What's In IT For Me?

This Chapter Will Help Prepare You To...

ACCT	**FIN**	**MKT**	**POM**	**HRM**	**MIS**
ACCOUNTING	FINANCE	MARKETING	PRODUCTION OPERATIONS MANAGEMENT	HUMAN RESOURCES MANAGEMENT	MIS
Cost justify firm's databases	Use data for internal investment decisions	Use customer data to plan marketing campaigns	Analyze data for quality control	Use employee data for performance evaluations	Provide infrastructure to store firm's data

[Database Saves the State of Washington Medicaid Dollars]

When a patient is admitted to the emergency room (ER) of a hospital, his physician may never have seen him before and must diagnose his problem very quickly. If the physician already knew the patient's medical history, then her examination and subsequent diagnosis would be faster, less expensive, and more accurate.

As the Affordable Care Act expands Medicaid to an increasing number of patients, the need for states to control ER costs becomes more critical. Many Medicaid patients visit hospital ERs too many times. In fact, in the state of Washington, patients who went to the ER more than four times in one year comprise some 20 percent of all ER visits paid for by Medicaid.

To address this problem, the State of Washington implemented the Emergency Department Information Exchange (EDIE), a database that contains the records of each patient treated in every hospital ER in the state. The database allows physicians to track patients' ER visits to multiple hospitals.

The state experienced some difficulties implementing the database. In the past, some state hospitals had attempted to create regional databases. However, many hospitals did not join these efforts, fearing they would lose both patients and Medicaid dollars.

In response, the state announced that it would no longer reimburse hospitals for more than three non-emergency ER visits by a Medicaid recipient each year. Physicians and hospitals successfully sued the state, claiming the policy was arbitrary and would increase the hospitals' costs.

The state's Medicaid office responded by creating a list of 500 medical problems—for example, acute bronchitis, urinary tract infections, and headaches—that it would no longer reimburse as emergency care. The state argued that those complaints could be treated in doctors' offices or clinics.

Hospitals objected to this list because patients who were not treated in hospitals would reduce hospitals' income. As a result, the state adopted the database as a compromise. The EDIE database meets federal health privacy laws by allowing only approved medical staff members to access data on patients under their care. When a patient registers at an ER anywhere in the state of Washington, the attending physician and nurses immediately receive a fax (some hospitals still use fax machines) or e-mail from the database. The report lists all of the patient's recent ER admissions, diagnoses, and treatments.

Further, when patients leave the ER, the database helps physicians track their care. One hospital sends paramedics to check on high-risk patients. Other hospitals hire care coordinators to ensure that patients make appointments with a family doctor or specialist. Rural hospitals discovered that many of their ER patients needed help managing pain, so they set up a pain-management clinic.

In addition, the database has helped reduce the prescription of narcotics in the state's ERs by 24 percent in its first year of use in large part because patients cannot visit multiple health

facilities to obtain prescriptions. More than 400 primary care physicians have signed up to receive automatic notifications when one of their patients is admitted to the ER. The state is signing up more family doctors as well as community and mental health clinics.

Physicians can now send many of their patients to clinics or other less expensive care centers. Data released in March 2014 indicate that ER visits by Medicaid patients dropped 10 percent in the 2013 fiscal year, and the rate of ER visits that resulted in a nonacute diagnosis decreased more than 14 percent. The state credits the database for a substantial amount of the state's $33.7 million reduction in 2013 Medicaid costs.

Sources: Compiled from "How Big Data Can Reduce ER Visits," *Real Business*, October 23, 2014; J. Creswell, "Doctors Find Barriers to Sharing Digital Medical Records," *The New York Times*, September 30, 2014; T. Bannow, "Oregon Hospitals Begin Sharing ER Data," *The Bend Bulletin*, September 18, 2014; "Report Finds Data Sharing Popular Among Hospitals," *ClinicalKey*, September 12, 2014; R. Daly, "EHR Data Sharing Challenges Hospitals," *Healthcare Financial Management Association*, August 7, 2014; D. Gorenstein, "Data: The Secret Ingredient in Hospital Cooperation," *Marketplace.org*, June 5, 2014; K. Weise, "Hospitals Share Data to Stop ER Abusers," *Bloomberg BusinessWeek*, April 7–13, 2014; "Emergency Department Partnership Is Improving Care and Saving Medicaid Funds," *Washing State Hospital Association*, March 20, 2014; E. Rizzo, "When Hospitals Share Data, Who Benefits?" *Becker's Hospital Review*, March 12, 2014; "When Hospitals Share Patient Records, Emergency Patients Benefit, Study Suggests," *University of Michigan Health System*, January 24, 2014.

Questions

1. Describe additional benefits (beyond those discussed in the case) of the State of Washington's EDIE database.
2. Describe potential disadvantages of the State of Washington's EDIE database.

What We Learned from This Case

Information technologies and systems support organizations in managing—that is, acquiring, organizing, storing, accessing, analyzing, and interpreting—data. As you noted in Chapter 1, when these data are managed properly, they become *information* and then *knowledge*. (Recall our discussion of data, information, and knowledge in Section 1.2). As you see in the chapter's opening case, information and knowledge are invaluable organizational resources that can provide any organization with a competitive advantage.

So, just how important are data and data management to organizations? From confidential customer information, to intellectual property, to financial transactions, to social media posts, organizations possess massive amounts of data that are critical to their success. Of course, to benefit from these data, they need to manage them effectively. This type of management, however, comes at a huge cost. According to Symantec's (*www.symantec.com*) State of Information Survey, digital information costs organizations worldwide $1.1 trillion annually, and it makes up roughly *half* of an organization's total value. The survey found that large organizations spend an average of some $40 million annually to maintain and utilize data, and small-to-medium-sized businesses spend almost $350,000.

This chapter will examine the processes whereby data are transformed first into information and then into knowledge. Managing data is critically important in all organizations. Few business professionals are comfortable making or justifying business decisions that are not based on solid information. This is especially true today, when modern information systems make access to that information quick and easy. For example, we have information systems that format data in a way that managers and analysts can easily understand. Consequently, these professionals can access these data themselves and then analyze them according to their needs. The result is useful *information*. Managers can then apply their experience to use this information to address a business problem, thereby producing *knowledge*. Knowledge management (KM), enabled by information technology, captures and stores knowledge in forms that all organizational employees can access and apply, thereby creating the flexible, powerful "learning organization."

Organizations store data in databases. Recall from Chapter 1 that a *database* is a collection of related data files or tables containing data. We discuss databases in Section 5.2.

Clearly, data and knowledge management are vital to modern organizations. But, why should *you* learn about them? The reason is that you will play an important role in the development of database applications. The structure and content of your organization's database depend on how users (you) define your business activities. For example, when database

developers in the firm's MIS group build a database, they use a tool called entity-relationship modeling. This tool creates a model of how users view a business activity. When you understand how to create and interpret an entity-relationship model, then you can evaluate whether the developers have captured your business activities correctly.

Keep in mind that decisions about data last longer, and have a broader impact, than decisions about hardware or software. If decisions concerning hardware are wrong, then the equipment can be replaced relatively easily. If software decisions turn out to be incorrect, they can be modified, though not always painlessly or inexpensively. Database decisions, in contrast, are much harder to undo. Database design constrains what the organization can do with its data for a long time. Remember that business users will be stuck with a bad database design, while the programmers who created the database will quickly move on to their next projects. This is why it is so important to get database designs right the first time—and you will play a key role in these designs.

In addition, you might want to create a small, personal database using a software product such as Microsoft Access. In that case, you will need to be familiar with at least the basics of the product.

After the data are stored in your organization's databases, they must be accessible to users in a form that helps them make decisions. Organizations accomplish this objective by developing *data warehouses*. You should become familiar with data warehouses because they are invaluable decision-making tools. We discuss data warehouses in Section 5.4.

You will also make extensive use of your organization's knowledge base to perform your job. For example, when you are assigned a new project, you will likely research your firm's knowledge base to identify factors that contributed to the success (or failure) of previous, similar projects. We discuss knowledge management in Section 5.5.

You begin this chapter by examining the multiple problems involved in managing data. You then study the database approach that organizations use to help solve these problems. You turn your attention to Big Data, which organizations must manage in today's business environment. Next, you study data warehouses and data marts, and you learn how to utilize them for decision making. You finish the chapter by examining knowledge management.

5.1 Managing Data

All IT applications require data. These data should be of high quality, meaning that they should be accurate, complete, timely, consistent, accessible, relevant, and concise. Unfortunately, the process of acquiring, keeping, and managing data is becoming increasingly difficult.

The Difficulties of Managing Data

Because data are processed in several stages and often in multiple locations, they are frequently subject to problems and difficulties. Managing data in organizations is difficult for many reasons.

First, the amount of data increases exponentially with time. Much historical data must be kept for a long time, and new data are added rapidly. For example, to support millions of customers, large retailers such as Walmart have to manage petabytes of data. (A petabyte is approximately 1,000 terabytes, or trillions of bytes; see Technology Guide 1.)

In addition, data are also scattered throughout organizations, and they are collected by many individuals using various methods and devices. These data are frequently stored in numerous servers and locations and in different computing systems, databases, formats, and human and computer languages.

Another problem is that data are generated from multiple sources: internal sources (for example, corporate databases and company documents); personal sources (for example, personal thoughts, opinions, and experiences); and external sources (for example, commercial databases, government reports, and corporate Web sites). Data also come from the Web, in the form of clickstream data. **Clickstream data** are those data that visitors and customers produce when they visit a Web site and click on hyperlinks (described in Chapter 6). Clickstream data