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2

## STRATEGIC HRM, DATA-INFORMED DECISION MAKING, AND HR ANALYTICS

## LEARNING OBJECTIVES

After reading and studying this chapter, you should be able to do the following:

- 2.1 Identify the steps for formulating and implementing a strategy.
- 2.2 Explain the importance of strategic HRM for realizing employee, operational, stakeholder, and financial outcomes and for sustaining a competitive advantage.
- 2.3 Demonstrate the use of data-informed decisions in realizing organizational strategy, contrasting different HR analytics competencies and levels of HR analytics.
- 2.4 Summarize the arguments for a scientific, ethical, and legally compliant approach to HR decision making.
- 2.5 Manage the components of a successful HR analytics function.

## DATA ANALYTICS AND ARTIFICIAL INTELLIGENCE AS HR TOOLS: THE CASE OF STANLEY BLACK & DECKER



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Known for manufacturing hand tools like power drills and wrenches, Stanley Black & Decker was founded in 1843 and today is a publicly traded Fortune 500 manufacturing company based in New Britain, Connecticut. The company owns a number of well-known brands, such as DeWalt, Black & Decker, Stanley, and Craftsman, with many of these brands' products sold in hardware stores. In 2021, the company ranked 41st on Fast Company's list of 100 Best Workplaces for Innovators.

Innovation at Stanley Black & Decker stems in part from its digital transformation strategy centered on human resource management. In recent years, Stanley Black & Decker has used data analytics and AI to support and enhance how it develops and manages its employees. Consistent with the company's "people plus technology" operations model, CEO Jim Loree

assigned the company's new chief AI officer, Mukesh Dalal, to work within the HR function. Loree believes the purpose of AI and other digital transformation technologies is to support and enhance the organization's workforce. Both technology and people contribute to the company's ability to maintain a competitive advantage and to realize its strategic objectives.

In 2021, as part of a program to develop company-wide talent, the company announced new data-informed and technology-assisted programs. These include *StanleyConnex* for employee mentorship and *EI for Everyone* to develop employees' emotional intelligence. Around the same time and in partnership with DeepHow, Stanley Black & Decker launched its AI training platform they called Stephanie across 30 manufacturing sites. The Stephanie platform uses a three-step process to generate and deploy employee training content. First, using DeepHow's mobile application, individuals within the company record videos of expert employees performing actual job tasks and, in the process, capture the employees' workflow, knowledge, and skills. Second, using AI, Stephanie analyzes, indexes, and segments the video data to generate step-by-step training videos. Third, trainees use the resulting self-paced and searchable videos to learn important job-related tasks and workflows, and based on an algorithm, the tool recommends specific training videos to the employees who need them the most.

AI tools like Stephanie offer a number of potential benefits for employees, the HR department, and the organization. Employees can use cameras on their mobile devices to record training content, with no need for expensive video equipment and editing software. Thus, an organization can quickly assemble an internal library of video-based training modules. This enables a manufacturing company like Stanley Black & Decker to create new training content for rapidly changing jobs and products. It also allows them to capture the expertise of retiring and resigning employees who possess valuable knowledge and skills. To that end, Kevin Lemke, vice president of strategy for the Innovation Group, noted, "There is a tremendous opportunity to help our customers minimize the disruption caused by employee turnover" and that DeepHow's AI Stephanie tool provides a "knowledge transfer system for the skilled trades."

While AI tools like Stephanie offer promising solutions, organizations must also carefully identify and evaluate potential data-integrity, ethical, and legal challenges. When low-quality data are used as inputs, the AI tool will produce low-quality outputs (e.g., recommendations), a phenomenon often referred to as "garbage in, garbage out." For example, imagine a situation in which a number of training videos are created using the Stephanie AI application; however, instead of recording the workflows of employees with high expertise, employees with low expertise are recorded by mistake. The resulting video-based training might reduce employee performance. This example highlights the importance of human involvement and oversight when it comes to AI. In fact, some companies have announced new roles focused on using AI ethically and in ways that preserve human dignity. For example, some companies have established a chief ethical and humane officer.<sup>1</sup>

## CASE DISCUSSION QUESTIONS

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1. How has Stanley Black & Decker used data analytics and AI to support human resource management?
2. Could DeepHow's AI Stephanie tool be used for non-manufacturing jobs? If so, for what types of jobs would these tools be most appropriate or effective?
3. DeepHow's AI Stephanie tool is supposed to be used to record expert employees performing their work. How can an organization determine which employees are experts at their job?
4. Are there any other data-integrity, ethical, or legal challenges that organizations should consider when using AI tools for human resource management?

## INTRODUCTION

As noted in the previous chapter, people matter for an organization's success. Jim Goodnight, CEO of SAS Institute Inc., is quoted as saying, "Ninety-five percent of my assets drive out the gate every evening. It's my job to maintain a work environment that keeps those people coming back every morning."<sup>2</sup> This chapter focuses on the role HR plays in managing people to achieve organizational success. This chapter explains how organizations combine strategy with HRM to achieve success and how HR professionals can make data-informed decisions that are accurate, fair, ethical, and legal—considerations that are becoming increasingly important as our society pushes forward into an era of big data and new technologies like artificial intelligence (AI).

## DEFINING STRATEGY

### LEARNING OBJECTIVES

- 2.1 Identify the steps for formulating and implementing a strategy.

**Strategic human resource management** is the process of aligning HR policies and practices with the objectives of the organization, including employee, operational, stakeholder, and financial outcomes. Central to strategic human resource management—and to strategic management in general—is the concept of a strategy. What is a strategy? Think of a **strategy** as a well-devised and thoughtful plan for achieving an objective.<sup>3</sup> A strategy is inherently future-oriented and is intended to provide a road map toward completion of an objective. Strategy reflects the way a unit, department, or organization coordinates activities to achieve planned objectives in both the short and long term.<sup>4</sup> In the opening case on Stanley Black & Decker, we learned how the company leverages data analytics and artificial intelligence to inform and support business strategies aimed at minimizing disruptions for customers when, for example, expert manufacturing employees and their "know-how" leave the company due to retirement. That is, strategy can be paired with data analytics and other digital-transformation technologies like artificial intelligence to make data-informed decisions, which improve the likelihood of achieving strategic objectives and sustaining a competitive advantage.

Some firms keep their strategies relatively private, while others, like Space Exploration Technologies Corp. (SpaceX), announce aspects of their strategy to the world. Based in Hawthorne, California, and ranked ninth on Fast Company's 2022 list of the World's Most Innovative Companies, SpaceX's mission is to "make humanity multiplanetary" by developing and launching fully reusable rockets and launch vehicles capable of traveling to the Moon, Mars, and beyond. In 2020, SpaceX took a big step toward realizing its strategy when it became the first private company to shuttle human beings to the international space station. The following year, the company successfully launched and then safely landed a vehicle called *Starship SN15*, a major milestone toward the goal of reusable rockets. With the help of its rockets, SpaceX also launches its Starlink high-speed Internet satellites into low orbit, and in 2022, Starlink satellites became critical and free communication tools for the people of Tonga after a volcanic eruption.<sup>5</sup>

SpaceX's employees are essential to realizing the company's strategic objectives and for achieving and maintaining a competitive advantage. To build a strong workforce, SpaceX leverages HRM as a strategic tool to design systems and procedures aimed at attracting, motivating, and retaining talented people. For example, Brian Bjelde, vice president of HR, has shared that, in addition to identifying talented, passionate, and driven job candidates, SpaceX selects candidates who value exploration and the company's mission. With competitors like Blue Origin, SpaceX must rely heavily on its human capital to outperform its competition.<sup>6</sup>

### Strategy Formulation: Developing and Refining a Strategy

To realize their mission, organizations like SpaceX must both formulate and implement a strategy. **Strategy formulation** involves planning what to do to achieve organizational objectives—or in other words, the development or refinement of a strategy. In some organizations, the CEO and executive



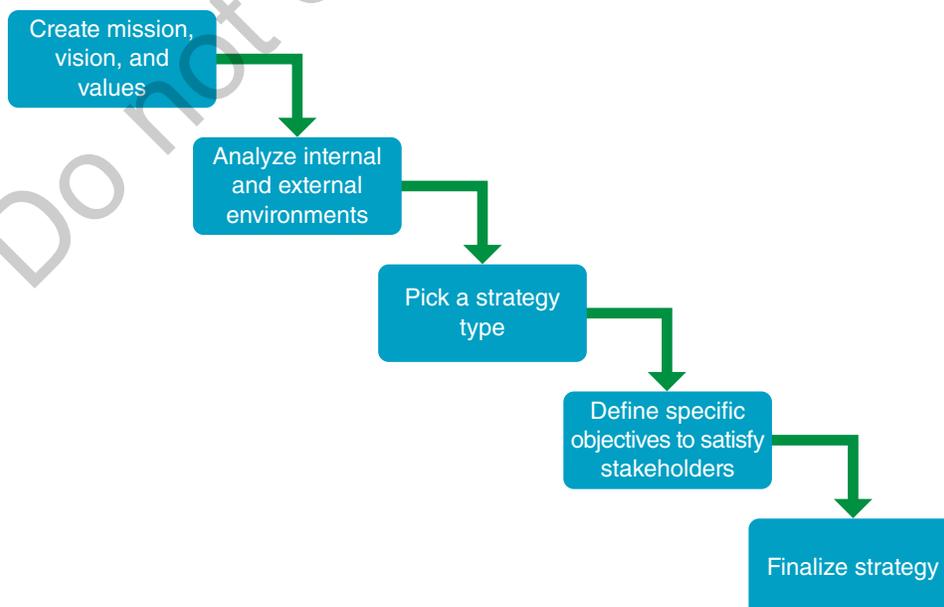
In 2021, SpaceX achieved a major milestone in reusable rocketry when the company successfully launched and landed *Starship SN15*. Pictured here is SpaceX preparing *Starship SN15* for launch at Starbase Space Facility in Boca Chica, Texas.

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team formulate the strategy in a top-down manner, whereas in other organizations, the strategy emerges from the pattern of many organizational decisions that are made over time. In some organizations, strategy formulation is the product of both top-down and bottom-up processes. Regardless of how a strategy originates, an organization's strategy is not set in stone. Rather, an organization should demonstrate flexibility by staying on top of dynamic changes in the internal and external environments and by re-envisioning and reformulating a strategy as needed. Strategy formulation often follows the steps depicted in Figure 2.1, which ultimately set the stage for strategy implementation. Figure 2.1

### FIGURE 2.1 ■ Steps for Strategy Formulation

Formulating an organizational strategy requires identifying or developing the mission, vision, values, and strategy type; analyzing the internal and external environments; and defining objectives designed to satisfy stakeholders.



### Create a Mission, Vision, and Set of Values

A **mission** describes a core need that an organization strives to fulfill and thus represents the organization's overarching purpose—or in other words, the organization's reason for existing. Recall that SpaceX's espoused mission is to “make humanity multiplanetary,” and as you have probably observed, many organizations feature their mission statements prominently on their webpages. SpaceX is no exception. In addition to a mission, strategy formulation also involves stating a vision and articulating values. An organization's **vision** is an extension of the mission and describes what the organization will be, do, or look like at some point in the future. Creating a set of core **values** provides the organization with parameters and guidelines for decision making and bringing its vision to fruition.

#### SPOTLIGHT ON ETHICS: FIGHTING CLIMATE CHANGE WITH IMPOSSIBLE FOODS



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Stanford University professor Pat Brown founded Impossible Foods Inc. in 2011 with the mission to fight climate change by creating a more sustainable global food system. Recognizing the environmental impact of animal meat production, the company develops and produces plant-based substitutes for animal products like meat, fish, and dairy—sometimes referred to as “meatless meat.” Impossible Foods scientists develop plant-based substitutes that mimic the taste and texture of common animal products while also mitigating the environmental impact of the production processes. Today, well-known food retailers and restaurants like Kroger, McDonald's, and Burger King sell Impossible Foods products like the now-famous Impossible Burger. The company's mission is also featured in its recruiting and selection materials, as the company seeks candidates whose values align with the mission of combating climate change.

Impossible Foods, however, is not immune from criticism. For example, John Mackey, CEO of Whole Foods, shared concerns that plant-based substitutes for animal products, like those produced by Impossible Foods, can be overly processed and thus unhealthy. In response, some food scientists and nutritionists have argued that high levels of processing do not necessarily imply a food is unhealthy or less healthy. Some evidence suggests that an Impossible Burger is probably about as healthy as its meat-based counterpart. Other critics point to a lack of transparency in the reporting of greenhouse emissions produced by Impossible Foods across all operations and supply chains. In the absence of such reporting transparency, some academic and third-party research

has shown that plant-based substitutes result in considerably lower greenhouse gas emissions than meat-based products.

Despite its critics, Impossible Foods and its popularity continue to grow, with the company even considering an initial public offering (IPO) as of February 2022. Founder and CEO Pat Brown wants the public to have an opportunity to invest in the company in order to support the future of the planet by continuing to bring the company's strategic vision to life.<sup>7</sup>

### Questions

1. How might the mission and ethical values of Impossible Foods influence its HRM policies?
2. As more companies begin making plant-based substitutes for animal products, what can Impossible Foods do to remain competitive while also living up to its mission and vision?

## Analyze Internal and External Environments

An organization must look both internally and externally to understand how to bring its mission, vision, and values to life and to achieve a competitive advantage. That is, an organization must analyze the internal *strengths* and *weaknesses* that are under its control and the external *threats* and *opportunities* that are beyond its direct control—a process commonly referred to as a **SWOT analysis**.<sup>8</sup> When analyzing the internal environment, an organization comes up with a plan for how to leverage its strengths and improve on its weaknesses. When analyzing the external environment, an organization identifies opportunities and threats with respect to the state of its industry and competitors, as well as other external factors like the labor market, unemployment rate, and the general condition of the local, national, and/or global economies. Taken together, a SWOT analysis is a systematic and methodical decision-making tool used to formulate a *viable* strategy.

Taking a **resource-based view** during a SWOT analysis allows an organization to identify its strengths and weaknesses in terms of its physical, financial, organizational, and human resources and identify how these resources can be used to maximize opportunities and minimize threats in the external environment. According to the resource-based view, resources that are rare and inimitable are more valuable to an organization. A *rare* resource is scarce, and relatively few (if any) competitors have the resource. An *inimitable* resource is difficult (if not impossible) for competitors to reproduce, attain, or deploy. For example, reusable rockets are currently rare in the space industry, and SpaceX has found success building and launching the *Falcon 9* reusable rocket. Thus far, competitors have found it difficult to imitate SpaceX's reusable rocket program.<sup>9</sup> The process of identifying rare and inimitable internal resources provides a way of anticipating whether the organization, upon applying the strategy, will be able to achieve its objectives and sustain a competitive advantage.<sup>10</sup>

## Pick a Strategy Type

After analyzing internal and external environments, an organization is ready to select a strategy type. A **strategy type** provides a general approach for how an organization will bring its mission, vision, and values to life, while at the same time leveraging its strengths and improving its weaknesses. Examples include the following<sup>11</sup>:

- **Differentiation:** The organization creates a product, service, or customer experience that is different from those provided by competitors, thus warranting a higher price or more attention from consumers.
- **Cost leadership:** The organization identifies ways to create a product or service at a lower cost compared with competitors. This can help the organization increase its margin or sell the product or service at a cheaper price than competitors.
- **Focus:** The organization uses differentiation or cost leadership but identifies a narrow consumer base to appeal to a specific product or service type that might not be produced or sold by competitors.



Ranked 40th on Fast Company's 2022 list of the World's Most Innovative Companies, Shopify's 2022 total revenue increased 21% compared to the prior year, reaching a full-year revenue of \$5.6 billion. The company provides Internet infrastructure for commerce and exemplifies a differentiation strategy, which is reflected in the company's product. Shopify helps businesses reach customers through their own websites and through marketplaces like Facebook. At the same time, the company aims to give businesses the ability to retain their unique identities.<sup>12</sup>

Photo Illustration by Rafael Henrique/SOPA Images/LightRocket via Getty Images

### Define Specific Objectives to Satisfy Stakeholders

Ultimately, an organization formulates a strategy to meet the needs of stakeholders and, above all, to be competitive. This means the strategic objectives should be designed to satisfy key stakeholders.

**Stakeholders** include different groups that an organization must appeal to, such as

- customers,
- investors and shareholders,
- employees, and
- communities.

### Finalize Strategy

Once an organization defines its mission, vision, and values; analyzes the internal and external environments; chooses a general strategy type; and defines its strategic objectives, it is ready to finalize the strategy. That is, the organization must create a clear plan before progressing to strategy implementation.

### Strategy Implementation: Bringing a Strategy to Life

During **strategy implementation**, an organization follows through on its strategic plan. It is during this stage that an organization builds and leverages the capabilities of its human resources (which are often referred to as **human capital** at the organizational level of analysis), as human resources will ultimately play an important role in supporting the enactment of an organization's strategy. The following section discusses how to align an organization's HR policies and practices with its strategy and how a well-designed system of HR policies and practices can improve human capital capabilities within an organization and, ultimately, performance.

## Contributing to Your Organization's Strategy

After the formulation stage, the strategy must be implemented, which requires the coordination and cooperation of employees and managers at all levels of the organization. As you might imagine, sometimes there are disconnects between an organization's official strategy and how managers interpret and implement that strategy. Managers who behave in their own self-interest—and not in the interest of the organization—can derail strategy implementation by delaying or reducing the quality of the implementation or even sabotaging the strategy! Here are some actions you can take as a manager to bring your organization's strategy to life.<sup>13</sup>

1. *Know what your organization's strategy is.* In a survey of employees from 20 major Australian corporations, only 29% of respondents were able to identify their company's strategy from a list of six choices.<sup>14</sup> Take the following steps to understand your organization's strategy:
  - Review the organization's mission statement, vision, and values.
  - Ask your manager to explain how you can contribute to strategic objectives.
  - Pay attention to formal communications from executives and upper management.
  - Stay on top of changes to your organization's strategy.
2. *Align your own goals with your organization's strategic objectives.* As a manager, it is important to align your self-interests with the interests of the organization, assuming the strategy aligns with your own personal ethics. Specifically, set goals that describe how you and your team can contribute to organizational objectives, such as decreasing turnover or increasing productivity.
3. *Communicate the strategy to your employees.* Explain the strategy to your employees, and engage them in activities that help them understand how they can contribute to the organization's strategic objectives. Remember, as a manager, you play an essential role in communicating company strategy to employees.

## STRATEGIC HRM: LINKING STRATEGY WITH HRM

### LEARNING OBJECTIVES

- 2.2** Explain the importance of strategic HRM for realizing employee, operational, stakeholder, and financial outcomes and for sustaining a competitive advantage.

Recall that *strategic HRM* is the process of aligning HR policies and practices with the strategic objectives of the organization, including achieving employee, operational, stakeholder, and financial outcomes to achieve and sustain a competitive advantage. An important implication of strategic HRM is that HR practices and employees are company assets that add value and not merely costs.<sup>15</sup> If implemented in a systematic and data-informed manner, strategic HRM can help an organization realize its strategy and objectives through the deployment of its human resource capabilities.

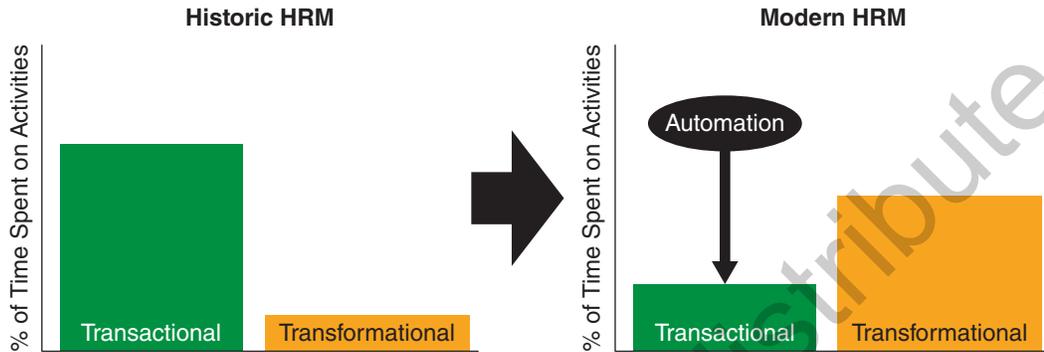
## The Origins of Strategic HRM

HRM activities have changed over the years. A growing number of organizations now focus on *strategic HRM* and using HR data to make better organizational decisions. Historically, the function was labeled *personnel management*, which carried with it the implication that employees were an organizational expense.<sup>16</sup> Personnel management professionals tended to focus mostly on transactional (e.g., recordkeeping, compliance) and employee relations activities. However, the amount of time spent on transactional activities has decreased over the past century as more processes have become automated, freeing up more time for transformational activities that help the organization leverage its human

resources to achieve strategic objectives (see Figure 2.2). Today, it is common to hear the use of the terms *human resource management* and *people operations* instead of *personnel management*, as these terms emphasize the more strategic role that HR plays.

**FIGURE 2.2 ■ Evolution of HRM Activities**

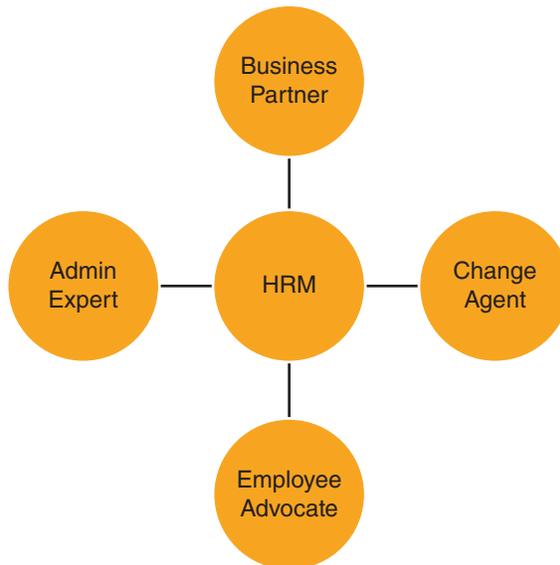
The amount of time spent on transactional activities has decreased over the past century as more HR functions become technology-assisted, -augmented, and -automated. This leaves more time for activities designed to transform the organization by strategically deploying human resources.



The focus on strategic HRM has also expanded the responsibilities of the HR function. According to Ulrich’s model of strategic HRM, the HR function should play the roles of administrative expert, employee advocate, change agent, and business partner (see Figure 2.3). Specifically, HRM has retained foundational activities related to administrative and employee relations activities while introducing additional activities related to orchestrating change and serving as a business partner. Strategic HRM has expanded the influence of the HR function. Namely, the deployment of HR practices and human resource capabilities can be used to realize strategic change initiatives, such as mergers, acquisitions, reorganizations, and restructurings, as well as gain a “seat at the table” during key business decisions and influence strategy formulation and implementation. Though, with greater influence comes greater responsibility. The modern HR function now faces greater pressure to make impactful decisions and to link HR activities to organizational performance.

**FIGURE 2.3 ■ Ulrich’s Model of Strategic HRM**

Ulrich’s model indicates that HRM should provide administrative expertise, serve as an employee advocate, be an agent of change, and serve as a strategic business partner.



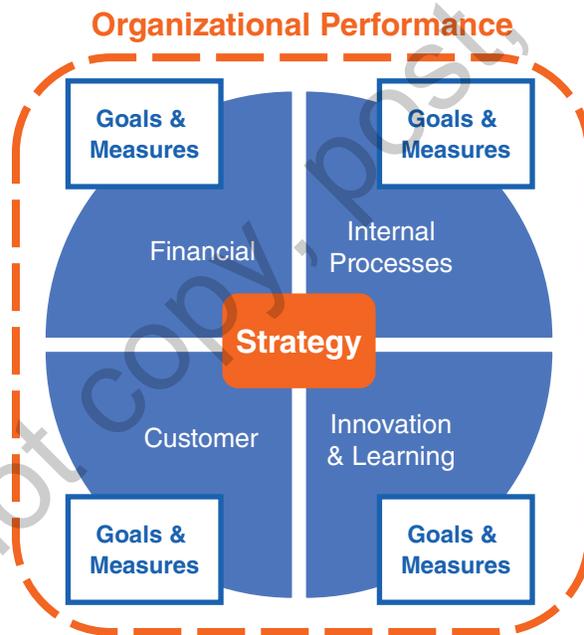
Source: Adapted from Ulrich, D. (1996). *Human resource champions: The next agenda for adding value and delivering results*. Cambridge, MA: Harvard Business School Press.

## Organizational Performance and the Balanced Scorecard

Historically, organizational performance and strategy attainment were defined primarily in terms of financial indicators, such as return on assets, return on equity, and market return. Achieving financial outcomes is indeed a worthwhile and necessary objective, but other nonfinancial factors shed light on an organization's progress toward realizing strategic objectives. The introduction of the **balanced scorecard** was a game-changer in this regard because it made the case for considering both financial and operational factors when evaluating strategic progress and organizational performance.<sup>17</sup> As shown in Figure 2.4, the balanced scorecard is a strategic management support system that requires managers to “balance” different stakeholder needs, such as the needs of customers, investors and shareholders, employees, and the broader community. Specifically, this system directs managers' attention to four factors: financial, customer, internal processes, and innovation and learning. For each of those factors, managers identify specific goals that connect to the organization's overarching strategy, as well as develop measures (e.g., surveys) to track attainment of those goals. The balanced scorecard encourages managers to consider performance from both external perspectives (e.g., customer satisfaction) and internal perspectives (e.g., operational efficiency). An organization's HRM function can use a balanced scorecard to identify opportunities for aligning HR strategy with organizational strategy. For example, to help the organization achieve high external customer satisfaction, the HRM function might create a strategy aimed at acquiring, managing, and retaining talented individuals in customer-facing roles.

**FIGURE 2.4** ■ Example of a Balanced Scorecard

The amount of time spent on transactional activities has decreased over the past century as more HR functions become technology-assisted, -augmented, and -automated. This leaves more time for activities designed to transform the organization by strategically deploying human resources.



## Identifying Best Practices

Strategic HRM has roots in multiple disciplines, as it reflects the intersection of HRM and strategic management, and incorporates principles from other areas, such as industrial relations, economics, and organizational theory.<sup>18</sup> Together, these disciplines provide a basis for understanding how human resources can be deployed in the service of organizational strategic objectives. Some HR practices can be thought of as *universal best practices* because implementing them often leads to improved organizational performance, regardless of the organization. In HRM, evidence-based universal best practices include enhancing perceptions of job security among employees, promoting from within the organization, providing financial incentives linked to performance, offering training, and providing flexible work arrangements.<sup>19</sup>

Pfeffer's practices are examples of high-performance work practices that are instrumental for developing human capital capabilities across different contexts.<sup>20</sup>

1. *Create employment security* policies to encourage employee involvement and commitment.
2. *Selectively hire new employees* to create a highly qualified workforce that is a good fit.
3. *Organize employees into self-managed teams* to achieve higher-performing teams.
4. *Compensate employees based on performance* to attract, motivate, and retain talented employees.
5. *Train employees* to enhance the knowledge and skills necessary for high performance.
6. *Reduce status differences between employees* to leverage ideas, skills, and effort at all levels.
7. *Share information on strategy and performance* to motivate employees to contribute to the organization.

Such practices are often referred to as **high-performance work practices**.<sup>21</sup> Meta-analytic evidence indicates that certain well-designed individual HR practices generally have positive effects on organizational outcomes.<sup>22</sup>

### Systems Thinking: Considering the System and Context

In addition to identifying universal best practices, such as high-performance work practices, it is important to consider how these practices and others fit into the broader HR system and organizational strategy. In other words, the effectiveness of some HR practices may be contingent on the context (e.g., industry, culture) and the configuration of other HR practices that are part of a larger system.<sup>23</sup> Thus, in addition to identifying universal best practices, we recommend taking a **systems perspective**, which means considering how all the pieces of the HR puzzle fit together, how HR fits within the broader organization, and how to address any misalignment in HR practices. When a system of HR practices is well designed and well integrated, certain synergies can emerge, such that the potential of the whole system may be greater than the sum of the system's individual parts.

Synergy between bundled HR practices, however, is not guaranteed. Without consideration of the organization's strategy and without taking a systems perspective, it is unlikely that a system of HR practices will reach its full potential. For instance, imagine a company in which teamwork is integral for achieving a strategic objective. Accordingly, this company devises a selection tool to identify job applicants who are likely to be team players and an onboarding program to train new employees to work effectively in teams. Now imagine the same company introduces a new compensation program that rewards only individual performance and not the performance of teams. Rather than interacting synergistically with the selection and training subsystems to improve team effectiveness, the compensation subsystem may thwart team effectiveness by focusing individuals' efforts on their own individual achievement, as opposed to the achievement of their team. In this hypothetical case, the whole might even be *less* than the sum of the parts when it comes to achieving the team-oriented strategic objective. Thus, to achieve desired organizational outcomes, it is important to develop HR practices with a strategic mindset and to focus on the entire system of HR practices as a whole and their potential configurations, as well as their interaction with the organization's culture and technology capabilities.

Research has shown that integrated systems of high-performance work practices outperform well-designed individual HR practices. Based on data from 968 organizations of various sizes and from a variety of industries, one study found that investing in an HR system can lead to valued organizational outcomes, such as lower turnover, higher productivity, and higher financial performance.<sup>24</sup> Offering additional support, a meta-analytic investigation of eight longitudinal studies showed that well-integrated systems of high-performance work practices lead to higher organizational performance than individual HR practices, which suggests that integrating different HR practices matters.<sup>25</sup> Further, the meta-analytic investigation showed that the relationship between HR practices and organizational performance was stronger among manufacturing firms compared with service firms, which lends support to the argument that the context matters from an industry standpoint too. Table 2.1 provides examples of other factors that have been found to influence the effectiveness of HR practices.

**TABLE 2.1** ■ Factors Influencing the Effectiveness of HR Practices

Factors	Description
<b>Internal Environment</b>	
<i>Business Strategy</i>	Although research findings have been mixed, some evidence indicates differentiation strategies enhance the effectiveness of HR systems in relation to certain organizational outcomes, such as reducing turnover.
<i>Culture</i>	Most evidence to date indicates that a positive and supportive organizational culture enhances the effectiveness of HR systems in relation to organizational outcomes.
<i>Manager Characteristics</i>	Research has shown that having more senior managers and managers with stronger HR backgrounds enhances the effectiveness of HR systems.
<b>External Environment</b>	
<i>Industry Characteristics</i>	The type of industry an organization operates within can influence the effectiveness of HR systems. For example, the positive effects of HR systems on organizational outcomes tend to be stronger in manufacturing industries (as opposed to service industries).

Source: Republished with permission of Academy of Management, from Jackson, S. E., Schuler, R. S., & Jiang, K. (2014). An aspirational framework for strategic human resource management. *Academy of Management Annals*, 8, 1–56; permission conveyed through Copyright Clearance Center, Inc.

### How Does a System of HR Practices Influence Organizational Outcomes?

$$\text{Performance} = \text{Ability} \times \text{Motivation} \times \text{Opportunity.}$$

The **ability-motivation-opportunity model** proposes that a system of HR practices influences employee outcomes and, ultimately, operational and financial outcomes to the extent that the practices target three different elements: ability to perform, motivation to perform, and opportunity to perform. The first element—*ability* to perform—encapsulates employees' knowledge, skills, and abilities. In a sense, ability to perform can be thought as what an employee *can do* on the job. The second element—*motivation* to perform—refers to the work-related effort that employees exert toward goal completion and captures what employees *will do* on the job. That is, just because employees are able to perform the work does not necessarily mean they have the motivation to perform the work and vice versa. The third element—*opportunity* to perform—entails whether employees have the chance to perform on the job. Taken together, we can conceptualize employee performance as a function of their ability, motivation, and opportunity to perform. Thus, according to this model, if ability, motivation, or opportunity falls to zero, performance will be zero. We recommend using this conceptual formula to help you wrap your mind around how employees achieve high levels of performance in the workplace, as well as how different HR practices can be designed to target each of these three elements.<sup>26</sup>

### SPOTLIGHT ON GLOBAL ISSUES: STRATEGIC INTERNATIONAL HRM

Today, many organizations, such as Amazon, Meta, and Marriott, span international boundaries. Consequently, these multinational companies operate across national and cultural contexts and conditions, with different laws, customs, and values. Strategic international HRM requires a nuanced and intentional approach to deploying human resources to achieve strategic objectives. To be successful in the international arena, scholars have argued that organizations must show flexibility in their HR practices to adapt to and fit with the different national environments. For example, in the Chinese national environment, organizations show higher performance when their HR practices emphasize the importance of complying with rules *and* encourage commitment to the organization. The flexible application of HR practices, however, is not without its challenges, as multinational corporations struggle with whether to integrate HR practices in a consistent manner via a global strategy or to tailor HR practices to fit the needs of each national context via an adaptive strategy.<sup>27</sup>

## STRATEGIC HRM, DATA-INFORMED DECISION MAKING, AND HR ANALYTICS

### LEARNING OBJECTIVES

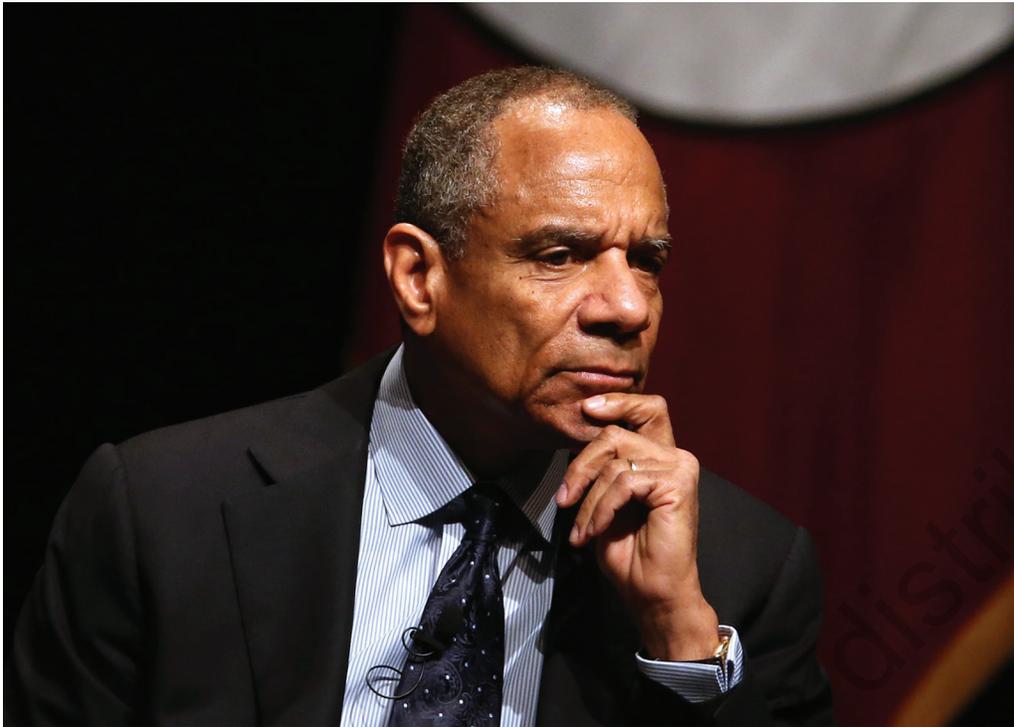
- 2.3** Demonstrate the use of data-informed decisions in realizing organizational strategy, contrasting different HR analytics competencies and levels of HR analytics.

We live in a world with ever-increasing amounts of data, technologies, and big decisions to make. We collect, analyze, and interpret data for many reasons but often with the goal of making better decisions—that is, decisions informed by evidence. For example, when Covid-19 brought the world to a standstill in early 2020, pharmaceutical companies developed and manufactured Covid-19 vaccines with unprecedented speed and efficacy. In the process, they demonstrated the importance of leveraging years of prior scientific research and technological advances and making decisions based on data collected using rigorous research designs like randomized clinical trials.<sup>28</sup> Further, technological advances in the form of artificial intelligence have made it easier for us to acquire, manage, analyze, and interpret data about ourselves and data about our organizations. As a society, we have grown more used to the idea of using data and technology to inform decision making. This has made its way into HR departments. In recent years, strategic HRM has expanded to place a greater emphasis on **data-informed decisions**, paving the way for HR analytics and technological advances like artificial intelligence.

At this point, you may be thinking, “Do I have to become an expert in data analysis if I work in HR?” The answer is no, but we do recommend that you improve your data literacy skills. Data literacy includes competence in mathematics and statistics, data analysis and visualization, and critical thinking and problem solving.<sup>29</sup>

Today, data-informed decision making is an important aspect of strategic HRM. Companies like Chevron have led the way when it comes to integrating advanced and strategically aligned data analytics into their HR function. The energy company launched a centralized HR analytics team, and from the beginning, the team made it clear that its mission was to “support Chevron’s business strategies with better, faster workforce decisions informed by data.” To do that, R. J. Milnor, the former head of talent analytics for Chevron, stated that “[HR] analytics is really about informing and supporting business strategy, and we do that through people data.” With respect to workforce planning, the team built models to forecast future talent demand and supply 10 years in the future. These models identified key drivers of talent demand and supply for different geographic locations and provided estimates of future employee turnover with 85% accuracy.<sup>30</sup> Ultimately, informing HR decisions using data helps organizations to attract, motivate, and retain talented people. This can ultimately drive organizational outcomes, such as productivity and innovation, and reduce costs associated with turnover and counterproductive behaviors.

Using data to inform people decisions requires making a business case to organizational leaders by linking data to strategic organizational objectives. One way to garner support for HR analytics and data-informed decision making in general is to convince organizational leaders and HR professionals of the value of the scientific process. That is, organizational leaders and HR professionals must think like scientists when it comes to collecting, analyzing, and interpreting people data, but at the same time, they need business acumen to make a strong case for using science-based HR practices to improve the organization.<sup>32</sup> When using HR analytics in this way, an overarching goal should be to provide managers with actionable evidence-based practices that improve the management of people. In fact, recent research has linked the use of HR analytics to higher organizational performance, because HR analytics leads to better evidence-based management and managerial decision making, which in turn lead to higher organizational performance.<sup>33</sup>



Kenneth Chenault, who is a former chief executive at American Express and the current chairperson at General Catalyst, is the co-chairperson of a corporate group called the Data & Trust Alliance. The group developed a 55-question measure to evaluate algorithmic bias in AI-based recruitment and selection tools.<sup>31</sup>

Photo by Justin Sullivan/Getty Images

## SPOTLIGHT ON DATA AND ANALYTICS: USING ARTIFICIAL INTELLIGENCE ETHICALLY TO ASSIST AND AUGMENT HUMAN RESOURCES

Advances in artificial intelligence (AI) and associated technologies have the potential to assist and augment many different aspects of an organization's human resources. As described in this chapter's opening case, Stanley Black & Decker partnered with DeepHow to deploy an AI training platform called Stephanie. Rather than automate the role of a training specialist, the AI assists the training function with collecting, indexing, and creating training materials for manufacturing jobs. In doing so, the AI supports HR by enhancing its ability to develop up-to-date training content for rapidly changing work and technology.

As another example, HR vendors are beginning to offer a recruiting platform with automated AI algorithms that score and classify applicants based on interviews. Because of inherent algorithmic complexities, the actions of AI platforms can seem mysterious to applicants, employees, and organizations alike. Scholar Jenna Burrell describes the following challenge when it comes to understanding AI algorithms: "When a computer learns and consequently builds its own representation of a classification decision, it does so without regard for human comprehension." Burrell goes on to say, "The workings of [AI] algorithms can escape full understanding and interpretation by humans, even for those with specialized training, even for computer scientists."<sup>34</sup>

The opacity of some AI algorithms has raised concerns about fairness and bias, leading to legal challenges and pushes for regulation. Governments have already been taking steps to address AI-related fairness and bias. For instance, the state of Illinois passed a law in 2019 requiring organizations to inform and explain to applicants how video-based interviews will be used and how the associated AI works. In addition, both the White House and the European Union have pushed for frameworks to guide the ethical development and application of AI.

Beyond legislation and regulation, some have encouraged the use of audits to ensure the ethical use of AI in HR. These audits would ideally involve collaboration between AI developers, HR subject matter experts, and psychologists. The purpose of audits is to uncover bias and fairness issues related to the algorithm itself as well as how people understand and perceive the algorithm. Experts have also encouraged the creation of “bias dashboards,” which allow analysts to evaluate how a tool performs across groups of individuals from different protected classes. Recently, organizations like Humana, Nike, and Mastercard have joined a corporate group called the Data & Trust Alliance, which has created a system for detecting and evaluating algorithmic bias in AI-based tools. In 2022, the Society for Industrial and Organizational Psychology published a set of recommended guidelines for evaluating AI-based assessment tools. While AI presents many exciting opportunities for HR, the field must also recognize the potential for unintended consequences and the importance to develop and apply such technological advances ethically.<sup>35</sup>

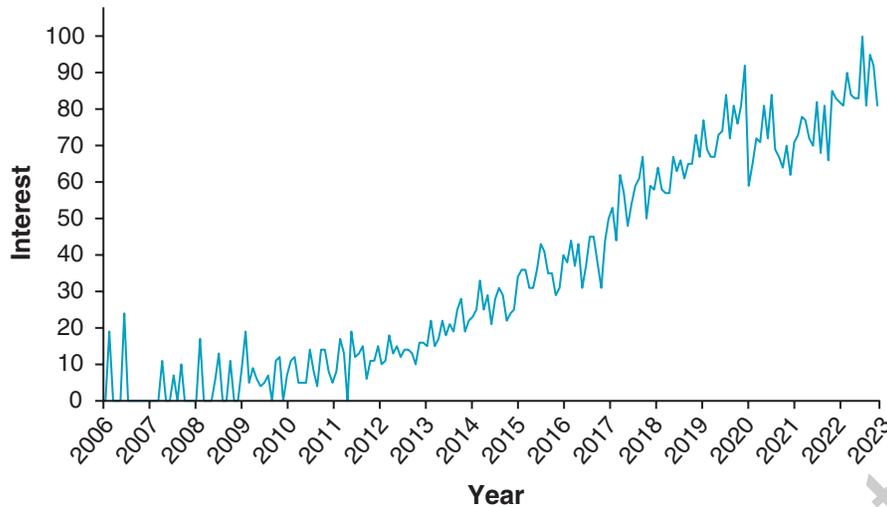
### Defining HR Analytics

Given its large focus on data and scientific decision making, HR analytics has been referred to as a “game changer.”<sup>36</sup> Many would also argue that HR analytics has the potential to be HR’s best friend. Collecting, analyzing, and interpreting people data can lead to valuable insights, and the emergence of HR as a strategic business partner has paved the way for HR analytics. **Human resource (HR) analytics** goes by different terms, such as people analytics, workforce analytics, human capital analytics, and talent analytics; it refers to the process of collecting, analyzing, and reporting people-related data for the purpose of improving decision making, achieving strategic objectives, and sustaining a competitive advantage. In other words, HR analytics is the systematic process of applying quantitative or qualitative methods to derive insights that shape and inform people-related business decisions and strategy. Thus, HR analytics is intended to provide data-informed decisions that improve decision making at all levels of an organization, including among frontline managers. In general, HR analytics can provide evidence supporting the links among HR systems, policies, and practices and employee, operational, stakeholder, and financial outcomes. Advanced HR analytics can even provide prescriptive recommendations for the future.

The growth of HR analytics signals that more and more organizations are beginning to understand the importance of making data-informed decisions to achieve a competitive advantage. To that end, after reviewing survey responses and panel discussions, the Society for Human Resource Management (SHRM) Foundation concluded in a report that leveraging HR analytics to achieve a competitive advantage is an important area of growth for HRM.<sup>37</sup> The report, however, concluded that talent shortages are on the rise and that HR must provide HR analytics to aid in strategic business decision making. The shortage of people who possess technical and data analytics skills extends well beyond those working in HR and has been reported by recruiters as one of the top challenges they face in finding qualified candidates for positions.<sup>38</sup>

Figure 2.5 displays growth in interest in HR analytics based on Google search term use. The value 100 represents the peak popularity for the search term, whereas the value 50 represents times in which this term had half the popularity. Data were queried from Google Trends for January 1, 2006, to January 1, 2023.

As shown in Figure 2.5, interest in HR analytics has been growing steadily since 2006, as indicated by the number of Google searches for the term “HR analytics.” Numerous organizations, including Google, Meta, and Microsoft, have expanded their internal HRM function by adding an HR analytics team. Further, companies like ADP, Inc., Workday, and SAP SuccessFactors offer products and services for analyzing people data in addition to those related to data collection and storage. These changes reflect the findings from the 2018 Deloitte Global Human Capital Trends Report, which showed that 85% of surveyed companies rated HR analytics as “important” or “very important” for their business, but less than half of the surveyed companies indicated they were “ready” or “very ready” for the HR analytics trend.<sup>39</sup> Thus, many organizations and HR departments are in need of individuals who possess knowledge and skills related to HR analytics.

**FIGURE 2.5** ■ Growing Interest in HR Analytics

### Identifying HR Analytics Competencies

Integrating HR analytics into the HRM function requires certain competencies that do not necessarily need to be held by a single individual. Ideally, HR analytics should be a team endeavor. Working as a team with diverse backgrounds and perspectives can facilitate sound judgments and good decision making, particularly when it comes to ethically or legally gray areas. While some HR analysts may have degrees in business or HRM, others may have backgrounds in industrial and organizational psychology, law, statistics, mathematics, data science, computer science, or information systems. Aside from educational differences among HR analysts, what matters most is that an HR analytics *team* is competent in the following seven areas: theory, business, data management, measurement, data analysis, employment law, and ethics (see Table 2.2).

**TABLE 2.2** ■ The Seven Competencies of Effective HR Analytics Teams

Competency	Description
<b>Theory</b>	Knowledge of psychological and social scientific theory is critical because findings from people data should be interpreted through the lens of human behavior, cognition, and emotion.
<b>Business</b>	Business knowledge and skills ensure the activities of an HR analytics team are in the service of HR and organizational strategies and thus help the organization gain a competitive advantage.
<b>Data Management</b>	Data management knowledge and skills ensure that data are acquired, cleaned, manipulated, and stored in a way that facilitates subsequent analysis while maintaining data privacy and security.
<b>Measurement</b>	Measurement knowledge and skills provide a basis for developing sound HR metrics and measures that demonstrate sufficient reliability and validity.
<b>Data Analysis</b>	Knowledge and skills related to mathematics, statistics, and data analysis are critical, especially when it comes to identifying an appropriate analysis technique to address a given hypothesis or question.
<b>Employment Law</b>	Knowledge of employment law and HR legal issues separates an HR analytics team from a general business analytics team; teams lacking such knowledge might inadvertently violate laws when collecting data, analyze data that should not be analyzed, or use data in ways that may result in adverse consequences for protected groups.
<b>Ethics</b>	Knowledge of ethics helps the team navigate legally gray areas while also answering the question: "Just because we can, should we?"

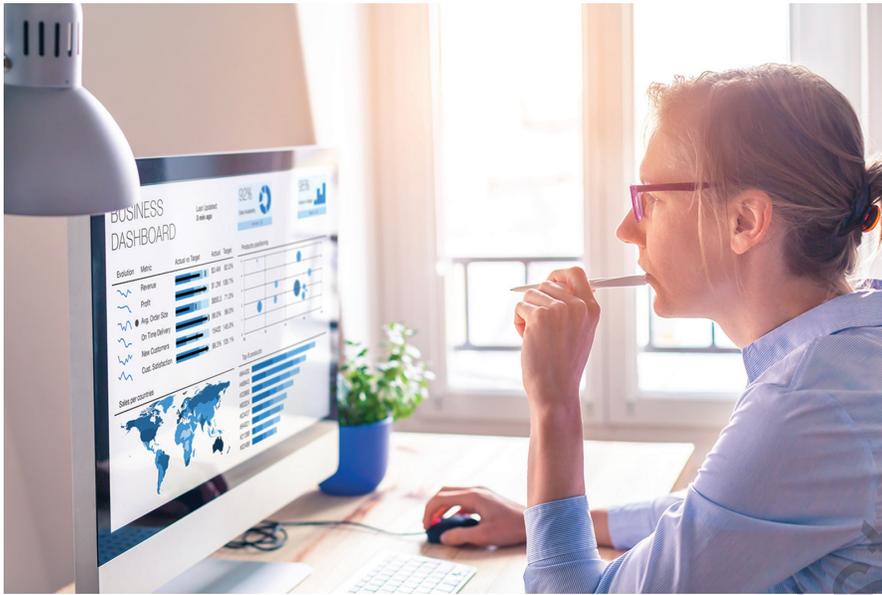
Even if you have no desire to become an HR analyst but still wish to work in HR, developing data analysis skills is wise. A common complaint from data analysts is that managers do not understand or recognize the value of data analysis and data-informed findings. Conversely, a common complaint among managers is that data analysts fail to provide *understandable* answers to the questions that managers *actually* need answered. Both complaints lead to frustration, and it is not uncommon for a rift to emerge between data analysts and managers. In recognition of this communication issue, Tom Davenport, who is an independent senior advisor to Deloitte Analytics, wrote a blog post praising what he refers to as *light quants*.<sup>40</sup> Whereas a *heavy quant* would include the likes of a statistician, mathematician, or data scientist, a light quant is someone who knows enough about mathematics, statistics, and data analysis to communicate with a heavy quant and who knows enough about the business to communicate with a manager. Davenport contends that many organizations with an analytics function would benefit from hiring or training individuals who qualify as light quants, as such individuals can help managers pose better questions for heavy quants to answer and, in turn, translate the findings of heavy quants into words and ideas that are understood by managers. Davenport refers to these individuals as *analytical translators*. We agree with Davenport and argue that all HR students and professionals should develop their competence in mathematics, statistics, and data analysis, at least to the point where they are able to bridge the communication divide between so-called heavy quants and managers.

### Understanding the Levels of HR Analytics

There are three levels of HR analytics and data analytics more generally: descriptive, predictive, and prescriptive. **Descriptive analytics** focuses on understanding what has happened already, providing a “snapshot” of the past. Often descriptive analytics involves operational reporting and includes summary statistics, such as sums, means, and percentages. For example, Kavitha Prabhakar, chief diversity, equity, and inclusion (DEI) leader at Deloitte US, and associates surveyed more than 1,500 U.S. workers to assess their trust in their organizations’ DEI initiatives. Applying descriptive analytics, they found that 80% of workers trusted their organizations to reach their stated DEI goals but that 40% of workers would consider quitting their organizations if they couldn’t trust their organizations’ commitment to DEI.<sup>41</sup> Additional examples of descriptive analytics include commonly reported HR metrics, such as absence rate, turnover rate, cost per hire, and training return on investment. HR dashboards serve as decision-support tools and provide managers with summaries of key HR metrics and other descriptive analytics to help them understand their workforce. Descriptive analytics does not have to be complicated, and most involve simple arithmetic.

The next level of analytics is **predictive analytics**, which focuses on predicting what is likely to happen in the future given what is already known. True predictive analytics also involves validating and evaluating the accuracy of those predictions. Often, predictive analytics involves building statistical and computational models. What is a *model*? Broadly speaking, a model offers a parsimonious representation of reality or the way we think things work. By extension, statistical models are mathematical approximations of reality based on data sampled from an underlying population. A common type of statistical model used in predictive analytics is the regression model. In fact, there are many different types of regression models, which can be used as the basis of artificial intelligence and machine learning algorithms. Using regression, we can evaluate the extent to which scores on one or more predictor variables are associated with scores on a particular outcome variable. For instance, in the context of selection, we might estimate a model to test whether applicants’ level of extraversion is associated with their future level of sales performance. We might then apply that model to future applicants’ scores on extraversion to make predictions about their future sales performance scores. Note that we do not expect 100% accuracy in our predictive models, as human behavior is influenced by many factors that may not be captured in the regression model. However, we strive to forecast future events and outcomes with as much accuracy as we can. As described by a SHRM Foundation report, very few companies have reached the level of predictive analytics, as the vast majority relies on descriptive analytics and basic reporting for HRM.<sup>42</sup>

Finally, the most advanced form of analytics is prescriptive analytics, and at this point, relatively few companies effectively apply prescriptive analytics to HR-related decision making. **Prescriptive analytics** focuses on what actions should be taken in the future based on what is known and what is predicted to happen in the future. Prescriptive analytics is forward-looking, just like predictive analytics, but prescriptive



Dashboards act as decision-support tools. Some dashboards are interactive and allow managers to manipulate the data display, drill down into different teams and units, and conduct “what if” analyses.

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analytics builds upon predictive analytics by taking data-informed predictions and translating them into different decision alternatives and courses of action. An overarching goal of prescriptive analytics is to optimize decision making to ultimately achieve the best outcome that is aligned with organizational strategy.

## HR ANALYTICS AND THE SCIENTIFIC PROCESS

### LEARNING OBJECTIVES

- 2.4** Summarize the arguments for a scientific, ethical, and legally compliant approach to HR decision making.

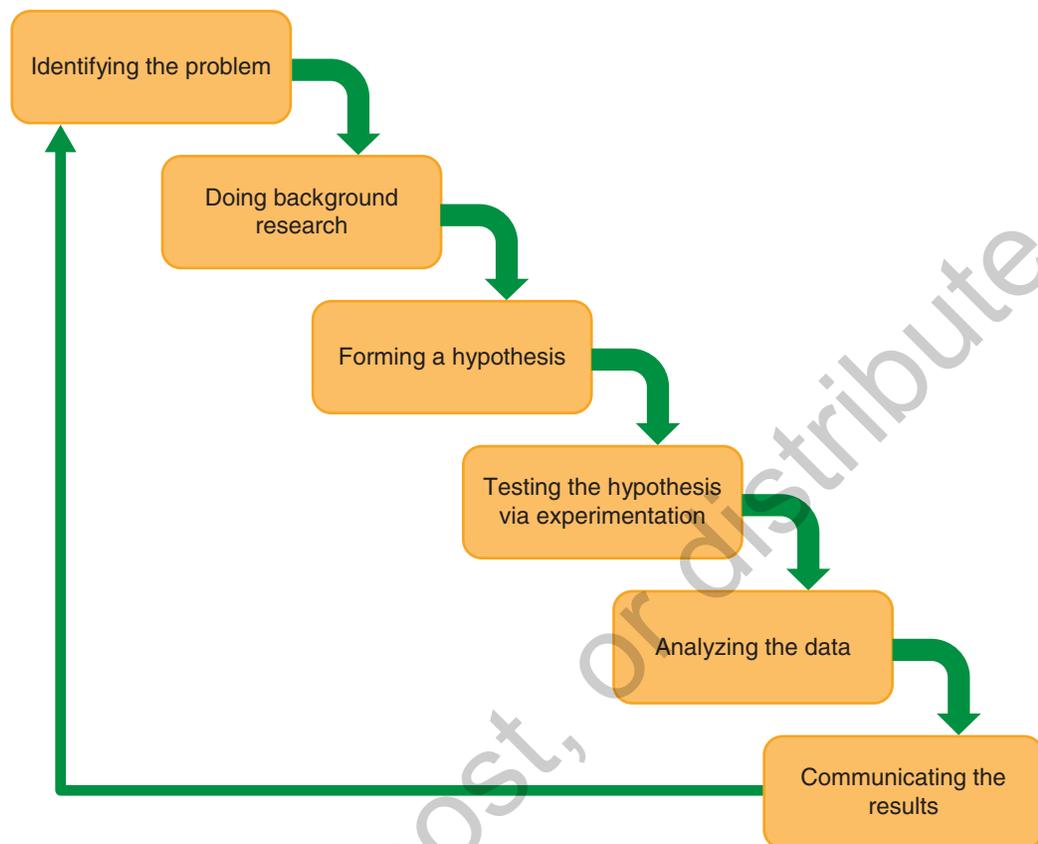
Regardless of whether a company uses descriptive, predictive, or prescriptive analytics, we recommend you envision HR analytics—and data-informed decision making, in general—as a scientific endeavor. The **scientific process** offers a rigorous framework for guiding the way in which HR departments collect, analyze, and interpret data in service of HR and organizational strategies. In essence, the scientific process can be thought of as a rigorous and rational approach to problem solving and decision making and consists of the six steps shown in Figure 2.6. The goals of science are to describe, explain, determine the cause, or predict some phenomenon of interest, such as employee productivity and turnover.

### Step 1: Identifying the Problem

Like any problem-solving approach, the first step of the scientific process is to identify and define the problem. That is, what specifically will you try to describe, predict, explain, or understand using analytics? Imagine your organization has been facing a retention issue, in which high-performing employees are leaving the organization voluntarily at a concerning rate. What’s more, turnover is a major cost for your organization. In fact, some estimates suggest that recruiting, selecting, and training a replacement employee can cost an organization between 90% and 200% of the annual salary for each person who leaves the organization.<sup>43</sup> Given the cost of voluntary turnover and your organization’s latest turnover rates (which represent a type of descriptive analytics), you might define voluntary turnover as a problem for which you wish to find a solution. Failure to solve the problem might impair the organization’s ability to achieve strategic objectives due to insufficient human capital.

**FIGURE 2.6** ■ Steps in the Scientific Process

The scientific process can be thought of as a rigorous approach to problem solving and decision making.



### Step 2: Doing Background Research

It is unlikely that the problem you identified is entirely unique to your organization. For example, others who came before you have investigated the problem of voluntary turnover. Universities and other academic institutions employ organizational scholars and researchers who have investigated countless organizational problems. Thus, before starting from scratch, look to prior theory and research to help you understand the phenomenon you wish to investigate using the scientific process. If you were to look through scholarly journal articles for the phenomenon of voluntary turnover, for example, you would find thousands of articles on the topic. In doing so, you might come across a meta-analysis that shows job dissatisfaction, low work engagement, and poor leadership predict voluntary turnover.<sup>44</sup> Plus, you might find a theory that can help you wrap your mind around why turnover occurs. For instance, the *unfolding model of turnover* describes how sudden changes or “shocks” at work or at home might lead to thoughts of quitting.<sup>45</sup> For example, the Covid-19 pandemic was a global shock that led workers across industries to reevaluate their jobs and employers, motivating some to quit. From a practical standpoint, doing background research can save your HR department money, as you will spend less time and energy on trying to solve a problem for which others have already found a viable solution.

### Step 3: Forming a Hypothesis

A hypothesis is simply a statement of what you believe or predict to be true. In other words, it is an educated guess based on the background research you performed. We recommend stating the hypothesis as an if/then statement. For example, based on your identification of the problem and background research, you might hypothesize: “If new employees perceive a low degree of job satisfaction, then they will be more likely to quit.” As a suggestion, try to make your hypothesis as specific as possible by

including conditional statements or qualifiers, such as “in this situation” or “for whom.” For instance, you might revise your hypothesis to state: “If *new sales* employees perceive a low degree of job satisfaction *after 3 months on the job*, then they will be more likely to quit *by the end of their first year*.” Remember, your hypothesis serves as a compass to guide you through the scientific process. For instance, a hypothesis informs what data you need to collect. In the turnover example, we would need to measure new sales employees’ job satisfaction, as well as pull organizational turnover records for employees at one-year post hire.

#### Step 4: Testing the Hypothesis via Experimentation

A true experiment is one of the most rigorous designs you can use to test a hypothesis. For a true experiment, employees must be randomly assigned to either a treatment or control group. Under some circumstances it may be impractical or inappropriate to conduct a true experiment. For instance, imagine a scenario in which you developed a new training module aimed at increasing new sales employees’ job satisfaction. Using a true experimental design, you could randomly assign half of new employees to a treatment group that receives the training and the other half to a control group that doesn’t receive the training. At the end of the first year, you could evaluate whether fewer individuals quit when they received the job satisfaction training.

Although using a true experimental design could give you greater confidence that increasing sales employees’ job satisfaction using training *causes* lower turnover, there are still practical and ethical concerns that should be considered. Namely, assuming the training increases job satisfaction and ultimately reduces the probability of voluntarily quitting, would it be ethical to withhold the new training from those in the control group? Given the potential consequences of not participating in the new onboarding module, you may argue that a true experimental design would not be ethical in this scenario. Instead, you might opt for another way of testing your hypothesis, even if it means you will be less confident that participating in the onboarding module is the reason behind reduced turnover. You might even conduct what are referred to as pre- or quasi-experiments, which lack a control condition or random assignment. Alternatively, you might opt for an observational design in which you survey employees or record their behavior through direct observation or archival organizational records. For example, to test our turnover hypothesis, we might administer a survey in which sales employees respond to a job satisfaction measure after 3 months on the job and then gather organizational turnover records 1 year later to assess whether each employee quit or stayed. Regardless of how a hypothesis is tested, it is important to consider the types of data that will be collected, as the type of data informs the type of analysis.

#### Qualitative Versus Quantitative Data

In general, there are two types of data: qualitative and quantitative (see Table 2.3). On the one hand, **qualitative data** are nonnumeric and include text or narrative data, such as interview transcripts or responses to open-ended survey questions. Additional examples of qualitative data include videos and photos. Qualitative data can be quite rich, providing important information about context and processes. Qualitative data, however, are analyzed differently than quantitative data. For instance, the transcripts from qualitative interviews could be thematically analyzed to uncover recurring themes. Qualitative data can also be used to uncover employee experiences that were not understood by the researcher. There are even software programs to facilitate this process, such as NVivo and ATLAS.ti. Sometimes HR analysts or artificial intelligence tools take qualitative data and transform them into quantitative data. As a simple example, an analyst might use sentiment analysis to determine the proportion of positive words relative to negative words that employees wrote when responding to an open-ended survey question. This process would, in effect, translate nonnumeric qualitative data to numeric quantitative data.

On the other hand, **quantitative data** are numeric and can be counted or measured in some way. Employee age is an example of a continuous quantitative variable, whereas employee voluntary turnover—when coded in binary as 0 = stayed and 1 = quit—is an example of a categorical quantitative variable. Statistical models can be estimated using quantitative data.

**TABLE 2.3** ■ Example of Qualitative vs. Quantitative Data

This data table provides an example of a qualitative variable and a quantitative variable. The performance description variable is qualitative because the associated data are nonnumeric and text. The performance rating variable is quantitative because the data are numeric.

Employee ID	Performance Rating	Performance Description
9082625	2.65	Peter performed satisfactorily. He still struggles with his TPS reports and arrives late to work at least once a week. Nonetheless, he showed glimpses of potential from time to time.
9077854	4.99	Lisa’s performance was exceptional this quarter. She went above and beyond on her grant proposals and showed great teamwork when she helped get a team member back up to speed who had been on maternity leave.

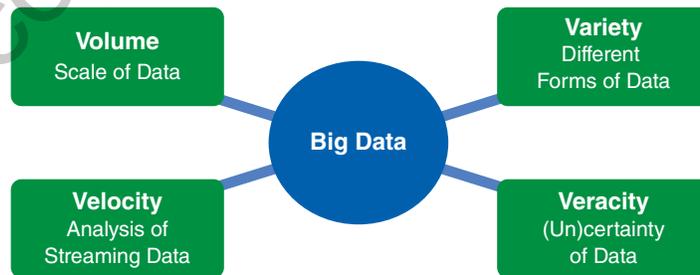
**Big Data Versus Little Data**

In addition to the qualitative vs. quantitative distinction, we can distinguish between big data and little data. The term *big data* has received a lot of attention in the popular press in recent years, and companies like Amazon, Meta, and Google have built enormous reputations and revenues from leveraging data to optimize business decision making. Amazon, for example, tracks huge volumes of consumer data and, using sophisticated algorithms, can predict what consumers will buy. In the realm of HRM, HR analysts have begun to use big data to make better people decisions.

But exactly what are big data? It turns out that the term *big data* means different things to different people. For some, big data simply mean a lot of data. For others, big data have to do with the structure of the data. For our purposes, **big data** refer to large (or massive) amounts of unstructured, messy, and/or quickly streaming data—sometimes from sources that we did not originally intend to use for analytical purposes (e.g., scraping résumé data). As shown in Figure 2.7, big data are also described in terms of four Vs: volume (amount of data), variety (different sources and forms of data), velocity (speed with which new data arrive), and veracity (trustworthiness of the data, data integrity, and certainty).<sup>46</sup> Together, these Vs provide an indication of the “bigness” and quality of big data.

**FIGURE 2.7** ■ Four Vs of Big Data

The complexity and size of big data can be described according to four characteristics: volume, variety, velocity, and veracity.



In contrast, **little data** are structured data that are gathered in smaller volumes, usually for previously planned purposes. Consider an analogy involving a water fountain and a fire hydrant to illustrate the distinction between little data and big data. Working with little data is like drinking from a water fountain; the water flow is steady, clean, slow, predictable, and easy to manage. Working with big data is like drinking from a fire hydrant spraying out untreated and unfiltered water; the water flow is voluminous, dirty, fast, largely unpredictable, and difficult to manage. Thus, working with big data requires a lot of up-front data management and restructuring, so much so that prepping big data for subsequent data analysis may require the expertise of a data scientist or data engineer.

## Data Collection and Measurement

Regardless of how or where data are collected, sound measurement is key. Think carefully about what is being measured and how it is being measured and distinguish between two terms: concept and measure. A **concept** is a theoretical construct, and job performance is a prime example. Performance on a given job entails multiple different behaviors. For instance, a sales position requires the enactment of customer service behaviors. Different **measures** can be used to assess the concept of job performance for a sales position. For instance, an HR analyst might survey customers for feedback on their experiences working with specific salespeople. Or the analyst might observe and rate salespeople interacting with customers. That is, different measurement types and sources can be used to measure the same concept. Regardless of the measure type, an analyst's goal should be to measure the target concept consistently and accurately.

## Step 5: Analyzing the Data

After testing your hypothesis through experimentation or observation, you are ready to analyze the data to formally test your hypothesis—that is, accept (confirm) or reject (disconfirm) the hypothesis. The way in which you analyze the data will differ based on whether you collected qualitative or quantitative data.

### Qualitative Data Analysis

As mentioned previously, qualitative data can be analyzed using a variety of analytical tools; however, the notion of hypothesis testing for qualitative data analysis differs from that of quantitative data analysis. Qualitative data analysis often involves agreement between independent coders/analysts to determine whether a phenomenon exists and the processes underlying that phenomenon. A full discussion of qualitative data analysis is beyond the scope of this textbook, but nonetheless, we highly recommend that you learn more about qualitative data analysis tools and techniques, as qualitative data can be a rich source of data and can answer unique questions. In fact, if you are interested in learning more about qualitative data analysis applied to understanding people in a workplace, we recommend reading the article by Annika Wilhelmy and Tine Köhler found in this end note.<sup>47</sup>

### Quantitative Data Analysis

A number of quantitative data analysis tools exist, and determining which one to use rests on a number of assumptions, including the type(s) of data you collected and your research design. For example, for categorical data analysis, statistical techniques like the chi-square test of independence may be appropriate. For designs in which the means of two or more continuous variables are compared, such as in a true or quasi-experimental design, a *t*-test or analysis of variance (ANOVA) may be appropriate. When testing the relation between two or more continuous variables, such as job satisfaction scores in relation to job performance scores, you might use analyses such as correlation or regression. Further, when you are modeling change over time, growth-modeling techniques can be applied, and when modeling the structure of social network interactions, social network analysis is appropriate. Our point is that there are many different types of statistical analyses, and part of the challenge being an HR analyst is determining which analysis is most appropriate given the data and the research design.

With the rise of big data, some HR analysts have begun to use artificial intelligence models and algorithms. The term *artificial intelligence* can mean many different things to different people, and what constitutes artificial intelligence is still a topic of discussion and debate. In HR analytics, however, **artificial intelligence (AI)** commonly refers to statistical or machine learning models that are highly complex, and AI can be used for both predictive and prescriptive analytics.<sup>48</sup> AI can be particularly useful when the goal is to identify patterns and make predictions using big data.

Interpreting results is the final stage of the data analysis process. Remember, data do not “speak”; they are interpreted or evaluated. That is, the act of interpretation, like other aspects of the scientific process, requires sound judgment and decision making. This also means that interpretation is susceptible to bias and error, which is addressed next.

## SPOTLIGHT ON LEGAL ISSUES: BIAS, FAIRNESS, AND REGULATION OF ARTIFICIAL INTELLIGENCE

Advances in AI have improved organizations' ability to make accurate predictions about the future. For example, using AI-based recruitment and selection assessments, organizations have improved predictions regarding which applicants will excel on the job. AI tools can assist, augment, or automate key HR decision-making processes, which can free up time for HR analysts and other HR professionals to contribute to other transformational activities.

However, even when developers and analysts have the best intentions, AI-based assessments can result in biased, unfair, or discriminatory decisions. The inherently complex nature of many AI tools can render their internal workings a "black box" with little transparency, making some tools very difficult to fully understand and therefore challenging to defend. Further, bias can creep into an AI tool in different ways. For example, to improve prediction accuracy, AI tools are provided with training data that have (hopefully) been sampled from the target population (e.g., organizational employees). If the data used to train and build the AI are collected in a biased manner or reflect biases in the organization's systems or processes, the AI may perpetuate those biases in its recommendations or decisions.

Amazon uncovered this type of bias firsthand when an engineering team in Edinburgh, Scotland, began developing a recruitment AI. Their goal was to create an AI that could scour the Internet to find promising candidates. As a preliminary step, the team trained the AI using 10 years of the company's historical résumé data. Because the training data were collected over a 10-year-period in which Amazon overwhelmingly hired men, the AI began to favor résumés from men, ranking them as more promising candidates. Behind the scenes, the algorithm scored candidates lower if their résumés contained the word *women's* or the name of two specific all-women's colleges. Ultimately, Amazon executives stopped development of the AI and have since indicated that the tool was never used by the company's recruiters.

Amid growing concerns, calls have been made to regulate the development and application of AI in general and AI-based assessments specifically. In 2021, leaders from the White House Office of Science & Technology Policy called for an AI "bill of rights" that would describe the AI-related rights and freedoms of the public. Without added transparency and proper audits, Lander and Nelson argued that AI tools could negatively impact individuals' civil rights. That same year, the U.S. Equal Employment Opportunity Commission announced that it had launched an initiative on AI, with the goal of providing guidance to employers, employees, vendors, and applicants on how AI tools can be used in a fair and unbiased manner.<sup>49</sup>

### Biases in Model Building, Testing, and Interpretation

We have hinted throughout this chapter that HR analytics involves many judgment calls and decisions. For instance, when building a regression model, the assumption is that you have included all necessary predictor variables to explain your outcome and no irrelevant predictor variables. This is a difficult assumption to meet, and it relies on the judgment and expertise of HR analysts to determine which variables to include and which to exclude in the model. Psychological and social-scientific theory can play a helpful role when determining which variables to measure and include in a model. At this point, we also reiterate a previous point that models are, by nature, a parsimonious approximation of reality—reality as perceived by humans. That is, models are inherently subjective. To that end, prominent data scientist and mathematician Cathy O'Neil reminds us of the subjective nature of models by stating, "Models are opinions embedded in mathematics."<sup>50</sup>

### Step 6: Communicating the Results

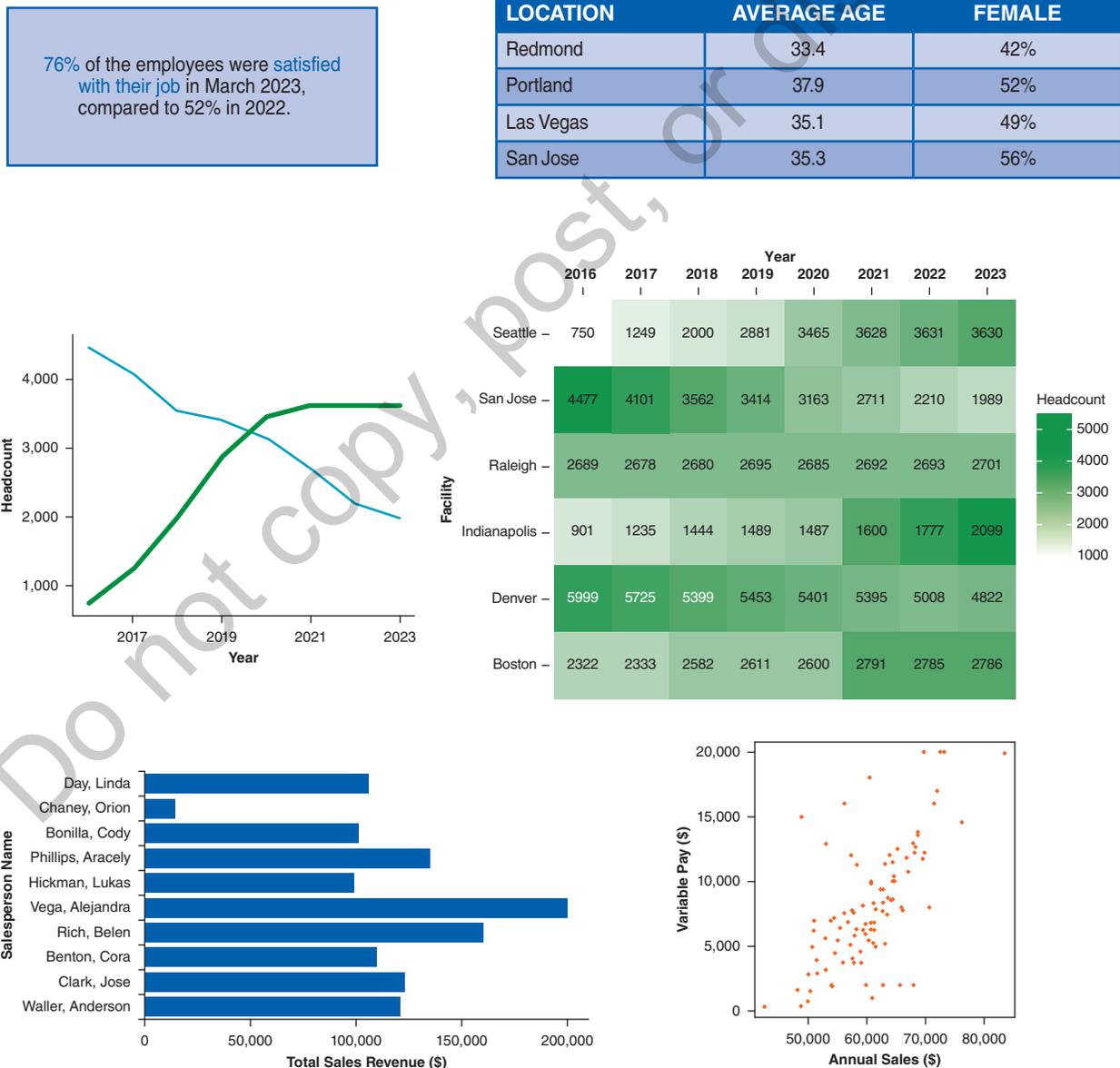
The way you communicate the results of the scientific process depends largely on where you work and the company culture. In academia, communicating results takes the form of a formal research paper at a conference or publishing a paper in a peer-reviewed journal. In other types of organizations, it is common to communicate findings in internal presentations, technical reports, or white papers. Amazon, for example, is known for communicating findings in technical reports that are read silently during the

first part of meetings. Many other companies rely on PowerPoint presentations in which written and oral descriptions of results are provided. In recent years, more value has been placed on creating easy-to-understand data visualizations. **Data visualizations** refer to pictorial and graphic representations of quantitative or qualitative data, which includes (but is not limited to) displays like bar charts, line charts, pie charts, and dashboards.<sup>51</sup>

Regardless of how you communicate the results, it is important to focus on the story you are telling. When storytelling with data, try to keep the story simple, be clear and concise, use repetition, and do not overburden the reader or viewer with too much information.<sup>52</sup> When possible, we recommend connecting the story to strategic objectives, a process referred to as *strategic storytelling*.<sup>53</sup> Finally, when deciding upon the specific results you wish to communicate, recognize the limitations of the data you collected and the study design you employed to test your hypothesis. In other words, take care not to overstate or exaggerate your findings. At the same time, do not understate your findings, either. See Figure 2.8 for examples of different data visualizations.

**FIGURE 2.8** ■ Examples of Different Types of Data Visualizations

Data visualizations can take different forms, from simple text to bar graphs to geographic plots. Pick the visual that best represents the data and tells the most accurate story.



## ENSURING HR ANALYTICS SUCCESS

### LEARNING OBJECTIVES

#### 2.5 Manage the components of a successful HR analytics function.

A sustainable HR analytics function requires considering several important issues. First, HR analytics should be integrated and embedded into HR and organizational strategies, and this requires taking a systems perspective of the organization and its various subsystems. Earlier in the chapter, we described how Chevron integrated its HR analytics team into the organization and created a community of practice to bring together those employees interested in analytics. HR analytics can become an integral part of the HR strategic business partnership by leveraging people data to inform and support people decisions and strategy. In other words, the HR analytics function can provide data-informed recommendations regarding the design and implementation of HR practices to facilitate the organization's achievement of strategic objectives.

Second, HR analytics should be integrated into the culture of HR and the organization. As we previously noted, many executives continue to make major decisions based on their gut instincts, or intuition. As such, developing an HR analytics function in some organizations may be difficult, especially if the culture does not ostensibly value data and data-informed decisions. By gaining manager support and creating a culture that supports evidence-based practices, the HR analytics function will have a better chance of implementing changes.

Third, and related to the second point, HR analytics must be paired with good change management, where change management refers to the “systematic process of applying knowledge, tools, and resources to transform the organization from one state of affairs to another.”<sup>54</sup> People have a natural tendency to resist change, and thus, in addition to creating a culture supportive of data-informed decision making, a culture of continuous change should be cultivated as well.

Fourth, an HR analytics team must include the right people with the right mix of competencies. Earlier in the chapter, we recommended the following seven competencies: theory, business, data management, measurement, data analysis, employment law, and ethics. Deficiencies in any one of these competencies within a team may result in failure to contribute or, worse, may use HR analytics in ways that are illegal or unethical.

Finally, we cannot overstate the importance of ethics. Today, new information technologies make it easier than ever to collect, manage, and analyze potentially sensitive people and organizational data, and with these new technologies come new ethical responsibilities. For example, some platforms allow us to systematically scrape data about our employees from social media sites. Before doing so, however, we must pause and ask this question: “Just because we can, should we?” For example, just because we can scrape employees' social media data with ease and just because those data might be predictive of employee outcomes, should we do it? The same rigor that is applied to the scientific process should also be applied to decision making surrounding what data to use, how to use data, and whether to run certain analyses. Referring to the systems perspective once more is important because it reminds us of the interconnectedness between ourselves and other organizational entities. In other words, a systems perspective reminds us that one decision—ethical or not—can result in a large ripple effect through the organization system and beyond.

### CHAPTER SUMMARY

HRM has evolved immensely over the past century, with the development of strategic HRM, data-informed decision making, and HR analytics. Leading organizations leverage their HR function to inform and support organizational strategy; to realize employee, operational, stakeholder, and financial outcomes; and to achieve a competitive advantage. Data-informed decision making in the form of HR analytics plays an important role in strategy realization. An effective HR analytics function can be leveraged to improve the quality of decisions we make by informing the way an organization collects, manages, analyzes, and interprets its people data.

## KEY TERMS

Ability-motivation-opportunity model	Prescriptive analytics
Artificial intelligence (AI)	Qualitative data
Balanced scorecard	Quantitative data
Big data	Resource-based view
Concept	Scientific process
Data visualizations	Stakeholders
Data-informed decisions	Strategic human resource management
Descriptive analytics	Strategy
High-performance work practices	Strategy formulation
Human capital	Strategy implementation
Human resource (HR) analytics	Strategy type
Little data	SWOT analysis
Measure	Systems perspective
Mission	Values
Predictive analytics	Vision

## HR REASONING AND DECISION-MAKING EXERCISES

### Mini-Case Analysis Exercise: Organizational Culture and the Success of HR Analytics

Chapter 1 discussed the importance of organizational culture in relation to HRM. Specifically, the chapter reviewed a popular organizational culture typology called the competing values framework, which characterizes different culture types by their emphasis on either collaboration, creating, controlling, or competing. The culture types are as follows: clan, adhocracy, market, and hierarchy. Given what you learned in this chapter about HR analytics and data-informed people decisions, consider how the different culture types might influence an organization's acceptance of HR analytics.

Now, you decide:

1. For which organization culture type do you think HR analytics will best integrate? Is there an ideal culture type to support HR analytics? Why?
2. Which organization culture type will be least likely to accept HR analytics as a viable part of the organization's strategy? Why?

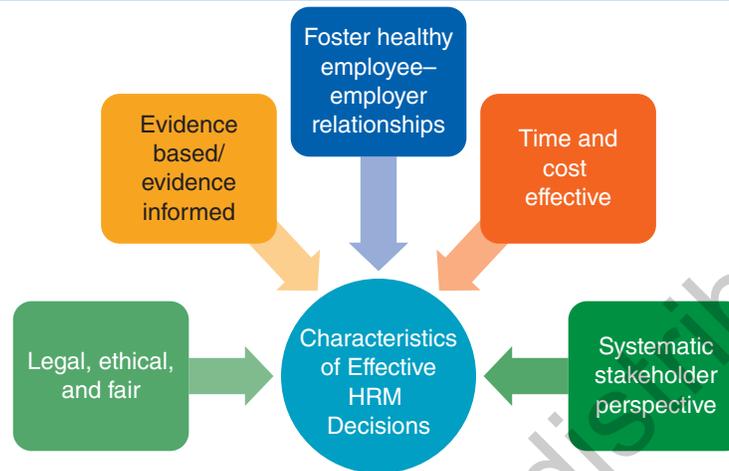
### HR Decision Analysis Exercise: The Case of Gravity Payments

The CEO of Gravity Payments, Dan Price, made national headlines in 2015 when he announced that he would be increasing all employees' annual pay to \$70,000 over the course of several years. Price had read a study showing that emotional well-being improved as income increased, up until about \$75,000 a year, and he was inspired to raise his employees' pay with the hope that it would lift their emotional well-being. Reportedly, he moved very quickly when making this major decision. In the months that followed his compensation announcement, Price was both cheered and jeered. His supporters touted his inspirational message, while his critics argued it was all a publicity stunt and questioned his motives. In addition, not everyone within the company was happy with this decision. Within 3 months, two of his most-valued employees had quit, citing the fact that newer and less experienced employees would make the same amount of money. Some of his company's clients commended him, while other clients said he made their job harder because they feared they would have to justify the costs of services that might come with the pay increases.<sup>55</sup>

Six years later, in 2021, Dan Price reported that the company was thriving, having almost doubled its workforce and cut its turnover rate by half. After the company lost 55% of its business at the start of the Covid-19 pandemic, some employees voluntarily reduced their salaries to keep the company afloat. When business bounced back, the company repaid the employees who had voluntarily sacrificed their own pay.<sup>56</sup>

Now, answer the following questions regarding what you think about Price's HRM decision making in terms of the five characteristics of effective HRM decisions depicted in Figure 2.9.

**FIGURE 2.9** ■ Characteristics of Effective HRM Decisions



Source: Reprinted from *SHRM Competency Model* with permission of the Society for Human Resource Management. © SHRM. All rights reserved.

*Be sure to include specific examples from the case or your own research to support your answers.*

**Was Dan Price's HRM decision legal, ethical, and fair?**

**Was it evidence based/evidence informed?**

**Did it foster healthy employee-employer relationships?**

**Was it time- and cost-effective?**

**Did it take a systematic stakeholder perspective?**

*Considering your analysis above, overall, do you think this was an effective decision? Why or why not?*

*What, if anything, do you think should be done differently or considered to help make this decision more effective?*

### **HR Decision-Making Exercise: Building Your HR Analytics Team**

HR analytics is an interdisciplinary field, and as a result, HR analytics teams are often composed of individuals from different disciplines, specializations, and degree programs. Critical areas of expertise in any HR analytics team include the following: theory, business, data management, measurement, data analysis, employment law, and ethics. For this exercise, work in a group to determine how you would recruit, select, and train members of an effective HR analytics team.

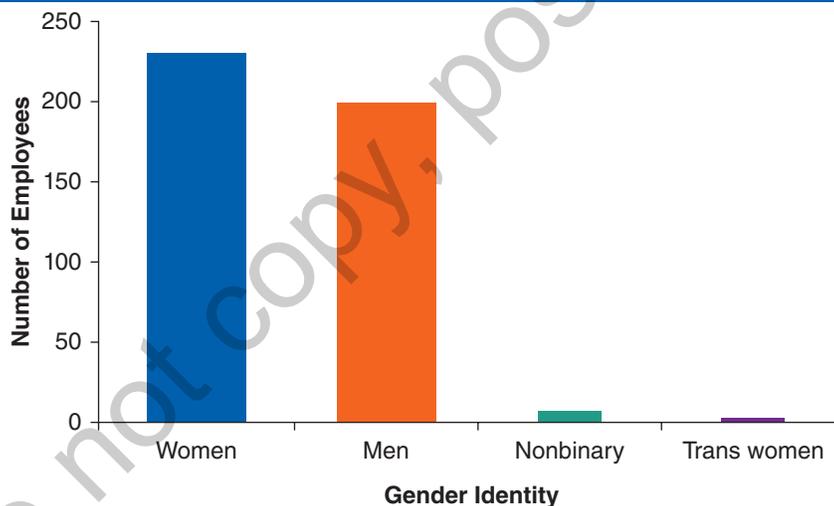
1. As a group, create a series of jobs for which you will ultimately recruit and select new employees. A given job may cover more than one area of expertise, and multiple jobs may overlap in terms of some areas of expertise.
2. For each job created in Step 1, identify the competencies and educational/professional experiences that are necessary for success.
3. Develop a brief recruitment and selection strategy for each job. In other words, where will you recruit individuals for these positions? Why? How and why will you select and hire individuals for these positions?

## DATA AND ANALYTICS EXERCISE: DESCRIBING YOUR DATA

Summarizing people data using descriptive analytics can provide valuable insights into the state of your company. Although there are a number of common HR metrics such as turnover rate and yield ratio, often it is valuable to summarize basic demographic data, survey data, and performance data using descriptive statistics like frequency, percentage, mean, median, mode, and standard deviation. Part of the challenge is determining which descriptive statistic to use to describe a particular variable. Regarding quantitative variables, one can distinguish between categorical variables and continuous variables. Although variables can be described in even more specific terms, the categorical and continuous distinction is an important one.

A *categorical variable* consists of multiple levels, but these levels do not have a particular order or inherent numeric values. For example, race is typically operationalized as a categorical variable, where the levels of the race variable correspond to the different categories of race (e.g., Asian, Black, White), in no particular order. As another example, for reporting purposes, employee gender identity can be reported as a categorical variable with levels such as agender, man, woman, nonbinary, trans man, and trans woman. When we report categorical variables, we often use frequency or percentage to describe the data. For example, imagine that a company employs 230 women, 199 men, 8 nonbinary, and 4 trans women. We could describe gender identity using two frequencies: frequency of women (230), men (199), nonbinary (8), and trans women (4). Alternatively, we could describe each level of the gender variable as a percentage. For example, 52.2% of employees identify as women ( $52.2\% = 230 / (230 + 199 + 8 + 4) \times 100$ ), and 1.8% identify as nonbinary ( $1.8\% = 8 / (230 + 199 + 8 + 4) \times 100$ ). Data visualizations like the bar charts shown in Figures 2.10 and 2.11 facilitate the communication of such descriptive analytics findings.

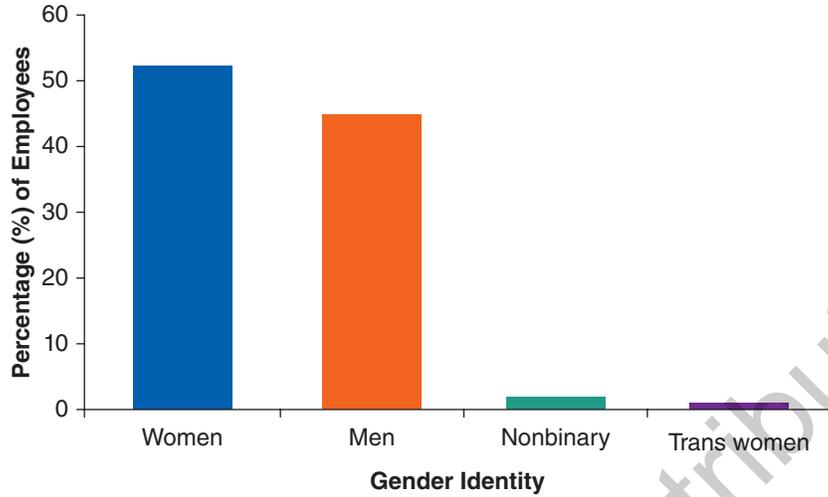
**FIGURE 2.10** ■ Bar Chart Displaying Frequency of Each Gender Identity



A *continuous variable* consists of a continuum of numerically ordered values. A classic example is employee age when measured in years. Years can be ordered such that we can say someone who is 39 years is older than someone who is 38 years, and thus, one value is larger or higher than another value. Although many survey response scales technically represent what are referred to as ordinal variables, which are distinguishable from continuous variables, we often treat them like continuous variables for the purposes of data analysis. For instance, in an employee engagement survey, you might ask employees to respond to different survey items using a 5-point response scale ranging from *strongly disagree* (1) to *neither agree nor disagree* (3) to *strongly agree* (5).

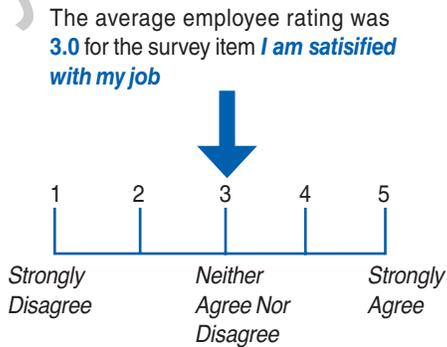
To summarize employees' ages or their responses to the item "I am satisfied with my job," you could compute descriptive statistics of central tendency and/or dispersion. For example, you might find that

**FIGURE 2.11** ■ Bar Chart Displaying Percentage of Each Gender Identity

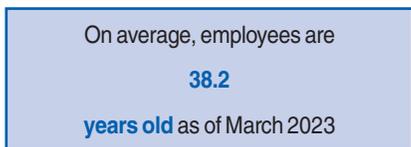


the *mean* (average) employee age is 38.2 years with a *standard deviation* of 5.4 years. This means that the center of the distribution of employee ages is 38.2 years and that about two thirds of employees' ages fall within 5.4 years of 38.2 or, in other words, 32.8 to 43.6 years. Similarly, you might find that the mean response to the job satisfaction item is 3.0, which indicates that, on average, employees neither agree nor disagree with the statement: "I am satisfied with my job." A standard deviation of 1.2 for responses on that item, however, indicates that approximately two thirds of employees' responses fall within 1.2 points above and below the mean or, in other words, 1.8 to 4.2. Thus, in that example, a large proportion of employees' responses varied anywhere from slightly dissatisfied to slightly satisfied with their job. When creating a data visualization for a mean, there are many options; Figures 2.12 and 2.13 provide examples.

**FIGURE 2.12** ■ Example of Data Visualization Used to Describe the Average Age of Employees



**FIGURE 2.13** ■ Example of Data Visualization Used to Describe the Average Employee Rating for a Survey Item



In summary, descriptive analytics includes basic summary statistics and the data visualizations used to communicate those summary statistics. Identifying the difference between categorical and continuous variables is the first step toward picking the right statistic to summarize your data.

**Excel Extension: Now You Try!**

- On [edge.sagepub.com/bauer2e](https://edge.sagepub.com/bauer2e), you will find an Excel exercise on descriptive analytics. Specifically, you will compute basic descriptive and summary statistics for the following variables from a sample dataset: age, gender, race, engagement, and pay.
- First, you will classify each variable as either a categorical or continuous variable.
- Second, you will select and compute appropriate descriptive and summary statistics to describe the variables.
- Third, you will create a data visualization in Excel to help communicate your findings.

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