distinguish and refer a predetermined number of qualified candidates; and follow veterans’ preference rules in rating, referral, and selection.[32](#)

**9. Receive and withstand scrutiny.** Automation, contracting, and “partnering” give agencies great flexibility in how they examine. For example, agencies may use a contractor to analyze a job and identify rating criteria, a computer to score applications, and a panel of outside experts to conduct interviews. However, agencies remain responsible for their employment practices. They cannot delegate or “contract out” that responsibility. And that responsibility extends beyond assessment and selection. The Uniform Guidelines on Employee Selection Procedures[33](#) require Federal agencies not only to use job-related employment practices, but also to:

- Maintain information and records needed to evaluate the effects of employment practices along demographic lines (e.g., race, sex, national origin); and
- Defend, modify, or discontinue any employment practice that has an adverse impact.

Maintaining information and records—and rigorously analyzing them—is essential, because a successful defense of an employment practice (such as assessment tools and processes) must be based on hard data. Previously, we noted that managerial satisfaction with the assessment process is important, and can be a good indicator of its soundness. However, the Uniform Guidelines clearly state that managerial satisfaction cannot be used to defend an assessment process:

Under no circumstances will the general reputation of a test or other selection procedures, its author or its publisher, or casual reports of its validity be accepted in lieu of evidence of validity. Specifically ruled out are: assumptions of validity based on a procedure's name or descriptive labels; all forms of promotional literature; data bearing on the frequency of a procedure's usage; testimonial statements and credentials of sellers, users, or consultants; and other non-empirical or anecdotal accounts of selection practices or selection outcomes.[34](#)

Agencies should do more than simply defend existing employment practices when challenged. Instead, agencies should systematically evaluate and improve their assessment processes and tools. Put differently, agencies should examine how they assess and select employees before they receive a complaint from a manager or a legal challenge from a dissatisfied applicant—not after.

#### **10. Make reasonable demands on HR professionals and hiring managers. We include this standard for practical reasons.**

Assessment, including job analysis, is worthy of the time and attention of HR professionals and managers. We do not agree with the proposition that these people should not be bothered with “trivial” matters such as job analysis and assessing applicants. However, we are also realists. An assessment process is only as good as its use in practice; an assessment process that requires time or money that HR professionals and managers do not have—or are unwilling to invest—is unlikely to be effective.

#### **The (Un)Importance of Cost Per Hire**

Our list of standards does not include a low cost per hire. That omission is deliberate. Certainly, an efficient hiring process is

desirable. Some aspects of efficiency, such as applicant burden and timeliness, are important because they directly affect fairness and the quality of the applicant pool. The same cannot be said of cost per hire: applicants neither know nor care how much the agency spends to hire an employee. Of course public money should be spent wisely; all else equal, it is better to spend \$1,000 to select a good employee than to spend \$10,000. And agencies should continually measure and improve their hiring process. But, as the private sector observer quoted below recommends, such efforts should be directed at important matters, such as hiring the right person—not hiring a person as cheaply as possible:

Employees are such a bargain, and hiring costs are such a small percentage of an employee's value, that fretting over the cost of a hire is like agonizing over whether the gumball machine will give you seven or eight gumballs for a nickel. Who cares?

Measuring the cost of each of your hires is one way to spend time. It takes a lot of it. Don't do it. It's a waste. Instead, every HR and recruiting pro should spend time measuring what a top employee is worth. Compare that to what an average employee is worth, then sprint to your CFO's office with the numbers.[35](#)

If this line of reasoning leads agency leaders to conclude that they should spend more time or money on assessing and selecting employees, so be it. It is not always possible to “do more with less.”[36](#)

# Automation Objectives and Initiatives

This section discusses (1) what agencies hoped to achieve through use of an automated hiring system, (2) agency automation initiatives—how agencies went about automating their hiring processes, and (3) OPM initiatives related to assessment and the use of automated hiring systems.

## Objectives of Automation

### **Agencies' primary reason for automating the hiring process was to achieve faster hiring.**

When we talked to agencies, we asked them why they used automated hiring systems. All mentioned speed: to reduce the time to hire by announcing jobs and screening, ranking, and referring candidates more quickly.

Other reasons were to reduce workload and increase efficiency. Less frequently cited reasons were to expand the candidate pool and to improve candidate quality. However, as reflected in a Government Computer News (GCN) interview of Kay Coles James, Director of the U.S. Office of Personnel Management, such reasons were secondary. Timeliness mattered most:

GCN: One of the biggest stumbling blocks to solving the work force crisis is the hiring process. People say it takes much too long.

Kay Coles James: And they're absolutely right. You can't tell me a horror story that I would not nod my head and say "Yes, I agree." \* \* \*  
The question isn't how do you get more people to come [apply for a Federal job]. The question is how do you build the internal capacity to respond to those individuals quickly, to keep them informed as you go

through the process and to make a quick hiring decision so that the best and brightest don't get annoyed with the process and leave?[37](#)

## **Agencies expected automation to reduce the amount of work needed to fill a job.**

Tight budgets, the emphasis on “citizen-centered” government, and a desire to reduce administrative overhead costs are driving agencies to reduce the staff and work time devoted to administrative functions such as staffing.[38](#) Agencies looked to automated hiring systems, which can simplify or perform many of the administrative tasks[39](#) associated with paper-based hiring, to achieve these reductions.

## **Agencies expected automation to improve the applicant pool and the quality of new employees.**

Agencies did not, however, expect to achieve these gains through better assessment. Agencies expected automated systems to be more consistent and less prone to bias (and, in this sense, more fair) than human examiners. But no agency asserted that the system would be more thorough or discriminating (in the positive sense) than a good human examiner. Instead, agencies anticipated—reasonably enough—that a more accessible, comprehensible, and efficient application process would produce a larger, better applicant pool, and that a faster assessment process would reduce the loss of good quality, “in-demand” candidates to other employers.

## **Agencies expected automation to improve the collection and use of hiring data.**

Federal agencies, like other employers, are required to collect applicant flow data. In most cases, agencies must also maintain records sufficient to permit audit and reconstruction of the hiring process. Agencies expected that automated hiring systems would make it easier to collect,

store, and retrieve these records. Agencies also planned to use their automated hiring systems to help them solicit customer feedback and produce basic measures such as time to hire.

## Agency Initiatives

### **An increasing number of agencies are using automated hiring systems.**

The “early adopters” of automation were large agencies (such as Department of Defense agencies, the Department of the Interior, and the National Aeronautics and Space Administration) that had the staff and resources needed to undertake a major information technology initiative. As automated hiring systems have matured—reducing the need for subsequent adopters to develop detailed technical specifications and participate in software development—and their potential benefits have become apparent, more agencies have adopted one or more automated hiring systems. Nevertheless, automation remains more common in large agencies than in small ones, for reasons of cost and, possibly, return on investment.[40](#)

While some agencies are still considering whether to adopt an automated system or which system(s) to use, other agencies with some automation experience are already considering changing systems. A small number appear to be considering multiple systems, sometimes for different occupations and sometimes as sequential processors for the same applicants.

### **Agencies use automated hiring systems that are designed around Federal hiring processes and requirements.**

Current automated hiring systems replicate most of the paper-based processes they replace. This is not surprising, because the laws, regulations, and policies governing Federal hiring are extensive and often highly prescriptive. This greatly limits the imagination and discretion of agencies and the designers of automated hiring systems. Accordingly, the automated systems included in our study are “federalized”: they collect information, carry out processes, and apply



rules particular to Federal staffing.<sup>41</sup> Essential features of a “federalized” system include a way to:

- Determine the basic eligibility of each applicant to be considered for Federal employment;
- Adjudicate applicant claims for special consideration based on special factors (e.g., veterans’ preference, eligibility for career transition assistance programs<sup>42</sup>);
- Assess applicants against the requirements of the job and make distinctions among them;
- List qualified applicants in the proper order (including credit for special consideration claims) when referred to a manager for selection; and
- Maintain documentation needed to allow third-party audit of referrals and selections.

Most agencies have chosen from among five different automated hiring systems. These systems are, in alphabetical order:

- Avue, a product of Avue Technologies Corporation;
- Commerce Opportunities On-Line (COOL), developed by the U.S. Department of Commerce;
- QuickHire, a product of QuickHire LLC, a division of Monster Government Solutions;
- Resumix, a product of Yahoo! Resumix; and
- USA Staffing, developed by OPM.

Each system follows one of two models. We refer to the first model as “question-based.” In the question-based model, the system uses questions to determine whether, and how well, the applicants meet the requirements of the job being filled. Generally, questions are forced-choice, requiring the respondent to choose from among a set of provided responses (such as “yes” or “no”). Questions of this type may

be combined with a free-form narrative in which applicants can explain or support their response choices. Avue, COOL, QuickHire, and USA Staffing follow this model. We refer to the second model as “application-based.” In this model, the automated system applies logic to “read” an application and identify the applicant’s competencies and credentials. Resumix follows this model. Resumix differs from the other systems in one other important respect: it is not “federalized.” For this reason, agencies that use Resumix supplement it with “bolt-on” programs to collect information and apply decision rules specific to the Federal Government. Appendix C provides a more detailed description of how the two models operate.

## **Agencies’ automated hiring systems retain much of the substance of paper-based hiring.**

We mentioned earlier in this report and have noted in previous reports<sup>43</sup> that Federal agencies usually assess applicants in terms of their training and experience (T&E) instead of assessing them on factors such as job knowledge or cognitive ability.<sup>44</sup> That pattern continues with automated hiring systems: all the systems we reviewed in this study are designed to assess training and experience.<sup>45</sup> This is convenient—and encouraged by the structure of most existing qualification standards—but it is not necessarily effective. As discussed earlier, the value of a T&E rating depends on the rating method. This dependence, combined with the documented variability in the capability of agency delegated examining units,<sup>46</sup> has significant implications for the value and use of automated hiring systems.

## **Agencies’ automated hiring systems enable agencies to make some systematic changes in recruitment and assessment.**

As we noted earlier, Federal agencies have limited discretion in many aspects of hiring. Although automation does not change that fact, automation does make it easier to use some existing flexibilities. For example, automated hiring systems are well-suited to establishing and maintaining inventories (also known as standing registers) of qualified applicants. Inventories are particularly useful for organizations that

engage in continuous recruitment for an occupation or have high-volume or “peak-and-valley” hiring needs.

Automation also enables agencies to improve the assessment process, not just make it more efficient. The speed of automated systems makes it easier to follow an initial rating of training and experience with other rigorous assessments, such as a structured interview or a work sample test, and to factor those assessments into referral and selection decisions.<sup>47</sup> The use of multiple assessments in sequence (an approach known as “multiple hurdles” or “phased assessment”) has always been desirable, but automation makes it more practicable. We provide additional information about the multiple hurdles approach in Appendix D.

However, relatively few agencies have used automated hiring systems to reengineer their hiring process. Instead, agencies have tended to automate the existing process, an approach familiarly known as “paving the cowpath.” Most agencies continue to announce most jobs on a case-by-case basis, even in situations where it might be more effective to announce a job once and establish an inventory of candidates. Most agencies also continue to evaluate and refer applicants based on a single rating of training and experience.<sup>48</sup>

We have already mentioned the key factors that have contributed to this approach: an emphasis on expediency over quality when hiring; the highly regulated Federal hiring process (discouraging inventiveness); qualification standards written in terms of experience (encouraging assessment through T&E); and—all too often—HR offices and staff that lack the support, time, or expertise needed to significantly change the process.

## **Agencies took different approaches to implementing an automated hiring system.**

As discussed above, agencies used similar technologies and applied those technologies in conceptually similar ways to similar processes. However, agencies varied in how they introduced and implemented their automated hiring systems. Some agencies took a systematic approach and devoted considerable time and money to designing the

hiring process, planning the introduction of the automated hiring system, and introducing the automated hiring system. Other agencies directed most of their initial attention and resources toward acquiring and configuring the automated hiring system.

### **OPM Activities and Initiatives**

OPM is working on several initiatives that should (or could, if fully developed and implemented) improve the hiring process and the effectiveness of automated hiring systems.

## **Governmentwide standards for the application process**

First, OPM is leading an e-government initiative called Recruitment One-Stop (ROS) that will consolidate and maximize gains from the use of technology in the hiring process. ROS has already produced major improvements in USAJOBS. Plans include an application builder that will work with all major hiring systems and a requirement for agencies to provide applicants with on-line access to the status of their applications. These steps will do much to simplify the search for a Federal job—a quest that is often gratuitously labor-intensive and frustrating.

Second, in 2002 OPM published a “Pledge to Applicants” committing OPM and Federal agencies to an application process that will “enable rather than deter job seekers.”<sup>49</sup> The pledge includes a reasonable application process, timely information on the status of job vacancies, and timely hiring decisions. This pledge recognizes that Federal agencies have obligations to applicants that go beyond compliance with the letter of the law and provides constructive goals for agencies’ hiring processes. MSPB supports this pledge, which contains several of our own standards for the hiring process.

## **Experimentation with new methods of recruitment and assessment**

In 2002, OPM held a “virtual job fair” for information technology occupations. This job fair demonstrated the potential of Internet-based

recruiting and the ability of automated hiring systems to process large numbers of applications quickly. In connection with that job fair, OPM also used a brief objective test to evaluate applicants, demonstrating that such assessment tools can be used effectively in a format other than paper and pencil.

## **Experimentation with new qualification standards**

Most existing qualification standards for white-collar occupations are written in terms of experience and education. Such standards are problematic: they are prone to inconsistent application, their value in distinguishing good from poor applicants is limited, and they emphasize training and experience over other, potentially better, indicators of ability. Such standards are also, despite their surface simplicity, not always easy to use or to automate: their application can require much data and interpretation.[50](#)

For two occupations, accounting and information technology management, OPM has developed and tested an alternative: job profiles, or qualification standards written in terms of competencies. This approach has considerable promise: job profiles can provide more detailed and (we believe) more valid descriptions of occupational requirements, and are more amenable to automated application than traditional qualification standards. However, OPM and agency experience with these profiles, although generally positive, clearly shows that job profiles are not a “quick fix” solution: they are costly to develop and require competent users and sound assessment methods. Much more must be done for this approach to become widespread and effective. We understand that OPM plans to move forward with competency-based qualification standards, building on experience from the pilot job profiles.

# Results and Agency Experience

This section describes Federal agencies' experiences with their automated hiring systems, including the results of automation, issues raised by the introduction of an automated hiring system, and "lessons learned."

## **Results varied.**

Automated systems are tools, not solutions. To use an analogy, a chef's knife is merely a tool; its use does not guarantee good cooking. The quality of the cooking ultimately depends on other factors, such as the quality of the ingredients and the chef's competence. Similarly, the use of an automated hiring system does not guarantee an easy-to-use application process, high-quality referrals, fast hiring, or increased efficiency.

As discussed below, agencies devoted different levels of attention and resources to the introduction of an automated hiring system. It is not surprising, then, that referral quality—and every other important aspect of hiring, from applicant burden to timeliness to fairness—depended on how the agency used its chosen system(s). Some agencies were able to consistently refer promising candidates to hiring managers; others struggled to refer good (or even qualified) candidates. Some agencies succeeded in increasing the pool of applicants and reducing time to hire (or at least time to referral); others were buried under a figurative pile of applications. Some agencies provided a reasonable and understandable application and assessment process; others provided a process that many applicants considered bureaucratic and obscure.[51](#)

## **Results were affected by how an agency introduced its automated hiring system.**

Hiring is a complex process that affects everyone in an organization, from executive to manager to employee. Moreover, the hiring process

does not merely affect these groups, but also depends on each group's constructive participation in the process. Thus, the introduction of an automated hiring system is much more complex than a routine upgrade to computer hardware or software.

Agencies that approached this introduction in a systematic, comprehensive way—that engaged in what is commonly called “change management”—fared much better than agencies that did not.<sup>52</sup>

Agencies did not succeed simply by acquiring the “right” hardware or software or having the “best” IT and HR professionals. Agencies that achieved good results were attentive to both technical issues (such as selection criteria, measurement, staffing policies, and IT infrastructure) and human issues (such as training, employee roles, and resistance to change).

## **Results depended on the soundness and quality of “content”**

The adage “garbage in, garbage out” continues to apply to the hiring process. Automated hiring systems, like their paper-based predecessors, depend on what we call “content.” Content comprises (1) the job-related attributes (such as competencies) to be assessed, (2) the measures of those attributes, and (3) the methods used to translate those measurements into applicant ratings (e.g., scores or rating categories). Table 4 illustrates two points. First, content is the basis of any merit-based hiring process, paper-based or automated. Second, automated hiring systems use content in formats unlike those used in paper-based processes.

<b>Table 4. Comparison of Formats for Evaluating Training and Experience</b>			
<b>Content Element</b>	<b>System Type</b>		
	<b>Paper-Based</b>	<b>Question-Driven</b>	<b>Application-Driven</b>
<b>Attributes</b>	Knowledges, skills, and abilities and other characteristics (KSA's) or competencies.		
<b>Measurement</b>	Rating of application against benchmarks	Question responses	Analysis of application text
<b>Translations</b>	Crediting plan	Question response values and weights	Keyword values and weights

Agencies indicated that the development of good content required a substantial investment. Agencies could develop content in several ways, including contracting for technical assistance, convening panels of HR professionals and subject matter experts, and using recurring discussions between individual HR professionals and subject matter experts.<sup>53</sup> Each way has advantages and disadvantages, but all require a substantial investment of time and money.

Agency experience makes it quite clear this investment is essential: good content is a necessity, not a luxury, and good content cannot be acquired cheaply. Organizations that sought short cuts to developing content (such as “quick and dirty” adaptation of paper-based content or borrowing or buying another organization’s content) were almost always disappointed. These organizations found that their content was not effective: the assessment process failed to measure important attributes, failed to make useful distinctions among applicants, or both.<sup>54</sup> The result was either inaccurate differentiation (e.g., highly qualified candidates rated lower than less qualified candidates) or minimal differentiation (e.g., candidates of varying quality levels all received similar ratings).



## **Automated hiring systems, if used properly, can meet standards of merit-based hiring.**

Earlier in this report, we outlined 10 standards for merit-based hiring. Agencies believed—and we agree—that automated hiring systems can be part of a process that meets these standards. Specifically, automated systems can do much to make the hiring process:

- **Not unduly burdensome.** Automated hiring systems cannot, at present, make it possible to apply for a Federal job without effort. Federal agencies simply require too much information for that to be possible. But technology can make the job search much more efficient and the application process less paper-intensive and time-consuming.
- **Transparent.** Automated hiring systems do not prevent agencies from providing clear, helpful descriptions of job requirements, desired skills, and the assessment process. In fact, as shown in demonstrations of planned upgrades to USAJOBS, effective use of technology can make this information much easier to find.[55](#) But neither does technology force agencies to make their assessment criteria transparent. For example, although applicants using question-driven systems will usually be able to deduce what attributes (e.g., experience, skills, and credentials) the agency is seeking, they will not know what weight (if any) the agency will give those attributes unless the agency provides that information. Similarly, applicants using an application-driven system will not know what attributes the agency is seeking, let alone what weight will be given to those attributes, unless the agency chooses to disclose them.[56](#)
- **Thorough, fair, and able to consistently distinguish among applicants to identify the most promising.** Automated hiring systems cannot meet these standards unaided. In their current form, they are not realistically capable of more than a rough and imperfect sorting of applicants. These systems' initial evaluations of training and experience must be supplemented by human judgment—and subsequent assessment(s), manual or automated—if the process is to be fair and thorough, as opposed to impartially cursory.

- **Compliant with legal requirements and professional standards.** Automated hiring systems can apply decision rules and mathematical formulas quickly and accurately. Yet agency compliance with legal requirements cannot be left entirely to automated systems. People must still decide which laws and regulations apply and whether to obey those laws and regulations. For example, automated hiring systems can do much to assure that veterans' preference is applied when required—but they cannot force selecting officials to observe veterans' preference. The same is true of compliance with professional standards (such as the Uniform Guidelines) and merit system principles. Automated hiring systems can contain databases and decision guides to help managers and HR professionals prepare job descriptions and choose effective, job-related selection criteria. But the systems can neither assure that the “virtual” job description accurately reflects the actual job, nor prevent managers from applying ineffective or inappropriate selection criteria, either online or “off line.” [57](#)
- **Able to withstand scrutiny.** As noted above, automated hiring systems can support assessment practices and hiring decisions that meet legal and professional standards. And automated hiring systems can collect data on the hiring process, helping agencies better understand how that process is working and, when needed, demonstrate the soundness and legality of their hiring decisions.

## **Agency experience suggests that initial ratings of training and experience—whether automated or manual—are better used to sort applicants than to select them.**

Agencies with effective “content” found that their automated hiring systems could make useful distinctions among applicants. For example, staff at the U.S. Geological Survey, which uses a question-driven automated hiring system, stated that a carefully chosen set of questions would usually produce a wide distribution of scores, with relatively few applicants earning very high scores. Similarly, staff from NASA, which

uses an application-driven system, believed that their system produced good results when supported by thorough job analysis, a well-written vacancy announcement, and a sound rating procedure. These users also indicated that these distinctions were—with appropriate quality control measures in place—at least as clear and accurate as the distinctions previously made by people reading applications and scoring applicants.

Nevertheless, our discussions with these and other agencies make it very clear that initial automated assessments of training and experience should not be used to make fine distinctions among applicants. This is not a criticism of automated hiring systems. Instead, it is a fundamental limitation of the underlying method of assessment and its context, whether automated or manual.

As we have noted, ratings of training and experience provide only limited (albeit useful) insight into an applicant's ability. That insight is further limited by practical constraints on the quantity and quality of information available to agencies during initial assessment and constraints on how much time and effort agencies can devote to evaluating that information. Moreover, regardless of automation, evaluation of training and experience is not a particularly effective tool for measuring many attributes—such as writing ability, problem solving, or interpersonal skills—that are important in many Federal jobs.

For these reasons, while initial assessments of training and experience are useful for identifying an “A group” of promising candidates, they are much less effective at identifying a small, predetermined number of candidates to be considered to the exclusion of all other applicants.<sup>58</sup> Yet the latter approach is precisely how many agencies have used these assessments. This approach may have been necessitated by the realities of paper-based examining (many applications and few staff and limited time to process those applications). However, it has never been sound assessment practice or a good way to hire the best qualified people. Automation does not change this fact.

## Automated hiring systems, used properly, have great potential to improve how jobs are filled.

As we have indicated above, agencies believe that their automated hiring systems are fully adequate for performing many hiring tasks. But automated systems can be more than “good enough.” Automated systems have potential to improve hiring processes and hiring results. In particular, automated hiring systems can help agencies meet higher standards of:

- **Timeliness.** Agency experience generally confirms what logic suggests: that automation can significantly improve timeliness.<sup>59</sup> For example, HR staff at the Department of the Interior’s U.S. Geological Survey report that they can deliver a list of candidates to the hiring manager within 7 days of the closing of the vacancy announcement, in contrast to the 30 to 60 days that was typical before automation. Such speed was implausible (or prohibitively costly) when examining was paper-based and, as the quote below suggests, it surprises applicants who expect a slow-moving process:

Interesting thing! I had a declination from one of my applicants. Okay, why is that interesting? She said she applied for my position figuring she would not hear from us for several MONTHS by which time she would know whether she and spouse would be moving to the area. She was astounded that I had a certificate two business days after the announcement closed. She declined consideration because she was not prepared to move for several months \* \* \*.<sup>60</sup>

But agencies also indicated that improvement is not guaranteed. Several conditions must be met to improve timeliness and to ensure that greater speed is not an empty achievement. These include an assessment process that consistently produces good (not just fast) results and hiring policies and practices adapted to automation.

- **Selection Quality.** Automated hiring systems can improve the quality of new employees in two ways. First, these systems can improve the pool of applicants by making it easier to apply for jobs. Agencies noted that the improvement is not uniform; automating the application process tended to increase the number of unqualified or marginally qualified applicants as well as the

number of good applicants. But agencies also believed that automation had improved their ability to reach and attract “passive applicants”<sup>61</sup>—prospects who were usually not willing to enter the “essay contest” typical of Federal paper-based hiring.

Second, automated hiring systems can improve selection quality by helping managers identify the best candidates. Automated hiring systems give agencies several options for improving applicant assessment. Table 5 lists and briefly describes them.

<b>Table 5. Options for Improving Assessment Using Automated Hiring Systems</b>	
<b>Option</b>	<b>Discussion</b>
<b>Improve evaluation of training and experience.</b>	Compared to paper-based approaches, automated hiring systems can: <ul style="list-style-type: none"> <li>• Assess applicants on more competencies;</li> <li>• Collect more specific information on an applicant’s competencies; and</li> <li>• Apply more complex decision rules when sorting applicants.</li> </ul>
<b>Multiple hurdles—follow initial assessment with one or more structured assessments.</b>	Automated systems can: <ul style="list-style-type: none"> <li>• Provide guidance on the content and conduct of secondary assessments. For example, an automated system could “suggest” interview questions and provide a scale for rating candidates’ responses;</li> <li>• Help administer the assessment; and</li> <li>• Assist in the recordkeeping and administration associated with the use of multiple assessments.</li> </ul>
<b>Use alternatives to evaluation based on training and experience.</b>	Most of the automated hiring systems used by Federal agencies can or should soon be able to support objective tests (such as job knowledge and cognitive ability tests). The Federal Government has traditionally used such tests for both screening and ranking, but this is not mandatory. Such tests could be used either for the initial screening or to make distinctions within a group of promising applicants after the initial screening. <p>Technology can also support other methods of assessment, such as work samples or assessment</p>

	centers.
<b>Use category rating.</b>	<p>Category rating is not a method of assessment; it is a method of sorting and selection. Under category rating, an agency sorts candidates into quality groups (e.g., “C,” “B,” and “A”) and selects from the highest group, instead of assigning numerical scores, ranking candidates (that is, referring candidates in order of score), and following the “rule of three” in selection.<sup>62</sup></p> <p>We list this option here because it supports the assessment options described above. In particular, it is an ideal complement to the use of multiple hurdles.</p>

As discussed above, there are limits to the precision and practical uses of the initial rating of an applicant’s training and experience.

Nevertheless, automated hiring systems can help make these ratings more useful, by improving:

- **The quantity of information that can be collected from applicants.** For example, few applicants would tolerate a request to provide specific, written descriptions of training, experience, and accomplishments on 10 distinct competencies. Compared to paper-based hiring, automated hiring systems can collect more information with much less work on the applicant’s part.
- **The quality of information that can be collected from applicants.** Under paper-based examining, it is rarely feasible to request that applicants provide precise—much less standardized—descriptions of their experience and accomplishments. Automated hiring systems make this possible, within limits; and
- **The sophistication of applicant sorting.** Under paper-based examining, raters rarely have the time or information needed to evaluate applicants on more than a few KSA’s or competencies. Consequently, the method used to sort and refer applicants is usually quite crude: the more points, the better. As noted above, automated systems may have more information to work with—and if they do, these systems can apply decision rules that reflect a

more subtle understanding of jobs and applicants' qualifications.[63](#)

## **Agencies that made systematic improvements in the hiring process had better results.**

Few agencies we talked with had made extensive use of the options described in Table 5.[64](#) However, agency experience suggests that they should: agencies that used automation to improve the hiring process, instead of simply replicating the previous paper-based process, achieved better results. For example, the U.S. Geological Survey devoted substantial time and effort to improving the initial assessment of applicants, yielding a process that was much better able to distinguish good from mediocre applicants. The National Aeronautics and Space Administration (NASA) used examining flexibilities to allow managers to consider more highly qualified applicants than they could under standard methods of referral and selection.[65](#)

The options described above may be used singly or in combination. However, we believe that the category rating option should not be used alone, but, at the very least, should be used with the multiple hurdles option.[66](#) This is because the process that was used to sort candidates into categories probably evaluated only a limited number of competencies using limited information. If so, then further rigorous assessment tools (i.e., multiple hurdles) should be used before a selection is made. Not to do so is to treat as equals candidates who may differ in important and measurable ways, or to rely on superficial assessment (or nonassessments such as random numbers[67](#)) to make specious distinctions among candidates, instead of valid distinctions.

## **Automated hiring systems raise policy issues.**

Agencies indicated that automated hiring systems are a mixed blessing. Automation can expand the applicant pool (i.e., increase the number of applications)—but the agency must then process those applications. Automation can be used to create a paperless application process—but the agency must then do without paper or find an adequate substitute. Automation greatly reduces human involvement in initial screening and sorting of applicants—reducing workload and the potential for

errors in judgment and subtle or overt discrimination—but also introduces the possibility that applicants’ inadvertent or deliberate misrepresentation of their qualifications will go undetected and uncorrected. Consequently, agencies have found that they need ways to: (1) balance applicant burden and agency risk; (2) manage volume (that is, a large number of applications); and (3) assure the integrity of the assessment and referral process.

**Balancing Applicant Burden and Agency Risk.** This issue is one of documentation: what to require and when to require it. In the past, most agencies required applicants to submit documentation of their qualifications and eligibility (such as college transcripts, veterans’ preference claims forms and documentation, and lists of awards and training received) at the time of application. This made sense when the process of examining relied on paper (and the postal system to deliver that paper). Most agencies also took a “no risk” approach to rating, usually rating candidates ineligible unless they proved their eligibility. That caution reflects, in part, the Federal system’s lack of tolerance for error. But caution also cost little in a paper-based system: the documents needed to verify eligibility and the human examiners needed to review and analyze those documents were both readily available.

The introduction of an automated hiring system raises the cost of caution. First, requiring applicants to provide transcripts, service records, and the like along with their resume or questionnaire may deter people from applying—especially highly accomplished applicants who can attract competing offers with little effort. Second, such a requirement simply creates two parallel application processes, one paperless and one paper-based, forfeiting many of the possible benefits of automation.

Thus, it is problematic for agencies to require applicants to document each claim and credential “up front.” Yet neither can agencies afford to go paperless and accept all applicant claims at face value. At some point, agencies still need paper (or its electronic equivalent) to document applicants’ citizenship, education, licensures, military service, and the like.

**Managing Volume.** This issue is not new; agencies have long struggled with how to process large numbers of applications. Yet



automation makes the issue more pressing. Compared to paper-based job announcement and application processes, well-designed automated processes will make it easy for applicants to find job information and apply for jobs. The likely consequence is that agencies will receive unprecedentedly large numbers of applications. Agencies must find ways to handle these applications that are both fair and expeditious. Otherwise, agencies will (1) be buried by applications, (2) seek to artificially limit the number of applications received, possibly by establishing new barriers to application, or (3) resort to cursory assessment of applicants, driven by considerations of cost and time.

### **Assuring the Integrity of the Assessment and Referral Process.**

“Assuring the integrity of the assessment and referral process” means more than following laws and regulations and treating candidates even-handedly. It means assuring that the process is fulfilling its primary purpose: making consistent, accurate, and merit-based distinctions among applicants. Automated hiring systems can help achieve this purpose. They are less likely than people to lose or misfile an application; they do not tire; they bring neither prejudices nor feelings to the assessment process; they do not make mathematical errors. However, automated systems’ relative freedom from these human failings does not mean that their results can be accepted at face value. As we discuss below, research and agencies’ experience clearly show that human judgment and intervention are still needed to maintain the integrity of the hiring process.

Relying solely on applicant-provided information and applicant self-ratings to make merit-based distinctions is ill-advised. Even applicants who try to be honest (who, we hope, constitute the vast majority of applicants for Federal jobs) may systematically overestimate or underestimate their abilities. Research suggests that individuals may tend to self-enhancement (i.e., an unduly positive view of one’s abilities and accomplishments) or self-diminishment (i.e., an unduly modest self-image).<sup>68</sup> Table 6 summarizes the risks and consequences associated with both overstatement and understatement.

**Table 6. Consequences and Risks of Self-Rating Errors**

<b>Error</b>	<b>Consequences</b>	<b>Level of Risk</b>
<b>Overstatement (Self-Enhancement)</b>	<p>Less qualified applicants may be “screened in” and referred to the hiring manager. Depending on the referral and selection rules in effect, this may exclude other, better qualified candidates from consideration.</p> <p>If this error occurs, it can be detected and corrected, especially if the assessment is conducted through “multiple hurdles.”</p>	<p>Applicants have a clear incentive to overstate their qualifications.<sup>69</sup></p> <p>Overstatement may be more likely among candidates who have unrealistically positive self-images.</p>
<b>Understatement (Self-Diminishment)</b>	<p>Highly qualified applicants may be excluded from consideration. If undetected, the error is fatal to these applicants’ employment chances.</p> <p>Detection is unlikely, even under a multiple hurdles approach, unless the agency takes steps to review and correct self-ratings.</p>	<p>Applicants have no incentive to knowingly understate their qualifications. However, understatement may occur for reasons such as modesty or an imperfect fit between applicants’ experiences and the questions they are asked to answer during a self-rating exercise.</p>

The Recommendations section of this report provides some suggestions on how agencies can manage these risks.

## **Automation’s long-term effects on efficiency are not yet known.**

Many agencies hoped that automated hiring systems would allow them to make the hiring process more efficient, not just faster. Some agencies anticipated that greater efficiency would enable them to

reduce the level of HR staff without compromising hiring timeliness or quality.

Yet the agencies we talked to, including those that had achieved significant improvements in timeliness, did not tell us that they had significantly reduced their level of HR staff. Moreover, Federal employment data provide little evidence of such reductions.[70](#) Possible explanations for this include:

- **Increased volume of applications.** Efficiency gains may be offset by an increased number of applications;
- **The “learning curve.”** Automated hiring systems can require new skills, from the mechanical (“which buttons to push”) to the technical (e.g., developing rating procedures in the format required by the automated hiring system) to the professional (e.g., working with managers as a “consultant” instead of “processor”). Until HR staff develop these skills and become fully productive, staff reductions make little sense;
- **Transitional work.** Automated systems use content in formats that differ from that used in paper-based hiring. For example, existing KSA’s and crediting plans must be rewritten as questions and response scales or as keywords and grammar. Moreover, many agencies found that it was not sufficient to simply convert existing “content” into the format used by the automated hiring system, because that content was itself dated or flawed. Consequently, many agencies had to develop new content or spend much time “fixing” or reissuing referral lists;
- **Rising expectations.** Federal agencies are paying greater attention to human capital issues at both the strategic level (e.g., linking staffing levels and recruiting efforts to organizational goals) and the operational level (e.g., writing better vacancy announcements). This attention may have (1) limited any short-term gains in efficiency by preventing automation of “business as usual” or (2) diverted any gains in efficiency in the hiring process achieved through automation;[71](#) and

- **Aging of “content.”** Jobs, work methods, and terminology are not static. They change, as do agencies’ missions and workforce needs. Applicants also change. Over time, applicants can discern which questionnaire responses (or words and phrases) produce higher ratings, and unscrupulous applicants may provide the “right” answers regardless of their actual qualifications and accomplishments. For these reasons, agencies cannot develop content once and reuse it indefinitely, but must continually maintain and refine their content—which requires work.

Thus, it appears that automation’s promised gains in efficiency (1) have yet to be fully realized; (2) are less than some agencies hoped; or (3) will not necessarily be reflected in HR staff levels. It is simply too soon to tell.

## **Competent HR professionals are critical to effective use of automated hiring systems.**

Automated systems may eventually perform much work previously or currently performed by HR staff.<sup>72</sup> Yet these systems do not eliminate the need for competent HR professionals. On the contrary. Designing and administering an effective hiring process requires knowledge of many areas, including the organization’s mission and workforce needs, employment laws and regulations, negotiated agreements, and assessment principles and methods. HR professionals are more likely than any other group (including line managers, attorneys, contractors, and personnel psychologists) to have knowledge of all of these areas.

In fact, agencies found that the introduction of an automated hiring system increases the need for competent HR professionals. First, it is much more difficult to design new tools and processes than to administer existing ones. For example, an HR assistant can apply a predeveloped crediting plan with reasonable consistency and accuracy. An HR assistant will be much harder pressed to translate a written crediting plan into questions, keywords, and decision rules. That task requires both an understanding of the fundamental properties of an automated hiring system and experience in developing assessment tools.

Second, it appears that the need for new and greater skills is not transitory. Instead, automated hiring systems “raise the bar” for HR professionals. These systems can minimize or eliminate tasks such as screening applicants, calculating ratings, and compiling referral lists, but they do not eliminate high-level functions such as developing assessment strategies and rating procedures. Moreover, it appears that these high-level functions are becoming more demanding, not less. For example, the agencies that had greater success with automated hiring systems used selection criteria and rating procedures based on extensive data collection and analysis. The sophistication of these criteria and procedures far exceeded that of most “traditional” KSA’s and crediting plans.

Finally, automated hiring systems do not merely require that HR professionals know more. They also require that HR professionals do more. HR professionals cannot be passive operators or observers of automated hiring systems. HR professionals must identify and choose effective selection criteria; they must monitor the operation of the automated hiring system to ensure that it is working properly; and they must ensure that the content (and not merely the format) of referral lists is satisfactory. These tasks require judgment, decisiveness, and acceptance of accountability.[73](#)

Agencies reported that not all HR professionals were prepared to perform at this higher level.[74](#) Causes varied. In some cases, staff had never received appropriate training or acquired the necessary skills. In other cases, important skills and behaviors had simply fallen into disuse. Whatever the cause, many agencies found that they needed to provide coaching or training so that HR staff could perform new functions and assume new roles.

# Summary and Conclusions

## Hiring Decisions and Assessment Tools

- Hiring decisions have long-term consequences for an organization's productivity and performance. Therefore, quality—not speed—should be the primary measure of the success of hiring decisions and the underlying hiring process.
- Good hiring decisions require valid selection criteria and effective assessment tools. Managers' good intentions and unaided judgment will not suffice.
- Assessment tools are not all created equal. Evaluation of training and experience—the Federal Government's most commonly-used assessment tool—can be useful, but only if that evaluation gives credit only for training and experience that is clearly relevant to the job's roles and duties. Mechanical evaluations of training and experience, such as those that give “automatic” credit for years of experience or education, have little value.
- Qualification standards based on training and experience, the Federal Government's most common type, may be a barrier to efficient, effective hiring. Their validity is uncertain and they may exclude qualified candidates who have followed atypical career paths.<sup>75</sup> The primary argument for use of such standards—administrative convenience—has become less compelling with the emergence of automated hiring systems and competency-based qualifications.

## The Potential of Automated Hiring Systems

- Automated hiring systems offer speed, consistency, and economies of scale. However, these benefits do not guarantee good results. Results depend on how agencies use and support their automated hiring systems.
- Automated hiring systems can help agencies distribute job information quickly and widely and reduce applicant burden.

However, automated hiring systems are not a substitute for recruitment programs. They are merely tools to support recruitment.

- Agency experience indicates that both the question-driven and application-driven approaches to assessment can produce usable results. However, the approaches are very different. Agencies need to understand the capabilities and limitations of their chosen approach and their chosen automated hiring system(s).
- Automated hiring systems can and should be used to improve the initial sorting of applicants. However, these systems do not transcend the limitations of any initial assessment of applicants. Thus, automated hiring systems are better suited to making broad distinctions among applicants (e.g., not qualified, qualified, highly qualified) than to making fine distinctions (e.g., selecting among highly qualified applicants).
- Automated hiring systems are not restricted to evaluating training and experience. These systems can be used to administer or support other types of assessment, such as objective tests and structured interviews.
- Automated hiring systems can be used to analyze and understand the hiring process—not just administer it. Federal agencies have only begun to make use of this ability.
- Automated hiring systems may provide long-term gains in efficiency. However, the introduction of an automated hiring system requires much transitional work, requires new skills, and changes the roles of managers and HR professionals. For these reasons, it may be unrealistic to expect immediate gains in efficiency, especially ones that translate into HR staff reductions.

### **Designing a Hiring Process and Using Automated Hiring Systems**

- Agencies must balance competing objectives when designing a hiring process. Agencies should take care to ensure that mandates—such as legal compliance and fair treatment of applicants—and immediate concerns—such as reducing time to

hire—do not overwhelm the most important objective: systematic identification of the best person(s) for the job.

- Agencies should use automated hiring systems to do more than simply “pave the cowpath.” Agencies that materially changed and improved the hiring process, instead of merely replicating the preexisting paper-based process, generally fared better than agencies that sought to faithfully replicate the paper-based hiring process. The agencies that achieved the best results changed their assessment and referral processes, not just the application process.
- The quality of selections depends on “content”—the criteria and methods used to distinguish among applicants. Agencies using automated hiring systems report that good content requires an investment of time and effort, just as it does in manual systems.

### **Use of Automated Hiring Systems**

- Agencies should evaluate their paper-based content before translating it into the format used by their automated hiring system. Experience suggests the relevance and soundness of paper-based content cannot be assumed.
- Automated hiring systems can sharply increase the volume (number) of applications received. Agencies need to develop strategies to handle this volume; they cannot rely solely on automated hiring systems to do this.
- Automated hiring systems rely heavily on self-reported information. Agencies have found that undue reliance on self-reported information can compromise the quality of referrals and the integrity of the hiring process. Consequently, agencies found that quality control—a procedure for verifying and documenting applicant’s self-ratings, and modifying ratings, referrals, or both when appropriate—is critical to consistent referral quality and the integrity of the hiring process.



# Recommendations

We offer the following recommendations to maximize the benefits of using automated hiring systems and to improve the Federal hiring process. For convenience, Appendix F lists these recommendations on a single page and links them to factors critical to the successful use of an automated hiring system.

## **Federal departments and agencies should—**

### **A. With respect to leadership:**

1. *Manage hiring as a critical business process, not an administrative function.*

The obvious purpose of the hiring process is to hire the best possible employees. Unaided, even the most intelligent and well-intentioned managers cannot consistently make good hiring decisions. They need valid selection criteria and assessment procedures. Agency leaders must understand the importance and nature of the hiring process if they are to invest the resources, attention, and leadership needed to develop and implement a successful automated hiring process.

2. *Manage the introduction of an automated hiring system as an organizational change initiative, not as an information technology or an “HR office” initiative.*

The success of the hiring process depends on valid selection criteria and assessment methods, but it also depends on people. Introducing an automated hiring system changes almost every significant aspect of the hiring process, including the roles of managers, HR staff, and applicants. For this reason, agencies should take an equally comprehensive approach to the design and implementation of an automated hiring system.

3. *Invest appropriate resources in the design, implementation, and operation of the hiring system.*

“Resources” include dollars, staff, and training. The purchase, lease, or in-house development of an automated hiring system is only a part of the total investment cost. Evaluating and improving selection criteria, developing effective questions or

grammar,<sup>76</sup> training HR staffs and line managers—these measures come at a cost but they provide a return. If not done, or not done well, then the money spent to obtain the system becomes merely spent money with nothing to show for it.

**B. With respect to designing the hiring process:**

4. *Use automated hiring systems to support recruitment programs, not to replace them.*

Automated hiring systems can make it easier for job seekers to learn about an agency's job openings and to apply for available jobs, but they are not substitutes for recruiting programs. Agencies should avoid burdening their automated hiring systems with such expectations.

5. *Emphasize selection quality over less-important outcomes such as cost and efficiency.*

When introducing an automated hiring system, agencies should not seek gains in timeliness at the expense of referral quality. Such gains will be illusory or come at the price of lowered organizational performance. Instead, agencies should keep their focus on the quality of selections and use automated hiring systems in the way most likely to produce high-quality referrals and selections.

For example, we encourage agencies to consider using automated hiring systems to sort applicants (instead of making fine distinctions based on an initial assessment of applicants), and then to use one or more subsequent assessment tools (which may be manual or supported by an automated system) to make further qualitative distinctions between applicants. This “multiple hurdles” approach requires more time, initially, than a single assessment—but it should produce better referrals and selections and, in so doing, save both time and money in the long run.

6. *Evaluate the soundness and usefulness of existing assessment tools before “converting” them for use by their automated hiring systems.* This step is necessary for at least two reasons. First, existing assessment tools may not have aged well—they may be so outdated that their usefulness as manual assessment tools has

substantially deteriorated. Second, existing tools may not translate easily or at all to the methodology used by the automated hiring system, essentially rendering the system's results useless unless this step is first accomplished.

**C. With respect to implementing an automated hiring system:**

7. *Invest in “content”—selection criteria, methods for assessing applicants against those criteria, and methods for translating assessment results into ratings and referrals.*

An automated hiring system's value depends on the quality of the information and decision rules it uses to process applications. Resources spent to develop good content will pay substantial dividends; failure to invest in content makes it likely that the automated assessment process will produce poor results.

8. *Communicate roles and expectations to line managers, HR professionals, and applicants.*

All of these groups will find their roles changed as a result of automation—and all will find that they have roles to play. Agency leaders need to clearly define these roles and communicate their expectations. Otherwise, individuals may misunderstand and fail to perform their assigned role(s). Line managers, in particular, need to understand that automated hiring systems do not relieve them of their responsibilities, including active participation in job analysis and the assessment of applicants. As one agency HR manager noted, “Managers would like for us to provide them the ideal candidate with no work on their part. We can't.”

9. *Ensure the competence of HR professionals.*

Many HR professionals who performed adequately in a paper-based environment are less prepared for an environment that demands proficiency with technology and a higher level of professional knowledge and judgment. Important skills may have atrophied or be lacking. Since HR professionals play major roles in making automated hiring systems work, ensuring their competence is essential.

10. *Adopt documentation requirements that balance applicant burden and risk.*

Historically, many agencies took a “no risk” approach to documentation and ratings: they required applicants to provide complete documentation of their credentials and entitlements with their initial application, and they determined that a standard (such as an experience or education requirement) was unmet unless documentation had been provided. That approach (captured in the axiom “when in doubt, rate them out”) was understandable when the hiring process was paper-based—documentation was generally available, and the time an agency needed to obtain missing documentation was prohibitive—but it makes less sense when automated hiring systems are used. Yet a totally paperless process remains out of reach; documentation of education, veterans’ preference, citizenship, and other important matters remains essential.

We suggest that agencies take an approach between these two extremes: postpone requesting documentation when (1) the risk of error is low and (2) the cost of error is not excessive. For example, an agency recruiting high-level research scientists probably does not need to require college transcripts at the time of application: any serious candidate for the job, who will have an extensive record of professional accomplishment, is also likely to have the required education.<sup>77</sup> Moreover, requesting documentation later (for example, at the time of interview) should permit the agency to “recover” from any errors.

We do not provide detailed guidelines on this matter. The costs of requesting documentation and the risks of forgoing documentation depend on many factors, including the agency’s hiring process, the agency’s use of technology, applicable laws and regulations, the applicant pool, and the type of job being filled. For this reason, each agency must decide for itself what documentation to require and when to require it.

11. *Adopt a “triage” strategy to manage increased volume.*

The introduction of an automated hiring system can sharply increase the volume of applications received. Unfortunately, the introduction of an automated hiring system is not, by itself, an answer to the challenges posed by increased volume. Automated hiring systems do not relieve agencies of the responsibility to operate a fair, open, equitable, and rigorous hiring process. And, as we have discussed in this report, automated hiring systems cannot perform all the tasks required by such a process. Yet managers and HR professionals cannot spend an equal amount of time and attention on each applicant, unless that amount is minimal—far too little for thorough assessment, let alone “selling” the job and the organization. Thus, automated hiring systems demand that HR professionals and managers use their time wisely. We suggest triage: deal with all applicants fairly, promptly, and courteously—but devote limited time and attention to unqualified or average applicants; devote more time to distinguishing the “A group” from the “B group”; and devote considerable time to assessing the “A group.” Our suggested approach to quality control, discussed below, reflects this approach.

We reiterate that a well-designed hiring process—one that is transparent, reasonable, rigorous, and uses technology effectively—is essential. An agency with a poorly designed or poorly administered hiring process, whether automated or manual, will surely be inundated with questions from confused applicants, inquiries from candidates left “in the dark,” and complaints from dissatisfied applicants. Effective triage is not possible when every applicant needs personal assistance.

12. *Implement quality control measures.*

Automated systems rely heavily on information provided by job applicants. That reliance is efficient and often appropriate. However, agencies must not permit considerations of efficiency and equitable treatment to compromise the quality of referrals or the integrity of the hiring process. Agencies cannot expect applicants and automated hiring system algorithms to do a flawless job of screening out unqualified applicants and identifying the best applicants; the judgments of HR

professionals and subject matter experts continue to have an important place in the hiring process. Quality control measures, including review and verification of selected applicants' self-ratings and actual accomplishments and credentials, are still needed to ensure that the right candidates are referred.

We believe it is neither necessary nor practicable to manually review the qualifications and self-ratings of each applicant. In most cases, it is reasonable to accept the self-ratings of applicants who are unqualified or well below the referral threshold. Agencies should generally reserve manual review and verification prior to referral for those situations where comparatively minor self-rating errors may have significant consequences, such as those described in Table 7.

<b>Table 7. Situations That May Warrant Manual Review of Self-Ratings</b>	
<b>Situation</b>	<b>Rationale for Review</b>
The applicant is rated at or above the referral threshold.	If the number of candidates referred is fixed (e.g., when the “rule of three” applies), overstatement or misrating may prevent consideration of a more highly qualified candidate. Also, referral of a candidate who has overstated his or her qualifications can create negative perceptions of the hiring process.
The applicant is rated just under the referral threshold.	Understatement or misrating may eliminate an excellent candidate from consideration.
The applicant is entitled to special selection consideration, but does not appear to meet one or more requirements.	The selection decision may be compromised if the applicant actually does meet requirements.

*13. Systematically evaluate and improve the hiring process.*

Even a well-designed automated hiring process may not produce the desired results at first. Adjustments and “mid-

course corrections” will almost certainly be needed. Systematic collection and analysis of data on the operation of the hiring process and its outcomes can help agencies identify and make these adjustments and corrections.

Systematic evaluation should go beyond collecting routine measures of satisfaction and efficiency. Automated hiring systems can collect data, ranging from referral source to applicant demographics to the assessment criteria used, with much greater success and at much lower cost than is possible with manual systems. Analysis of such data can improve hiring effectiveness (for example, by identifying a need for targeted recruiting or by identifying assessment strategies that are particularly good or poor at making distinctions among applicants) and help agencies comply with merit principles, public policy goals, and other requirements.

**The Director and staff of the Office of Personnel Management should, in cooperation with Federal agencies—**

1. *Establish a core application document and Governmentwide “applicant service standards.”*

All agencies require applicants to provide basic information such as dates of employment, job titles and major duties, and education. Yet an applicant who wishes to apply for jobs in several different agencies cannot simply provide this information once. Instead, that applicant may have to provide this information several times, in several different formats. A standardized electronic “core application document” that contains basic, universally-required information, such as name, telephone number, jobs held, dates of employment could reduce the need for repetitive data entry and submission. Such a core document would not be a complete employment application—applicants would still need to provide agency-and job-specific information—but it would simplify the application process.

All agencies should provide applicants with information about matters such as the agency’s receipt of an application, the agency’s overall assessment of the applicant’s qualifications, and the status of the job(s) being filled. Most provide some information—but not all do. Applicants deserve better. A

Governmentwide “applicant service standard” would give applicants a clearer sense of what information will be given them, and commit agencies to provide that information.

OPM currently plans to do both as part of its Recruitment One-Stop e-government initiative. We support these plans because they can reduce applicant burden and improve communication with applicants—areas where the Federal Government needs to improve. OPM’s plans, as described to us, will not prevent agencies from (1) selecting a particular automated hiring system; (2) obtaining additional information from applicants beyond the minimum specified by OPM; or (3) selecting and using the assessment methods they deem most appropriate. Specifically, although agencies would be required to accept this core document, they would not be required to make it the sole (or even primary) basis of their assessment process.

2. *Move toward competency-based qualification standards.*

OPM has already developed and pilot-tested competency-based qualification standards (called job profiles) for two occupations. Such standards should, in the long term, provide a more valid and more usable basis for evaluating applicants than existing training- and experience-based qualification standards. (Appendix E, “An Argument for Competency-Based Qualification Standards,” provides our rationale for this assertion.) Accordingly, we recommend that OPM proceed from experimentation to active development and publication of job profiles.

Agencies will require assistance to use job profiles effectively. First, job profiles generally do not contain the clear, if often arbitrary, “bright lines” found in existing qualification standards (e.g., “1 year of experience” or “24 credit hours”). Second, job profiles and their underlying competency models contain “soft” competencies such as flexibility and continual learning that are not particularly easy to measure. Nonetheless, it is important that agencies develop the ability to measure such competencies. The potential benefits of job profiles will not be realized if agencies avoid assessing applicants on such competencies, or if they measure those competencies poorly. OPM



leadership—in the form of education, training, and development and distribution of assessment tools and guidelines—is needed to help agencies develop the required measurement capability.<sup>78</sup> We note that the development of this capacity is a joint venture between OPM and the agencies. Agencies must also, as recommended above, invest in their own HR staff and in assessment tools; they cannot expect OPM to provide all necessary resources and expertise.

# Appendix A—An Overview of the Federal Hiring Process

The information in this appendix is adapted from the OPM’s 2003 Delegated Examining Operations Handbook.<sup>79</sup> The sequence of steps in the table is illustrative; not all are performed each time a job is filled, and some steps may be combined or reordered.

## Steps in the Hiring Process—

The table below outlines the major steps in the hiring process. The text following the table explains these steps in more detail.

Major Steps in the Federal Hiring Process			
Step	Action	Who Performs	
1	Define the job and conduct a job analysis to identify job requirements.	HR staff, working with the selecting official, subject matter experts, or functional experts (such as staff from an OPM service center or outside consultants).	
2	Select assessment tools.		
3	Develop a rating procedure—a method for distinguishing among qualified applicants.		
4	Recruit, publicize the job, and receive applications.		
5	Review applications for legal requirements.		
6	Assess minimum qualifications—determine whether an applicants meet minimum requirements.		
7	Assess relative qualifications—make distinctions among candidates (qualified applicants).		
8	Issue a list of candidates to the selecting official.		Selecting official.
9	Assess candidates.		
10	Select a candidate (or candidates).		

**Step 1—Define and classify the job and identify job requirements.**

Job requirements are identified through a process known as job analysis. OPM defines job analysis as “a systematic procedure for gathering, documenting, and analyzing information about the content, context, and requirements of the job.” Job analysis produces (1) a list of important job roles or tasks and (2) a list of attributes needed to perform the tasks successfully. Generally, these attributes fall into one of three categories (knowledge, skill, or ability—referred to collectively as KSA’s or competencies).

**Step 2—Select assessment tools.** OPM-issued qualification standards may specify how agencies will assess minimum qualifications, but agencies generally can determine how they will assess relative qualifications. (The concepts of minimum qualifications and relative qualifications are discussed below.) The most frequently used assessment tool is a rating of training and experience. Other assessment tools that agencies may use include objective tests, work sample tests, assessment centers, and unstructured and structured interviews.

**Step 3—Develop a rating procedure.** A rating procedure is a plan for making job-related distinctions between candidates.<sup>[80](#)</sup> Components of a rating procedure include (1) the competencies to be evaluated and the assessment tool(s) that will be used to evaluate those competencies; (2) benchmarks for evaluating applicants, such as a crediting plan for rating training and experience or a scoring key for an objective test; and (3) decision rules for translating the results into numerical scores or qualitative groupings.

**Step 4—Recruit, publicize the job, and receive applications.**

Generally, an agency seeking to hire from outside its own workforce must issue a vacancy announcement and post that announcement on USAJOBS, the Federal Government’s web-based job information site. The extent of recruitment varies; often, recruitment is limited to posting.

**Step 5—Review applications for legal requirements.** This step determines whether an applicant can be considered for appointment and how the applicant will be considered. Factors may include age, citizenship, previous Federal service, entitlement to veterans’

preference, and meeting criteria for special employment programs such as the Interagency Career Transition Assistance Program (ICTAP).

**Step 6—Assess minimum qualifications.** The agency determines whether an applicant meets the minimum requirements for the job. These requirements are usually outlined in OPM-issued qualification standards. The standards generally stipulate that applicants must possess a certain quantity and quality of experience; for some occupations, the standards may also include a positive educational requirement or a written test requirement. Applicants who do not meet minimum qualification requirements are not further considered.

**Step 7—Assess relative qualifications.** Assessment of relative qualifications determines how well a qualified applicant (now a “candidate”) is likely to perform. Candidates are assessed using the methods, benchmarks, and scoring procedures specified in the rating procedure. Candidates are grouped or rank-ordered based on the results.[81](#)

**Step 8—Refer candidates to the selecting official.** The number of candidates referred depends on several factors, including eligibility, assessment results, the number of positions to be filled, and the appointing authority. Depending on the appointing authority and the terms used by the hiring agency, this list may be called a “referral list,” “best qualified list,” or a “certificate.”

**Step 9—Assess referred candidates.** The selecting official may use formal or informal assessments, such as interviews and reference checks, to further reduce the number of candidates and make a selection. Typically, these assessments are relatively unstructured and are not scored.

**Step 10—Select a candidate (or candidates).** The selecting official’s discretion in selection depends on the appointing authority and the procedures in use. In some cases, the selecting official may be able to select any referred candidate. (This is usually true in merit promotion.) In competitive examining, the selecting official may be able to select only from among the top three candidates—and in some cases, the selecting official’s choice is effectively limited to only a single candidate.[82](#)

# Appendix B—A Brief Discussion of Selection Tool Validity

## What is Validity?

In the context of employee selection, “validity” typically refers to the relationship between performance on an assessment tool (e.g., the score on a written test) and a measure of job performance (e.g., the employee’s performance appraisal).<sup>83</sup> Validity is expressed as a number between 1.0 and -1.0. A value of 1.0 means that there is a perfect positive relationship between the score received on the assessment tool and performance on the job. A value of 0 means that there is no relationship—in practical terms, that the assessment tool has no ability to predict job performance. A negative value indicates an inverse relationship: the better the performance on the assessment tool, the worse the expected on-the-job performance.<sup>84</sup>

Validity measures are used to estimate how much of the variability in an employee’s performance can be predicted by the assessment tool. The estimate is calculated by squaring the validity measure, as illustrated below.

<b>Examples—Estimating the Predictive Value of an Assessment Tool</b> <sup>85</sup>
<p><b>Example 1—General Mental Ability (GMA) Tests</b></p> <ol style="list-style-type: none"><li>1. GMA tests have a validity of 0.51.</li><li>2. <math>0.51 \times 0.51 = 0.2601</math>, or approximately 26 percent.</li><li>3. GMA tests predict 26 percent of the variability in how well people will do on the job.</li></ol>
<p><b>Example 2—Reference Checks</b></p> <ol style="list-style-type: none"><li>1. Reference checks have a validity of 0.26.</li><li>2. <math>0.26 \times 0.26 = 0.0676</math>, or approximately 6.8 percent.</li><li>3. Reference checks predict 6.8 percent of the variability in how well people will do on the job.</li></ol>

No instrument has achieved a validity measure of 1.0. The best commonly used assessment tools in the Federal sector include the work sample tests (0.54), structured interviews (0.51), and general mental ability tests (0.51). Ratings of training and experience—the most common assessment—range from 0.11 to 0.45, depending on the rating method used.

## What is incremental validity?

Incremental validity is the increase in validity resulting from the use of an assessment tool in addition to the tool(s) already in use. For example, as shown above, general mental ability tests have a validity of 0.51. The combination of mental ability tests and structured interviews has a validity of 0.63.<sup>86</sup> The gain in validity is 0.12.

When initial validity is high, even small gains in validity have real value. In the example above, a mental ability test, alone, predicts approximately 26 percent of the variability in on-the-job performance. But the combination of that same test and a good structured interview predicts almost 40 percent of the variability in on-the-job performance. The converse also holds true: when initial validity is low, seemingly impressive increases mean little. An organization that increases an assessment tool's validity from 0.05 to 0.30—a step in the right direction—nevertheless knows very little about how candidates assessed with that tool might perform.

Research does not provide estimates for every possible combination of assessment tools. However, research does offer some guidelines for combining assessment tools:

- Each individual assessment tool must be job-related and have some validity in its own right. Poor assessment tools do not become valuable by virtue of association with good assessment tools. For example, graphology (handwriting analysis) has a validity of 0.02—in practical terms, useless—and the validity of a GMA test and graphology combined is 0.51, the same as a GMA test alone.<sup>87</sup>

- Incremental validity is greater when an assessment tool does not duplicate any assessment tool already in use. Restated, an assessment tool should not merely tell you what you already know. To the extent possible, different assessment tools should measure different job-related criteria. When used to complement good “baseline” assessment, even assessment tools that are not among the best—such as reference checks and integrity tests—can make a meaningful contribution to the selection process.

We offer two cautions on this latter point. First, although research discourages “overlapping” assessments, the choice between collecting new information and verifying existing information is less clear in practice. Most managers have, at one time or another, reviewed an inflated resume or received a glowing recommendation for a mediocre candidate. When information and assessment tools are not perfectly reliable, there is a strong case—which we emphasize in this report—for using an assessment tool (such as reference checks) to confirm or disconfirm the results of a previous assessment (such as a rating of training and experience). Second, it is essential that all assessment tools be carefully designed and administered. Casual inquiries about an applicant’s work habits do not qualify as thorough “reference checks,” nor do snap judgments about an applicant’s honesty qualify as an “integrity test.”

# Appendix C—How Automated Hiring Systems Perform Assessments

This appendix provides brief descriptions of the Federal Government’s two distinct approaches to using automation in the assessment process. We provide these descriptions to give the reader a basic understanding of how the systems assess applicants;[88](#) we do not discuss matters such as the information technology infrastructure, operating expenses, licensing and contracting, data management, or ease of use.

These descriptions are composites that represent “typical” or common practice; they are not highly detailed, nor do they reflect the policy or practice of any single system or agency. However, we do describe system-or agency-specific practices when a “generic” description is insufficient or nonexistent. Such descriptions are neither endorsements nor criticisms of the system or practice described.

In this discussion, we frequently refer to “the system.” This usage is convenient and focuses attention on the properties and capabilities of the automated tools. However, the reader should keep in mind that “the system” is much more than a collection of computer hardware and software. Instead, it is a complex and constantly changing product of people, policies, hardware, and software.

## **Application-Driven Systems**

### **Who uses this type of system?**

Major users are the National Aeronautics and Space Administration and the Department of Defense (including the Department of the Air Force, the Department of the Army, the Department of the Navy, and DOD components such as the Defense Logistics Agency).



## Who provides this type of system?

The core component of this type of system is a suite of software components collectively known as Resumix. However, Federal agencies do not use Resumix by itself. Resumix is not “Federalized”—that is, it does not incorporate the procedures, rules, or formulas associated with the Federal Government’s competitive examining process. For this reason, Federal users “augment” Resumix with customized programs that apply decision rules (e.g., assign candidate scores) and produce staffing documents (e.g., referral lists). Thus, current application-driven systems are not a single product provided by a single source; instead, each system is a collection of interrelated programs, which may come from a variety of sources.

## What does an employment application include?

An application typically includes:

- A resume providing basic applicant information (such as name and telephone numbers) and describing the applicant’s work history (duties and accomplishments), education and training, and relevant awards and credentials. The agency may ask the applicant to describe specific skills (such as typing) or types of experience (such as contracting). The resume must adhere to agency formatting rules governing the placement and sequence of information, document length, typeface, and the like.
- A profile or data sheet containing other types of information, such as supervisors’ names and contact information, veterans’ preference, and career status; and
- A formal expression of interest in a specific job vacancy.[89](#)

## What do these systems do?

These systems attempt to describe applicants’ competencies, credentials, and types of experience using a common vocabulary.[90](#) To do this, Resumix uses two software components—the KnowledgeBase (a set of business rules, linguistic algorithms, and employment-related terms) and the AutoMatch Search function.[91](#) The components enable

the system user to “read” an application (resume),<sup>92</sup> “extract” the candidate’s skills and experience, and produce a list of terms (“key words”) that characterize the applicant’s skills and experience. This list is frequently referred to as a “skills bucket.” The extraction process differs from manual KSA-based examining (evaluating knowledges, skills, and abilities) in some important ways:

- First, it makes no level distinctions. For example, when Resumix extracts “proofreading” from a resume, it makes no judgment about the candidate’s level of proofreading experience or proficiency; and
- Second, the process extracts key words without regard to their relevance to a particular job or occupation. (Put differently, Resumix does not require the user to specify desired competencies and credentials before it receives applications.) In contrast, question-driven systems (like their manual predecessors) require the user to determine the questions to be asked—and thus, the experience, education, and competencies to be measured—before receiving an application.

## **How does the system assess minimum qualifications?**

Agencies may use the automated system to make a preliminary qualifications determination. (At the time of our study, some did; others did not.) To do this, the user identifies competencies essential to successful job performance, identifies a set (or sets) of key words that reflect those competencies, and (with computer assistance) “looks in” the skills bucket for the designated key words. However, agencies do not rely solely on the automated hiring system: they also conduct a manual review of minimum qualifications.<sup>93</sup> Manual review is necessary for two reasons: accurate minimum qualifications determinations are critical to the integrity of the hiring process, and the structure of existing qualification standards makes it difficult to fully automate the minimum qualifications determination. Typical standards require a specific quantity of experience (usually 1 year) at a specific quality level, or a specific quantity and type of education (often in a particular curriculum), or both. Evaluating applicants against such

standards requires a level of detail beyond that of a typical resume and an interpretive ability beyond the practical reach of existing systems.

## **How does the system distinguish among qualified applicants?**

All agencies made the distinction by comparing candidates' skills buckets. However, each agency we visited took a different approach to making the comparison. Below, we briefly describe the processes of three agencies. These descriptions are intended to illustrate each agency's definition of "quality" and how it implements that definition.

### **Agency 1**

At the time of our interview, Agency 1 used its automated system for merit promotion only. The agency's merit promotion plan does not require ranking or numerical scores; all that is needed is to distinguish a group of best qualified candidates. The user:

1. Identifies a set of desired competencies (typically no more than eight).
2. Searches candidates' skills buckets for the desired competencies. The system returns the number of competencies that each candidate possesses. Candidates possessing a higher number of competencies are considered better qualified. (In effect, each competency carries equal weight.)
3. Refers the candidates with the most competencies, consistent with merit promotion plan provisions governing candidate referral. If the search yields too few (or no) candidates, the user may revise the search criteria to make them less restrictive.

### **Agency 2**

Agency 2 uses its automated system for delegated examining.[94](#) The user:

1. Conducts a job analysis to identify major job requirements and job-related competencies.

2. Develops a crediting plan (a plan for evaluating applicant qualifications). The crediting plan contains three quality levels: basic experience (experience that meets minimum qualifications), good experience, and outstanding experience.
3. Establishes key-word-based criteria for each level. The result is a set of decision rules that will be used to assign each candidate to a quality level. The table below provides a simplified sample crediting plan. As shown, there is usually more than one way to meet any given level.
4. Runs a program to apply the crediting plan (that is, search applicants' skills buckets for the identified sets of key words) and assign each candidate to a quality level.

<b>Sample Crediting Plan—Agency 2</b>	
In this example, the user has identified eight job-related key words (labeled “A” through “H” for simplicity). The table lists the three quality levels and the key word or combinations of key words needed to meet that quality level.	
Level	Level Criteria (Required Key Words)
70 (meets minimum qualifications)	A or B
80 (good experience)	(B and C) or (C and D) or (D and E)
90 (outstanding experience)	(B and F) or (B and G) or (F and H)
Ineligible	Meets none of the above
<b>Note:</b> Each candidate is assigned to the highest level met. In this example, a candidate whose skills bucket contains “F” and “H” will be assigned to the 90 level, even without “A” or “B”.	

### Agency 3

Agency 3, like Agency 2, uses its automated system for delegated examining and sorts candidates into three quality groups. The examiner:

1. Conducts a job analysis to identify major job requirements and job-related skills. The examiner then identifies a set of key words

(typically 8 to 12) associated with those skills. The skills that are the most important to the job are designated “primary” skills.

2. The user runs a program to search candidates’ skills buckets and apply a standard decision rule, shown below, to assign each candidate to a quality level.

<b>Decision Rule for Assigning Candidates to Quality Levels— Agency 3</b>	
<b>Level</b>	<b>Key Words</b>
70	One or more
80	50% of primary skills and 50% of all skills
90	75% of primary skills and 65% of all skills

## **Question-Driven Systems**

### **Who uses this type of system?**

Most civilian departments and agencies that use automated systems, with the exception of NASA and DOD, use a question-driven system.

### **Who provides this type of system?**

Major providers of question-driven automated systems used by Federal agencies include (in alphabetical order) Avue Digital Systems, the U.S. Department of Commerce (Commerce Opportunities On-Line, referred to as COOL), Monster Government Solutions (QuickHire), and the U.S. Office of Personnel Management (USA Staffing).

### **What does an employment application include?**

1. A multiple-choice questionnaire that asks applicants about their experience, education, and competencies. Agencies may also ask applicants to provide a narrative statement to support their response; and
2. A written employment application that provides information (such as dates, academic credits and degrees, and duties and accomplishments) on relevant education and experience.

Agencies also ask applicants for information such as address, level of education, veterans' preference, geographic preference, and eligibility for special appointing authorities. This information may be collected through the questionnaire, the written application, or an on-line applicant profile (an electronic record, unique to each applicant, that contains personal information such as name, address, telephone number, and job interests).

## **How does the system assess minimum qualifications?**

The most common approach is to assess minimum qualifications through experience- and education -based questions. These questions ask applicants whether they meet minimum education and experience requirements. An applicant who gives a negative response to any such question is eliminated from consideration. Agencies may also ask questions to determine whether a candidate has essential competencies. Most OPM qualification standards state that qualifying experience must provide the candidate with essential competencies, in addition to meeting a level of difficulty and complexity. The table below provides some examples of questions used to assess minimum qualifications.

## Sample Questions Used to Assess Minimum Qualifications

The questions below appeared in vacancy announcements advertised on USAJOBS in February 2003. We have edited or reformatted some of the questions for readability.

Question and Source	Response Options
<p>Choose the one answer that best describes your education and experience.</p> <p>(From an announcement for a grade GS-7 wildlife biologist position.)</p>	<ol style="list-style-type: none"> <li>1. I completed 4 years of college study leading to a bachelor's degree in biological science including: 9 semester hours in wildlife subjects; 12 semester hours in zoology; and 9 semester hours in botany or plant sciences.</li> <li>2. I have completed courses in an accredited college or university equivalent to a major in biological science (30 semester hours) with at least 9 semester hours in wildlife subjects, 12 semester hours in zoology, and 9 semester hours in botany or related plant science, plus appropriate experience and/or additional education comparable to the completion of a 4-year course of study.</li> <li>3. I am currently employed in this series in the federal government.</li> <li>4. I do not meet any of the requirements as described above.</li> </ol>
<p>Choose the one answer that best describes your education and experience.</p> <p>(From an announcement for a grade GS-12 administrative officer position.)</p>	<ol style="list-style-type: none"> <li>1. I possess 1 year of specialized experience equivalent to the GS-11. Examples of experience may include: formulating &amp; executing annual operating budgets; analyzing budget/fiscal reports; communicating with a variety of personnel at all levels in administrative management and support; working with staff in interpreting human resources policies and directives; reviewing and approving procurement activities; communicating and providing guidance to staff on issues.</li> <li>2. I do not meet any of the requirements as described above.</li> </ol>
<p>Do you have knowledge of generally accepted accounting principles</p>	<ol style="list-style-type: none"> <li>1. Yes.</li> <li>2. No.</li> </ol>

<p>(GAAP) and standards promulgated by the Financial Accounting Standards Board (FASB) or the Federal Accounting Standards Advisory Board?</p> <p>(From an announcement for a grade GS-11 accountant position.)</p>	
<p>I certify that I can type 40 words per minute.</p> <p>(From an announcement for a grade GS-6 office automation assistant position.)</p>	<p>Yes/No—The applicant checks a box to respond “Yes” or leaves it unchecked to respond “No.”</p>

However, as noted in the preceding discussion of application-based systems, the minimum qualifications determination is both information- and judgment-intensive. For this reason—and because accurate minimum qualifications determinations are important—agencies do not rely solely on the automated system to make final minimum qualifications determinations.<sup>95</sup> If nothing else, agencies will manually verify a selectee’s minimum qualifications.

## How does the system assess relative qualifications?

Question-based systems assess relative qualifications by asking applicants to assess themselves on one or more job-related competencies (e.g., oral communication) or tasks related to a competency (e.g., giving briefings on a technical subject to a non-technical audience).<sup>96</sup> The applicants rate their training, experience, or proficiency using the provided response scale. Responses typically cover a wide range of ability and experience, from no experience or training to a high level of experience or proficiency. The response scale may be generic or may be specific to the competency or task described



in the question. The table below provides some sample questions and response options.

<b>Sample Questions Used to Assess Relative Qualifications</b>	
<p>These questions appeared in vacancy announcements advertised through USAJOBS in February 2003. We have edited or reformatted some questions and responses for readability.</p>	
<b>Question and Source</b>	<b>Response Options</b>
<p>Provide advice and assistance on staffing and recruitment.</p> <p>(From an announcement for a grade GS-11 human resources specialist position.)</p>	<ol style="list-style-type: none"> <li>1. I have not had experience, education, or training in performing this task.</li> <li>2. I have completed formal education or training in performing this task, but have not yet performed this task on the job.</li> <li>3. I have performed this task on the job under close supervision by a supervisor, manager or senior employee to ensure compliance with correct procedures.</li> <li>4. I have performed this task as a regular part of a job, independently and usually without review by a supervisor, manager or senior employee.</li> <li>5. This task has been a central or major part of my work. I have performed it myself routinely, and I have trained others in performance of this task, and (or) others have consulted me as an expert for assistance in performing this task.</li> </ol>
<p>Applied administrative procedures such as grammar, spelling, syntax, and other required formats sufficient to produce correspondence, reports, and briefings in an office setting.</p> <p>(From an announcement for a grade GS-6 office automation assistant position.)</p>	<ol style="list-style-type: none"> <li>1. Prepared draft documents and routine correspondence.</li> <li>2. Prepared grammatical corrections of own work in preparation of final documents.</li> <li>3. Reviewed the work of others for grammatical, spelling, and punctuation accuracy. Proofread formal documents and composed material to be read by others.</li> <li>4. Experience, education, or training less than the levels described above.</li> <li>5. None of the above.</li> </ol>

The system scores candidates based on their responses, using a pre-established scoring key. The keys vary by job and by agency, but they all follow the same general pattern: candidates who claim higher levels of proficiency on a greater number of skills receive higher scores. Most agencies that use question-based systems use the full 70- to 100-point range when assigning scores, instead of the 70/80/90 pattern discussed earlier in the section on application-driven systems.[97](#)

# Appendix D—An Overview of “Multiple Hurdles”

## The Multiple Hurdles Concept<sup>98</sup>

Even the best assessment tool merely predicts future performance; it cannot guarantee it. Consequently—although we wish it were otherwise—the hiring decision remains, at best, an educated guess. One strategy that can increase the probability of making a good selection is to use multiple assessment tools in succession. This is often called a “multiple hurdles” strategy, using an analogy from sports. In track and field, a runner who does not clear a hurdle is out of the race. Similarly, when multiple hurdles are used, applicants who perform poorly on an assessment are eliminated from further consideration for the job. Applicants who perform sufficiently well move on to another assessment. The process is repeated until a selection is made. (This strategy is also sometimes called “phased assessment.”)

A recent study confirms that two assessments can be significantly better than one. The study examined the validity of mental ability tests, used alone, and the validity of such tests combined with a second assessment tool.<sup>99</sup> The authors estimated that mental ability tests, alone, have a validity of 0.51. Adding a structured interview raised validity to 0.63; adding reference checks instead raised validity to 0.57.<sup>100</sup> Although these improvements may appear minor, they are not: they represent a substantial improvement in ability to predict actual job performance. (Appendix B, “A Brief Discussion of Selection Tool Validity,” discusses the concept of validity in more detail.)

## Using Multiple Hurdles

Most managers already intuitively understand the rationale for multiple hurdles. For example, few managers wish to consider a candidate whose resume contains no applicable experience or education. But neither are most managers willing to hire, sight unseen, a candidate on the basis of excellent paper qualifications alone. Typically, hiring managers will (at a minimum) interview the most promising candidates to further narrow the pool. In other words, they

use the written application as the first hurdle and the interview as the second hurdle. The challenge, then, is to use multiple hurdles effectively. Keys to effective use include ensuring that:

- Each hurdle is carefully developed and administered, so that it produces usable, job-related information. It does little good—and may do substantial harm—to follow a valid assessment such as a work sample test with an invalid assessment such as graphology (handwriting analysis);
- Each hurdle adds significantly to the depth, scope, or reliability of the organization's knowledge of the candidates. An assessment tool should not duplicate (in mathematical terms, be highly correlated with) any previous assessment(s). Instead, any additional assessment should provide information on a different set of competencies, or provide a different perspective (and, therefore, perhaps a different result) on competencies that have previously been assessed; and
- The value of the additional information outweighs its cost.

How many hurdles are enough? Research confirms the value of a second assessment, but is silent on the value of a third (or fourth). We note that a cost-benefit analysis could well favor using a third assessment, such as reference checks or a work sample exercise, because the benefits can be substantial. Consider the value of avoiding a poor selection. A 2002 study conducted by the Employment Management Association reports that the average cost of hiring a professional employee is nearly \$7,000. And this \$7,000 is only a small portion of the actual costs of a poor selection, because it does not include items such as wasted salary dollars and the consequences of poor performance, which can be truly staggering. Viewed this way, a few hours devoted to conducting reference checks or reviewing work samples to reduce the likelihood of an expensive mistake is time well spent.

So is more assessment always better? No. First, assessment must be timely as well as thorough, because good candidates will not wait forever for a hiring decision. Any agency that pursues the illusion of certainty in selecting employees will have a shallow and unpromising

candidate pool indeed. Second, at some point, additional assessment can yield minimal or even negative returns. If a selecting official believes that he or she has a full and accurate understanding of candidates' abilities, then further assessment will do little to inform the selection decision. It will also detract from the perceived fairness of the hiring process. As the Board found in its recent study of the Federal merit promotion program, continuing to assess candidates after a decision has been made merely contributes to applicant cynicism.

In conclusion, there is no easy answer to the question of how many assessments to use. Research and experience suggest that agencies do well not to rely on a single assessment when they make selection decisions. However, assessment cannot go on indefinitely. Hiring decisions must be made, and they should be made in a timely manner and at reasonable cost. Ultimately, agencies and managers must use their judgment.

# Appendix E—An Argument for Competency-Based Qualification Standards

In this report, we recommend that OPM replace experience- and education-based qualification standards (which we refer to as time-based qualification standards<sup>101</sup>) with competency-based qualification standards. We base this recommendation on two arguments.

First, we believe that competency-based standards can provide a more sound basis for assessment and selection than time-based standards. The competency-based standards (“job profiles”) that OPM has tested<sup>102</sup> were professionally developed, using research and input from agencies and subject matter experts. We are not aware of any comparable basis for existing time-based standards.

Also, competency-based standards provide a reasonable balance between specificity and flexibility to accommodate differences among jobs, advances in knowledge and technology, and changing work and skills needs. In contrast, current time-based standards are flexible (responding to agency concerns about dated and inflexible standards), but have little specificity. Most time-based standards provide only general guidance, such as defining specialized experience as “experience that equipped the applicant with the particular knowledge, skills, and abilities to perform successfully the duties of the position, and that is typically in or related to the work of the position to be filled.” The standards are mostly silent on what those KSA’s might be. Recent OPM guidance, OPM oversight reviews, and the Board’s 2002 study of vacancy announcements all report that agencies have difficulty “filling in the blanks” in these standards. With considerable frequency, agencies either do too little—giving applicants little, if any, idea of whether they qualify—or do too much, establishing restrictive requirements that can deter or eliminate from consideration applicants who might actually be highly qualified.<sup>103</sup>

Second, it appears that time-based qualification standards are becoming an impediment to efficient staffing operations, instead of an administrative convenience. In an era of paper-based staffing, examiners needed a consistent, quick-to-apply criterion for distinguishing (likely) qualified applicants from (likely) unqualified applicants. Time-based standards fulfilled this need. But time-based standards are not an administrative convenience when automated systems are used. If anything, they impede efficiency: it has proven rather difficult to automate minimum qualifications determinations grounded in time-based standards. Consequently, in many cases, it appears that agencies are devoting greater human effort to evaluating minimum qualifications than to evaluating relative qualifications. If so, more time is spent answering the question “Who could perform this job?” than is spent answering the question “Who should perform this job?” That would be unfortunate, because the latter question is far more important.

Competency-based standards would make it possible to use a single criterion, competency, to assess both minimum and relative qualifications. This could reduce nonproductive work and help HR professionals and managers focus their attention on identifying the best qualified candidates—which is where their attention belongs.

# Appendix F—List of Recommendations Linked to Automation Success

All of the recommendations in this report are aimed at helping agencies select high-performing employees. The table below links our recommendations to specific “success factors” needed to achieve that objective.



Recommendation	Success Factor								
	Effective Leadership	Adequate Resources	Competent HR Staff	Line Mgmt. Support	High Quality Applicant Pool	Sound Assessment Strategy	Appropriate Selection Criteria	Effective Assessment Tools	Hiring Process Integrity
Manage hiring as a critical business process.	X	X							
Manage the introduction of an automated hiring system as an organizational change initiative.	X	X							
Invest appropriate resources in the design, implementation, and operation of the hiring process.		X							
Use automated hiring systems to support recruitment programs, not to replace them.					X				
Design a hiring process that emphasizes selection quality over less important outcomes such as cost and efficiency.				X		X	X	X	
Evaluate existing assessment tools before automating them.						X	X	X	
Invest in "content."							X	X	
Communicate roles and expectations to line managers, HR professionals, and applicants.	X	X	X	X			X	X	X
Ensure the competence of HR professionals.			X	X		X	X	X	X
Adopt documentation requirements that balance applicant burden and risk.					X				X
Adopt a triage						X		X	X

strategy to manage volume.									
Adopt quality control measures.						X		X	X
Systematically evaluate and improve the hiring process.						X	X	X	X
Establish a core document that applicants can use to apply for jobs in different agencies and Government-wide "applicant service standards."					X				
Move toward competency-based qualification standards.						X	X	X	X

1 Testimony of William H. Donaldson, Chairman of the Securities and Exchange Commission, before the Subcommittee on Commerce, Justice, State, and the Judiciary, Committee on Appropriations, United States House of Representatives, Mar. 31, 2004.

2 Our use of the term "automation" is not meant to imply that the technology is inflexible or that it operates without human instruction and control.

3 The Office of Personnel Management (OPM) has used automation for years to establish and maintain registers (inventories of candidates that were used to fill vacancies in multiple agencies and multiple locations). OPM also used computer programs for case examining.

4 The General Accounting Office also has found that hiring automation is widespread in Federal agencies. In a May 2003 report, it reported that "Nineteen of the 24 agency HR directors we met with said they had automated or planned to automate at least a portion of their hiring processes." United States General Accounting Office,

“Human Capital: Opportunities to Improve Executive Agencies’ Hiring Processes,” Washington, DC, May 2003 (GAO-03-450), p. 23.

5 Competitive examination is the “default” method of filling jobs in the competitive civil service.

Elements of competitive examining include: public notice of the job, receipt of applications from the public, formal review of applicants’ qualifications, referral and selection in accordance with legal requirements, and (typically) a probationary period following appointment. When an agency conducts a competitive examination under a delegation of authority from OPM, competitive examining is usually called “delegated examining.”

6 The Federal civil service comprises the competitive service, the excepted service, and the Senior Executive Service. The competitive service includes employees appointed through a competitive examination or an equivalent means. The excepted service includes (1) positions which generally are not filled through competitive examining and (2) employees who were appointed through noncompetitive means.

7 Title 5, United States Code, Chapter 33, Subchapter I establishes general rules for competitive examining. OPM’s Delegated Examining Operations Handbook, available at [www.opm.gov/deu](http://www.opm.gov/deu), provides specific guidelines and procedures for agencies conducting competitive examinations.

8 Robert M. Guion, “Assessment, Measurement, and Prediction for Personnel Decisions,” Lawrence Erlbaum Associates, Inc., Mahwah, NJ, 1998, p. 4.

9 Much of this section is adapted from previous MSPB reports. See U.S. Merit Systems Protection Board, “The Federal Selection Interview: Unrealized Potential,” Washington, DC, February 2003, and U.S. Merit Systems Protection Board, “Assessing Federal Job Seekers in a Delegated Examining Environment,” Washington, DC, December 2001.

10 Survey report from “The Human Capital Index: Linking Human Capital and Shareholder Value,” Watson Wyatt Worldwide, 1999, p. 5.

11 Although it is simpler to terminate an employee during a probationary or trial period than it is to remove an employee for poor performance, termination still involves some costs.

12 U.S. Merit Systems Protection Board, “Federal Supervisors and Poor Performers,” Washington, DC, July 1999, p. 15.

13 For example, in a competitive examination, a veteran with a compensable service-connected disability rated at 10 percent or more who meets minimum qualification requirements must, for most positions, be placed at the top of the certificate (list of candidates). Federal agencies also are required to grant job preference to well-qualified Federal employees adversely affected by reductions in force (staff reductions).

14 In a competitive examination, an agency may rank candidates (list them in order of numerical score) or place them in quality groups (a method called “category rating”). The ranking or grouping of candidates determines which candidates the hiring manager can select. If candidates are ranked, the manager must follow the “rule of three” and select from among the top three available candidates; if the candidates are placed in quality groups, the manager must select from the top group. (The manager must also observe veterans’ preference.) Our point is that accuracy is critical: the manager may not substitute his or her judgments for the “judgments” of the examining process.

15 Validity coefficients range from 0 to 1. A coefficient of 0 would indicate that there is no relationship between the assessment and job performance. A coefficient of 1 would indicate that there is a perfect relationship—i.e., that higher scores on the assessment are always associated with better job performance.

16 Source of validity coefficients: Frank L. Schmidt and John E. Hunter, “The Validity and Utility of Selection Methods in Personnel Psychology: Practical and Theoretical Implications of 85 Years of Research Findings,” *Psychological Bulletin*, The American Psychological Association, Inc., vol. 24, No. 2, September 1998, p. 265.

17 MSPB’s 2000 Merit Principles Survey listed several sources of information about applicants and asked Federal supervisors to indicate

the extent of their use of each source. Prior work experience was used to a “great extent” or “moderate extent” by 96 percent of respondents; level of education was used to a “great extent” or “moderate extent” by 82 percent of respondents.

18 We refer to these parties as “participants” instead of “stakeholders” because “stakeholders” is too broad and passive. The parties listed here do not merely have interests in the hiring process; they also have responsibilities.

19 Here, “line managers” includes supervisors (i.e., first-level managers) and individuals they designate to carry out their roles (e.g., interview candidates) or represent their interests (e.g., participate in a job analysis). These individuals have direct knowledge of the job(s) being filled and are known as “subject matter experts.”

20 Individual tasks may be performed outside the HR office, by line managers, administrative support staff, or contractors. Nevertheless, HR professionals usually remain wholly or partially accountable for the timeliness and quality of this work.

21 Line managers may also initiate or perform many of these functions.

22 These include regulations in 5 CFR Chapters 300, 302, 332, 333, 335, 337, 338, and 339 and the Delegated Examining Operations Handbook.

23 OPM's regulatory authority generally does not extend to employment under laws other than title 5, such as title 38 (covering Department of Veterans Affairs medical professionals) and title 10 (covering selected defense and national security agencies and occupations).

24 For example, if a qualification standard states that an applicant must have one year of specialized experience, an agency is effectively required to evaluate applicants' training and experience. We note that OPM has eliminated the written test requirement from many qualification standards, making the use of a written test optional for those occupations unless it is otherwise required.

25 Information about these and other OPM-led e-government initiatives is available at <http://www.opm.gov/egov/>.

26 The term “black box” refers to an object or process whose internal logic and operations are unknown and difficult or impossible to discern.

27 5 USC 2301(b)(1), the first merit system principle, states that “selection and advancement should be determined solely on the basis of relative ability, knowledge, and skills, after fair and open competition \* \* \*.” 5 CFR 300.103, which governs competitive service employment practices, requires Federal agencies to base their employment practices (which include assessment criteria and methods) on job analysis and to establish a rational relationship between employment practices and job performance.

28 Stephen W. Gilliland, “Effects of Procedural and Distributive Justice on Reactions to a Selection System,” *Journal of Applied Psychology*, vol. 79, No. 5, American Psychological Association, Inc., 1994, p. 696.

29 Excerpt from a letter from Colleen M. Kelley, National President of the National Treasury Employees Union to Steve Nelson, Director of Policy and Evaluation, U.S. Merit Systems Protection Board, dated Aug. 13, 2002.

30 Nevertheless, managerial satisfaction does not constitute evidence of validity. It will not, for example, help an agency justify an employment practice that has adverse impact.

31 USAJOBS ([www.usajobs.opm.gov](http://www.usajobs.opm.gov)) is the Federal Government’s web-based job posting system.

32 This list is illustrative, not exhaustive.

33 Section 60-3, Uniform Guidelines on Employee Selection Procedures, 1978; 43 FR 38295, Aug. 25, 1978. We discuss Federal agency responsibilities, but the Uniform Guidelines also apply to private sector employers.

34 *Ibid.*, Sec. 16.9.

35 Todd Raphael, “Cost per hire: don’t even bother”, *Workforce*, June 2002, p. 112.

36 We acknowledge that agencies may face situations, such as scarcity of qualified applicants or the need to fill a job immediately, where thorough pre-employment assessment is not practical. In such situations, post-employment assessment (including rigorous use of a probationary or trial period, if one applies) is particularly important.

37 “James: building a new culture for federal work” (interview of Kay Coles James, Director, U.S. Office of Personnel Management), *Government Computer News*, vol. 21, No. 33, *Post Newsweek Tech Media*, Nov. 18, 2002, p. 112.

38 See, for example, “From Red Tape to Results: Creating a Government that Works Better & Costs Less,” Washington, DC, Sep. 7, 1993. This report of the National Performance Review recommended that agencies reduce the proportion of managers and supervisors in their workforce, and reduce the number of employees in “overhead” occupations such as human resources.

39 For example, under paper-based staffing, a job application (which is typically received by mail) must be received, checked for timeliness and completeness, and filed. This task is not complicated, but the workload becomes substantial when multiplied by dozens or hundreds of vacancies and dozens or hundreds of applications per vacancy.

40 The elimination of many technological barriers to automation has made it easier for small agencies to automate their hiring. However, there are still important differences between small and large agencies. Small agencies typically have fewer distinct jobs to fill in addition to smaller numbers of employees, making their business case for automating hiring different from that of larger agencies. Small agencies also typically have fewer resources to allocate to an automation initiative, but their smaller size also can simplify issues such as internal communications and access to subject matter experts. In the long run, the overall savings in staff time and the consistency gained in applicant assessment—outcomes also important to large

agencies—seem to make small agencies' initial investment in automation worthwhile.

41 One system included in our study is not fully “federalized.” Agencies that use this system meet Federal hiring requirements by combining this system with other programs.

42 Career transition assistance programs are intended to help surplus and displaced Federal employees find other Federal jobs. These programs are described at 5 CFR 330, subparts F and G.

43 See U.S. Merit Systems Protection Board, “Assessing Federal Job Seekers in a Delegated Examining Environment,” Washington, DC, December 2001, and U.S. Merit Systems Protection Board, “Help Wanted: A Review of Federal Vacancy Announcements,” Washington, DC, April 2003.

44 Cognitive ability is usually measured through objective tests. Because cognitive ability tests tend to be expensive to develop and may have a disparate impact on one or more classes of job applicants, only a few agencies routinely use them, and then only for a few occupations. However, agency experiences with these tests are very favorable.

45 Question-based systems can also administer objective tests (including cognitive ability tests) although this is not often done.

46 U.S. Merit Systems Protection Board, “Assessing Federal Job Seekers in a Delegated Examining Environment,” Washington, DC, December 2001, pp. viii, 28-29.

47 Many agencies use non-T&E assessments such as interviews, reference checks, and writing samples when hiring employees. However, such assessments are rarely used as part of the formal rating process, and thus are used primarily to select among referred candidates; they rarely influence which candidates are referred to managers.

48 We reiterate that automation does not dictate this approach, although the automated hiring systems used by Federal agencies are designed around evaluation of training and experience. OPM staff



observed that automation and assessment methods can, and should be, considered separately.

49 As of April 2004, the full text of the “Pledge to Applicants” was available at [www.opm.gov/hrmc/2002/msg-087b.asp](http://www.opm.gov/hrmc/2002/msg-087b.asp) and in OPM’s Delegated Examining Operations Handbook.

50 In most cases, it is not difficult to determine whether an applicant meets experience and education requirements. However, “borderline” cases—which may require close evaluation of job duties, time worked, and courses taken and credit hours earned—are not readily resolved using automated tools alone.

51 We have no objective measure of applicants’ views of the various application processes that agencies have created to support their automated hiring systems. We have, however, observed many of these processes by reviewing vacancy announcements and applicant instructions. We have also received many comments from agency managers, HR professionals, and applicants. Those comments range from highly positive to highly negative. Clearly, not all automated application processes are created equal.

52 One definition of change management, from Executive Transformations Consulting ([www.changeready.com](http://www.changeready.com)), is “a conscious, deliberative, collaborative effort to increase the performance of a human system.” Another, less formal characterization of change management is “an engineer’s approach to improving business performance and a psychologist’s approach to managing the human side of change.” See Jeff Hiatt and Tim Creasey, “The Definition and History of Change Management,” at [www.prosci.com/tutorial-change-management-history.htm](http://www.prosci.com/tutorial-change-management-history.htm).

53 Whatever process is chosen, agencies are expected to adhere to general professional standards for the development of employment practices. One mandatory step is job analysis. See, for example, 5 CFR 300.103.

54 Such problems are often caused by a deficient job analysis or by failure to act upon the results of a job analysis.

55 The planned upgrade would divide a vacancy announcement into logical sections (e.g., job duties, job requirements, how to apply), instead of presenting the vacancy announcement as a single (and often very long) document, as is done now.

56 Disclosure of desired attributes (i.e., selection criteria) may be explicit or implicit. The traditional and more common approach is explicit: listing the attribute (such as writing ability or a driver's license) or asking a candidate a question directly related to the attribute. With implicit disclosure, an agency could describe representative job tasks—such as writing regulations and preparing Congressional testimony—and state that qualified candidates must be able to perform those tasks with minimal training and orientation. That would clearly indicate that writing ability is important.

57 We note that any automated system that made error or abuse impossible would also be likely to prevent its users from modifying system inputs or outputs when appropriate.

58 This is what the “rule of three” effectively requires agencies to do.

59 We cannot quantify how automated hiring systems have affected timeliness: there are no broad, reliable measures of time to hire, and time to hire is affected by factors other than automation, such as vacancy announcement open periods, the agency decision-making process, and investigation and clearance requirements.

60 Quote from a manager with the U.S. Geological Survey, shared in a meeting with MSPB staff during the research phase of our study.

61 “Passive applicants” are individuals who are not actively seeking work. Often, they are individuals who are content with their current jobs and valued by their employer, yet willing to consider other opportunities, if those opportunities are appealing and can be pursued without too much initial effort. From the recruiter's perspective, “passive applicants” are often excellent prospects—but not easy “sales.”

62 This description of category rating is simplified for clarity. If the agency is hiring from outside the Federal service, it must also apply and observe veterans' preference.

63 For example, an automated system could assign higher scores to “balanced” candidates (that is, candidates with good ratings on all important competencies) than to “unbalanced” candidates (candidates with a mix of high and low ratings on important competencies), or vice versa. Or candidates could be rated “best qualified” if they have high scores in selected sets of competencies—recognizing that excellent candidates may have distinct strengths. We emphasize that these are illustrations, not suggestions. As always, selection criteria and related decision rules must be based on job analysis.

64 One option—category rating—was not available to most agencies when we conducted our research for this report.

65 Our interview with NASA predated Governmentwide availability of category rating. NASA combined two examining flexibilities (an alternative rating procedure and name requests of outstanding candidates) to create a process similar to category rating. The 1999 edition of OPM’s Delegated Examining Handbook describes these flexibilities in detail.

66 One possible exception is when all the candidates in the top category (the “A group”) are known to be highly qualified and to differ significantly only in individual accomplishments, strengths, and weaknesses, not in overall level of ability. We note that this situation will only occur if the initial assessment was extremely comprehensive and thorough—which is rarely practical or possible. Another exception is when there are very few qualified applicants.

67 OPM’s Delegated Examining Handbook discusses the use of random numbers to break ties. We note that the Handbook also presents the option of using a job-related assessment to break ties.

68 For example, one study that compared the ratings of participants in a simulated management task found striking differences in how participants’ self-ratings of performance compared with ratings provided by neutral, trained observers. Nearly one-third of the participants significantly overestimated their performance and nearly one-sixth significantly underestimated their performance. See Shaul Fox, Tamir Caspy, and Avner Reisler, “Variables affecting leniency,

halo, and validity of self appraisal,” *Journal of Occupational and Organizational Psychology*, The British Psychological Society, 67, Leicester, UK, 1994, p. 53.

69 Cultural factors may also create a tendency toward overstatement or understatement. Research on the role of culture in self-assessment accuracy is limited and inconclusive.

70 We base this statement on an analysis of data from OPM’s Central Personnel Data File. For selected Cabinet-level agencies, we calculated a “servicing ratio” by dividing the number of permanent employees in non-HR occupations by the number of permanent employees in HR occupations. In most agencies, the servicing ratio changed little between 1998 and 2003. This analysis shows only that agencies’ employment of HR staff has not significantly decreased; it provides no insight into changes in operational efficiency or HR staff utilization.

71 For example, staff may have taken on new responsibilities, such as human capital planning. Also, even comparatively minor departures from “business as usual”—such as improving the content and tone of vacancy announcements—can greatly reduce efficiency in the short term.

72 “HR staff” refers to the people who design and administer HR programs, including HR specialists, assistants, and clerks. “HR professionals” refers to HR staff members who perform nonprocedural work. We use the term “professional” to indicate that these employees’ jobs require them to master an extensive body of specialized knowledge.

73 These are distinct characteristics, but they are related. One agency observed that a reluctance to make decisions based on judgment (instead of clear-cut rules) was often the symptom of a deficiency in basic skills. For example, HR professionals who had difficulty analyzing and interpreting applicants’ work histories were often reluctant to rerate applicants when appropriate, or to accept responsibility for such rerating.

74 This is not a criticism of all HR professionals. Many were fully prepared for these new demands; many have also revealed previously unrecognized and underused skills.

75 The standards should, if applied properly, be content valid (that is, they should be rationally related to the duties and tasks of the job being filled). What is uncertain is the standards' predictive validity; that is, their effectiveness at distinguishing applicants who can perform the job satisfactorily from applicants who cannot.

76 "Grammar" refers to the terms and decision rules that an application-based automated hiring system uses to identify an applicant's skills, experience, or other attributes.

77 We emphasize that we are discussing when documentation should be required, not whether it should be required. As we have noted, documentation is necessary: falsification or misrepresentation of education and other credentials is a serious matter and is not infrequent.

78 OPM has indicated that future competency-based standards will be modified based on agency feedback from the pilot tests. One possible modification is the inclusion of required competencies and required proficiency levels, which could make new standards more specific and easier to apply than the pilot standards.

79 The full title of this document is "Delegated Examining Operations Handbook: A Guide for Federal Agency Examining Offices." As of March 2003, this handbook could be obtained at <http://www.opm.gov/deu/>.

80 This definition is much broader than the definition in OPM's Delegated Examining Operations Handbook. OPM defines a rating procedure as the qualitative distinctions that result from the initial evaluation of applicants.

81 This step corresponds to the application of quality ranking factors and the application of a rating procedure in OPM's Delegated Examining Operations Handbook. We use the term "relative qualifications" to emphasize the fact that relative judgments are being

made (as opposed to assessment against an absolute standard) and to emphasize that this step applies to every form of hiring, not just competitive examining.

82 This situation occurs when the first-ranked candidate is entitled to veteran's preference and the second- and third-ranked candidates are not eligible for such preference. The selecting official may reject the first candidate, but may not "pass over" that candidate to select one of the lower-ranked candidates unless he or she can successfully "object" to the first candidate. To do so, the selecting official must demonstrate that the candidate is unqualified or unsuitable for the position. "Unsuitable" does not mean "less than ideal for the position"; it means unfit by virtue of past misdeeds or some other factor.

83 Wayne F. Cascio, "Applied Psychology in Human Resource Management," fifth ed., Prentice-Hall, Inc., Upper Saddle River, NJ, 1998, p. 103.

84 Although assessments with a high negative validity coefficient could conceivably be quite useful, few—if any—are used.

85 Source of validity coefficients: Frank L. Schmidt and John E. Hunter, "The Validity and Utility of Selection Methods in Personnel Psychology: Practical and Theoretical Implications of 85 Years of Research Findings," *Psychological Bulletin*, The American Psychological Association, Inc., vol. 24, No. 2, September 1998, p. 265.

86 *Ibid.* The validity of two assessment tools used together cannot be calculated based on the individual tools' "stand alone" validity; the calculation must be based on actual experiments or complex statistical analysis.

87 *Ibid.*

88 Our discussion of "assessment" does not include eligibility—matters such as United States citizenship, civil service status, meeting age requirements, or time-in-grade requirements.

89 Increasingly, Federal agencies allow any interested person to create and store a profile or resume on-line. However, storing a profile or

resume is usually not sufficient for a person to be considered for employment. Generally, agencies do not regard a person as an “applicant” until he or she formally expresses interest in a particular job. That expression can take a number of forms, such as a cover letter containing a vacancy announcement number and job title or a “self nomination” (an electronic message containing an announcement number and a personal identifier).

90 Competencies and types of experience are not always distinct. For example, the term “accounting” could indicate that a candidate has the ability to perform such work (i.e., the competency) or that a candidate has performed accounting work (the experience). However, other terms that Resumix might identify—such as “foreign governments”—can only be understood as a description of an applicant's background or work experience.

91 This software is proprietary. Therefore, we do not know and cannot describe precisely how it works.

92 Technology of this type, commonly called “natural language processing,” is much more ambitious and sophisticated than the “word search” function in common office software applications. The idea is to combine vocabulary and algorithms to provide interpretive power comparable to that of a human reader. Readers wishing a fuller description of this approach may contact Resumix through its web site at [www.resumix.yahoo.com](http://www.resumix.yahoo.com).

93 For internal candidates, it may be possible to eliminate or greatly reduce the need for manual verification. For example, most current employees can provide occupational series and grade information (a commonly used “proxy” measure of type and quality of experience), which can be readily “read” and “assessed” by an automated system. Agencies may also evaluate education and credentials by proxy. For example, an agency filling a physician vacancy might assume that the professional credentials of a Federally-employed physician have already been reviewed and verified by the current employing agency. However, these “proxies” have their limitations, and are not available for most external candidates.

94 Agency 2 and Agency 3, below, also use their systems for merit promotion. Here, we discuss only delegated examining, which requires finer distinctions among candidates.

95 The extent of manual review depends on the importance of the qualifications determination. Agencies are most likely to review determinations that materially affect the integrity or outcome of the hiring process, such as those for candidates referred for selection consideration and (under delegated examining) candidates eligible for veterans' preference.

96 A question may be used for assessing both minimum and relative qualifications, but agencies generally use separate sets of questions for these purposes.

97 Category rating is not mentioned here because category rating was not an option for most agencies at the time we interviewed them.

98 The material presented in this appendix originally appeared in the September 2002 and July 2003 issues of *Issues of Merit*, the newsletter of MSPB's Office of Policy and Evaluation.

99 Frank L. Schmidt and John E. Hunter, *op. cit.*, p. 265.

100 *Ibid.* The authors used general mental ability (GMA) tests as the primary assessment because of their high validity and their applicability to a wide range of jobs. The authors did not publish estimates for any combination of assessments that did not include GMA tests.

101 The term "time-based" reflects the fact that most OPM qualification standards define qualifying experience or education in terms of time. The time element may be explicit (such as "3 years of general experience") or implicit (such as a baccalaureate degree, which is typically attained following 4 years of full-time college attendance).

102 OPM has developed and tested two competency-based qualification standards ("job profiles") for two occupations: accountant and information technology specialist.



103 In a memorandum to the Human Resources Management Council (#MSG-022a, dated Mar. 25, 2002), OPM Director Kay Coles James states that “An increasing number of job announcements describe qualifications too narrowly. Although they must be job-related, qualifications should not be so agency-specific that only applicants who have worked for your agency qualify for consideration.” See also U.S. Merit Systems Protection Board, “Help Wanted: A Study of Federal Vacancy Announcements,” Government Printing Office, Washington, DC, April 2003, p. 24.

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