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HR METRICS AND WORKFORCE ANALYTICS

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EDITORS' NOTE

The capacity to effectively manage an organization's workforce limited by the type and quality of data available to managers. Better information provides a strong foundation for better understanding how HR can support the strategic direction of organizations. However, data alone are not the answer. As illustrated in this chapter, the best organizations will not simply collect more data. Instead, they will leverage data to solve key business problems. Rather than starting with the data, organizations should start with an HR or organizational problem or opportunity and determine what data are necessary to most effectively solve the problem or take advantage of the opportunity. Ultimately workforce analytics and big data are only as effective as the problems they are able to help the organization solve. This chapter offers a brief history of the efforts involved in the development of HR metrics and workforce analytics and of how these efforts have been enhanced by the advent of integrated HRIS. From benchmarking to operational experiments, the HRIS field is rapidly evolving on many fronts. These advances are changing how HR metrics and analytics are used in organizations and, subsequently, their impact on organization effectiveness.

CHAPTER OBJECTIVES

After completing this chapter, you should be able to

- Discuss why the information from numeric systems like HR metrics and workforce analytics may fail to generate value for an organization
- Discuss the roles that activities such as data mining, predictive analytics, and operational experiments play in increasing organizational effectiveness
- Discuss the differences between analytics used to assess efficiency, operational effectiveness, and organizational realignment, and offer examples of each
- Discuss why the objective of analytics efforts needs to be improving decisions and why doing so is critical to generating return on investment
- Discuss how a decision based view of HR can be used to identify important workforce analyses that can drive improved value in almost any organization.
- Describe what factors managers should consider when building workforce analytics capability in an organization

HRIS IN ACTION

When Dan Hilbert arrived as Manager of Employment Services at Valero Energy, he wasn't quite sure what he wanted or needed to do. Coming from a background in operations, he was used to having information about the effectiveness of all current operations; yet, as he quickly learned, these data were not available for HR operations and programs, nor were there systems in place to generate them. He recognized the potential value of having even simple descriptive statistics about the organization's people, and its operations—to highlight potential opportunities and how changes in these values could signal potential problems. However, since these data were not currently available or easily developed, he created a small team, consisting of one HR staff member, who could help get access to data from the organization's current systems, and a graduate student with a statistical background, who was hired as a part-time employee. The team's assignment was to collect data about the human

capital in the organization in an effort to learn more about the organization and its people, which Dan was now charged with supporting.

The team's analysis highlighted a unique characteristic of the Valero workforce—all of its refinery managers were at least 55 years old. This meant that these managers, each with long tenure in one of the most critical positions for assuring operating success, would be eligible to retire in fewer than 10 years. Further, given that these managers had all joined the company at roughly the same time and had held these refinery manager positions for many years, the promotion pipeline for succession to this position was limited. In other words, promising managers who had joined the organization at lower managerial positions decided to leave the company when it was clear that upward opportunities were limited.

When Hilbert presented the results of this analysis and his conclusions to senior managers, they were shocked. No one had considered the issue of the aging of refinery managers, and, likely, management would not have become aware of the situation until the refinery managers began to retire. By then, it would have been too late to develop internal replacements. Interestingly, as Valero's success increased and the stock price increased, the retirement age lowered, compounding the problem. The pipeline of trained managers capable of filling these positions internally would not have been sufficient to meet the demand created by the mass retirements, and the time to train them as refinery managers was lengthy. Here, the computation of relatively simple metrics and analytics provided new insights on the retirement status of employees. These data allowed management to engage in the training and development needed to build internal bench strength for this critical position prior to these managers retiring, likely saving the refiner millions in salary expense and reduced refinery performance.

INTRODUCTION

I have found that the largest single difference between a great HR department and an average one is the use of metrics . . . bar none, there is nothing you can do to improve yours and your department's performance that exceeds the impact of using metrics.

—John Sullivan (2003)

There are three kinds of lies: lies, damned lies, and statistics.

—Mark Twain

War is ninety percent information.

—Napoleon Bonaparte

Human resources (HR) metrics and **workforce analytics** have become a hot topic in organizations of all sizes. Interest is rising, and organizations are reaching out to learn more about useful metrics and analytics and how they can use them to improve organizational effectiveness. Although the use of HR metrics and workforce analytics is not new, various factors are driving increased interest. An important driver is the widespread implementation of integrated human resource information systems (HRISs) and the greater availability of information from third-party sources. Today's HRIS builds on the capabilities of faster and more capable computers, improved connectivity through organizational networks and the Internet, and the availability of user-friendly analytics software. These changes have fundamentally altered the dynamics of human capital assessment in organizations, driving the marginal cost of assessment lower, while providing the potential for near real-time analysis and distribution of information. These factors, combined with recent and growing interest in evidence-based management, account for the rapidly growing interest in HR metrics and workforce analytics.

A BRIEF HISTORY OF HR METRICS AND ANALYTICS

Systematic work on the development of measures to capture the effectiveness of an organization's employees can be traced as far back as the days of scientific management (Taylor, 1911) and industrial and organizational psychology (Munsterberg, 1913). Methods of quantitative analysis and its use in decision making were developed during the build-up of both men and materiel leading up to and during World War II. Further study and development occurred during the great post-war industrial expansion in the United States that continued into the 1970s. Many of the HR metrics used today were first considered and developed during this period (e.g., Hawk, 1967).

Widespread assessment of HR metrics did not occur until the pioneering work of Dr. Jac Fitz-enz and the early benchmarking work he conducted through the Saratoga Institute. In 1984, Fitz-enz published *How to Measure Human Resources Management,* currently in its third edition (Fitz-enz & Davidson, 2002), which is still a highly valued overview of many HR metrics and the formulas used to calculate them. A set of 30 metrics were developed through the joint efforts of the Saratoga Institute and

the American Society for Personnel Administration (ASPA), the forerunner of the current Society for Human Resource Management (SHRM). These metrics are listed in Table 14.1. Initially, HR metrics were primarily used to measure or audit aspects of HR programs and activities as described by Cascio (1987) and Fitz-enz and Davidson (2002). Next, metrics began to be used to measure HR effectiveness. SHRM has identified

TABLE 14.1 ■ Measures in the Saratoga Institute/SHRM Human Resources Effectiveness Report

Revenue per Employee
Expense per Employee
Compensation as a Percentage of Revenue
Compensation as a Percentage of Expense
Benefit Cost as a Percentage of Revenue
Benefit Cost as a Percentage of Expense
Benefit Cost as a Percentage of Compensation
Retiree Benefit Cost per Retiree
Retiree Benefit Cost as a Percentage of Expense
Hires as a Percentage of Total Employees
Cost of Hire
Time to Fill Jobs
Time to Start Jobs
HR Department Expense as a Percentage of Company Expense
HR Headcount Ratio—HR Employees: Company Employees
HR Department Expense per Company Employee
Supervisory Compensation Percentage
Workers' Compensation Cost as a Percentage of Expense
Workers' Compensation Cost per Employee
Workers' Compensation Cost per Claim
Absence Rate
Involuntary Separation
Voluntary Separation
Voluntary Separation by Length of Service
Ratio of Offers Made to Acceptances

Source: Adapted from Fitz-enz, J. (1995). *How to Measure Human Resources Management*, 2nd Edition. New York, NY: McGraw-Hill, Inc.

a number of metrics that organizations can use in this way. These metrics comprise the HR Metrics Toolbox seen in Table 14.2 (SHRM, 2010). For example, cost per hire, which can be calculated as Cost per Hire (CPH) equals the sum of external costs (recruiting) and internal costs (training new employees) divided by the total number of starts in a time period (SHRM, 2010). There are also more detailed approaches for the measuring and benchmarking of employees' behaviors such as turnover (Cascio, 2000), as well as for creating HR metrics for programs such as employee assistance and work-life programs (Cascio, 2000).

TABLE 14.2 ■ HR Metrics Toolkit (2010)

HR Metrics		
Absence rate	{(No. of days absent in mo.) / [(Ave. no. of employees during mo.) × (No. of workdays)]} × 100	Measures absenteeism. Determines if your company has an absenteeism problem. Analyzes why and how to address the issue. Analyzes further for effectiveness of attendance policy and effectiveness of management in applying policy. See Hollmann (2002).
Cost per hire	(Advertising + Agency fees + Employee referrals + Travel cost of applicants and staff + Relocation costs + Recruiter pay and benefits) / No. of hires	Costs involved with a new hire. Use *EMA/Cost per Hire Staffing Metrics Survey* as a benchmark for your organization (Kluttz, 2003). Can be used as a measurement to show any substantial improvements to savings in recruitment/retention costs. Determines what your recruiting function can do to increase savings/reduce costs, etc.
Health care costs per employee	Total cost of health care / Total employees	Per capita cost of employee benefits. Indicates cost of health care per employee. For benefit data from the Bureau of Labor Statistics (BLS). See BLS's publications titled *Employer Costs for Employee Compensation and Measuring Trends in the Structure and Levels of Employer Costs for Employee Compensation* (BLS, 2010) for additional information on this topic.
HR expense factor	HR expense / Total operating expense	HR expenses in relation to the total operating expenses of the organization. In addition, determines if expenditures exceeded, met, or fell below budget. Analyzes HR practices that contributed to savings, if any.

HR Metrics		
Human capital ROI	{Revenue – [Operating expense – (Compensation cost + Benefit cost)]} / (Compensation cost + Benefit cost)	ROI ratio for employees. Did organization get a return on their investment? Analyzes causes of positive/negative ROI metric. Uses analysis as an opportunity to optimize investment with HR practices such as recruitment, motivation, training, and development. Evaluates if HR practices have a causal relationship in positive changes to improving metric.
Human capital value added	{Revenue – [Operating Expense – (Compensation cost + Benefit Cost)]} / Total no. of FTE	Value of workforce's knowledge, skill, and performance. This measurement illustrates how employees add value to an organization.
Prorating merit increases	(No. of mos. actually worked / No. of mos. under the current increase policy) × Increase in percentage the person would otherwise be entitled to	The basic steps to calculate an employees' pay increase appropriate to the period of time worked.
Revenue factor	Revenue / Total no. of FTE	Benchmark to indicate effectiveness of company and to show employees as capital rather than as an expense. Human capital can be viewed as an investment.
Time to fill	Total days elapsed to fill requisitions / No. hired	Number of days from which job requisition was approved to new hire start date. How efficient/ productive is recruiting function? This is also a process measurement. See *EMA/Cost per Hire Staffing Metrics Survey* for more information.
Training investment factor	Total training cost / Headcount	Training cost per employee. Analyzes training function further for effectiveness of training (e.g., Has productivity increased as a result of acquiring new skills and knowledge? Have accidents decreased?). If not, evaluate the causes.
Training (ROI)	(Total benefit – Total costs) × 100	The total financial gain/benefit an organization realizes from a particular training program less the total direct and indirect costs incurred to develop, produce, and deliver the training program (see white paper Four Steps to Computing *Training ROI* [Lilly, 2001] for more information on this topic).

(Continued)

TABLE 14.2 ■ (Continued)

HR Metrics		
Turnover costs	Total of the costs of separation + vacancy + replacement + training	The separation, vacancy, replacement, and training costs resulting from employee turnover. This formula can be used to calculate the turnover cost for one position, a class code, a division, or the entire organization. *Exit interviews* (Drake & Robb, 2002) are a useful tool in determining why employees are leaving your organization (see white paper *Employee Turnover Hurts Small and Large Company Profitability* [Galbreath, 2000] for more information on this topic). Implements retention efforts. Evaluates if HR practices are having a causal relationship in positive changes to improving cost of turnover.
Turnover rate (monthly)	(No. of separations during mo. / Avg. no. of employees during mo.) × 100	Calculates and compares metric with national average, using business and legal reports at www.bls.gov/jlt/home.htm. This measures the rate at which employees leave a company. Is there a trend? Has metric increased/decreased? Analyzes what has caused increase/decrease to metric. Determines what an organization can do to improve retention efforts. Evaluates if HR practices have a causal relationship in positive changes to improving metric. (See white paper titled *Employee Turnover: Analyzing Employee Movement Out of the Organization* [Ofsanko & Napier, 1990].)
Turnover rate (annual)	[(No. of employees exiting the job / Avg. actual no. of employees during the period) × 12] / No. of mos. in period	Calculates and compares metric with national average, using business and legal reports at www.bls.gov/jlt/home.htm. This measures the rate at which employees leave a company. Is there a trend? Has metric increased/decreased? Analyze what has caused increase/decrease to metric. Determines what organization can do to improve retention efforts. Evaluates if HR practices have a causal relationship in positive changes to improving metric. (See white paper titled *Employee Turnover: Analyzing Employee Movement Out of the Organization* [Ofsanko & Napier, 1990].)

HR Metrics		
Vacancy costs	Total of the costs of temporary workers + independent contractors + other outsourcing + overtime – wages and benefits not paid for vacant position(s)	The cost of having work completed that would have been performed by the former employee or employees less the wages and benefits that would have been paid to the vacant position(s). This formula may be used to calculate the vacancy cost for one position, a group, a division, or the entire organization.
Vacancy rate	(Total no. of vacant positions as of today / Total no. of positions as of today) × 100	Measures the organization's vacancy rates resulting from employee turnover. This formula can be used to calculate the vacancy rate for one position, a class code, a division, or the entire organization.
Workers' compensation cost per employee	Total WC cost for year/ Average no. of employees	Analyzes and compares (e.g., Year 1 to Year 2, etc.) on a regular basis. You can also analyze workers' compensation further to determine trends in types of injuries, injuries by department, jobs, and so forth. HR practices such as safety training, disability management, and incentives can reduce costs. Use metric as benchmark to show causal relationship between HR practices and reduced workers' compensation costs.
Workers' compensation incident rate	(No. of injuries and/or illnesses per 100 FTE / Total hours worked by all employees during the calendar year) × 200,000	The "incident rate" is the number of injuries and/or illnesses per 100 full-time workers. 200,000 is the base for 100 FTE workers (working 40 hours/week, 50 weeks/year.) The calculated rate can be modified depending on the nature of the injuries and/or illnesses. For example, if you wished to determine the lost workday case rate, you would include only the cases that involved days away from work.
Workers' compensation severity rate	(No. of days away from work per 100 FTE / Total hours worked by all employees during the calendar year) × 200,000	The "severity rate" is the number of days away from work per 100 FTE. To calculate the severity rate, replace the number of injuries and/or illnesses per 100 FTE from the incident rate calculation with the number of days away from work per 100 FTE. More information is available regarding the types of injuries, incident rates, and comparison with other SIC codes at www.bls.gov/iif/oshdef.htm#incidence.
Yield ratio	Percentage of applicants from a recruitment source that make it to the next stage of the selection process (e.g., 100 resumes received, 50 found acceptable = 50% yield)	A comparison of the number of applicants at one stage of the recruiting process with the number at the next stage. (*Note:* Success ratio is the proportion of selected applicants who are later judged as being successful on the job.)

Kaplan and Norton's (1996) introduction of the **balanced scorecard** (see Chapter 8) further refined managers' thinking about metrics. The balanced scorecard recognizes the limitations of organizations' heavy reliance on financial indicators of performance. Such measures focus on what has already happened rather than providing managers information about what *will* happen. Balanced scorecards focus on developing leading indicators of performance from several important perspectives, including customer satisfaction, process effectiveness, and employee development, as well as financial performance. In addition, the thinking required to develop balanced scorecards help managers identify causal sequences believed to lead to critical organizational outcomes.

About the same time, Huselid's (1995) work on high performance work systems demonstrated that the systematic management of human resources was associated with significant differences in organizational effectiveness. This work provided evidence that human resource management did indeed have strategic potential. Becker, Huselid, and Ulrich (2001) helped bring these ideas together in the HR scorecard, which highlights how the alignment of HR activities with both corporate strategy and activity improve organizational outcomes.

LIMITATIONS OF HISTORICAL METRICS

Unfortunately, while the computing, communications, and software infrastructure supporting HR metrics and analytics has undergone dramatic change since the late 1990s, the metrics themselves have not. Current computing operations are capable of capturing data on a wide range of electronically supported HR processes, extracting, analyzing, and then distributing that information in real time to managers throughout the organization. However, currently popular HR metrics were developed before current computing infrastructures existed. As a result, the metrics organizations utilized were primarily a function of what data most organizations could easily and inexpensively gather. A quick perusal of the metrics listed in Table 14.1 highlights the early emphasis on readily available data, most of which came from accounting systems.

Consequently, these metrics emphasize costs or easily calculated counts (e.g., head count, turnover) that often serve as proxies for costs. Every managerial decision, though, has **cost and benefits consequences**, whether we recognize them or not. As a result, when metrics and analytics systems only provide information about costs, they are of limited value to managers. If managers are only provided information about costs, with little or no information about benefits, costs are likely to become the primary driver of managerial decisions. This perpetuates the still common perception of HR as a "cost center." Thus, information on benefits from a managerial decision must also be known in order to conduct an estimated return on investment (ROI) for the decision.

Second, early metrics efforts often aggregate data to the level of the organization. As such, they offer limited information that could be used to identify and diagnose within-organization differences. Organizational turnover rates, for example, are heavily

influenced by the turnover rate in the organization's dominant job category, masking particularly high or low turnover rates for jobs with fewer incumbents.

Finally, early efforts only provided data after events had occurred. These "feedback" metrics result in slow responses to problems or opportunities. Feedback metrics can be effectively used to signal problems, but they are suboptimal as a primary source of data because they do not support real-time remedial action to minimize any negative effects.

CONTEMPORARY HR METRICS AND WORKFORCE ANALYTICS

Understanding Workforce Analytics Practices

Workforce analytics has become an umbrella term that encompasses a wide range of activities and processes that are expanding and evolving. Examples of the most practices in workforce analytics are introduced in the paragraphs that follow:

HR Metrics

HR metrics are data (numbers) that reflect some descriptive detail about given processes or outcomes, for example, success in recruiting new employees. In the domain of human resources, these often reflect attributes of the organization's HR programs and activities, or related outcomes, such as the number of applicants attracted, turnover rate, headcount, or the cost of conducting training programs.

Workforce Analytics

Workforce analytics refer to strategies for combining data elements into metrics and for examining changes in metrics or the magnitude of relationships among them. Such analyses can inform managers about the current or changing state of human capital in an organization in ways that impact their decisions. Understanding what opportunities and problems managers face can suggest relevant analyses that can support better decisions. These analyses then determine what metrics the organization needs, what data elements are relevant and need to be captured, and how these data elements should be combined.

Benchmarking

Benchmarking is a method of creating useful comparisons. The Saratoga Institute was the first systematic effort to develop information on standard HR metrics to inform management about human capital. Benchmarking data is useful in that it provides insights into an organization's relative standing or insight into levels of outcomes that might be possible. However, a challenge in using HR metrics for benchmarking is that an organization's human resource practices and the use of its HR staff reflect current challenges facing that organization. As a result, most organizations have an HR department, but the specific functions performed by these departments vary widely across organizations. Consequently, direct comparisons of external HR benchmarking data

to one's own organization may not provide realistic evidence of relative standing nor provide guidelines for either goal setting or forecasting the potential effectiveness of the remedial actions an organization might undertake.

Data Mining and "Big" Data

Interest in mining human capital data has been on the rise since the implementation of integrated HRIS and digitized HRM processes. **Data mining** refers to efforts to identify patterns that exist within data and that may identify unrecognized causal mechanisms that can be used to enhance decision making. To identify these causal mechanisms, data mining uses correlation and multiple regression methods to identify patterns of relationships in extremely large datasets. An example would be the identification of a correlation between employee job satisfaction and employee turnover. Data mining has a number of important applications, but the caveat with its use is that it can also uncover spurious or nonsensical relationships (e.g., older employees have longer tenures; taller employees make better leaders).

Current interest in **Big Data** reflects efforts to analyze the extremely large datasets created by many transaction systems. Often these datasets can be many terabytes (2^{10} gigabytes) or more. Many Web-based applications and transaction sites, like those generated by Amazon.com, Google, and many social media sites generate large numbers of transactions. Mining these very large data sets can uncover patterns that provide additional insights for managers about customer preferences or process characteristics that managers can use to drive greater sales, higher customer satisfaction, and reduce costs. In many cases, this process involves analyses of quantitative data as well as qualitative analysis of unformatted text.

Big data is often seen as valuable because it offers volume, variety, and velocity. It offers **volume** because it provides large amounts of data on which analyses can be based. In most cases, data sets as large as several hundred or thousand instances are sufficient to identify useful trends, although there are instances where very large volumes of data may permit additional insights. Big data offers **variety** through access to a wider range of data elements. New insights may be generated by incorporating new types of data into analyses that were previously not available to the organization. A caution here, though, is that organizations have a tendency to conduct these analyses independent of the existing data that managers currently use to make decisions. Social media, for instance, can be mined to identify characteristics of applicants who may be high performers, but the more important question is whether these data provide incremental validity for selecting employees beyond the practices organizations are currently using to make hiring decisions. **Velocity** refers to the speed at which data can be generated. Velocity is the big data characteristic most likely to consistently create value for organizations. With respect to big data, velocity refers to how quickly organizations can generate data on which to conduct analyses—shortening decision cycles.

Predictive Analyses

Predictive analysis is the goal of many metrics and analytics efforts. Predictive analysis involves the creation of models of organizational systems that can be used to (a) predict future outcomes, (b) estimate the effect of changes in environmental influences, or

(c) estimate the consequences of proposed interventions. If, for example, the organization discovered a correlation between employee job satisfaction and turnover, HR could use these data to begin to suggest modifications to the employees' work situation that might yield increases in job satisfaction as a means of reducing turnover. Predictive models could then estimate the potential effects of these interventions, leading to more effective estimates of effects. Efforts to develop balanced scorecards are examples of elementary predictive systems. They involve identifying leading indicators of important organizational outcomes and the nature of the influences and processes expected to determine those outcomes. Engaging in efforts to test the assumptions in these models over time can lead to enhancements in the quality of the models' underlying predictive analyses, either by identifying additional leading indicators or by better specifying the nature of the relationships between predictors and outcomes.

Operational Experiments

The evidence-based management movement argues that managers should base their decisions on data drawn from the organization and evidence about the actual functioning of its systems, in lieu of personal philosophies or untested models and assumptions about "how things work." One of the most effective methods for developing the evidence on which to base decisions is through **operational experiments** conducted within the organization. Ayres (2007) describes how Google uses operational experiments to test the effectiveness of the ad words used on its Web site. Rather than simply relying on intuition or "expert judgment" about which ad wording is more effective, it creates an experiment. It configures its site to alternate the presentation of competing ad text to visitors to its site and then tracks the number of "click-throughs" on the ad for a period of time. Given the large number of daily hits, Google can get objective data on the effectiveness of the various ads in a relatively short time and then adopt the ad wording demonstrated to be most effective.

Workforce Modeling

Workforce modeling attempts to understand how an organization's human capital needs would change as a function of some expected change in the organization's environment. This change may be a shift in the demand for the organization's product, entry into a new market, divestiture of one of the organization's businesses, or a pending acquisition of or merger with another organization. This process builds on and enhances a human resource planning (HRP) program, which is covered in more detail in Chapter 9.

HR METRICS, WORKFORCE ANALYTICS, AND ORGANIZATIONAL EFFECTIVENESS

Changes in the data available to organizations allow them to take advantage of today's more capable assessment infrastructures. However, despite reporting more metrics with greater frequency to a wider group of managers, many HR professionals who generate

HR reports question whether these efforts have had a significant impact on organization effectiveness. Often, these individuals report frustration with their inability to get managers to (a) tell them what information they need, (b) read or use the HR metrics data included in existing reports, or (c) even acknowledge receipt of the reports. These perceptions point to fundamental challenges and opportunities to improve the impact of workforce analytics efforts.

A Common and Troublesome View

Many managers perceive the increased interest in metrics and analytics as simply a mandate to compute and report more metrics. The assumption behind this perception is that assessing and reporting HR metrics results in better organizational performance. But it is not clear that generating and reporting more HR metrics will necessarily result in better individual, unit, or organizational performance. In fact, these links are not well established.

Further, a common misperception is that the objective of workforce analytics is to extract value from HR data. In this approach, the process starts with the HR data and the objective is to use that data to create metrics. These metrics can then be combined in various analyses that can then be reported to managers who use the information in these analyses to drive decision making. This view was dominant in the development of many metrics and analytics over the last decade. However, the problem with this approach is that it is not clear, from just looking at the data, which data elements are relevant, and there is no basis for guiding how they should be combined into metrics, or how those metrics should contribute to analytics. These approaches have two common and predictable outcomes. First, individuals tasked with developing and reporting HR metrics in organizations struggle to determine which metrics to report and how those metrics should be calculated. Second, as a result of the first outcome, these organizations subsequently report large numbers of metrics—because there is no a priori basis for choosing which are likely to be more useful—and the vast majority of these metrics ultimately have little or no impact on decision making and, therefore, offer no return to the organization.

A more effective approach is to start with the problems or opportunities faced by the organization and develop an understanding of what information is likely to be useful to support managers' decisions. An understanding of the problem to be addressed permits organizations to determine effectively the analysis that is most likely to be useful for improving decision making and organizational effectiveness. These analyses then determine which metrics are needed, which specific data elements are needed for those metrics, and how the data elements need to be combined to create the metrics. The differences between "data first" versus "problem first" approaches is dramatic. The latter is more focused; analyses are targeted at specific managerial decisions, increasing the likelihood that the analysis will impacting decision-making while simultaneously reducing costs because fewer metrics need to be calculated and reported.

Maximizing the Impact of Workforce Analytics Efforts

An emphasis on improving managerial decisions changes the dynamics driving analytics efforts; that is, it raises the bar. It is not simply good enough to "do" metrics and

analytics. These activities need to be approached in a way that increases the possibility that access to the information from these efforts will change managerial decisions, making them more effective. A fundamental problem is that many of the currently popular HR metrics do not provide a clear impact on important managerial decisions. More effective workforce analytics efforts are those that attend to both the potential contributions and costs of analyses.

Each workforce analysis effort has a potential return on investment; therefore, those individuals in organizations responsible for managing workforce analytics efforts need to recognize and attend to the potential return on investment dynamics of workforce analytics efforts. The challenge is to identify the analyses that provide managers with the information they need to make better decisions regarding the acquisition and deployment of an organization's human capital.

HR metrics and workforce analytics comprise an information system, and information systems can only have an impact on organizations if, as a result of the information they receive, managers make different and better decisions than they would have without that information. No information system, including HR metrics and analytics, generates any return on the investment unless managers change their decision behavior for the better. It is not simply good enough for analyses to confirm decisions that managers were already going to make. Although managers may feel better, the organization is no better off than they would have been otherwise. If managers do not make different and better decisions as a result of the information reported to them, the time and effort expended in conducting and reporting HR metrics and analytics is wasted.

If managers must make different or better decisions, it is useful to examine how this might occur. Decisions can be different in three ways. First, and most common, managers can make a different (and better) decision than the one they would have made before they received the results of the analysis. Second, managers can improve decision making by making the same decision they would have made before receiving the information, but they can make that decision sooner. Making the decision sooner can accentuate the benefits to the organization. Third, managers can improve decision making by not making a new decision when one is not required. In some instances, managers can misinterpret data, confusing random variability with systematic changes, and conclude a change in practice is needed, when in fact it is not. Intervening when a system is under control generally results in a reduction, rather than an enhancement, of outcomes. The use of control charts is a good example of a decision support tool that can help managers recognize earlier when a process is heading out of control allowing them to intervene sooner, but which also helps managers differentiate between normal variation in outcomes that are inherent in a process and systematic change in the system that requires intervention.

Triage in Evaluating Workforce Analysis Opportunities

There are many ways that workforce analytics can be focused in organizations. However, it is important to recognize that while many analyses many require roughly the same amount of analyst time and effort, not all opportunities to apply workforce analytics in an organization offer the same potential return on investment. In fact, the potential

returns to investments in workforce analyses can vary dramatically. In large organizations that are just introducing workforce analysis, there are likely to be many analysis opportunities that can generate returns of hundreds or thousands of dollars. But there will opportunities that can return hundreds of thousands or millions of dollars for the same analyst effort. Organizations that want to generate greater impact from their investments in analytics, need to develop the capacity and discipline to recognize large analytics opportunities and focus their analysis there.

SO WHERE ARE THE BEST WORKFORCE ANALYTICS OPPORTUNITIES LIKELY TO BE FOUND?

One approach to isolating better opportunities is to focus on the right workforce analytics domains. Broadly, workforce analytics efforts fit in one of three categories: HR process efficiency, operational effectiveness and strategic realignment. Each represents a separate domain in which organizations can and do conduct workforce analytics.

HR Process Efficiency

Currently, a substantial amount of workforce analysis and reporting addresses HR **administrative process efficiency.** These metrics focus on how well the HR department (and/or the broader organization) accomplishes critical HRM processes that support organizational effectiveness. Metrics in this area might include cost per hire, days to fill positions, percentage of performance reviews completed on time, and HR department costs as a percentage of total costs or as a percentage of sales. In many cases, base-level proficiency in HR process efficiency analytics is viewed as necessary to create credibility for HRM managers within an organization. However, in many cases, how well HR processes are executed has only limited potential to impact organization effectiveness. How well HR processes are executed is important, but often less critical than assuring that the organization has the right processes in place to support the organization's objectives.

Operational Effectiveness

Operational effectiveness analyses focus on organizational process improvement. Here, the objective is to identify opportunities to improve operational outcomes through improved human capital interventions. Often this requires analysts to utilize the technical competence of the HR professionals. For example, this could include using analyses to help managers determine whether changes to recruiting, selection, employee deployment, training, job design, employee motivation or engagement, development, or retention could help managers more effectively accomplish their objectives. These outcomes are outside of HR; they are the business units' operational metrics (i.e., percentage of on-time deliveries, operational downtime, lost time accidents, units sold, or cost per unit).

Analysts in these instances play a consultative role in helping identify opportunities to use HR interventions to improve the operational effectiveness of other units of the organization,

Strategic Realignment

Strategic realignment involves the set of activities most commonly known today as human resource planning (HRP; for more detail, see Chapter 6). These planning efforts focus on both long-term plans to ensure replacement of the labor power needed to operate as an organization as well as planning for needed strategic changes in the organization. Boeing, for example, engages in a number of efforts to ensure that it will have sufficient numbers of engineers available to staff operations in future years, as the company faces the approaching retirement of a large portion of its engineering workforce. Strategic realignment also extends the use of HRM analytics to planning for new situations and circumstances. New situations and circumstances occur when an organization undergoes a strategic change in direction, such as through merger, acquisition, divestiture, or entry into new geographic or product markets. The ability of the HR department to estimate the future demand for and supply of needed human capital is largely driven by changes in organizational strategy, and this ability to forecast these future needs is crucial to the survival of the organization.

In sum, all three areas of expertise are important, but the emphasis of workforce analytics in organizations is shifting from HR process efficiency to operational effectiveness and with that shift, organizations increase the potential impact of workforce analysis on organizational outcomes. HR managers must first be able to demonstrate their capacity to use metrics and analytics to manage their own operations well, and only then will others be more likely to listen to their recommendations. HR managers and professionals must also work closely with their business partners in operational departments to help improve their capability to achieve their desired outcomes. Using workforce analytics to improve strategic realignment is less developed in most organizations than analyses in the other two domains, but ultimately these analyses, when done well, may have the greatest potential effect on an organization's bottom line.

Starting With the End in Mind

A key to generating impactful workforce analyses is to begin by identifying big problems or opportunities. An effective approach to surfacing potential problems is to identify, either through existing data or discussions with managers, those areas of greatest challenge or opportunity in the organization. Once these areas of opportunity are identified, the next step is to identify the organizational outcome associated with that opportunity; understanding what outcome variable would change if the organization was to solve the problem or capture the opportunity. Example outcome variables might be sales, levels of scrap, on time shipments, etc. The second step is to represent that outcome using numbers. This set will be easier if the organization has existing metrics. If not, raw data may need to be collected and the appropriate metric combining that data may need to be developed. Third, if possible, we would like to attach dollar values to differences in the

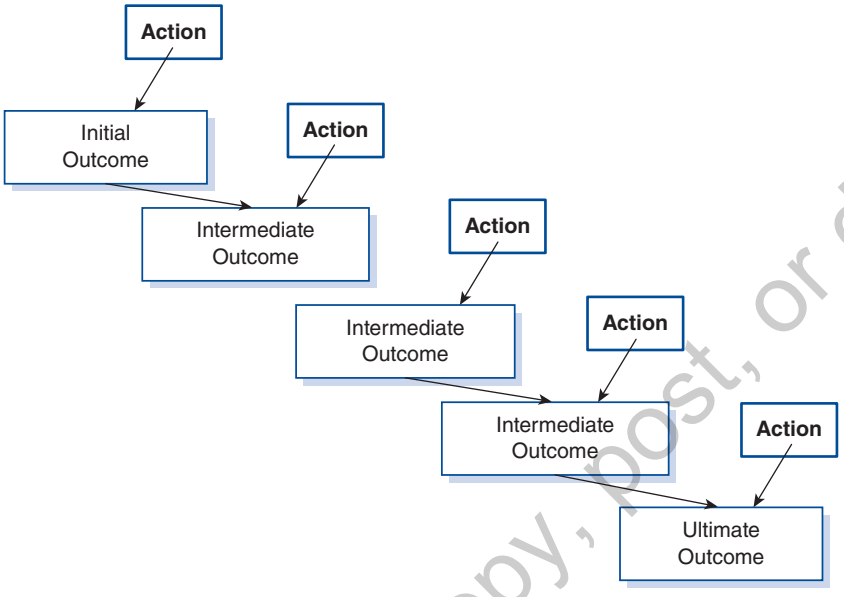
values of these outcomes. Sales are already in a dollar metric, but the value of on-time shipments may require some additional thinking to develop an understanding of how it impacts revenue or costs.

These data are critical when triaging analytic opportunities. Triage is the process of examining available analytics opportunities to determine which should receive priority. By examining data on the level and distribution of existing outcome data, it is possible to identify where there may be opportunities to raise the average outcome (and by how much) or shift the distribution of outcomes (e.g., eliminate low outliers) and from these data estimate how much the organization might gain from tackling each analytics opportunity. It is important to remember that many workforce analytics projects will likely consume roughly the same amount of analyst time. But the potential differences in benefits will differ dramatically across potential projects. Thus, the potential benefits, rather than the likely cost of conducting the analysis is likely to be more critical in triage decisions. Organizations should encourage analysts to spend their time on projects with very large opportunities. This is also important because not every analysis will completely solve the problem. But capturing only half of the value from a $5 million opportunity, though, will still substantively benefit an organization.

Once an analyst understands the important outcomes, the focus then shifts to (1) understanding the factors that influence those outcomes, and (2) identifying available intervention options and their costs. The system of factors that influence outcomes of interest (e.g., a downturn in the economy on sales) and the types of available interventions and their effects (e.g., changing a sales incentive system) are not always well understood in organizations. Many organizational systems have multiple sources of influence, and many organizational processes are actually sequential systems of intermediate outcomes. Each outcome may be subject to a number of influences and each outcome is likely the result of a process into which managers can intervene. These sequential processes can often be depicted as shown in Figure 14.1. Here interventions or influences in early outcomes create new starting points for downstream processes, which can be further impacted by subsequent influences and decisions. In many cases, it is often useful to determine whether a chosen outcome is an intermediate outcome, or the ultimate outcome of a process. A quick test is to ask yourself why you care about this outcome? If the answer is that it directly leads to increases in revenue, reductions in cost, or some combination thereof, you may have an ultimate outcome. If not, it is important that the analyst continue to ask *why* questions until the ultimate outcome can be identified.

This process is particularly important in workforce analytics because human resource interventions (i.e., changes in practice) almost never directly change an ultimate outcome. In most cases, the objective of the intervention is to cause some change in employee behavior (i.e., their actions and/or decisions) that impact an outcome, which many sequentially influence one or more additional intermediate outcomes before impacting the ultimate outcome. An important challenge to human resource managers and business partners is attempt to understand these sequences. Frequently, the exact sequence of expected effects of many human resource management interventions are not known. This can lead to the following caricature of human resource interventions:

FIGURE 14.1 ■ Action–Outcome Sequence to Identify Important HR Metrics



We engage in Intervention X, which will improve intermediate outcome Y, and "then a miracle occurs" and we become more profitable. Limits in this understanding can lead to incorrect decisions about appropriate interventions and can result in managers not getting the outcomes they expect. In those instances, analysts should work with managers to surface the assumptions associated with the causal sequences expected from interventions so that the validity of these hypotheses can be tested.

AN EXAMPLE ANALYSIS: THE CASE OF STAFFING

Up to this point, the chapter has focused on the role of metrics and workforce analytics to support HR and employee-related decisions. In addition, it discusses how to best develop them and where they can most effectively support the organization. At this point in the chapter, we focus on a specific context in which metrics and analytics can be applied, walking the reader through an example of their use in support of the staffing function.

Carlson and Connerley (2003) discuss how staffing can be framed as a sequence of decisions, rather than a sequence of processes. Their Staffing Cycle Framework highlights a sequence of seven high-level decisions that occur in staffing every position in an organization. These decisions, listed in Table 14.3, cover the time period from the initial intent of individuals and organizations to enter into employment relationships, through the matching

processes associated with making and accepting job offers to the decision by individuals or organizations to end these employment relationships. In staffing, these decisions are not seen as joint hiring decisions, but as a sequence of decisions in which control shifts between job seekers and the organization. In Table 14.3, the following decision events (D1, D3, D5, and D7) are controlled by job seekers, which decision events (D2, D4, and D6) are controlled by organization decision makers. When they are not in a control of a decision, the job seeker or organization decision making acts as an influencer of those decisions.

TABLE 14.3 ■ Seven Core Decisions in the Staffing Cycle (Carlson & Connerley, 2003)

Decision Event	Description
D1	The job seeker's decision to enter the workforce (to begin actively seeking employment). In the United States, just over half of the population is a part of the workforce (employed or actively seeking employment).
D2	The organization's decision to create a position that it wants to hire an individual to fill. A key aspect of this decision is the organizations decision about how the job will be designed, compensated, incentivized, located, and supervised. In many cases, these decisions can substantial impact the success of subsequent staffing outcomes.
D3	The job seeker's decision to apply for the organization's position. In the United States, applicants must make an affirmative decision to seek a specific position within an organization. Carlson, Connerley, and Mecham (2002) argue that this decision is likely the most critical in staffing as it determines who can potentially be hired. Influencing better quality recruits to apply increases the potential impact of the cycle (achieving a high-quality hire). If high-quality applicants do not apply, they cannot be hired, and no subsequent action in the staffing cycle can replace this lost potential value. Recruiting is efforts by the organization to influence these job seekers' decisions.
D4	The organization's decision to extend an individual a job offer. This is the domain of selection. Organizations increase value by using more valid and cost-effective selection procedures.
D5	The job seeker's decision to accept a job offer. While we can offer individuals positions, not all of them may accept them. Top candidates that fail to accept job offers represent lost value; the value of that loss is determined by the difference in the potential to contribute to the organization between the top individuals that do not accept offers and the lesser-rated candidate who eventually accepts.
D6	The organizations decision to retain an employee. Framed in the negative, this is the organization's decision to dismiss an employee, or involuntary turnover. This may happen if the organization no longer needs the position (the opposite of D2), or the individual is unable to perform in the position that is acceptable to the organization. This decision in framed in the positive to acknowledge that the organization's evaluation of the individual is ongoing throughout their employment.
D7	The job seeker's decision to remain in a position. Framed in the negative, this is a person's decision to leave a position (but not necessarily the organization), or voluntary turnover. Retention programs are efforts by organizations to influence these decisions.

This framework is useful for guiding workforce analytics efforts in staffing because it identifies key intermediate outcomes in the sequence of staffing decisions that can be evaluated and helps identify the critical component processes (and roles of the key players) in influencing these outcomes. For example, consider the outcomes of decisions D3, D4, and D5.

Evaluating Recruitment Effectiveness (D3)

D3 is the decision by job seekers to apply for a position. The outcome of that decision from the organization's perspective is the creation of an applicant pool. Applicant pools have attributes that can be used to determine how good the outcome of D3 is for the organization. Traditionally, this is often evaluated by examining the number of applicants attracted. Having enough applicants to ensure that the position can be filled is an important outcome of recruitment. But not only does the organization want the process to result in a hire, but they want to hire an employee who, through their work, will be able to maximize value contributed to the organization. Thus, not only does the organization want to attract applicants, but they want to attract high-quality applicants. Further, because every applicant that applies will require at least some amount of expense to process their application and candidacy, the organization does not want large numbers of low quality applicants. Table 14.4 offers an example of a workforce

TABLE 14.4 ■ Analysis of Quality of Applicants Attracted by Requisition ID

Req_ID/ SCORE	←10	10s	20s	30s	40s	50s	60s	70s	80s	90s	100s	110s	Total Apps
22473		37		52	73	68	27	32	21	8	1		319
23473	32	8	16	5	5	26	80	63	6				241
27453	22	7	2	4	3	23	69	30	1				161
25106	17	3	2	2	1	10	50	27	5				117
23549					1	9	19	38	29	15	3		114
27158						8	18	37	28	16	3		110
27160								32	59	19			110
32159						8	18	14	6	1	2		49
30060		9		2	1	8	11	9	4				44

analyses that provides insight into the quality of recruitment outcomes for a position in an organization. This analysis includes information about the number of applicants attracted for each job requisition and an estimate of their quality (e.g., capacity to contribute in this job).

These data highlight substantial differences in recruitment outcomes across requisition IDs and show that the number of applicants attracted to a job listing (requisition) may not be strongly associated with the number of high-quality applicants in the pool. For instance, Requisition 22473 resulted in the most applicants (n = 319), but generated slightly fewer high-quality applicants and substantially more low-quality applicants than requisitions 23549, 27158, or 27160. These types of data can be used to guide decisions regarding recruiting processes, particularly with respect to how organizations might alter the content of their recruiting messages and channels to alter the distribution of quality scores in future requisitions. For instance, an organization may seek to replicate the recruiting outcomes, like those for 27158, or even improve upon these results. Carlson, Connerley, & Mecham (2002) offer guidance for helping organizations that currently do not generate quality scores for all applicants to do so.

Evaluating the Effectiveness of Job Offer Decisions (D4)

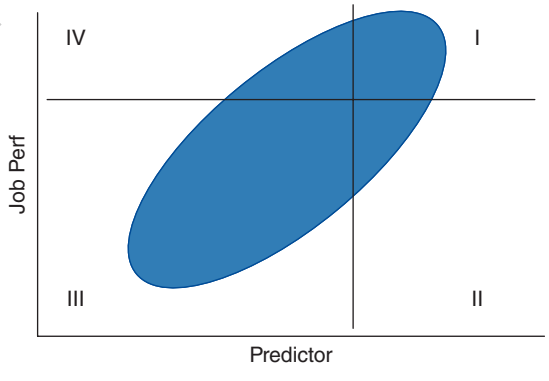
D4 is the organization's decision regarding who among those who have applied will receive job offers. As noted above, the outcomes of D3 represent the starting point for D4 selection processes. Consequently, the outcomes of D3 have downstream effects on the outcomes of selection decisions. The objective of selection is to identify the applicants who will be the best performers; however, because the selection activities have costs, the objective is to optimize selection decisions in light of these costs. We know from selection research that an optimal set of selection devices can be identified for any job (though that optimal set will not guarantee perfect selection decisions). To maximize selection validity (i.e., making the most correct hiring decisions), the strategy that maximizes validity is to administer all useful selection devices to all applicants and then aggregate scores optimally across these devices. Offers should then be made first to those individuals with the highest scores.

Although this approach maximizes validity, it also maximizes cost. Therefore, organizations seek methods to find an optimal combination of validity and cost. One common approach is the use of multiple hurdle selection systems. In multiple hurdle selection, organizations administer one or a few devices at a time to applicants, identify high scorers (and dismiss low scorers), then administer the next device, retain high scorers and so on until all useful devices have been used. This minimizes costs because not every device is administered to every applicant. However, validity is lost because not every device is equally valid, so individuals who score high on some devices may not score high on others. Consequently, applicants that may ultimately be top performers get dismissed during the process. This is further exacerbated by the incentive to use lower costs devices early in the sequence when there are lots of applicants to process. However, lower-cost selection devices also typically have lower validity, which increases the likelihood of losing high-quality applicants early in the process.

The objective of workforce analysis in support of selection decisions is to help organizations first understand and then improve the validity of their selection practices. Validity refers to the association between scores on a predictor (selection device) and future job performance. The validity of a selection practice is typically evaluated by examining how individuals' scores on the selection device (i.e., a resume review, standardized test, interview, etc.) correlate with future job performance scores. Consider for example, a situation where the predictor and future job performance are correlated $r_{xy} = .50$ (Figure 14.2).

Figure 14.2 uses an oval to represent where within the plot area the greatest density of points will occur with a correlation of $r_{xy} = .50$. The horizontal and vertical lines divide the X and Y axes respectively into low versus high scores on the predictor and low versus high scores on the outcome, with high scores being to the right or above the lines respectively. In Figure 14.2, the intersection of these horizontal and vertical lines divides the area in the diagram in to four quadrants. Quadrant I represents people who scored high on the predictor and were hired and who were also high performers on the job. Quadrant III represents people who did not score well on the predictor and, therefore, where not hired, but would have been poor performers had they been hired. Thus, Quadrants I and III represent correct hiring decisions. Quadrant II represents individuals who scored well on predictor, but will not be high performers on the job; these are false positives. Quadrant IV represents people who do not score well on the predictor and were not hired, but had they been hired would have been high performers; these are false negatives. Both Quadrant II and IV represent hiring mistakes. The proportion of hiring mistakes here is indicated by the proportion of the area in blue that falls in Quadrants II and IV. Higher selection validity results in a tightening of the distribution of points, reducing the number of instances falling in Quadrants II and IV.

FIGURE 14.2 ■ Stylized Scatter Plot Depicting the Distribution of Data Points for a Selection Processes That Has a Validity for Predicting Future Job Performance of $r_{xy} = .50$



To evaluate selection device validity, the organization requires data on the correlation between applicant scores on selection devices and their future job performance. As readers may recognize, organizations are unlikely to hire all individuals in an applicant pool, so the organization will not have performance scores for all applicants. There are several imperfect solutions to this challenge. First, organizations can examine the magnitudes of relationships between predictor scores and outcomes for the data they do have (i.e., job performance for hires only). This can be a potential solution when the organization hires large numbers of individuals for a given position. Second, organizations can choose to rely on selection devices that have been developed by outside organizations for which large scale validation studies have been conducted. Here evidence of validity generalization can be used to estimate the validity of devices for positions in a given organization. Schimdt and Hunter (1998) provide evidence of the validity of a number of common selection devices. While methods for estimating the validity of selection devices may yield imperfect results, organizations should not be dissuaded from developing the best data they can to help improve the validity of selection procedures.

Evaluating Job Acceptance Performance (D5)

Finally, organizations want to maximize acceptance rates of applicants. Job acceptance performance refers to the extent to which the organization is able to influence their preferred candidates to acceptance of job offers. In our staffing example, an outcome of D4 is a list of individuals to whom the organization is willing to make job offers. If all preferred candidates accept the offers extended, job acceptance performance is maximized. Often that is not the case. A traditional means of assessing job acceptance is through a yield ratio, the ratio of offers accepted to offers extended. For example, an organization that extends five job offers for a particular position and has three of them accepted would have a yield ratio of .60 or 60%. Organizations seek to maximize yield ratios.

A yield ratio does have limitations though. Specifically, yield ratios assume that every job offer that is accepted and, likewise, every job offer that is declined, have the same impact on the organization. That is rarely true. Not everyone who is extended an offer is necessarily expected to produce the same on-the-job performance. Further, if the organization has a given number of positions to fill, failing to gain acceptance of an offer often means that an offer will need to be extended to the next-higher-scoring applicant pool that, by definition, is perceived to have lower potential. The difference in performance potential between the first-choice applicant and the person who eventually accepts the offer reflects the loss that occurs by not gaining an acceptance from the preferred candidate.

The magnitude of the opportunity that exists for improving job acceptance results is gauged by the number of individuals who do not accept offers and the difference in job performance potential between initial offerees and the individuals that ultimate accept positions. If an organization experiences few instances of rejected offers, or who recruits sufficient numbers of highly rated applicants such that there is little difference in performance potential between original offerees and accepters, then there may not

be opportunities to substantively improve job acceptance practices. On the other hand, job acceptance results are poor and poor recruiting results in few high-scoring applicants, then improving job acceptance results may be an important opportunity for the organization.

The following example illustrates these effects. The data in Table 14.5 represent applicant scores for the top 10 applicants for a position for two different job requisitions. The three top-scoring individuals from each applicant pool will receive offers. Now consider the following scenarios. First assume that the top applicant in each pool does not accept their offers, while Candidates 2 and 3 do. In response to the nonacceptance, the organization offers the fourth best candidate who then accepts. The amount of regret in each case can be initially scaled by the difference in applicant scores between the nonaccepting top scoring applicant, and fourth best applicant who accepts. In Pool 1, the presence of several high scoring applicants results in a modest loss of six points (i.e., [1st – 4th] 108 – 102). In Pool 2, which has the highest overall scoring applicant, the smaller number of top scoring applicants results in a more substantial loss of 25 points (i.e., [1st – 4th] 110 – 85).

Consider the alternate scenario where job acceptance performance is worse, resulting in the first, second, and fourth best applicants do not accept offers, but the third, fifth, and sixth do. In Pool 1, this results in a loss of 20 points (i.e., [1st – 4th] 108 – 102 + ([2nd – 5th] 107 – 99) + ([4th – 6th] 102 – 96) = 20). However, in Pool 2, the result is a more substantial loss of 52 points (i.e., [1st – 4th] 110 – 85 + [2nd – 5th] 102 – 81 + [4th – 6th] 85 – 79).

Analyses like these can be useful for every organization. Ideally, organizations would attempt to estimate more precise value of differences in scores in dollar increments, though in many cases, this may not currently be feasible for at least some positions in

TABLE 14.5 ■ Job Acceptance Performance Analysis

Score Range	Pool 1 Applicant Scores	Pool 2 Applicant Scores
110–120		110
100–110	108, 107, 105, 102	102
90–100	99, 96, 95, 92, 90	93
80–90	87	85, 81
70–80		79, 76, 73
60–70		67, 65
50–60		

every organization. But the value of working toward such estimates is easily seen in these examples, particularly when gauging the amount of investment an organization should be willing to make to intervene to capture opportunities of different magnitudes. But, even in the absence of dollar valued estimates of score differences, these analyses can be very useful. They provide guidance that is more conceptually correct than commonly used alternative metrics and score differences are directionally correct and the magnitudes have at least ordinal interpretations—bigger differences in scores represent bigger opportunities for improvement.

Assessing the Financial Impact of Staffing Decisions: Utility Analysis

Thus far, the staffing analyses that have been described examine changes in intermediate staffing outcomes, such as increases in applicant quality, increased acceptance rates of first choice job offerees and retention of high performing employees. Although improving these outcomes is important, these metrics do not provide an outcome that is readily interpreted in dollars that can be directly compared to changes in costs. Estimating the contribution of better performance on intermediate outcomes to organizations can be challenging. Boudreau's (1989) discussion of utility analysis provides an initial step toward estimating the value of the greater contributions of better employees to organization effectiveness. Utility analysis requires three pieces of information. The first is an estimate of where applicants fall in the distribution of potential employee performances. The can be estimated imperfectly by the relative location of an applicant's quality score in the distribution of all applicant quality scores. The second is an estimate of how imperfect the estimate of applicant quality is likely to be. This is provided by the estimate of the validity of the selection procedure. The third piece of information is an estimate of the value of differences in job performance. Jobs that have high autonomy, where individuals have greater capacity to determine what they will do and how it will be done, have greater potential for increasing the variability in outcome. Done really well, those decisions create the potential for high outcomes, but done poorly, there is also the potential for very poor outcomes. Low autonomy positions tend to produce more consistent results. High responsibility increases the potential impact of each decision, perhaps because it involves more dollars or impacts more people, further increasing the difference in the value of high versus low performance. These can be estimated by subject matter experts, or in the absence of these data, a rough estimate can be develop using salary data as shown below.

In utility analysis, differences in the value of better employees can be determined by estimating the difference between the location of two employees in the distribution of all employees. This can be done by calculating a standardized difference in applicant scores (i.e., ΔZ = [Score of Applicant 1 – Score of Applicant 2] / Standard deviation of applicant scores). If standardized differences are calculated, the value of these differences can be estimated if we know the difference in contribution we might expected for a one standard deviation difference in job performance. In utility analysis, this is known as the standard deviation of job performance in dollars (SD_y). This value will vary across jobs according to a number factors including the amount of autonomy and responsibility

assigned to the job. In the absence of more specific information, an initial estimate of SD_y can be developed by multiplying .4 times salary. So, for a job with a salary of $50,000, this approach would yield an estimate of SD_y = $20,000. Given these inputs differences an initial rough estimate of differences in job performance could be estimated using the following formula:

$$\text{Utility} = \Delta Z * r_{xy} * SD_y$$

Therefore, for two applicants with scores of 110 and 90 for a device for which the standard deviation of applicant scores is SD = 20, a selection device with validity of r_{xy} = .50, and who are applicants for a managerial position with an annual salary of $50,000 an estimate of the difference in job performance per year would be calculated as follows:

$$\text{Utility} = (110 - 90)/20 * .50 * (.40 * \$50{,}000) = \$10{,}000$$

Thus, when triaging selection analysis opportunities, greater opportunity comes from (a) high volume of hires, (b) low validity of current selection processes, and (c) the value of the standard deviation of performance for a given position. These data can then be evaluated in conjunction with data on the validity and cost of various alternative selection processes. Thus, workforce analytics can be used to put a tangible cost or benefit value to the hiring decision based upon the score on a selection device.

BUILDING A WORKFORCE ANALYTICS FUNCTION

Getting Started

When undertaking a metrics and analytics effort, the first question the organization needs to answer is, what problems in the organization are worth solving or what opportunities for enhancing organizational effectiveness exist? Organizations are awash in opportunities for increasing effectiveness. Choosing to spend time on projects with a greater potential return to the company makes good business sense. Given that most organizations' capabilities in HR metrics and analytics may not be well developed at this point, focusing on a limited number of potentially high-payback opportunities may be the best strategy as organizations develop their workforce analytics capability.

Understanding *Why*

Management scholars have theories of how organizations work. Most organizational members have their own personal theories regarding how their companies work. These theories provide a framework for identifying potentially important information, focusing attention on environmental stimuli, and strengthening the capacity to identify the tactics that can be used to solve problems. However, choices for outcome measures to

assess are often based on personal theories about how things work in the organization, theories that may not reflect reality. For example, company employees often identify intermediate outcomes, such as implementation of flexible work hours (flextime) or changes in supervisors, as outcomes of interest. Intermediate outcomes are those that are more immediate indicators of things that employees believe lead to more important outcomes, for example, changes in the two previous intermediate outcomes leading to a "much happier" workplace. However, in some cases, the intermediate outcomes may not be the best ones on which to focus. This situation occurs when changes in decisions impact intermediate outcomes but do not have the expected impact on the ultimate or distal outcomes.

An important test of the appropriateness of intermediate outcomes is the *why* test. When one considers a potential outcome variable, it is useful to ask why the organization is interested in that particular outcome. If the answer is because it impacts some other variable that influences an important outcome, then care must be taken to ensure that changing the intermediate (or proximal) outcome also impacts the distal outcome. Organizational factors such as pay and working conditions that have influence through their effects on intermediate variables are reasonable targets for assessment, particularly if we understand the subsequent impact these factors have on ultimate, distal, and more important outcomes. Often, changing factors such as pay and working conditions will impact intermediate outcomes but may not produce any effect on the ultimate outcome of company profitability. Therefore, when analyzing intermediate outcomes, it is important to determine whether the intermediate outcome is limiting the performance of the ultimate outcome.

Employee turnover of valued employees, for example, is often identified as an important organizational outcome due to the costs associated with it (Cascio, 2000). It is among the most frequently assessed and reported HR metrics in organizations. Most managers agree that excessive turnover is a significant problem. High levels of turnover are disruptive to operations and can cause organizations to lose the critical expertise and capabilities of employees that leave. The answer to *why* turnover is important is that it disrupts operations and leads to potential loss of knowledge and important skill sets. But, in many cases, it is not clear whether the departure of specific employees actually results in decreasing profits. In some cases, a departing employee is replaced by a stronger performer, which will enhance profits. At a minimum, asking why helps highlight the potential causal sequence through which these intermediate variable effects are expected to have their influence. These analyses can highlight which metrics are likely to be more critical and provide a framework for understanding how change in these metrics should be interpreted. Building the capacity to understand the causal sequences through which interventions have their effects is an important capability for an organization's workforce analysts.

Putting HR Metrics and Analytics Data in Context

Reporting HR metrics data alone is ineffective in leading to improvement in managerial decision making. Data points representing important organizational outcomes become useful when the decision maker can attach some meaning to them. Often data will need

to be placed in context. For example, knowing that an organization's turnover level for newly hired management trainees is 13% is more meaningful when it can be placed in the context of the organization's previous turnover history for this position. Is turnover rising or falling for this position, and if so, how quickly? Reporting trend information for metrics is one way to provide the context that gives meaning to the data, thus creating useful information.

Benchmarking is a second means to putting data in context. Data on metrics from other organizations in the same industry can provide information that offers insight into an organization's performance relative to its peers. However, not all companies are organized in the same way. As a result, and particularly for HR metrics, how the HRM function is structured in an organization can have a significant impact on the value of HR efficiency metrics. A department with a more centralized structure of HR functions typically has lower efficiency metrics than HR departments structured such that more of the responsibility for HR processes and activities exists in operating units. As a result, HR benchmarking data need to be considered in the context of how the organization has structured the HR function. Senior management needs to ensure that the HRM function is supporting organizational effectiveness. Then, the HR organization can be structured in order to maximize HRM effectiveness in supporting organizational objectives. HR effectiveness measures can then be maximized within the context of that structure. For these reasons, internal rather than external benchmarking will often provide more appropriate data for establishing operational objectives for the HR efficiency benchmarks. Although external data are useful, care needs to be taken to understand how HR functions and activities are structured in the organizations providing these data.

Reporting What We Find

Reporting Metrics incorporates decisions about (a) what metrics will be reported; (b) how these metrics will be packaged; and (c) how, (d) when, and (e) to whom they should be reported. Effort has focused on attempting to identify what metrics an organization should use. However, trying to identify what metrics should be reported without considering an organization's problems and opportunities misses the reasons for the metrics. How metrics should be reported focuses on depicting metrics for decision makers so that the "message" relevant to them has a greater probability of being understood.

How questions deal with choosing between distributing metrics to decision makers using e-mail or creating opportunities for decision makers to extract metrics as needed. This latter approach can be done by posting the metrics on company Web sites.

When questions deal with the timing and frequency of metrics reports. In some cases, reporting is currently done annually, quarterly, or monthly. Some organizations are also considering the possibility of real-time updating for some metrics.

To whom questions address who receives metrics data? To date, it is most common for metrics and analytics to be reported first to senior executives. However, there is a growing recognition that managers at lower levels of the organization may be able to make more immediate use of the information contained in these data in order to assist in tactical, operational decisions.

HR metrics and workforce analytics information can be reported in a number of ways. Generally, a combination of "push" and "pull" means of communication will work for most organizations. Push communications channels, such as e-mail, actively push information and analyses to the attention of managers. These channels are used for information that is time critical or that the manager is unaware of. **Push systems** are excellent for getting information to decision makers. However, sending irrelevant or poorly timed information through push systems can contribute to information overload and reduce managers' sensitivity to messages. As a result, they may only skim the information sent through push systems or, even worse, not attend to it at all.

Pull systems are ways of making information available to managers so that they can access any of it at a point in time when it will be most useful for their decision making. Examples include (1) posting HR metrics and analytics analyses and reports on internal company Web sites, (2) offering access to searchable information repositories, or (3) providing access to analytics tools as examples. These pull methods avoid the e-mail clutter associated with push systems, but pull systems can be ineffective because managers may not know what information is available or when or where to look for the information.

How frequently data are analyzed and reported is also an important consideration. The existence of an integrated HRIS, faster computing capabilities, more effective software, and advanced internal communication systems creates the capability to analyze and report information in real time for managers. How frequently data are reported and how narrowly data are packaged are also critical to supporting effective decision making. Creating reporting cycles that are too long risks losing opportunities to make changes in operations on the basis of the reported information. Aggregating too much data from subunits to higher-level units can result in the problem of causing differences between operating units, departments, or functions to be buried in the aggregated averages for the higher unit. This information for managers' work units must be available to support decision making.

HR Dashboards

A common form of reporting HR analytics data is in the form of a dashboard. Dashboards are an enriched component of reporting. **Dashboards** reflect efforts to align real-time analysis of organizational and HR processes as well as an increased capacity to aggregate organizational data. Dashboards also contain business unit analyses to permit managers to drill down to examine metrics on several levels within the organization. The dashboard allows users to maintain a current snapshot of key HR metrics. In discussions with individuals who construct metrics and analytics reports, we hear a common concern: These individuals wonder *whether anyone pays any attention* to the reports they produce. Often, they send reports to managers and receive no feedback of any kind. Often those who do get positive feedback are HR professionals who embed an interpretation of what the data they mean for the organization and the decision maker. Reporting data in context is a key component of their success stories.

Being consultative is an important skill workforce analysts need to develop. For individuals conducting metrics and analytics work, paying attention to the capabilities

and needs of the targeted audience is critically important. The information reported must be relevant to the issues facing the managers who receive it. Further, simply providing numbers to managers is unlikely to be of much use to them until they can understand the meaning of the information for their decision situations. Consequently, the HR analyst must report the numbers but also provide an interpretation of what the data mean for the manager's decision situation. Some HR analysts argue that the interpretation of analyses is the central message that needs to speak to managers, which, in turn, is then supported by the data. When packaging a metrics analysis, then, we must understand the needs of the recipients and fit the data to the information needs of the decision maker.

USEFUL THINGS TO REMEMBER ABOUT HR METRICS AND ANALYTICS

Don't "Do Metrics"

The *primary objective* of developing capabilities in HR metrics and workforce analytics is *to increase organizational effectiveness.* It is not simply to generate a static menu of HR metrics reports. Simply conducting the analysis and developing reports are activities, and activities raise costs. Developing HR metrics and workforce analytics to be used by managers and professionals must involve a return on the organization's investment. The real test of the value of HR metrics and workforce analytics is whether managers who have access to the information provided by these analyses make different and better decisions.

Bigger Is Not Always Better

The success of any metrics and analytics project is not measured by how many people are involved, how many metrics the project tracks, or how many people receive reports. It is gauged by the impact that the project's results have on managerial decisions. Many successful efforts have been focused on small, narrowly targeted metrics and analyses that have addressed organizationally important questions.

Small metrics and analytics projects have several advantages over the multimillion-dollar implementation projects that include integrated prepackaged analytics systems. First, they cost less and require fewer resources in terms of time and materials. Second, they are less visible during the initial start-up, while the project team is learning through trial and error. These two aspects provide the project team with opportunities to focus on critical HR metrics, while giving them the flexibility to work through the necessary trials and errors.

HR Metrics and Analytics Is a Journey—Not a Destination

Because the focus is on identifying and responding to opportunities and problems, useful and effective HR metrics and workforce analytics projects change over time. Markets for both products and labor will change, as will organizational processes. These

changes will require adjustments in the ideal size, skill requirements, and deployment of an organization's human capital. If organizations are successful in solving operational problems or capturing opportunities, the focus for managers naturally shifts to other problems or new opportunities. These problems are unlikely to require the same analytics and therefore may depend on identifying new metrics.

Be Willing to Learn

Organizations that have an HR metrics and analytics function will develop a bias for experimentation to try out new HR activities, programs, or processes. One consequence of organizational life is the ongoing opportunity to recognize that there may be a better way to do things than your current approach. This point is true not only for the organization's operational processes but also for its metrics and analytics efforts. The organization should develop a metrics and analytics "laboratory" where the HRM professionals can experiment with new analyses and test existing assumptions about the requirements of the organization's current systems. This examination can foster new approaches and allow new metrics and analytics to be created.

Avoid the Temptation to Measure Everything Aggressively

Not every HR function, process, or metric that can be analyzed should be. Successful efforts will focus on those things, at a given point in time, that are most likely to have the greatest impact on managerial decision making. The intensity of an assessment project should be matched to how much opportunity it offers for improvements, and the project itself should be focused on factors, processes, and functions related to those things that are likely to have the greatest impact on organization effectiveness.

Workforce Analytics and the Future

The development of useful and effective workforce analytics is likely to be viewed in the future as a very significant source of competitive advantage. We now have the tools and the computing infrastructure to handle these projects that can help us understand organizations and support effective organizational functioning. By using effective approaches to workforce analytics, decision makers will acquire the ability to more effectively manage and improve HR programs and processes as well as to improve the effectiveness of HRIS use. Using this acquired ability, managerial decision makers may be able to modify entire employment systems to manage the company's human capital more effectively. Bintliff-Ritchie (2006) notes the following managerial benefits of metrics for organizations:

- Operational reporting is more efficient and cost-effective because the data from individual applications is integrated and accessed through a single solution.
- Graphically rich information is available to the people who need to make decisions and show metric-based results.

- Human resources practices and investments can be optimized to meet enterprise performance goals.

As a result, organizations that make investments in internal human capital assessment resulting in useful HR metrics and workforce analytics will become less willing to share their knowledge with other organizations in their industry. Benchmarking, which has been a staple of HR metrics and workforce analytics for almost three decades, will become more difficult to access and develop as organizations recognize the competitive value of these capabilities.

Summary

The central focus of this chapter was to define workforce analytics and discuss how and when it can contribute to improving organizational effectiveness. Workforce analyses activities provide no return on the organization's investment unless managers make different and more effective decisions as a result of the information provided by metrics and analytics reports. Therefore, focusing the development of workforce analytics around organizationally important problems and opportunities is likely to increase the possibility of significant returns for the organization.

This chapter also highlights the wide range of activities that fall within the domain of workforce analytics. Although classic metrics still have value, new software offers tremendous opportunities to change both the metrics and types of analyses organizations undertake. We can expect the types of metrics organizations used in the future to change as the needs of decision makers change, and as these analyses continue to work toward effectively balancing the cost and benefit consequences of decisions (see Chapter 7). Components of this continued evolution of metrics and analytics capabilities are driven by increased use of both push and pull reporting systems, more extensive use of predictive analytics and operational experiments, and the development of organizational expertise in metrics and analytics capabilities. As these skills mature, organizations will be able to move beyond simple analyses of HR efficiency metrics to a greater emphasis on operational effectiveness and organizational realignment analyses, which will further enhance the value of workforce analysis systems.

Key Terms

administrative process efficiency 402
balanced scorecard 396
benchmarking 397
Big Data 398
computing infrastructures 000
cost and benefit consequences 396
dashboards 416
data mining 398
HR metrics 390
operational effectiveness 402
operational experiments 399
predictive analysis 398
pull systems 416
push systems 416
reporting metrics 415
strategic realignment 403
variety 398
velocity 398
volume 398
workforce analytics 390
workforce modeling 399

Discussion Questions

1. What factors have led to increased organizational interest in HR metrics and workforce analytics?
2. When might the information from numeric information systems such as HR metrics and workforce analytics *not* generate any return on investment (ROI)?
3. What are some of the limitations of the traditional HR metrics?
4. Discuss the historical role of HR benchmarking and its strengths and weaknesses as part of a metrics and analytics program in organizations today.
5. What roles might more recent analysis activities, such as data mining, predictive statistical analyses, and operational experiments, play in increasing organizational effectiveness?
6. What differences exist between metrics and analytics that focus on HR efficiency, operational effectiveness, and organizational realignment? Offer examples of each.
7. Describe which characteristics of HR metrics and workforce analytics are likely to result in greater return on investment and organizational impact.

Case Study

Regional Hospital is a 500-bed hospital and several associated clinics in a major East Coast metropolitan area. It has been an aggressive adopter of computing technologies in efforts to decrease costs and improve operational efficiencies. A critical challenge facing the hospital is meeting its ongoing challenges to staff the hospital and allied clinics effectively, given the ongoing shortage of nurses; uncertainty in health care legislation; emphasis on shortening hospital stays to reduce costs, which causes the daily census (numbers of patients in various departments) to vary dramatically from day to day and shift to shift; the continued aging of the population in its primary care area; and the unending competition for employees with key skill sets. Employee expenses represent more than 80% of the overall costs of operation for the hospital, so identifying ways to match optimal skills and numbers of employees to the appropriate shifts is critical to achieving consistent success. However, individual shift managers struggle to make effective staffing decisions, resulting in consistent overstaffing or understaffing of shifts and departments. These staffing problems potentially increase the high costs of varied levels of patient care and satisfaction and potentially increase the risk that staff turnover may escalate because of dissatisfaction with the continuing inability of managers to match staffing needs to demand.

Company managers recognize the potential that HR metrics and analytics might have for their organization, and they have come to you for help. They are hearing from their peers in other hospitals that metrics can help in this area but are not quite sure where to start. They are looking for you to offer guidance on how to do HR metrics and workforce analytics.

Case Study Questions

1. Do you believe that a program of HR metrics and workforce analytics might be useful in Regional Hospital? If so, why?
2. What opportunities do you see regarding *where* and *how* metrics and analytics might be applied in this organization?
3. Identify three analyses and associated metrics you think might be useful for Regional Hospital to consider.

4. How might Regional Hospital utilize benchmarking as a part of its metrics and analytics effort, if at all?
5. What advice would you offer to the managers at Regional Hospital about developing a program of HR metrics and workforce analytics?
6. What potential problems might occur in the establishment of an HR metrics and workforce analytics program for Regional Hospital managers about which you would want to alert them prior to beginning this project?

Student Study Site

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