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CHAPTER FOUR

THE ECONOMIC VALUE OF EMOTIONAL INTELLIGENCE COMPETENCIES AND EIC-BASED HR PROGRAMS

Lyle M. Spencer

Acceptance of emotional intelligence competency (EIC) concepts and programs by academics, professionals, and organizations will ultimately depend on their demonstrated validity and utility. This chapter reviews the rationale and methods for evaluating EIC-based human resource programs in monetary terms, and it also presents preliminary met a-analytic estimates of the economic value added by these interventions.

Rationale

Reasons for evaluating EIC projects in economic terms include satisfying professional ethics and acceptance criteria, satisfying legal requirements, and demonstrating economic utility.

Professional Ethics and Acceptance

The Standards for Educational and Psychological Testing, prepared by a committee of the American Educational Research Association, American Psychological Association, and National Council on Measurement in Education (1999), require measures (and l)y inference, human resource programs based on these measures) to be reliable and valid (that is, to statistically predict) outcomes of (economic) value to individuals or organizations.

EIC researchers and practitioners are regularly savaged by critics for failing to publish reliability and validity data: for example, Barrett (2000) denounces EIC as “slickly packaged junk science perpetrated by unscrupulous consultants on ignorant customers.” Published data about the efficacy of EIC programs exist (see Chapter Nine), but EIC advocates have largely failed to bring these data to human resource (HR) professionals’ attention.

Legal Requirements

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U.S. and Canadian courts, under civil rights and (in Canada) pay equity laws, have ruled that "any [HR] decision-making processes, from background checks to supervisory performance ratings, that affect an employee's status in an organization, are tests, and thus subject to scrutiny for adverse impact" (Latham & Wexley, 1981). These rulings effectively extend requirements for statistical reliability and validity to any assessment for selection or promotion, any development opportunity and any performance appraisal affecting pay or career opportunities.

Legal requirements for scientific reliability have been expanded by U.S. Supreme Court Associate, Justice Stephen Breyer's decision for the majority in *Kumho Tire, Inc.* v. *Carrnithael* (119 Sup. Ct. 1167 [1999]), which extends an earlier U.S. Supreme Court ruling in *Daubed* v. *Merrell Dow Pharmaceuticals, Inc.* (509 U.S. 579 11993]). Daubert required expert witness testimony to be based on "tested scientific knowledge, demonstrate reasonable reliability criteria, have been subjected to peer review, report the size of the known error rate for findings . . [and] establish whether the knowledge enjoys widespread acceptance in the scientific community" (Daubert, cited in Wiener, 1999).

Valid development opportunities, for example, can clearly make a difference in an employee's status, and for this reason they have been the subject of many legal battles (such as the 1978 *Bakke* v. *Regents of the University of (California).* Access to (quality) EIC education and training opportunities almost certainly falls under these laws. An employee can complain: "You sent me to the 'feel-good' course when my colleagues got to go to *validated* training which helped them show improved business results and get promoted? Discrimination!" And lawsuit?

The legal status of psychological tests and programs in European Community countries under EC and individual country labor laws and union and worker council agreements is less clear, but many observers believe scientific validity requirements for HR practices will become law in Europe. Multinational HRIS vendors (for example, PeopleSoft and SAP) are designing their systems to provide data on whether EIC programs pass legal tests of reliability and validity.

Economic Utility

Evaluation methods that look at the economics of human resource programs are premised on the same survival-of-the-fittest concept that governs all businesses: that is, the goal is to help investments flow from less valuable uses to uses where they generate the highest returns.

Economic value-added (E\A), cost-benefit, and return on investment (ROI) analyses lead HR staff to improve practices by helping them to

- Focus on the *right* problems or opportunities—those with the greatest cost or value, respectively to the firm.
- Focus on *interventions* that will have the maximum impact on costly problems and valuable opportunities.

Demonstrating the economic value of outcomes also enhances the professional longevity credibility, and satisfaction of EIC researchers and practitioners in several ways.

First, the HR function competes with every other organizational function for capital investment funds. HR professionals are more likely to he able to convince their customers to adopt programs when they can describe program benefits in economic terms. Investment proposals with business cases showing compelling ROI projections are more likely to be funded. “Soft" programs and staff (that is, those lacking economic justification are more likely to be cut. Second, HR programs are increasingly emphasized in making ISO 9000, JACHO, Deming, arid Baldrige audits and awards. Most of these assessments arc qualitative. Economic value—added data can provide powerful measures of HR programs’ quality Hard data showing that HR interventions made a meaningful business contribution to an organization are more likely than oilier evaluations to find their way into management reports and personnel folders and to enhance HR staff careers.

The Economic Value of EIC-Based Programs

An *emotional intelligence competency* may be defined as “an *underlying* characteristic of an individual which is *causally* related to *effective* or *superior* (one standard deviation above the mean) performance in a job" (Boyatzis, *1982).* This definition may be stated more generally as an EIC is *any individual characteristic (or combination of characteristics) that can be measured reliably* and that *distinguishes superior from average performance, or effective from ineffective performers, at levels of statistical significance.* This *superior performance* definition of competence -- specifically, performance one standard deviation above the mean (or the top 15 percent, roughly the top one out of ten performers in a job)—is preferred for two reasons: first, the economic value of EIC programs is easily calculated, and second, like any best practice bench-mark, EIC programs that predict the *best* level at which a job can be done drive human resource applications to *add* value——that is, to do *better* than individuals’ or firms’ present *average* level of performance.

The EVA added by EIC-based interventions is found by (1) determining the EVA of performance one standard deviation above the mean (+1 SD), and (2) determining the percentage of this increased productivity attributable to EIC as opposed to other competency and exogenous variables. Therefore the economic value added by EIC-based intervention = EVA + I SD x % EVA attributable to EIC variables.

Finding the EVA of Performance +1 SD

As illustrated in Figure 4.1, Hunter, Schmidt, and Judiesch (1990) found that, depending on the complexity of the job, performance one standard deviation above the mean is worth between 19 percent and 48 percent of economic value added in non-sales jobs and that it results in a 48 to 120 percent increase in productivity in sales jobs.

These percentages are *actual* productivity or economic value-added “performance distribution” figures—not merely “global estimation” guesstimates by employees, managers, or HR staff. Real performance distribution figures from organizational records are of course preferable to global estimates of the incremental value of performance that is one standard deviation above the mean.

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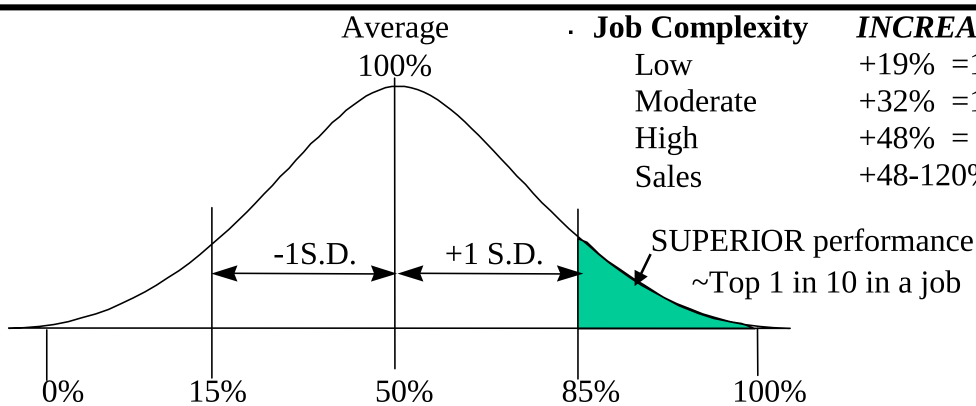
FIGURE 4.1. EVA ADDED BY SUPERIOR PERFORMANCE



Job Complexity	***INCREASED* Productivity**
Low	+19% =119%
Moderate	+32% =132%
High	+48% = 148%
Sales	+48-120% = 148-220%

Salary Value @ SD	$52,000	$100,000	$148,000

The simplest means of valuing superior performance (that which is one standard deviation above the mean) for any job is to multiply the average salary for the job (for example, $100,000) by 100 percent plus the additional percentage of productivity contributed by superior workers. If a superior worker in a complex job is 148 percent more productive than an average worker, he or she has a productivity salary value of $ 148.000, even if he or she is paid an average of only $100,000. Conversely a poor performer one standard deviation below the mean may be paid $100,000 but has a salary value of only $52,000.

Most studies of economic value added by superior performers suggest that such global estimation by salary value is very conservative. First, using the full cost of employment (salary plus benefits plus overhead, usually totaling three times base salary) as the economic value an employee must attain for the organization simply to break even is a better method of estimating. Second, most employees in valuable jobs can leverage economic benefits that are vastly greater than their salary or employment costs alone might suggest.

Figures 4.2 through 4.5 present performance distributions for computer programmers, salespeople, project managers, and account managers, respectively. Figure 4.2 shows that average programmers produce five Albrecht function points (AFPs) of debugged code per person per month.

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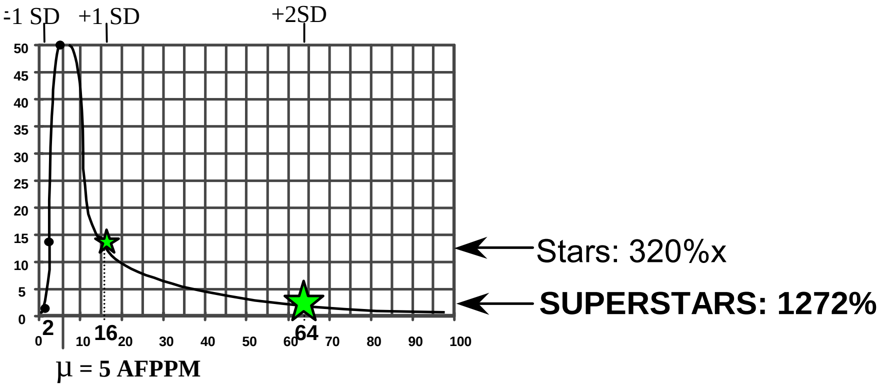
FIGURE 4.2 PERFORMANCE DISTRIBUTION FOR COMPUTER PROGRAMMERS

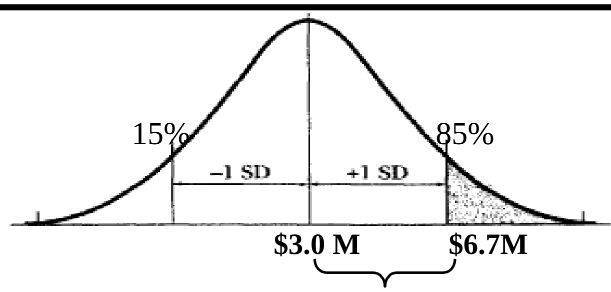


<u>Increased Productivity @</u>	<u>+1SD</u>	<u>+2SD</u>
% Value Added	320%	1272%
Economic Value added	$132K	$703K
Multiplier effect x Salary	2.2x	11.2x

Figure 4.3 illustrates the finding that average salespeople in forty-four fortune 500 firms, earning about $42,000 in direct salary, sell $3 million worth of goods or services, but superior salespeople who are one standard deviation above the mean sell 123 percent more—that is, goods and services worth $6.7 million (Sloan & Spencer, 1991).

FIGURE 4.3. PERFORMANCE DISTRIBUTION FOR SALESPEOPLE IN U.S. FIRMS.

Average salary: $41,777



Increased Productivity @	<u>+1 SD</u>
% Value Added	123%
Economic Value Added	$3.0 million
Multiplier effect x Salary	88x

Source: Data from Martin, 1990; Jones, 1986, 1991.

Note: N of firms = *44.* *Source:* Data from Sloan & Spencer, 1991.

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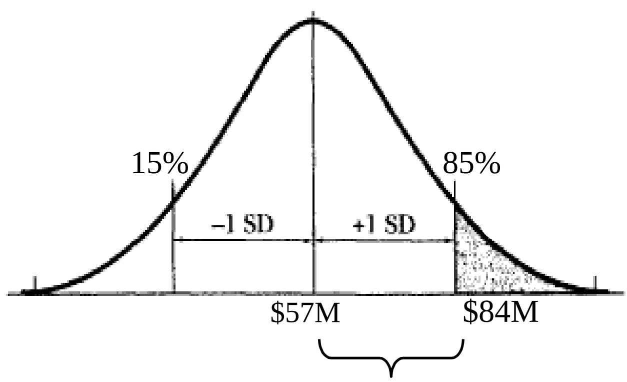
This 123 percent difference between superior and average salespeople is at the top end of the 48 to 120 percent range found by Hunter et al. (1990). Note that the $3.7 million in economic value added is not 123 percent of salary, but 8,800 percent, or eighty-eight times, salary.

Figure 4.4 reflects data showing that average engineering construction managers earning $87,000 in direct salary managed projects worth $57 million (Spencer, 1997).

FIGURE 4.4. PERFORMANCE DISTRIBUTION FOR CONSTRUCTION PROJECT MANAGERS.

Average salary: $87,000



Increased Productivity @	+1 SD
% Value Added	47.3%
Economic Value Added	$27 million
Multiplier effect x Salary	310x

Superior project managers had 47 percent more economic value, worth an *additional* $27 on (through avoiding costs and time overruns and selling additional engineering change orders). This 47 percent difference between superior and average managers is almost exactly the 48 percent predicted by Hunter et al. (1990). Note that the $27 million in economic value added represents not 47 percent of salary but 31,000 percent, or 310 times, salary.

Figure 4.5 represents the finding that superior account managers generate six times the revenue produced by average account managers (salaries are not comparable, so multipliers have not been calculated) (Hay/McBer, 1997).

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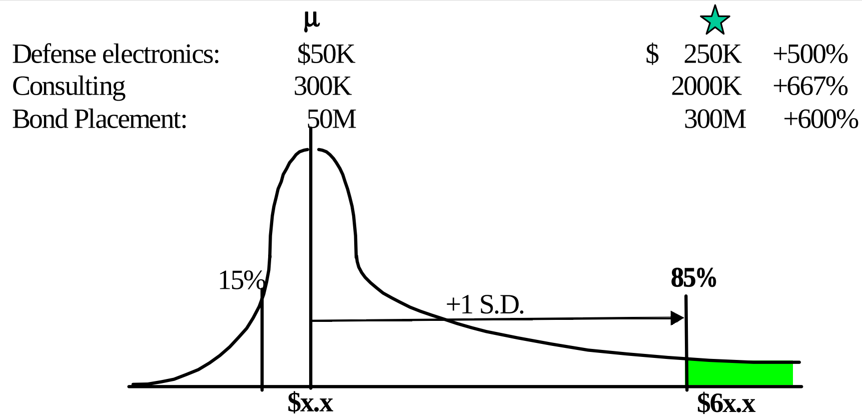
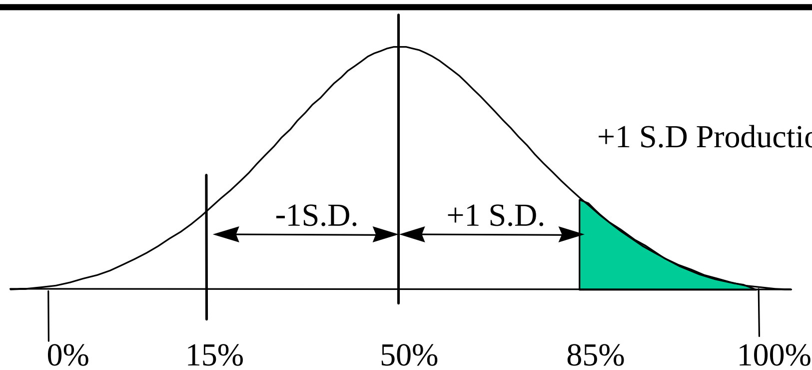
FIGURE 4.5. DISTRIBUTION OF PERFORMANCE FOR ACCOUNT MANAGERS



Performance distribution methods can also be applied to groups and organizations. For example, Figure 4.6 shows the distribution of production of pounds of polyester fiber by self-managing work group teams in Hoescht Celanese U.S. plants.

FIGURE 4.6. DISTRIBUTION OF PRODUCTION OF POUNDS OF POLYESTER FIBER BY SELF-MANAGING WORKGROUP TEAMS



		+1 SD = +30%	
Global estimation: salary value		$270K	$351K
		+$81K	
Productivity value added lbs	17mil	24mil	31mil
Value@$1.40/lb	$23.8mil	$33.6mil	$43.4mil
Economic Value Added		**+$9.8mil**	
Leverage: Salary value::EVA =		***121x***	

Superior teams—those one standard deviation above the mean in production—outperformed average teams by 30 percent. Salary costs for these workers at $13 per hour were $270,400. The

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actual economic value added was an additional seven million pounds of fiber worth $1.40 per pound, which equals $9.8 million. The ratio of an additional 30 percent incremental salary value to actual economic value added is 1 to 121 ($88K::$9.8Mil). Interestingly, the additional 30 percent incremental productivity Hunter et al. (1990) found for individuals in moderately complex jobs appears to hold for teams as well. Teams, however, greatly leverage economic outcomes. The value of team EICs— Team Achievement Motivation, Empathy, Organizational Awareness, Collaboration, Peer Team Leadership-- all of which can be affected by EIC-based selection and team-building training-- can be calculated for groups in the same way it is for individuals. Even a 1 percent shift in team performance in this case is worth $98,000—which provides an economic justification for a lot of team building.

Finding the Percentage of EVA of Performance ±1 SD Attributable to EIC Competencies

In finding the percentage of EVA of performing one standard deviation above the mean attributable to EIC competencies, EICs -- as opposed to other individual characteristics (IQ or reaction tune) and exogenous variables (for example, technology, managers, or local economies)- must first be defined. Reasonable consensus exists among researchers about the definitions of EIC competencies; Table 4. 1 lists the generally accepted emotional intelligence competencies.

A question is whether operant cognitive competencies (Technical Expertise, Analytic Thinking. and Conceptual Thinking) should be included or excluded. Neuroscience studies by Damasio (1994) suggest that cognitive competence is indivisible from and influenced by emotional competence. In a classic experimental study Damasio had orbital-cortex-damaged and normal subjects play a business game subtly rigged to ensure players always lost. Normal subjects soon refused to play the game. When asked why, they could not give rational (calculation of odds) reasons but simply said, “It just didn’t feel right” The subjects’ emotional sensors (the amygdala and related limbic system structures) seem to have detected the negative bias of the game before their “pure reason” prefrontal cortices had figured out that something was “wrong” and why it was wrong.

Frequently cognitive competencies, which represent approximately 20 per-cent of the variables measured in most studies, do not explain any of the variance in superior job performance. Figures 4.7 and 4.8—structured equation models of independent variables that predict superior performance in two samples of executives—show an example of and an exception to this rule. (The numbers on the lines running from the independent variables on the left side of each figure to the dependent criterion variables on the right are standardized partial regression coefficients, or beta weights They indicate the approximate influence each independent variable has on the non-residual variance in the dependent variable (R^2 =.34-.35 or 34 to 35 percent, in both cases)

Exogenous variables are either controlled for by stratified or random sampling designs or tested by entering them as separate variables in regression analyses. For example, in a study of branch managers, all subjects had the same products, promotion budgets, technology (computers network support, and so forth) and boss. Superior and average performers were selected as subjects randomly on the basis of their percentage of growth in profits in order to control for the size and history of different branch districts and variation in the relative strength of local economics. Figure 4.7 shows the impact of

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TABLE 4.1. EIC DICTIONARIES.

EIC Cluster	Boyatsis[a]	Spencer[b]	McClelland[c]	Fetzer Consortlum[d]
Achievernent	Efficiency Orientation	Achievement Orientation	Achievement Orientation	Achievement Motivation
	Innovativeness			
	initiative	Initiative	Initiative	Initiative (Self-Direction, Self-Motivation)
	Attention to Detail Conscientiousness	Concern for Order and Quality		
Affiliation	Empathy	Interpersonal Understanding Customer Service Orientation Teamwork and Cooperation	Interpersonal Understanding Customer Service Orientation Teamwork and Cooperation	Empathy Customer Service Team Building/Teamwork Collaboration and Cooperation
Power	Persuasiveness Written Communication Oral Communication	Impact and Influence	Impact and Influence	Influence Effective (Oral) Communication
		Organization Awareness	Organization Awareness	Networking
		Relationship Building	Relationship Building	Building Bonds Handling Relationships
	Negotiating			Conflict Management! Negotiation
Management	Developing Others	Directiveness Developing Others	Directiveness Developing Others	Coaching and Developing Teaching Others
	Group Management	Team Leadership	Team Leadership	Leadership Change Catalyst Managing Diverse Workforce Leveraging Diversity Managing Human Resources
Cognitive	Quantitative Analysis Planning	Analytic Thinking Conceptual Thinking	Analytic Thinking	Analytic Thinking
	Using Technology	Technical Expertise		
Personal Effectiveness	Self -Confidence	Self Confidence	Self Confidence	Self Confidence (Self-Esteem) Optimism and Hope
	Self Control	Self Control		Self-Control (Self-Management. Managing Emotions, Stress Tolerance)
	Flexibility		Flexibility	Flexibility Adaptability
	Social Objectivity	Organizational Commitment	Organizational Commitment New: Integrity	Honesty/Integrity
				Trustworthiness
	Accurate Self Assessment			Emotional Self Awareness

a.Boyatzis. 1982; Boyatzis, Cowen, & Kolb, 1995.
b.Spencer & Spencer, 1993.
c.McClelland, 1996.
d.Goleman. 1998b.

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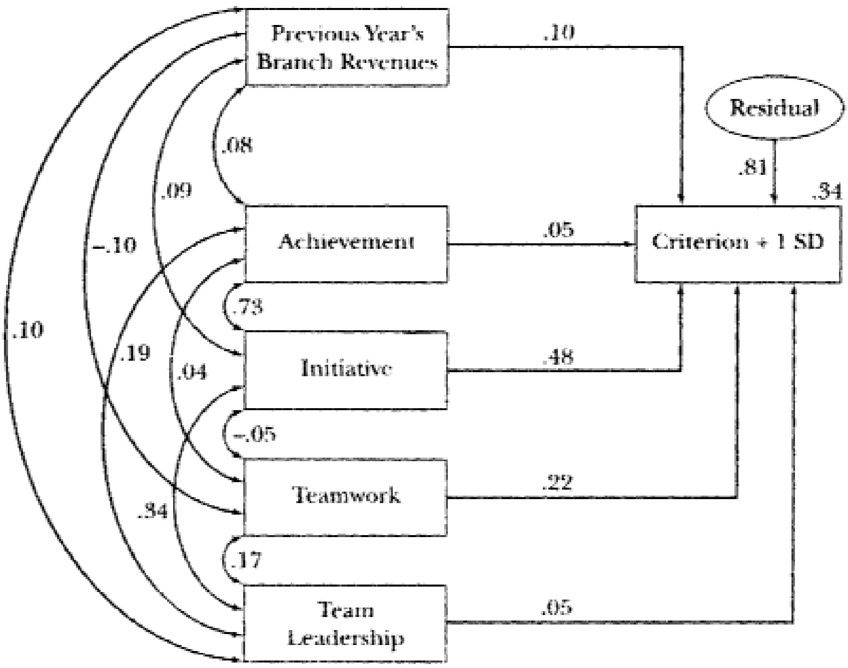
FIGURE 4.7. EICS PREDICTING +1SD SUPERIOR ECONOMIC PERFORMANCE AMONG U.S. INDUSTRIAL CONTROL FIRM BRANCH MANAGERS



Note: *N* = 98 branch managers, in two samples. An exogenous variable, previous year branch revenues, accounts for 10% of variance (R^2 = .34), EICs account for 80%; no cognitive competencies enter the regression analysis.

the previous year's branch revenues tested in a regression equation. This variable accounted for .10 x .34 = 3.4% of the explained variance in a branch manger s performance. EICs accounted for .80 x .34 = 27% of the performance variance. Variance attributable to competencies ranges from r = .10 to r = .90, with *r* s = .40 to .60 (R^2 = .15 -.35) most common (McClelland, 1998; Spencer & Spencer, 1993). These results are usually attainable when EIC research is done in accordance with rigorous standards using behavioral event interviews and analysts trained to ~> .80 inter-rater reliability

These examples illustrate several important points about the global estimation method. First, many employees leverage incremental economic values much greater than their salaries. For this reason the actual economic contributions of superior performers who are one standard deviation above the mean should be used whenever available. or cost of employment. Second, the more complex the job and the more economic value it leverages, the more superior performance is worth. Identifying EICs for these jobs and developing HR programs that can improve them add the greatest economic value. Third. "pure" emotional and cognitive competencies, in addition to exogenous variables, predict superior performance. The definition of *EIC* used in this chapter-— *any individual characteristic* (or *combination of characteristics) that can be measured reliably* and that *distinguish superior from average performers, or effective from ineffective performers, at levels of statistical levels of significance—is* deliberately broad. All independent variables

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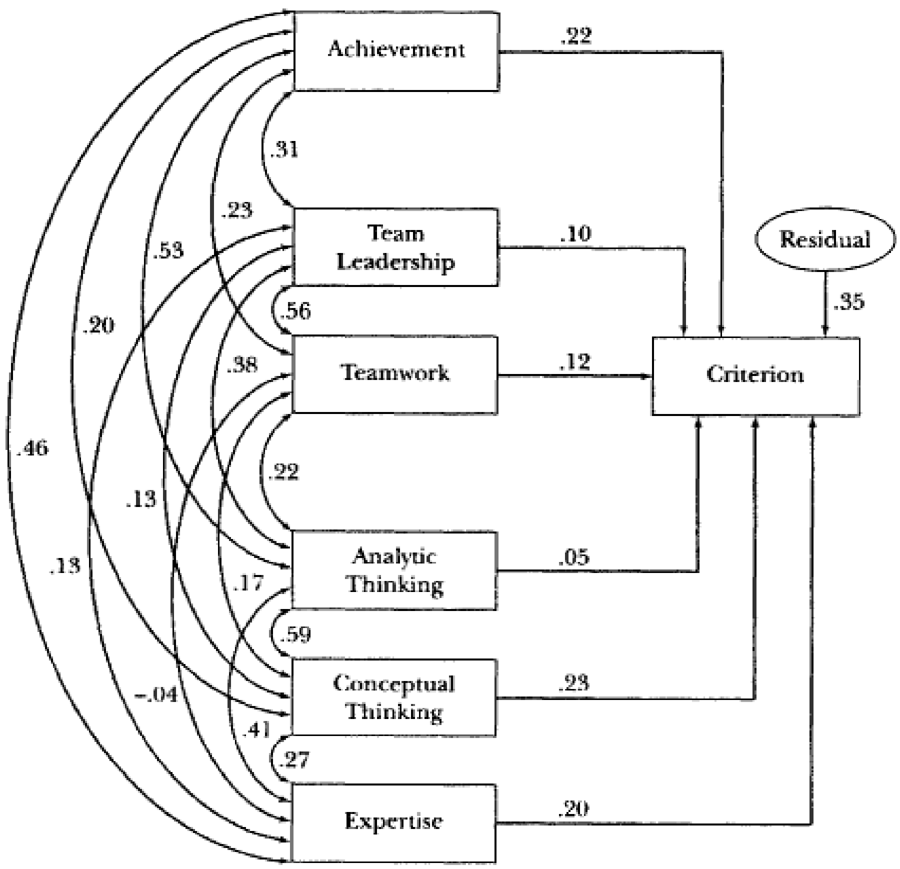
should be controlled for or measured and analyzed to determine the percentage of variance they account for.

FIGURE 4.8. EICS PREDICTING +1 SD SUPERIOR ECONOMIC PERFORMANCE AMONG EUROPEAN FOOD AND BEVERAGE SENIOR MANAGERS.



Note: N = 75 managers. Cognitive competencies account for 48% of variance (R^2 = .35), EICs account for 44%.

Fourth, *differentiating* EICs distinguish superior from average performers. *Threshold,* or *essential,* ElCs are required for minimally adequate or average performance. Differentiating ElCs *add* value, and for any given job they can serve as a template for personnel selection, succession planning, performance appraisal, and development. Any human resource approach that does not use an explicit benchmark *superior* to its present performance risks staffing, training, and

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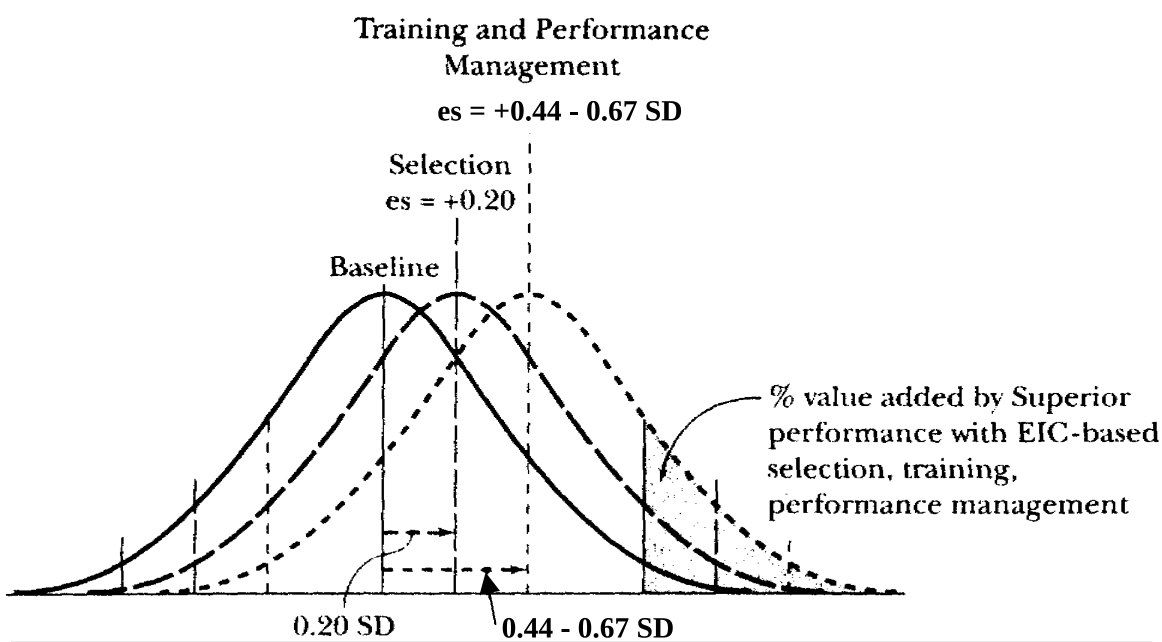
managing to mediocrity—such an approach will be unlikely to improve upon the existing (average) performance level. Finally the performance distributions, global estimation methodology, and findings of Hunter et a]. (1990) provide powerful tools for estimating amid evaluating the economic value of FIG-based HR applications. The Appendix to this chapter contains a survey form and spreadsheet template for calculating the value of performing one standard deviation above the mean in a job and for calculating the potential economic value added from staffing, training, and performance management applications.

How Much Value Can EIC—Based HR Interventions Add?

As illustrated in Figure 4.9. human resource interventions add value by shifting employees' performance curves toward greater average economic value added per employee (a shift to the right on the figure)

FIGURE 4.9. EFFECT SIZE SHIFTS PRODUCED BY SELECTION AND BY TRAINING AND PERFORMANCE MANAGEMENT.



Once the economic value of performance one standard deviation above the mean is known, this value can be used as a yardstick, called an *effect size (es),* to measure how much value an HR application can add. One effect size equals one standard deviation: intervention impacts are then measure-cl in percentages or multiples of effect sizes. Figure 4.9 illustrates that selection effect sizes average 0.20 SD (range = 0.12—0.36, SD = 0.08); and training and performance management effect sizes average 0.44 to 0.64 (range = -0.07- -0.99), SD = 0.37).

The economic value added by an intervention equals the economic value added by performance + 1 SD x effect size x the number of people (or teams) impacted. Figure 4.9 summarizes algorithms used and provides a template to calculate EVA.

FIGURE 4.10 ALGORITHM FOR CALCULATING EVA FROM PERFORMANCE DISTRIBUTION AND EFFECT SIZE DATA

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
2	**ECONOMIC VALUE OF COMPETENCY-BASED HR APPLICATIONS**								$=000s							
3	Input data =		Calculated Data =			*100* (numbers in italics) = example data			19% (numbers not in italics) = mean meta-analytic study findings							
	1. $Economic Value Added by +1 SD						**2. %EVA impacted by HR Intervention** *Choose:*		**3. Economic Value Added by EIC HR Intervention**			**4. $Value Added per FTE**		**4. # Staff Impacted/ Year**		**5. Total $ Value Added by HR Application/ Year**
4	**1.1 $Job Value**	*Choose:*	**1.2%Value Added by +1 SD Performance**		**1.3 Measured $ EVA at +1SD** *Choose*				**EIC HR Application**	**Effect Size Shift (.SD)** Choose:						
5	A. $Salary/Year	$ *100*	**Complexity**	**%** *Choose:*			A.% Job Tasks addressed by intervention	1.00	A. EIC Feedback & Goal Setting	0.1						
6	*or*		A. Low	19%			*or*		*or*							
7	B. $Full Cost of employment/ year (~2.7-3.0 x Salary)	$ *300*	*or*				B. % Variance explained by independent variables addressed by training	*0.27*	B. Business Results Goal Setting	0.19						
8	*or*		B. Medium	32%			*or*		*or*							
9	C. $Economic resources (revenues, costs, capital budget) person in the job can can control		*or*						C. Selection	0.2						
10			C. High	48%					*or*							
11			*or*						D. Training	0.44-.67						
12			D. Sales	100%					*or*							
13			*or*						E. Perf. Mgmt	0.6						
14									*or*							
15			E. Other ________/ Mgmt Estimate				F. Other ________/ Mgmt Estimate		F. Other ________/ Mgmt Estimate							
16	CHOICE	$ 300	**X**	48%	= A.	$ *144*										
17				$ Value Added/Year	B.	$ *1,690*										
19	CHOICE					$ *1,690*		*0.27*	**X**	*0.125*	**=**	$ *57*	**X**	*28*	**X**	*1,597*
20	**Investment**	$ *224*														
21	**Return**	$ *1,597*														
22	**ROI (1 Year)**	*613%*														

The steps in this algorithm are

I. Choose how you will calculate the economic value of + I SD above the mean. Choices are

A. “Global estimation’ from

1. INPUT value of employee time per year:
   a. Salary/Year
   b. Full Cost of Employment/Year (usually about three times salary----get this figure from your financial analyst, or calculate it using the Economic Value of’ EIC in Appendix A.)

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or

2. OUTPUT value—the values of economic resources (revenues, costs, capital budget) a person in the job can control, that is, can increase or save depending on his or her competence.

Choose a value calculated by one of these three methods and enter this value in spreadsheet cell B16

B. Choose how you will estimate the economic value of' + I SD above the mean. Choices are

1. Choose findings from meta-analytic research in spreadsheet column D:
   a. 19%, for low,
   b. 32%, for moderate,
   c. 48%, for high,
   d._100%, for sales jobs

   or

   e. Use the mean global estimate (collected using the Economic Value of EIC in Appendix A) of managers or other knowledgeable experts in your own organization. Enter this value in cell D16. Multiply B16 by D16 and enter this value in cell F16.

or

2. Use the actual measured economic value (increased revenues or profits, cost savings, and so on) at performance + 1 SD) above the mean. Actual economic value is preferable by far if these data are available from organization records. Enter this value in spreadsheet cells Fl6 and F17.

II. Estimate the percentage of job tasks or independent variables impacting EVA addressed by HR intervention.

Note: early meta-analytic studies assumed this percentage to be 100%, and report only the observed effect size shift from interventions. Later studies attempted to value intervention effects by multiplying the total value of time on the job by the percentage of time spent on tasks or EICs addressed by the intervention. For example, if managers with a total employment cost of $200,000 per year spend 50% of their time in meetings. a meeting management seminar would impact 50% x $200,000 = $100,000 in economic value. This approach assumes time spent on a task equals its economic value added (a dubious assumption for most meetings!)

A more scientific--and conservative--estimate can be made by multiplying the percentage cu independent variables addressed by an intervention by the statistical variance these variables make in business results (EVA dependent variables). The Figure 4-10 example uses this value from Figure 4.7, .27 entered in cell H19. All four competencies shown in Figure 4.7 to predict EVA were addressed by the Incon case intervention discussed at the end of this chapter

If only some independent variables are addressed by an intervention, a third alternative is to multiply intervention time spent on independent variables by the variance these variables cause in business results outcomes. Figure 4.8 shows Teamwork and Team Leadership competencies account for 25% of .34 = 8.5% of explainable variance in Branch Manager profits, so training in these team competencies could impact 8.5% of EVA.

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A. Choose Intervention

1. Time on task.

2. Variance Impacted, or

3. The product of Time on Task and Variance impacted and enter this value in cell H19.

III. Choose the most likely effect size shift for your application.

A. From meta-analytic data:

1 .10 for EIC data feedback amid goal setting
2. .19 for business results goal setting
3. .20 for selection
4. .44 to.67 for training
5. .60 for performance management

or

B. From estimates by knowledgeable experts, or (best) from measured results in your organization.

Enter this value in cell L19. Multiply the economic value of + 1 SD in cell F19 by percentage of independent variables causing EVA outcomes in cell H19 by effect size shift in Cell JI9 to find the EVA per full time equivalent (FTE) employee, and enter this value in cell LI9.

IV. Multiply EVA per FTE value in cell L19 by the number of people (or teams) per year impacted (selected, trained, performance managed) per year in cell N17. This product, in cell P17, is the total EVA your E1C application can add to your organization per year.

Staffing

Staffing adds value by (1) hiring, placing, or promoting greater numbers of supenor performers (that is, persons better matched to specific jobs which increases both performance and satisfaction), (2) deselecting marginal performers (General Electric CEO Jack Welch ruthlessly outplaces the bottom 15 percent of GE managers each year) and (3) reducing turnover (by making better job person matches so employees selected perform better and are not fired are more satisfied and don’t quit, The costs of turnover include

A. Lost productivity during the time of acquiring new staff (55-57 days) e.g. approximately two months of lost sales for a sales position.
B. Acquisition costs totaling roughly one third of an employee’s first year salary, whether paid to a search firm or incurred by all the steps and costs of internal recruitment

and selection.
C. Out-of pocket costs for relocation and training.
D. Lower productivity during a new hire's learning curve period—the time from the day he or she is hired to the day he or she is 100 percent productive: the average productivity of an average experienced person in the job). Learning curve time averages twelve months for technical and professional personnel.

The *minimum* cost of replacing a technical or professional person is his or her direct salary for a year (Spencer 1986); the actual cost is probably two to three times direct salary if the full cost of employment, including benefits and overhead, is added to the salary and if lost productivity (from for example, lost sales the loss of a major contract, or a delay in time to market of a new product during those fifty-five to fifty-seven days it takes to replace an employee) is taken into account (McClelland, 1998; Spencer & Spencer, 1993).

Increased revenues and productivity come from better performers—as the averaged data in Figure 4.2 show, superior performers produce 19 percent, 32 percent, 48 percent, and 48 to 120 percent more in low, moderate, and high complexity jobs and sales jobs, respectively. A median 24 percent productivity increase from competency-based selection means the same amount of work can be done with {100% – [l00%/(l00% + 24% productivity improvement)]} = 20.5% fewer staff.

Table 4.2 shows a meta-analysis of eight ECI-based selection systems. The median productivity increase was 19 percent, the median turnover decrease was 63 percent, the medial) economic value added was $1.6 million, and the median return on investment was greater than 1,000 percent. These figures appear incredible until one recalls how much even one additional superior performer can contribute (for example, one superior salesperson generates $3.7 million in additional revenues). A bad hire in an executive position was calculated by PepsiCo to cost $250,000 (McClelland, 1998); a bad placement to the Middle East costs Mobil $375,000.

An EIC intervention program costs $80,000 to $120,000. A single superior hire or avoided luring mistake usually justifies the cost of the investment in EIC-based staffing programs. Examples in Table 4.2 include:.

Retail sales. Fifty percent of sixty new hires were selected on the basis of competencies assessed using a behavioral event interview (BEI), and the other 50 percent were selected using traditional biodata criteria (one requirement was "ten years of sales experience," which meant mostly middle-aged white males were hired, an affirmative action concern). In the year following selection, turnover in the competency-selected group was 20 percent (six people) and average sales were $5,000 per week compared to 40 percent turnover (twelve people) and average sales of $4,200 per week in the traditional group. Benefits of the competency-based selection system were

- Avoidance of turnover costs: six salespeople retained at a saving of $20,000 per person in costs to replace them translates into saved costs of $120,000.
- Increased revenues: thirty salespeople producing $40.000 in extra sales per year with a 50 percent gross margin equals a $600,000 per year net increased contribution.

The total one-year benefit from a $720,000 return on $30,000 invested in the competency study and selection training was 2,300 percent (Spencer, 1986, pp. 95-96). In addition. the competency-based selection system resulted in the hiring of more female and minority salespeople (without prior sales experience, thereby lessening the likelihood of

In Cherniss, C. and D. Goleman, eds. (2001) The Emotionally Intelligent Workplace: How to Select for, Measure, and Improve Emotional Intelligence in Individuals, Groups and Organizations. San Francisco, CA: Jossey-Bass/Wiley.

an affirmative action problem.

TABLE 4.2 META-ANALYSIS OF EFFECTS OF EIGHT COMPETENCY-BASED SELECTION SYSTEMS

Industry (Job Family)	*N*	Design	Productivity Increase	Turnover Decrease	Economic Value Added	Return on Investment
Retail (sales)	60	Control	19%	50%	$ 720K	2, 300%
Wholesale (sales)	80	Control	16%	50%		
Computer (sales trainees)	700	Longitudinal	—	90%	>$3.15M	>1,000%
Food and beverage (executives)	47	Longitudinal	10%	87%	$3.75M	>1,000%
Cosmetics (sales)	74	Control	33%	63%	$2.56M	>1,000%
Computer (programmers)	100	Longitudinal	—	99%	$1.43M	>1,000%
Retail/customer service (telemarketers)	320	Longitudinal	24%	99%	>$1 .6M	>1,000%
Financial services	120	Control	24%	—	$ 750K	525%
Median			**19%**	**63%**	**$1.6M**	**>1,000%**

Computer programmers. A reduction in turnover among competency—selected programmers saved the company the cost of replacing twenty-two professionals at $65,000 each, a $1.43 million return on an $120.000 investment in competency research and selection training.

Food and beverage executives. An 87 percent reduction in the turnover of executives costing $250,000 each to replace saved the firm (PepsiCo) $5.4 million (McClelland, I 998).

Cosmetics sales. Thirty-three people were hired using the BEI and a competency model; a control group of forty-one was selected without behavioral interviews. in the following three years. five of the competency-selected group quit or were fired, compared with seventeen in the control group. Competency—selected people increased their sales an average of 18.7 percent per quarter) compared to a 10.5 percent average increase for salespeople in the control group. On an annual basis, competency-selected people each sold $91,370 more than control-group salespeople, a net revenue increase of $2,558,360 ($91,370 x 28 salespeople).

Computer sales. A large computer firm decided to transform several thousand senior staff—"overhead people who cost money" with an average yearly compensation of $57,000 per person—into "salespeople who make money." Not all the staff "bureaucrats" had the competencies to be effective in sales: the initial attrition rate from the sales training was 30 percent, or 210 of the 700 staff sent for sales training each year. (Sales trainees were terminated after four months if they had failed three consecutive month-end tests.) Each failure cost the firm $16,667 in salary costs alone, which totaled $3.5 million per year for the 210 failures (this figure is conservative because costs of trainee benefits and other costs of training—instructors, materials, and overhead—were also lost). Using

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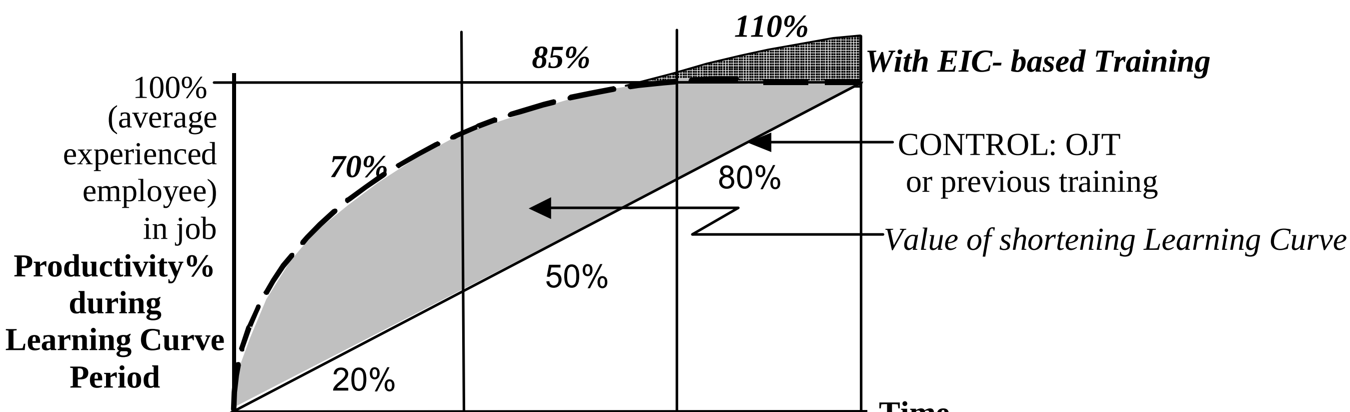
an E1C model developed by studying its successful salespeople, the firm cut program attrition to 3 percent twenty-one dropouts), a 90 percent reduction worth $3.15 million (Rondina, 1988).

Training and Performance Management

Training development activities, and performance management add value by (1) shortening the time it takes employees to reach 100 percent productivity (defined as the average productivity of at average experienced workers in the job) and (2) increasing productivity by shifting average employees performance toward that of superior performers.

Figure 4.11 shows the economic value of shortening learning curve by 33 percent by teaching new hires the EICs and best practices of superior performers (Spencer, 1986) The learning curve time to reach 100 percent productivity is divided into three equal periods, each costing one third of the total cost of employment for the entire learning curve period, in this case $100,000/3 = $33,000 for first, second and third sub-periods.

FIGURE 4.11, VALUE OF SHORTENING LEARNING CURVE TIME FOR EMPLOYEES WITH EMPLOYMENT COST OF $100,000 PER YEAR.



Learning Curve Time Period:	*First 3rd* 0-4 Mos	*Second 3rd* 5-8 mos	*Third 3rd* 9-12 Mos	TOTAL
Value of Time/Period:	$33.3K	$33.3K	$33.3K	$100K
%Prod x $Time Value				
Before EIC Training:	6.7K	16.7K	26.7K	$50K
After EIC Training:	**23.3K**	**28.3K**	**36.6K**	**$88K**
Economic Value Added by Reducing Learning Curve:				$38K

Managers estimate new hires' productivity (where 100% equals the average productivity an average experienced employee without training, the control condition) and with EIC-based training. Economic value added for trained and control subjects is estimated

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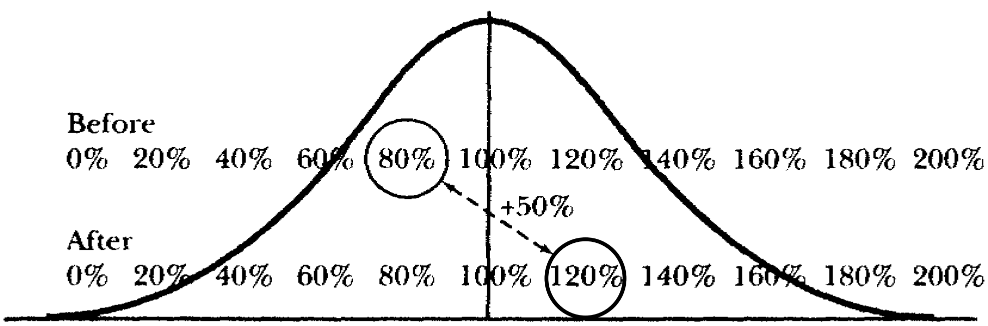
productivity% x $value of time during each sub-period. Sums of productivity value for untrained subjects is $50K versus $88K for trained subjects, hence training adds $38K per trainee.

Productivity improvements from training are estimated from manager ratings of trainees' productivity before and after training as shown in Figure 4.12 (Spencer, 1986) Assuming the full cost of employee time per year is three times salary ($33,333 x 3 =$100,000), and time on tasks addressed by training is 50 percent of total time training affects: 50% x $100,000 = $50 000 of employees economic time value. Managers (or 360-degree raters: bosses, peers, subordinates, and customers surrounding the person being rated) estimate employees' productivity before training and three months after training.

Productivity before training is multiplied by the economic value of time on tasks addressed by training, in this case 80% x $50,000 = $40,000. This baseline value is subtracted from productivity value of time after training, in this case 120% x $50,000 = $60,000, a gain of $20,000 per trainee.

FIGURE 4.12. MANAGER RATINGS OF TRAINEES' PRODUCTIVITY ON TASKS BEFORE AND AFTER TRAINING.



Productivity gain = 120% – 80% = 40%/80% baseline = 50% gain

Economic value added per trainee before training = 80% × $50K = $40K

Economic value added per trainee after training = 120% × $50K = $60K

Gain in economic value per trainee = $60K – $40K = $20K

Source: Data from Spencer, 1986.

Economic value added from training and performance management can also be estimated directly by multiplying the effect size shift from the intervention (from meta-analytic studies) ***x*** the known value of performance +1SD). Table 4.13 shows a meta-analysis of effect sizes and returns on investment (ROIs) in four studies of training programs. With outliers below the 10th and above the 90th percentile eliminated, the mean effect size shift for training in these studies was 0.44. with a standard deviation of 0.27. and ROI was 116 percent, with a standard deviation of 154 percent. Effect size findings in Table 4.13 are 28 percent more conservative than the mean 0.64 to 0.67 effect size shifts for both training and performance management reported by Burke and Day (1986) and by Falcone, Edwards, and Day (1986), ROIs varied significantly with the complexity of jobs, whether researchers used salary (as most did), cost of employment, or actual economic value added h superior performance, as demonstrated in Figures 4.2 through 4.5.

The identical effect size shift for training and performance management reported by Burke and Day (1986) and Falcone et al. (1986) is in itself an interesting finding. One hypothesis is that good performance management *is* training—that is, rather than simply forcing employees towards goal accomplishment, performance management that involves coaching teaches EICs and best practices that help employees improve performance. For example, Latham and Locke's meta-analysis (1979) of the effects of goal-setting (which showed a mean 19 percent productivity increase for jobs of varying complexity) supports findings of' effect size shifts from performance management. Using the *rule of 40* (that is, performing one standard deviation above the mean equals 40 percent increased

TABLE 4.3. ES SHIFTS AND ROI FOR A PORTFOLIO OF TRAINING PROGRAMS

	Exec Ldrshp		Management		Comunication		Sales		Technical		All		All--conservative		+1SD		-1SD ROI	
	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI	Perf. Shift (d)	ROI
Executive-2	*-0.05*	*-105%*									*-0.05*	*-105%*			-	-	*-0.05*	*-105%*
Leadership Skills	0.12	-36%									0.12	-36%	0.12	-36%	-	-	-	-
															-	-		
Managers-1			0.76	126%							0.76	126%	0.76	126%	-	-	-	-
Managers-2			*1.11*	492%							*1.11*	492%		492%	*1.11*	4.92	-	-
Lab Managers-1			*-0.09*	-129%							*-0.09*	*-129%*			-	-	*-0.09*	*-129%*
Project Management			0.37	60%							0.37	60%	0.37	60%	-	-	-	-
Supervisors-1			0.23	-39%							0.23	-39%	0.23	-39%	-	-	-	-
Supervisors-2			0.38	125%							0.38	125%	0.38	125%	-	-	-	-
Team Building			0.12	-86%							0.12	-86%	0.12	-86%	-	-	-	-
In-House Time Mgt.			*0.89*	*1989%*							0.89	*1989%*	0.89		*0.89*	*19.89*	-	-
Off Shelf Time Mgt.			0.28	106%							0.28	106%	0.28	106%	-	-	-	-
															-	-		
Oral Presentations					0.26	69%					0.26	69%	0.26	69%	-	-	-	-
Written Communication					*1.07*	275%					*1.07*	275%		275%	*1.07*	2.75	-	-
															-	-		
Territory Mgt.							0.54	85%			0.54	85%	0.54	85%	-	-	-	-
Product Sales							*0.67*	*3931%*			0.67	*3931%*	0.67		-	-	-	-
															-	-		
Problem Solving									0.31	16%	0.31	16%	0.31	16%	-	-	-	-
Hazard Energy									*0.9*	306%	*0.9*	306%	*0.9*	306%	*0.9*	3.06	-	-
Specialty Valves									0.37	130%	0.37	130%	0.37	130%	-	-	-	-
															-	-		
Median	0.04	-71%	0.37	106%	0.67	172%	0.61	2008%	0.37	130%	0.37	96%	0.37	96%	-	-	-	-
mean	0.04	-71%	0.45	294%	0.67	172%	0.61	2008%	0.53	151%	**0.46**	**406%**	**0.44**	**116%**	**0.99**	**766%**	**(0.07)**	**-117%**
SD	0.12	49%	0.39	661%	0.57	146%	0.09	2720%	0.32	146%	**0.37**	**999%**	**0.27**	**154%**	**0.11**	**821%**	**0.03**	**17%**

productivity), goal-setting has an effect size of 0.076 (19 percent x 40 percent).

Meta-analytic studies consistently find that training programs that generate performance one standard deviation *below* the mean have zero or negative effect sizes and negative returns on investment. Table 4.13 shows that most training has a positive effect size and return on investment The exception is top executive training Although hypotheses advanced to explain this finding include that you can't teach old dogs new tricks, these top executive sessions are usually not really training but rather vacations or perks held in lush surroundings with ample time off to play golf or ski, and such "training" is rarely EIC-based.

Most meta-analytic studies do not report the percentage of variance in effect size that can he attributed to EIC training versus training in cognitive abilities, technical knowledge or other skills An exception is Miron and McClelland's (1979) meta-analysis of the effects of Achievement Motivation training on small business entrepreneurs, which used a modified Solomon four-group design in which some entrepreneurs were trained in Achievement Motivation, a comparison group was trained in business knowledge and skills (accounting finance manufacturing, marketing and sales and human resources), and a third group was trained in both Achievement Motivation and business skills. Standard Metropolitan Statistical Area (SMSA) means for dependent variables in comparable small businesses were used as a control. Only Achievement Motivation training made a difference (effect size 0.50) in the independent variables: the number of jobs created (an increase of 32 percent) and the reported income taxes paid by businesses, proprietors and the incremental employees' hired (see Figure 4.13)

FIGURE 4.13. EFFECTS OF ACHIEVEMENT MOTIVATION TRAINING ON SMALL BUSINESS.

COST for 100 trainees: $287,500 (funded by the U.S. Small Business Administration)

BENEFITS: Compared to a control group, achievement motivation trainees generated

- **Increased jobs: 32% more (227 total, or 2.3 per business)**
- **Increased income:**

	Reported Income Year 1	Tax Rate	Tax Revenues
Businesses	$615,000	22.0%	$189,900
Proprietors	484,000	20.0	97,400
Employees	651,000	11.5	75,000
Total year 1			362,300
Total year 2			705,000
Total years I and 2			$1,067,300

- **Effect size shift: ~0.5 SD**
- **Time to recover training cost: 9.5 months**
- **ROI: 1 year 26%; 2 years 271%**

Source: **Data from Miron & McClelland, 1979**

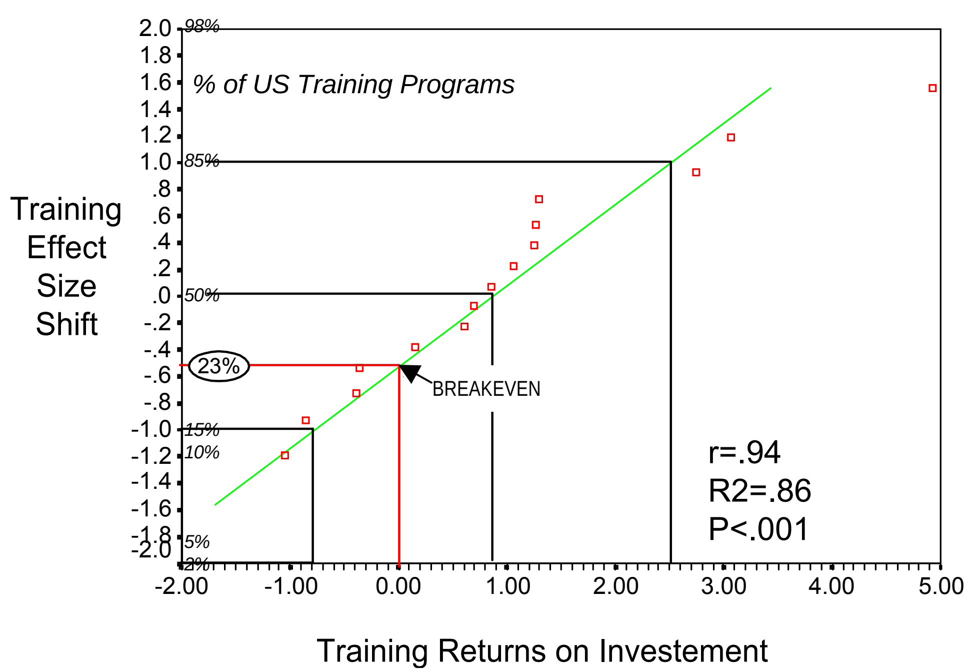
Achievement Motivation combined with business skills training had no significant impact. Business skills training alone actually decreased the entrepreneurs' business activities and results The researchers hypothesized that business skills training diminished trainees efficacy and self- confidence by making success in business ventures seem too complex and difficult to achieve.

A reanalysis of the data reported in Table 4.3 attempted to classify training programs into EIC and non-EIC groups to estimate the value added by EIC inputs (Spencer &

Morrow; 1996). Training programs were classified as EIC-based if they (1) explicitly taught at least one EIC (for example, Achievement Motivation), and (2) used experiential adult learning methods that required trainees to practice and demonstrate EICs. EIC-based training programs positively shifted performance an average of 0.70 SD and returned a mean ROI of 700 percent. Content knowledge and other training shifted performance 0 41 SD and returned an average 87 percent ROI. These data suggest that EIC based training can produce as much as 1.7 times the effect size shift and 8 times the ROI of non-EIC-based training These findings however, are not conclusive because (1) the criteria for classifying training as EIC or non EIC were not tested for inter-rater reliability; (2) the sample size was too small to report statistical significance and (3) EIC-based training results were biased by a large outlier of 3,971 percent ROI for one sales training program.

Figure 4.14 shows a normalized plot of training ROIs against effect size shifts and the extrapolated effect size and ROI of U.S. training programs.

FIGURE 4.14. DISTRIBUTION OF TRAIING PROGRAMS BY EFFECT SIZE AND ROI



Training effect size shifts closely predict returns on investment. Meta-analytic estimates of effect size shifts and potential returns from training are useful in developing business cases for development and performance management HR' interventions. For example, the Consortium for Research on Emotional Intelligence in Organizations (CREIO) has published guidelines for the design arid delivery of development programs based on fourteen model programs that significantly improved E1Cs or performance results

(Cherniss & Adler, 2000). The potential economic value added by the Consortium's guidelines can be straightforwardly calculated. As illustrated in Figure 4.14, the bottom quartile (23 percent) of training programs produces a negative return on investment of 80 to 90 percent. If U.S. organizations invest $60 billion *in* training per year, the training efforts in the bottom quarter cost $13.8 billion and have a negative ROI of greater than $10 billion. The next quartile (27 percent) costs $16.2 billion ($60 billion x .27) and produces an average ROI of 44% ($7.2 billion). Net return on investment for training programs in the bottom half of the distribution is therefore —$10 billion + $7.2 billion = —$2.8 billion.

A conservative assumptions that application of the guidelines could raise the bottom half of the distribution-- those training programs costing $30 billion and returning —$2.8 billion —to the average 116 percent ROI. This application would produce $30 billion x 1.16 =$34.8 billion, versus the current loss of $2.8 billion, a net gain of $37.6 billion. This estimate assumes only a single year's benefit rather than a stream of benefits over two or more years, on the basis that data reported in the meta-analytic studies are for only one year, and that the Ebbinghaus curve suggests that few training programs have multiyear benefits.

Recommend Economic Value Analysis Protocol

A five step protocol for developing business cases for, and evaluating, EIC-based HR interventions, is shown below with a recent case study example. ”Incon“ is a US$2 billion industrial controls firm with 400 branch managers (BMs) in 56 countries. In 1997 Incon developed a BM competency model, training program, and trained a pilot group of 28 US BMs. At the end of 1999 management asked for a business case and preliminary evaluation of this effort.

Step 1: Define Performance Criterion

The initial step of defining the performance criterion appears obvious, but in many organizations, managers lack consensus about measures of output performance. Most firms have explicit or de facto *balanced scorecard* variables, but these need to be probed to determine what management really values.

CASE EXAMPLE

Incon's balanced scorecard for sales managers included growth in revenues, return on sales, cost reduction, customer satisfaction, improvement in productivity and operational efficiency, sales of new products and services, organizational climate, and qualified turnover of subordinate managers and salespeople. When pressed, finance told HR that the only performance measures that mattered were increased profits: growth in revenues x return on sales. This measure was used as the dependent variable in developing the business case and evaluating the competency-based training program.

Step 2: Develop a Business Case

The first question in developing a business case should always be: is there enough variance in the value of dependent variable to make investment in intervention worthwhile. This question can be answered by the following steps

A. Calculate the Economic Value of the problem or opportunity the HR program will address by

- Valuing the problem: the cost per problem incident x # incidents
  and/or
- Valuing the opportunity: finding the economic value added (EVA) per employee (team or firm) per year a the benchmark or desired level of performance-----for example, a criterion sample of' employees (teams, firms) + 1 SD above the mean (EVA/employee/year x # employees).

CASE EXAMPLE

Data for the business case were easily developed from Incon financial records with basic descriptive statistics. Sales for branch managers ranged from $4 million to $90 million, with a mean of $17.0 million. As shown in Table 4.4, BMs one standard deviation above the mean had 5.66 percent higher return on $12.8 million more sales, worth $2.94 million in yearly profits, 134 percent more than average performers. Variance in BM Performance is very large, hence offers a large opportunity for an HR intervention that improves average BM performance.

TABLE 4.4. CRITERION SAMPLE: AVERAGE V. STAR (+1 SD) BRANCH MANAGER VARIANCE AND ECONOMIC VALUE ADDED.

	Revenue	Operating Income	Profit
Mean	$17.02M	5.60%	$1.32M
SD	**$12.82M**	**5.66%**	**$1.69M**
EVA of superior performer (+1 SD)	$29.84M	11.27%	$3.36M

Note: Profit does not equal Revenue x Operating Income exactly because distributions are skewed, causing rounding errors.

The second business case question is how much impact is the HR intervention likely to have on business results dependent variable(s) i e its probable EVA in problem cost savings or opportunity increased profits

B. Estimate the Percentage of EVA Variance an HR intervention can influence e.g. the amount of variance in superior performance +1 SD due to competencies impacted by training. This can be estimated from meta-analytic studies, or better by an empirical competency study of superior versus average performers. Empirical competency studies identify valid independent variables with the greatest impact on dependent result variables, hence priorities for training

CASE EXAMPLE

Incon completed a competency study of Branch Managers. Behavioral event interview (BEI) and other assessment data identified competencies that differentiate superior performers from averages, and predict outcome results, and best practices: work processes, technology, organization/team/job design, staffing, development, performance management, rewards, climate and culture interventions used by superior performers to get significantly better results.

As shown in Figure 4.7, competencies that differentiated superior performers included Achievement (ACH), Initiative (INT), Teamwork (TW) and Team Leadership (TL). BM competencies accounted for 27 percent of variance in performance, worth .27 x $1.69 million = $456,300.

C. Estimate the Percentage Change HR Intervention Can Make

The percentage change or effect size shift an HR intervention can make can be estimated from published meta-analytic studies—-or better, from evaluation of pilot interventions using random samples of firm employees

CASE EXAMPLE

Incon used conservative estimates of training effect size shifts (ES = .44, SD = .27) from Table 4.3.

D. Calculate Expected EVA and ROI. If training can achieve a .44 expected effect size shift in average trainee performance, the expected value added (EVA) per trainee would he .44 x $456,300 = $200,772, and total return from training 28 BMs at a cost of $8,000 per trainee, $5,621,616, a potential 2,410 percent ROI, as shown in Table 4.5.

CASE EXAMPLE

If the firm's cost of capital is 8.5 percent, and the standard deviation of effect size shifts from training is .27, the effect size shift needed to achieve an adequate return, and the probability of successfully achieving this return, can he calculated as follows:

$$es_{ROI} = \frac{I(1+\%CC)}{VA_{es}\,N} = \frac{\$224{,}000*(1+.085)}{\$200{,}772*28} = .04$$

Where

es_{ROI} is the effect size needed to achieve the required ROI when

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I = investment in training ($224,000),
%CC = the firm's cost of capital (8.5%)
VA_{es} = value added ($456,300) by the expected es (.44) per trainee = $200,772, and
N = number of persons trained (28).

TABLE 4.5. BUSINESS CASE FOR TRAINING.

ES shift from training	0.44
EVA of training per person	$456,300
N trained in U.S.	28
EVA from N trained	$5,621,616
Investment in U.S. training	$224,000
ROI	2,410%

E. Calculate a Sensitivity Analysis. Calculate a "sensitivity analysis" to check the minimum effect size shift needed to justify the investment in training, and the probability of achieving this effect size shift and return.

Probability of success = p @ z

Where

$$z = \frac{\mu\, es - es_{ROI}}{SD_{es}} = \frac{(.44) - (.04)}{(.27)} = 93\%$$

μ es = mean effect size expected from training, .44 (from Table 4.3)
es_{ROI} = effect size needed for an ROI equal to the firms cost of capital (calculated above)
SD_{es} = standard deviation in es from training (from Table 4.3)

p =the probability at the calculated z value (available from any statistics text).

In this case, an effect shift of 4 percent justifies the investment in training, and the probability of achieving an acceptable return is 93 percent, as shown in Table 4.6. The business case for training is reasonable.

TABLE 4.6 SENSITIVITY AND SUCCESS PROBABLILITY ANALYSIS

ROI required	8.50%
ES required for desired ROI	0.04
z @ ES shift required	1.481
p success @ z	93%

Step 3: Design Course and Evaluation

This process involves two phases:

A. Course Design. Ideally, competency-based training uses experiential adult learning methods to develop individual competencies, gives trainees opportunities to practice using competencies, and follows training with on-the-job action learning projects in which trainees apply competencies (with coaching, feedback, and technical assistance from instructor-consultants) to implement best practices used by superior performers to improve results.

B. Evaluation Design. Ideally, a randomized treatment and training versus control group, usually a "wave" or "waiting list" design in which participants trained in later periods serve as a control groups for those trained earlier.

CASE STUDY

In this case, business pressures limited training to a two-day seminar in which twenty-eight United States branch managers learned *about* (the definitions of) EICs, received feedback on their EICs as compared with superior performers, and set goals to improve their ElCs and business performance. A post-hoc quasi-experimental "wave" evaluation design compared twenty-eight trainees with fourteen matched sales managers who did not receive the training as controls.

Step 4: Train, Monitor, and Coach

In this step the training is actually conducted and follow-up activities such as monitoring and coaching are provided to assist trainees in applying learning to improving business results.

CASE EXAMPLE

Follow-up, monitoring, coaching, and goal progress review meetings with trainees are in progress in the company.

Step 5: Evaluate Effects of Training

The final step in EIC-based training is to evaluate the change *in* trainees' competence and calculate the economic value added in comparison with the competence and EVA of the control group.

CASE EXAMPLE

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As shown in Table 4.7, the EIC definition training, feedback, and goal-setting intervention at Incon appears to have significantly increased participant branch managers' sales and profits, producing a 613 percent ROI. Trainees' return on sales decreased (insignificantly) compared to that of the control group—perhaps because trained managers were investing in revenue-increasing marketing and area expansion efforts. However, trainees' increased revenues more than made up for this decline. The 0.04 effect size shift achieved by training was only 10 percent of the expected 0.44. This shows that even a very small shift in performance can result in significant statistical and economic results when the economic value of the problem or opportunity in the business case is large.

TABLE 4.7. TREATMENT GROUP VERSUS CONTROL GROUP PERFORMANCE OVER ONE YEAR AFTER TRAINING.

	Revenue	Operating Income	Profit
Trained group *(N=23)*	$3.117M	0.3%	$249,000
Control group *(N* = 7)	$1.660M	0.7%	$192,000
Difference	$1.457M	- 0.4%	$ 57,000
p (t- test)	*< .04*	*n.s.*	*< .02*

- Es shift from training: $57K/$456K ~.125
- Investment: $8,000/BM trained x 28 BMs trained = $224K
- Return: +$57K Profit/BM trained x 28 BMs trained = $1,596K additional profit
- ROI = 613 percent

Trainees increased revenues and profits significantly more than the control group. Trainee versus control return on sales did not differ significantly. The .125 effect size shift achieved by training and feedback is similar to that reported by McClelland (1998) for EIC assessment feedback to executives. That the .125 effect size is 28 percent of the .44 meta-analytic mean for all training programs suggests that more in-depth training involving action learning projects could increase return on training investments.

Did the training actually *cause* the economic value added? Probably, through feedback and goal-setting, but the case for competency-based training remains incomplete. A complete evaluation protocol would include a design (see Figure 4.15) that measures (1) the change in trainees' competence, (2) the change in results, (3) the predictive link between changed competence and changed results, and (4) additional analyses to refute alternative hypotheses for the changed results (looking at the effects of selection processes and at differences in local economies, budgets, management, climate, and so forth), if these alternative explanations have not been eliminated by stratification or randomization.

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FIGURE 4.15. EVALUATION DESIGN FOR EIC 1NTERVENTIONS.

Trained group	O_1	X	O_2	$Time_2$ – $Time_1$		Δ Trained - Control ($Time_2$- $time_1$)
	$competencies_1$ A		$competencies_2$ B	$comp_2$ – $comp_1$		
	economic $performance_1$		economic $performance_2$	C	ec $perf_2$— ec $perf_1$	
				D		T $comp_2$ – $comp_1$ -C $comp_2$ – $comp_1$
Control group	$competencies_1$		$competencies_2$	($comp_2$ - $comp_1$)		E
	economic $performance_1$		economic $performance_2$		(ec $perf_2$ -ec $perf_1$)	T ec $perf_2$—ec $perf_1$ -C(ec $perf_2$ -ec $perf_1$)

Note: $Comp_1$ = competencies before training
$Comp_2$ = competencies after training;
ec $perf_1$ = economic performance before training
ec $pert_2$ = economic performance after training;
T = trained group
C = control group

Path **A** is the concurrent criterion validity between competencies and economic performance before training; path **B** is post-test concurrent validity.

Path **C** is the predictive validity of competence before training to competence after training (do the smart get smarter?) i.e. competencies which predict gaining from training, findings useful in selecting who to send training programs, verifying hypotheses about "learning environments". (In the case example, ACH, INF, FLX and DEV predicted significant gains from training).

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Path **D** is is the predictive validity of economic performance before training to economic performance after training (do the rich get richer?). In the case example, the trained BMs' branch sales were significantly larger at $time_1$ – data which should be partialed out.

Path E is critical for proving the case for competency-based training: statistically significant findings that competence changed by training predicts/causes economic gains significantly different from those in control group(s).

CASE EXAMPLE

Researchers are conducting a post-training assessment of trainees' competencies to measure the difference made by training and to see if economic gains can be attributed to changed competence resulting from training. An additional 250 SMs have been trained, most in Europe, which will provide cross-validation samples.

Lessons front this case include the following:

Economic analysis, business case development and evaluation/data collection design should ALWAYS precede EVERY EIC intervention. An axiom of behavioral science is "it never gets better than your dependent variable-- it only gets worse."

Intervene only when justified by a business case. Go for large value problems/opportunities (cf. Nobelist Sir Peter Medewar's advice: "the way to win a Nobel prize is to have an instinct for a jugular problem"). A small difference in a BIG $value problem /opportunity can produce significant results; a BIG difference in a trivial problem can only yield trivial results. Do sensitivity analyses and calculate your probability of achieving a significant ROI.

EICs should be taught in the context of planning for and practicing best practices. Numerous "tricks of the masters" for expanding sales territories, introducing new products and services, reengineering customer service (e.g. to have one v. multiple points of contact) and internal operations (using estimating software, consolidating duplicated cost centers); team leadership, organization and team design e.g. creating sales teams of sales people and engineers; staffing e.g. explicit strategies for hiring competitors' top salespeople to capture market share in new territories and launch new products and services; rewards; etc. appeared in superior performers' interviews. These should be taught to illustrate *how* superior performers demonstrate EICs.

Action Learning projects to use EICs to implement best practices to improve economic performance should be required, in addition to standard goal setting.

Follow up monitoring, technical assistance and coaching, and goal progress review meetings (to share learning and collect post-test data) should be in integral part of every EIC program.

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Summary

Professional standards, ethics, acceptance and practice improvement; legal rulings; and client "value for money" demands will increasingly require EIC researchers and practitioners to report reliability and EVA validity statistics.

Global estimation/performance distribution methods (see Appendix A) make collection of these data quick, cheap and easy—no more onerous than the "reactions" smile-sheet exercises that follow most training programs. Fifteen years of published meta-analytic data show that EIC-based staffing, training and performance management interventions do (or can) add economic value, although the effect size shifts produced by EIC, as opposed to knowledge content, inputs have not been conclusively established. All EIC research and practice should report the value and change in EVA "business case" dependent variables attributable to EIC inputs. The alternative is that EIC methods and variables will continue to be viewed as a "junk science" fad by many who could benefit from them.

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APPENDIX A.

ECONOMIC VALUE OF COMPETENCE SURVEY

This survey collects data you can use to cost-justify competency-based human resources applications.

Please answer the following questions in the data input boxes for an economically valuable job you want to analyze (a sales job is ideal) and return this form to [the Conference Coordinator.]

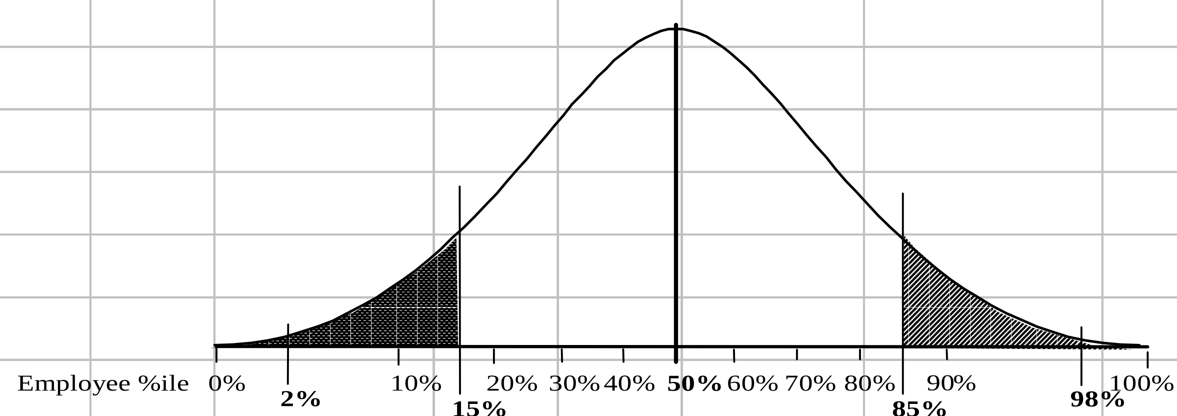
[ ] Data input cells` — *italics* Calculated cells

I. ANALYSIS

1. INDUSTRY (product/service):		Building Controls
2. JOB/ROLE		*Branch Manager*
3. FULL COST OF EMPLOYMENT(salary + benefits + overhead/year) for people in this job		
To calculate		
a.The average annual SALARY for this job:	$ 100,000	
b. BENEFITS RATE% (US average: 35%)	35%	
c. Benefits Cost (a * b)	*$ 35,000*	
d. Subtotal (a + b)	*$ 135,000*	
e. OVERHEAD RATE (US average: 115%)	115%	
f. Overhead Cost (d * e)	*$ 155,250*	
g. FULL COST OF EMPLOYMENT (d + f)		*$ 290,250*
4. ECONOMIC VALUE: Revenues (sales), costs (payroll, capital) or profits people in position control		$ 1,690,000

II. PRODUCTIVITY of Unsuccessful, Average and SUPERIOR people in this job.

If an Average experienced employee produces 100% (by definition) on a normal "bell" curve



PRODUCTIVITY % — UNSUCCESSFUL *52%* %? — AVERAGE **100%** — **SUPERIOR** *148%* %?

1. How much *more* *(>100%)* do SUPERIOR performers (defined as the top 15%, or "top 1 out of 10") in the job produce?	*148%*
2. How much *less* *(<100%)* do UNSUCCESSFUL performers (defined as people who will be replaced because their performance is below what the organization can tolerate) in the job produce?	*52%*
3. What % of employees in the job are UNSUCCESSFUL?	*10%*
Estimate actual DOLLAR figures for yearly sales or other economic outcomes for performers at the three points on the curve:	
4. SUPERIOR	$ 3,260,000
5. AVERAGE	$ 1,320,000
6. UNSUCCESSFUL	

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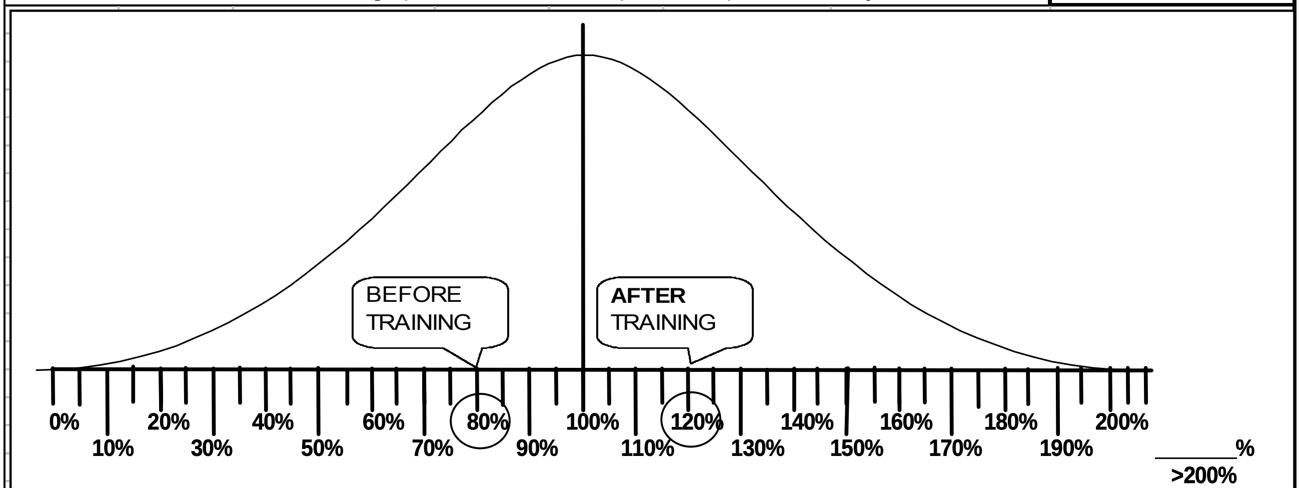
ECONOMIC VALUE OF COMPETENCE SURVEY- page 2

III. STAFFING	
6. How many employees are there in this job?	*400*
7. What is the annual turnover rate for employees in this job?	*20%*
8. For SUPERIOR performers?	*5%*
9. For UNSUCCESSFUL performers?	*10%*
10. How many MONTHS do UNSUCCESSFUL performers remain in the job before being replaced?	*3*
11. Average TERMINATION cost (severance pay, etc.)	*$ 50,000*
IV. TRAINING, DEVELOPMENT, PERFORMANCE MANAGEMENT	
12. LEARNING CURVE: How many MONTHS does it take for a new hire to become fully productive (equal to the average productivity of an experienced person in the job)?	*12*
For the training program you are analyzing:	
13. PERCENTAGE OF TOTAL JOB tasks addressed by training:	*70%*
14. The % PRODUCTIVITY of the average trainee BEFORE training, on the 0% -200% scale below the curve; where 100% = the average performance of an experienced person in the job:	*80%*



% PRODUCTIVITY BEFORE / **AFTER** TRAINING

15. The % PRODUCTIVITY of the trainee AFTER training, on the scale below the curve, where 100% = the average performance of an experienced person in the job (fill in a % productivity if greater than 200% after training):	*120%*
16. For how many MONTHS after training is this INCREASED PRODUCTIVITY MAINTAINED ?	*24*

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APPENDIX B. SAMPLE BENEFIT AND ROI ANALYSES

The following analyses show some of the ways data collected in the Economic Value of Competence Survey can be used to calculate HR program benefits and return on investment. Analyses use data from the Appendix A Economic Value of Competence Survey. Formulas are given opposite calculated fields in italics. Input fields are shown as bolded boxes. Unused fields are shown in gray. Examples below are illustrative. Users should feel free to use data from their own organizations and modify assumptions used in formulae. Most important is getting consensus on analysis assumptions. If challenged, users can suggest skeptics use their own assumptions and data in the spreadsheet. Invite challengers to convince themselves with their own data and assumptions. Experience indicates that these "sensitivity analyses" rarely vary more than ± 10-15% from those shown below—and almost never change the policy that follows from the initial analyses.. The best advice is: when in doubt, check with a financial analyst from headquarters to be sure your assumptions and calculations will be credible to management.

STAFFING BENEFITS come from better selection which reduces *turnover* and *increases productivity*—increasing revenues and profits, reducing costs and staff because fewer more productive people can do the same amount of work [# more productive staff = previous staff/(1+%productivty increase)]. Effect size shift from competency-based selection is assumed to be .20 standard deviation.

1. Turnover Cost Avoidance A minimum estimate of the cost of turnover is the annual salary of a person who leaves. A full replacement accounting which assumes a hiring cost of one third salary (whether paid to a search firm on incurred internally); lost productivity at full employment value of time for the number of days it takes to fill the job divided by 365 days in a year; learning curve time of 12 months, and new hire productivity averaging 50% during this time, hence learning curve cost of B1*B7*.5 (see spreadsheet below) ~ 2.5 x annual salary.

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Appendix Table B.1 Turnover Cost Avoidance from EIC-based Selection

	A	B	C	D
1	FULL REPLACEMENT COST	Data	FORMULA	Note
2	Salary/year	$ 100,000		
3	Hiring Cost	$ 33,333	=B2/3	Headhunter or internal, about 1/3 1st year salary
4	Full Employment Cost @ 3x Salary	$ 300,000	=B2*3	Full cost (salary + 35% benefits +115% overhead) ~ 3x salary
5	Days to Fill Job	55		value from meta-analytic literature
6	Cost of lost productivity during time to fill job	$ 45,205	=B4*(B5/365)	
7	Learning Curve Time in months	12		value from meta-analytic literature
8	Average Productivity During Learning Curve Period	50%		value from meta-analytic literature
9	Cost of Lost Productivity During Learning Curve @ 50%	$ 150,000	=B4*0.5	
10	Direct costs of relocation, training, etc	$ 15,000		
11	Other opportunity costs			E.g. lost sales due to product late to market
12	TOTAL COST OF TURNOVER/PERSON	$ 243,539	=B3+B6+B9+B10+B11	
13	**Baseline/Control**			
14	# Employees in job	100		
15	% turnover/year	0.20		
16	# Employees lost/year	20	=B13*B14	
17	Turnover cost/year	$ 4,870,776	=B12*B16	
18	**With EIC-based selection**			
19	**%** reduction in turnover	67%		value from meta-analytic literature
20	% turnover/year	7%	=B15*(1-B19)	
21	# Employees lost/year	7	=B14*B20	
22	Turnover cost/year	$ 1,607,356	=B12*B21	
23	**Net Benefits from Reduced Turnover**	**$ 3,263,420**	**=B17-B22**	

	A	B	C	D
24	BENEFITS FROM FEWER BAD HIRES, PLACEMENTS, PROMOTIONS			
25		Data	Formula	Note
26	Full Cost of Employment	$ 300,000	*=B3*	
27	%Bad Hire Productivity	52%		Assume complex job: 100% Average - 48% @ -1 SD = 52%
28	Months in job before replaced	18		
29	$Bad hire lost productivity cost	*$ 216,000*	*=(1-B27)*B26*(B28/12)*	
30	Termination cost @ 50% salary	$ 50,000		Assume 50% of annual salary of $100,000
31	Replacement Cost	*$ 243,538*	*=B12*	~2.5x annual salary
32	Total cost per bad hire	*$ 509,538*	*=B29+B30+B31*	
33	#Employees in job	100		
34	**Baseline/Control**			
35	%Bad Hires	15%		Assume all -1 SD below mean
36	#Bad Hires	*15*	*=B33*b35*	
37	TOTAL COST BAD HIRES/YEAR	$ 7,643,070	=B32*B36	
38	**With EIC-based Selection**			
39	**%**Reduction in Bad Hires	67%		Meta-analytic study median
40	%Bad Hires	*5%*	*=B35*(1-B39)*	
41	#Bad Hires	5.0	=B40*B33	
42	TOTAL COST BAD HIRES/YEAR	$ 2,522,213	=B41*B32	
43	TOTAL BENEFITS FROM FEWER BAD HIRES	$ 5,120,857	=B37-B42	

2. Increased Productivity. Note that productivity benefit calculations may "double (or triple) count" the true benefits from the effect size shift. For example, you cannot count salary value of productivity AND cost savings from reduced staff because these are the same saving.

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Appendix Table B.2 Increased Productivity from EIC-based Selection

	A	B	C	D
1	BENEFITS FROM INCREASED PRODUCTIVITY USING FULL COST OF EMPLOYMENT	Data	FORMULA	Note
2	Salary/year	$ 100,000		
3	Full Employment Cost @ 3x Salary	*$ 300,000*	*=B2*3*	Full cost (salary + 35% benefits +115% overhead) ~ 3x salary
4	Productivity value of +1 SD	0.48		value from meta-analytic literature: complex job
5	S.D. Effect Size Shift	0.2		value from meta-analytic literature: es for selection
6	% Gain from Improved Selection	*9.6%*	*=B4*B5*	
7	PRODUCTIVITY ECONOMIC VALUE ADDED/PERSON	*$ 28,800*	*=B3*B6*	
8	# Employees in job	100		
9	TOTAL PRODUCTIVITY ECONOMIC VALUE ADDED	$ 2,880,000	=B7*B8	
10				
11	BENEFITS FROM INCREASED REVENUES/PROFITS			
12	Net revenue/person	$ 17,020,000		Data from branch manager case in chapter
13	Profit margin	5.33%		Data from branch manager case in chapter
14	Net profit/employee	*$907,166*	*=B12*B13*	
15	% Gain from Improved Selection/Employee	*9.6%*	*=B4*B5*	
16	$Gain from improved selection/employee	$87,087.94	*=B14*B15*	
17	#Employees in job	100		
18	Net Benefits from Increased Revenues/Profits	*$8,708,794*		
19	OR			
20	.BENEFITS FROM COST SAVINGS			
21	Costs managed/employee	$1,000,000		
22	%Cost Savings/employee	*9.6%*	*=B4*B5*	
23	$Cost Savings/employee	*$ 96,000*	*=B21*B22*	
24	#Employees in job	*100*		
25	BENEFITS FROM COST SAVINGS--all employees	$9,600,000	=B23*B24	
26	OR			
27	BENEFITS FROM REDUCED STAFF			
28	Full employment cost/employee	*$ 300,000*	*=B2*3*	
29	#Employees in job	100		
30	Full employment cost--all employees in job	*$ 30,000,000*	*=B28*B29*	
31	%Productivity improvement	*9.6%*	*=B4*B5*	
32	# Employees needed with this productivity improvement%	*91.2*	*=B29/(1+B31)*	
33	TOTAL BENEFIT: Full employment cost with fewer more productive employees	*$ 27,372,263*	*=B28*B32*	

DEVELOPMENT: TRAINING AND PERFORMANCE MANAGEMENT BENEFITS similarly come from increased revenues, cost savings and reduced staff due to greater productivity. The "Quick Estimate" of Development Benefits uses the .44 standard deviation effect size shift for training and performance management found by several meta-anlaytic studies. Again note the caution against double or triple counting for productivity increase

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benefits. The “Evaluation “ benefits calculation uses the difference between before and after development productivity X the full employment cost of employee time spent on tasks affected by training. Actual changes in revenues or cost savings by employees should be substituted for full cost of employment if these figures are known.

Appendix Table B.3 Increased Productivity from EIC-based Training

	A	B	C	D
1	BENEFITS FROM INCREASED PRODUCTIVITY FROM TRAINING--QUICK ESTIMATE FROM FULL COST OF EMPLOYEE TIME	Data	FORMULA	Note
2	Salary/year	$ 33,333		
3	Full Employment Cost @ 3x Salary	$ 100,000	=B2*3	Full cost (salary + 35% benefits +115% overhead) ~ 3x salary
4	Productivity value of +1 SD	48%		value from meta-analytic literature: complex job
5	S.D. Effect Size Shift	0.44		value from meta-analytic literature: average es for training
6	% Productivity Gain from Training	21%	=B4*B5	
7	PRODUCTIVITY ECONOMIC VALUE ADDED/PERSON	$ 21,120	=B4*B7	
8	# Employees in job	100		
9	TOTAL PRODUCTIVITY ECONOMIC VALUE ADDED	$ 2,112,000	=B8*B9	
10				
11	BENEFITS FROM POST-PRE TRAINING PRODUCTIVITY			
12	% Job Time on Tasks Impacted by Training	50%		
13	Full Employment Cost @ 3x Salary	$ 100,000	=B2*3	Full cost (salary + 35% benefits +115% overhead) ~ 3x salary
14	Full Cost of Time spent on tasks impacted by training	$ 50,000	=B13*B14	
15	.BEFORE training % Productivity on tasks addressed by	80%		
16	Economic Value produced by employee BEFORE training	$40,000	=B14*B15	
17	AFTER training % productivity on tasks impacted by	120%		
18	Economic Value produced by employee AFTER training	$60,000	=B14*B17	
19	ECONOMIC VALUE ADDED BY TRAINING/EMPLOYEE	$20,000	=B18-B16	
20	# EMPLOYEES TRAINED	100		
21	# years training productivity gains continue	2		
22	TOTAL BENEFIT FROM TRAINED EMPLOYEES	$4,000,000	=B19*B20*B21	

RETURN ON INVESTMENT

The spreadsheet below shows a ROI analysis for a typical competency-based human resources application. Internal firm labor costs are valued at full cost of employment divided by days worked per year (average = 230). Vendor costs are at per diem or per unit cost multiplied by units expended. Costs should include both the competency study and its implementation—in this case, training line managers to use competency methods to hire new employees. The case return is based on STAFFING benefits of Reduced Turnover ($3,263,420) and Increased Revenues/Profits ($8,708,794). The return on a $61, 797 investment in the competency project is $11,972,214, 1484%.

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Appendix Table B.4 Return on Investment Analysis

	A	B	C	D	E
1	**RETURN ON INVESTMENT ANALYSIS**				
2	**INVESTMENT**				
3	**Labor Costs**				
4	Full Cost of employment = 3x annual salary				
5	Internal Staff Per Diem = (Annual Salary*3)/230 days worked/year				
6	**>Internal Staff**	**Salary**	**Per Diem/Unit**	**# Days/Units**	**Total**
7	HR Professionals	$65,000	*$847.83*	$30	*$25,435*
8	Line Managers	$100,000	*$1,304.35*	$8	*$10,435*
9	Participant employees	$65,000	*$847.83*	$20	*$16,957*
10	Support	$28,000	*$365.22*	$3	*$1,096*
11	**>Vendor Direct Costs**				
12	Consultants		$2,000	$20	*$40,000*
13	Travel & Expenses		$500	$4	*$2,000*
14	Materials		$125	$6	*$750*
15	Equipment				*0*
16	TOTAL INVESTMENT				***$96,672***
17	**RETURN**				
18	Increased Revenues				$ 8,708,794
19	Reduced Turnover				$ 3,263,420
20	TOTAL RETURN				**$ 11,972,214**
21	RETURN ON INVESTMENT				**12284%**

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