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ABSTRACT

Evidence from executive surveys and the business press suggests that while ”winning the talent war,” the attraction and retention of key talent, is increasingly pivotal to organization success, it is an area of poor perceived performance. This paper shows how the Boudreau & Berger (1985) staffing utility framework can be used by industrial/organizational psychologists and other HR professionals to integrate turnover and compensation research to address this issue. Using published research based on a large petrochemical organization, we used this model to estimate the financial implications of how incentive pay programs affect the turnover patterns of employees of various performance levels. The demonstration highlights the importance of an integrated approach to employee selection, retention and compensation, and reveals the key role of performance variability in the decision to use incentive pay to enhance talent retention. Furthermore, our method should provide a structure for organizations to assess the profitability of company-specific performance-based pay policies.

The Value of Performance-Based Pay in the War for Talent

Recent research provides strong evidence that the relationship between employee performance and voluntary turnover is curvilinear, such that low and high performers exhibit greater turnover than average performers (Trevor, Gerhart, & Boudreau, 1997; Williams & Livingstone, 1994). This finding provides support for theoretical positions and models advanced over a number of years (e.g., Jackofsky, 1984; March & Simon, 1958). Research has also advanced the notion that an organization's reward system is likely to be an important contingency in determining voluntary turnover (Dreher, 1982; Gerhart & Milkovich, 1992; Harrison, Virick, & William, 1996; Jackofsky, 1984; Porter & Lawler, 1968; Schwab, 1991; Steers & Mowday, 1981), a hypothesis also supported by the Trevor et al. (1997) study. In fact, Trevor, et al. (1997) found that the performance/turnover curvilinear relationship differs by pay level. The probabilities for high performer turnover were most sensitive to pay differences. Together, these findings suggest that compensation can enhance organizational through pay systems that promote the attraction and retention of top talent, and encourage the exit of poor performers (Boudreau, 1991; Boudreau & Berger, 1985).

The professional literature in HR suggests this is a laudable goal, with many citing the increasing difficulty in obtaining and keeping top talent in tight labor markets (Branch, 1998; Chambers, 1998; Rich, 1999; Quinn, Anderson, & Finkelstein, 1996). A recent report (McKinsey & Company, 1998) of interviews with over 5,000 executives and managers found:

- 65% of company executives believed that they had insufficient talent in the ranks of their top 300 leaders
- 78% of the executives also believed that line managers should be held accountable for the quality of their people and yet only 7% felt that this actually was happening in their organizations.
- 81% felt that human resource professionals (HR) should partner with other leaders to build a stronger executive talent pool while only 27% thought that HR plays this role.
- Only 10% strongly believed that their companies retain most of their high performers

Identifying, attracting and retaining good talent, and providing measures that help managers understand and become accountable for good talent, are basic tenets of research. Yet, translating these research findings into concrete practical applications apparently remains a significant challenge for most organizations.

This paper demonstrates a technique for such a translation. The employee movement utility model of Boudreau & Berger (1985) provides the means to use the Trevor et al. (1997) results, and related turnover research describing how pay policy affects the nature of the

performance/turnover relationship, to evaluate the dollar value implications of various pay-for-performance strategies. The application described here is meant to (a) demonstrate how research findings can be used to diagnose, inform and evaluate management decisions, (b) demonstrate the conditions under which this model provides information that would enhance decisions beyond traditional cost or accounting-based analysis, and (c) encourage and enable others to perform company-specific replications.

Utility Analysis

The Trevor et al. (1997) results suggest that pay policies that provide greater pay growth for high performers (and less for low performers) would retain more high performers, encourage separation among low performers, and thus increase the value of the work force. In principle, this is an appealing prospect, but it is unclear whether organizational resources devoted to such rewards will yield a value-added return. Moreover, it is unclear to what extent the value would depend on factors such as the pay policy, the retention pattern, the variability in performance, or other factors. The utility framework provides a method to address these questions.

Traditionally, utility analysis has been used to aggregate diverse effects into a common dollar-valued scale (Boudreau, 1991). In order to estimate the dollar value implications of different performance-based pay systems, we adapted the Boudreau and Berger (1985) separation/ acquisition utility model. This model captures the value associated with separations and acquisitions over time, differentially by performance level. Specifically, this model estimates three components in each relevant time period: (1) the movement costs associated with separations and acquisitions; (2) the service costs (pay, benefits, and associated expenses) required to support the work force; and (3) the service value, or dollar value of the goods and services produced by the work force. The dollar-valued implications of different separation and acquisition patterns over time are estimated by summing the stream of service value levels, and then subtracting the stream of service costs and movement costs.

The Boudreau-Berger utility framework has recently been employed to examine the financial effects of different pay policies. Klaas & McCledon (1996) examined the effects of changes in pay level, demonstrating that a policy of lagging the market would generate the highest utility, when applied to a sample of bank tellers using parameter estimates from both prior research and the particular situation. These findings are intriguing, and demonstrate the value of applying the attraction-retention utility framework to compensation. This is the only prior study to use utility analysis to empirically examine compensation policies, and it suggests that simply raising the pay level may not always be worth the cost. Klaas and McCledon focused on the question of setting the pay level, which is a different decision from the pay-

performance link, and a decision on which organizations may have less discretion to differentiate from each other (Gerhart & Milkovich, 1992). Bank tellers were also found to be a job with a low value for performance variability (Klaas & McCledon, Table 2). Thus, the Klaas & McCledon results are useful, and suggest the need to examine other elements of the compensation system, and the effects of differences in the value of performance variability.

Table 1 presents a summary of the steps used in our application, and the Tables we employ to illustrate these steps.

TABLE 1: Guide for Estimating the Financial Value of Using Various Pay Strategies to Reduce High Performer Turnover

Step	Goal of Step	Needed Information	Source	Relevant Tables
1	Determine Pay Plans	Data on specific pay policies, yielding the average expected pay at each performance level.	Company-specific information, proposed pay plans, pay survey results, or research results.	2
2	Determine Turnover Probabilities	A formula predicting the probability of turnover given a pay policy and performance level. See Trevor, et al. (1997) for a detailed summary.	Company-specific information, or research results	2
3	Determine Performance Distribution and Number of Separations	Results of Steps 1 and 2		2
4	Determine Movement Transaction Costs	Estimate of costs associated with separating and hiring new employees	Company specific data, research results, or estimate (e.g., 1.5 times average salary)	2
5	Determine Service Costs	Costs associated with each individual's employment: salary, benefits, ongoing training etc.	Company-specific information, pay survey results, or estimate (e.g., salary from Step 1, and benefits equal to 35% of salary)	3
6	Determine Service Value	Individual service value at each performance level (reported in Table 4) Total service value of the workforce in years of interest (Calculations illustrated in Tables 5, 6, 7, and 8)	Company specific data, research results, or estimate. Calculations, are based on estimates of individual service value (Table 4) and number of separations and retentions (Table 2)	10
7	Combine The Components into Overall Results	Service Value (Table 9) minus Service Cost(Table 3) minus Movement Costs (Table 2)		10

We demonstrate this application on the results of the Trevor et al. (1997) study. This study demonstrated the curvilinear relationship between performance and turnover, and also showed this relationship was modified by reward structure. However, the methods we describe below should provide sufficient detail so that others can use the same method with their own data on turnover trends and/or potential pay plans, and incorporate new information from future studies linking pay, performance and mobility.

Trevor et al. (1997) examined turnover patterns over a four-year period, so we applied the Boudreau and Berger (1985) model to a four-year period. We modeled the investment decision as follows. At the end of 1989, this organization chooses to implement pay strategies with varying linkages to performance. Each potential strategy would change separation and retention patterns over the four years (1990 through 1993). In 1993, after the four-year effects, the organization would possess a work force reflecting the performance distribution produced by the pay strategy. Thus, by calculating the movement costs, service costs and service value between 1990 and 1993, and assuming that the intervening changes were linear, we can estimate the cumulative effects of a pay strategy over the four-year period.[1]

The necessary calculations require a number of steps to specify the requisite data. We use a statistical application and a number of spreadsheets to make the necessary calculations. The spreadsheets are available from the lead author upon request, but the following description should be sufficient for readers to create their own.

Step 1: Determine Pay Plans

The first step in estimating the dollar-value effects of various pay policies with regard to their effects on turnover is to determine which pay policies are to be examined. We chose three pay strategies to span a continuum from conservative to aggressive in linking pay to performance. There is little empirical data on the distribution of specific pay-growth policies across pay levels, so to ground our estimates on realistic data, we constructed three hypothetical, but realistic, strategies constructed from the Trevor et al. (1997) sample's actual mean and standard deviation of pay growth over the study period. Those desiring to evaluate other pay plans would simply use the values appropriate to their decision situation. Our results are likely to illustrate the general pattern, though particular applications may vary.

In our hypothetical evaluation, Pay Strategy 1 gave employees in all performance categories average pay increases (for their particular performance category) over the four-year period. Pay Strategy 2 gave average pay increases to most employees, but those in the three highest performance categories (performance ratings 4, 4.5, and 5) were given yearly increases equal to one standard deviation above the mean for their respective performance categories. Pay

Strategy 3 was similar to Pay Strategy 2, except that we added a low-pay component, in which those in the lowest two performance categories (performance ratings 1 and 1.5) were given yearly pay increases equal to one standard deviation below the mean for their particular performance category. Hence, Pay Strategy 2, and particularly Pay Strategy 3, stress a relationship between pay and performance. We then assessed the dollar-value implications related to each strategy's implementation. The pay levels for each strategy for 1989 and 1993 are shown in Table 2.

TABLE 2: Estimated Four Year Separation Patterns and Movement Costs Under Different Pay Strategies

Performance Category	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	Mean
#Employees (1990)	48	78	946	881	1347	543	256	37	19	
1989 Average Pay	$28,490	$29,473	$32,194	$37,437	$39,864	$43,561	$46,385	$41,041	$43,058	$38,187
1993 Average Pay (Strategy 1: Weak pay/performance link)	$30,124	$32,105	$37,882	$45,861	$48,404	$53,897	$57,677	$51,326	$54,462	$47,093
1993 Average Pay (Strategy 2: Moderate pay/performance link)	$30,124	$32,105	$37,882	$45,861	$48,404	$53,897	$64,393	$57,034	$62,982	$47,914
1993 Average Pay (Strategy 3: Strong pay/performance link)	$23,476	$26,529	$37,882	$45,861	$48,404	$53,897	$64,393	$57,034	$62,982	$47,957
Turnover Probabilities[s]										
Strategy 1	89%	37%	42%	19%	21%	16%	23%	20%	66%	
Strategy 2	89%	37%	42%	19%	21%	16%	5%	2%	12%	
Strategy 3	97%	42%	42%	19%	21%	16%	5%	2%	12%	
Retained Employees (1993)										Total
Strategy 1	5	49	549	714	1064	456	197	30	6	3070
Strategy 2	5	49	549	714	1064	456	243	36	17	3133
Strategy 3	1	33	549	714	1064	456	243	36	17	3113
Replaced Employees (1990-1993)[2]										
Strategy 1	43	29	397	167	283	87	59	7	13	1085
Strategy 2	43	29	397	167	283	87	13	1	2	1022
Strategy 3	47	45	397	167	283	87	13	1	2	1042

Notes: 1. These values were based on analyses from the Trevor et al. (1997) study. Those performing their own analyses would need to complete with table with their own company-specific data, or use approximations from the Trevor et al. results. 2. Recall that we are evaluating the effects of the different pay policies going into effect in 1990. Thus, while are data are based on the state of the workforce at the end of 1989, we are evaluating the effects of the programs in 1990-1993.

Step 2: Determine Turnover Probabilities

Once the pay policies are determined, the next step involves determining the expected effects of each plan on turnover rates for each performance level. Specifically, we wanted to model the following function:

Probability of turnover = f (Pay Growth, Performance Level)

By modeling this function, we can obtain an estimate for the probability of leaving the organization during the time period of interest in a way that reflects the effects of both performance and pay policy.

Probabilities of turnover can be modeled in a number of ways. At its simplest, one can calculate the average rate of turnover at a given performance level and a specific pay level. This is advantageous in its simplicity of calculation, but requires specified (and few) categories of both performance and salary growth. With continuous salary growth and performance variables, turnover probabilities can also be modeled using logit or probit regressions. This approach requires a statistical package, but allows estimating the expected probability of turnover at a set future time, for a specific performance and salary growth level. This approach is also limited in that it does not differentiate between someone who separates after 1 day versus someone who leaves after 2 years. Losing this information may make subsequent analyses inaccurate (Morita, Lee & Mowday, 1993). A third approach is survival analysis (Kalbfleisch & Prentice, 1980). This method computes the probability of individuals surviving (i.e., not leaving the organization) over the time span of interest, and takes into account the length of time an individual stays before leaving the organization. Under certain circumstances, this approach can be more accurate than the previously described approaches (see Trevor et al., 1997), and is advantageous because the results can be used to model a variety of time frames (e.g., a one year analysis, four year analysis, etc.). In sum, there are a number of ways to compute turnover probabilities. We advocate the solution that is most practical to the circumstance, which of course depends on the availability of organizational data, availability of statistical packages, and the statistical sophistication of the individual performing the analyses.

The Trevor et al. (1997) paper employed survival analysis and thus includes four-year survival probabilities of employees hired between the years 1983 and 1988. Their analysis modeled survival as a function of demographic control variables, employee promotions, employee performance, salary growth, and the interaction of employee performance and salary growth. The specific analysis and results are reported in Trevor et al. (1997), Tables 4 and 5 (pg. 54 and pg. 55 respectively). Results from this analysis allow us to determine the probability

of turnover (equal to [1 - the probability of survival]) for each performance category at the end of the four-year analysis period. These are the probabilities shown in Table 2.

Step 3: Determine Performance Distribution and Number of Separations

With the pay policies and the effects of the pay policies specified, it is necessary to have specific data on the number of people being affected. We created a hypothetical 1989 cohort, based on the Trevor et al. (1997) data set, in order to track the effects of the three pay strategies over four years. Our data contained information on employees hired between 1983 and 1988 who were present at the beginning of 1989. Thus, our analysis applies to a group of 4,155 employees with six or less years of tenure with this firm (i.e., pre-1983 hires were not included in the data), representing 3,635 stayers and 520 employees that separated between 1983 and 1989.

The cohort's performance distribution, based on the actual distribution of employee performance levels in the Trevor et al. (1997) data set, is depicted in Table 2. The number of individuals retained and the number of those who left (turned over) were determined by multiplying the number of individuals in each category by the probability of leaving. These numbers are also reported in Table 2.

Step 4: Determine Movement Costs

Costs of accommodating separations and replacements were assumed to be a linear function of the number of separations/replacements. Because the number of separations is assumed to equal the number of replacements for this analysis, we combined separation and replacement costs and refer to them simply as "movement costs."

An empirical estimate of movement costs for this particular organization was not available, so they were estimated to be 1.5 times the average salary of the work force in the year of the movement (a value recommended by Cascio, 1991, p. 19). We also assumed that costs per employee movement would not vary with pay strategy, so we estimated average salary assuming average pay growth for all performance categories (Strategy 1).

To make the necessary calculations, average salary level was calculated for 1989 and 1993 based on the salary levels from Strategy 1. Then, the movement costs for 1990 and 1993 were calculated (as 1.5 times the average salary). Finally, the overall average cost per movement was calculated assuming the rate that movement costs increased over time was linear, and thus equaled the average of the 1990 and 1993 movement costs. These values are shown in Table 3. The average movement cost was estimated to equal $65,629. Total separation/acquisition costs for each pay strategy over the four-year period were calculated by multiplying the number of separations by this estimated movement cost. As shown in Table 3,

total separation costs were $70.40 million, $66.32 million, and $67.61 million for Strategies 1, 2, and 3. Thus, by reducing turnover among high-performers, the strategy of paying high performers more (Strategy 2) saves over $4 million in movement costs. Paying high performers more and low performers less (Strategy 3) incurs additional movement costs as more low-performers leave, but still represents a saving of almost $2.4 million over the four-year analysis period. Some of these cost savings would be evident with standard accounting tools, to the extent that they represent "out of pocket" costs such as fees to search firms or consultants providing exit interviews. However, many of these costs are "opportunity costs" such as the time of staff spent in processing separations and acquisitions. Thus, it seems likely that only a portion of these cost savings would be recorded by the accounting system.

TABLE 3: Estimated Four Year Movement Costs Under Different Pay Strategies

	Strategy 1	Strategy 2	Strategy 3
Average Salary			
1989	$38,187		
1993	$46,295		
Movement Costs			
1989	$57,280	$57,280	$57,280
1993	$70,639	$70,639	$70,639
Average Yearly Increase	$3,041	$3041	$3,041
1990	$60,322	$60,322	$60,322
Avg. (1990 & 1993)	$64,883	$64,883	$64,883
# Separations	1085	1022	1042
Total Movement Costs	$70.40M	$66.32M	$67.61M

Notes:
1. Movement costs were assumed to be unaffected by pay strategy, and thus were based on the average salary of the workforce under Strategy 1.
2. Total Movement Costs were calculated assuming a linear growth in movement costs and an equal number of separations in each year. Thus, Total Movement Costs could be calculated as the number of separations times the average 1990 & 1993 movement costs.

Step 5: Determine Service costs

Service costs reflect the total ongoing costs required to retain and support the work force, such as pay and benefits (Boudreau & Berger, 1985). Thus, service costs vary with pay strategies because base pay varies, as do pay-related expenses. Again, we assumed linear increases in service costs between 1989 and 1993 to estimate the total service costs incurred under each strategy during the four-year period.

We calculated service costs as salary plus benefits, with benefit costs assumed to average 35% of salary (U.S. Chamber of Commerce, 1996). This may underestimate total service costs, which would also include training costs and administrative costs supporting the employment relationship, but if these latter costs do not vary with pay strategies, comparisons

between pay strategies are unlikely to be substantively affected. Service costs were calculated differently for those who were retained versus those replaced (Boudreau & Berger, 1985). Specifically, retained employees carried the effects of prior pay strategies, while the service costs of employees hired after 1989 was assumed equal to the average of the work force in the year they were hired. For employees retained to the end of the four-year analysis, we determined the 1993 salary level for each performance category at the end of the four-year period, under each pay strategy (see Table 2). We multiplied this salary level by 1.35 to reflect total service costs, and then multiplied each service cost estimate in each performance category by the projected number of retained employees in each performance category under each pay strategy (see Table 4) to obtain the total 1993 service costs for retained employees in each performance category. These were summed across performance categories to give an estimate of the total 1993 service costs for those retained from the 1989 work force. As shown in Table 4, we divided the total by the number of retained employees to compute the average service cost of retained employees in 1993. Then, we estimated the average employee service cost for the 1990-93 time frame as the average of the 1990 and 1993 per-employee service cost levels. We multiplied this average by the number of retained employees in 1993 to determine the total service costs of retained employees for the four-year time frame.

TABLE 4: Estimated Four Year Service Costs Under Different Pay Strategies

		Strategy 1	Strategy 2	Strategy 3
Average Salary	1989	$38,187	$38,187	$38,187
	1993	$47,093	$47,914	$47,957
Average Service Cost	1989	$51,552	$51,552	$51,552
(per employee)	1993	$63,575	$64,685	$64,742
Average Yearly Increase		$3,006	$3,283	$3,298
	1990	$54,558	$54,835	$54,850
Avg.	(1990 & 1993)	$59,066	$59,760	$59,796
Number of Retained Employees		3070	3133	3113
Total Service Cost of retained employees		$725.33M	$748.91M	$744.58M
Total Service Cost of replaced employees		$256.35M	$241.46M	$246.19M
Total Service Costs (1990-1993)		$981.68M	$990.37M	$990.77M

Notes: Total costs were calculated assuming a linear growth in service costs. Thus, it was estimated to equal the number of employees times the number of years times the average service costs (1990 & 1993).

To calculate 1993 service costs for the replacements, we assumed that under all pay strategies, replacements would have been of average quality, and paid the salary level that would have existed if average pay increases had been given over the four-year period (Strategy 1). This was calculated by multiplying the following--the number of replaced employees for each strategy, by the average service cost associated with Strategy 1, by four--to represent the

four-year time frame. The total service cost of the replaced employees is also shown on Table 4, as is the total service costs for each pay strategy. Note that this approach assumes that the average service costs of the applicant population equals the average service costs of the incumbent population, and does not vary with pay strategies. We will discuss the potential effects of this assumption below.

Table 4 suggests that the more aggressive the pay-for-performance strategy, the higher the service costs. Strategy 3, which both raises the pay for high performers and lowers pay for low performers, costs about $9 million more over four years than Strategy 1 which gives average pay increases. This increase is due to the greater pay for high performance, and the higher pay for the replacements of low performers, with those replacements assumed to be average performers receiving the average pay level. It is notable that if standard accounting analysis were used, these costs would clearly become evident over time, as increases in payroll budgets, cost of goods sold, general and administrative expenses, etc. Thus, considering that only a portion of the movement cost savings would appear in the ordinary accounting statements, and virtually all of the service cost increase would be evident, it is likely that standard accounting would project a four-year cost of between $5 million and $9 million. In the absence of a clear alternative analysis, it seems likely that such significant accounting costs would result in a decision to forego performance-based pay systems. Next, we demonstrate the key factors that can reveal such a decision to be a significant mistake.

Step 6: Determine service value

Movement patterns also affect the quality or "service value" of the workforce. Moreover, it has been shown that when performance variability is high, the effect of movement patterns on workforce value can be far greater than their effect on costs. (Boudreau & Berger, 1985; Boudreau, 1991). To examine the potential effects of performance-based pay on workforce value, we need to estimate the dollar value of variability in the performance distribution and subsequent changes in the value of the work force. Our data provide estimates of changes in the performance rating distribution, so a conversion method is required to estimate the dollar value of particular performance levels. This conversion method requires two components (Boudreau & Berger, 1985): (a) the value of the average performance level, and (b) the incremental value of deviations from that average performance level.[2]

We employed the Schmidt and Hunter (1983) approach, which assumes that the value of performance at each level would equal 1.754 times the average wage at that level. For the 1989 work force, we multiplied the average salary by 1.754 to obtain a value of $66,980 per person. For the 1993 work force, consistent with the estimate of average service costs above,

we estimated average salary as that which would have been produced by four years of average salary increases, beginning in 1989. Thus, as noted above, average 1993 salary was estimated to be $47,093 producing an average work force value estimate (1.754 times $47,093) of $82,600 per person.

For the second component, we needed an estimate for the standard deviation of dollar-valued performance (SDy) to calculate the value of each of the nine performance levels, in both 1989 and 1993. In this study, and probably typical of most organizations, we had no direct estimates of the dollar value of particular performance levels. Hence, we used an estimation approach, based on SDy, the value of a one-standard-deviation difference in employee value, that does not require such estimates. We investigated three values. As an extremely conservative approach, we used 20% of average salary; we used 40% of average salary as a conservative estimate; and we used 100% of average salary as a more realistic estimate.[3] In other words, for example, our three estimates suggest that an employee performing better than 84 percent of the employee population (one standard deviation above the mean) is worth 20% of salary, 40% of salary, or 100% of salary more to the organization than an average performer (i.e., someone performing at the 50th percentile).

We estimated the Z-score corresponding to each of the nine performance ratings, using the observed distribution of employees across performance categories. The average performance rating was 2.74, with a standard deviation of .66. We assumed that the Z-scores for the underlying performance distribution would be the same from 1989 to 1993, because the underlying value function changes only with the job activities, which we assumed were constant. Thus, although the distribution of workers across performance categories changes from 1989 to 1993, we assumed that the relative standardized value of different performance levels did not change. This produced Z-scores corresponding to each performance rating, shown in the second row of Table 5.

TABLE 5: Computations for Estimating Individual Service Value at Each Performance Level

Performance	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Z(Performance)	-2.64	-1.88	-1.14	-0.40	0.35	1.10	1.85	2.60	3.35
Average Service Value									
1989	$66,979	$66,979	$66,979	$66,979	$66,979	$66,979	$66,979	$66,979	$66,979
1993	$82,600	$82,600	$82,600	$82,600	$82,600	$82,600	$82,600	$82,600	$82,600
Incremental Value (SDy = 20%)									
1989	-$20,170	-$14,454	-$8,739	-$3,023	$2,692	$8,407	$14,123	$19,838	$25,554
1993	-$24,874	-$17,826	-$10,777	-$3,729	$3,320	$10,368	$17,417	$24,465	$31,514
Incremental Value (SDy = 40%)									
1989	-$40,340	-$28,909	-$17,478	-$6,047	$5,384	$16,815	$28,246	$39,677	$51,108
1993	-$49,748	-$35,651	-$21,554	-$7,457	$6,640	$20,737	$34,833	$48,930	$63,027
Incremental Value (SDy = 100%)									
1989	-$100,850	-$72,272	-$43,695	-$15,117	$13,460	$42,037	$70,615	$99,192	$127,770
1993	-$124,370	-$89,128	-$53,885	-$18,643	$16,599	$51,841	$87,084	$122,326	$157,568
Total Individual Value (SDy = 20%)									
1989	$46,809	$52,525	$58,240	$63,956	$69,671	$75,387	$81,102	$86,818	$92,533
1993	$57,726	$64,775	$71,823	$78,872	$85,920	$92,969	$100,017	$107,066	$114,114
Total Individual Value (SDy = 40%)									
1989	$26,639	$38,070	$49,501	$60,932	$72,363	$83,794	$95,225	$106,656	$118,087
1993	$32,852	$46,949	$61,046	$75,143	$89,240	$103,337	$117,434	$131,531	$145,628
Total Individual Value (SDy = 100%)									
1989	-$33,870	-$5,293	$23,284	$51,862	$80,439	$109,017	$137,594	$166,172	$194,749
1993	-$41,770	-$6,527	$28,715	$63,957	$99,199	$134,442	$169,684	$204,926	$240,168

For 1989, we estimated average salary as $38,187, producing SDy estimates of $7,637, $15,275 and $38,187 for the 20%, 40% and 100% levels, respectively. For 1993, estimated average salary was $47,093, producing three corresponding estimated SDy levels of $9,419, $18,837, and $47,093. Multiplying the Z-scores by the appropriate dollar value of a one standard deviation performance difference in 1989 and 1993 produced the "incremental" (beyond the average) dollar values corresponding to each performance rating level for each SDy assumption, shown in Table 5. The sum of the average value for the workforce, plus the incremental value for each performance category, produced the total individual service values shown in Table 5.

With total individual service values determined for both 1989 and 1993, it is possible to compute the total service value for the cohorts under each compensation method. For 1989 (for all three methods), the total service value of the work force was calculated by multiplying the performance category service values by the corresponding quantities of employees in each performance category, and adding the products. Table 6 shows the results of these analyses.

TABLE 6: Computing Total Service Value for the Workforce in 1989

Performance	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	Total
# Employees (1989)	48	78	946	881	1347	543	256	37	19	4,155
1989 Total Service Value										
SDy = 20%	$2.25M	$4.10M	$55.10M	$56.35M	$93.85M	$40.94M	$20.76M	$3.21M	$1.76M	$276.05M
SDy = 40%	$1.28M	$2.97M	$46.83M	$53.68M	$97.47M	$45.50M	$24.38M	$3.95M	$2.24M	$277.02M
SDy = 100%	-$1.63M	-$0.41M	$22.03M	$45.69M	$108.35M	$59.20M	$35.22M	$6.15M	$3.70M	$279.93M

For 1993, the total service value of the work force was calculated separately for those employees retained over the four-year analysis, and for those hired during the four-year period, similarly to the service-cost calculation earlier. For the retained employees, as shown in Table 7, the 1993 service values for each SDy level were multiplied by the quantity of retained employees for each performance category, and these products were summed.

TABLE 7: Computing Total Service Value of Retained Employees, in 1993

Performance	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	Total
Retained Employees (1993) [From Table 3]										
Strategy 1	5	49	549	714	1064	456	197	30	6	3070
Strategy 2	5	49	549	714	1064	456	243	36	17	3133
Strategy 3	1	33	549	714	1064	456	243	36	17	3113
1993 Total Service Value										
SDy = 20%										
Strategy 1	$0.29M	$3.17M	$39.43M	$56.31M	$91.42M	$42.39M	$19.70M	$3.21M	$0.68M	$256.62M
Strategy 2	$0.29M	$3.17M	$39.43M	$56.31M	$91.42M	$42.39M	$24.30M	$3.85M	$1.94M	$263.12M
Strategy 3	$0.06M	$2.14M	$39.43M	$56.31M	$91.42M	$42.39M	$24.30M	$3.85M	$1.94M	$261.85M
SDy = 40%										
Strategy 1	$0.16M	$2.30M	$33.51M	$53.65M	$94.95M	$47.12M	$23.13M	$3.95M	$0.87M	$259.66M
Strategy 2	$0.16M	$2.30M	$33.51M	$53.65M	$94.95M	$47.12M	$28.54M	$4.74M	$2.48M	$267.45M
Strategy 3	$0.03M	$1.55M	$33.51M	$53.65M	$94.95M	$47.12M	$28.54M	$4.74M	$2.48M	$266.57M
SDy = 100%										
Strategy 1	-$0.21M	-$0.32M	$15.76M	$45.67M	$105.55M	$61.31M	$33.43M	$6.15M	$1.44M	$268.77M
Strategy 2	-$0.21M	-$0.32M	$15.76M	$45.67M	$105.55M	$61.31M	$41.23M	$7.38M	$4.08M	$280.45M
Strategy 3	-$0.04M	-$0.22M	$15.76M	$45.67M	$105.55M	$61.31M	$41.23M	$7.38M	$4.08M	$280.72M

Those employees hired during the four-year analysis were assumed to have an average value equal to the average work force value that would have been produced by giving average pay increases over the four years ($82,600, see Table 5, which is 1.754 times the average salary of $47,093). Thus, total service value of replaced employees was equal to the number of replacements times this average service value. This value for each strategy is shown in Table 8. Note that the more aggressive pay policy produces a lower value for replaced employees, primarily due to the fact that it reduces separations, and thus the quantity of replaced employees is less.

TABLE 8: Service Value of Replaced Employees

	Strategy 1	Strategy 2	Strategy 3
Average Service Value (1993)	$82,600	$82,600	$82,600
# Separations	1085	1022	1042
Total Service Value Of Replacements (1993)	$89.62M	$84.42M	$86.07M

We assigned the average incumbent service value (and the average incumbent service cost as discussed earlier) to new hires, which assumes that the applicant population has an average value and cost equal to the average job incumbent. This seems reasonable over the long run, under steady-state conditions. However, changing the pay system is not steady-state. Those attracted to organizations with strong pay-performance links may differ from those attracted by organizations having weaker links. Gerhart and Milkovich (1992) suggested that pay not only affects behaviors of current employees, but also affects which applicants apply, accept offers and stay (workforce composition). Cable and Judge (1994) found that several aspects of pay systems affected the attractiveness of organizations among college students. Their findings showed that a contingent (pay-for-performance) system was more attractive to risk takers, suggesting that pay systems can affect the applicant population. This is consistent with Boudreau and Rynes (1985) who noted that attraction and retention must consider potential changes in the average value of applicant populations. In sum, it seems possible that the average service value and cost of applicants may differ with different pay-for-performance systems. If, as evidence suggests, such applicants have a better "fit" (e.g., a more appropriate risk tolerance), then their service value may be higher, and their service costs (e.g., discipline/discharge, remedial training, etc.) may be lower. This would make our estimates of the value of performance-based pay conservative. On the other hand, should performance-

based pay lower the average applicant value, or increase average applicant costs, our estimates would be inflated. In view of the limited evidence on this issue, we chose to assume that average applicant service value and service costs do not vary with the pay system.

The service value of the replacements and retained employees was added to produce the estimated total 1993 service value for each pay strategy, and each assumed SDy level, as shown in Table 9. As with service costs, we calculated the four-year stream of service value levels under each pay strategy and each assumed SDy level by assuming that total service value rose linearly between 1989 and 1993. Calculations and results yielding the four-year total service value for each strategy and each SDy value are shown in Table 10.

TABLE 9: Total Service Value of the 1993 Workforce

		Value of Retained EEs		Value of Replaced EEs		Total
SDy = 20%						
	Strategy 1	$256.62M	+	$89.62M	=	$346.24M
	Strategy 2	$263.12M	+	$84.42M	=	$347.54M
	Strategy 3	$261.85M	+	$86.07M	=	$347.92M
SDy = 40%						
	Strategy 1	$259.66M	+	$89.62M	=	$349.28M
	Strategy 2	$267.45M	+	$84.42M	=	$351.87M
	Strategy 3	$266.57M	+	$86.07M	=	$352.64M
SDy = 100%						
	Strategy 1	$268.77M	+	$89.62M	=	$358.39M
	Strategy 2	$280.45M	+	$84.42M	=	$364.87M
	Strategy 3	$280.72M	+	$86.07M	=	$366.79M

TABLE 10: Computing Four Year Total Service Value

SDy=20%	Strategy 1	Strategy 2	Strategy 3
1989	$276.05M	$276.05M	$276.05M
1993	$346.24M	$347.54M	$347.92M
Average Yearly Increase	$17.55M	$17.87M	$17.97M
1990	$293.60M	$293.92M	$294.02M
Avg. (1990 - 1993)	$319.92M	$320.73M	$320.97M
Total Service Value (1990 - 1993)	$1,279.68M	$1,282.92M	$1,283.88M

SDy=40%	Strategy 1	Strategy 2	Strategy 3
1989	$277.02M	$277.02M	$277.02M
1993	$349.28M	$351.87M	$352.64M
Average Yearly Increase	$18.06M	$18.71M	$18.90M
1990	$295.09M	$295.73M	$295.93M
Avg. (1990 - 1993)	$322.18M	$323.80M	$324.28M
Total Service Value (1990 - 1993)	$1,288.73M	$1,295.20M	$1,297.13M

SDy=100%	Strategy 1	Strategy 2	Strategy 3
1989	$279.93M	$279.93M	$279.93M
1993	$358.39M	$364.87M	$366.79M
Average Yearly Increase	$19.62M	$21.24M	$21.72M
1990	$299.54M	$301.16M	$301.64M
Avg. (1990 - 1993)	$328.97M	$333.01M	$334.22M
Total Service Value (1990 - 1993)	$1,315.87M	$1,332.05M	$1,336.86M

Under all assumptions about SDy, the 1993 yearly service value is lowest when giving all employees average pay increases (Strategy 1), higher when giving high performers high pay increases and all others average increases (Strategy 2), and highest when giving high performers high pay increases, middle performers average pay increases and low performers low pay increases (Strategy 3). Compared to Strategy 1, which gives all employees average pay increases, Strategy 2 causes more high-performing and highly-paid employees to stay, and their value enhances the work force. Compared to Strategies 1 and 2, Strategy 3 augments this effect by encouraging low performers to leave, who are replaced with workers whose expected value is that of average workers.

Step 7: Combining The Components into Overall Results

We have estimated the three components for this decision: (1) the four-year stream of movement costs, (2) the four-year stream of service costs, and (3) the four-year stream of

service value. Now, we combine them to estimate the relative value of the three pay strategies, by taking the stream of service value and subtracting the stream of service costs and movement costs (Boudreau & Berger, 1985). The relevant figures are summarized in Table 11, for each strategy and SDy assumption.

TABLE 11: Computing of Four Year Investment Value of Different Pay Strategies

	Service Value	-	Service Costs	-	Movement Costs	=	Four Year Value
SDy = 20%							
Strategy 1	$1,279.68	-	$981.68	-	$71.21	=	$226.79
Strategy 2	$1,282.92	-	$990.37	-	$67.07	=	$225.47
Strategy 3	$1,283.88	-	$990.77	-	$68.39	=	$224.73
SDy = 40%							
Strategy 1	$1,288.73	-	$981.68	-	$71.21	=	$235.84
Strategy 2	$1,295.20	-	$990.37	-	$67.07	=	$237.76
Strategy 3	$1,297.13	-	$990.77	-	$68.39	=	$237.97
SDy = 100%							
Strategy 1	$1,315.87	-	$981.68	-	$71.21	=	$262.98
Strategy 2	$1,332.05	-	$990.37	-	$67.07	=	$274.61
Strategy 3	$1,336.86	-	$990.77	-	$68.39	=	$277.71

These results suggest a different conclusion from the cost analysis presented earlier. Strategy 1, which appeared optimal based on costs, now appears optimal only if one assumes that performance differences are relatively low (SDy = 20% of average yearly salary). If SDy is 40% of average yearly salary or the more probable 100% of average salary, Strategy 3 produces the greatest four-year value. When SDy = 100%, the Strategy 3 advantage over Strategy 1 is potentially as high as $14.7 million. Table 11 vividly shows the danger of relying simply on visible accounting costs. As we have noted, it seems likely that the service costs (e.g., pay, benefits, training) would be most visible to the accounting system. In this case, these costs produce the impression that Strategies 2 and 3 produce over 7 to 8 million dollars in additional costs for the four years. Movement cost reductions offset this by approximately three to four million dollars, but such costs are less likely to be apparent in the accounting calculations. Thus, it appears plausible that traditional compensation-cost analyses probably lead decision makers to the conclusion that performance-based pay systems will be extremely costly. When the potential benefits of workforce value are estimated, however, it becomes clear that such investments carry the potential for significant organizational improvement.

In this case, the decision to forego the performance-based pay system is appropriate only if decision makers are relatively certain that performance differences (SDy) among these high-level employees amount to only 20% of average salary per year. In other words, pay for performance schemes are less likely to be effective when the value of high performers is not much more than the value of average performers. At higher SDy levels, when performance differences are more pivotal, the risk of failing to implement performance-based pay can easily be far greater than even a large apparent cost.

Conclusions, Limitations, and Further Research

This analysis suggests that under realistic and moderately conservative assumptions about the value of performance variability (SDy) among employees, the four-year financial benefit of linking pay to performance in this organization was substantial. Continuing the prior policy of relatively non-differentiated pay levels seems to be appropriate only if decision makers believe that performance differences are relatively inconsequential (i.e., when SDy equaled 20% or less). If individual performance is of little consequence, or if pay is linked to a performance measurement system that fails to capture individual value differences, the costs of implementing a performance-based compensation plan may well outstrip both the savings in turnover transaction costs and any workforce quality enhancements. Under realistic assumptions of a positive relationship between performance ratings and value, and significant consequences of performance variability, the present model shows the potentially high payoff from investments in performance-based pay.

Moreover, the analysis shown here vividly illustrates the limitations of standard accounting and cost-based approaches for identifying the critical variables, and the appropriate strategy. The value of performance differences emerged as a pivotal factor in this decision, and this approach provides a tool to isolate this factor so that it can be analyzed in conjunction with the more apparent cost implications. Boudreau and Ramstad (1997, 1999) have noted the importance of understanding the “moments of truth” that link employee actions to strategic success. One manifestation of this link is the value of performance variability. The technique described here is one way to make the link between human resources and strategic success more tangible and usable for both researchers and decision makers.

Of course, these results reflect a particular set of organizational characteristics, such as pay plan specifics, the individual job performance distribution, and the relative value of differences in job performance ratings. This is appropriate to the intent of this paper, which was to demonstrate how turnover and compensation research findings could be translated through the movement utility model, to evaluate the impact of HR interventions. These particular results

may not generalize across all pay policies and organizations, and other organizations may have additional relevant cost and benefit factors. For example, we may have understated the dollar value implications of pay for performance. Rosenbaum (1979, 1984) and Forbes and Wertheim (1995) maintain that early career promotions predict later promotions and that those not promoted early tend to be eliminated from later competition. Thus, SDy values would be higher if SDy encompasses future career progress, rather than simply current job performance. This would increase the consequences of performance variation and result in further advantage for the pay for performance strategies. Essentially, the better-performing employees of today become the key leaders of tomorrow if they stay, or create significant leadership vacancies if they do not stay. Additionally, our utility analysis assumed no change in performance levels of the "stock" of employees, focusing instead on the effects of the pay system on the "flow" of employees into and out of the workforce. Yet, paying for performance may motivate employees to perform better. Such effects could increase the average level of performance for those who do not leave, which would also enhance the payoff for performance-based pay.

On the other hand, there may be additional training costs or administrative costs associated with the various policies, which we did not include. We believe such costs could easily be incorporated into this framework, and that the framework provides useful guidance on the role of costs in the performance-based pay decision. The method we describe involves a significant amount of calculation, but is relatively simple to replicate on a spreadsheet. Actual replication may require some customization to fit a specific company's profile, but the basic premise of the methods should be the same.

We hope that this demonstration will inspire organizations to more fully tap available research findings to help them enhance decisions about their HR policies. Organizations of all types will apparently face increasing pressures to "win the talent war" by employing all available tools to enhance attraction, selection and retention processes. A formidable tool in this endeavor is the accumulated knowledge available from industrial/organizational psychology and human resources research. The method described here shows how utility analysis can be used to demystify and integrate this research, making it a more practical decision-making tool, and thus a more potent influence on significant strategic organizational goals (Boudreau, 1991; Boudreau & Ramstad, 1999; Boudreau & Ramstad, 1997).

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Footnotes

[1] The Boudreau and Berger (1985) model in its purest form would calculate the work force value in each intervening year and apply a discount factor to equalize the time value of the dollar amounts. However, such embellishments would not have a significant effect in this case because the changes in dollar amounts are assumed to be linear, the time frame is relatively short, and our focus is on the relative (versus absolute) value of the different strategies. We also did not have information about the organizational tax rate, so we report our results in pre-tax dollars. After-tax effects could be easily calculated by multiplying the final results by an appropriate after-tax proportion, but the relative effects of the options would not be altered.

[2] There is no single accepted method of estimating the dollar value of average performance among workers or applicants. Some research has suggested that average performance value can be estimated equal to the average compensation of the work group (Boudreau, 1991, p. 654; Raju, Burke & Normand, 1990, p. 9). However, it seems unlikely that average-performing employees produce only enough value to offset their direct wage costs. Considering the other service costs that are incurred, and the need for organizations to obtain a positive return on costs, a higher level of average service value seems likely. Based on an analysis of wage and productivity estimates in the national income accounts of the United States, Schmidt and Hunter (1983) proposed assuming that the ratio of average dollar value to average wage is approximately 1.754.

[3] Support of the 100% approach is provided by Becker and Huselid (1992), who found direct observations of SDy fell in the 74% to 100% of mean salary range.