

A large, dotted line graphic that starts as a vertical line on the left, turns 90 degrees to the right, and then curves into a semi-circle pointing towards the title text.

How strategic personnel development can reduce operations costs

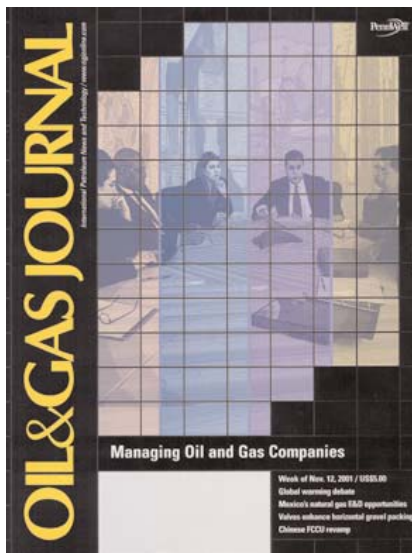
A White Paper

*strategic
personnel
development*

[performance]

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Innovative E&P companies are demonstrating that smart investment in personnel development can significantly reduce operations costs and help make their investments in hardware and technology more secure. Companies such as Shell Offshore, Inc., Conoco, Inc., Pan-Canadian Petroleum Ltd. and others have made major investments in personnel development as part of strategies to increase operations efficiency.

These investments appear to be paying off. Some of the companies are performing the same work with staff reductions of 30 percent or more, and seeing net reductions in operating budgets equal to or exceeding 15 percent. These personnel development programs can be as encompassing as enterprise-wide skill-based pay programs, or

How strategic personnel development can reduce operations costs

by Daniel Follette

focused on narrower objectives such as process safety management and preventive maintenance.

So why isn't everybody moving more money into personnel development? Personnel development programs have demonstrated their value, but few companies appear to notice. Companies that aggressively push the envelope in E&P technology often remain very traditional in the ways they address the development and use of operations personnel.

The primary reason appears to be limited awareness and understanding of personnel development in the executive suite—limited understanding of how programs work, how they generate dollars, how their potential contribution can be estimated and what are appropriate criteria for measuring program quality.

In addition, emphasis on immediate profitability means that availability of funds for personnel development is generally 180 degrees out of phase with recognition of the need. As a result, even modest programs capable of returning millions over the long run have been less successful in competing for available capital against flashier, more-familiar

investments in hardware, software, Web technology and fancier holes in the ground.

What is at stake

The stakes are high and go beyond cost savings to the very viability of E&P companies' technology investments and physical assets. All these assets rest in the hands of operations personnel. The diligence and skill of operations oversight and maintenance determine production reliability, reservoir health, equipment life and efficiency. Every company has had incidents that underscore this fact.

Losing core competencies as companies merge or downsize is a real risk. In many companies, the knowledge that backs the technology is not fully institutionalized and resides mainly in the minds of individual employees. When they leave, so do the skills.

To some companies, the staffing and operations efficiencies produced by personnel development programs are essential to their competitive position. Other strategic issues also demand consideration of personnel development programs:

- Retaining the knowledge of retiring workers
- Creating quicker turn around and payout on new assets and acquisitions

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- Minimizing the cost and productivity impact of bringing a new generation of operations personnel into the business
- Efficiently implementing new cost-reducing, production-enhancing technologies

What personnel development means

Many E&P executives equate personnel development with training. In fact, training is only a single element in a much larger strategy to reduce costs by more-efficiently supplying the manpower and skills required by the enterprise. A thorough strategy includes:

- Documenting and prioritizing all tasks needed to carry out a company's mission
- Optimizing work processes and implementing of best practices
- Assigning work tasks to field personnel more efficiently
- Identifying, documenting and delivering (on an as-needed basis) all information and tools relevant to job performance

In addition a comprehensive personnel development strategy may also:

- Define the skills required for each job position and create a means of competency verification (where competency is defined in observable, measurable terms).
- Provide training for each job position.

Strategic personnel development programs are not complicated

Creating an effective strategic development program boils down to six straightforward steps:

1. Explicitly and clearly define all the work you expect employees to perform; define it in terms of observable, measurable tasks.
2. Prioritize the work and allocate it in the

Creating clear work expectations critical to delivering performance

Whether you are simply writing a job description or trying to describe training skills, you must describe observable behavior to create any meaningful definition. Many programs have failed to deliver because the standards they establish for performance are vague or are so broad that they can be satisfied by almost any activity. (The following table demonstrates the difference between meaningful and trivial descriptions of work expectations.)

You can tell right away if any planned or existing program is likely to deliver performance by looking at how it defines work expectations: if they don't exist, are very broad, are vague, or simply list the names of equipment or activities, the company is probably not getting much benefit from the money it puts in the program.

Work expectations that don't deliver	
"Valve inspection"	This is only a topic. It says nothing about what an individual is expected to do. To a pipeliner, this may mean just driving by in a truck and confirming that there are no observable leaks or deterioration. To a lease operator, this may involve many tasks such as lubing and testing dump valve operation or separators.
"An operator must be extremely proficient in gas measurement"	What "extremely proficient" means is ambiguous. It could mean anything from changing charts, or observing proving to calculating Reynolds factors. To be effective, you must describe the exact actions the operator must perform.
"An operator will have a thorough understanding of lease operations"	The topic is lease operations. There is no definition of what would demonstrate a "thorough understanding." Any attempt to verify performance would be extremely subjective and therefore, neither fair nor consistent for all personnel.

Work expectations that communicate clearly	
"An operator will be able to trace the flow of produced gas, oil, and water through the facility on both a schematic diagram and on the actual equipment."	The objective states clearly observable behavior with conditions. A knowledgeable supervisor would be able to unambiguously verify successful performance.
"Locate, read, and interpret emergency shutdown system indicators."	Again, the expectations are clear. Further clarification could be provided by additional criteria such as the following: <ul style="list-style-type: none"> --Locate all 12 gauges on the system. --Compare readings with normal operating parameters. --Describe possible causes of abnormal pressures. --Describe what could happen when pressures are out of normal operating range.

3. Communicate all work expectations (responsibilities for specific tasks) to employees.
4. Document all relevant information about how to perform work; then deliver the information relevant to specific tasks, on demand, in a convenient format to employees performing the work.

5. Verify employee competence to perform assigned work; support employee development with skill-focused, on-demand training.
6. Provide incentives for competence or performance efficiency (optional, as in skill-based pay programs)

Figures 1 and 2 present a development schema for collecting the necessary

[Performance]

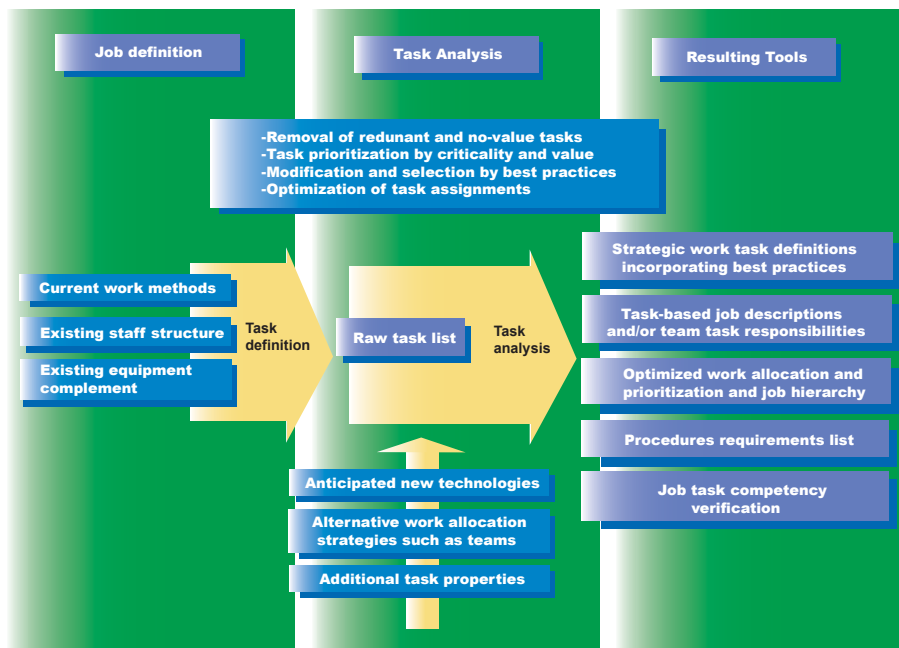


Figure 1: Task Analysis Process

information to implement a strategic personnel development program.

The value of defining work in terms of specific actions

The success of any personnel development program depends on unambiguous communication of performance expectations.

Effective personnel development programs are designed around task-specific definitions of work expectations rather than general descriptions of activities. Task definitions describe work in observable, measurable terms (see side box). Figure 3 shows a small part of a task-based operator job description that results from this kind of analysis.

Task definitions break work into discrete components that can be explicitly assigned to an individual or team and whose completion can be observed and confirmed. You may hear this kind of analysis called "task analysis," or more broadly, "behavioral analysis." It is a

simple, effective technology that has been in use over 25 years. Surprisingly, most training development has not been based on a formal behavioral analysis.

One result of defining responsibilities in terms of tasks is much greater accountability for preventive maintenance and production monitoring. Things don't get missed because a job description is like a punch list.

In contrast, typical production monitoring, preventive maintenance and repairs are generally prioritized and assigned on an ad hoc basis. For example, a person may be assigned to "lease monitoring" without any explicit definition of the monitoring tasks, frequency or range of measures. This kind of job description defines an activity, not an outcome. (For more information, see the side box). Any manager experiencing lapses in monitoring or PM work should consider defining and assigning tasks, not activities. Task based work can also help improve production data quality.

Evaluating the cost-benefit equation

By breaking work into individual tasks, managers can also analyze the costs of performing them, their value and relative importance. Some of the benefits of this analysis are more intelligent maintenance strategies and more efficient work allocation. When an operating unit has performed a task analysis, work can be prioritized on the basis of a broader perspective; and work allocation considers the most efficient use operations staff time. Companies that are successfully reducing operations cost have defined their strategies for work prioritization and allocation ahead of time. They have made cost/benefit comparisons between different scenarios and have institutionalized the optimum path.

By contrast, the activity-based definitions the industry generally uses can only tell managers the amount of resources consumed by a given part of the business. Descriptions of activity say nothing about the impact work efficiency or work quality has on the company. Nor do they define the relative benefit or priority of any work.

With tasks, you have a specific accomplishment and you can measure how much it costs to complete it. You can use that information to make decisions about how to more efficiently complete tasks.

For example, one company working offshore found it much more efficient to assign to operators certain tasks that had been handled by other crafts such as mechanical and instrument maintenance personnel. With some training, operators were able to perform the work and eliminate some trips to each platform. The cost of training was more than offset by the savings in transportation.

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Another company found that reacting immediately to every shut in was not as efficient as setting a production threshold for wells-below which, they waited until scheduled preventive maintenance runs.

Comprehensive task analysis can also facilitate root cause analysis to pinpoint the exact tasks on which performance failures occurred. The frequency and cost of failures on specific tasks can determine the need for training or other intervention. When the costs of failures are tied to specific tasks, companies can quickly see what a lack of knowledge or procedure or oversight really cost a company.

Comprehensive task analysis

Good work allocation decisions are best based on enterprise-wide task analyses that provide a complete model of the work to be performed by all personnel within the business entity. An enterprise-wide analysis lets managers see what really goes on in the field-- exactly what operations payroll is used for.

Generally a company's equipment and technology drive the majority of operations work with some additional tasks contributed by administrative procedures. Walking through an equipment list is an efficient way to look for most tasks. Those remaining come out of a mental review of a typical work month.

New tools help manage more efficiently

A company can use the raw task list to streamline operations and introduce new technologies. Even a cursory inspection of a set of tasks typically pinpoints unnecessary work and identifies important work that has been overlooked. It is not unusual for a company to discover the majority of tasks are assigned to the job position, "unknown," or to "operator" with no reference to level, tenure or skill.

By adding measures of importance or criticality, tasks can be prioritized. And with the entire scope of work defined and prioritized, it is easier to develop efficient job assignment strategies. Similarly, tasks will show where the company is using dated or less-than-optimal practices. Companies can easily introduce best practices by including the tasks that represent them.

The immediate product of task analysis is a very clear picture of what the company does

and how it does it. It lets companies determine what is the most efficient job hierarchy or reporting structure to allocate and monitor work. It permits very clear job assignments and accountability. When work allocation is based on comprehensive task analyses, work is less likely to get overlooked and more likely to be done in accordance with company procedures.

Task analyses also let companies better assess and manage their procedures. Companies can set criteria to determine what tasks must be guided by procedures, then link all relevant procedures to the tasks and identify the holes and procedures needing revision. The task listings can also be used directly to verify job competency.

In summary, task analyses provide:

- a clearer picture of what a company really does
- the ability to improve work processes
- very clear job descriptions and intelligent reporting structures
- guidance for development of procedures

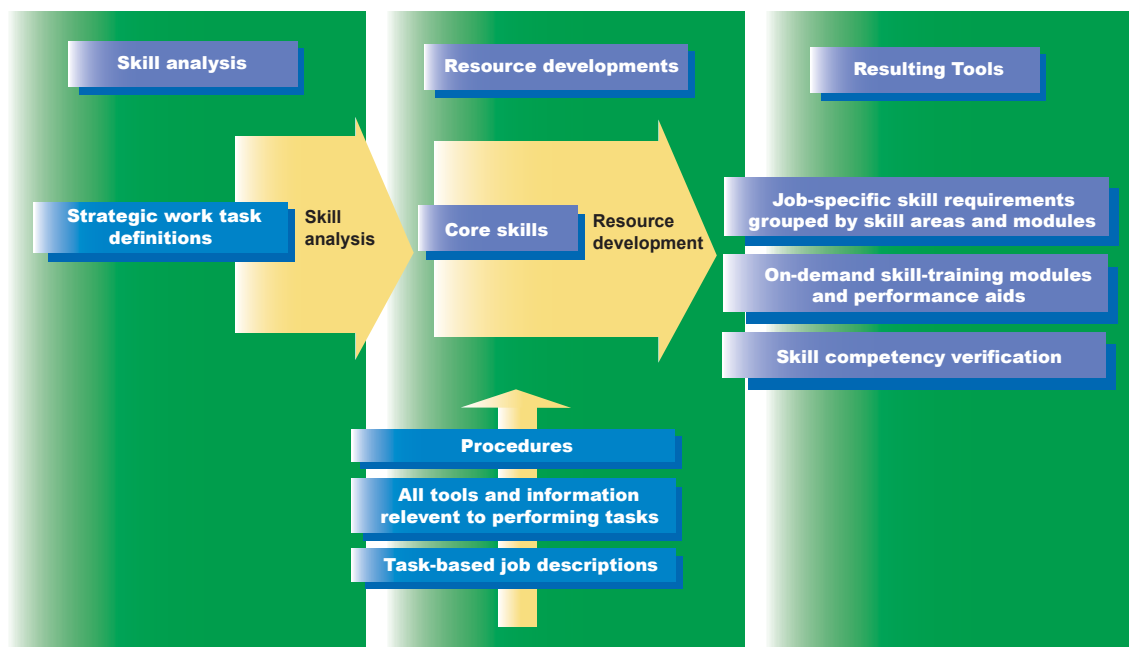


Figure 2: Skill Analysis and Knowledge Management

[Performance]

Figure 3: Task-Based Job Description
(Representative selection: Ellipses indicate omissions.)

Job description for position of level one operator position O-1

Position authorized by _____ Date: _____

Atmospheric vessels

Perform API corrosion inspection to determine minimum shell, roof, and bottom thickness.
Install new bearing plates on floating roof and fixed roof support columns.
...

Compressors

Perform start-up and loading operations for all standard gas compressor/driver types.
Perform shutdown and unloading for all standard gas compressor/driver types.

Drivers, reciprocating engine

Lubricate and adjust carburetor and governor linkages.
Perform condition-monitoring survey.
...

Drivers, turbine

Inspect governor and topping system.
Check diffuser tube o-ring and gasket for leaks.
...

Generators

Perform electrical protection system function test and calibration.
...

Instruments

Maintain orifice fitting.
Maintain and calibrate level switch.
...

Operations rounds

Perform daily operations check.
Observe LACT proving.
...

Safety devices

Adjust the zero control on a combustible gas detector.
Perform weekly preventive maintenance on ESD system, including push-pull station o-ring lubrication.
Perform external pressure test on PSV safety relief valve.
Inspect and calibrate toxic gas detection system.
Reset the fire loop system during start-up after an emergency shutdown.
...

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Authorized by _____ Date: _____
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- the ability to confirm job competence

Tasks guide definition of core skills

Strategic work task definitions are also used to define critical job skills. Skill definitions are communication tools that

provide a clearer description of job competence than tasks do. For example, competency assessments based on performance of tasks are very repetitive: Many steps in a variety of tasks will be identical. And often, memorized recall of tasks steps is unimportant. Much more important are the individual "pieces" of

knowledge that are necessary to successfully perform task steps. These skills include the analytical and manipulative abilities it takes to perform the work. Generally, teaching skills to employees is much more efficient and effective than rote training of individual tasks. Skill definitions also help training developers create focused, efficient training and produce competency testing.

Effective strategic performance management systems are driven by the employee and build in ongoing performance improvement. Job task and skill sets are readily available to employees through paper or electronic documents and software. Each employee can look up all job task responsibilities for his or her job title or team assignment. When an individual has located the specific task at hand, he or she can immediately identify and access any procedures, performance aids or other relevant tools.

Skill listings are directly linked to self-assessment tools, training modules and training resources. Employees can see what is required for their present job and for progression and can use self-evaluation materials, training modules and resources for each skill as needed. Figure 4 illustrates information flow in a strategic performance management system.

As employees use procedures or go through training or competency verification, they can provide feedback about the accuracy of procedures, effectiveness of training and fairness of verification to an oversight group. Typically the oversight group represents a vertical cross-section through the organization and may have specific subgroups for individual crafts or technologies.

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The oversight group is responsible for regular evergreen review of the program to make sure that any changes in the work environment are reflected in the way work is assigned and performed. They look at any new equipment and technologies to identify new tasks or tasks that must be modified. In turn, the tasks are reviewed to identify any new skill requirements or skills that are no longer necessary. They evaluate new tools and information for dissemination to the field. And they recommend modifications to job descriptions or work allocation that could improve work efficiency. Any changes to work practices can be implemented almost instantaneously through modification of the relevant documents in the company's knowledge repository.

Overcoming hurdles to personnel development programs

Three primary hurdles stand in the way of industry acceptance of investment in personnel development.

Personnel development technology must be seen as an important corporate skill set. To a large extent, operations are driven by the engineering. Equipment and technology, not psychology or team dynamics, are the primary operations competencies. Naturally, operations focuses on doing what it does best and the net result is that organizations are not exposed to state-of-the-art personnel development technology.

Personnel development usually falls to training departments. And most people who become trainers enter those positions because of extensive technical competence or for other

reasons that take them out of field operations. While accurate technical content is essential, personnel development programs require many other abilities. They include:

- The ability to analyze and optimize work processes
- The ability to define an organization's future technology and manpower requirements
- Fluency in current curriculum development, training delivery and competency verification technology

These skill sets are generally not represented in operations, at executive levels in E&P companies or even in training departments. In addition, training departments are generally given a peripheral role to operations. As a result, they generally do not have a voice in corporate personnel development strategy.

The result is that, because their position limits their effectiveness and their skill sets do not support the required work, operators, trainers or managers are generally not the best

people to design or implement personnel development programs. Firms must recruit manpower development talent and place it high enough in the firm to have impact.

Programs must be able to demonstrate return on investment to win funding

Training and development funding (and time) is generally seen as an operations expense and not an investment that can produce its own return. For example, most operations or asset managers would agree that training is important but generally need to be goaded when asked to contribute manpower or money for a specific project.

This prejudice is not entirely without basis. Operations personnel may have seen programs that, frankly, didn't deliver much. To line management, development often looks expensive, is of suspect value and interferes with operations.

For personnel development programs to flourish, they must be able to generate

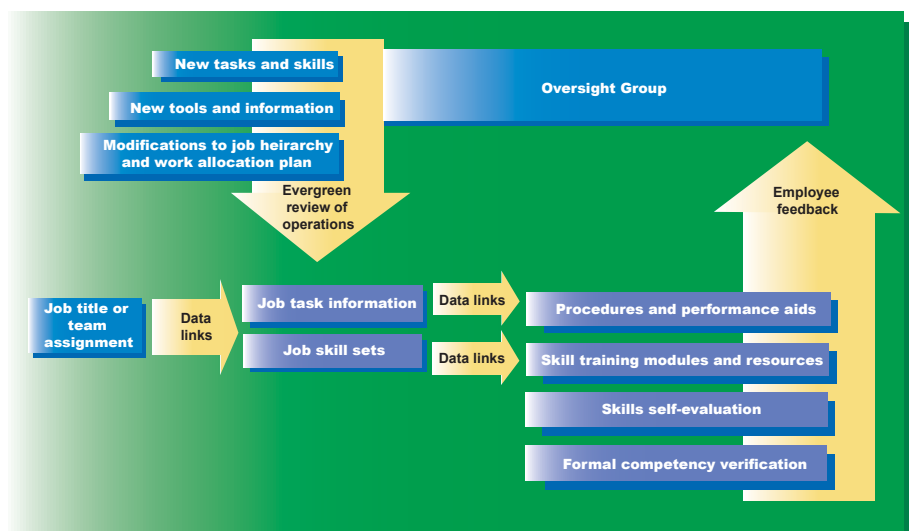


Figure 4: Information Flow in a Strategic Performance Management Program

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defensible financial justifications for their existence. Task-based work analyses help because they permit clear ROI analyses on personnel development programs. Managers can calculate the cost of performance failures on a task-by-task basis. They can then define corrective steps, estimate their costs and calculate the anticipated return. This is the kind of information the boardroom needs to move on personnel development programs.

Longer-range commitments are needed to supply funding when need is greatest

As mentioned earlier, budgets are out of cycle with need. When oil and gas prices are high people are more concerned with maximizing production than they are with increasing operations efficiency. It's when prices are a low that companies get concerned about squeezing every cent out of operations. And that, typically, is exactly when there is no

budget for personnel development to implement more efficient practices. When prices are down, cost control becomes all-important and effectively eliminates investment in manpower development. Only long-range planning and commitment can end this flip-flop. Companies must recognize that personnel development programs are long-range programs that should be viewed with a 3-to-5-year horizon. And that, in turn depends on clear financial justification.

Events make programs a strategic imperative

To understand the importance of personnel development, it's worth looking more closely at requirements that don't show up on the income statement every quarter.

Retaining the knowledge of retiring workers

The oilfield workforce is aging. Most companies have done the numbers and recognize they will be losing a lot of talent in the next five years. Unless they act, the knowledge of retiring workers is about to be lost. The cost of rebuilding that knowledge base may represent tens of millions of dollars for an individual company. A strategic personnel development program can serve as a true knowledge management system by capturing and disseminating employee knowledge and driving documentation of best work practices. Personnel development programs represent a means to preserve value for a company by documenting employees' collective knowledge.

Quicker turn around and payout

Speed counts in turning around new acquisitions or bringing new production online. A personnel development strategy produces a franchise-like template for operations and maintenance. It creates a plan that is logical

and easy to implement in new assets. Clear templates for management and personnel deployment can enable companies to absorb and profit from new assets more quickly.

Minimizing the cost and productivity impact of bringing a new generation of operations personnel into the business

Collective knowledge must also be transferred to new workers. To accommodate work schedules and satisfy budget constraints, training and development must be very focused and cost-effective. Strategic personnel development programs provide lower-cost development and delivery. Testing can exempt people from training where they are competent and help them identify the areas in which they need training.

Efficiently implementing new cost-reducing, production-enhancing technologies

Deepwater and other new production technologies require skills that can take time to develop. Too often, companies raid their existing organization (or competitors') and deplete the workforce in older operations. Companies need comprehensive plans to define and develop the skills their organizations will need internally. They need to be able to efficiently introduce new technologies and equipment into operations.

Remaining competitive

And not to forget the bottom line, new personnel development programs represent a way to capture lost income through intelligent deployment of a company's most adaptable resource—field personnel. Companies will need to bring new skill sets to their executive suites more effectively manage this resource. In return, they can expect enhanced operations efficiencies—and significant savings.