
Beyond Utility: Measuring the Return on INS' Investment in a New Promotional Assessment System

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Return for Investment

- External Mandate
 - » Include a return for investment study for all major R&D initiatives
- Internal Mandate
 - » Prove “value added”

Assessing the Return on INS' Investment

- The Program: Competency-Based Promotional Assessments for INS Managers and Supervisors
- Developing the Return for Investment Model
 - » A generic guide for R&D initiatives
- Applying the Return for Investment Model
 - » Measurement issues
- A Protocol for the Promotional Assessments
 - » The evaluation plan

Competency-Based Promotional Assessments

- **Commissioner's Objective**
 - » Improve professionalism in the INS
- **Program Objective:**
 - » Improve managerial and supervisory performance through objective assessment
 - Assess job-related competencies
 - Identify top-quality candidates
 - Provide objective scores
 - Provide developmental feedback

Competency-Based Promotional Assessments

Assessment Strategy

Competency Area	Decision Making	In-Basket	Writing	Past Achievement Record
Thinking Skills	X			
Administrative Skills		X		
Writing Skills			X	
Personal Attributes				X
Technical Skills				X

Competency-Based Promotional Assessments

Candidate Feedback

- Scores
 - » Overall standing
 - » Competency scores
- Developmental Resource Guide
 - » Self-improvement tips
 - » Recommended readings

Competency-Based Promotional Assessments

Status Report

- Supervisory Border Patrol Agent
 - » **Assessment Development:** Complete
 - » **Implementation:** In Progress
- INS Supervisory Immigration Officer Positions
 - » **Assessment Development:** In Progress
 - » **Scheduled implementation:** FY98

Model Development

Beyond Utility. . .but where?

- Considerations
 - ✓ Program Objectives
 - ✓ Measurement Issues
 - ✓ Evaluation Budget and Resources

Model Development

Utility is Necessary . . .

- An increase in validity translates into increases in productivity
 - » The increase in productivity is proportional to the size of the correlation coefficient
- Utility formulas translate the increase in productivity into dollar terms

Model Development

*...But **NOT** Sufficient*

- Unfamiliar
 - » Terminology
 - » Underlying assumptions
 - » Statistical Calculations

- Unconvincing

“Utility estimates that dwarf the size of the national debt . . .”

Model Development

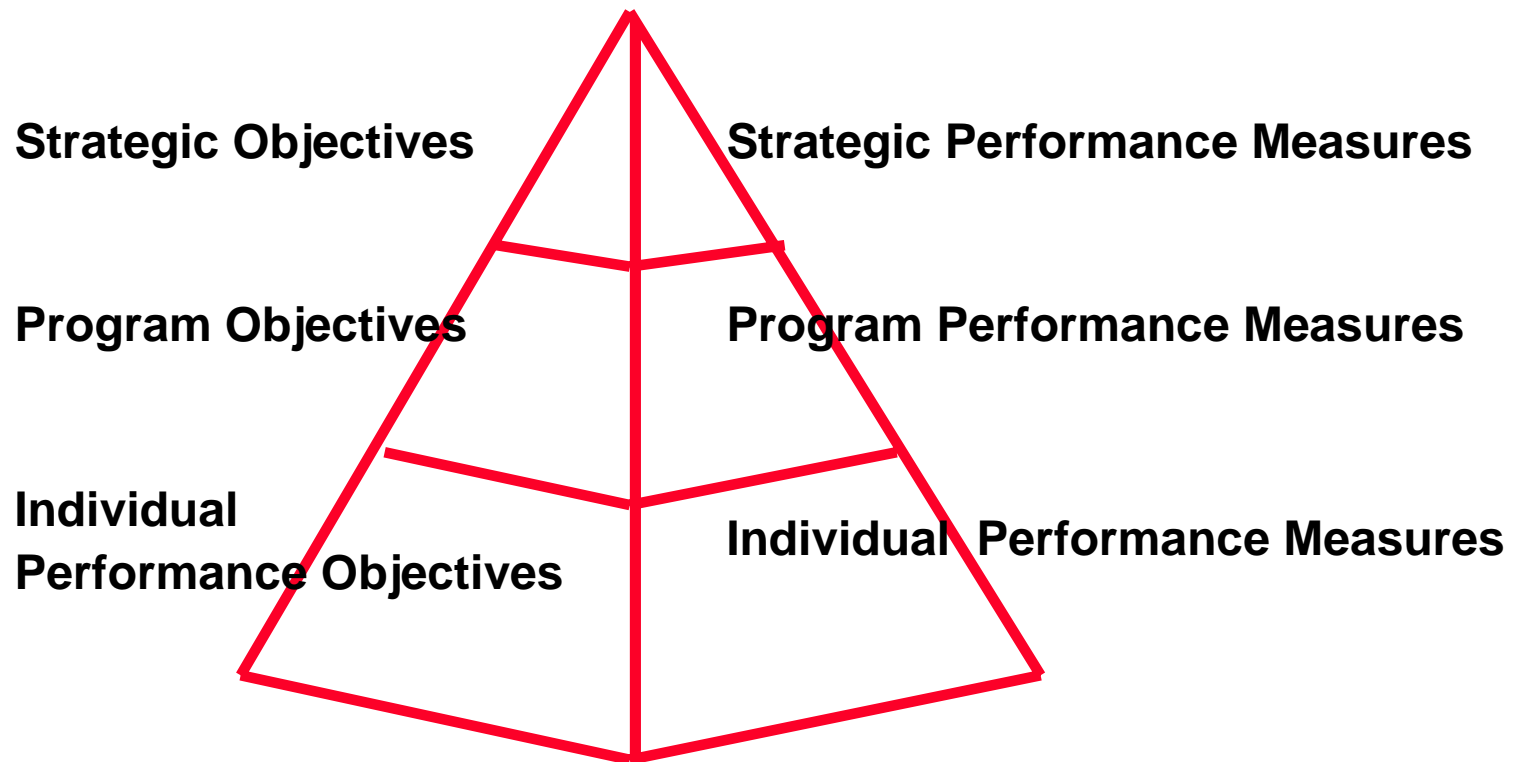
*...But **NOT** Sufficient*

- Incomplete

- » Includes only variables that can be expressed in \$ terms
- » Focuses on individual performance
- » Excludes qualitative data

Model Development

Levels of Information



Return for Investment Model

Investment

- Costs
 - » Basic Research and Design
 - » Development
 - » Implementation
 - » Administration
 - » Evaluation

Return for Investment

- Monetary Returns
 - » Utility
 - » Organizational Economies
- Non-Monetary Returns
 - » to Direct Customers
 - » to Indirect Customers

Applying the Model

- What to Measure: Hypotheses

How will this program affect . . .

- » The target population
- » Other organizational members
- » People outside the organization
- » Organizational systems

Applying the Model

- How to Measure Key Variables
 - » Methodology
 - » Unit of analysis

Applying the Model

- What will go wrong?
 - » Soundness of data
 - » Format of data
 - » Reactivity of data
 - » Availability of data
 - » Accessibility of data

Applying the Model

- The Cost of Evaluation

“I don’t want this evaluation costing more than the assessment system . . .”

- » Where are the data?
- » Who will collect the data?
- » Who will analyze the data?
- » Who will prepare the report?

The Evaluation Plan

Return for Investment Protocol

for

Competency-Based
Promotional Assessments
for Border Patrol



The Protocol: Investment Costs

	FTE	Travel	Resources
Developmental Costs	\$	\$	\$

- Costed Project Activities: **Development**
 - » Assessments
 - » Candidate feedback system
 - » Database
 - » Applicant materials

The Protocol: Investment Costs

	FTE	Travel	Resources
Administrative Costs	\$	\$	\$

- Costed Project Activities: **Administration**
 - » Management briefings
 - » Policy development
 - » Project management and oversight

The Protocol: Investment Costs

	FTE	Travel	Resources
Implementation Costs	\$	\$	\$

- Costed Project Activities: **Implementation**
 - » Application dissemination, screening, and processing
 - » Assessment administration
 - » Assessment scoring
 - » Dissemination of results
 - » Referral list processing

The Protocol: Investment Costs

	FTE	Travel	Resources
Evaluation Costs	\$	\$	\$

- Costed Project Activities: **Evaluation**
 - » Validity estimation and documentation
 - » Estimation of selection utility
 - » Design of qualitative instruments
 - » Collection of quantitative data
 - » Preparation of final report

The Protocol: Monetary Returns

Selection Utility

	Per Unit Value	Overall
Selection Utility Benefits	\$ $\Delta U / \text{selectee}$	\$ ΔU

- Break-Even Analysis
 - » Break even cost per applicant
 - » Break even validity
 - » Break even \$ value of performance (SD_y)

The Protocol: Monetary Returns

Organizational Economies

- Compare pre- and post-implementation costs incurred by:
 - » Applicant screening and certification
 - » Freedom of Information Act requests
 - » Complaints against managers
 - » Grievances and appeals

The Protocol: Non-Monetary Returns

Returns to Customers

- Direct Customers

- » Candidates

- Satisfaction with process
- Satisfaction with assessments
- Satisfaction with developmental feedback

- » INS Management

- Satisfaction with candidates
- Satisfaction with procedures

The Protocol: Non-Monetary Returns

Returns to Customers

- Indirect Customers
 - » The INS Workforce
 - Perceptions of professionalism
 - Perceptions of supervisory and managerial effectiveness
 - » The Media
 - Requests for information, appearances
 - Articles about the new system

Return for Investment Model

Investment

- Costs
 - » Basic Research and Design
 - » Development
 - » Implementation
 - » Administration
 - » Evaluation

Return for Investment

- Monetary Returns
 - » Utility
 - » Organizational Economies
- Non-Monetary Returns
 - » to Direct Customers
 - » to Indirect Customers

R & D Corporate Report



Research and Development Division
Office of Human Resources and Development

April 1997

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS IN USE AT INS

Overview of the Process

The U.S. Immigration and Naturalization Service (INS) has recently implemented a competency-based promotional assessment process that is used for promoting individuals into GS-11 through GS-15 Supervisory Border Patrol Agent jobs and for providing participants with diagnostic feedback about their strengths and weaknesses in a number of job-related competency areas.

In the competency-based assessment process, candidates for supervisory and managerial positions in the Border Patrol complete four assessments that measure competencies critical to effective performance in the jobs. These assessments include (1) a *Past Achievement Record* in which participants describe their optimal achievement in a number of job-related competency areas, (2) a *Decision Making Situational Assessment* in which applicants evaluate information that they would be expected to encounter frequently in the job, (3) a multiple-choice *In-Basket Job Simulation* in which individuals are required to make administrative and supervisory decisions that are part of the job, and (4) a *Managerial Writing Skills Exercise* that determines whether participants have the writing skills required in the job. Each of

these assessments replicates the actual tasks that incumbents perform on a regular basis.

Initial Implementation

The initial implementation of the competency-based assessment process went extremely well. A total of 876 candidates completed all four of the assessments and have received detailed feedback about their strengths, weaknesses, and performance relative to other candidates at the same grade level.

The candidates who participated in the initial implementation represented all of the Border Patrol's 21 sectors and 24 of INS' 33 districts. In addition, INS Headquarters and three regional offices were represented. Assessments were administered in 42 locations across the country. Candidates from as far away as Agana, Guam; Havana, Cuba; Shannon, Ireland; and Rome, Italy participated in the process.

Of the 876 candidates who completed all four assessments, 781 (89%) are currently in the Border Patrol. The other 95 candidates work in other programs in INS and are eligible to compete for supervisory and managerial vacancies in the Border Patrol.

Overall, candidates scored very well on the assessments, reflecting the high skill level of INS employees and the rigor of the INS entry-level assessment process. Candidates were assigned to one of three score bands based on their performance on the assessments. Over 75% of candidates reached the two highest score bands, indicating potential for excellent performance as a Border Patrol supervisor or manager.

Assessment scores will immediately replace the traditionally-used rating and ranking method for filling supervisory and managerial vacancies in El Paso, Miami, San Diego, and Tucson sectors. The assessments will be administered again in June, and after candidates participating in this phase have received their feedback, assessment scores will be used also to fill vacancies in Del Rio, El Centro, Laredo, and McAllen sectors. Finally, the last group of candidates will be assessed in the fall of 1997, and then assessment scores will be used to fill all supervisory and managerial vacancies in the Border Patrol. This will include staff officer positions in regional offices and at INS Headquarters.

Candidate Feedback

Candidates who completed the assessments were given a brief survey with questions about their perceptions of the new process. The survey was designed so that candidates could provide their input as to the strengths and weaknesses of the system. About 150 individuals chose to respond to the survey.

Overall, candidates appeared to be cautiously optimistic about the new assessment process. Only 29% of candidates prefer the traditional rating and ranking method, and 29% chose to withhold judgment until after the new process has been used to fill vacancies. The remaining 42% of the candidates who responded to the

survey explicitly endorsed the competency-based method for developing Best Qualified lists over the traditional method.

Candidates also provided feedback about specific parts of the assessment process. A minority of candidates indicated that they would prefer more time to complete the *Past Achievement Record*. A few comments also indicated difficulties with some aspects of the assessment facilities in a handful of locations. In the next phase of the competency-based assessment process, every attempt will be made to provide candidates with more than adequate time to complete the *Past Achievement Record*. Also, alternative assessment facilities are being identified to replace those facilities that candidates described as anything less than optimal.

Future of the Competency-Based Assessment Process

A parallel competency-based assessment process for the Adjudications Officer, Criminal Investigator, Deportation Officer, and Immigration Inspector occupations is under development and will be implemented during FY98. This process will parallel the Border Patrol system and will ensure that all INS Officer Corps supervisors and managers are promoted in a fair and objective manner.

For further information about the development, validation, and implementation of competency-based promotional and diagnostic assessments, please contact Magda Colberg, David Pollack, or Greg Beatty at the Research and Development Division in the Office of Human Resources and Development on (202) 305-0600.

R & D Report

Important Information for INS Staff

Research and Development Division
Office of Human Resources and Development

March 1997

UTILITY: THE PAYOFF OF VALID SELECTION INSTRUMENTS

We often talk about the validity of selection instruments such as tests, work samples, assessment centers, and others. However, we do not often discuss the real payoff of using valid instruments. The payoff comes in the form of increased productivity that can actually be expressed in terms of dollars.

It is common to study validity by finding the statistical correlation between a selection instrument and one or more criteria of successful job performance. If the correlation is high, then we know that the selection instrument is closely related to job performance. People who get high scores on the selection instrument will tend to be successful on the job. People who get low scores on the instrument will tend to be unsuccessful on the job.

If valid selection instruments are used to select employees--and the high scorers are chosen rather than the low scorers--then the employees selected will show better job performance and thus be more productive than employees chosen by some means other than a valid selection instrument. The increase in productivity is proportional to the size of the correlation coefficient.

Well-established formulas allow us to express this increase in productivity in terms of dollars of benefit to an organization (see Technical Note). These formulas show us that valid selection instruments can increase an organization's productivity by millions of dollars. For example, if the Immigration and

Naturalization Service (INS) hired 100 employees at the GS-7 level using a selection device with a validity of .5, the annual productivity increase would be worth \$887,749 (using FY97 salary values). If 1,000 employees were hired, the productivity gain would be worth \$8,877,490. These gains are for the first year alone. The organization would realize similar productivity gains for every year that it retained the employees.

By contrast, if INS used less valid selection instruments, or, worse yet, selection instruments with unacceptable validities (say, .07), then huge productivity decreases would occur, as compared with the productivity levels obtained from use of a highly valid predictor of, say, .5. These decreases would approximate the dollar figure cited above and would accumulate year after year, as long as the ill-predicted incumbents remained on the job.

Clearly, the use of valid selection procedures is a critically important investment in any organization. In the Federal Government it is even more critical, since the Federal Government is the nation's largest employer and, as such, stands to affect the very foundations of our national economy.

For further information on the utility of valid selection instruments, contact the Research and Development Division at (202) 305-0600.

Technical Note: The following equation expresses the increase in productivity per employee selected with a valid selection instrument (Schmidt, Hunter, McKenzie, & Muldrow, 1979):

$$\Delta U/\text{selectee} = r_{xy}SD_y\phi/p$$

The symbols in the formula represent the following:

$\Delta U/\text{selectee}$ = the increase in productivity in dollars for each employee selected

r_{xy} = the validity coefficient for the selection instrument

SD_y = the standard deviation of job performance measured in dollar value among randomly selected employees. (SD_y is conservatively estimated to be 40% of annual salary, according to Schmidt et al., 1979, and Schmidt and Hunter, 1983.)

ϕ/p = the average score on the selection instrument of those who were hired. (The score is expressed in standard score form. Assuming that scores on the selection instrument are normally distributed, the average standard score of selectees is found by using this formula. p is the percentage of applicants who were selected--also called the selection ratio. ϕ is the ordinate of the normal curve at the point of cut corresponding to p .)

Applying this formula to the example given in the text, we have the following values:

$r_{xy} = .5$ = validity of a highly valid selection instrument such as a test of reasoning ability or a work sample

$SD_y = \$10,358.80$ = the FY97 salary of GS-7 employee (\$25,897) multiplied by .40

$\phi/p = 1.714$ = the average score of the selectees, assuming that 10% of the applicants were hired, that scores are normally distributed, and that the highest-scoring applicants were hired.

The calculation of the productivity increase per selectee is:

$$\begin{aligned}\Delta U/\text{selectee} &= .5 \times \$10,358.80 \times 1.714 \\ &= \$8,877.49\end{aligned}$$

This quantity is multiplied by the number of selectees to obtain the total increase in productivity for one year.

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Return for Investment Model



Personnel Research and Assessment Division

Office of Human Resources and Development

RETURN FOR INVESTMENT MODEL

The Return for Investment Model guides Research and Assessment staff in determining the returns—monetary and non-monetary— that result from the implementation of new personnel selection systems. Accordingly, the Model will analyze costs involved in producing the new system and delineate quantitative and qualitative variables which permit comparison to preexisting systems.

The model is intended to be followed during implementation of all new systems produced by the Research and Assessment Division. In addition, for each new system implemented, project staff must produce a protocol that identifies the specific costs and returns that will be assessed. The protocol should follow the model strictly. All variables for any system should be subsumed under the model.

Project Team

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RETURN FOR INVESTMENT MODEL

Investment

Costs

- Basic Research and Design Costs
- Developmental Costs
- Implementation Costs
- Administration Costs
- Evaluation Costs

Return for Investment

Monetary Returns

- Selection Utility
 - Validity
 - Content/Construct
 - Criterion-related and Validity Generalization
 - Dollar Value of Performance (SD_y)
 - Number of Hires and Selection Ratio
- Organizational Economies
(for example, reduction in FOIA requests and complaints and appeals)

Non-Monetary Returns

- Benefits to Direct Customers
 - System Users
 - INS Management
- Benefits to Indirect Customers
 - the Public
 - INS Workforce

Return for Investment Protocol:

Competency-Based Promotional Assessments for Border Patrol



Personnel Research and Assessment Division
Office of Human Resources and Development

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
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Basic Research and Design: *Costs of activities prerequisite to the design of the Promotional system*

\$	\$	\$
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Project activities and associated costs to be considered in calculating overall costs for FTE, Travel, and Resources

Job Analysis	Survey development, distribution, data analysis and reporting	Site visits	Printing of surveys Distribution and mailing
Assessment Plan	Review of relevant literature, review of job analysis results, formulation of plan		
New Item Formats and Test Types	Development/adaptation of taxonomies and item formats for assessments		
Test Plans	Translation of job analyses into test plan per taxonomies		

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
Developmental Costs	\$	\$	\$

Costs associated with developing assessments, accompanying materials, and systems and procedures for administering the assessments

Project activities and associated costs to be considered in calculating overall costs for FTE, Travel, and Resources

Assessments

Development of assessments: PAR, Writing Assessment, In-Basket, Decision Making Assessment

Assessment Administration and Scoring Procedures

Preparation of Directions For Conducting (DFC)
Development of rating and scoring procedures and materials

RETURN FOR INVESTMENT PROTOCOL:**COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL**

Investment Costs	FTE	Travel	Resources
Candidate Information and Feedback System	Development of Candidate Information Booklet Development of Candidate Feedback Report Review of training and developmental opportunities and preparation of Developmental Resource Guide		
Applicant Processing and Tracking System	Programming System development		Software Hardware Materials, books
Applicant Materials	Preparation of formal announcements Preparation of application forms		

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
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Administrative Costs

Project management and oversight costs

\$	\$	\$
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Project activities and associated costs to be considered in calculating overall costs for FTE, Travel, and Resources

Management Briefings	Development of materials Delivery of briefings	Travel to briefing sites	Reproduction/printing
Policy Development	Development of new PROM-related policies (e.g., eligibility for assessment, length of referral list)		
Project Management and Oversight	Project monitoring by senior PRAD staff		

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
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Implementation Costs

\$	\$	\$
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Recurring costs associated with implementing the promotion process across the country

Project activities and associated costs to be considered in calculating overall costs for FTE, Travel, and Resources

Application dissemination, screening, and processing

Distribution of formal announcements and applications

Reproduction/printing
Distribution and mailing

Distribution of up-front materials (Candidate Information Booklet, PAR)

Reproduction/printing
Distribution and mailing

Applicant support by PRAD staff (e.g., candidates' requests for additional information and materials)

Applicant screening and processing

RETURN FOR INVESTMENT PROTOCOL:**COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL**

Investment Costs	FTE	Travel	Resources
Assessment Administration	Scheduling of candidates		Printing/reproduction of assessments and related materials Administration of assessments
Assessment Scoring	Scoring of assessments		Reproduction of scoring materials Payment to contractors who will assist with scoring
Dissemination of Candidate Results	Preparation of Feedback Reports		Distribution and mailing of Feedback Reports and Developmental Resource Guides
Referral List Processing	Production and distribution of Referral lists		

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
Evaluation Costs: Costs associated with conducting evaluation of system	\$	\$	\$

Project activities and associated costs to be considered in calculating overall costs for FTE, Travel, and Resources

Estimation and Documentation of Assessment
Validity

Content/Construct Validity

Establish content/construct
validity

Criterion-related Validity and Validity
Generalization

Conduct VG study;
conduct literature
review; estimate
validity

Prepare validation report

Calculation of Selection Utility

Derive overall selection
utility and break-even
estimates of validity, SD_y ,
and cost of assessment per
position filled

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL

Investment Costs	FTE	Travel	Resources
Development and Administration of Candidate Satisfaction Surveys	Development of customer satisfaction surveys Development of data collection plans and procedures Processing and analysis of survey data		Printing Distribution and mailing of surveys
Development of Interview Protocol and Administration of Post-assessment Focus Groups with Candidates	Development of interview protocol and sampling plan Conduct of focus groups Analysis of interview data	Site visits	Reproduction of materials
Development of Interview Protocol and Administration of Telephonic Interviews with Selecting Officials	Development of interview protocol and sampling plan Conduct of focus groups Analysis of interview data	Site visits to conduct focus groups and face-to-face interviews	Reproduction of materials
Collection of quantitative data (e.g, FOIA requests and complaints)	Development of data collection and quantification procedures Data collection Data analysis		
Preparation of final report	Combine qualitative and quantitative data analysis; prepare report.		

**RETURN FOR INVESTMENT PROTOCOL:
 COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL**

Monetary Returns

Per-Unit Value

Overall Value

Selection Utility Benefits

Dollar value of increased productivity derived from test use.

\$	ΔU /selectee
<i>(Dollar value of individual performance)</i>	

\$	ΔU
<i>(Dollar value for all hires made)</i>	

**RETURN FOR INVESTMENT PROTOCOL:
COMPETENCY-BASED PROMOTIONAL ASSESSMENTS FOR BORDER PATROL**

Monetary Returns	Pre-Implementation Costs	Post Implementation Costs	Savings
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Organizational Economies

To estimate the “organizational economies” listed below, we (1) estimate the per incident cost, (2) ascertain the number of incidents during a specified period, and the associated costs before the Promotional system was been implemented, (3) ascertain the number of incidents during a specified period, and the associated costs after the system has been implemented, and subtract the post-implementation figure from the pre-implementation figure.

Savings derived from reductions in FOIA requests	\$	\$	\$
Savings derived from reductions in complaints against managers	\$	\$	\$
Savings derived from reductions in appeals	\$	\$	\$

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED ASSESSMENTS FOR BORDER PATROL

Non-Monetary Returns	Customer	Evaluation Criteria	Measurement Method
Benefits to Direct Customers			
	Candidates	Satisfaction with application screening and processing	Maintain log of questions and comments during the pre-assessment period.
		Satisfaction with assessments Perceived fairness of the selection process	Post assessment questionnaire or focus groups
		Perceived value of developmental feedback (completeness, practicality, general satisfaction)	Include pre-addressed customer satisfaction survey with "Resource Guide"
	INS Management <i>(Selecting Officials and Program Managers)</i>	Satisfaction with new procedures	Telephonic interviews
		Satisfaction with quality and quantity of candidates referred	
		Perceptions of timeliness of referrals	

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED ASSESSMENTS FOR BORDER PATROL

Non-Monetary Returns	Customer	Evaluation Criteria	Measurement Method
Benefits to Indirect Customers	The general public	Number and nature of Congressional Inquiries about promotional system	Maintain a log of congressional inquiries and their resolution. Compare to experiences from past selection procedures.
	The media	Number and nature of inquiries by media personnel (e.g., requests for information or appearances on radio and television) to discuss promotional system Number of positive articles about promotional system in magazines and newspapers	Maintain a log of inquiries and requests for appearances
	Professional Societies	Invitations to speak about promotional system by professional societies Acceptance of submissions (e.g., papers, symposia about promotional system) to professional conferences Acceptance of articles about promotional system in professional journals/publications	Track invitations, acceptances of symposia, papers and journal articles

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED ASSESSMENTS FOR BORDER PATROL

Non-Monetary Returns	Customer	Evaluation Criteria	Measurement Method
		Requests for information by other I/O psychologists and members of related fields	Maintain a log of requests for information
	INS Workforce	Perceptions of professionalism in INS	INS-wide organizational climate survey ²
		Perceptions of supervisory and managerial effectiveness	INS-wide organizational climate survey
		Quality of supervision	
		Satisfaction of with supervision	
		Soundness of managerial practices	

²Assumes development and dissemination of INS-wide organizational climate survey.

RETURN FOR INVESTMENT PROTOCOL:

COMPETENCY-BASED ASSESSMENTS FOR BORDER PATROL

Non-Monetary Returns	Customer	Evaluation Criteria	Measurement Method
		Perceptions of organizational effectiveness Opportunity for advancement Fairness of promotions/ selection process Organizational focus on productivity and quality Clarity of organizational goals Quality of organizational communication	INS-wide organizational climate survey