



# The measure of **PERFORMANCE**

*Industrial engineers are perfectly suited  
to manage human capital*

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WHILE HUMAN CAPITAL HAS ALWAYS BEEN A NECESSARY INPUT for business enterprises, the shift to a knowledge-based economy in the United States has increased its relative importance. Measurement practices in capitalist organizations have traditionally focused on the evaluation of capital and capital goods, but the value of the human element is being increasingly recognized.

The concept of human capital relies on seeing people and the knowledge, skills, and abilities they possess as critical assets to their organizations. This viewpoint requires thinking about how we manage and measure human capital in our organizations.

## Key issues

Our deficiencies in understanding human capital are significant. There is no wide body of applied research to draw on and there are no norms available for comparison. Managing human capital is much more than the sum of recruitment, training, performance management, and compensation — the traditional processes of the human resources function.

And measuring human capital is much more than assessing the effectiveness and efficiency of these key human resources processes. Recognizing human capital as an asset adds a new dimension of assessing total value and looking at the big picture.

There are several key issues associated with human capital:

- The shift to a knowledge-based economy and the corresponding need for highly educated knowledge workers has increased the relative value of key knowledge, skills, and abilities.
- The global availability of capital goods and goods-producing equipment has reduced the competitive advantage of traditional assets. Increasingly, the most sustainable competitive advantage is more productive human capital.
- An aging work force in industrialized nations is leading to future worker shortages, particularly for positions requiring college-level skills.
- Recruitment, retention, development, and motivation practices will likely have to be more varied to be effective in cultivating an increasingly diverse work force.
- Downsizing, re-engineering, temping, and outsourcing have eliminated loyalty from the employee-employer relationship.
- Organizational strategy, performance measures, and traditional financial reporting and controls must be integrated with approaches from human performance technology, industrial engineering, quality management, information technology, and related change management disciplines to address human capital at the enterprise level.
- Continual change in the enterprise, its environment, and technology prompts the need for ongoing retraining of the work force.
- Improvements must be made in the development and deployment of practices to measure the return on investment in human capital. Better decision supporting tools are needed to prioritize alternative investments and identify which initiatives and drivers must be emphasized to produce business results.

## Human performance technology

Studying and addressing human capital issues hasn't been left solely to the economists. The field emerged from multidisciplinary approaches to improving the value of human capital in organizations. Human performance technology evolved when instructional technologists realized that organizational instruction and training systems are ineffective or inappropriate without attention to other organizational factors.

The International Society for Performance Improvement defines human performance technology as a systematic multi-

disciplinary approach that stresses rigorous analysis of present and desired levels of performance, identifies causes of performance gaps, offers a wide range of interventions, guides the change management process, and evaluates the results. Human performance technology employs a design approach with proven methods to solve costly people-performance problems. Its models typically include a process and a list of potential interventions to address the problems identified. Like the basic engineering process, human performance technology models start with analysis of the situation and design of potential solutions before deciding on which techniques to employ.

Human performance technology parallels and complements the variety of engineering approaches used in industrial engineering to reconcile root cause problems. If total quality management can be viewed as a system for addressing the cost of nonconformance, then human performance technology can be viewed as a systems approach to addressing and quantifying the cost of nonperformance within the context of organizational and human behavior.

## The IE's role

One obvious place for IEs to contribute to the field of human performance technology and improve our approaches for managing and measuring human capital is performance measurement. For human capital, effective performance measurement needs to bridge the gap between individual performance measures and strategic performance measures.

Effective measurement of human capital must support strategy implementation as well as efficient operations. As high-value-creation opportunities shift from physical products to services and knowledge, IEs should do more to transfer traditional practices regarding measurement of physical products and processes to the information economy. Establishing cause-and-effect relationships among the many factors affecting human capital offers opportunities for modeling, simulation, and testing.

IEs study work, and the nature of work is changing. We must use our analytical skills and knowledge of human factors and work systems to apply the plan-do-study-act cycle to human capital. Some IEs are addressing human capital issues in their practice, but are we as a profession doing enough?

## Case in point

The organization in the following example is in the defense industry, exposed to constant changes in technology and work-

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load. Present were all the organizational and cultural issues with personnel that most organizations today have to deal with — low morale and job satisfaction, high sick leave, and a desire to increase worker productivity. A study was conducted to determine what factors served as motivators and demotivators in the work environment and to see if there were differences between various subgroups in the organization. The objective was to retrieve actionable data that could be used to make recommendations for improvements.

The population under review consisted of approximately 1,000 workers, including about 400 craftsmen, 50 engineers, 150 computer scientists, and 400 administrative and managerial personnel. One-on-one discussions with approximately 15 percent of the personnel were conducted using Frederick Herzberg's job attitudes patterned interview questionnaire. Herzberg showed that workers could articulate the kind of events that affected their performance either positively or negatively. He then found that there were two distinct categories of attributes that either motivated or demotivated people. He categorized these motivators and demotivators (which he termed "hygienes") into 16 factors that give management the insight needed to improve motivation and, therefore, productivity in an organization.

Groups were identified that might respond differently to organizational change, reflect different values and beliefs, and exhibit different motivational attributes. Descriptors of possible differences in language, artifacts, behavior patterns, underlying assumptions, and subcultures were reviewed with management. Five groups were targeted: wage (union, salaried, and non-exempt salaried), major departments, age, gender, and tenure.

Factors found to be predominate motivators were achievement, work itself, recognition, responsibility, possibility of growth, relations with peers, and relations with supervisors. Predominate hygienes were company policy and administration, relations with supervisor, recognition, communication, advancement, salary, job security, and work conditions.

The events cited most often as good experiences included promotions, new management, increases in responsibilities, recognition, getting important work done, and working in a cohesive group. Events cited most often as bad experiences included salary restructuring, job scope changes, new management, old management, loss of benefits, lack of respect, and changes in policy. The way people were treated by the organization affected their job satisfaction and performance.

Subcultures in the organization were evident by their

## HERZBERG'S INDICATORS

*Examining job attitudes with Frederick Herzberg's theory*

**Hygienes** do not lead to higher levels of motivation, but their absence can lead to dissatisfaction. Typical hygienes include company policy and administration, supervision, relationships with supervisors, relationships with peers, relationships with subordinates, work conditions, salary, personal life, status, and security.

**Motivators** result from internal generators in employees, yielding motivation rather than improvement. Typical motivators include achievement, recognition, work itself, responsibility, advancement, and personal growth.

Hygiene and motivation theory must be examined simultaneously. Treat people as best you can so they have a minimum of dissatisfaction. Use people so they get achievement, recognition for achievement, interest, and responsibility, and they can grow and advance in their work.



Source: [www.accel-team.com](http://www.accel-team.com)  
and [www.businessballs.com](http://www.businessballs.com)

distinctly different motivational attributes. For example, the 25-to-45 years of tenure subgroup had much lower dissatisfaction with recognition, salary, responsibility, relations with supervisors, and relations with peers than the groups with less tenure. These differences were particularly noticeable when compared to those with less than five years of service, who responded with significantly higher dissatisfaction for the same factors. Likewise, the 25-to-45 years of tenure subgroup showed higher motivation in relations with peers and with supervisors compared to those with less than five years. Those with less than five years found achievement and the possibility of growth the greatest motivational factors.

Information derived from the analysis was found to be actionable based on sound industrial engineering principles: treating people like the true resources they are, providing rewards and recognition consistent with the organization's goals and objectives; providing feedback so personnel know where they stand; and providing them with the tools, time, knowledge, and training necessary to get the job done. The organization's leadership was provided with 10 recommendations for interventions. Observed implementation of the recommendations three years later was then recorded to verify their effectiveness.

Recommendations to the organization's leadership were made in two main areas: those pertaining to the organization overall and those addressing specific subgroups of the organization. Of the 10 specific interventions recommended, six were implemented — five with successful, measurable results.

**Recommendation 1:** One of the most effective recommendations was to give people a process focus: Show them how the part they play is integral to the success of the mission, and show them the impacts of their actions. This recommendation was based on the data from the interviews that indicated the opportunity to do the whole job and meaningful work was second only to the successful completion of a job and seeing the results of work.

Implementation: A major initiative was launched to establish a performance measurement system that could reflect objectively whether the organization was meeting the goals established. These new measures included increased emphasis on performance at the department level, measuring things like cycle time, earned value, deliverables in a period, objectives met, and customer satisfaction. A much better focus on what was important was established, and the result was a consistent increase in customers' scores of the organization's service.

**Recommendation 2:** Set attainable goals for people to buy

into and own as individuals and teams. Analysis of the data from the interviews found that having responsibility was the fourth largest motivator of this organization.

Implementation: In addition to the goals set for each of the measures and the measures tied to the individual departments, these goals and objectives were tied into an employee performance planning system in 1999 whereby the organization's goals were translated to the individual level for all of the salaried and non-exempt salaried wage groups. Most of the objectives were met, and customer satisfaction increased.

**Recommendation 3:** Continue to expand recognition efforts, but do not overlook the role supervisors, team leaders, and managers play. This recommendation was based on the fact that work praised (with or without a reward) was the third largest motivational factor.

Implementation: Recognition was expanded to include not only those who submitted suggestions and employees of the quarter and year but also those who received additional job-related training and special job-related certifications, as well as those who showed excellent environmental stewardship and safety performance. The annual cultural survey the company administered showed employees' positive response to recognition rose consistently at approximately 2 percent per year during the years that followed.

**Recommendation 4:** Be cautious about changing or instituting new policies since these changes tend to be more dissatisfying than anything else. This recommendation was made due to the overwhelming responses depicting company policies and administrative procedures as the number one dissatisfier.

Implementation: Unfortunately, this is one area where the organization has continued to change things to try to save money. Sick leave, travel, and training policies have been changed without communicating them well to the work force, and these changes have been met with very negative responses.

**Recommendation 5:** Pay more attention to the needs and concerns of the non-exempt salaried personnel, particularly in the area of recognition. This recommendation was based on findings that this group had higher percentages of dissatisfiers than the other wage groups, especially in the recognition and supervisory relationship factors.

Implementation: The company has increased the non-exempt salaried sick leave and vacation benefits to match those of the other wage groups. However, no measurable results were observed.

**Recommendation 6:** Improve interpersonal relationships

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and communications within the central engineering department. This recommendation was based on the findings that interpersonal relations with supervisors and communication were much higher dissatisfiers in central engineering than in the other cost centers. The events cited by the participants were focused on their supervisor's behavior in the recent past.

**Implementation:** The central engineering cost center was reorganized at least twice since the interviews. Overall, personnel queried did appear to be more satisfied in their jobs.

**Recommendation 7:** Watch the workload in the supply support department, particularly purchasing. This was based on the finding that working conditions were a significantly higher dissatisfier in this department, with respondents citing that there was too much work (more than they could adequately accomplish). Achievement was recorded as a higher dissatisfier in supply support than in the rest of the cost centers, attributed to personnel not being able to achieve what they thought they could because there was too much work.

**Implementation:** Unfortunately, managers, supervisors, and employees have continued to perform well by increasing their productivity and been "rewarded with continued cutbacks," according to the manager. This department has been downsized by as much as 30 percent since the interviews and was not meeting its goals at the time of the observations.

**Recommendation 8:** Highlight recognition and advancement opportunities in the business systems department. This recommendation was based on the findings that advancement was the number one dissatisfier and recognition was the number two dissatisfier. This was the only cost center where this was found; personnel felt their work was not noticed and that they had been passed over for advancement.

**Implementation:** There have been many changes driven by turnover, both voluntary and involuntary. The business processes handled by this cost center have been radically re-engineered, so whether its performance has increased overall is hard to tell.

**Recommendation 9:** Continue to address the salary problem in information technology and watch for this trend in other areas. This recommendation was based on responses from the participants depicting salary as much more of a concern in information technology than in any other cost; in fact, the data revealed it to be the number two dissatisfier, tied with recognition.

**Implementation:** Shortly after the interviews, an effort was made to bring IT salaries in line with industry averages, as well as some of the other professional disciplines such as systems and design engineering. These issues no longer appear to be

that much of a problem, and presumably the downturn in the economy and the company's continued pressure to downsize have contributed to relief in these areas.

**Recommendation 10:** Be aware of the differences in the motivational and hygiene factors of the younger personnel. This recommendation was made in response to findings that personnel under the age of 35 were motivated significantly more by responsibility and the possibility of growth than the average. Recognition and interpersonal relationships with their peers also served as higher dissatisfiers than the norm.

**Implementation:** There do not appear to have been any specific initiatives made to address the younger age group. The company has tried to address better ways to attract, develop, and retain personnel in general, but again, with the downturn in the economy and continued pressure to reduce personnel, these efforts have been minimized.

In summary, this case study found that people in various subgroups of an organization have different motivational attributes, and understanding those differences can help managers, particularly engineering managers in a high-tech setting with a diverse work force. Managers can increase job satisfaction and motivation and increase productivity by focusing as much on the human aspects of the job as on the technical aspects. ❧

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