

# Utility Analysis:

## A Tool for Quantifying the Value of Hospitality Human Resource Interventions

Utility analysis can be used to assess the effectiveness of human resource interventions (among other uses).

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In a survey of hospitality managers and executives, the most frequently identified concerns related to issues of human resource management.<sup>1</sup> A major obstacle in the way of improving human resource management is the lack of practical methods for determining and demonstrating the strategic value of human resource interventions. How does one answer questions like, "what is the return from a better performance-appraisal system?," "would I be more (or less) profitable if I were to raise wages?," or "what is more valuable, spending \$10,000 on a new selection system or on a training program?" General managers who want to get more out of their human resource systems need to demand that human resource departments identify the returns from human resource investments. Human resource practitioners need

to be able to talk about such investments, and be able to make a compelling case for the need to use resources to improve human capital. This article explains a tool for human resource management, known as utility analysis, that is designed to facilitate answering questions such as those raised above. In addition to the mathematics behind the technique, I will also provide two hypothetical examples that should help those interested to better understand the principles behind the technique.

### The Utility Model

In its essence, the utility model is as follows. The model is explained in the sidebar on the next page and discussed further later in this article.

Utility = Benefits - Costs, or

Utility = (Quantity × Quality) - Costs, more specifically

Utility = (Quantity × Performance Change × Dollar Value of Performance Change) - Costs

<sup>1</sup> Cathy A. Enz, "What Keeps You Up at Night," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 41, No. 2 (April 2001), pp. 38-45.

There are, of course, many ways in which the basic formula can be made complex, depending on the characteristics of the specific program being examined. Nonetheless, the benefit can be expressed as the product of (1) the quantity of employees affected, (2) the quality of the effect, and (3) the dollar value of improved performance.<sup>2</sup> The characteristics of each component are described below.

### Estimating Quantity

To estimate the quantity factor, one must determine the number of employees affected in each year, such as the number of employees being hired or the number of employees being trained. The quantity is also affected by how long the effect lasts. Selection-system effects can be lengthy, for example, when excellent employees may be hired and retained for a number of years. Training-system effects may last weeks, months, or years, depending on the nature of the training. The simplest approach to estimating quantity is to multiply the average expected future tenure of affected employees (T) by the number of affected employees (N). This is expressed in the utility formula simply as  $N \times T$ .

More-sophisticated approaches are also feasible. One technique is to use existing turnover research to make predictions as to how long employees stay with a company based, for instance, on their performance, pay level, pay growth, and demographic characteristics.<sup>3</sup> It is also possible to model employee-movement patterns in, through, and out of companies, at whatever level of detail is desired by the decision maker.<sup>4</sup> Simulation could also provide a useful technique for modeling the number of employees affected or for estimating the length of time employees stay with a company.<sup>5</sup> In any case, whether the

<sup>2</sup> J.W. Boudreau and C.J. Berger, "Decision-theoretic Utility Analysis Applied to Employee Separations and Acquisitions," *Journal of Applied Psychology*, Vol. 70 (1985), pp. 581-612.

<sup>3</sup> J.W. Boudreau, M. Sturman, C.O. Trevor, and B. Gerhart, "The Value of Performance-based Pay in the War for Talent," *Center for Advanced Human Resource Studies Working Paper #99-06*, School of Industrial and Labor Relations: Cornell University, 1999.

<sup>4</sup> Boudreau and Berger, *op. cit.*

<sup>5</sup> See: G. Thompson and R. Verma, "Computer Simulation in Hospitality Teaching, Practice, and Research," on pages 85-93 in this issue of *Cornell Quarterly*.

## The Utility Analysis Equation

$$\text{Utility} = \text{Benefits} - \text{Costs}$$

$$\text{Utility} = (\text{Quantity} \times \text{Quality}) - \text{Costs}$$

	Quantity	Quality	Costs
$\Delta\text{Utility}$	= $[T \times N] \times [(\bar{Z}_x \times r + d_t) \times SD_y] - \text{Costs}$		
$\Delta U$	= Utility change from the human resource intervention		
T	= Average future tenure of those affected		
N	= Number of employees affected (hired or trained)		
$\bar{Z}_x$	= Average Z-score of the predictor of hired employees		
r	= Correlation between a predictor and criterion		
$d_t$	= The average net gain in performance exhibited by employees affected by the intervention		
$SD_y$	= Dollar value of an employee performing one standard deviation above average		
Costs	= Cost of acquiring and administering the human resource intervention		

method is simple or complex, the first component of the basic utility model is to know how many person-years are being affected by the potential human resource intervention.

### Estimating Quality

The quality improvement associated with a human resource intervention is more difficult to determine than is the quantity. To estimate the quality improvement, utility analysis requires one to estimate (1) how much individual job performance increases, and (2) the value of improved job performance. This first factor is usually expressed in standardized units.<sup>6</sup> That is, the magnitude of any effect is expressed in terms of the number of standard deviations that performance improves because of the human resource intervention. The second factor provides a means of converting the amount of performance improvement into a dollar value.

Two basic utility-analysis functions describe the basic nature of almost all human resource interventions. The first of those functions is the overall increase in performance that affects, at least on average, all of the individuals influenced by the human resource intervention, and the second is an increase in the performance of individuals in a company due to its ability to select better performers. Each basic model will be described below.

**Overall performance gains.** Some human resource interventions are expected to have a net effect on employees' collective performance. One might expect, for example, that a new training program will increase all participants' customer-service skills, make them better at upselling, or make them better able to address customer complaints. Similarly, a new compensation plan may have a motivating effect on the employee population, or perhaps a new performance-appraisal plan may give employees the type of feedback

<sup>6</sup> Using standardized units means that the magnitude of effects are expressed as though they came from a normal distribution with a mean of 0 and a standard deviation of 1. This is also referred to as expressing the units in terms of Z-scores. When converted to standardized units, any magnitude is expressed in terms of how many standard deviations the effect is away from the mean. Because effect sizes are converted into standardized units, the users of utility analysis will know that the magnitude of effects are expressed in the same units.

they need to enhance their productivity. The size of any gain will likely vary across the population of employees. However, it is often possible to estimate the average improvement.

As will be explained in more detail below, the utility-analysis formula requires that this estimate be expressed in standard units. That is, the effect on performance must be expressed in terms of the number of standard deviations (SD) by which the performance changed. This can be estimated by comparing the performance scores of individuals who received the intervention (e.g., training) versus those who did not,<sup>7</sup> using existing research to estimate the effects of the training,<sup>8</sup> relying on studies provided by the vendors conducting the training, or even simply by obtaining estimates from the managers of those receiving training. Obviously, the accuracy of the improvement estimate will greatly affect the validity of any resultant utility estimate. Such estimates do usually exist in some form but are often not used to estimate the value of the human resource program. For the sake of consistency when writing the utility formula, the overall improvement in job performance due to a human resource intervention is expressed by the term  $d_i$ .

**Selectivity.** In addition to improving existing employees' performance, an intervention may also improve performance because it means that the hotel is selecting better employees. An improved selection system, whether for choosing new employees or for identifying existing employees for job movements, has the potential of yielding an improved workforce.

The extent to which a selection system can improve the performance of those hired is a func-

<sup>7</sup> Companies can perform what is called a quasi-experiment. The simplest approach is to compare the performance scores of those receiving the training to those who did not. A more accurate, although more complex approach, is to compare the performance scores of trained versus untrained individuals after statistically controlling for the performance of individuals before training. See: A. Lynn and M. Lynn, "Experiments and Quasi-experiments: Methods for Evaluating Marketing Options," on pages 75-84 in this *Cornell Quarterly*.

<sup>8</sup> See: Morrow, Jarrett, and Rupinski, "An Investigation of the Effect and Economic Utility of Corporate-wide Training," *Personnel Psychology*, Vol. 50 (1997), pp. 91-119. Their results show that management training had an average effect of improving performance by 0.31 standard deviations; they also show that technical and sales training increased job performance an average of 0.64 standard deviations.

## Utility Analysis: Definition and History

The term utility analysis (UA) can have a host of different meanings depending on the field of study. In general, it refers to processes that predict the usefulness (utility) of decision options. For human resource management, UA refers to a specific tool designed to estimate the institutional gain or loss anticipated to a company from various human resource interventions designed to enhance the value of the workforce. The development of utility analysis is explained in the accompanying sidebar.

Utility analysis has its roots in economics, finance, and psychology.<sup>1</sup> This technique emerged out of work originally designed to show that programs affecting the workforce will subsequently affect the value of a company. In 1939 Taylor and Russell developed a model that showed the usefulness of a staffing program to be a function of (1) the validity of the program, (2) the likelihood that a new hire would be successful, and (3) the ratio of the number of hires to the number of applicants.<sup>2</sup> A criticism of this model, though, was that it treated utility as a dichotomous variable (i.e., success or failure). A new model was thus developed that assumed a linear relationship between the average performance of employees and their value to their organization. The new model, called the Brogden-Cronbach-Gleser model,<sup>3</sup> provided techniques that considered the value of greater performance, the number of applicants compared to the number of positions being filled, the validity of the selection device, the number of people affected, and the program cost.

While the Brogden-Cronbach-Gleser model was innovative in that it considered the dollar value of employee performance, researchers had little success in quantifying that value. In the 1960s and 1970s work on the concept known as "human resource accounting" emerged. This procedure attempted to estimate the costs and values of people as organizational resources.<sup>4</sup> This work was motivated by the concern that standard accounting reports provided no information on the contributions of human resources in the way that information was provided on the contribution of capital or real estate. Techniques emerged that purported to estimate the cost of replacing a person or group of people with another group capable of providing the same value to the company (known as the cost method), or to estimate the present worth of the set of services that a person is expected to

provide during the period during which he or she is expected to remain in the company (known as the asset method). The research on human resource accounting provided valuable techniques for estimating human resource program costs, but the techniques did not necessarily lend themselves to improved human resource decision making.<sup>5</sup> Both the cost method and the asset method focus on measurement, and not on how the information can be used to improve decision making. While they certainly could provide much information on the current status of a company's human resources, the techniques did not address the program decisions that needed to be made by human resource practitioners. The combination of the failure to speak to specific decisions and the complexities associated with the techniques led to human resource accounting's falling out of favor in the mid-1970s.

About that time, the research by Brogden, Cronbach, and Gleser began to gain attention once again. Work by Wayne Cascio, John Boudreau, and others began to emerge to provide more detailed techniques and examples of how formulas could be used to estimate the value of various human resource programs. Furthermore, work emerged that started addressing some of the assumptions of the basic utility model, thus providing techniques to improve the accuracy of the cost-benefit techniques. The work from this period combined to provide the set of techniques used today for utility analysis.—M.C.S.

<sup>1</sup> W.F. Cascio, *Costing Human Resources: The Financial Impact of Behavior in Organizations*, fourth edition (Cincinnati: Southwestern College Publishing, 2000).

<sup>2</sup> Taylor and Russell, "The Relationship of Validity Coefficients to the Practical Effectiveness of Tests in Selection: Discussion and Tables," *Journal of Applied Psychology*, Vol. 23 (1939), pp. 565-578.

<sup>3</sup> The Brogden-Cronbach-Gleser model refers to the outcomes of separate, but highly related work. See: Brogden, "When Testing Pays Off," *Personnel Psychology*, Vol. 2 (1949), pp. 171-183; and Cronbach and Gleser, *Psychological Tests and Personnel Decision*, second edition (Urbana: University of Illinois Press, 1965).

<sup>4</sup> Flamholtz, *Human Resource Accounting: Advances in Concepts, Methods, and Applications* (San Francisco: Jossey-Bass, 1986).

<sup>5</sup> A. Maher, "Measuring Human resource Value: An Analysis Based on the Hotel Industry," *Journal of Human Resource Costing and Accounting*, Vol. 1, No. 2 (1996), pp. 15-33.

tion of two factors: (1) the validity of the system used, and (2) how picky one can be when making the selection decision. Both must be present for a selection system to be effective. For example, if one possessed a great selection system that could perfectly predict future performance but only one person applied for the job, then the selection system is ultimately of no more value than doing nothing. On the other hand, if 1,000 people apply for a job, but you hire based on who is closest on picking a number that you are thinking of, then the ultimate quality of the decision will also be random.

Utility-analysis research has shown that the average improvement in performance due to a selection device is equal to the following:

$$\bar{Z}_x \times r$$

where  $\bar{Z}_x$  is the average performance (in standardized units) of the hired applicants on the selection device being employed, and  $r$  is the validity of the selection device (expressed as a correlation coefficient, which connotes the relationship between the selection device and job performance). The calculation of  $\bar{Z}_x$  is complex, but published tables allow one to simply look up its value once one knows the selection ratio (i.e., the number of people to be hired, divided by the number of total applicants).<sup>9</sup> The validity of a selection device can be computed by evaluating company records, be estimated through research studies, or be given by vendors who provide such services to companies. As with estimates of the net improvement to performance, the accuracy of this estimate is crucial for the resultant utility analysis to produce useful information.

### Estimating the Dollar Value of Improved Performance

After the quantity and quality of performance improvements are estimated, it is still necessary to convert the information into a metric that can be compared against the costs of the program. This entails converting the performance gain from standardized units to a dollar value. By estimating the value of a human resource function

<sup>9</sup> This is called the Naylor-Shine table. See: Naylor and Shine, "A Table for Determining the Increase in Mean Criterion Score Obtained by Using a Selection Device," *Journal of Industrial Psychology*, Vol. 3 (1965), pp. 33-42; or Cascio, *op. cit.* (where the table has been reprinted).

in terms of dollars and cents, it is comparable to other potential organizational investments. The way in which the utility analysis converts performance scores to a dollar value is through the use of the variable,  $SD_y$ , which is the standard deviation of job performance in dollar terms. The variable  $SD_y$  is defined as the added value in dollars of an individual who performs one standard deviation above average (that is, compared to that of an average performer). One then multiplies the change in performance due to the human resource intervention by  $SD_y$  to estimate the dollar value associated with the estimated performance change.

The simplest approach, estimating  $SD_y$ , is feasible when there is clear dollar-value performance data on each employee. For example, if estimating the value of sales employees, it is possible to simply plot the distribution of sales amounts per employee and calculate the value of one standard deviation. Unfortunately, such financial data are rarely available for most types of hospitality jobs. Another simple approach to estimating  $SD_y$  involves using the following simple rule, which is based on research studies. For low-complexity jobs,  $SD_y$  is estimated to equal 40 percent of the job's salary; for moderate complexity jobs, it is equal to 60 percent of salary; and for high complexity jobs,  $SD_y$  is equal to 100 percent of salary.<sup>10</sup>

Another approach to estimating  $SD_y$  involves surveying managers. One can simply ask managers how much they value performers at the 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles, and use those values to estimate  $SD_y$ . Alternatively, one could ask how many top performers (say, at the 95<sup>th</sup> percentile) would be required to perform the same amount of work as that of average workers (i.e., those at the 50<sup>th</sup> percentile). Based on the total cost of employees, those estimates could be used to calculate  $SD_y$ .

<sup>10</sup> Support for the 40-percent estimate comes from: F.L. Schmidt, J.E. Hunter, A.N. Outerbridge, and M.H. Trattner, "The Economic Impact of Job-selection Methods on Size, Productivity, and Payroll Costs of the Federal Work Force: An Empirically Based Demonstration," *Personnel Psychology*, Vol. 39 (1986), pp. 1-29. See also: B.E. Becker and M.A. Huselid, "Direct Estimates of  $SD_y$  and the Implications for Utility Analysis," *Journal of Applied Psychology*, Vol. 77 (1992), pp. 227-233, which reported that  $SD_y$  varied between 74 percent and 100 percent of mean salary range.

Despite the existence of simple approaches to estimating  $SD_y$ , it is a difficult factor to establish with a high degree of confidence. Indeed, the  $SD_y$  parameter is the most difficult factor of the utility model to estimate, and many researchers have suggested that this difficulty is what has largely led to the limited use of utility analysis. Although several methods of estimating  $SD_y$  have been proposed,<sup>11</sup> each has been criticized in the research literature, and no method has emerged as clearly superior to the others. Yet despite the disagreement as to which method is best, the differences among the alternative approaches are usually less than 50 percent, or less than \$5,000.<sup>12</sup>

While I certainly do not disagree that  $SD_y$  can be difficult to estimate, I argue that it is nonetheless a critical step that human resource decision makers must make to evaluate human resource programs, regardless of whether utility analysis is employed. As I have argued elsewhere,<sup>13</sup> an essential starting point for thinking about human resource interventions is estimating the extent to which one values superior performance. How much more valuable is a great housekeeper than an average housekeeper? How much more valuable is a great rooms manager than an average rooms manager? What about a great general manager compared to an average one? Clearly, the value of improved performance increases with the importance and complexity of the job, and it makes sense that enhanced performance will be more valuable to a company for certain jobs over others. For hospitality jobs, estimates of  $SD_y$  may even be greater than the 40 percent suggested for low-level jobs by previous research. This may occur because even low-complexity hospitality jobs (e.g., wait staff, housekeeping, theme-park ride attendant) frequently have high levels of interaction with customers. Differences in performance of low-level employees may be worth sub-

stantially more to companies than, for example, the value of performance of people in entry-level manufacturing jobs. Even if one is not performing utility analysis, one should have—or one should get—some idea of the value of better-performing employees. This is particularly important if one's company's stated goal is to provide excellent customer service, most of which is delivered by low-skill or low-paid employees. Util-

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ity analysis simply requires that this value be quantified; it is then used to estimate the value of human resource practices.

### Estimating Cost

To provide a complete estimate of the return on investment from a human resource program, it is also necessary to estimate the costs associated with the program. This may appear to be the simplest aspect of a utility analysis. Indeed, with human resource programs still often seen as costs rather than investments,<sup>14</sup> many companies have the tools and experience to estimate how much training, increased wages, or a new selection device will cost to implement.

Any estimate of costs, however, should include both direct and indirect costs. Direct costs include the cost of hiring a trainer, the cost of wage raises, and the cost of recruiter travel. They are generally easy to track because there is some direct outlay of cash to make the human resource intervention possible. However, the calculation of opportunity cost requires more thought on the part of those evaluating the potential human resource intervention. Opportunity costs include the time lost by those involved in the implementation of the human resource investment (e.g., the time a rooms manager may have to spend in

<sup>11</sup> See, for example: Cascio, *op. cit.*

<sup>12</sup> See: Boudreau, "Utility Analysis for Decisions in Human-resource Management," in *Handbook of Industrial and Organizational Psychology*, second edition, ed. M.D. Dunnette and L.M. Hough (Palo Alto, CA: Consulting Psychologists Press, 1991), pp. 621–745.

<sup>13</sup> M. Sturman, "What's a Great Employee Worth: A Starting Point for Considering Investing in Human Resources," *AAHOA Hospitality*, Vol. 6, No. 9 (September 2001), pp. 57–59.

<sup>14</sup> Tracey and Nathan, *op. cit.*

training, as opposed to actually performing the tasks of the job), and lost productivity (e.g., new hires will take a while to perform the job at full efficiency). Financial resources spent on human resources could also have been used elsewhere, and so there is always an opportunity cost with regard to the money not gained from a different investment. Opportunity costs may also include other sources of lost revenues, such as a room being used for training instead of being sold. In short, opportunity costs may not be immediately obvious, but they can constitute a substantial portion of costs associated with human resource activities.

A good example of estimating costs is provided by Hinkin and Tracey.<sup>15</sup> As part of their study, they examined both the direct costs (i.e., separation costs, recruiting costs, hiring costs) and indirect costs (i.e., productivity loss) of employee turnover. In their examination of front-desk associates at four hotels, they found that the indirect costs accounted for over 65 percent of the cost of turnover. Not only did those results show the importance of considering less-immediately observable cost implications, but they also provide valuable information on how to approach the estimation of such costs.

### Using the Utility Model

Utility analysis allows decision makers to estimate the value of human resource interventions, thus purportedly aiding managers deciding whether to invest in human resource management systems, such as selection systems or training programs, and adding credibility to the perceived "soft" decisions commonly associated with human resources. General managers may see it as a useful tool that can be used to quantify the value of investments in their employees. Human resource decision makers may see it as a way of increasing the rigor associated with human resource decisions. With both general managers and human resource directors using the tool, the hospitality industry can benefit from an increased sophistication regarding how to think about investments in human capital.

The formula, which is ultimately an estimate of benefits minus costs, is derived by estimating

<sup>15</sup> Hinkin and Tracey, *op. cit.*

the product of (1) the quantity of employees affected, times (2) the effect of the program on the quality (i.e., performance) of the employees, times (3) the value of better performance, all minus the cost of the program. The result is the basic utility formula discussed earlier in this article and the previous sidebar. With the formula spelled out, and the basic logic behind it explained, I now turn to presenting two examples designed to help illustrate how utility analysis can be used.

### Example 1: Evaluating a New Selection System

A hypothetical luxury hotel is considering changing the way it hires its front-desk employees. Currently, employees complete an application form, and those with acceptable backgrounds and experience are interviewed by the front-desk manager, who makes a final determination of whether to hire the individual, contingent on a quick background check.

The front-desk manager and general manager have had concerns about the effectiveness of this selection process. While a number of good employees have been hired this way, the method has also produced its share of poor performers. The front-desk manager acknowledges that he has never received training on how to do an interview, and the nature of the interviews can vary widely depending on how much time is available, other events occurring at the time, and even his mood. The hotel is considering moving from the current system to (1) a more in-depth and structured interview to be conducted by someone from the human resources department, and (2) training for the front-desk manager on how to perform a structured interview.

Abundant research has shown that structured interviews are better predictors of employee performance than are unstructured interviews.<sup>16</sup> At issue, though, is whether the interviews' benefits outweigh their costs. Because they must be planned out ahead of time, structured interviews have a one-time cost associated with their devel-

<sup>16</sup> See, for example: R.D. Gatewood and H.S. Field, *Human Resource Selection*, fifth edition (New York: Harcourt College Publishers (2001)); and H.G. Heneman, R.L. Heneman, and T.A. Judge, *Staffing Organizations*, second edition (Chicago: Irwin, 1997).

opment. Additionally, as mentioned in the above scenario, the front-desk manager will require training; this, too, involves a one-time cost. A knowledgeable human resource department, in conjunction with the front-desk manager, should be able to develop the structured interview. As a conservative assumption, I will assume it takes a total of 40 person-hours (between the human resource department and the front-desk manager) at a cost (direct and opportunity) of \$50/hour, for an estimated cost of \$2,000. The structured interview should take no more time to conduct than the unstructured interview. (Indeed, the structured interview may take less time, but, to be conservative, I do not factor that in as a potential cost saving.)

Because this is a hypothetical example, it is necessary to make other, realistic assumptions. I will assume that there are three applicants on average per open position, the average front-desk employee stays with the company for two years, and  $SD_y$  will be estimated at 40 percent of annual pay. If the full-time employee's hourly rate is \$10, the value of greater employee performance is \$8,320, or 40 percent of the employee's \$20,800 annual pay (\$10/hour  $\times$  40 hours a week  $\times$  52 weeks a year). Again, note that this is probably a conservative estimate because the nature of front-desk work involves much customer interaction, and even low-paid employees (perhaps especially low-paid employees) can have a dramatic effect on customer satisfaction. Based on meta-analytic research on interviews, I will assume that a structured interview's validity is 0.12 higher than that of an unstructured interview.<sup>17</sup>

Exhibit 1 summarizes the above assumptions and shows the resultant utility estimate. The calculation shows that for a cost of \$2,000, the estimated utility of the investment (benefits - cost) is \$15,412. In terms of return on investment (ROI = [benefits - cost]  $\div$  cost), the investment provides an estimated return of 771 percent. Even with fairly conservative assumptions, the utility analysis suggests that changing from an unstructured interview to a structured interview would be a good human resource decision.

## EXHIBIT 1

### Implementing a structured interview for front-desk associates

#### Parameters:

- Number of people being hired: 8 per year
- Number of applicants per position: 3
- Average tenure of employees: 2 years
- Validity improvement: increase in  $r$  of 0.12
- Average employee annual pay: \$20,800
- $SD_y$  (Using 40-percent-of-salary rule): \$8,320
- Cost: One-time cost of \$2,000
- Other costs: None (no additional cost of implementing structured interview)

Note:  $d_t$  is not estimated or used in this example; we will assume it equals 0.

#### Utility estimate:

$$\bar{Z}_x: \Delta U = T \times N \times (\bar{Z}_x \times r + d_t) \times SD_y - C$$

The selection ratio is  $1 \div 3$ , or 0.3333.

Looking this value up in Cascio to determine  $\bar{Z}_x$  shows  $\bar{Z}_x = 1.09$

$$\Delta U = [2 \times 8 \times (1.09 \times 0.12 + 0) \times \$8,320] - \$2,000$$

$$\Delta U = \$17,412 - \$2,000$$

$$\Delta U = \$15,412$$

$$ROI = \Delta U \div \text{cost} = \$15,412 \div \$2,000$$

$$\text{Return on investment} = 771 \text{ percent}$$

<sup>17</sup> M.A. McDaniel, D.L. Whetzel, F.L. Schmidt, and S.D. Maurer, "The Validity of Employment Interviews: A Comprehensive Review and Meta-Analysis," *Journal of Applied Psychology*, Vol. 79 (1994), pp. 599-616.

### Example 2: Evaluating a New Training Program

Consider another hypothetical example. A mid-scale restaurant is considering providing training to its servers to improve their customer-service skills. Specifically, the managers want to make the restaurant more friendly to customers, and thus want to use training to improve the rapport between the table servers and the customers. By improving customer service, the

**While utility analysis can be complex, it is nevertheless valuable to have a technique to help evaluate the quality of human resource investments.**

restaurant's managers hope to gain two key benefits: improved customer satisfaction (and higher revenues due to increased repeat business) and enhanced employee retention due to larger tips.

There has been abundant research that examines the effects of customer-service training on table servers. Improved rapport between the customer and the server—such as is achieved when the server gives the customer his or her name, touches the customer, or squats next to the table—improves perceptions of service quality and tip-size amounts.<sup>18</sup> Improved customer service has also been shown to be related to diminished server turnover.<sup>19</sup>

Experimental studies have shown that customer-service training designed to increase rapport improves customer satisfaction by roughly 0.57 standard deviations.<sup>20</sup> Based on the -0.44 correlation between customer service and turnover,<sup>21</sup> we would also expect turnover to de-

crease by 0.25 standard deviations. Using the characteristics of the data described in Lynn's study—where the average turnover was 112.32 percent (and the SD of turnover was 45.59 percent)—turnover would, on average, be reduced from 112.32 percent to 100.9 percent.

Of course, the potential benefit of the training needs to be compared against its costs. Assuming a restaurant with 40 servers, training would likely cost \$1,500 for the "expert" to provide the training, and two hours of employee time.<sup>22</sup> The employees' time would have to be beyond normal working hours, and if they are paid the minimum wage (and to be conservative, the additional hours were estimated as if they incurred overtime pay, at time and a half), then the total cost would be  $\$1,500 + (40 \times \$5.15 \times 1.5 \times 2)$ , or \$2,118.

The benefits would be achieved through better customer service and reduced turnover. Hinkin and Tracey estimated the turnover cost of a room-service employee to be \$1,332.05. This seems to be a reasonable estimate for our example. We will also use the conservative assumption that  $SD_y$  equals 40 percent of total annual pay, which we will assume to be minimum wage for wait staff. This yields an estimated  $SD_y$  of  $(.40 \times 20 \text{ hours/week} \times 52 \text{ weeks/year} \times 5.15/\text{hour})$ , or \$2,142.

Exhibit 2 shows a summary of the data for this analysis and the results. The analyses show that both the dollar gain from improved employee performance (\$24,419) and the savings from reduced turnover (\$6,660) both substantially outweigh the cost of the training program (\$2,118). Even with fairly conservative estimates (such as the cost of training and for estimating  $SD_y$ ), the value of improved customer-service training in this circumstance appears substantial. While actual restaurants would likely want to do their own research and use their own numbers to provide estimates, this example shows how utility analysis can illustrate potentially large gains associated with recommended courses of action that have been discussed in published research. Even if we were to assume that all the benefits were cut in half and the cost of the training were doubled, the analysis would still suggest that the benefit

<sup>18</sup> See: J. Hornik, "Tactile Stimulation and Customer Response," *Journal of Consumer Research*, Vol. 19 (1992), pp. 449–458; and M. Lynn, "Seven Ways to Increase Servers' Tips," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 37, No. 3 (1996), pp. 24–29.

<sup>19</sup> M. Lynn, "Turnover's Relationship with Sales, Tips, and Service across Restaurants in a Chain," *Hospitality Management*, Vol. 21 (2002), pp. 443–447.

<sup>20</sup> Hornik, *op. cit.*

<sup>21</sup> See: Lynn (2002), *op. cit.*

<sup>22</sup> As estimated by Michael Lynn, Cornell University.

(\$15,539) would outweigh the cost (\$4,236) and yield a substantial return on investment (267percent).

## Flaws and Limitations

Like any modeling technique, utility analysis has its limitations. The utility analysis formula itself relies on a number of statistical assumptions that limit the validity of its results. For example, the basic formula does not take into account the time value of money; it implicitly assumes that all the individuals who receive job offers accept them; and it does not consider the possibility of a probationary period that can be used to weed out bad hires. Moreover, the examples above used an elementary method of considering employee turnover. All of these assumptions limit the validity of the final utility estimate and, in general, can cause the basic model to overestimate the value of specific human resource interventions.<sup>23</sup>

Fortunately, researchers have proposed adjustments to the basic utility analysis model to correct for the limitations that I just mentioned and others that I did not discuss. This paper's purpose is to explain the technique (and not to examine its subtleties). A review of the advanced utility model's applicability to hospitality is best saved for another paper specifically on that topic.

**Using utility analysis.** A different type of problem associated with utility analysis relates to its use, or more specifically to its lack of use, by decision makers. Indeed, some have discussed the "futility of utility analysis" based on the results of research which suggests that decision makers who are presented with the results of utility analysis actually chose the opposite of what was recommended by the model.<sup>24</sup> As I have argued elsewhere,<sup>25</sup> this is probably a flaw relating to the use of utility analysis and not the technique itself. Indeed, in the experiments that led to the

## EXHIBIT 2

### Customer-service training for table servers

#### Parameters:

- Number of employees: 40
- Number of people being trained: 40 per year
- Average tenure of employees: 6 months
- Performance improvement due to training ( $d_t$ ): 0.57
- Average employee annual pay: \$5,356
- $SD_y$  (Using 40-percent-of-salary rule): \$2,142
- Cost: One-time cost of \$2,118
  
- Reduction in turnover: 11.42 percent,  
or roughly five fewer turnover incidents per year
- Cost of turnover: \$1,332

Note:  $\bar{Z}_x$  and  $r$  are not used in this example; we will assume they equal 0.

#### Utility estimate:

$$\Delta U = T \times N \times (\bar{Z}_x \times r + d_t) \times SD_y - C$$

$$\Delta U = T \times N \times d_t \times SD_y + \text{cost savings due to reduced turnover} - \text{cost of training}$$

$$\Delta U = 0.5 \times 40 \times 0.57 \times \$2,142 + 5 \times 1,332 - \$2,118$$

$$\Delta U = \$24,419 + \$6,660 - \$2,118$$

$$\Delta U = \$28,961$$

$$\text{ROI} = \$28,961 \div \$2,118$$

$$\text{Return on investment} = 1,367\%$$

<sup>23</sup> M.C. Sturman, "Implications of Utility-analysis Adjustments for Estimates of Human-resource-intervention Value," *Journal of Management*, Vol. 26 (2000), pp. 281-299.

<sup>24</sup> See: G.P. Latham and G. Whyte, "The Futility of Utility Analysis," *Personnel Psychology*, Vol. 47 (1994), pp. 31-46; and G. Whyte and G.P. Latham, "The Futility of Utility Analysis Revisited: When Even an Expert Fails," *Personnel Psychology*, Vol. 50 (1997), pp. 601-610.

<sup>25</sup> See: Sturman (2000), *op. cit.*

conclusion of "futility," none of the decision makers had been trained in the use of utility analysis or even had seen it used prior to the experiment. Others have argued that presenters of utility analysis have tried to lobby for a single course of action and have used the analysis as evidence in a one-sided argument, rather than using it as an evaluative tool to help decision making.<sup>26</sup> The usefulness of utility analysis is limited mostly by the fact that decision makers have not been exposed to it. In particular, managers at several levels must be exposed to the tool. That includes general managers (as well as owners) who will ultimately be making the final investment decisions and the human resource directors who will need the tools to convince general managers to make the necessary human resource investments.

### Making Use of Utility Analysis

Utility analysis can become a useful decision aid for hospitality managers. While the method can certainly be complex, the fact that labor costs can constitute more than 50 percent of costs in hospitality operations suggests that it would be valuable to have techniques available to help evaluate the quality of human resource investments.

The future value of utility analysis also depends on information technology designed to facilitate its use. First, this means that informa-

<sup>26</sup> S.F. Cronshaw, "Lo! The Stimulus Peaks: The Insider's View on Whyte and Latham's 'The Futility of Utility Analysis.'" *Personnel Psychology*, Vol. 50 (1997), pp. 611-616.

tion systems should be able to provide decision makers with the type of data that is needed to evaluate human resource interventions. Second, I argue that specific utility analysis programs should be developed so that decision makers can focus on the problem, rather than on the mathematics needed to implement the technique. I am aware of no publicly available software that can be used to implement utility analysis. As part of my research, I am working on developing such a program and hope to make it freely available within the next year. Third, and perhaps most important, general managers and human resource decision makers need to be trained to think quantitatively about human resource interventions. Utility analysis can be taught in introductory human resource courses. Already, the Cornell hotel school offers an executive-education course on the topic. Additionally, those interested could look into books specifically on the topic.<sup>27</sup>

Utility analysis can undoubtedly be complex, but the problems associated with successfully managing a company's human resources require that decision makers be capable of rigorous evaluation of human resource programs. General managers and human resource directors need to be able to determine where investments in human capital are necessary to contribute to the organization's bottom line. Utility analysis is a tool that can help make this happen. ■

<sup>27</sup> In particular, see: Cascio, *op. cit.*



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