Data Management and Human Resource Information Systems

3

CHAPTER 3 OUTLINE

LEARNING OBJECTIVES:

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

3.1 Describe key aspects of data management.

3.2 Apply opportunities for data management and HRIS.

3.3 Identify and address challenges for data management and HRIS.

3.4 Address key points of the process of HRIS implementation.

3.5 Apply core information system concepts in HR management.

3.6 Describe basic technical aspects of developing an HRIS.

Opening Case

Shifting to a Data-Driven Organization with Hris: The Case of Nissan[1]

As former Nissan CEO Carlos Ghosn tells it, in 1999, the Japanese carmaker Nissan was in trouble. The company had not been profitable for 8 years, its margins were low, and it was estimated that the car company gave away $1,000 for every car it sold in the United States. In addition, plant capacity was much larger than demand, leading to high overhead costs. In the hopes of turning things around, French carmaker Renault invested $5.4 billion in Nissan for an equity stake in the company. After their strategic alliance governed by cross-sharing agreements was struck, Renault-Nissan became the fourth-largest car company in the world. But the alliance only made sense if Nissan could turn things around. Ghosn was asked to do just that.

Akio Kon/Bloomberg via Getty Images

Carlos Ghosn at the Toyota Motor Show in 2015.

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Nissan logo on a car

One of the major ways that Ghosn set out to turn things around was to transform HR to a *shared services model*. This entailed a multitier HR service delivery system, where employees first had access to technology that allowed them to answer their own questions and to make most of their HR-related decisions on their own. If employees still needed help, then their question could be escalated to the next level of service, which included sending a ticket to a shared service desk. Finally, if the HR concern was not resolved at that level, it was escalated to HR experts. This change was transformational in allowing HR staff to shift from spending much of their time on administrative and transactional activities to spending more time on activities associated with being a strategic business partner.

Today, Renault, Nissan, and Mitsubishi are all part of unique strategic alliance partnership. However, in 2012, Nissan was running multiple non-cloud-based HR systems across its multiple regions without a way to link them. For example, Nissan ran SuccessFactors and Oracle's PeopleSoft in North America but SAP HR packages in Europe and outdated software in Japan. Through pressure from Nissan's board to streamline the HR systems, Alfonso Díez David, Alliance General Manager of Global Digital Human Resources at Renault-Nissan-Mitsubishi, was tasked with integrating and unifying all of Nissan's HR systems to achieve global consistency. The transition was not without its challenges, but after successfully piloting the Workday, Inc. platform in Hong Kong and South Africa, Nissan rolled it out to North America and Japan in 2016. By 2017, both the French carmaker Renault (with nearly 125,000 employees in 128 countries) and Nissan (with nearly 140,000 employees in over 160 countries) had a global cloud-based HR software system.

Díez David explains that the rationale behind the major investment in time and money to move to a single global HR system was to allow Nissan to compare "apples to apples" when it came to employees and HR. Another major driver was the desire to leverage analytics to manage their talent globally. The hope was to save time for HR staff by offloading common administrative HR tasks and allowing them time to focus on high-value data analytics to help Nissan become more efficient and profitable.

Díez David recommends several things when rolling out a major HRIS project such as this one including:

- Being user-centric
- Recruiting system champions to answer questions and help with trainings locally
- Focusing on data quality up front to avoid problems later on
- Investing in the management of data privacy concerns

Of course, the changes made with Nissan's HR system and their global HRIS rollout are not the only factors influencing Nissan's successful turnaround. However, this case remains a valuable reminder of how important data management and HRIS are as a foundation to strong organizations.

Case Discussion Questions:

1. Nissan underwent a great deal of change in a short period of time. How do you think the employees who were asked to make these changes reacted along the way?
2. Díez David shared four recommendations for those considering a major HRIS project. Can you think of other recommendations that might make sense to help the process go smoothly?
3. What role do you think HRIS played in Nissan's turnaround story?
4. Do you think there are any downsides to having a global HRIS in place? If so, what could be done to help mitigate those problems in the design and implementation phases?

Click to learn more . . .

Read more about how Nissan was transformed by reading *Shift: Inside Nissan's Revival* (2004) by former Renault and Nissan CEO and current Mitsubishi CEO Carlos Ghosn.

After reading Chapters 1 and 2 of this book, you can see that our approach to covering HRM is based on the concepts and developments you will need to understand now and in the future of HR, organizations, business, and your own career. Among those concepts are the skills needed to make use of data to make sound HRM decisions. In today's business world, effective HRM requires that organizational members be knowledgeable about how data are managed, stored, retrieved, merged, analyzed, and reported to help with data-driven decision-making. Even if they are not data analysts or experts in ***human resource information systems (HRIS)***, everyone should be familiar with issues around data management and HRIS. Understanding these concepts will make you an effective consumer of data and its possibilities within your organization regardless of your position, functional area, or title.

Managing Data

LO 3.1 Describe key aspects of data management.

Recall from Chapter 1 that the availability of people data has increased dramatically with advances in technology and data-gathering tools. ***People data*** refer to data associated with various groups of individuals, such as employees and other stakeholders, who might be integral for an organization's success. As described in Chapter 2, HR analytics has emerged as an approach to leveraging people data to make data-driven decisions to improve the flow of human capital into and through an organization. Because of this, strategic data management has become especially salient to HR professionals and HR analysts. As seen in the Nissan case, HR has long since outgrown the days of employee records and data stored on paper and housed in filing cabinets. Before computer-based information systems became the norm, relatively small amounts of data were accessed with regularity, and merging data from different files was a cumbersome and time-consuming process. Today, with ever-accumulating amounts of people data and sometimes easier access to such data, we must think critically, ethically, and legally about how large volumes of data about individuals are stored and managed and how advances in information systems are

used to facilitate this process. HR information systems and electronic HRM (e-HRM) represent two closely related HRM data management topics that play an important role in that regard. In many organizations, HR information systems and e-HRM are integrated into a larger cross-functional data management system called an enterprise resource planning system—all of which can be broadly classified as information systems.

Enterprise Resource Planning Systems

An ***enterprise resource planning (ERP)*** system refers to integrated business management software intended to coordinate and integrate processes and data across different functional areas of a company, such as accounting, sales, finance, operations, customer service, and HRM. For instance, an ERP might capture, track, and integrate data pertaining to payroll, inventory, production capacity, applicant tracking, and purchase orders, to name a few. By integrating data cross-functionally, an ERP creates a robust data ecosystem, which enables organizational stakeholders to take a systems perspective when making important decisions. For example, imagine that customer service data residing within an ERP indicates that customer service representatives have been fielding increasingly more customer complaints having to do with faulty products. Using those data, a decision maker on the manufacturing floor might investigate where mistakes are being made in the production process. Ultimately, that decision maker might reach out to someone from the HR department with expertise in employee training to help design a new training program for manufacturing employees. Thus, a well-designed and well-integrated ERP has the potential to improve decision-making across different functional areas, as the entire business can be viewed as integrated system with separate yet related subsystems.

Like most technology, an ERP was originally a luxury of large companies. As computer processing speeds and data storage capabilities improved and came down in cost, introducing a robust ERP system became a reality for smaller and smaller companies. This has been great news for small- and medium-sized businesses, as ERPs were historically extremely expensive, and now many HR needs can be met for smaller businesses using ERPs at prices that are affordable.

Human Resource Information Systems

Many organizations incorporate an HR information system within their broader ERP system, such that HR processes and data are linked to and integrated with data from other business functions. An HR information system (HRIS) refers to a "system used to acquire, store, manipulate, analyze, retrieve, and distribute pertinent information about an organization's human resources,"[2] and the concept of HRIS can be nested within the broader concept of e-HRM. At its most basic, an HRIS is simply a system of the following: input → data management → output. Broadly speaking, ***e-HRM*** refers to Internet-based information systems and technology that span across organizational levels.[3] HRIS represents the confluence of HRM and information technology, and when coupled with strategic HRM, HRIS offers a way to realize synergies between and across different HR practices. It can provide a wealth of readily available data to provide organizational decision makers with accurate and timely information.

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Web-based HR systems such as this one by Workday allow individual employees and organizational decision makers access to data in real time.

Just like the broader ERP system, an organization can use its HRIS to integrate people data across

different HR functions, such as recruitment, selection, training, performance management, compensation, and benefits. Moreover, an HRIS can be designed to automate transactional HR activities, such as benefits enrollment or applicant tracking. After World War II, the payroll function was one of the first to be automated using early computers and information systems. As computer technology advanced in the following decades, organizations began to integrate web- and cloud-based services into their HRIS. An HRIS is a cost-saving tool, as it can reduce errors and increase efficiencies related to storing, accessing, and using data. For example, DHL, the largest international logistics company in the world, had employees apply for leave using physical forms that were then sent overseas to be processed, which was time consuming and frustrating to employees who wanted to know the status of their leave requests in a timely manner. In 2008, DHL transitioned from a web-based system to something much more efficient. As Jitin Patel of DHL says, "Our employees applied for leave by filling forms that were then sent to Malaysia payroll office for approval, such vague and lengthy process totally frustrated HR and payroll staff. It also incurred lots of leave liabilities. Leave records could not be traced without an online leave application." Following their transition, DHL now has "a simple and user-friendly system which enables DHL Supply Chain to start even with minimal training."[4] Thus, an HRIS can help HR become more efficient. Beyond efficiency, an HRIS, by definition, involves the complex collection, storage, and analysis of people data, providing an opportunity to analyze these data to make better people decisions.

As seen in the opening case of Nissan, the hallmarks of an advanced HRIS are consistency, accuracy, timely access to data, and integration. Rather than using a separate and insular information subsystem for each core HR function—such as selection, training, performance management, and retention—an advanced HRIS integrates people data across HR functions. And when integrated into a company's ERP, the comprehensiveness of the data becomes even more robust. Further, allowing subsystems to "speak" with one another means that analysts can retrieve and merge data from multiple subsystem functions for subsequent analysis and reporting. A number of vendors (e.g., Oracle, SAP) offer HRIS and ERP solutions, thereby facilitating data management and integration processes. In fact, many vendors now integrate data analytics solutions into their data management platforms. Integrated analytics solutions reflect tremendous advances in computing power such as those described in Chapter 1 regarding Moore's Law. At the click of a button, the software can run and generate off-the-shelf analyses and reports.

Some vendors, like ADP, offer proprietary data analysis algorithms to predict important outcomes, such as employee retention. Because such algorithms are proprietary and thus considered intellectual property, the specific criteria used in the algorithmic models often remain locked in a "black box" where the contents are unknown. As such, HR professionals—and all organizational members—should do their due diligence to understand, to the best of their ability, what data are being used in such models and how to properly interpret output or results from such models.

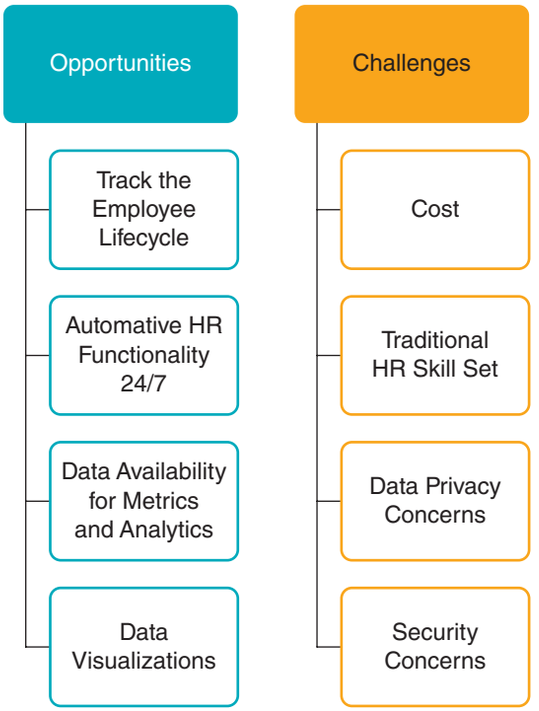
Opportunities for Data Management and Hris

LO 3.2 Apply opportunities for data management and HRIS.

When it comes to data management and HRIS, there exist a number of opportunities, as well as challenges. Figure 3.1 illustrates several of these when it comes to developing, implementing, and maintaining an HRIS. Opportunities exist in the form of being able to track the employee throughout their employment lifecycle, automating HR functionality for employees, allowing data to be available for HR analytics, and storing and merging employee attitude surveys and other sources of people over time. An example of HRIS in practice is Virginia Beach, Virginia (a town with more than 6,000 city employees and 45 city HRM professionals). In 2003, it embarked on what was considered an innovative approach to merging data from the city's HRIS, the Virginia Retirement System, and other data sources to enhance their workforce planning efforts. Managers can now use the system to understand projected retirement statistics, changing workforce demographics, and pending job vacancies, making the city more proactive and less reactive in terms of workforce planning.[5]

FIGURE 3.1

Both opportunities and challenges exist for organizations when it comes to data management and HRIS, and this figure presents examples of both



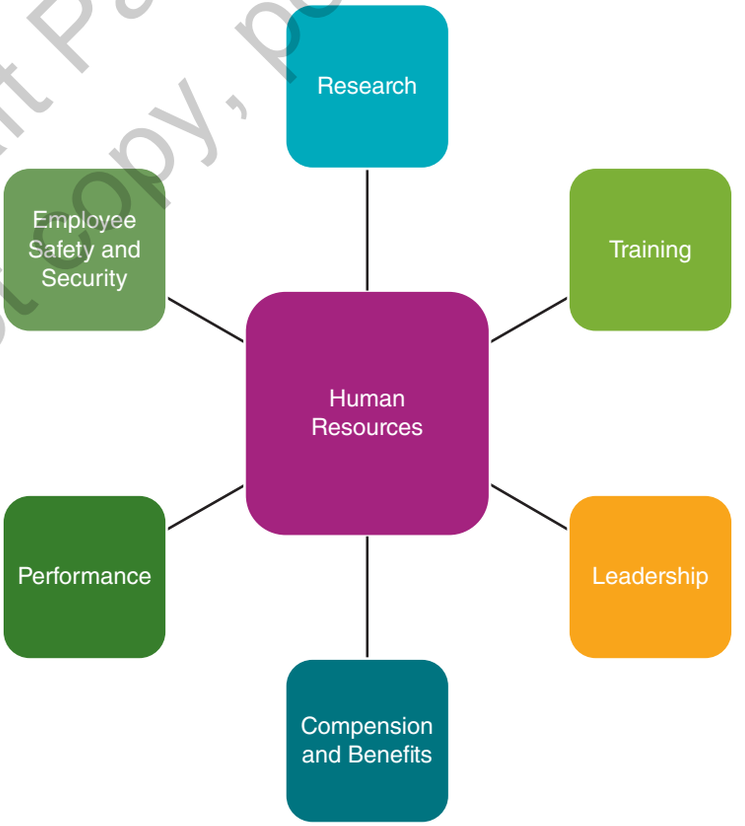
Track the Employee Life Cycle

Recall that HRM is *the constellation of decisions and actions associated with managing individuals through the employee lifecycle to maximize employee and organizational effectiveness in attaining goals.* This includes a range of functions such as analyzing and designing jobs; managing diversity and complying with local, national, and global employee laws; recruiting individuals to apply for jobs; selecting individuals to join organizations; training and developing people while they are employed; helping to manage their performance; rewarding and compensating employee performance while maintaining healthy labor relations and helping to keep them safe; and managing their exit from the organization (see Figure 3.2).

Thus, a major opportunity for an organization is to manage the valuable resources that are data in a manner that helps the organization not only describe their employees and predict their future movements throughout the organization but also prescribe what the ideal state of HR will be in the future. Effective data management and HRIS are critical to realizing this potential. One study of HR executives and managers working in diverse countries, including Argentina, Brazil, China, India, Latvia, and Slovakia, found that the presence of a global HRIS was related to higher staff retention of global IT service providers in emerging markets. This was especially helpful in decreasing turnover for employees assigned to other countries as the support of a global HRIS for scheduling and training were cited

FIGURE 3.2

HRM is the linking pin for many critical people decisions such as what skills are needed, who to hire, what training employees need, how they are performing, and leadership development and succession planning. All of these are facilitated by having real-time data to help inform those decisions.



SPOTLIGHT ON DATA AND ANALYTICS

Talent Analytics for Retention[10]

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HR analytics has many uses, and companies have started leveraging data collected during and after hiring employees to predict and manage retention. Companies can link a wide variety of information at their disposal to employee turnover and determine the strongest drivers of turnover. Identifying employees at risk of turnover may then be used to develop targeted interventions for those employees. For example, the telecommunications company Sprint found that employees who have not signed up for the company's retirement program are at risk of leaving shortly after being hired.

In addition to identifying predictors of turnover, many companies examine low work engagement and job satisfaction as early and lagged indicators of turnover. This means that conducting regular surveys and tracking results and metrics over time will be helpful. For example, JetBlue Airways created a "crewmember net promoter score," which asks employees their willingness to recommend the company as a place to work. Net promoter scores are usually used to measure customer satisfaction, but JetBlue asks this question to all new hires on their hire date, which means the company can regularly track these data.

Simply tracking satisfaction and engagement data may not achieve the goal of reducing employee turnover: The company will need to intervene using these data. The food service company Sysco tracks satisfaction ratings of their delivery associates and intervenes when satisfaction drops below a certain point. Using this methodology, the company was able to increase their retention rate from 65% to 85%.

It is also possible to identify the specific employees who are at risk for turnover for intervention purposes. At Credit Suisse, once employees with high turnover risk were identified, internal recruiters called employees to notify them about internal openings. This method allowed the firm to retain employees who might have left the company otherwise. Preemptive intervention is often a better strategy than providing a counteroffer to an employee who gets a job offer.

At the same time, companies will need to be careful in what type of data they use and how they intervene. It is technically possible for businesses to monitor how much time employees spend in networking sites such as LinkedIn or to use data from employee badges to see which employees may be interviewing at other locations within the company. Then, the manager of the employee may have a conversation with at-risk employees about whether they are happy about their jobs. Although there is value in having career-related conversations with employees, this situation may quickly evolve into a "Big Brother is watching" scenario, violating employee feelings of trust, privacy, and fairness, depending on how the manager broaches the subject. Any intervention with individual or groups of employees should reflect a genuine concern for employee well-being and career goals in order to be useful for turnover reduction.

as helpful for new employees and their managers alike.[6] It is clear that "the effective management of human resources in a firm to gain a competitive advantage requires *timely and accurate information* on current employees and potential employees in the labor market."[7]

The Value of Automated, Employee-Centered HR Functionality

Chapters 1 and 2 point out the trend in HRM is moving away from processing paperwork and more transactional interactions toward more strategic work. We have discussed the benefits of this approach in terms of time and cost savings as HR becomes more efficient. However, it also means better customer service for employees. Rather than waiting for HR to process paperwork, answer questions, or implement changes, employees now have access to their HR systems 24 hours a day, 7 days a week. Some questions are escalated to HR professionals, but many of their

HR IN ACTION

Valero Energy Gets Analytical[13]

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

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

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

more routine questions can be answered anytime and anywhere. Research shows that the perceived ease of use and perceived usefulness of an HRIS are related to higher job satisfaction and lower turnover intentions.[8] Thus, moving toward automated, employee-centered HR functionality meets two goals. First, it enables employees to access information more quickly and to verify the accuracy of the data, as they can view and detect inaccuracies more readily, which helps them

feel more satisfied with their jobs.[9] Second, because HR data are increasingly accessible via the web or the cloud, data from across the organization can be retrieved and merged with greater ease, enabling timely and efficient analysis of the data for HR decision-making.

Data Availability for Metrics and Analytics

The theme of technology has played a revolutionary role in the evolution of HRM. In order to make data-informed people decisions, data must be accessible. As experts state, "Data are the lifeblood of an organization."[11] As the Society for Human Resource Management (SHRM) notes, trends such as the growth of social networking and the rise in data analytics and dashboards having fundamentally changed what HR needs.[12] Another HR expert, John Sullivan, shares his thoughts about the importance of HR metrics, "I have found the largest single difference between a great HR department and an average one is the use of metrics . . . bar none, there is nothing you can do to improve yours and your department's performance that succeeds the impact of using metrics."

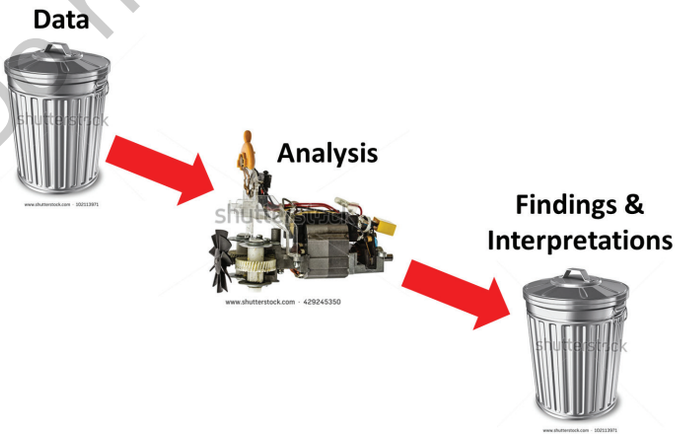
Having a clear data management plan and having an effective HRIS in place are critical aspects to HR analytics success, and an HRIS update, upgrade, or re-envisioning is a great opportunity to fix problems and set up the organization for success for becoming more deeply data informed when making people decisions. These are important considerations in avoiding huge problems and generating solutions while there is time to plan.

Data Quality

An important point to remember when thinking about metrics and analytics is the importance of gathering high-quality data, which starts with sound measurement. Recall from Chapter 2 that a *measure* is a tool or method used to gather data about a concept. Without sound measurement, we cannot state with any confidence whether we consistently or accurately measured a concept. With poor measurement techniques, we become susceptible to low-quality (e.g., unreliable) data—also known as "garbage data." When garbage data are collected, it does not matter how we analyze the data, as the findings and interpretations will be of low quality (e.g., invalid)—also known as "garbage findings." This phenomenon is referred to as "garbage in, garbage out," or GIGO (see Figure 3.3).

FIGURE 3.3 Garbage In, Garbage Out (GIGO) Phenomenon

An illustration of the "garbage in, garbage out" (GIGO) phenomenon. People analysts must collect high-quality data through sound measurement to ensure that subsequent analysis yields meaningful findings and interpretations. If poor data are used, useful conclusions cannot be drawn, regardless of how big the sample or how sophisticated the analytics.



Data Structure and Storage

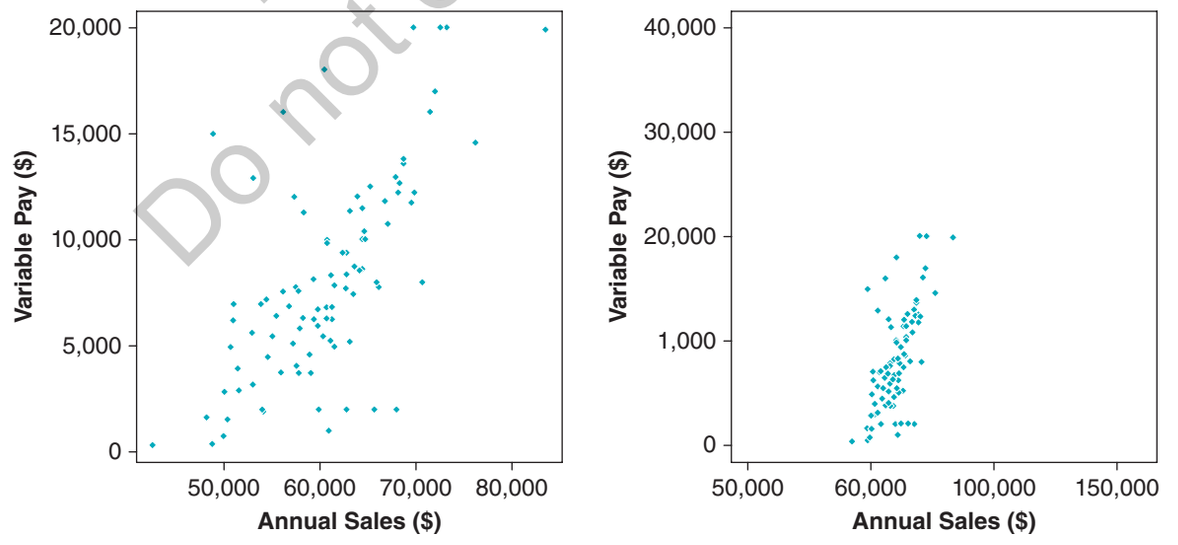
Databases are designed to store structured data, and a common approach to adding structure to data is to use tables, whereby the rows represent distinct entities (e.g., individual employees) and the columns represent unique fields or variables that characterize the entities (e.g., employee start date, address, job title). Databases and data warehouses were designed to deal with such data. However, with the rise of semistructured and unstructured data, new forms of storage are needed. Thus, data lakes are a solution that many organizations are turning to because unlike a data warehouse, a ***data lake*** stores a vast amount of raw data in its native format. Technology companies are meeting demand for data lakes such as with Microsoft's Azure and offerings by Amazon Web Services and IBM Analytics. Typically, these platforms allow users to use the open-source software framework called Apache Hadoop, which helps users process vast amounts of data across clustered computers. There are pros and cons to each storage approach, but at this point, consider what types of data you might have access to now and in the future, and plan data storage options accordingly and with the future in mind.

Data Visualizations

Although HRIS, HR metrics, and HR analytics are critical for making data-informed people decisions, effective data visualizations and storytelling with data can help facilitate the interpretation and communication of the findings. Today, HR professionals and managers use data visualizations to understand, predict, explain, and communicate their human capital challenges and opportunities based on available data. And data visualizations are useful tools for telling a compelling story about HR data.

Part of telling an effective story with data is knowing how to drill down to and communicate the most important findings. In other words, analyzing data can be quite complex, and thus, a good storyteller understands how to craft a straightforward, simple, and comprehensible narrative. Doing so requires striking a careful balance between engaging the audience and remaining faithful to the analytical findings derived from the data. As the saying goes, "A picture is worth a thousand words." And effective data visualizations play an important role when interpreting and communicating data and data-analytic findings in a succinct way. In fact, research even shows that the way in which data are presented visually has an effect on how data are interpreted and which decisions are ultimately made. For example, adjusting the axis scaling of a scatterplot, as shown in Figure 3.4, can give the impression that two variables are more strongly correlated than

FIGURE 3.4



they actually are, as the figure on the right seems to show a stronger pattern than the one on the left.[14] As such, it is important to be cognizant of the ways in which data visualization displays can be unintentionally or intentionally manipulated to affect the interpretations of different audiences. This means that choosing how to display data should be coupled with careful consideration of the ethical implications.

How does one begin to think through how to create the most effective data visualizations? Following work by experts on storytelling and data visualizations,[15] keep the following six points in mind when creating data visualizations:

1. ***Understand the context***. When crafting a story, there are many ways to approach it; however, there are three key questions to ask at the highest level when thinking about storytelling. First, *what* do you want your audience to know after you are done? Second, *how* do you want them to feel? Finally, *what*, exactly, do you want them to do based on exposure to your presentation or report? In addition, it is important to determine the context, understand who your audience is, and determine the tone you want to take with them. For example, are you presenting in an informative, exploratory, or urgent way? It can be helpful to "boil down" your goal into a short, concise 2-minute story. If that is compelling, the presentation or written document stands a better chance of being clear and concise.
2. ***Choose an appropriate visual display***. Regarding data visualizations, there are many kinds of elements for displaying data to choose from, including simple text, tables, bar graphs, line graphs, scatterplots, heat maps, and geographic charts. Certain display types are appropriate for communicating certain types of data or for communicating different messages. For example, if there are a few key numbers that make a powerful statement, simple text might have the most impact. Alternatively, if you are interested in sharing a table full of numbers but want to emphasize patterns in the numbers, a heat map, as presented in Table 3.1, can be effective. Consider using one color for positive numbers and another for negative numbers. The key is to match your goals to an appropriate display.

In addition, there are several tools that can help you generate data visualization, ranging from simple Microsoft Excel visuals, using SmartArt within the Microsoft Word program, to more sophisticated tools such as Tableau Software and visuals generated using open-source R software. The tools available for creating data visualizations will continue to evolve, but

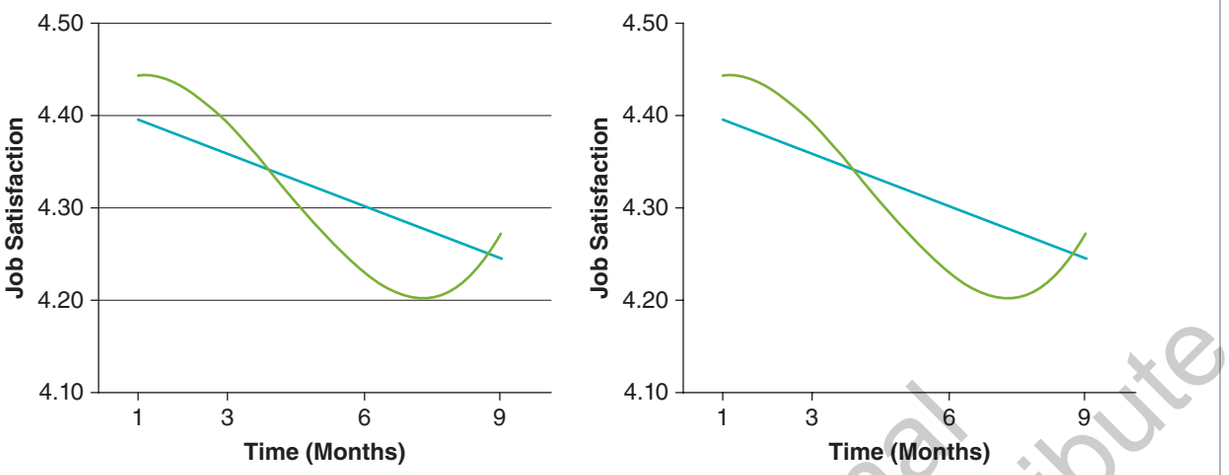
TABLE 3.1 Heat Map Table

Heat map table displaying headcount by year and facility, such that darker blue values represent larger head counts (generated with ggplot2 package in R).

FACILITY	YEAR							
	2011	2012	2013	2014	2015	2016	2017	2018
Seattle	750	1249	2000	2881	3465	3628	3631	3630
San Jose	4477	4101	3562	3414	3163	2711	2210	1989
Raleigh	2689	2678	2680	2695	2685	2692	2693	2701
Indianapolis	901	1235	1444	1489	1487	1600	1777	2099
Denver	5999	5725	5399	5453	5401	5395	5008	4822
Boston	2322	2333	2582	2611	2600	2791	2785	2786

Headcount
5000
4000
3000
2000
1000

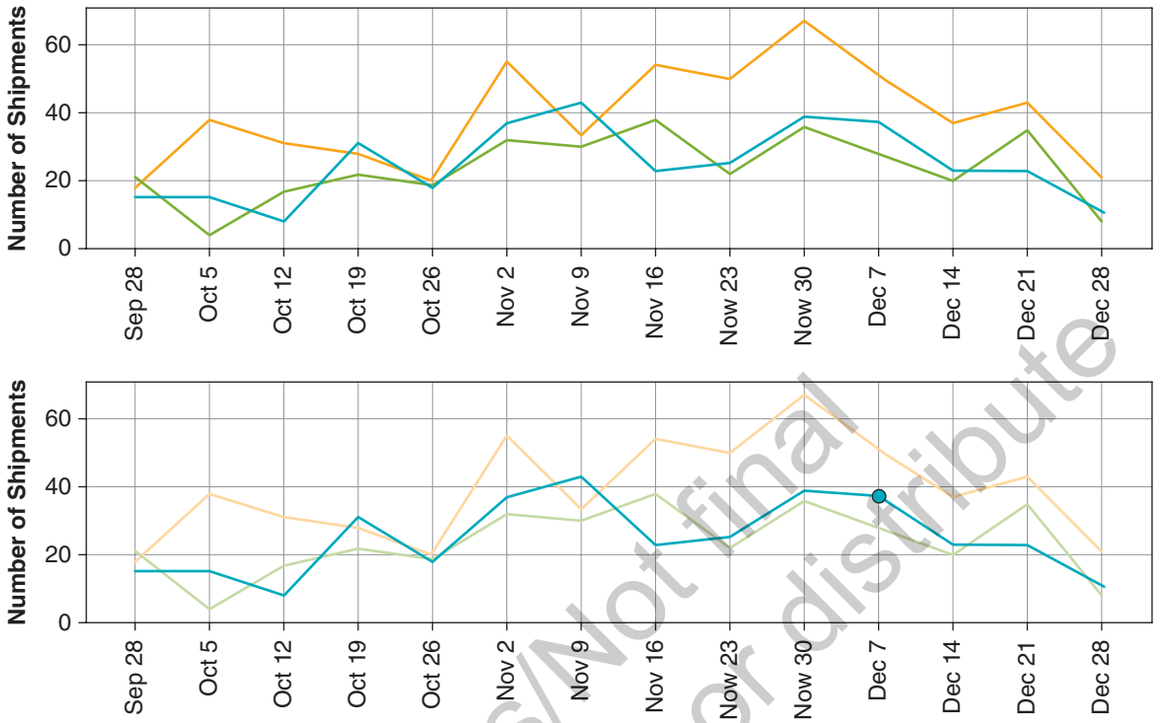
FIGURE 3.5



understanding the basic principles behind effective data visualizations continues to be an important skill for managers and HR professionals alike.

3. ***Keep things simple***. By removing clutter and focusing on your main points in the most efficient and succinct manner, you make it easier for your audience to focus because you are minimizing the energy they need to process the new information. In other words, you are decreasing their cognitive load. If anything in your visual is unnecessary, *eliminate it!* An example of this is to avoid gridlines, borders, and unnecessary shading on graphs. As you see in Figure 3.5, the graph on the left looks fine, but the one on the right is simpler, clearer, and communicates the trend more clearly.
4. ***Focus attention where you want it.*** You can do this by using color and shading strategically. The use of color and bolding of lines and figures can help people see trends more quickly and accurately. Thus, as you can see in Figure 3.6, effective emphasis using color and shading are factors to consider when it comes to data visualizations. However, please keep in mind that when it comes to color, less is more. Use it sparingly.
5. ***Think like a designer.*** You may have heard the phrase form follows function. It is an important phrase for designers, as it helps them focus their work. In our case, the function is what we want the audience to do with the data, and the form is the visualization created to communicate this. Designers also focus on making things visually appealing, or attractive, which is a goal of design thinking.
6. ***Tell a persuasive story***. Research tells us that one of the most effective ways to persuade individuals is through storytelling. As Cole Nussbaumer Knaflic writes, "At a fundamental level, a story expresses how and why life changes. Stories start with balance. Then something happens—an event that throws things out of balance."[16] This dramatic tension can feature data as the event that throws things off. Now you know something new or a key point that you had not noticed has become salient. Stories have a beginning, a middle, and an end. Stories start by introducing the plot and building the context for the reader or audience. With the audience in mind, the introduction should address the "So what?" question and explain why they should care about the topic at hand. The middle describes what could be possible, given more context and detail, and allows you to discuss potential solutions for the issues raised. The end should focus on a specific call to action so that the audience truly understands what they are expected to do after hearing your story.

FIGURE 3.6



These six points can help guide the generation of data visualizations. However, the availability of data, in the first place, rests on the quality of the HRIS of your organization and your ability to gather and merge the data necessary to tell your story.

Challenges for Data Management and Hris

LO 3.3 Identify and address challenges for data management and HRIS.

Although there are a great number of potential opportunities for data management and HRIS, challenges also exist. Being aware of them can help organizations proactively assess needs and manage potential threats to successful implementation. The challenges include cost, the lack of analytics skills in traditional HR skill sets, and privacy concerns.

Cost

Typical HRIS costs include time, money, and/or opportunity costs. With respect to budgeting time, it is important to think about the skill sets available within your organization versus hiring a consultant to help implement a project. The cost of an HRIS varies by organization, their needs, and the sales force of the software vendor. Note that a request for proposal (RFP) is a key part of the HRIS vendor selection process. Of course, another way to think about costs is to more fully consider the potentially large cost savings due to system automation. Such cost reductions might include time entry and attendance tracking, benefits administration, recruiting, training, payroll, and performance management, to name a few. For large organizations, conducting a formal return-on-investment (ROI) analysis is a good idea when dealing with projects this large. For smaller organizations, it may simply be a matter of finding a package or platform that meets their needs into the foreseeable future.

Traditional HR Skill Sets

In 2004, 80% of organizations had an HRIS, but fewer than 40% reported using them to generate data used in strategic decision-making. By 2007, the use of HRIS in strategic decision-making had increased, with some organizations creating a competitive advantage through their use of data-driven decision-making.[17] That means that many HRIS projects stop short of their potential to enjoy greater efficiency and reduced costs. As organizations hire and train more and more individuals with critical thinking skills, data management skills, and data analytics skills, we anticipate that the HR departments will begin to collect and store more higher quality data in their HRIS and will apply not only descriptive analytics but more sophisticated predictive and prescriptive analytics to inform and support decisions that impact the strategic objectives. In general, we expect HR to become more scientific.

Josh Bersin of Deloitte has found that it generally takes an organization between 5 and 8 years to put all the necessary pieces together in order to become a data-driven culture using data to inform decisions about people. This includes having the right people, processes, and infrastructure (such as hardware and software) in place. This is an important challenge, and as noted by *Forbes* columnist Vorhauser-Smith, "You can have access to the right data but without the right people to analyze it and—more importantly—act on it, what good is it?"[18] Indeed, researchers report that 80% of surveyed HR directors who were relatively early adopters of HRIS reported that HRIS improved their levels of information usefulness and information sharing. Fully 90% felt that HRIS added value.[19] Aligning the skill sets of those in HRM with the new realities of data and analytics is necessary to realize the full potential for HRM via HRIS. This is especially important because we know that HRIS expertise is one of the major factors related to HRIS success across 110 companies in 10 industry sectors.[20]

Data Privacy Concerns

With great amounts of data comes great responsibility. Because HRIS is a repository for personal data, safeguarding data and maintaining data privacy and security are foundational. To begin, ***data privacy*** refers to individuals' control over the collection, storage, access, and reporting of their personal data.[21] Research shows that individuals who are able to choose the type of HR systems they use report lower privacy concerns and higher satisfaction with the system. They are especially sensitive to medical data, which may be used for insurance purposes, for example, to be available to those within the organization who make decisions regarding their careers, such as managers.[22] In accordance with the Fair Labor Standards Act of 1938 and other legislation, U.S. companies are required to maintain basic employee data, such as their name, Social Security number, address, pay, and hours worked. Understandably, many employees would prefer that their personal data remain private, especially their pay or Social Security number. Employees grow concerned about their company's HRIS and data privacy when[23]

- supervisors are able to access employee data;
- employee data are used in employment and administrative decisions, as opposed to just HR planning purposes; and
- employees are unable to verify the accuracy of their own data.

Thus, an effective HRIS must guard against unauthorized access and disclosure of employees' personal data yet also allow employees to verify the accuracy of their own data. The rise of social media and scraping tools have turned the Internet into an enormous repository of data, where ***scraping and crawling tools*** include programs designed to scour and pull data from websites and other electronic sources in a systematic manner. In fact, a survey by SHRM in 2015 revealed that 84% of surveyed organizations recruited applicants using social media websites.[24]

SPOTLIGHT ON LEGAL ISSUES

Scraping Data Can Lead to Big Legal Problems[25]

In 2010, a software engineer in Colorado named Pete Warden developed and deployed a program designed to "crawl" publicly available Facebook pages. In no time, he had gathered data from 500 million Facebook pages from 220 million Facebook users. The data gathered were identifiable, as they included names, locations, friends, and interests. In the interest of research, Mr. Warden created an anonymized version of the dataset and offered it to others to use.

However, this was not the end of his story. As Mr. Warden is quoted as saying, "Big data? Cheap. Lawyers? Not so much." Thus, in order to try to avoid legal problems with Facebook, he deleted all copies of his dataset and never made it public. Data scraped or crawled (automatically extracted using computer software programs) from websites is subject to three major legal claims against their collection, including copyright infringement, the Computer Fraud and Abuse Act, and terms-of-use violations, among others. Subsequent data privacy issues emerged when Cambridge Analytica gathered data from Facebook users. These breaches of trust led Facebook to rethink which data are gathered and how much control users have over what it shared about them.

Recognizability of an individual's data. The extent to which individual employee records can be recognized is largely dependent on how the data were collected in the first place. There are three terms to describe data in terms of recognizability: anonymous, confidential, and personally identifiable data. ***Anonymous data*** refers to those pieces of information that cannot be linked to any information that might link those responses to an individual, thereby disclosing the individual's identity. To be truly anonymous, data should be gathered without IP addresses, GPS coordinates, e-mail addresses, and demographic questions—all of which can be used to narrow down the respondent. ***Confidential data*** refers to data for which individuals' identities are known by the researchers due to the linking of a name or code but are not generally disclosed or reported. This type of data is useful when dealing with sensitive issues such as salary, complaints, opinion survey responses, or exit interviews. In such cases, only those who need to know whose data they are have access to that information. ***Personally identifiable data*** refers to data that are readily linked to specific individuals.

The surprising thing with data recognizability is understanding how seemingly anonymous data, such as a query into a search engine, can give enough unique information to track that person down. For example, an IP address is a unique online identifier that may be tracked when a form is filled out or an online survey is taken. Although not 100% accurate, IP addresses can be used to identify a person or pinpoint his or her location, especially over a period of time as individuals travel to the same places (e.g., from their homes to work and back).

Social Security Numbers

One particularly sensitive issue is the safeguarding of Social Security numbers.[26] The Federal Trade Commission estimates that more than 9 million Americans have their identities stolen each year, and because Social Security numbers are such valuable targets to identity thieves, steps must be taken to ensure their safekeeping. Such steps include keeping all Social Security number information in secured locations (both virtually and physically) and only allowing access from authorized-access computer stations. Only individuals with legitimate business reasons should have access. Any documents released should be destroyed by shredding, and all state and federal laws should be followed regarding the collection, storage, and destruction of Social Security numbers.

SPOTLIGHT ON ETHICS

Fitness Trackers and Data Privacy[27]

Today, many organizations partner with vendors to address employee health and engagement. For example, with the goal of improving employee well-being for partnering organizations, Virgin Pulse provides employees with wearable devices and applications to track their sleep, stress, activity level, and other personal data. Companies like Virgin Pulse tout their commitment to data privacy, security, and compliance, thereby implying that employee data will not be shared in unauthorized manner.

However, if an organization decided to provide employees with wearable devices instead of working through a third-party vendor like Virgin Pulse, this could pose an ethical dilemma under certain circumstances. Namely, without proper data privacy and compliance restrictions in place, the data could be used in ways that would compromise individuals' privacy and other personal rights. Although perhaps not illegal, HR professionals may run dangerously close to committing discrimination under the Americans With Disabilities Act (ADA) if they use these data to make employment decisions. Poor or irregular sleep, for example, does not necessarily constitute a disability according to the ADA, but it could be an indicator of various physical diseases or psychiatric disorders, which are protected as disabilities under the ADA. Further, even if deemed to be legal, using employee health data in this manner could be construed as unethical, particularly if the data are used in a way that deviates from their intended use.

Questions

1. How does the use of a third-party vendor like Virgin Pulse make it more ethical to have employees wear monitoring devices than it would be if the employer did so directly?
2. Do you think the use of monitoring devices should be optional for employees? As an HR professional, how would you ensure that employees who opted out of using the device would not be penalized for nonparticipation?

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In 2010, Google purchased the large and historic Port Authority Terminal building in New York City for $1.9 billion. It is the fourth-largest building in the city. In addition to its size, another attractive feature of the building is that after it opened in 1932, it eventually sat atop one of the main fiber optic arteries in NYC, making it strategically desirable for data transmission.[30]

Data Security Concerns

Like data privacy, data security is a primary concern of both employees and managers. ***Data security*** refers to protective measures taken to prevent unauthorized access to employee data and to preserve the confidentiality and integrity of the data.[28] ***Cybersecurity*** can be thought of as data security applied to information accessible through the Internet. Data security can be threatened by a number of entities and for a variety of reasons. While data hacks, attacks, and viruses are real threats, human error is a huge risk when it comes to data security. An information system can have the most sophisticated password protection and security features, but an unintentional human error could still wreak havoc. Imagine a scenario in which you are logged into your company's HRIS while working on a company laptop in a coffee shop. You hear the barista announce your coffee order is ready and step away from your laptop for a moment, forgetting to logout. After picking up your order, you walk back to your table, and to your astonishment, your laptop is gone! An innocent human error and lapse of judgment on you part has put employees' personal data at risk. Unfortunately, human error is inevitable, but we can do our best to prevent these errors by training managers and employees on data security and providing rules and guidelines for protecting people data.

As a relatively recent example, the U.S. Office of Personnel Management (OPM), a federal agency that manages many of the federal government's human resources, suffered an attack. In

MANAGER'S TOOLBOX

Tips for Creating Strong Passwords

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Some of the tips for creating strong passwords are obvious, such as not writing down the password anywhere physically near your computer. However, other tips are not so obvious. The following are some key considerations when dealing with password management, including creating passwords which that are as follows:

- **Long**. The longer the better, with eight or more characters currently recommended.
- **Contain numbers, letters, and symbols**. There are only 26 letters in the alphabet and 10 numbers. So mixing them up and using symbols helps to create more powerful passwords, which are exponentially more challenging to decode.
- **Include both upper- and lowercase letters**. Using both uppercase and lowercase letters creates more options for the user and makes it tougher for hackers to crack your password.
- **Unique**. Some of the most common passwords include 123456, qwerty, Password, starwars, and admin. It is estimated that 10% of people have used at least one of the worst passwords on this list, with nearly 3% using 123456 alone.
- **Generated randomly**. There are random password generators available online. Although they make remembering passwords more challenging, they are more secure than using actual words. Using a password manager such as LastPass can help with that part, but such a treasure trove of information can be a highly attractive target for hackers, and even that company LastPass was hacked in 2015.

the summer of 2015, hackers stole more than 20 million current and former federal employees' work and personal data, including birthdates, Social Security numbers, and fingerprint records.[29] In the year that followed, it came to light that OPM was using outdated information systems in need of serious improvements, thereby putting OPM at risk for the data breach. Since the data breach took place, the American Federation of Government Employees has filed a class-action suit against OPM. Thus, beyond damages to its reputation and putting individuals' personal information at risk, the government stands to lose financially too. In addition, it is likely that federal employees lost trust in OPM's ability to secure their personal data, and if this is the case, OPM will need to regain the trust of their employees when it comes to data privacy and security.

Approaches for Maintaining Data Security

There are several common approaches for ensuring data security. Some are technological, including requiring strong passwords, training users, using two-step authentication, and applying blockchain technology. Other approaches have to do with proper training of the users of data.

Technological Security Measures

Increasingly complex passwords are something that we are all familiar with as we are creating and maintaining online accounts. As we now realize that human error is a large factor in many data breaches, it is important to realize that one of the ways these problems manifest themselves is via lack of password security, such as passwords being written down near computers, remembered by computers, or shared with others. In addition, as computing power increases, it becomes easier for computer programs to be able to decode passwords. It might be surprising to know that Mark Zuckerberg, founder of Facebook, had his Pinterest, LinkedIn,

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Access to Apple ID requires two-step authentication, even if the user knows the username and password, in the form of a verification code.

and Twitter accounts hacked.[31] Although many websites only allow a few attempts before locking out users, it is still advisable to select strong passwords, not to reuse the same password across multiple accounts, and to change your passwords to important sources of information frequently.

An extra layer of security can be had in the form of ***two-step authentication*** (also known as ***multifactor authentication***), an additional piece of information that only the user knows. For example, Apple computer, iPhone, or iPad users may be familiar with the process of this authentication process when any new device is seeking to access Apple ID information. Of course, two-step authentication works well when you are in possession of your devices, but if a thief has access to both and they are not sufficiently password protected, that can be a bigger problem.

Technology has and will continue to shape the way HR is managed and implemented in a number of ways. *Forbes* declared 2018 to be the year that blockchain "establishes itself as the fastest-growing digital technology since the evolution of the internet."[32] To that end, blockchain is poised to disrupt the current practice of HR. ***Blockchain*** is "a distributed incorruptible digital technology infrastructure which maintains a fully encoded database that serves as a ledger where all transactions are recorded and stored."[33] It has also been more simply described as an approach that "provides a decentralized and secure ledger that gives participating parties a way of validating the information related to a secure transaction."[34] Because it is more secure than other technology available today, it has the potential to be used in compensation, background checks, recruiting, and other HR functions in ways that we can only imagine at this point (and other ways that likely we cannot yet imagine). Although blockchain is new and will continue to evolve rapidly in terms of its applications to business broadly and HR specifically, it is important to include it in our discussion of potential data security tools. Maintaining data security is especially consequential given that 1.4 billion data records were compromised in 2016, and experts predict that by 2020, 25% of the world's population will be affected by data breaches.[35]

User Training

One of the major entry points for data security breaches is human error, which is the number-one cause of data breaches, especially for small- and medium-sized businesses.[36] Thus, it makes sense to consider training as an essential part of a data security program. Training might include awareness of key security issues, ethics and compliance when dealing with sensitive data, and security training for new employees or those moving to more information-sensitive positions within the company. There are several steps to consider when training employees, starting with a needs assessment aligned with the desired outcomes of the training. Many organizations have developed and offer such training programs for organizations not wishing to develop programs themselves. The key is to make sure the right employees are taking the training and engaging in safe data management behaviors.

Developing a Human Resource Information System

LO 3.4 Address key points of the process of HRIS implementation.

As you have seen so far in this chapter, a complex and comprehensive HRIS can be a costly and time-consuming undertaking for an organization. Before deciding whether to do so and how, organizations are well advised to systematically work through a step-by-step process for

SPOTLIGHT ON GLOBAL ISSUES

The General Data Protection Regulation (GDPR)

The General Data Protection Regulation (GDPR) is a regulation in European Union law regarding data protection and privacy that went into effect in 2018. Anyone working globally should be aware of GDPR and understand its rules and implications. Essentially, the law states that the European Union's (EU's) 500 million citizens have the "right to be forgotten." This means that companies that continue to collect and store data will face major fines and penalties up to 4% of their annual worldwide revenue or 20 million euros (whichever one is the larger amount).[37] This is a major consideration for multinational companies as this far-reaching law states that companies need to provide a "reasonable level" of protection for employees' personal data, but it does not explicitly define what reasonable protection is exactly.

Companies affected are those that have

- a presence in an EU country or no presence in the EU but process data of EU residents; and
- more than 250 employees or fewer than 250 employees but their data processing impacts the rights and freedoms of data subjects more than occasionally or includes sensitive data.

A 2017 survey by PwC found that 92% of the companies they surveyed viewed this law as one of their top data privacy and security priorities.[38]

FIGURE 3.7

Deciding which HRIS to use entails following several steps to ensure ultimate success.

evaluating the needs and feasibility of implementing an HRIS (see Figure 3.7).[39] After that, it is important to outline the features needed in such a system, to select a vendor, and to engage in activities designed to control costs.

Conducting a Needs Assessment

The process of conducting a needs assessment for an HRIS is much like what you will read about in Chapter 8 on training and development needs assessments. The ideas are parallel, in order to be sure that you design the right program by conducting an analysis of what exists, what should change, and what factors might hinder successful implementation. Thus, the best plan can be developed to deal with potential setbacks and challenges during implementation, including identifying the key stakeholders who should be involved in the process.

SPOTLIGHT ON HR FOR SMALL AND MEDIUM-SIZED BUSINESSES

The Advantage of Starting From Scratch

As you saw in the opening case and throughout this chapter, changing, merging, and coordinating the computer systems of a multinational corporation is a major undertaking. Larger organizations are more likely to adopt HRIS systems.[41] However, in some regards, small and medium-sized businesses may actually have some advantages over their larger counterparts. Although they may have less working capital and leaner staffing, they may be better positioned to design their systems from scratch. That means that the system can start small and grow with the firm. Additionally, the latest technology translates into fewer headaches for small or medium-sized organizations, as larger organizations typically have to adapt dozens of legacy systems into newer ones. For small and medium-sized businesses, designing an HRIS is predicated on the assumption that the adopted platform can scale as the firm grows.

It might seem counterintuitive for small- to medium-sized businesses to automate their HR systems when manually processing HR transactions is possible given the smaller numbers of employees. However, the efficiencies that come with an HRIS for smaller companies can be transformational. Namely, an HRIS can automate many transactional HR activities, which otherwise take up a lot of HR professionals' time, especially in small companies where there might only be one or a handful of HR professionals. Further, e-HRM, in general, allows smaller companies (and larger companies) to outsource HR functions in a way that can still electronically (potentially) integrate with their other HR functions that they do in house. Finally, with advances in cloud computing, companies no longer need to house and manage their own servers and other costly hardware.

Initial Assessment

In the initial assessment phase, a key question is whether the selection process is best led by internal HR individuals or whether engaging the services of an HRIS consultant to help with the process makes the most sense given time, experience, and cost factors. For example, if there seems to be a strong need for a new HRIS but the HR staff does not have a great deal of time or expertise in this area, it probably makes sense to bring in a consultant to help facilitate the process. During this phase, it is important to gain buy-in from management and key stakeholders by including them in the conversation; failure to do so may result in hurdles later on in the development and implementation process, as ultimately management and certain stakeholders may be gatekeepers to key resources.

Assess Organizational Needs

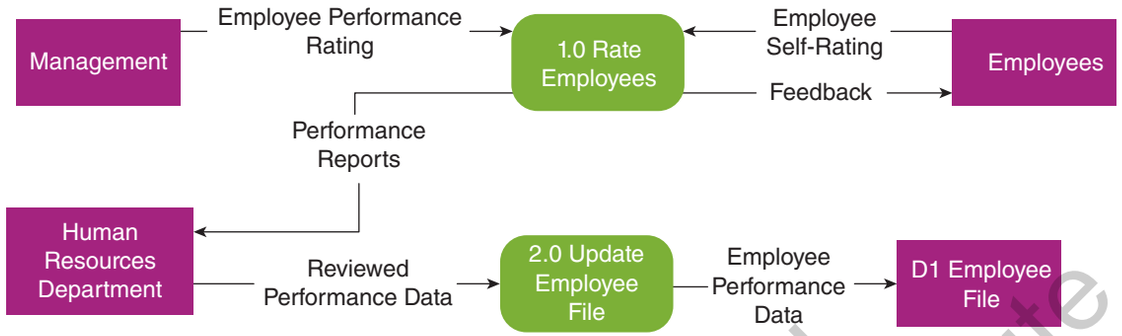
The next major activity is to assess organizational needs. The goal is to develop a system that meets all the current organizational needs, as well as having room to expand in the future. Every organization will have a different set of needs, but all share some common goals with an HRIS, including the need to have a system that allows them to gather, organize, and securely maintain employee data. The system also has to allow for the generation of standardized compliance and strategic HR reports such as EEO, VETS-100, new hires, and turnover. Beyond that, the goal of this step is to determine the needed features of a potential system versus the wanted features of the system.

Many systems allow for optional HR-relevant modules to be added, such as compensation, benefits, onboarding, and performance management modules. However, the needs of the specific organization's HR functions and strategy will determine the specific needs. One thing to keep in mind is the need for system integration. It is one thing to "have" the data, and as many organizations find out, it is a very different thing to access, retrieve, and merge such data.

Having standalone modules within HR that do not have the capability to link data with other organizational systems is not optimal. Thus, another key factor to consider in the needs assessment phase is various ways to handle the merging and joining of data from different databases. Finally, research consistently finds that understanding users' individual needs is a critical component of success when developing a new HRIS.[40]

FIGURE 3.8

Example excerpt from a data flow diagram depicting the logical design of a performance management system.



Designing the System

After identifying a list of minimum requirements and additional "wish list" items, assessing project parameters comes next, including budgetary, technological, and time constraints. Being as explicit and honest about these at this stage allows organizations to focus on features that are both feasible and desirable. These will lead directly into the design of the HRIS.

Two related but distinct factors are important to consider. These are logical design and physical design. On the one hand, ***logical design*** refers to the translation of business requirements into improved business processes.[42] For example, HR might identify all of the steps in the recruitment process, as well as the types of data that will be exchanged and stored. Often ***data flow diagrams***, such as the one pictured in Figure 3.8, are used to depict the old and/or new business processes. As the name implies, data flow diagrams show how data flow from one entity to the next, as well as how the data are processed.

On the other hand, ***physical design*** refers to determining the most effective way to translate business processes into the software and hardware solutions that make those processes a reality. For example, information technology experts might take the logical design of a recruitment system designed by HR and determine the software and hardware needed to bring the system to life and to integrate with other existing systems. As a general rule, the logical design (including process and data requirements) should precede the physical design (including both the associated hardware and software), as sometimes the logical design will reveal that the current physical design is actually fine and, thus, just the process needs to be changed.

Selecting a Vendor

The first step in choosing a vendor is creating a list of what you want the HRIS to be able to accomplish. This list is included in a request for proposal (RFP), which is sent to several potential vendors. When writing an RFP, important considerations include the price and the configuration of the plan. For example, does the organization seek to purchase and install the hardware and software on internal machines staffed by internal staff? Or is the organization interested in software as a service so that a subscription to software makes sense and employees access the software via the Internet? There are, of course, pros and cons to either approach, so it is important to be clear regarding which of these options is desirable and viable when sending out the RFP. Small- to medium-sized companies find the software as a service option to be particularly attractive, as software can be accessed via web browsers without having to install it on local computers and other devices, such as tablets and smartphones. Easy access to HR systems and information pave the way for useful employee self-service functions, such as

benefits enrollment, tax information, and updating employee contact information, as well as more sophisticated functions, such as access to onboarding materials, training and development programs, and performance management systems.

Identifying references is also important when considering different vendors. As the SHRM toolkit on designing and managing an HRIS notes, any reputable developer or reseller should provide references from current clients of similar size with comparable business processes.[43] SHRM recommends that HR professionals ask vendors' references questions like these:

- How has the system improved HR functions?
- What modules are you using?
- Has the system met your expectations? If not, what is it missing?
- Are end users satisfied with the system?
- Has the system been expanded or upgraded since the original purchase? If so, how did the upgrade affect customizations and other features?
- How has the vendor responded to any problems?
- What do you like best about the system? What do you like least?
- Has the system provided the expected ROI? Why, or why not?
- What was the implementation experience like? Did the vendor deliver on budget and on schedule?

After reviewing the different proposals that the organization receives and checking with vendor references, the selection committee should invite two to three vendors to give a demonstration of the HRIS platform to stakeholders within the organization. Finally, taking into consideration all of the available information, one vendor should be selected and a contract finalized. Among others, key points to consider in the contract are pricing, technical and maintenance support, and upgrades.

LO 3.5 Apply core information system concepts in HR management.

Implementing a Human Resource Information System

To this point, we have walked through the points to consider when considering, designing, and choosing a package. Next comes implementation. Although HRIS has the potential to transform organizations, and we covered several examples of HRIS successes, researchers note, "The available evidence suggests that in the vast majority of cases information technology (IT)-enabled HRIS have not helped produce a wholesale transformation of the HR function away from routine processing and compliance and towards the strategic business partner role that many were expecting."[44] Many of the challenges that get in the way of the potential benefits of HRIS are encountered during the implementation phase. Luckily, when it comes to implementing and maintaining an HRIS, there are some key points to consider in helping to ensure a successful project launch and ongoing implementation.

Managing Resistance to Change

Implementing a major HRIS or changing the way that data are gathered, stored, and retrieved can be a major change within an organization, and it can be challenging to handle effectively. It is not only about the software and hardware; it is also about the individuals whose work lives will be impacted by the change in procedures, job descriptions, and access to information. Thus, it is an organizational change process that must be managed, and such processes are, at their heart, people management challenges, as well as opportunities. When it comes to changes to an HRIS, three specific groups are most likely impacted: those working in HR who may have their

work practices fundamentally altered; managers who may have more access to information than ever before, which increases expectations of them; and employees who may be asked to engage in more self-service HR activities than in the past. It is understandable that such behaviors might trigger concerns for organizational members.[45] In addition, we discuss other factors related to successful and unsuccessful change management attempts beyond understanding resistance to change.

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People react to change in a variety of ways, ranging from active resistance to enthusiastic support, as depicted in Figure 3.9. Given that a survey of 1,400 executives found that 82% see the pace of change in their organization increasing and that a SHRM survey found that resistance to change is one of the top two reasons change efforts fail, it is not surprising that overcoming resistance to changes such as a new HRIS is an important part of the process.[46] Some individuals may also experience ambivalence to change, which is an opportunity to move them toward a positive attitude.[47] The closer to support that you can get individuals, the more likely the change implementation is to be successful. Whereas compliance is more helpful than passive or active resistance, the lack of enthusiasm can lead to short-lived gains, especially in the face of potential challenges or setbacks during implementation. Avon learned this the hard way when employees left in "meaningful numbers" following a challenging multiyear software overhaul project that was initially rolled out in Canada. Given the challenges during implementation, Avon opted to halt use of the new system and not to roll it out to the rest of the organization.[48] Thus, part of effective change management is knowing when to change course, as Avon did.

Effective managers learn to overcome resistance to change. That doesn't mean that changes always go exactly as planned or as the manager wants, but it does mean that they actively take steps to ensure a positive outcome. You might have a great idea, but people around you might not seem convinced, and/or they might express resistance. How do you make change happen?

We recommend that you

- recognize individuals may react negatively to change and plan accordingly,
- anticipate resistance and find ways to deal with it,

FIGURE 3.9

Reactions to change range from active resistance to enthusiastic support.

- listen to naysayers,
- show commitment and present a positive attitude toward the change,
- involve people in the process,
- ensure top management is visible and supportive,
- remind management and others that change is a process and successful change takes time,
- present data to your audience,
- appeal to your audience's ideals,
- reinforce change with incentives,
- communicate with employees and management,
- understand the reasons for resistance, and
- alter your approach, if necessary.[49]

Organizational Culture and Realistic Timelines for Change

Part of understanding what is or is not a realistic timeline relates to understanding the organizational culture.[50] Is the culture one that embraces risk taking, or is the culture more conservative when it comes to change? Cultures vary in terms of how much they embrace collaboration, creating, controlling, or competing.[51] Because ***clan cultures*** are collaboration-oriented and are characterized by valuing being cohesive, people-oriented, team players, and empowering employees, when implementing change and setting timelines, consider doing so after involving all affected internal stakeholders in the decision-making process. For ***adhocracy cultures***, which focus on creating and emphasize being entrepreneurial, flexible, taking risks, and being creative, aggressive timelines may be feasible and even encouraged. For ***market cultures***, which are characterized by competition and value being aggressive, competitive, and customer-oriented, changes in the ways things are done can be challenging if they take more time. Although the long-term payoff may exist, the time urgency within market cultures can make time one of the most salient concerns of employees. ***Hierarchy cultures*** focus on controlling and value being efficient and timely, and consistent strategies that emphasize the efficiency of HRIS changes may offset concerns regarding the short-term challenges during the transition and training period.

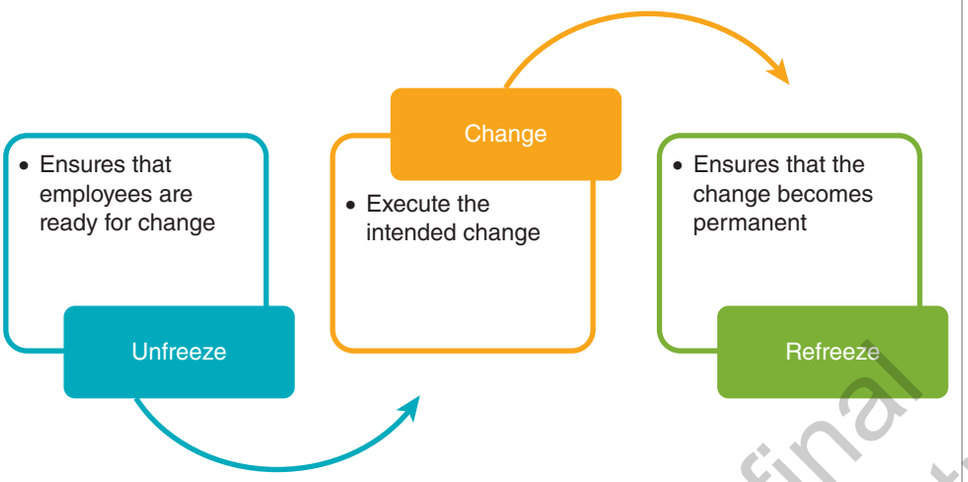
Successful implementation of HRIS or any ERP depends on creating and utilizing realistic timelines regarding how long each step will take and when a complete switch over can be undertaken. In 1999, three years after starting a transition to a new ERP, Hershey's was unable to fulfill $100 million worth of Kiss and Jolly Rancher candy orders due to a failed ERP transition. Part of the reason for this failure has been attributed to their attempt to set tight timelines without sufficiently changing them when things went wrong.[52]

Refreezing and Maintaining the New System

When approaching a major change such as a new HRIS, consider simple heuristics to help understand the key steps to follow during implementation. One such model was developed by Kurt Lewin in the 1940s. It is a simple model of change that many people continue to find useful even today. This involves three steps: ***unfreezing*** the current system and checking to see that individuals are ready for change, enacting the ***change***, and ***refreezing*** the new system in place so that it becomes the permanent replacement for the way things used to be done. Each phase is depicted in Figure 3.10 and features a unique set of opportunities and challenges. Much has been written about change management, and students interested in learning more about how to effectively enact and manage change are encouraged to read material covered in other courses such as "Organizational Behavior" or "Organizational Development."

FIGURE 3.10

Lewin Developed a Model of Change that Consists of Three Phases.



Effective change managers are able to avoid the key reasons for systems failures by making sure sufficient and effective leadership is present, planning is well executed, change management best practices are followed, effective communication is present throughout the HRIS exploration and implementation process, and that employees have sufficient training and support for the new systems.[53] Researchers have also identified five key areas for effective change champions to focus on during a change management process.[54] These include

- creating the case for change,
- creating structural change,
- engaging others in the process and building commitment,
- implementing and sustaining change, and
- facilitating and developing capability.

Following an effective unfreezing and subsequent change process, the next steps are to refreeze and maintain the change, which, in this case, means to solidify and stabilize the desired employee attitudes and behaviors in relation to the HRIS. During the refreeze and maintenance phases, organizations should consider several key questions: What will be needed to keep the new HRIS working effectively? How often will the effectiveness of the new HRIS be evaluated? When will updates be considered, and how will they be implemented? Who trains users on the new HRIS and associated changes, updates, and upgrades? Thinking through these questions initially as part of the process of HRIS feasibility will help to avoid unpleasant surprises down the line. Research finds that employee attitudes and behaviors are affected by leadership before, during, and after an organizational change, which means that management involvement in the change process from start to finish is critical.[55]

Getting Technical: Core Information System Concepts

LO 3.6 Describe basic technical aspects of developing an HRIS.

It is clear that data and how they are gathered, stored, and retrieved are critical to the ability of those within organizations to engage in effective analytics. Now that we have delved into the intricacies of designing and implementing an HRIS, we define some core concepts and terms

that are integral for understanding what a generic information system is and how it operates. Specifically, in the following sections, we describe concepts associated with databases, users, and architectures.

Database Management

In simple terms, a ***database*** refers to a collection of organized data, its structure designed to facilitate the realization of business processes. A ***database management system (DBMS)*** refers to the software used to manage and maintain a database or multiple databases. For example, today's organizations commonly use applicant tracking systems—a type of DBMS—to collect, manage, analyze, and evaluate applicant data and the various processes associated with recruitment and selection efforts that might necessitate the flow of applicant data from one data store (or collection) to another and through different processes. Organizations commonly design their information systems around what is referred to as a relational database; however, it is becoming increasingly common for organizations to store data in an unstructured manner as well.

A ***relational database*** is a specific type of database in which different subsets or collections of data are integrated through pieces of information residing within the data themselves. This avoids the need to include duplicate data in multiple locations within the database. Thus, data stored in different parts of the relational database can be linked through common identification number fields. For example, if a relational database contains a table filled with employee performance evaluation data and a table filled with compensation data, data from the two tables can be merged if a common field, such as one containing employee identification numbers, is present in both tables.

The software used to manage and maintain a relational database is referred to as a ***relational database management system (relational DBMS)***. Because different data sources can be linked in a relational DBMS, data are more readily shared by users from different functional areas and geographic locations.

Table

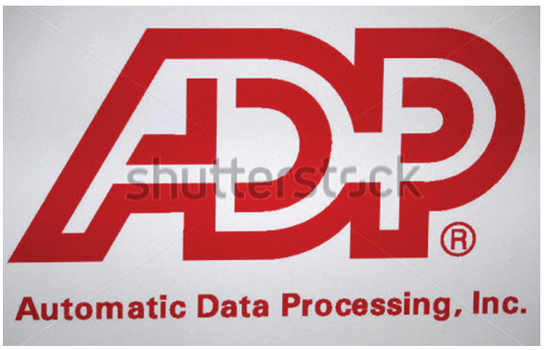
A ***table*** is a database object used to store data about cases (i.e., entities) and to add structure to the data. Often, a table takes the form of a matrix in which each column represents a different characteristic (or attribute) of cases and each row represents a unique case (or entity) (see Table 3.2). In the absence of a table, data would be left unstructured, adding challenges regarding manipulating, managing, and analyzing the data. Each column in a table that represents a unique characteristic is referred to as a ***field*** or ***variable***, and each case in a table is a ***record***. For example, in a table containing employee personal data, one field might include the employees' names, and another field might include the employees' home phone numbers—both of which are characteristics of the employees. In this scenario, each row represents a unique employee record, such that by reading across a single row in a table, one can see the characteristics of the employee, as defined by the fields.

Key Variable

A relational database is composed of two or more tables, which are "connected" via a key variable. A ***key variable***—sometimes referred to as a *linking variable*—provides the information necessary to construct the relationships between tables. For example, in many HRISs, a unique identifier is given to each employee (e.g., employee identification number). As shown in Table 3.3, the employee identification number serves as a key variable between the employee personal information table and the sales table. Note how a unique employee identification number is associated with each record (i.e., employee) in the employee personal information table but that employee identification numbers appear multiple times in the sales table. As described earlier in the chapter, relational databases reduce data redundancies by limiting the amount of repetition of identical data. Key variables are, consequently, used to connect tables so as to avoid data redundancies, which contribute to the process of database normalization.

HR IN ACTION

Automatic Data Processing, Inc. (ADP)[56]



Shutterstock.com

Christopher Goodney/ Bloomberg via Getty Images

Carlos Rodriguez, President & CEO of ADP

Since 1949, Automatic Data Processing, Inc. (ADP) has developed a global reputation for payroll processing products and services. For a number of years, the company had a AAA credit rating—the highest rating given—from both Moody's and Standard & Poor's. ADP has diversified in several ways since its inception. Notably, ADP now provides various products and services that connect the HRM function to company strategy by leveraging data analytics. In recent years, the company made headlines for developing a proprietary algorithm that predicts employees' risk of quitting based on several factors, such as employees' commuting distance and their income relative to neighbors' incomes.

Given the general decrease in the U.S. unemployment rate since 2009, there is a greater likelihood of increased turnover, as meta-analytic evidence indicates that individuals who are thinking about quitting will be more likely to do so when unemployment rates are lower. Consistent with that expectation, the United States has seen an uptick in turnover since 2012 as the unemployment rate has fallen. Because turnover—especially among high-performing employees—can be costly for organizations in terms of lost productivity and increased selection and training costs, adopting ADP's new algorithm as part of their HRM software package may help organizations' bottom lines.

However, there may be some legal and ethical implications associated with using employee data of this kind. The kind of personal data used in the algorithm, such as commute length and neighborhood income, could be proxies for other factors, such as socioeconomic status, race, and ethnicity.

TABLE 3.2 An Example of a Table Containing Employee Data

	EmployeeID	EmployeeName	Gender
1	RDEA120	Waller, Anderson	Male
2	RDEA122	Clark, Jose	Male
3	RDEA123	Benton, Cora	Female
4	RDEA124	Rich, Belen	Female
5	RDEA125	Vega, Alejandra	Female
6	RDEA126	Hickman, Lukas	Male
7	RDEA127	Phillips, Aracely	Female
8	RDEA128	Bonilla, Cody	Male
9	RDEA129	Chaney, Orion	Male
10	RDEA121	Day, Linda	Female

Form

A ***form*** is a database object that provides a user interface with which to enter, edit, and/or display data contained within a database. A well-designed form can facilitate the manner in which users interact with the database. Figure 3.11 shows an example of a form used for data entry, which, in this case, is used to enter applicant data from a paper application. To reduce the occurrence

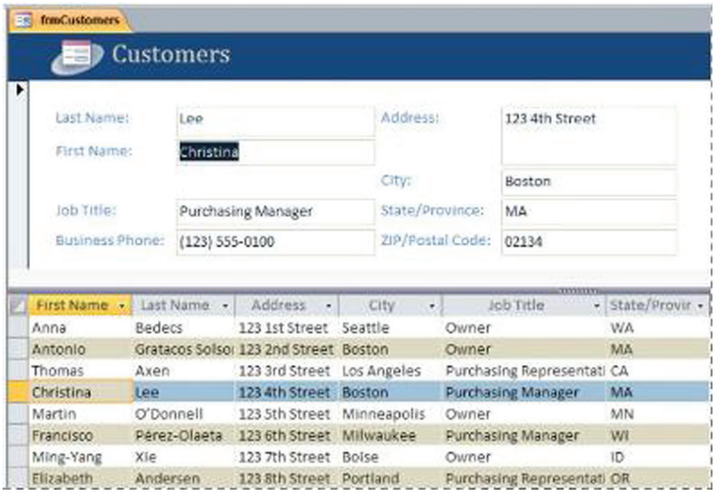
TABLE 3.3 An Example of a Key Variable Linking Tables Containing Employee Data and Customer Invoice Data, Respectively

	EmployeeID	EmployeeName	Gender
1	RDEA120	Waller, Anderson	Male
2	RDEA122	Clark, Jose	Male
3	RDEA123	Benton, Cora	Female
4	RDEA124	Rich, Belen	Female
5	RDEA125	Vega, Alejandra	Female
6	RDEA126	Hickman, Lukas	Male
7	RDEA127	Phillips, Aracely	Female
8	RDEA128	Bonilla, Cody	Male
9	RDEA129	Chaney, Orion	Male
10	RDEA121	Day, Linda	Female

	InvoiceNumber	CustomerName	SaleTotal	EmployeeID
1	281	Reese, Kaylyn	153	RDEA120
2	367	Bantham, Karli	182	RDEA122
3	281	Weaver, Zoe	182	RDEA123
4	393	Hanna, Dana	419	RDEA120
5	348	Gill, Cory	493	RDEA123
6	403	Little, Brent	279	RDEA123
7	379	Ruiz, Grayson	671	RDEA123
8	243	Scott, Alana	232	RDEA128
9	431	Deleon, Skyler	547	RDEA129
10	359	Jimenez, Audrey	627	RDEA121
11	285	Lindsey, Nicholas	514	RDEA122
12	239	Olsen, Alexis	237	RDEA120
13	396	Bowman, Alessandro	54	RDEA122
14	349	Fuentes, Neeraj	226	RDEA123
15	331	Love, Izabelle	595	RDEA124
16	323	Meyer, Angeline	201	RDEA125
17	431	Mathews, Tristan	372	RDEA126
18	375	Atkins, Julie	106	RDEA127
19	321	Cohen, Leonard	150	RDEA128
20	345	Harper, June	627	RDEA129
21	231	Freeman, Courtney	284	RDEA121
22	285	Nicholson, Jack	461	RDEA121
23	261	David, Maria	516	RDEA121
24	384	McDaniel, Dereon	459	RDEA121

FIGURE 3.11

An example of a form. https://support.office.com/en-ie/article/Create-a-form-in-Access-5d550a3d-92e1-4f38-9772-7e7e21e80c6b



of data entry errors, the form closely resembles the actual paper application. Often, these forms are directly connected to the data housed within the database, enabling users to update database objects (e.g., tables, queries) directly.

Query

As the name implies, a ***query*** is a question that is posed to a database. Such questions can be used to perform a number of different actions. For example, a common use of queries is to retrieve certain segments or subsets of data from one or more tables within the database. A query can also be used to display and/or sort data, create new tables, manipulate data, or even to perform a specified calculation. Queries come in handy when users find themselves posing the same question over and over again to the database. For example, if a manager wants to know how much sales revenue each member of her sales team generates each quarter, a query can be created that conducts the same actions, even when the data in the database are updated or changed. Commonly, structured query language (SQL) is used by organizations to manage, maintain, and generate queries using their DBMS. Figure 3.12 provides an example of SQL script.

Report

A ***report*** is a database object that is used to organize, summarize, format, and present data residing in the database. The data used in a report can come from tables or queries. Like queries, reports are useful because they can be used to perform the same actions every time they are applied, even when the underlying data have been updated or changed. Recall the example used in the context of queries. The manager wants to go a step further than using the query to determine how much sales revenue each member of her sales team generated in the past quarter. Accordingly, the manager creates a report to summarize and format the total sales revenue data for each salesperson. Specifically, she creates a nicely formatted horizontal bar chart in which sales persons' names appear on the *y*-axis, and total sales revenue appears on the *x*-axis (see Figure 3.13).

System Users

Different groups of individuals both within and outside of an organization may have reason to access and use an HRIS. As such, an HRIS should be designed with different system users in mind, as different system users often have different motivations or responsibilities when accessing an HRIS, and thus, user experience should be considered. Employees constitute a primary HRIS user group, as they need to access data within the system for entry, verification, analysis, and reporting purposes.

Even among employees, however, motivations or responsibilities when accessing the system may differ based on their roles. First, all employees need to interact with the HRIS for the purposes of viewing, changing, or verifying their own personal data. Many organizations allow employees to select their benefits during an open-enrollment period by accessing benefits self-service web portals. In this way, employees have direct control over their data in the HRIS instead of relying on a face-to-face meeting with a benefits administrator to select benefits. Second, some employees need to enter data into the HRIS for other users. Managers may be required to enter the performance appraisal ratings for each of their employees directly into the HRIS. Third, other employees play a more active role in updating the HRIS itself and/or analyzing and

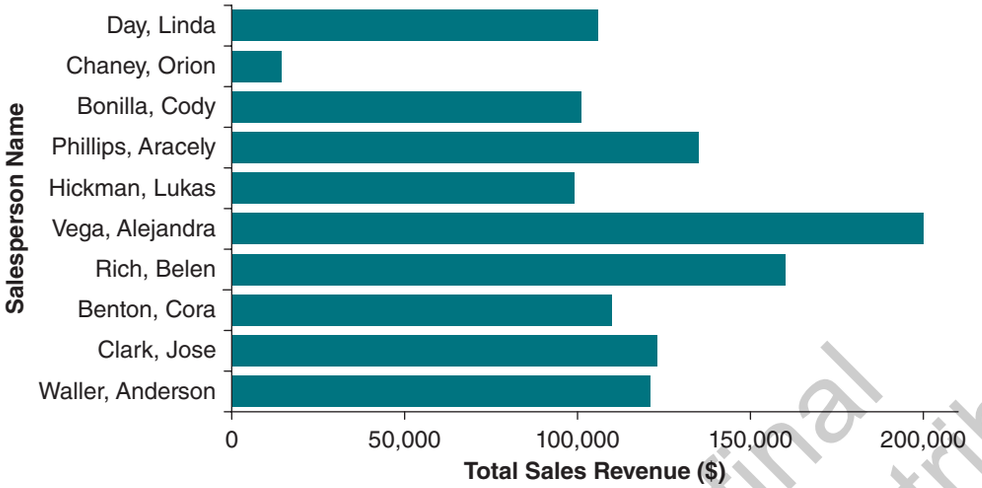
FIGURE 3.12

An example of a simple query to compute average of quantitative data from a column in a table using SQL

```
SELECT AVG(column1)
FROM table1;
```

FIGURE 3.13

Example of a report bar graph.



reporting data contained within the HRIS. For example, information technology employees are often responsible for implementing system design changes and fixing technology-related issues with the HRIS. In addition, HR analysts may analyze the existing HRIS data or collect new data for the purposes of finding answers to important HR-related questions. Finally, employees with managerial responsibilities may need to access actual employee data, but in many cases, they access data that are reported in aggregate about groups or units of employees. For example, the CEO may wish to know which organizational units have the highest turnover rates, and by accessing a dashboard with preconfigured yet customizable analytic findings, they can analyze turnover rates by organizational unit.

Other Users

In addition to an organization's employees, other users outside of the organization often need access to the HRIS. First, it is increasingly common for organizations to allow (potential) job applicants to enter their personal information, such as a résumé and applicant blank data, into the HRIS, often via an applicant tracking system. The system often allows applicants to log into the system at their convenience to check the status of their application. Second, many organizations outsource some of their HR activities to third-party partners, and thus, some data need to be shared with these partners. For example, some organizations outsource their payroll function to outside vendors; as a result, such vendors will need access to up-to-date compensation and benefits data for employees. Of course, sharing data with outside partners (or even internally with employee system users) may pose some data privacy and security risks.

System Architectures

System architectures for HRISs and other information systems have evolved since the advent of modern computing, and advancements in information technology are responsible for this evolution. For many decades, information systems were based on what are often called traditional tiered architectures, but in the past decade, there has been a rapid shift toward cloud-based architectures, especially as data transfer speeds and storage space have increased.

Traditional Tiered Architectures

In the mid-20th century, computers were the size of rooms and were so expensive that relatively few organizations had access to computers for information system purposes. Nonetheless, some organizations devised systems so that a few users could directly interface with a

computer mainframe, which meant that all databases and applications lived on the mainframe. These were called single-tier or one-tier architectures.

When personal computers were introduced, came down in price, and gained popularity during the 1970s and 1980s, client–server architectures (sometimes called two-tier architectures) were introduced. Specifically, many of the simpler functions with fewer processing demands were decentralized to personal computers that system users directly accessed via a user interface client, and the databases and applications lived on a server, thereby creating two tiers—one for the personal computers and one for the server. The next evolution in system architectures occurred when the server containing databases and applications was split into two separate servers so that more processing-intensive activities could be handled by a dedicated applications server.

Finally, with the advent of the Internet and expansion of its use, speed, and capabilities came what is referred to as N-tier architectures. (The "N" serves as a placeholder for any number that is four or greater.) By leveraging the Internet, N-tier architectures used the database and application servers of three-tier architectures but added web servers. Users no longer needed to download the user interface client onto personal computers because the user interface client was accessible via web servers. That is, through their personal computers, system users could log on to a web portal, which was hosted by web servers, to access and interface with the system. By introducing web servers, more and more devices, such as cell phones, could be used to access the system.

Cloud-Based Architectures

Today, we can access our music, movies, and software programs through the "cloud," or Internet-based databases and applications that are hosted remotely (from the perspective of the user). Cloud computing has revolutionized how we access information, as we can log on and interact with information through multiple devices and multiple locations, as long as there is a reliable Internet connection available. Cloud computing also has important implications for HRISs via cloud-based architectures, which allow organizational system users to access and interact with the HRIS in much the same way we access music and movies. In effect, cloud-based architectures move the database, application, and web servers of an N-tier architecture to the cloud. In this way, organizations do not need to house and manage their own servers; instead, their server needs are outsourced to a third-party entity that the organization partners with.

A common application of cloud-based architectures is ***software as a service (SaaS)***, arrangements through which software and hardware associated with databases and applications are maintained and controlled by a third-party entity. An advantage of SaaS is that an organization can purchase access to databases and applications on a subscription basis, which means that the organization does not need to update DBMS software and hardware, as such responsibilities are taken care of by the SaaS provider. A potential disadvantage of SaaS and other cloud-computing architectures is that the organization relies on the cloud-computing provider to manage data security. Most providers take data security very seriously and put many safeguards and protections in place; however, using a provider along with other companies may increase the desirability for hackers to access the data.

CHAPTER SUMMARY

Managing data is important to HR because all organizations need to be able to make decision about people and data-informed decisions can be more effective. HR information systems, or HRIS, provide both opportunities and challenges. Opportunities include the ability to track employees through their employment life cycle, employee-centered HR functionality, data availability for metrics and analytics, and the ability to create effective data visualizations. Challenges to consider include cost, the HR skill set, data privacy concerns, and data security concerns. In developing an HRIS, an organization conducts a needs assessment, creates a design, and considers choosing a vendor. When an HRIS is implemented, the organization undergoes a process of change that culminates in refreezing; the HRIS must also be maintained over time. Core information system concepts include the management of databases and users, understanding of HRIS architecture, and relational database concepts.

KEY TERMS

adhocracy cultures 000
anonymous data 000
blockchain 000
change 000
clan cultures 000
confidential data 000
cybersecurity 000
database 000
database management system (DBMS) 000
data flow diagrams 000
data lake 000
data privacy 000
data security 000
e-HRM 000
enterprise resource planning (ERP) 000
field or variable 000
form 000
hierarchy cultures 000
human resource information system (HRIS) 000
key variable 000
form 000
logical design 000
market cultures 000
multifactor authentication 000
people data 000
personally identifiable data 000
physical design 000
query 000
record 000
refreezing 000
relational database 000
relational database management system (relational DBMS) 000
report 000
scraping and crawling tools 000
software as a service (SaaS) 000
table 000
two-step authentication 000
unfreezing 000

HR REASONING AND DECISION-MAKING EXERCISES

MINI-CASE ANALYSIS EXERCISE: IS HRIS CONSULTING VALUABLE?

The Monday morning meeting is just starting. The room is full of individuals from the HR team. As the newest member and most well trained on statistics and HR analytics, you are looked to by staff to help them frame questions, conduct research to answer the questions, and help walk them through the implications.

John Bettle, a senior HR manager within your division, walks in. He starts the meeting off with several scenarios that the team has been asked to address. As the new HR analytics guru in your group, you've been asked to address key questions.

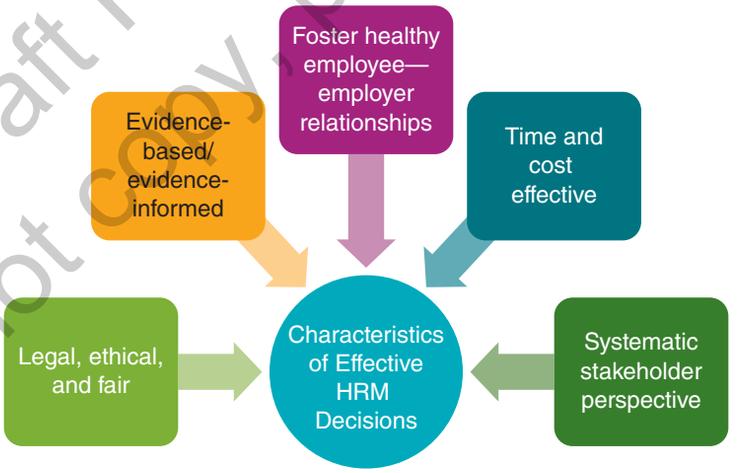
The organization has been spending a lot of money bringing in HRIS consultants and experts to help with understanding the HRIS needs of the organization. The VP of HR, Raja Sutton, has asked John to let him know if he thinks the investment in time and money is worth it. John's gut tells him it is, but he's not sure how best to make the business case for this. Given that the request came from "up high," John is asking for your help in how to address it.

Now, decide what you would do. Share your approach to how the team might best respond to this request from the VP of HR. What specifically would you tell John to say to justify the continued investment in understanding the organization's HRIS needs? Be specific, and outline your recommendations for John, being sure to include key points from this chapter.

HR DECISION ANALYSIS EXERCISE: CHARACTERISTICS OF EFFECTIVE HRM DECISIONS

Your new CEO recently went to a technology conference. Upon returning, she shared her excitement about artificial intelligence (AI), big data, and analytics and their roles in the future of management. She has mandated that the HR department create proposals for a new and improved HRIS to make sure the company stays current on these technology trends.

However, you are concerned that you may not have the right people with the right skills within the HR area, as most of them earned their college degrees many years ago. When you mentioned this to your manager, he said, "Well, maybe we need to retrain our current employees, or maybe we need to replace them with new talent that has the skills we need." How might you react to the suggestion to move forward in replacing current employees with those with better technology skills?



Please provide the rationale for your answer to each of the questions below.

Is this suggestion legal, ethical, and fair?

Is it evidence-based/evidence-informed?

Does it foster healthy employee–employer relationships?

Is it timely and cost-effective?

Does it take a systematic stakeholder perspective?

Considering your analysis above, overall, do you think this would be 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 3.3: ORGANIZATIONAL ATTRACTIVENESS AUDIT

You work on a team of four other members of the customer service team at C-Zone, an autoparts wholesaler. Your company has around 2,000 employees nationally. The company has low job acceptance rates of only 30%, which you suspect is too low, but since you do not work in HR, you have never mentioned anything about this. However, for a long time, you have believed that the high customer service turnover (75% each year) and low acceptance rates of jobs offered are related. Thus, it may be time for your team to think about what might be done about this. Your company recently implemented a new HRIS, which now makes it possible to get data on employees upon request. You decide it is time for your five-person leadership team to start doing a little investigation.

1. Develop a plan to examine why employees are hesitant to join the organization and always seem to be leaving. How can you assess why employees turn down job offers? How might you assess why employees are leaving? After you choose your method of measurement (i.e., focus groups, survey, interviews) develop an instrument, including the questions to be included. How would you analyze the data to identify the top reasons for employee departures?
2. Let's assume that you found out the top three reasons for low job acceptance to your company are as follows:
   a) Management is very authoritarian and not supportive of employees. When potential applicants read the comments on Glassdoor.com, it scares them off.
   b) Compensation is below average compared to other similar organizations.
   c) Employees feel they are working all the time with little downtime. This is especially true in the call center when calls can be stressful and plentiful at peak times.

What would be your proposed action plan to deal with these issues? Be specific, and make sure that your recommendations focus on recruitment, selection, training, compensation, and any other stages of employment cycle.

DATA AND ANALYTICS EXERCISE: DATA CLEANING

One of the overarching goals of any HRIS is to provide users with accurate data. Further, the integrity of the data directly influences the integrity of the insights gleaned from the data, or in other words: garbage in, garbage out. Unfortunately, the data that reside within an HRIS are not always what we would hope or expect. There are a number of reasons for this, but one of the most common reasons is human error.

Imagine that your HRIS is built around a relational database consisting of a number of different tables. In one of the tables, you store basic employee information, such as employee ID, employee name, job level, location, and department.

Here is an excerpt of the table:

EMPLOYEE ID	EMPLOYEE NAME	JOB LEVEL	LOCATION	DEPARTMENT
EA44312	Kim, Yeongjin	1	beaverton	Customer Service
EB58521	Dowsett, Jane	3	Hillsboro	
EA64533	Henderson, Lynn	4	Hillsboro	
EA89575	Mitchell, Terrance	1	Hillsboro	Customer Service
ET58748	Smith, John	1	Beaverton	Customer Service
ET96461	Martinez, David	4	Beavertn	Marketing
EB11248	Liu, Patricia	11	Beaverton	Customer Service

First, take a close look at the Location field. Do you notice anything? Note how the Beaverton location is spelled with a capital "B" for three of the cases and how it is spelled without the "o" for one case. Most likely, this difference in spelling was the result of an error during data entry. Errors like this might not seem like such a big deal, but down the road, it can lead to

issues when it comes to merging and analyzing the data. Namely, many software programs such as Microsoft Access Excel will treat the two different versions of the word "Beaverton" (i.e., Beaverton, Beavertn) location as two distinct categories. That is, instead of treating the Location field as a categorical variable with two levels (i.e., Beaverton, Hillsboro), the Location field will be treated as a categorical variable with the following three levels: Beaverton, Beavertn, and Hillsboro. If you were to create a PivotTable in Excel to determine the frequency (i.e., counts) of employees who work at each location, you would end up with the following frequency table:

Row Labels	Count of Location
Beavertn	1
Beaverton	3
Hillsboro	3
Grand Total	**7**

Row Labels	Count of Job Level
1	3
3	1
4	2
11	1
Grand Total	**7**

Note how the frequency table correctly indicates that three employees work at the Hillsboro location but incorrectly indicates that three employees work at the Beaverton location and one employee works at the Beavertn location.

Second, take a close look at the rest of the table. Did you notice the missing data? Specifically, Jane Dowsett and Lynn Henderson are missing the names of the departments in which they work. More than likely these two employees work in a department that has a name. As such, it is important that these missing data are found and the table is updated.

Third, in this organization, there are only 7 job levels, where a 1 corresponds to entry-level jobs and a 7 corresponds to executive jobs. Now take a look at the Job Level field. Note how Patricia Liu has a job level of 11, which is clearly beyond the 1–7 range. This might mean that someone accidentally entered 1 twice by mistake, resulting in 11. Again, a simple Excel PivotTable can be used to create a frequency table that displays how many employees fall into each Job Level. The frequency table below shows that in the left column that one of the job levels is 11, which is not correct.

The best course of action is to prevent these errors in the first place. For instance, you can design tables with data validation rules that only allow predetermined values to be entered into cells (e.g., Beaverton, Hillsboro). Alternatively, in the context of a relational database, you can create a form that facilitates data entry by requiring data to be entered into certain fields and only allowing certain fields to be completed using drop-down menus with preprovided options.

If, however, you still find yourself with "dirty" data, you will need to clean the data prior to analysis. Fortunately, Excel and other programs offer several tools that can facilitate the data-cleaning process, such as the PivotTable tool that was highlighted in the example.

EXCEL EXTENSION: *NOW YOU TRY!*

- On the textbook companion website, you will find an Excel exercise on data cleaning.
- First, you will learn how to use the filter feature to identify potential data integrity issues.
- Second, you will learn how to use the PivotTable tool to construct frequency tables that can be used to identify potential data integrity issues.
- Third, you will practice applying these tools and interpreting and communicating your findings.

CHAPTER 3 SUPPLEMENT: SAMPLE JOB DESCRIPTION FOR AN HRIS ANALYST

Sample Job Description for an HRIS Analyst. SHRM.

CLASSIFICATION

[Indicate exempt or nonexempt.]

SALARY GRADE/LEVEL/FAMILY/RANGE

[Insert applicable information.]

REPORTS TO

[Insert title of the position this job reports to, not name of current manager.]

DATE

[Indicate date of Job Description creation or review.]

JOB DESCRIPTION

SUMMARY/OBJECTIVE

The HRIS analyst is an intermediate position within the HRIS structure. The primary focus of this position is the support the maintenance of the human resource management system (HRMS), in addition to other systems supported by the HRIS team. This position serves as a technical point of contact for assigned functional areas and assists subject matter experts with ensuring data integrity, testing of system changes, report writing, and analyzing data flows for process improvement opportunities. The HRIS analyst also supports HRMS upgrades, patches, testing, and other technical projects as assigned.

ESSENTIAL FUNCTIONS

Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

1. **System Maintenance** (5% of time): Assist in the review, testing, and implementation of HRMS upgrades or patches. Collaborate with functional and technical staff to coordinate application of upgrade or fix. Maintain HRMS tables. Document process and results.
2. **Production Support** (20% of time): Provide support for HRMS, including researching and resolving HRMS problems, unexpected results, or process flaws; performing scheduled activities; and recommending solutions or alternate methods to meet requirements.
3. **Projects/Process Improvement** (55% of time): Recommend process/customer service improvements, innovative solutions, policy changes, and/or major variations from established policy that must be approved by appropriate leadership prior to implementation. Serve as a key liaison with third parties and other stakeholders (e.g., payroll). Use project management skills in managing projects. May provide overall project management for a given HR initiative.
4. **Reports/Queries** (10% of time): Write, maintain, and support a variety of reports or queries using appropriate reporting tools. Assist in development of standard reports for ongoing customer needs. Help maintain data integrity in systems by running queries and analyzing data.
5. **Training** (5% of time): Develop user procedures, guidelines, and documentation. Train clients on new processes/functionality. Train new system users.

6. **Individual Development** (5% of time): Maintain awareness of current trends in HRMS with a focus on product and service development, delivery, and support and applying key technologies. Examine trends in information systems training, materials, and techniques. Through classes, reading, CBTs, or other mechanisms, continuously increase both HR knowledge and HRIS application/tools knowledge. Participate in user group meetings/conferences.

COMPETENCIES

1. Critical Evaluation
2. Consultation
3. Business Acumen
4. HR Expertise
5. Communication

SUPERVISORY RESPONSIBILITY

This position has no supervisory responsibilities.

WORK ENVIRONMENT

This job operates in a professional office environment. This role routinely uses standard office equipment.

PHYSICAL DEMANDS

The physical demands described here are representative of those that must be met by an employee to successfully perform the essential functions of this job.

While performing the duties of this job, the employee is regularly required to talk or hear. The employee frequently is required to stand; walk; use hands to finger, handle, or feel; and reach with hands and arms. Specific vision abilities required by this job include close vision, distance vision, color vision, peripheral vision, depth perception, and ability to adjust focus. This position requires the ability to occasionally lift office products and supplies, up to 20 pounds.

POSITION TYPE/EXPECTED HOURS OF WORK

This is a full-time position, and hours of work and days are Monday through Friday, 8:30 a.m. to 5 p.m.

TRAVEL

Travel is primarily local during the business day, although some out-of-the-area and overnight travel may be expected.

REQUIRED EDUCATION AND EXPERIENCE

[[[Indicate education based on requirements that are job-related and consistent with business necessity. See examples below.]]]

1. Bachelor's degree in computer science or related field or equivalent work experience.
2. Three to five years of HRIS or HR generalist or specialist experience.
3. One to two years of project management experience.
4. Systems implementation experience.

PREFERRED EDUCATION AND EXPERIENCE

[[[Indicate education based on requirements that are job-related and consistent with business necessity. See examples below.]]]

1. SHRM Certified Professional (SHRM-CP) or Senior Certified Professional (SHRM-SCP).
2. Certified Associate in Project Management (CAPM).

ADDITIONAL ELIGIBILITY QUALIFICATIONS

None required for this position.

WORK AUTHORIZATION/SECURITY CLEARANCE (IF APPLICABLE)

[[[This section lists visa requirements, H1-B sponsorship, special clearances, etc. If applicable, insert information if you have government contracts or special requirements.]]]

AAP/EEO STATEMENT

[[[Insert AAP/EEO statement here if applicable.]]]

OTHER DUTIES

Please note this job description is not designed to cover or contain a comprehensive listing of activities, duties, or responsibilities that are required of the employee for this job. Duties, responsibilities, and activities may change at any time with or without notice.

SIGNATURES

This job description has been approved by all levels of management:

Manager _____

HR _____

Employee signature below constitutes employee's understanding of the requirements, essential functions, and duties of the position.

Employee _____
Date _____

CHAPTER 3 ENDNOTE REFERENCES

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